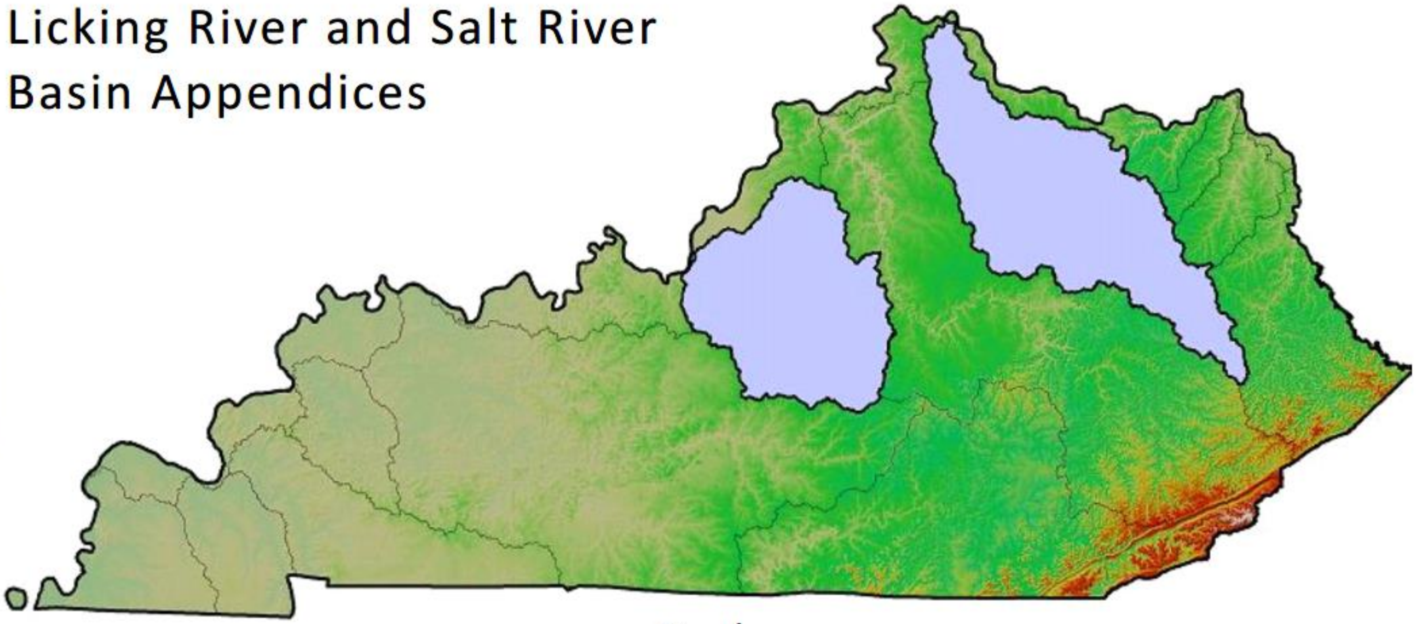
Addendum to
Kentucky Statewide Total Maximum Daily Load
for ***Bacteria*** *Impaired Waters*:

Licking River and Salt River Basin Appendices



Final
September 2021

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Addendum to Kentucky Statewide Total Maximum Daily Load for Bacteria Impaired Waters: Licking River and Salt River Basin Appendices

Final
September 2021

Kentucky Department for Environmental Protection
Division of Water
Frankfort, Kentucky

This report is approved for release

Carey Johnson, Director
Division of Water

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Date

Kentucky UNBRIDLED SPIRIT

DOCUMENT REVISION HISTORY

Date of Revision	Section(s) Revised	Revision Explanation

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

Co.	County
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DOW	Kentucky Division of Water
EEC	Kentucky Energy and Environment Cabinet
EPA	United States Environmental Protection Agency
HUC	Hydrologic Unit Code
KAR	Kentucky Administrative Regulations
KPDES	Kentucky Pollutant Discharge Elimination System
LA	Load Allocation
ml	Milliliter
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer System
PCR	Primary Contact Recreation
RM	River Mile
SCR	Secondary Contact Recreation
SWS	Sanitary Wastewater System
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
WLA	Wasteload Allocation
WQC	Water Quality Criteria
SWQMP	Storm Water Quality Management Plan

1.0 INTRODUCTION

The *Kentucky Statewide Total Maximum Daily Load* (TMDL) *for Bacteria Impaired Waters* is a new type of TMDL report that will address bacteria-impaired waters on Kentucky's 303(d) list in one streamlined report (DOW 2019). This new type of TMDL report will consist of a core document and a set of addendums. Initially, there will be a corresponding appendix for each of the 13 major river basins in Kentucky. Each appendix will contain TMDLs for the bacteria-impaired segments within that basin as of the 2016 303(d) list. The core background and methodology document and first river basin appendices (Green River and Tradewater River) were approved in 2019 by the U.S. Environmental Protection Agency (EPA). Subsequent river basin appendices will be added to the Kentucky Statewide Bacteria TMDL as they are completed. This addendum adds two new river basin appendices and provides references or updates where appropriate to the core background and methodology document.

1.1 Overview of Section 303(d) of the Clean Water Act

The Clean Water Act (CWA) requires states to designate uses for surface waters within their jurisdiction and to establish water quality standards to protect those designated uses. The designated uses assigned to waterbodies in Kentucky can be found in Kentucky Administrative Regulations (KAR) at 401 KAR 10:026. The water quality standards can be found at 401 KAR 10:031.

Section 303(d) of the CWA requires states to develop a list of impaired waters called the 303(d) list. Waterbodies placed on the 303(d) list have been assessed, have one or more designated uses impaired by one or more pollutants, and require the development of a TMDL for each pollutant causing an impairment. The TMDL establishes the allowable amount (i.e., load) of the pollutant the waterbody can naturally assimilate while continuing to meet the water quality standards for each designated use. Information from EPA on TMDLs can be found at http://www.epa.gov/tmdl.

The Kentucky Division of Water (DOW) submits the 303(d) list to the EPA during even-numbered years. Each submittal replaces the previous list. Listings of bacteria-impaired segments can be found on DOW's most recent *Integrated Report to Congress on the Condition of Water Resources in Kentucky Volume II. 303(d) List of Surface Waters* (https://eec.ky.gov/Environmental-Protection/Water/Monitor/Pages/IntegratedReportDownload.aspx).

1.2 Purpose of this Addendum

The purpose of this addendum is to:

- Add bacteria TMDLs for 98 stream segments to the *Kentucky Statewide TMDL for Bacteria Impaired Waters*

- Provide the waterbody-specific information for all bacteria-impaired segments on Kentucky's 2016 303(d) list for the following river basins: 1) Licking River basin and 2) Salt River basin

This addendum is not a stand-alone document. The method for developing a TMDL for each of the bacteria-impaired segments within this addendum (including general information and the TMDL loadings) can be found in the core TMDL document that was approved in 2019 (https://eec.ky.gov/Environmental-Protection/Water/Protection/TMDL/Pages/BactTMDL.aspx).

If an approved TMDL report existed for a bacteria-impaired segment within the Licking River or Salt River basins prior to the development of this addendum that TMDL report is still in effect and can be found on the Watershed-Scale TMDL Reports list.

DOW will provide public notice and seek comment when subsequent appendices are added to the Statewide Bacteria TMDL.

For more information, please review the Statewide Bacteria Fact Sheet [PDF, 1.1 MB] or contact the TMDL Program at TMDL@ky.gov or call (502) 564-3410.

Additional information on bacteria TMDLs and how Kentuckians are reducing bacteria in their waterways can be found in the Understanding TMDLs Story Map.

In accordance with EPA's 303(d) Program Long-Term Vision, DOW recognizes that in some cases activities to address water quality impairments are already in the planning stages or underway. Where these activities are on track to fully restore water quality, the development of a TMDL may temporarily be given a lower priority while an alternative restoration plan is being pursued. Some Kentucky stream segments have been identified as good candidates for such alternative approaches. Footnotes in Tables F.1 and K.1 identify waters in these basins where a TMDL is not being developed at this time because an alternative restoration plan is under development or already in place.

1.3 Where to Find TMDL Information for this Addendum

The appendices within this addendum rely upon the core TMDL document for TMDL development. The bacteria TMDL water quality criteria (WQC) for all surface waters in Kentucky are promulgated in 401 KAR 10:031, which in Section 7(1)(a) states that for the Primary Contact Recreation (PCR) use and season (May 1-October 31),

Escherichia coli content shall not exceed 130 colonies per 100 ml as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 240 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for Escherichia coli.

For the year-round Secondary Contact Recreation (SCR) use, Section 7(2)(a) states,

Fecal coliform content shall not exceed 1,000 colonies per 100 ml as a thirty (30) day geometric mean based on not less than five (5) samples; nor exceed 2,000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period.

The bacteria WQC are summarized below in Table 1.3-1.

Table 1.3-1. Bacteria TMDL Water Quality Criteria for All Surface Waters[1]

Designated Use	Numeric Criterion
PCR	240 *E. coli* colonies/100 ml which must be met in at least 80% of all samples taken within a 30-day period during the Primary Contact Recreational season of May through October
PCR	130 *E. coli* colonies/100 ml as a geometric mean based on not less than 5 samples taken within a 30-day period during the Primary Contact Recreational season of May through October
SCR	2000 fecal coliform colonies/100 ml which must be met in at least 80% of all samples taken within a 30-day period
SCR	1000 fecal coliform colonies/100 ml as a geometric mean based on not less than 5 samples taken within a 30-day period

[1]The Primary Contact Recreation (PCR) designated use WQC are in effect from May 1 through October 31. The Secondary Contact Recreation (SCR) designated use WQC are in effect for the entire year.

Prior to November 1, 2019, PCR criteria also existed for fecal coliform. Those WQC are summarized in Table 1.3-2 for informational purposes. Prior to the expiration of the fecal coliform PCR criteria, several waterbodies in the Licking and Salt River basins had been assessed as failing to meet those WQC and were listed as impaired due to fecal coliform. The TMDLs for waterbodies with PCR fecal coliform impairments are calculated in this document using the *E. coli* criteria, since the *E. coli* WQC must be met for a waterbody to support the PCR designated use.

Table 1.3-2 Expired Fecal Coliform Water Quality Criteria

Designated Use	Numeric Criterion
PCR	400 fecal coliform colonies/100 ml which must be met in at least 80% of all samples taken within a 30-day period during the Primary Contact Recreational season of May through October
PCR	200 fecal coliform colonies/100 ml as a geometric mean based on not less than 5 samples taken within a 30-day period during the Primary Contact Recreational season of May through October

A list of TMDL elements and their location within this addendum or the core TMDL document is provided in Table 1.3-3.

Table 1.3-3 Where to Find Information in this Addendum and the Core TMDL Document

TMDL Element	Description	Location
Water Quality Standards	Describes recreational uses, water quality standards, and waterbody assessment	Sections 1.0 and 2.0 of Core TMDL
Water Quality Criteria	Provides the indicator bacteria used to assess pathogen levels in waterbodies and the bacteria standards for Kentucky's surface waters	Section 1.3 of this addendum
Physical Setting	Provides an overview of Kentucky's physical setting including soils, geology, and hydrology	Section 3.0 of Core TMDL
Source Assessment	Defines point and non-point sources of bacteria pollution and provides examples of bacteria sources that affect Kentucky's waterbodies	Section 4.0 of Core TMDL
Monitoring and Data Validation	Describes the types of data used for assessment and TMDL development	Section 5.0 of Core TMDL
TMDL Development	Provides a description of the TMDL calculation process and of required components such as the margin of safety factor, seasonality, and critical conditions	Section 6.0 of Core TMDL
Implementation	Provides a description of the implementation process (e.g. permit translation, development of watershed plans, coordination with local stakeholders, types of funding assistance and other resources)	Section 7.0 of Core TMDL
Public Participation	Provides a summary of the process used to solicit public comment on this addendum and DOW response to those comments	Section 2.0 of this addendum

TMDL Element	Description	Location
MS4 Communities in Kentucky	Provides a list organized by county of Municipal Separate Storm Sewer System (MS4) communities in Kentucky (as of September 2018)	Appendix A of Core TMDL
Percent of Households Serviceable by Sewer	Provides the percent of households serviceable by sewer in Kentucky (2010). The list is organized by county and includes county population totals, and total number of households and serviceable households	Appendix B of Core TMDL
National Land Cover Database Classification Descriptions (NLCD 2011)	Defines the nationwide land cover classifications. The descriptions provide information on land cover and land use	Appendix P of Core TMDL

2.0 PUBLIC PARTICIPATION

The public was invited to provide written comments on this Proposed Draft Addendum to the Kentucky Statewide TMDL for Bacteria Impaired Waters during the period of August 2, 2021 through September 3, 2021.

Notice of the public comment period was posted on the Division of Water Public Notices website and distributed to the TMDL email distribution list (TMDL@ky.gov), which is a list of persons who have expressed interest in receiving information and announcements related to the 303(d) and TMDL program. The announcement was also distributed to the Nonpoint Source Pollution Control email list of persons interested in water quality issues (ollietheotter@ky.gov), posted to the Kentucky Energy and Environment Cabinet's weblog Naturally Connected, the Kentucky Energy and Environment Cabinet Facebook page, and the Kentucky EEC Twitter page.

Legal advertisements were purchased in the following local newspapers throughout the state: Lexington Herald-Leader (Lexington, Fayette Co.), Courier-Journal (Louisville, Jefferson Co.), The Daily Independent (Ashland, Boyd Co.), Appalachian News-Express (Pikeville, Pike Co.), Kentucky Enquirer (Ft. Mitchell, Kenton Co.), and News-Enterprise (Elizabethtown, Hardin Co.)

No comments were received during the public comment period.

REFERENCES

33 U.S.C. § 1251. Section 303(d). Clean Water Act. 1972.

401 KAR 10:026. Designation of uses of surface waters. Kentucky Energy and Environment Cabinet, Department for Environmental Protection, Division of Water. 2009.

401 KAR 10:031. Surface water standards. Kentucky Energy and Environment Cabinet, Department for Environmental Protection, Division of Water. 2009. Frankfort, KY.

DOW (Kentucky Division of Water). 2019. *Kentucky Statewide Total Maximum Daily Load for Bacteria Impaired Waters*. February 2019. Kentucky Department of Environmental Protection.

NLCD 2011. National Land Cover Database 2011 Legend and Land Cover Classification Description. Available at URL: https://www.mrlc.gov/data/legends/national-land-cover-database-2011-nlcd2011-legend.

APPENDIX F

Appendix F
Licking River Basin

HUC 8s: 05100101, 05100102

Level IV Ecoregions: Outer Bluegrass, Inner Bluegrass, Hills of the Bluegrass, Knobs-Lower Scioto Dissected Plateau, Northern Forested Plateau Escarpment, Carter Hills, Ohio/Kentucky Carboniferous Plateau, Dissected Appalachian Plateau

Drainage Area Within Kentucky: 3,705.34 square miles

Counties: Bath, Boone, Bourbon, Bracken, Breathitt, Campbell, Carter, Clark, Elliott, Fayette, Fleming, Floyd, Grant, Harrison, Johnson, Knott, Lewis, Kenton, Magoffin, Mason, Menifee, Montgomery, Morgan, Nicholas, Pendleton, Powell, Robertson, Rowan, Scott, Wolfe

Major Cities: Covington, Erlanger, Florence, Paris, Winchester, Carlisle, Cynthiana, Elsmere, Falmouth, Flemingsburg, Fort Wright, Highland Heights, Morehead, Mount Sterling, Owingsville, Salyersville, Taylor Mill, West Liberty

The Licking River basin is located in eastern Kentucky, originating in Magoffin County in the southeast. The basin is oriented southeast to northwest, generally along the axis of the Licking River. The southeastern portion of the basin occurs in the Eastern Coal Field physiographic region. The narrow Knobs region and a small corner of the Eastern Pennyroyal bisect the center of the basin, while the northwestern portion of the basin lies within the Outer and Inner Bluegrass regions. The basin extends to Kenton and Campbell Co., where the Licking River flows into the Ohio River near Covington, Ky., having drained an area of approximately 3,700 square miles.

Table F.1 provides a summary of the stream segments located in the Licking River basin that have been included on the Kentucky 2016 303(d) list for impairment due to fecal coliform and/or *E. coli*. Table F.1 identifies which listed waters will not have a TMDL developed at this time and provides a footnote explaining the rationale such as anticipated delistings or alternative restoration plans under development or in place. The locations of the stream segments within the Licking River basin are shown in Figure F.1.

The river miles for each TMDL segment in this appendix match the 2016 303(d) list. Since the National Hydrography Dataset (NHD) is continually updated to maintain accurate waterbody information, the river mile information in this appendix may not reflect the current 1:24K NHD for Kentucky. River mile information for stream segments is updated in each new 303(d) list submitted to EPA.

Table F.1 2016 303(d) List Bacteria-impaired Stream Segments in the Licking River Basin

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Banklick Creek 0.0 to 3.5[2]	KY486315_01	PCR (nonsupport)	Fecal Coliform	TMDL not included in this document	Municipal Point Source Discharges, Unspecified Urban Stormwater	Kenton
Banklick Creek 3.5 to 8.2[2]	KY486315_02	PCR (nonsupport)	Fecal Coliform	TMDL not included in this document	Agriculture, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Kenton
Banklick Creek 8.2 to 19.6[2]	KY486315_03	PCR (partial support)	Fecal Coliform	TMDL not included in this document	Agriculture, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Kenton
Big Brushy Creek 0.0 to 1.8	KY510632_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Non-Point Source, Package Plant or Other Permitted Small Flows Discharges	Rowan
Blacks Creek 0.0 to 5.6	KY487421_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Non-Point Source, Unrestricted Cattle Access	Bourbon
Blackwater Creek 3.85 to 11.8	KY510765_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Morgan
Boone Creek 0.0 to 5.2	KY487686_01	PCR (nonsupport)	*E. coli*	*E. coli*	Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
Boone Creek 5.2 to 9.1	KY487686_02	PCR (nonsupport)	*E. coli*	*E. coli*	Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems), Unrestricted Cattle Access	Bourbon
Buffalo Branch 0.0 to 1.6	KY511036_01	PCR (nonsupport)	*E. coli*	*E. coli*	Non-Point Source, Rural (Residential Areas)	Rowan
Burning Fork 0.0 to 3.3	KY488450_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Magoffin
Christy Creek 7.2 to 9.2	KY511363_02	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Non-Point Source	Rowan
Cooper Run 0.0 to 10.15	KY490062_01	PCR (nonsupport)	*E. coli*	*E. coli*	Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
Copperas Branch 0.4 to 1.5	KY511531_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Non-Point Source, Rural (Residential Areas)	Rowan

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Crooked Creek 0.0 to 9.4	KY490377_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Nicholas
Flat Creek 0.0 to 0.95	KY492182_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Bath
Flat Run 0.0 to 2.25	KY492217_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
Flat Run 2.25 to 9.05	KY492217_02	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
Fox Creek 0.0 to 10.1	KY512230_01	PCR (partial support)	Fecal Coliform	*E. coli*	Source Unknown	Fleming
Fox Creek 0.0 to 10.1	KY512230_01	SCR (partial support)	Fecal Coliform	Fecal Coliform	Source Unknown	Fleming
Grassy Lick Creek 0.0 to 6.5	KY493166_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	CERCLA NPL (Superfund) Sites, Loss of Riparian Habitat	Montgomery
Greenbrier Creek (Main Stem) 0.0 to 5.5[3]	KY493317_01	PCR (partial support)	*E. coli*	TMDL not included in this document	Loss of Riparian Habitat, Managed Pasture Grazing, Rural (Residential Areas)	Montgomery
Hays Branch 0.0 to 2.85	KY512612_01	PCR (partial support)	*E. coli*	*E. coli*	Crop Production (Crop Land or Dry Land), Managed Pasture Grazing	Rowan
Hinkston Creek 0.0 to 13.25	KY494298_01	PCR (nonsupport)	*E. coli*	*E. coli*	Source Unknown	Bourbon
Hinkston Creek 21.1 to 31.5	KY494298_03	PCR (nonsupport)	Fecal Coliform	*E. coli*	Rangeland Grazing	Bourbon, Nicholas
Hinkston Creek 42.4 to 51.75	KY494298_05	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Non-Point Source, Rangeland Grazing	Bath, Bourbon, Montgomery
Hinkston Creek 51.75 to 62.35	KY494298_06	PCR (nonsupport)	*E. coli*	*E. coli*	Grazing in Riparian or Shoreline Zones, Non-Point Source	Bath, Montgomery
Hinkston Creek 62.35 to 69.1	KY494298_07	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Municipal Point Source Discharges, Non-Point Source	Montgomery
Hinkston Creek 69.1 to 71.5	KY494298_08	PCR (nonsupport)	*E. coli*	*E. coli*	Non-Point Source, Rangeland Grazing, Upstream Source, Urban Runoff/Storm Sewers	Montgomery
Hinkston Creek 69.1 to 71.5	KY494298_08	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Non-Point Source, Rangeland Grazing, Upstream Source, Urban Runoff/Storm Sewers	Montgomery

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Hoods Creek 0.0 to 5.9	KY494496_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Agriculture, Loss of Riparian Habitat, Non-Point Source	Clark
Hoods Creek 0.0 to 5.9	KY494496_01	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Agriculture, Loss of Riparian Habitat, Non-Point Source	Clark
Houston Creek 0.0 to 9.1	KY494646_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Bourbon
Island Fork 0.0 to 3.75	KY512940_01	PCR (nonsupport)	*E. coli*	*E. coli*	Managed Pasture Grazing, Non-irrigated Crop Production	Rowan
Johnson Creek 0.0 to 3.25	KY495397_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Magoffin
Johnson Creek 0.0 to 0.9	KY495398_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Agriculture, Loss of Riparian Habitat, Non-Point Source	Clark
Johnson Creek 0.0 to 0.9	KY495398_01	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Agriculture, Loss of Riparian Habitat, Non-Point Source	Clark
Kennedy Creek 0.0 to 5.6	KY495646_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
Licking River 0.0 to 4.65	KY513416_01	PCR (partial support)	*E. coli*	*E. coli*	Municipal (Urbanized High Density Area), Urban Runoff/Storm Sewers	Campbell
Licking River 4.65 to 14.7	KY513416_02	PCR (partial support)	Fecal Coliform	*E. coli*	Source Unknown	Kenton
Licking River 76.6 to 88.7[4]	KY513416_06	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Source Unknown	Harrison
Licking River 76.6 to 88.7[4]	KY513416_06	SCR (partial support)	Fecal Coliform	TMDL not included in this document	Source Unknown	Harrison
Licking River 174.2 to 179.45[5]	KY513416_11	SCR (partial support)	Fecal Coliform	TMDL not included in this document	Source Unknown	Bath
Licking River 223.0 to 240.0	KY513416_12	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Morgan
Licking River 223.0 to 240.0	KY513416_12	SCR (partial support)	Fecal Coliform	Fecal Coliform	Source Unknown	Morgan
Little Stoner Creek 0.0 to 5.3	KY496870_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Clark
Middle Fork of Licking River 0.0 to 2.7	KY498128_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Agriculture, On-site Treatment Systems (Septic Systems and	Magoffin

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
					Similar Decentralized Systems)	
Morgan Fork 0.0 to 2.8	KY514059_01	PCR (nonsupport)	*E. coli*	*E. coli*	Non-Point Source, Rural (Residential Areas), Upstream Source	Rowan
North Fork Licking River 2.3 to 18.55[4]	KY499554_01	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Source Unknown	Bracken
North Fork Licking River 18.55 to 45.5	KY499554_02	PCR (nonsupport)	Fecal Coliform	*E. coli*	Agriculture	Bracken, Mason, Robertson
North Fork Licking River 8.5 to 12.3	KY514292_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Morgan
North Fork Triplett Creek 1.15 to 4.85	KY514293_01	PCR (nonsupport)	*E. coli*	*E. coli*	Managed Pasture Grazing, Non-irrigated Crop Production, Non-Point Source	Rowan
North Fork Triplett Creek 8.1 to 12.15	KY514293_02	PCR (partial support)	*E. coli*	*E. coli*	Managed Pasture Grazing, Non-irrigated Crop Production	Rowan
North Fork Triplett Creek 16.95 to 18.95	KY514293_04	PCR (partial support)	*E. coli*	*E. coli*	Managed Pasture Grazing, Non-irrigated Crop Production, Non-Point Source	Rowan
Phillips Creek 0.0 to 5.4	KY500540_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Campbell
Plum Lick Creek 0.0 to 5.9	KY500972_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Livestock (Grazing or Feeding Operations), Non-Point Source	Bourbon, Montgomery
Pond Lick Branch 0.0 to 1.75	KY514696_01	PCR (nonsupport)	*E. coli*	*E. coli*	Managed Pasture Grazing, Non-irrigated Crop Production, Non-Point Source	Rowan
Puncheon Camp Creek 0.0 to 1.15	KY501442_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Magoffin
Rock Fork 0.0 to 4.0	KY515026_01	PCR (nonsupport)	*E. coli*	*E. coli*	Managed Pasture Grazing, Rural (Residential Areas)	Rowan
Slate Creek 0.0 to 13.55	KY515470_01	PCR (partial support)	Fecal Coliform	*E. coli*	Source Unknown	Bath
Somerset Creek 0.0 to 4.45	KY503876_01	PCR (partial support)	*E. coli*	*E. coli*	Agriculture, Non-Point Source	Nicholas
Somersett Creek 0.0 to 5.85[6]	KY503875_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Non-Point Source	Montgomery
South Fork Licking River 11.6 to 16.95	KY503932_03	PCR (nonsupport)	*E. coli*	*E. coli*	Source Unknown	Pendleton

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Stoner Creek 0.0 to 5.55	KY504482_01	PCR (nonsupport)	*E. coli*	*E. coli*	Source Unknown	Bourbon
Stoner Creek 5.55 to 15.0	KY504482_02	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access, Urban Runoff/Storm Sewers	Bourbon
Stoner Creek 17.3 to 23.5	KY504482_04	PCR (partial support)	*E. coli*	*E. coli*	Animal Feeding Operations (NPS), Livestock (Grazing or Feeding Operations), Municipal Point Source Discharges, Non-Point Source, Unrestricted Cattle Access	Bourbon
Stoner Creek 35.7 to 45.1	KY504482_05	PCR (nonsupport)	*E. coli*	*E. coli*	Livestock (Grazing or Feeding Operations), Municipal Point Source Discharges, Non-Point Source, Unrestricted Cattle Access	Clark
Strodes Creek 2.7 to 7.95	KY504593_01	PCR (partial support)	Fecal Coliform	*E. coli*	Agriculture, Municipal Point Source Discharges, Unspecified Urban Stormwater	Bourbon
Strodes Creek 2.7 to 7.95	KY504593_01	PCR (partial support)	*E. coli*	*E. coli*	Agriculture, Municipal Point Source Discharges, Non-Point Source	Bourbon
Strodes Creek 7.95 to 19.3	KY504593_02	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Municipal Point Source Discharges, Non-Point Source	Bourbon
Strodes Creek 7.95 to 19.3	KY504593_02	PCR (nonsupport)	Fecal Coliform	*E. coli*	Agriculture, Municipal Point Source Discharges, Non-Point Source	Bourbon
Strodes Creek 7.95 to 19.3	KY504593_02	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Agriculture, Municipal Point Source Discharges, Non-Point Source	Bourbon
Strodes Creek 19.3 to 26.5	KY504593_03	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Municipal Point Source Discharges, Non-Point Source	Clark
Strodes Creek 19.3 to 26.5	KY504593_03	PCR (nonsupport)	Fecal Coliform	*E. coli*	Agriculture, Municipal Point Source Discharges, Non-Point Source	Clark
Strodes Creek 19.3 to 26.5	KY504593_03	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Agriculture, Municipal Point Source Discharges, Non-Point Source	Clark
Threemile Creek 0.1 to 4.7[2]	KY505251_01	PCR (nonsupport)	Fecal Coliform	TMDL not included in this document	Sanitary Sewer Overflows (Collection System Failures), Source Unknown	Campbell

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Triplett Creek 0.0 to 5.85	KY516023_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Rowan
Triplett Creek 5.85 to 12.3	KY516023_02	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Municipal Point Source Discharges, Non-Point Source, Urban Runoff/Storm Sewers	Rowan
Triplett Creek 5.85 to 12.3	KY516023_02	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Agriculture, Municipal Point Source Discharges, Non-Point Source, Urban Runoff/Storm Sewers	Rowan
Triplett Creek 12.3 to 13.8	KY516023_03	PCR (nonsupport)	*E. coli*	*E. coli*	Non-Point Source	Rowan
UT of Blacks Creek 0.0 to 1.7	KY487421-2.7_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
UT of Blacks Creek 0.0 to 2.3	KY487421-3.0_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
UT of Cooper Run 0.0 to 3.8	KY490062-5.85_01	PCR (nonsupport)	*E. coli*	*E. coli*	Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
UT of Cooper Run 0.0 to 1.0	KY490062-6.95_01	PCR (nonsupport)	*E. coli*	*E. coli*	Animal Feeding Operations (NPS), Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
UT of Cooper Run 0.0 to 3.05	KY490062-7.25_01	PCR (partial support)	*E. coli*	*E. coli*	Agriculture, Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
UT of Flat Run 0.0 to 2.1	KY492217-3.9_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, Unrestricted Cattle Access	Bourbon
UT of Greenbrier Creek 0.0 to 1.35	KY493317-2.7_01	PCR (partial support)	*E. coli*	*E. coli*	Loss of Riparian Habitat, Managed Pasture Grazing	Montgomery

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
UT of Greenbrier Creek 0.0 to 3.25	KY493317-3.2_01	PCR (partial support)	*E. coli*	*E. coli*	Loss of Riparian Habitat, Managed Pasture Grazing	Montgomery
UT of Hancock Creek 0.0 to 3.72	KY493672-4.2_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Agriculture, Loss of Riparian Habitat, Non-Point Source, Residential Districts	Clark
UT of Hancock Creek 0.0 to 3.72	KY493672-4.2_01	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Agriculture, Loss of Riparian Habitat, Non-Point Source, Residential Districts	Clark
UT of Strodes Creek 0.0 to 3.7	KY504593-22.2_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture, Loss of Riparian Habitat, Municipal (Urbanized High Density Area), Non-Point Source, Residential Districts, Urban Runoff/Storm Sewers	Clark
UT of Strodes Creek 0.0 to 3.7	KY504593-22.2_01	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Agriculture, Loss of Riparian Habitat, Municipal (Urbanized High Density Area), Non-Point Source, Residential Districts, Urban Runoff/Storm Sewers	Clark
Williams Creek 0.0 to 5.8	KY506817_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Morgan
Woodruff Creek 0.0 to 3.8	KY507110_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Agriculture, Non-Point Source	Clark
Woodruff Creek 0.0 to 3.8	KY507110_01	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Agriculture, Non-Point Source	Clark

[1]Segments with PCR impairment due to fecal coliform have a TMDL calculated for *E. coli* in this document.
[2]A TMDL is not included for this segment because an alternative restoration plan is under development.
[3]A TMDL is not included because the segment will be addressed in the future pending the correction of a segmentation error.
[4]A TMDL is not included because this segment will be proposed for delisting on a future 303(d) list based on the most recent monitoring data.
[5]A TMDL is not included because this segment will be proposed for delisting on a future 303(d) list due to a listing error
[6]The name of this waterbody was misspelled on the 2016 303(d) list. The correct spelling is Somerset Creek 0.0 to 5.85.

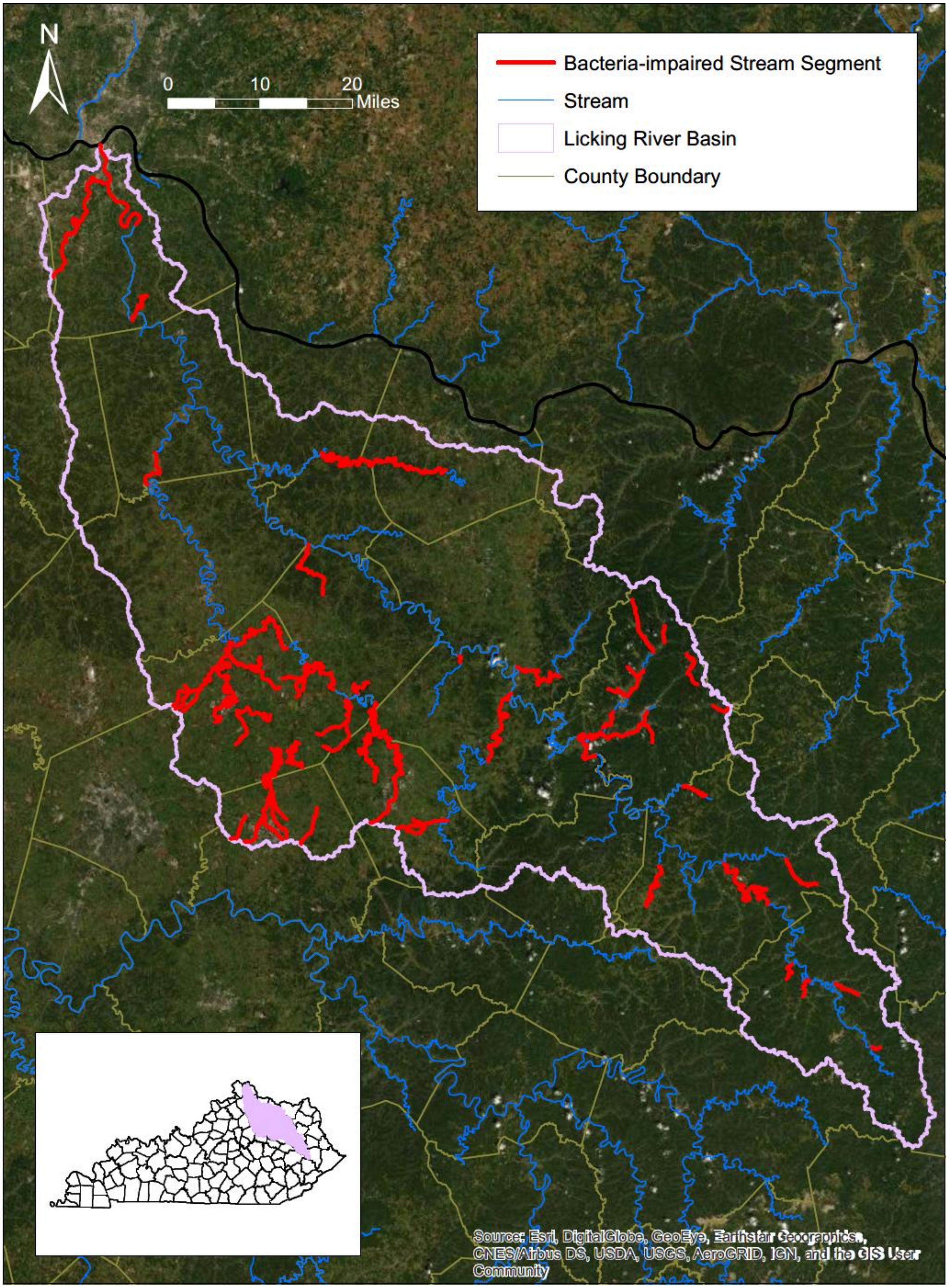


Figure F.1 Location of the Licking River Basin and 2016 303(d) List Bacteria-impaired Streams

Land cover data is summarized in Table F.2, and its geographic distribution is shown in Figure F.2. Deciduous forest is the predominant class of land cover in the Licking River basin, accounting for approximately 45 percent. The next three classes by magnitude are pasture/hay, open developed, and grassland/herbaceous. Land cover classes are described in Appendix P of the core TMDL document.

Table F.2 Land Cover Classes in the Licking River Basin (NLCD 2011)

Land Cover	Percent of Total Area	Square Miles	Acres
Open Water	0.61	22.62	14,479.96
Developed, Open	4.75	176.17	112,748.25
Developed, Low Intensity	1.67	61.70	39,488.02
Developed, Medium Intensity	0.58	21.31	13,641.34
Developed, High Intensity	0.18	6.49	4,153.97
Barren Land (Rock, Sand, Clay)	0.19	6.88	4,405.20
Deciduous Forest	44.68	1,655.51	1,059,524.08
Evergreen Forest	2.48	91.77	58,730.02
Mixed Forest	2.09	77.60	49,661.72
Shrub/Scrub	0.79	29.42	18,826.24
Grassland/Herbaceous	3.17	117.30	75,069.30
Pasture/Hay	36.51	1,352.78	865,776.17
Cultivated Crops	2.25	83.53	53,457.08
Woody Wetlands	0.02	0.87	559.15
Emergent Herbaceous Wetlands	0.04	1.40	897.09

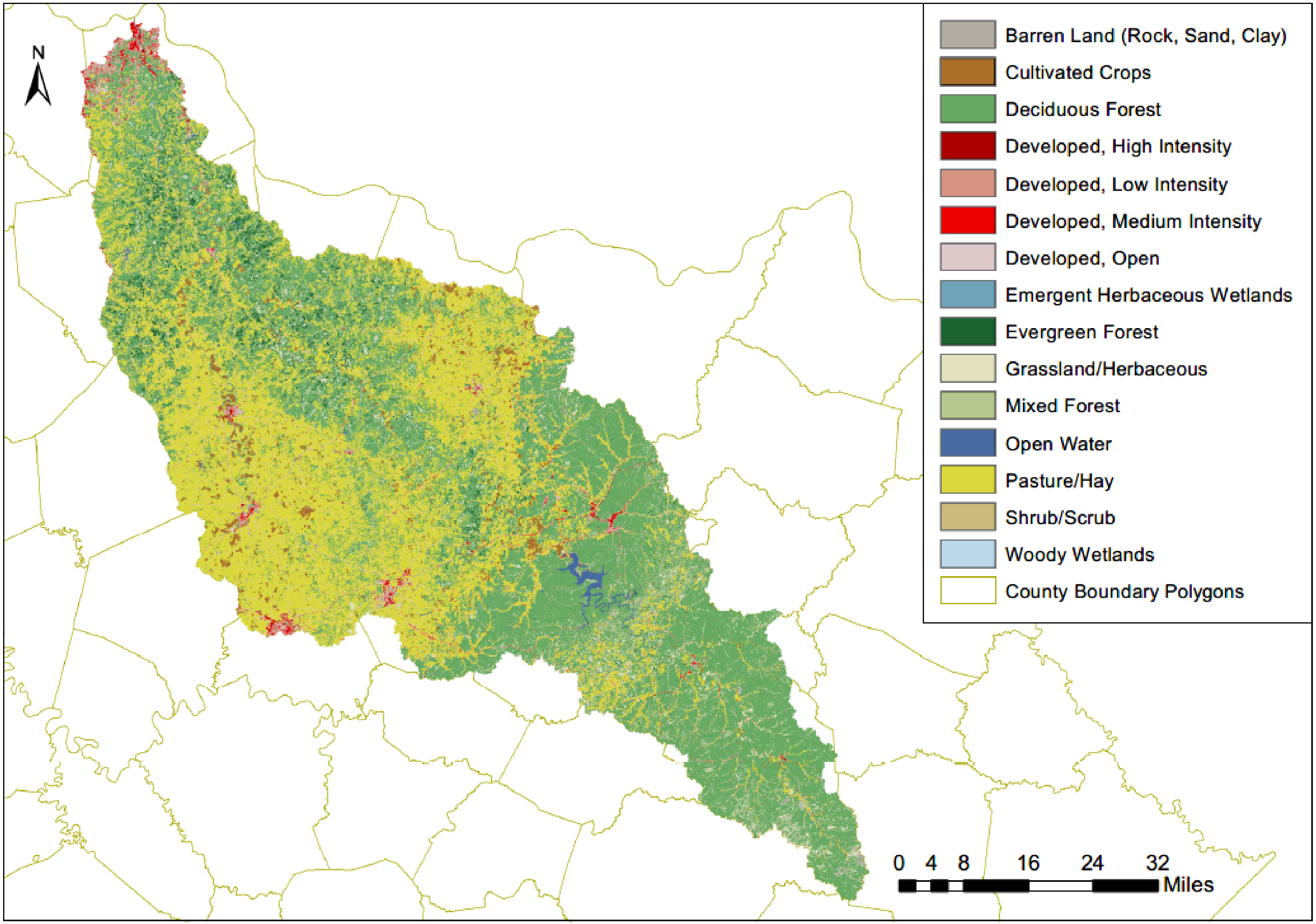


Figure F.2 Land Cover Types in the Licking River Basin

Section F.1 Big Brushy Creek 0.0 to 1.8

Waterbody ID: KY510632_01

Receiving Water: North Fork Triplett Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010602

County: Rowan

The Division of Water (DOW) collected samples from station BB - 0.23, located near river mile 0.2, for a watershed-based plan in Triplett Creek. The station was sampled nine times in 2009 and five times in 2010 during the PCR season. Table F.1-1 summarizes information about this sampling station; Table F.1-2 summarizes the data collected from this station.

Table F.1-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
BB - 0.23	38.21163	-83.47004	Big Brushy Creek 0.0 to 1.8	0.2

Table F.1-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
BB - 0.23	*E. coli*	14	90	7,900	863

(1)The full data set for samples collected from BB - 0.23 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Big Brushy Creek 0.0 to 1.8 are presented in Table F.1-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Big Brushy Creek. The location within the Middle North Fork Triplett Creek watershed is shown in Figure F.1-1.

Table F.1-3 Big Brushy Creek 0.0 to 1.8 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

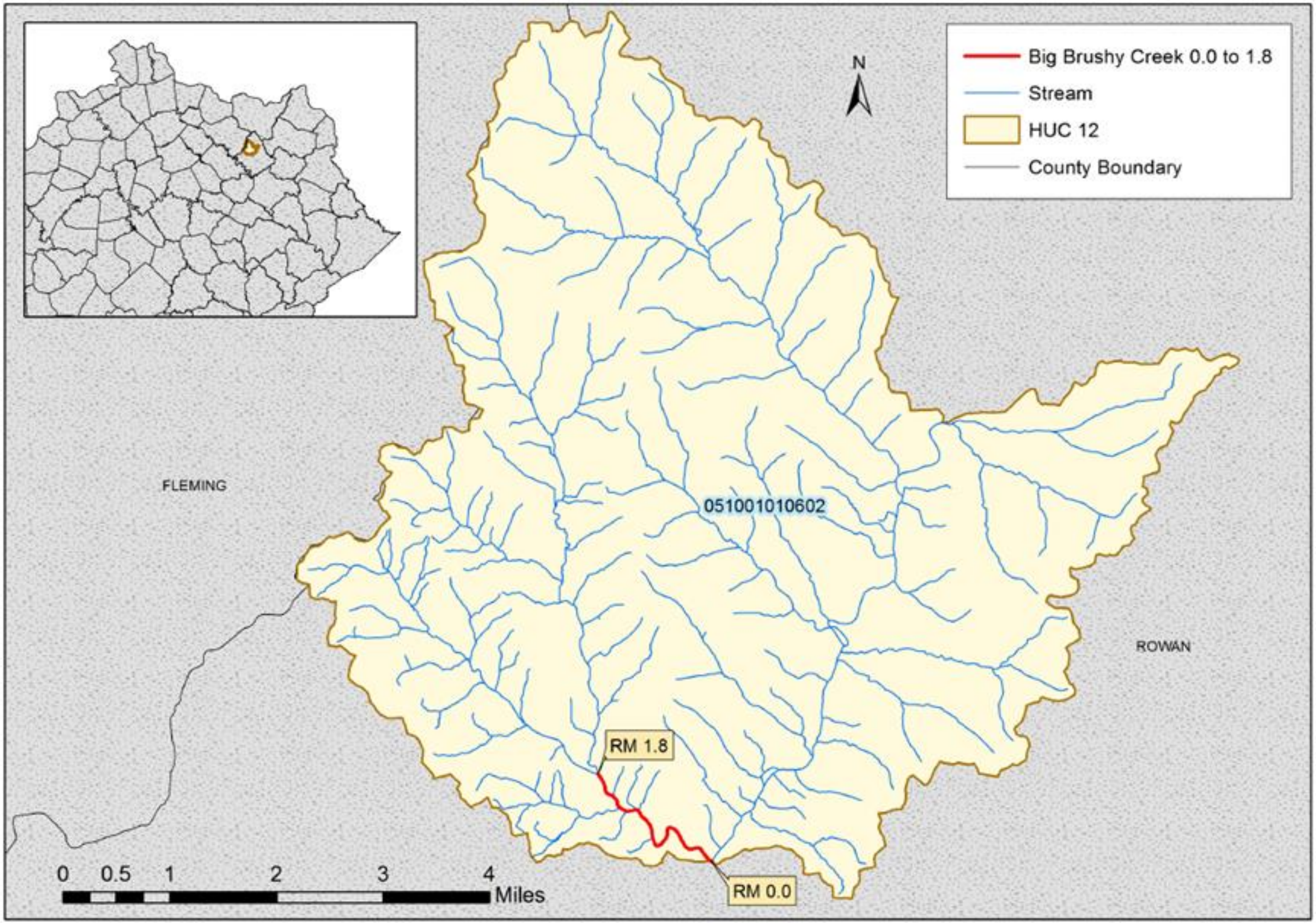


Figure F.1-1 Location of Big Brushy Creek 0.0 to 1.8

Section F.2 Blacks Creek 0.0 to 5.6

Waterbody ID: KY487421_01

Receiving Water: Hinkston Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020305

Counties: Bourbon

The Division of Water (DOW) collected samples during the PCR season from two stations on this segment. In 2010, seven samples were collected from DOW05016031 and six samples were collected from station DOW05016041. Table F.2-1 summarizes information about this sampling station; Table F.2-2 provides a summary of the data collected from this station.

Table F.2-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016031	38.26637	-84.11081	Blacks Creek 0.0 to 5.6	0.8
DOW05016041	38.24728	-84.11689	Blacks Creek 0.0 to 5.6	3.0

Table F.2-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016031	*E. coli*	7	884	11,199	3,313
DOW05016041	*E. coli*	6	275	>2,420	1,242

(1)The full data set for samples collected from DOW05016031 and DOW05016041 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Blacks Creek 0.0 to 5.6 are presented in Table F.2-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Blacks Creek.

Table F.2-3 Blacks Creek 0.0 to 5.6 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment: LA[3]	Allocations for Tributary Loads to the Segment[4]	MOS[5]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[5]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Blacks Creek-Hinkston Creek watershed is shown in Figure F.2-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Blacks Creek-Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

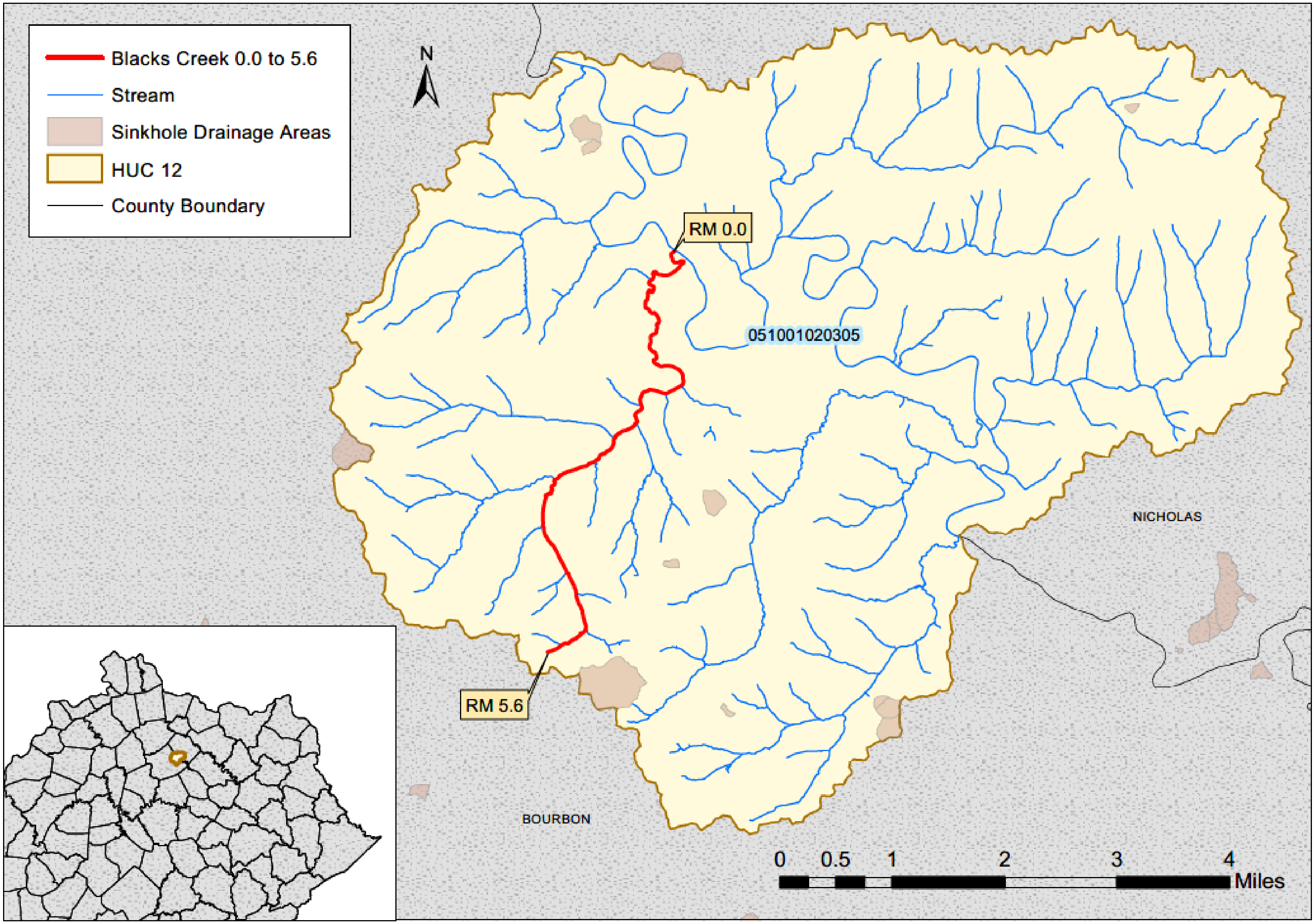


Figure F.2-1 Location of Blacks Creek 0.0 to 5.6

Section F.3 Blackwater Creek 3.85 to 11.8

Waterbody ID: KY510765_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001010507

County: Morgan

The Division of Water (DOW) has collected samples from station LRW008, located near river mile 5.6, since 2004. The station is sampled every five years during the PCR season as part of the DOW five-year rotating schedule for basin monitoring (see also Section 7.2.1, Kentucky Watershed Management Framework). This station has typically been sampled four or more times during a monitoring year. Table F.3-1 summarizes information about this sampling station; Table F.3-2 provides a summary of the data collected from this station.

Table F.3-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
LRW008	37.924792	-83.416309	Blackwater Creek 3.85 to 11.8	5.6

Table F.3-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100ml)	Average (colonies/ 100 ml)
LRW008	*E. coli*	17	3	>2,420	369
LRW008	fecal coliform	4	350	1,040	628

(1)The full data set for samples collected from LRW008 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Blackwater Creek 3.85 to 11.8 are presented in Table F.3-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Blackwater Creek. The location of the segment within the Blackwater Creek watershed is shown in Figure F.3-1.

Table F.3-3 Blackwater Creek 3.85 to 11.8 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment

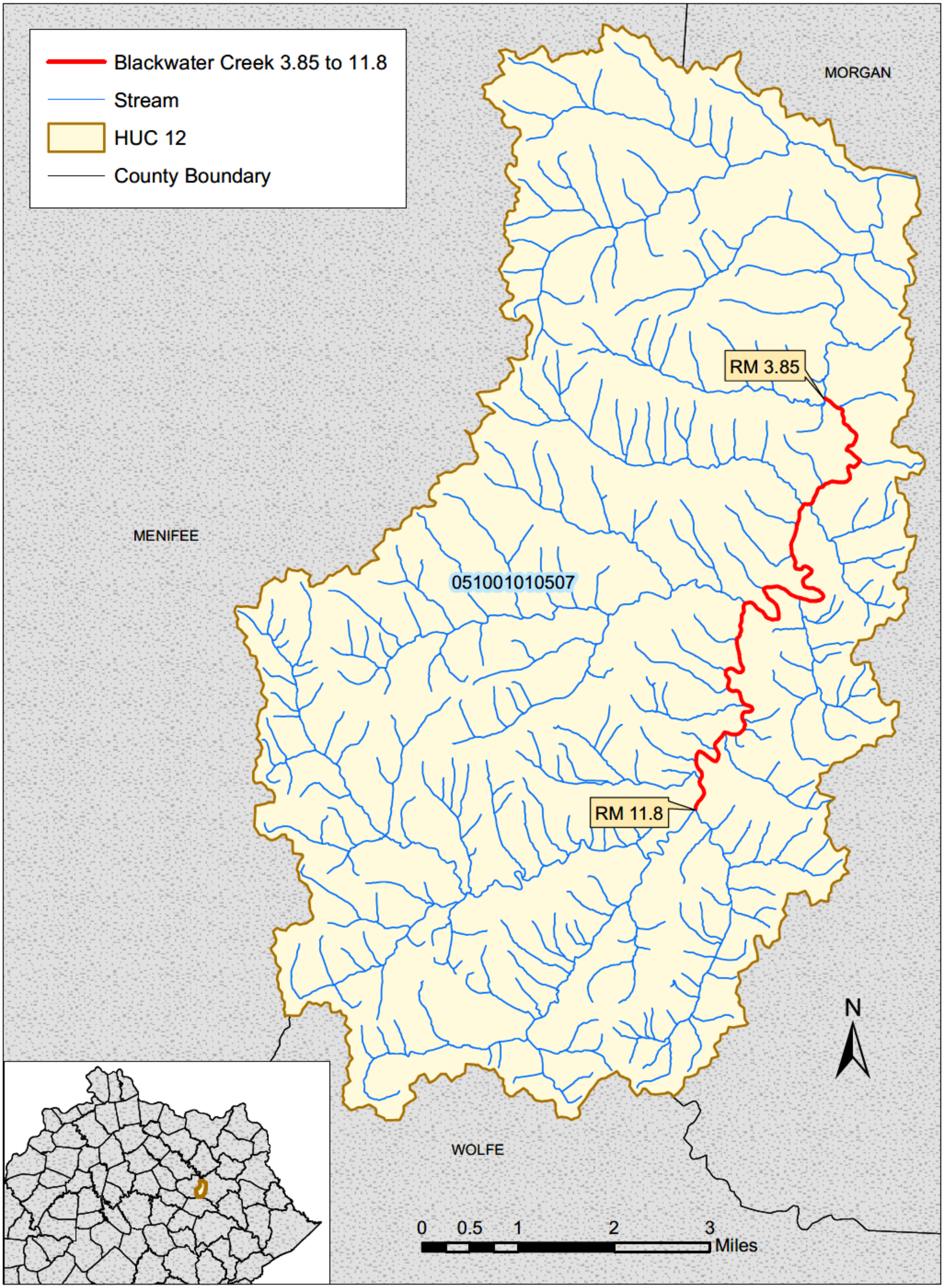


Figure F.3-1 Location of Blackwater Creek 3.85 to 11.8

Section F.4 Boone Creek 0.0 to 5.2

Waterbody ID: KY487686_01

Receiving Water: Hinkston Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020304

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05016034, located near river mile 0.1, in 2010. The station was sampled nine times during the PCR season. Table F.4-1 summarizes information about this sampling station; Table F.4-2 provides a summary of the data collected from this station.

Table F.4-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016034	38.21368	-84.02685	Boone Creek 0.0 to 5.2	0.1

Table F.4-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016034	*E. coli*	9	82	19,863	4,657

(1)The full data set for samples collected from station DOW05016034 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Boone Creek 0.0 to 5.2 are presented in Table F.4-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Boone Creek.

Table F.4-3 Boone Creek 0.0 to 5.2 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
[2]Q_S is the flow (ft^3/s) in the segment.
[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.
[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
[6]The following assumptions provide an implicit MOS:
(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment is shown within the Boone Creek-Hinkston Creek watershed in Figure F.4-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Boone Creek-Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

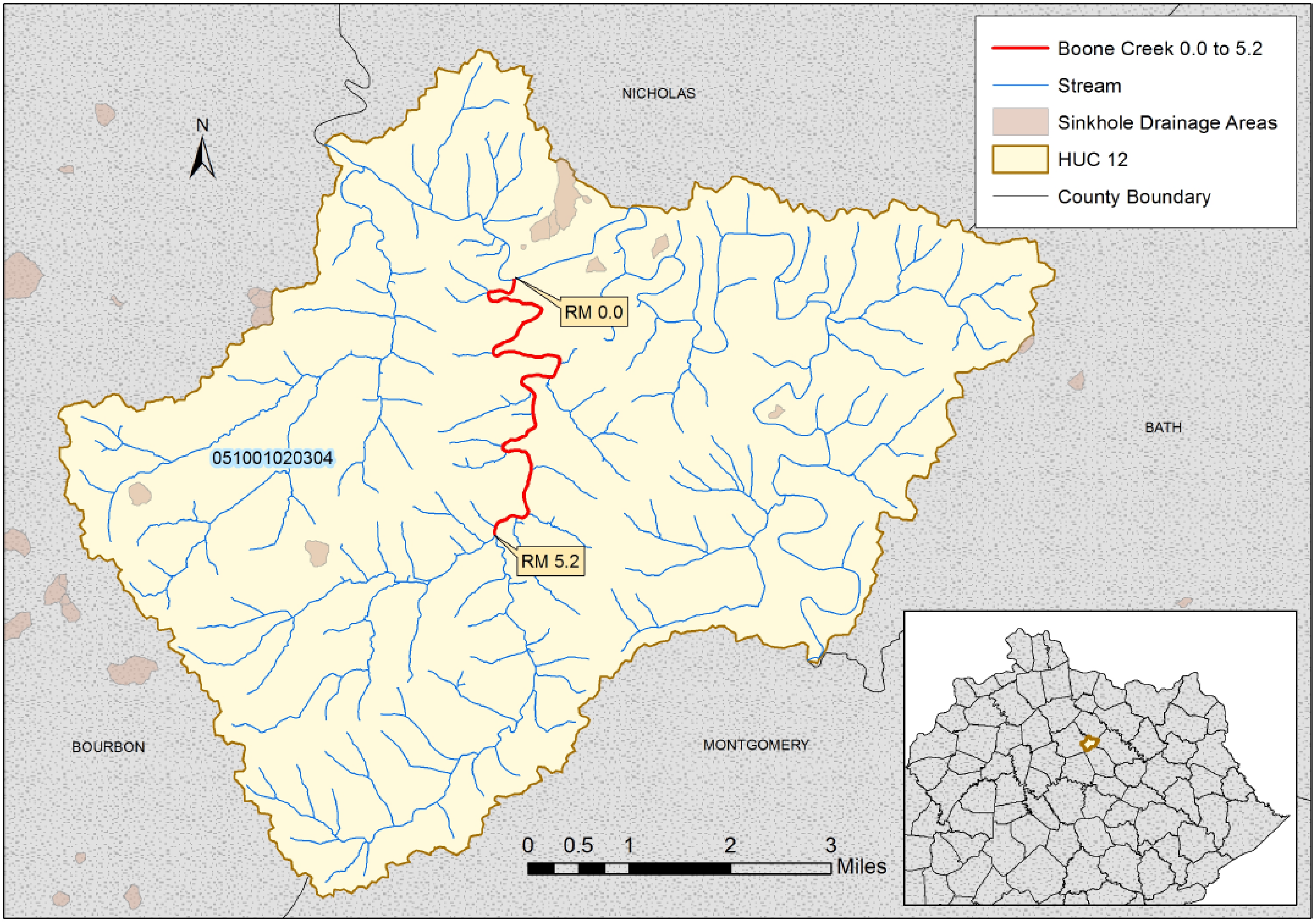


Figure F.4-1 Location of Boone Creek 0.0 to 5.2

Section F.5 Boone Creek 5.2 to 9.1

Waterbody ID: KY496312_04

Receiving Water: Hinkston Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020304

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05016036, located near river mile 5.3, in 2010. The station was sampled eight times during the PCR season. Table F.5-1 summarizes information about this sampling station; Table F.5-2 provides a summary of the data collected from this station.

Table F.5-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016036	38.17672	-84.03222	Boone Creek 5.2 to 9.1	5.3

Table F.5-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016036	*E. coli*	8	308	9,804	1,717

(1)The full data set for samples collected from station DOW05016036 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Boone Creek 5.2 to 9.1 are presented in Table F.5-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Boone Creek.

Table F.5-3 Boone Creek 5.2 to 9.1 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Tributary Loads to the Segment[4]	MOS[5]
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[5]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment is shown within the Boone Creek-Hinkston Creek watershed in Figure F.5-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Boone Creek-Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

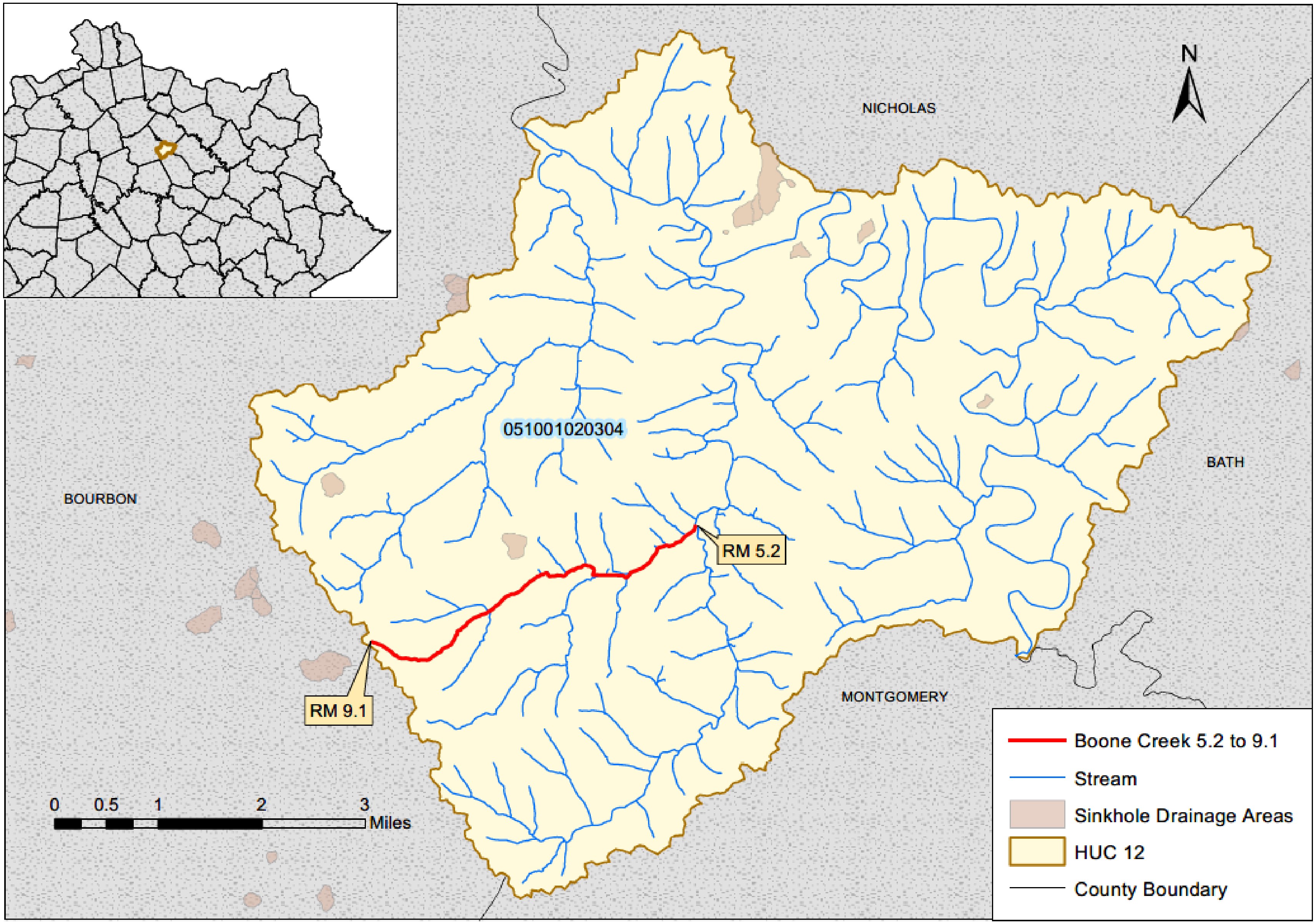


Figure F.5-1 Location of Boone Creek 5.2 to 9.1

Section F.6 Buffalo Branch 0.0 to 1.6

Waterbody ID: KY511036_01

Receiving Water: Triplett Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010604

County: Rowan

The Division of Water (DOW) collected samples at station BUB-0.03, located near river mile 0.05, for a watershed-based plan in Triplett Creek. The station was sampled eight times in 2009 and five times in 2010 during the PCR season. Table F.6-1 summarizes information about this sampling station; Table F.6-2 provides a summary of the data collected from this station.

Table F.6-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
BUB - 0.03	38.24219	-83.34211	Buffalo Branch 0.0 to 1.6	0.05

Table F.6-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
BUB - 0.03	*E. coli*	13	50	1,900	375

(1)The full data set for samples collected from station BUB - 0.03 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Buffalo Branch 0.0 to 1.6 are presented in Table F.6-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Buffalo Branch.

Table F.6-3 Buffalo Branch 0.0 to 1.6 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
	LA[(3)]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Upper Triplett Creek watershed is shown in Figure F.6-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Upper Triplett Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

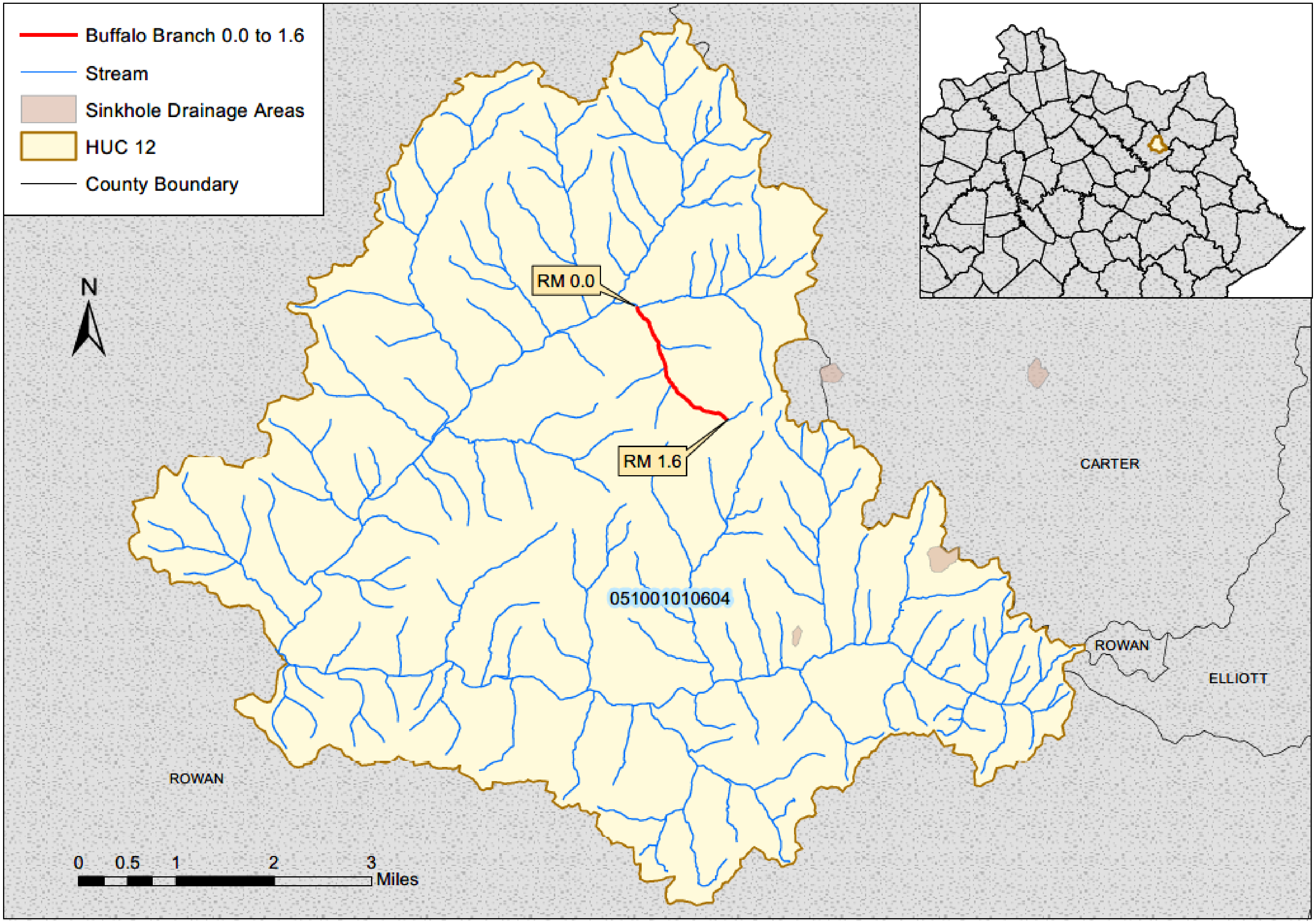


Figure F.6-1 Location of Buffalo Branch 0.0 to 1.6

Section F.7 Burning Fork 0.0 to 3.3

Waterbody ID: KY488450_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001010106

County: Magoffin

Northern Kentucky University collected samples from station L - 010, located near river mile 0.9. The station was sampled one to two times during the PCR season in 1998 and 1999. Table F.7-1 summarizes information about this sampling station; Table F.7-2 provides a summary of the data collected from this station.

Table F.7-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 010	37.743	-83.05565	Burning Fork 0.0 to 3.3	0.9

Table F.7-2 Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 010	fecal coliform	3	480	1,200	773

(1)The full data set for samples collected from station L - 010 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Burning Fork 0.0 to 3.3 are presented in Table F.7-3.

Table F.7-3 Burning Fork 0.0 to 3.3 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[5]	Allocations for Tributary Loads to the Segment[6]	MOS[7]
	SWS-WLA[3]	LA[4]			
Q_S×WQC×CF	∑(Q_{SWS}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

One facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Burning Fork. This directly discharging facility is an individual family residence with an on-site wastewater treatment system. There are no MS4 communities or CSOs discharging directly to this segment of Burning Fork. The definitions for MS4 and CSO are found in 401 KAR 5:002. The facility is identified in Table F.7-4 and the location of the segment within the Burning Fork-Licking River watershed is shown in Figure F.7-1.

Table F.7-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYG402076	Residence	0.0005	37.736851	-83.034911	8/31/2023	Q_{SWS}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

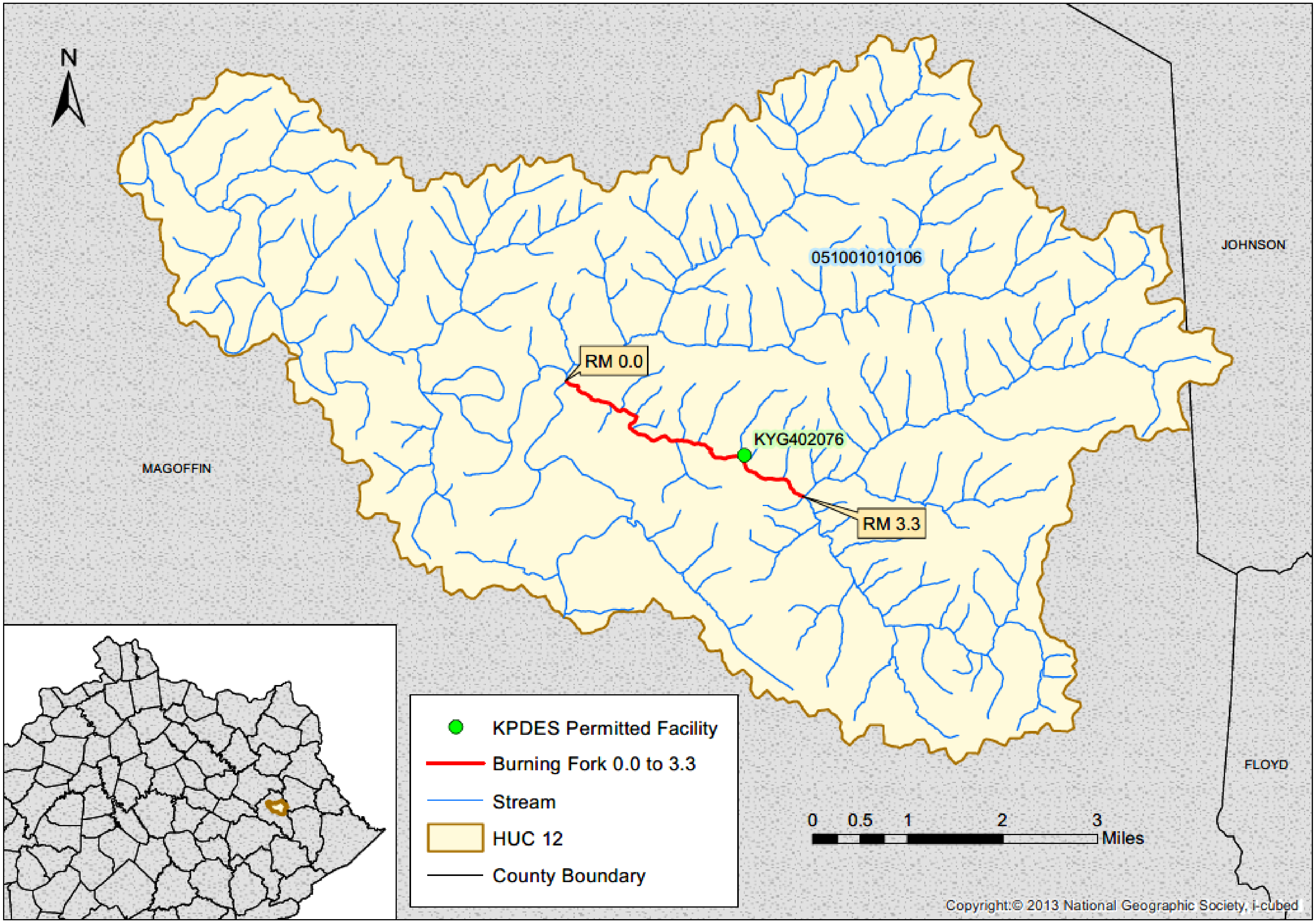


Figure F.7-1 Location of the KPDES-permitted Facility on Burning Fork 0.0 to 3.3

Section F.8 Christy Creek 7.2 to 9.2

Waterbody ID: KY511363_02

Receiving Water: Triplett Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010106

County: Rowan

The Division of Water (DOW) collected samples from station CC - 8.11, located near river mile 8.3, for a watershed-based plan in Triplett Creek. The station was sampled ten times in 2009 and five times in 2010 during the PCR season. Table F.8-1 summarizes information about this sampling station; Table F.8-2 provides a summary of the data collected from this station.

Table F.8-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
CC - 8.11	38.18388	-83.28044	Christy Creek 7.2 to 9.2	8.3

Table F.8-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
CC - 8.11	*E. coli*	15	<1	1,100	397

(1)The full data set for samples collected from CC - 8.11 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Christy Creek 7.2 to 9.2 are presented in Table F.8-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Christy Creek.

Table F.8-3 Christy Creek 7.2 to 9.2 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
	LA[(3)]			
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Upper Triplett Creek watershed is shown in Figure F.8-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Upper Triplett Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

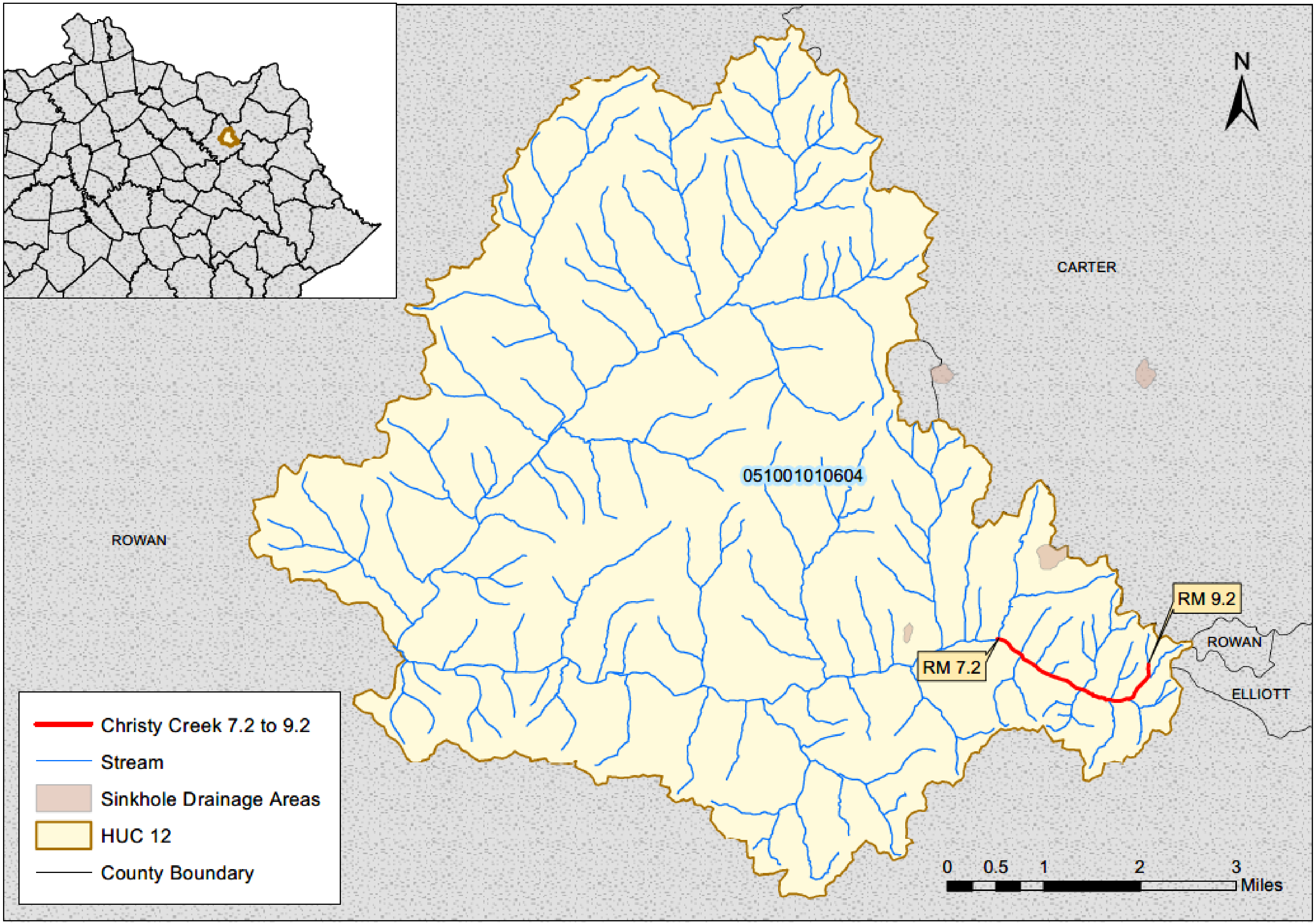


Figure F.8-1 Location of Christy Creek 7.2 to 9.2

Section F.9 Cooper Run 0.0 to 10.15

Waterbody ID: KY490062_01

Receiving Water: Stoner Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020206

County: Bourbon

The Division of Water (DOW) collected samples during the PCR season from three stations on this segment. In 2010, eight samples were collected from DOW05017011, eight samples were collected from DOW05017012, and seven samples were collected from DOW05017013. Table F.9-1 summarizes information about this sampling station; Table F.9-2 provides a summary of the data collected from this station.

Table F.9-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017011	38.27538	-84.27542	Cooper Run 0.0 to 10.15	0.1
DOW05017012	38.24136	-84.313	Cooper Run 0.0 to 10.15	4.9
DOW05017013	38.22062	-84.35318	Cooper Run 0.0 to 10.15	8.15

Table F.9-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/100 ml)	Maximum (colonies/100 ml)	Average (colonies/ 100 ml)
DOW05017011	*E. coli*	8	517	6,867	1,673
DOW05017012	*E. coli*	8	148	24,192	4,583
DOW05017013	*E. coli*	7	328	24,192	4,513

(1)The full data set for samples collected from DOW05017011, DOW05017012, and DOW05017013 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Cooper Run 0.0 to 10.15 are presented in Table F.9-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Cooper Run.

Table F.9-3 Cooper Run 0.0 to 10.15 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Tributary Loads to the Segment[4]	MOS[5]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[5]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

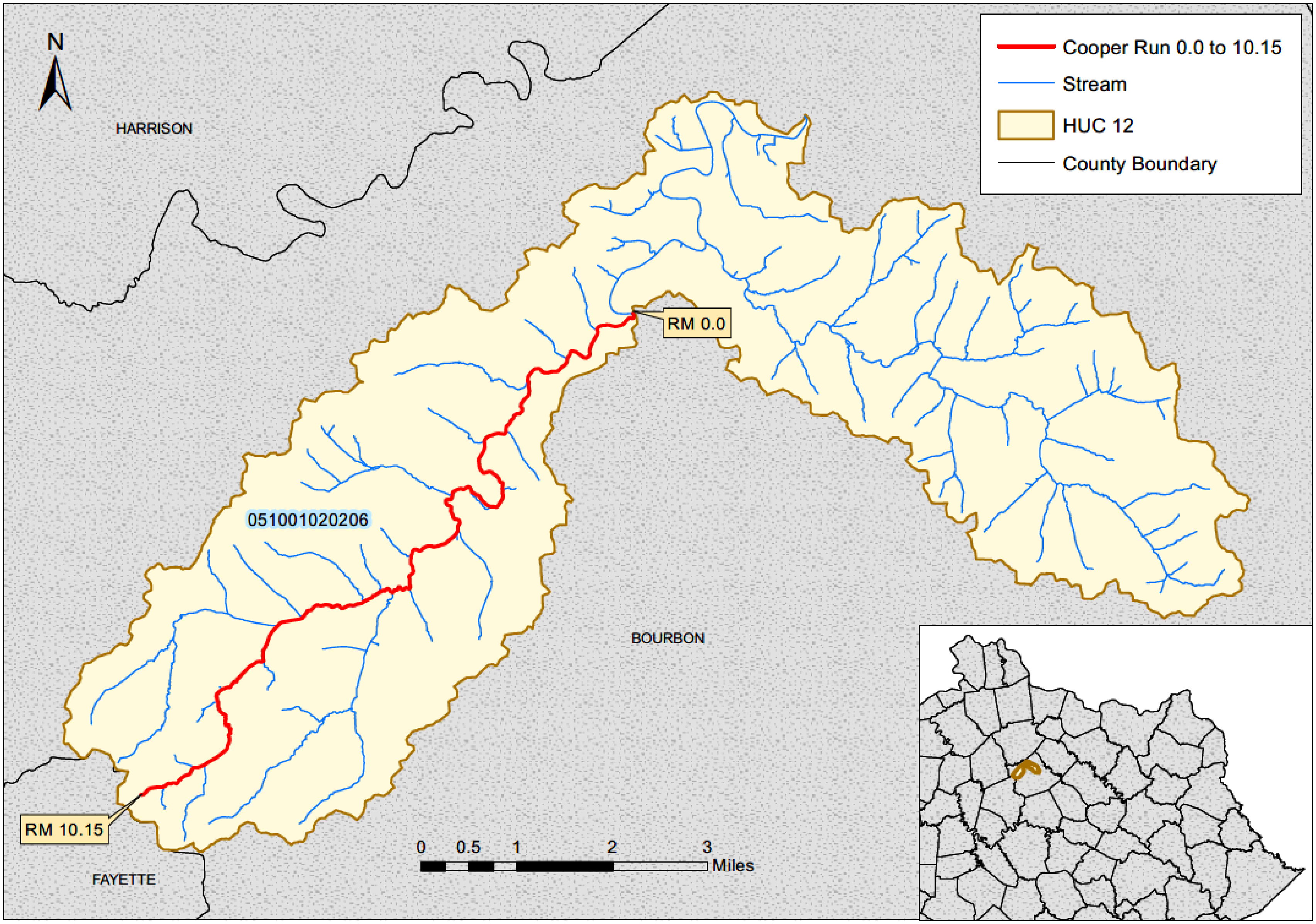


Figure F.9-1 Location of Cooper Run 0.0 to 10.15

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region identified an area of sinkholes from the neighboring Kennedy Creek-Stoner Creek watershed to the southeast of the segment that contributes drainage to Cooper Run 0.0 to 10.15 (see Figure F.9-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

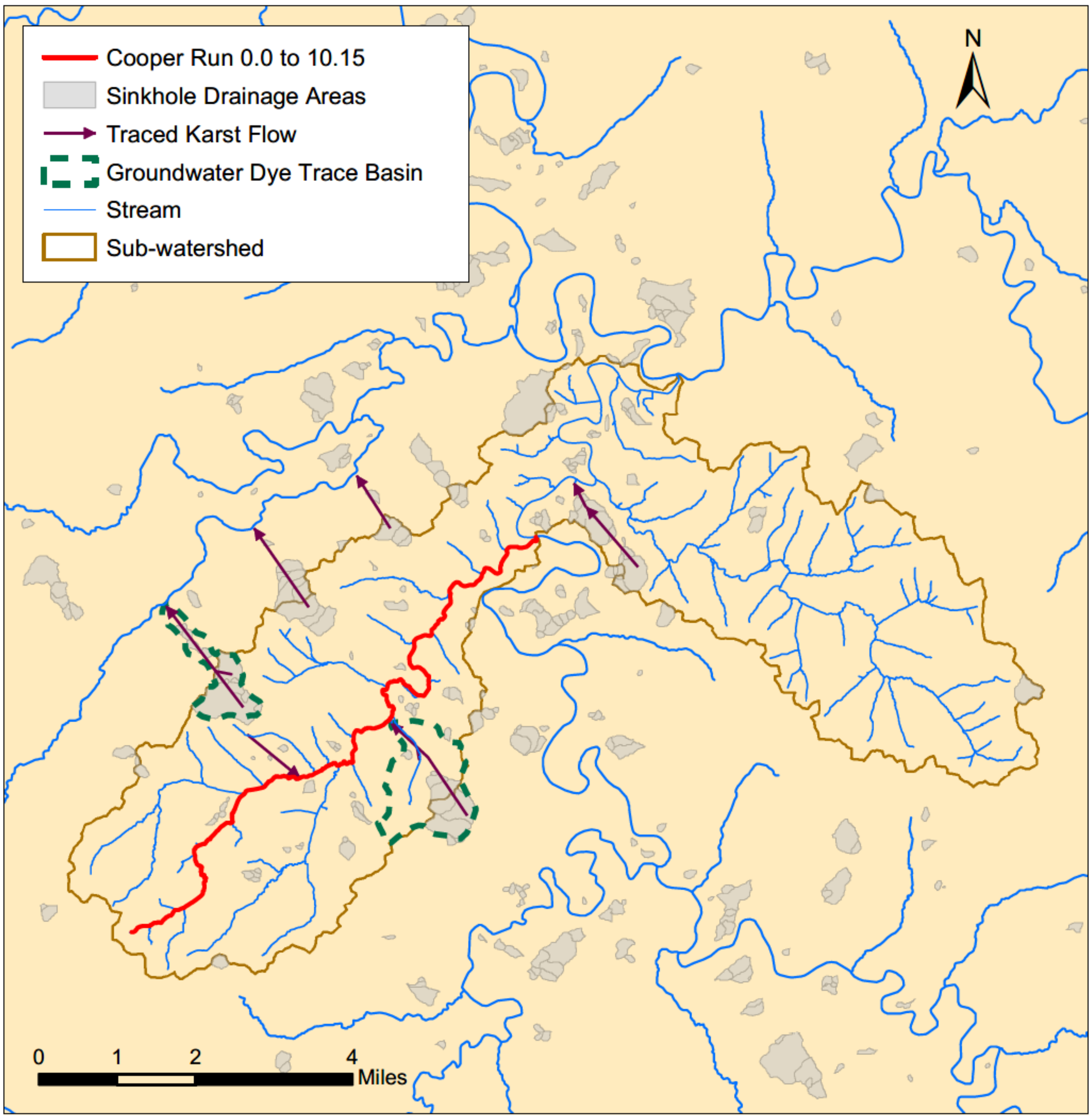


Figure F.9-2 Karst Influence in the Region of Cooper Run 0.0 to 10.15

Section F.10 Copperas Branch 0.4 to 1.5

Waterbody ID: KY511531_01

Receiving Water: Big Brushy Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010602

County: Rowan

The Division of Water (DOW) collected samples from station CB - 0.38, located near river mile 0.4, for a watershed-based plan in Triplett Creek. The station was sampled nine times in 2009 and five times in 2010 during the PCR season. Table F.10-1 summarizes information about the sampling station; Table F.10-2 provides a summary of the data collected from this station.

Table F.10-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment[1]	River Mile
CB - 0.38	38.21646	-83.4897	Copperas Branch 0.4 to 1.5	0.4

Table F.10-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
CB - 0.38	*E. coli*	14	10	2,600	440

(1)The full data set for samples collected from CB - 0.38 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Copperas Branch 0.4 to 1.5 are presented in Table F.10-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Copperas Branch. The location of the segment within the Middle North Fork Triplett Creek watershed is shown in Figure E.10-1.

Table F.10-3 Copperas Branch 0.4 to 1.5 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
	LA[(3)]			
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

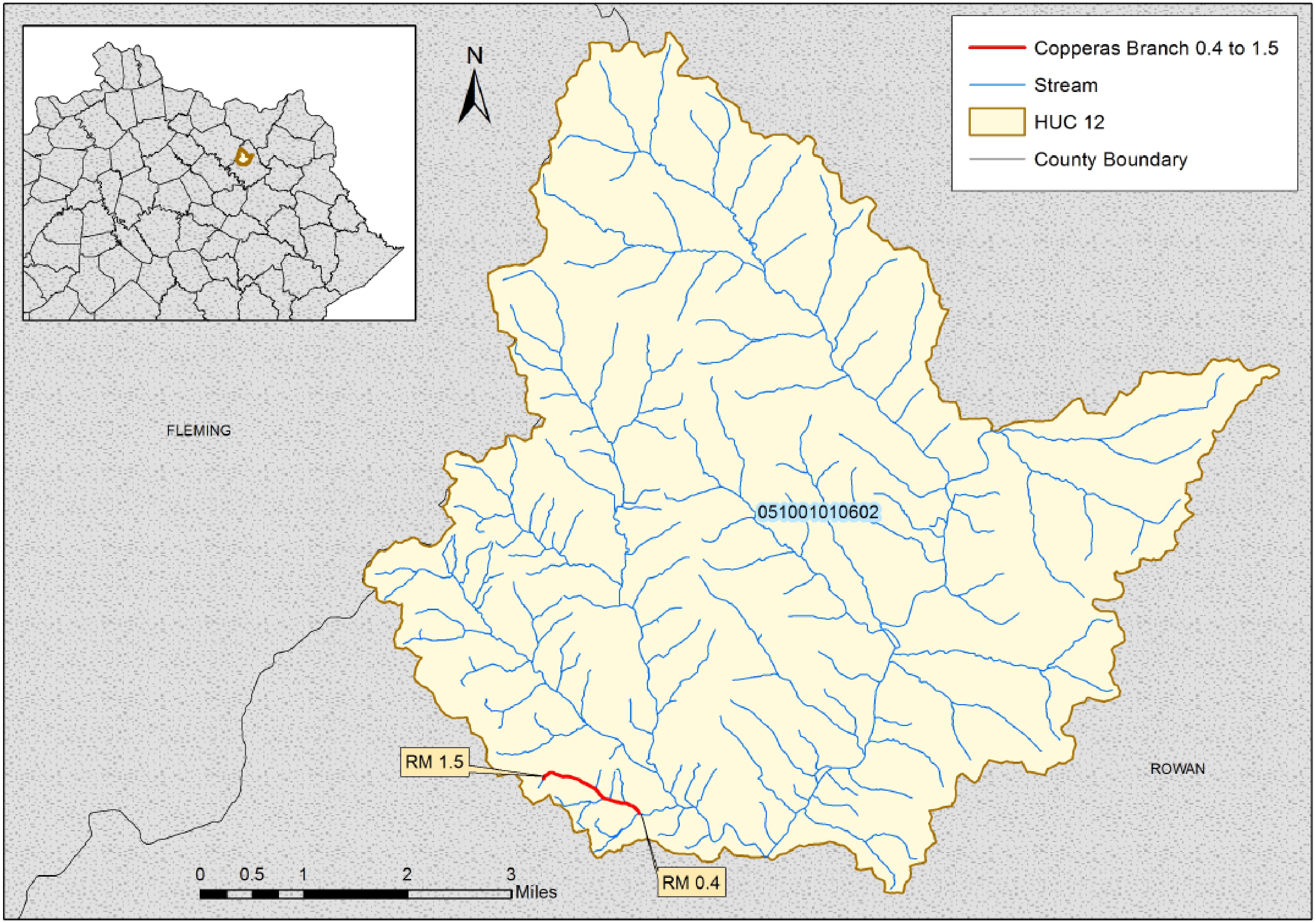


Figure F.10-1 Location of Copperas Branch 0.4 to 1.5

Section F.11 Crooked Creek 0.0 to 9.4

Waterbody ID: KY490377_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001011106

County: Nicholas

Northern Kentucky University (NKU) collected samples at station L - 028, located near river mile 1.1, in 1998 and from 2000 to 2003. Samples were collected one to three times each year during the PCR season. Table F.11-1 summarizes information about this sampling station; Table F.11-2 provides a summary of the data collected from this station.

Table F.11-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 028	38.44722	-84.101389	Crooked Creek 0.0 to 9.4	1.1

Table F.11-2 Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 028	fecal coliform	9	38	24,000	2,924

(1)The full data set for samples collected from L - 028 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Crooked Creek 0.0 to 9.4 are presented in Table F.11-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Crooked Creek.

Table F.11-3 Crooked Creek 0.0 to 9.4 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment LA[(3)]	Allocations for Tributary Loads to the Segment[(4)]	MOS[(5)]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
[(2)]Q_S is the flow (ft^3/s) in the segment.
[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
[(4)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
[(5)]The following assumptions provide an implicit MOS:
(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Cedar Creek-Licking River watershed is shown in Figure F.11-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Cedar Creek-Licking River watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

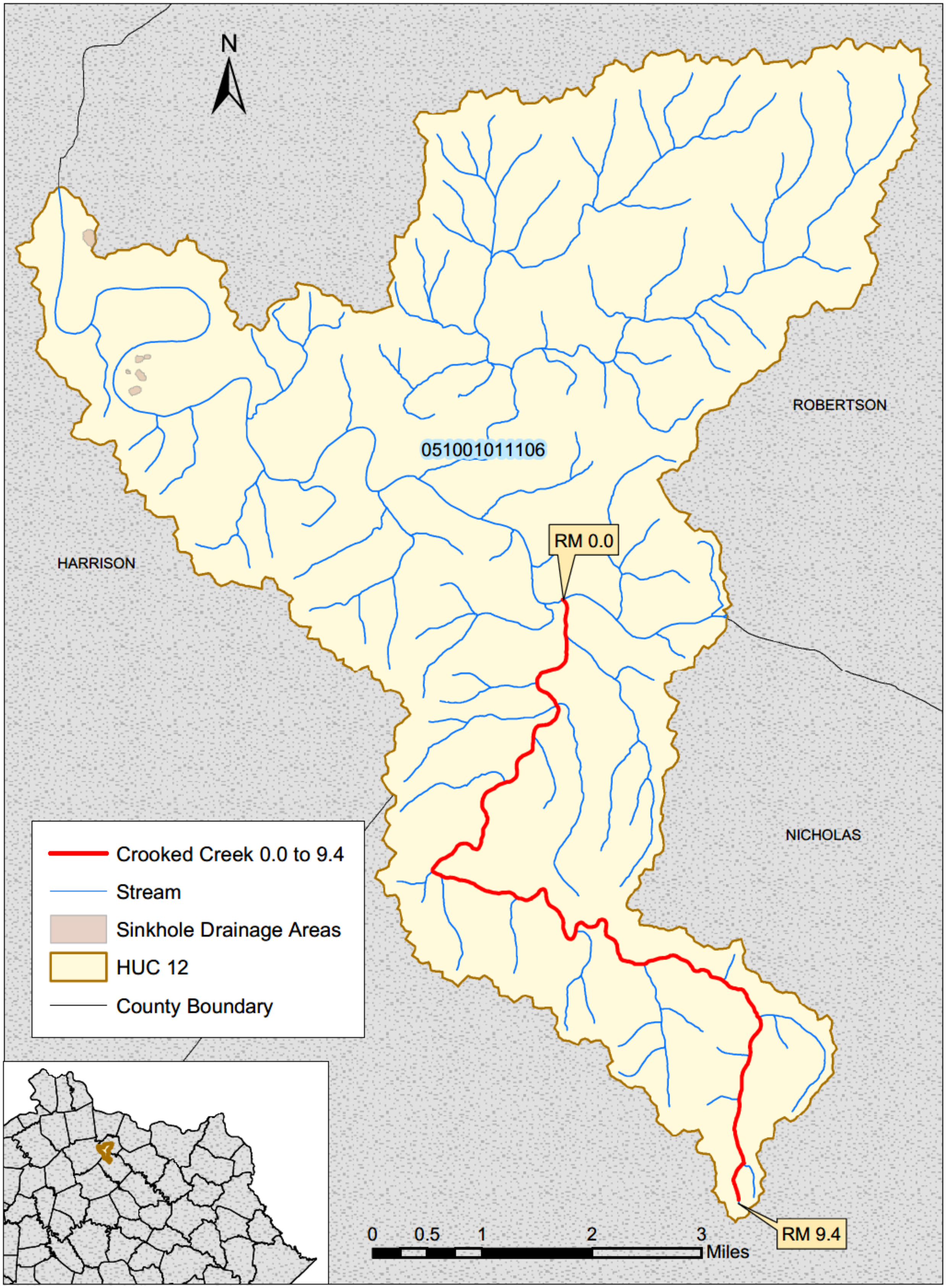


Figure F.11-1 Location of Crooked Creek 0.0 to 9.4

Section F.12 Flat Creek 0.0 to 0.95

Waterbody ID: KY492182_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001010806

County: Bath

This segment was first listed on Kentucky's 2002 303(d) list based on samples collected by Morehead State University as part of a 319(h) nonpoint source project conducted in 1999. Assessment records give coordinates for the sampling location, but the data could not be located as of this writing. Table F.12-1 summarizes information about this sampling station.

Table F.12-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
Unknown	38.275	-83.79819	Flat Creek 0.0 to 0.95	0.9

The TMDL allocations for Flat Creek 0.0 to 0.95 are presented in Table F.12-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Flat Creek.

Table F.12-3 Flat Creek 0.0 to 0.95 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	MOS(5)
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)The following assumptions provide an implicit MOS:

(a)Upstream bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Flat Creek watershed is shown in Figure F.12-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Flat Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

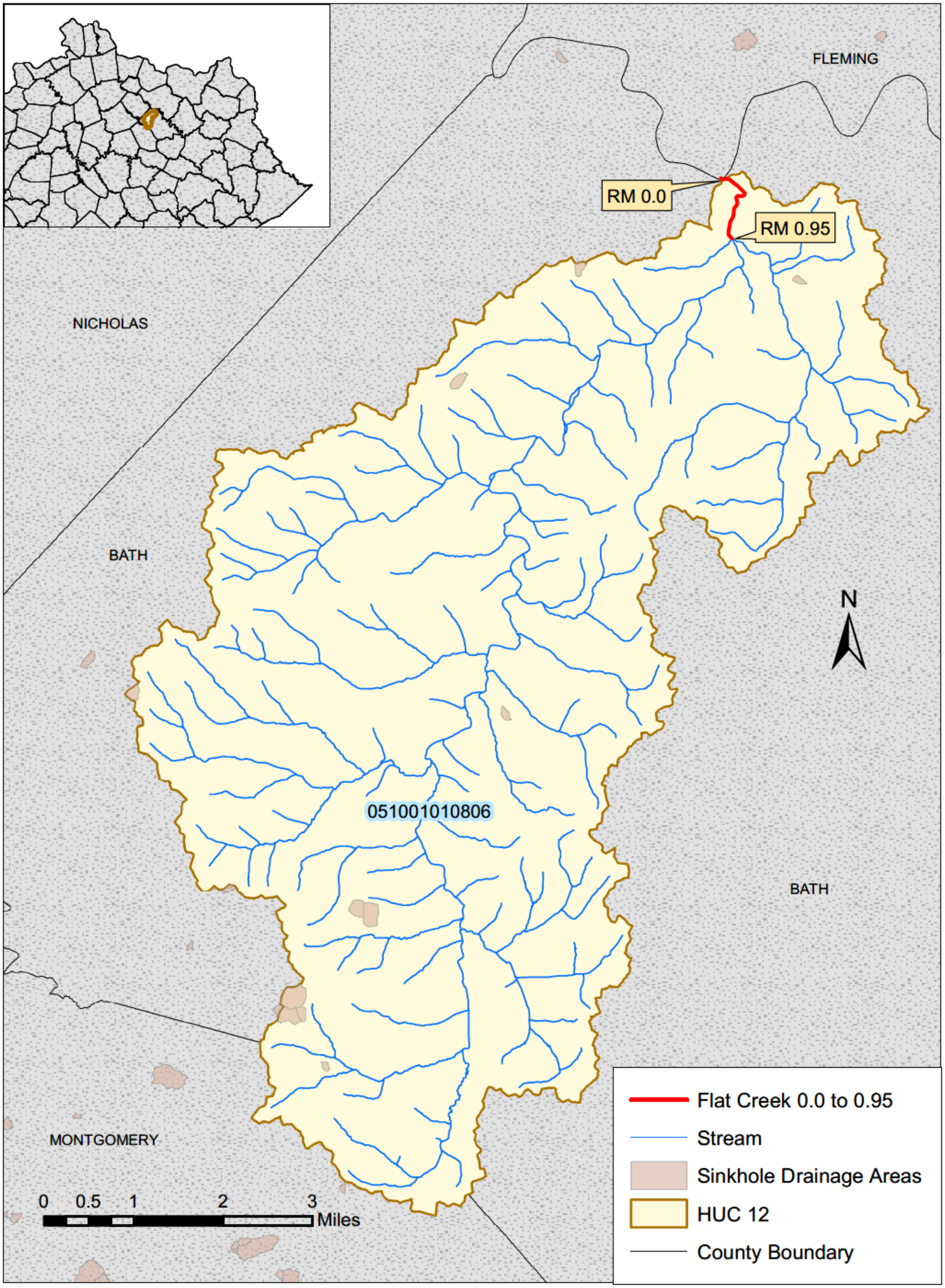


Figure F.12-1 Location of Flat Creek 0.0 to 0.95

Section F.13 Flat Run 0.0 to 2.25

Waterbody ID: KY492217_01

Receiving Water: Stoner Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020206

County: Bourbon

The Division of Water (DOW) collected samples from two stations on this segment. In 2010, eight samples were collected from DOW05017017 and seven samples were collected from DOW05017018. Table F.13-1 summarizes information about this sampling station; Table F.13-2 provides a summary of the data collected from this station.

Table F.13-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017017	38.28358	-84.25672	Flat Run 0.0 to 2.25	0.3
DOW05017018	38.27159	-84.2433	Flat Run 0.0 to 2.25	1.7

Table F.13-2 DOW Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017017	*E. coli*	8	185	24,192	6,767
DOW05017018	*E. coli*	7	172	24,192	4,619

[(1)]The full data set for samples collected at DOW05017017 and DOW05017018 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document

The TMDL allocations for Flat Run 0.0 to 2.25 are presented in Table F.13-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Flat Run. The location of the segment within the Flat Run-Stoner Creek watershed is shown in Figure F.13-1.

Table F.13-3 Flat Run 0.0 to 2.25 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

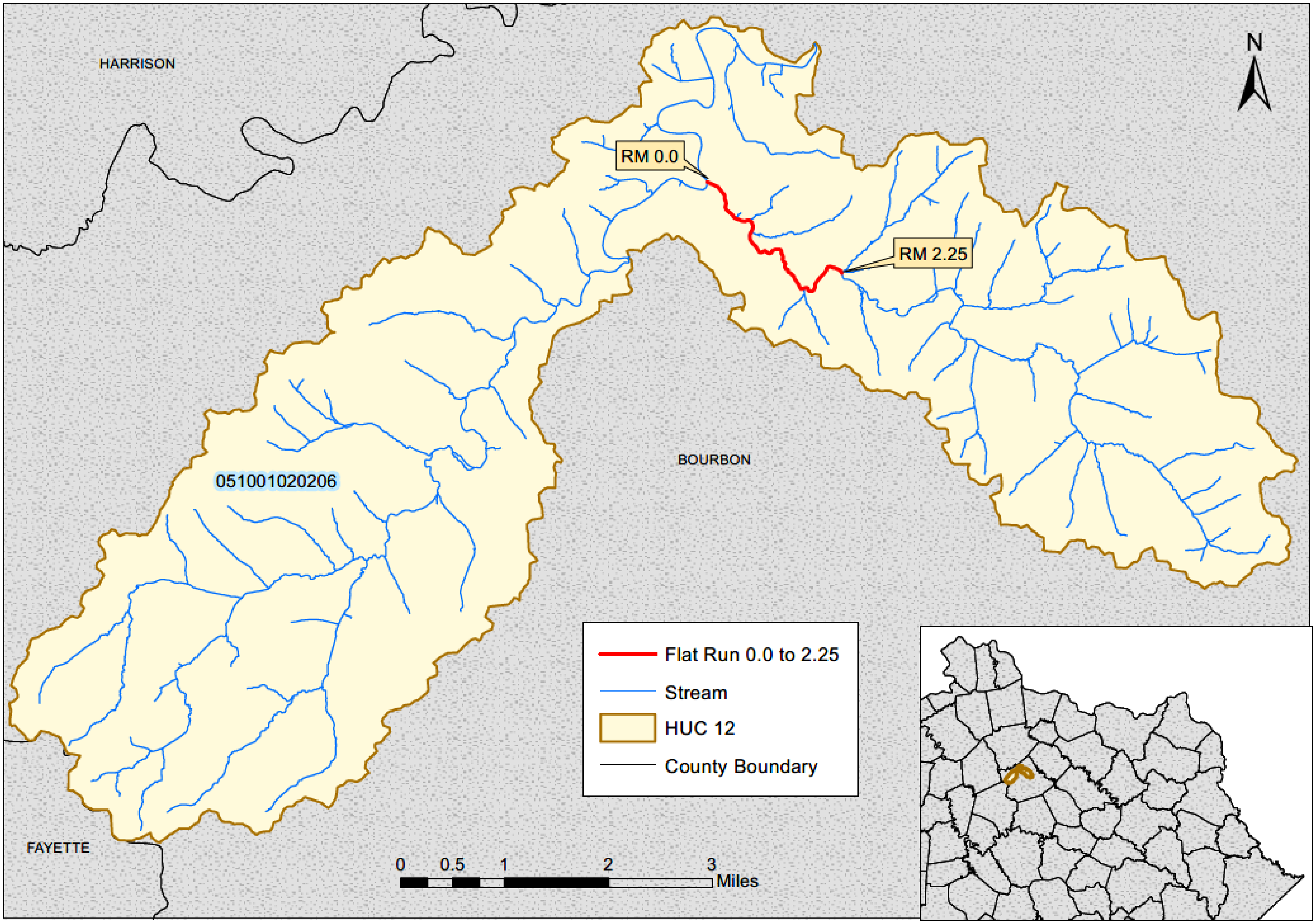


Figure F.13-1 Location of Flat Run 0.0 to 2.25

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region did not identify any karst areas outside the HUC 12 boundary that are contributing drainage to the segment (see Figure F.13-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

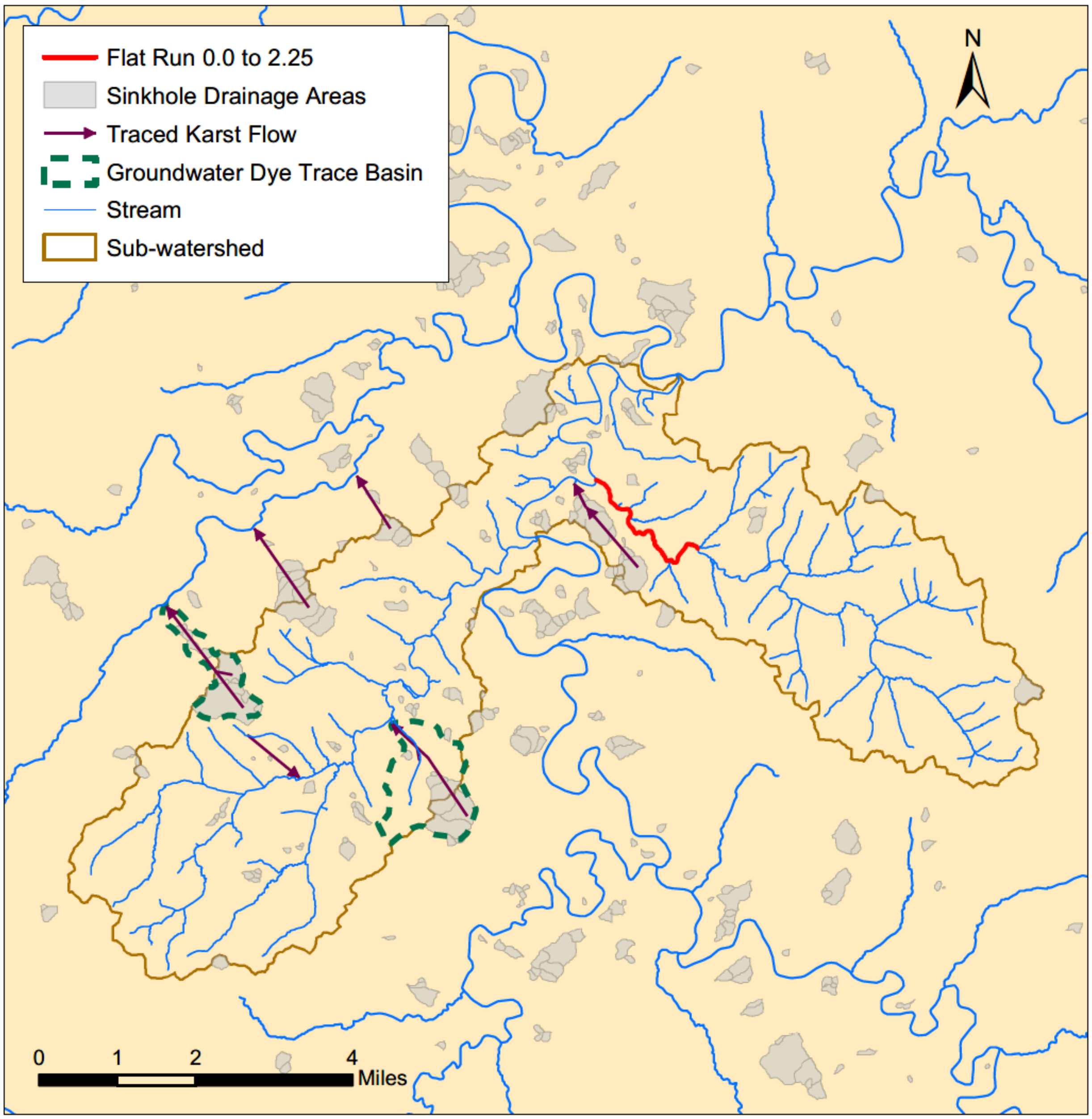


Figure F.13-2 Karst Influence in the Region of Flat Run 0.0 to 2.25

Section F.14 Flat Run 2.25 to 9.05

Waterbody ID: KY492217_02

Receiving Water: Stoner Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020206

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05017019, located near river mile 4.5, in 2010. The station was sampled eight times during the PCR season. Table F.14-1 summarizes information about this sampling station; Table F.14-2 provides a summary of the data collected from this station.

Table F.14-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017019	38.26322	-84.21213	Flat Run 2.25 to 9.05	4.5

Table F.14-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017019	*E. coli*	7	86	24,192	4,275

(1)The full data set for samples collected at DOW05017019 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Flat Run 2.25 to 9.05 are presented in Table F.14-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Flat Run. The location of the segment within the Flat Run-Stoner Creek watershed is shown in Figure F.14-1.

Table F.14-3 Flat Run 2.25 to 9.05 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Tributary Loads to the Segment(4)	MOS(5)
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(5)The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

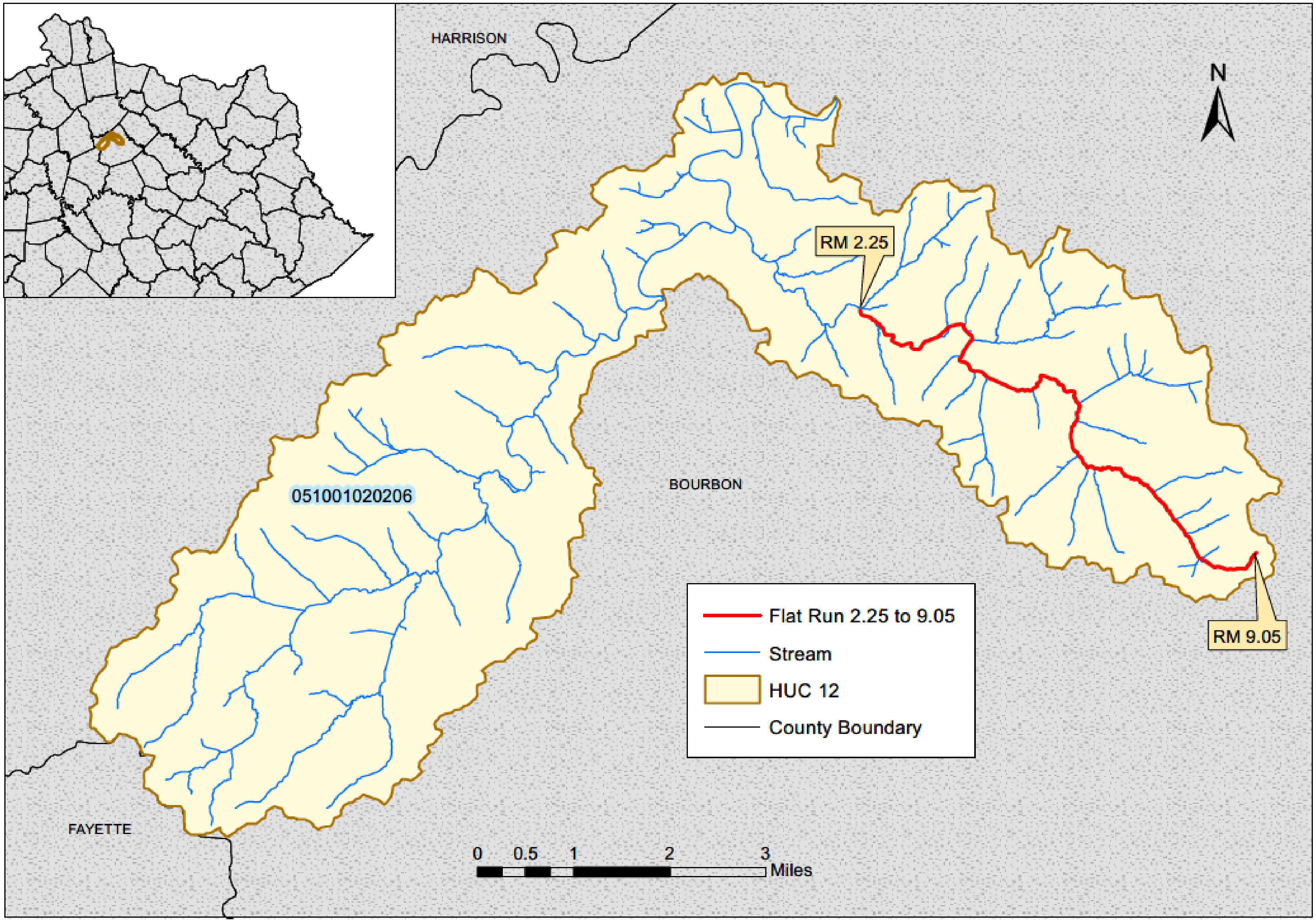


Figure F.14-1 Location of Flat Run 2.25 to 9.05

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region did not identify any karst areas outside the HUC 12 boundary that are contributing drainage to the segment (see Figure F.14-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

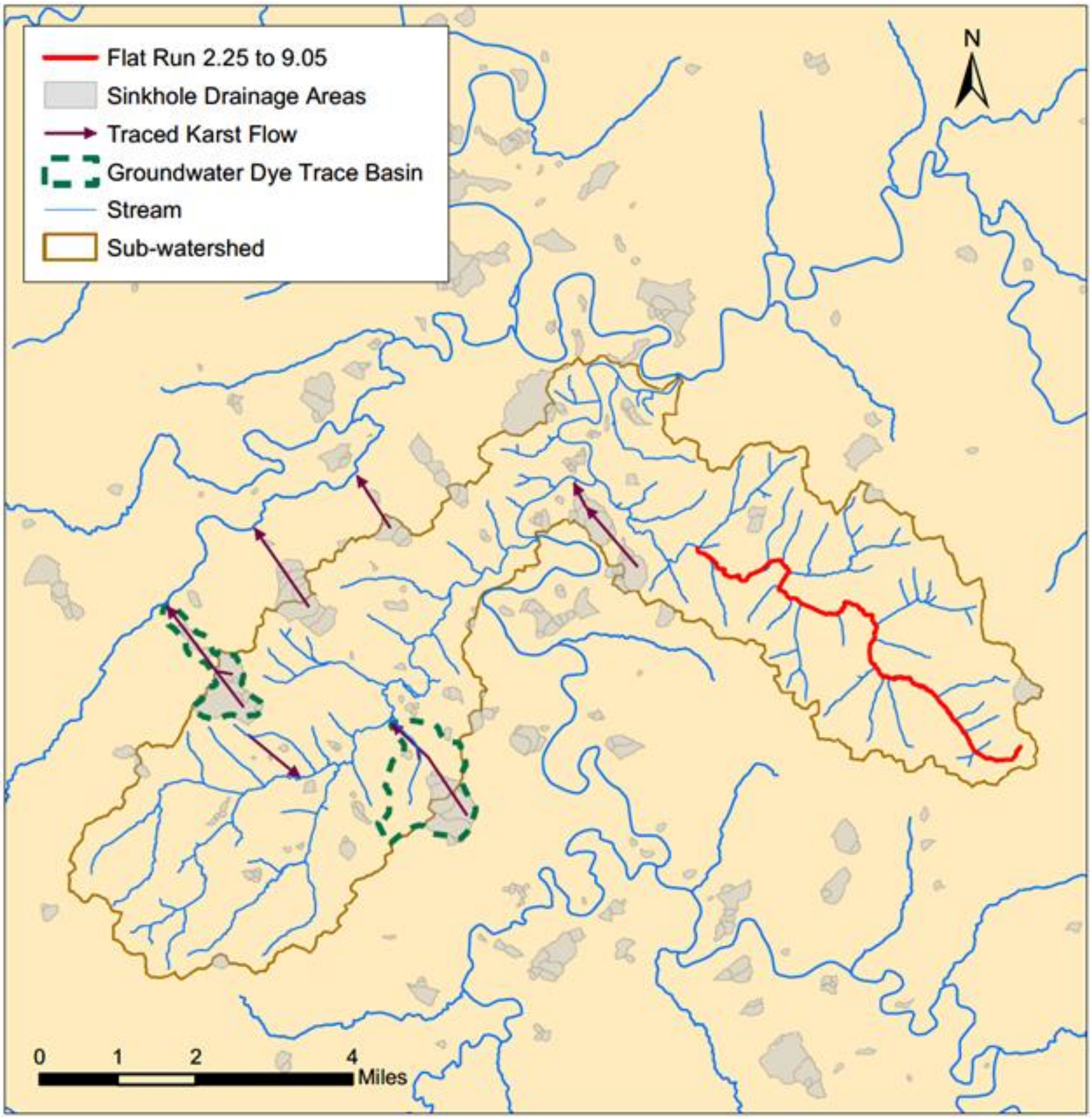


Figure F.14-2 Karst Influence in the Region of Flat Run 2.25 to 9.05

Section F.15 Fox Creek 0.0 to 10.1

Waterbody ID: KY512230_01

Receiving Water: Licking River

Impaired Use: PCR, SCR

Support Status: partial support (both uses)

Listed Pollutant: fecal coliform (both uses) **TMDL Pollutant:** *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001010805

County: Fleming

The Division of Water (DOW) has collected samples from two stations on this segment since 2004. The stations, LRW011 and LRW012, are sampled every five years during the PCR season as part of the DOW five-year rotating schedule for basin monitoring (see also Section 7.2.1, Kentucky Watershed Management Framework). The stations have typically been sampled four or more times during a monitoring year. Table F.15-1 summarizes information about this sampling station; Table F.15-2 provides a summary of the data collected from this station.

Table F.15-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
LRW011	38.467095	-84.065847	Fox Creek 0.0 to 10.1	0.8
LRW012	38.254704	-83.6529	Fox Creek 0.0 to 10.1	2.8

Table F.15-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
LRW011	*E. coli*	17	18	>2,420	330
LRW011	fecal coliform	5	8	2,500	1,007
LRW012	*E. coli*	16	42	1,300	387
LRW012	fecal coliform	4	320	840	585

(1)The full data set for samples collected at LRW011 and LRW012 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Fox Creek 0.0 to 10.1 are presented in Table F.15-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Fox Creek. The location within the Lower Fox Creek watershed is shown in Figure F.15-1.

Table F.15-3 Fox Creek 0.0 to 10.1 TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

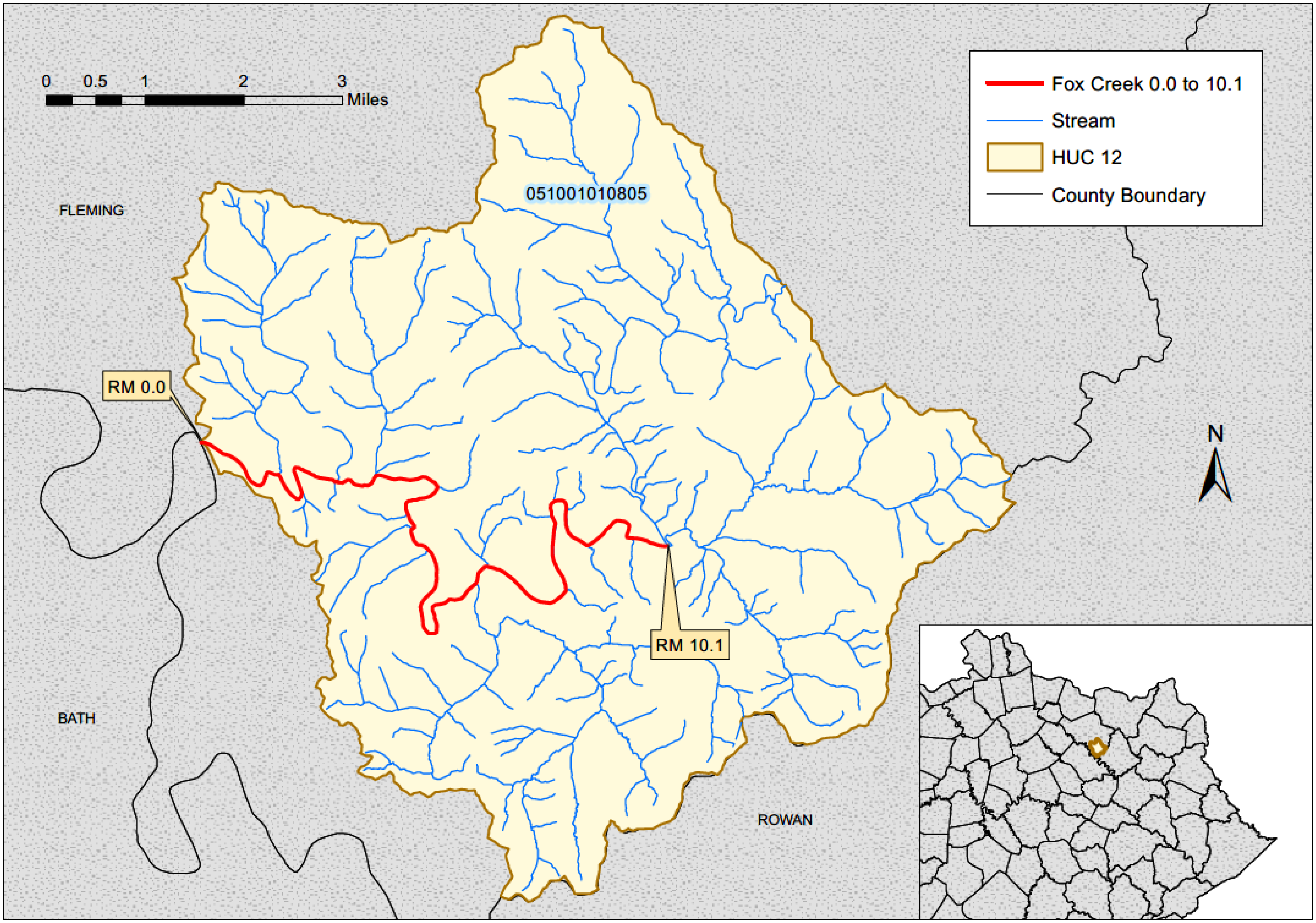


Figure F.15-1 Location of Fox Creek 0.0 to 10.1

Section F.16 Grassy Lick Creek 0.0 to 6.5

Waterbody ID: KY493166_01

Receiving Water: Hinkston Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001020301

County: Montgomery

The Division of Water (DOW) collected samples from station NPSHKC08, located near river mile 4.7, for a watershed-based plan in Hinkston Creek. The station was sampled once each month during the PCR season in 2010. Table F.16-1 summarizes information about this sampling station; Table F.16-2 provides a summary of the data collected from this station.

Table F.16-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
NPSHKC08	38.13472	-83.99472	Grassy Lick Creek 0.0 to 6.5	4.7

Table F.16-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
NPSHKC08	fecal coliform	6	60	2,240	650

(1)The full data set for samples collected at NPSHKC08 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.

(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Grassy Lick Creek 0.0 to 6.5 are presented in Table F.16-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Grassy Lick Creek.

Table F.16-3 Grassy Lick Creek 0.0 to 6.5 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Grassy Lick Creek watershed is shown in Figure F.16-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Grassy Lick Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

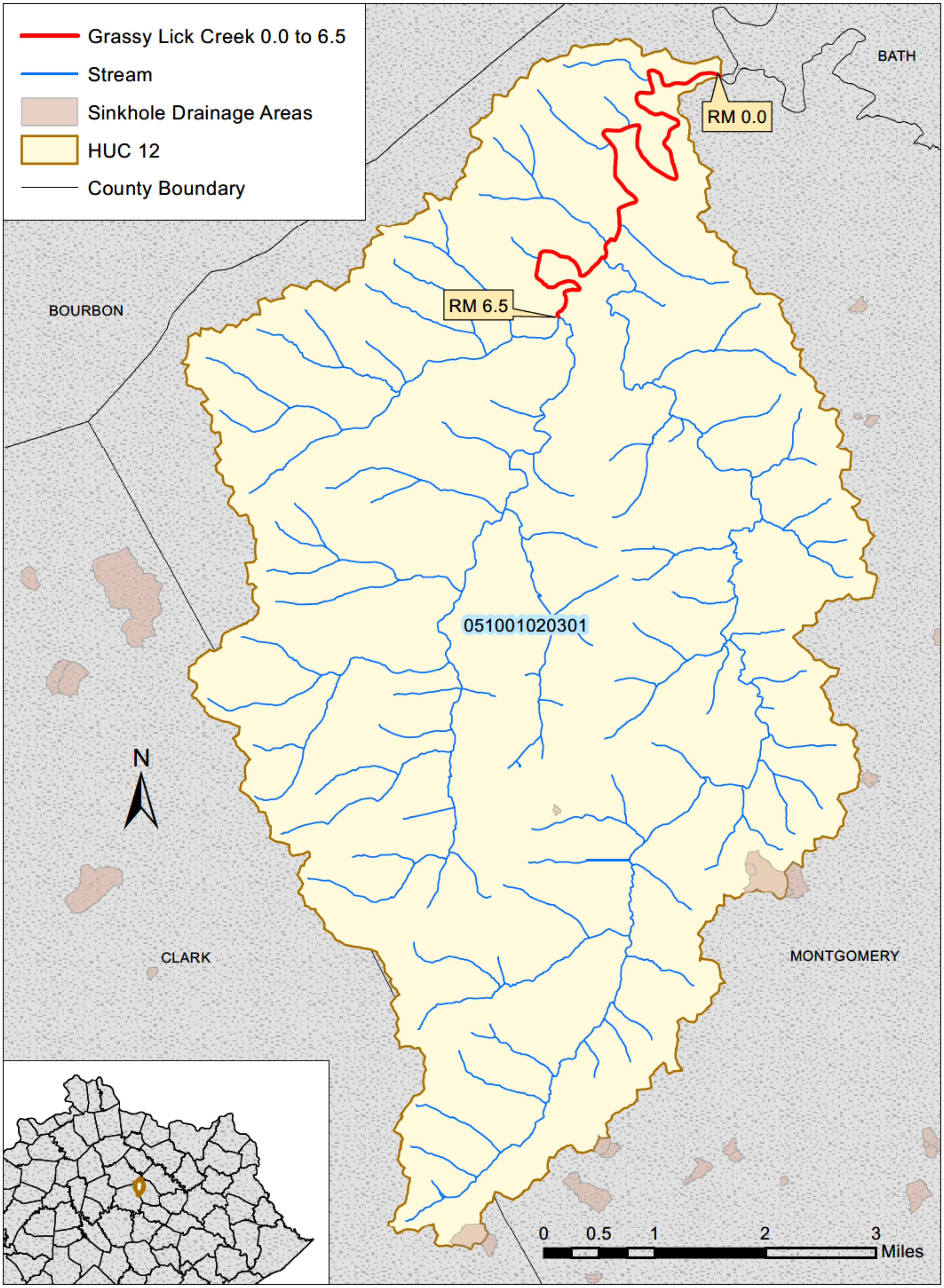


Figure F.16-1 Location of Grassy Lick Creek 0.0 to 6.5

Section F.17 Hays Branch 0.0 to 2.85

Waterbody ID: KY512612_01

Receiving Water: Triplett Creek

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010604

County: Rowan

The Division of Water (DOW) collected samples from station HB - 1.36, located near river mile 1.4, for a watershed-based plan in Triplett Creek. The station was sampled nine times in 2009 and five times in 2010 during the PCR season. Table F.17-1 summarizes information about this sampling station; Table F.17-2 provides a summary of the data collected from this station.

Table F.17-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
HB - 1.36	38.25877	-83.33302	Hays Branch 0.0 to 2.85	1.4

Table F.17-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
HB - 1.36	*E. coli*	14	20	700	204

(1)The full data set for samples collected at HB - 1.36 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Hays Branch 0.0 to 2.85 are presented in Table F.17-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Hays Branch.

Table F.17-3 Hays Branch 0.0 to 2.85 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Tributary Loads to the Segment(4)	MOS(5)
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(5)The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Upper Triplett Creek watershed is shown in Figure F.17-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Upper Triplett Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

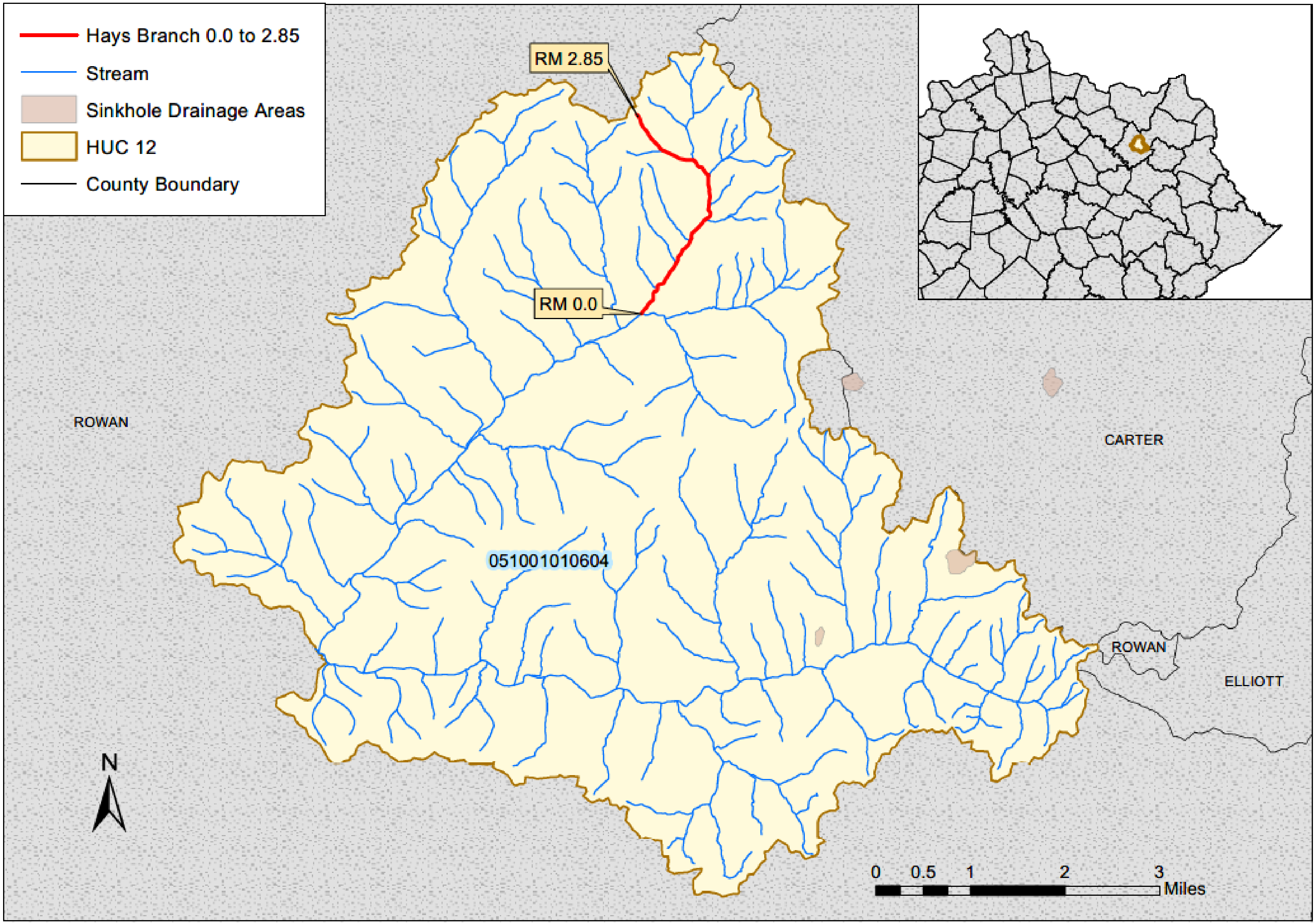


Figure F.17-1 Location of Hays Branch 0.0 to 2.85

Section F.18 Hinkston Creek 0.0 to 13.25

Waterbody ID: KY494298_01

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020307

County: Bourbon

The Division of Water (DOW) has collected samples from station PRI102, located near river mile 0.2, since 1999. The station typically has been sampled three or more times during the PCR season, although it was not sampled in 2005, 2007, 2012, and 2013. Table F.18-1 summarizes information about this sampling station; Table F.18-2 provides a summary of the data collected from this station.

Table F.18-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI102	38.304803	-84.237768	Hinkston Creek 0.0 to 13.25	0.2

Table F.18-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI102	*E. coli*	42	41	>2,420	459
PRI102	fecal coliform	37	8	40,000	1,462

(1)The full data set for samples collected at PRI102 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Hinkston Creek 0.0 to 13.25 are presented in Table F.18-3.

Table F.18-3 Hinkston Creek 0.0 to 13.25 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[5]	Allocations for Tributary Loads to the Segment[6]	MOS[7]
	SWS-WLA[3]	LA[4]			
$Q_S \times WQC \times CF$	$\sum(Q_{SWS} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Hooktown Branch-Hinkston Creek watershed is shown in Figure F.18-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Hooktown Branch-Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

One facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Hinkston Creek. The directly discharging facility is a sanitary wastewater system (SWS). There are no Municipal Separate Storm Sewer System (MS4) communities or Combined Sewer Overflows (CSOs) discharging directly to this segment of Hinkston Creek. This facility is identified in Table F.18-4 and the location in the Hooktown Branch-Hinkston Creek watershed is shown in Figure F.18-1.

Table F.18-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KY0020940	Kentucky American Water Co - Millersburg	0.2	38.299167	-84.15305	7/31/2021	Q_{SWS}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

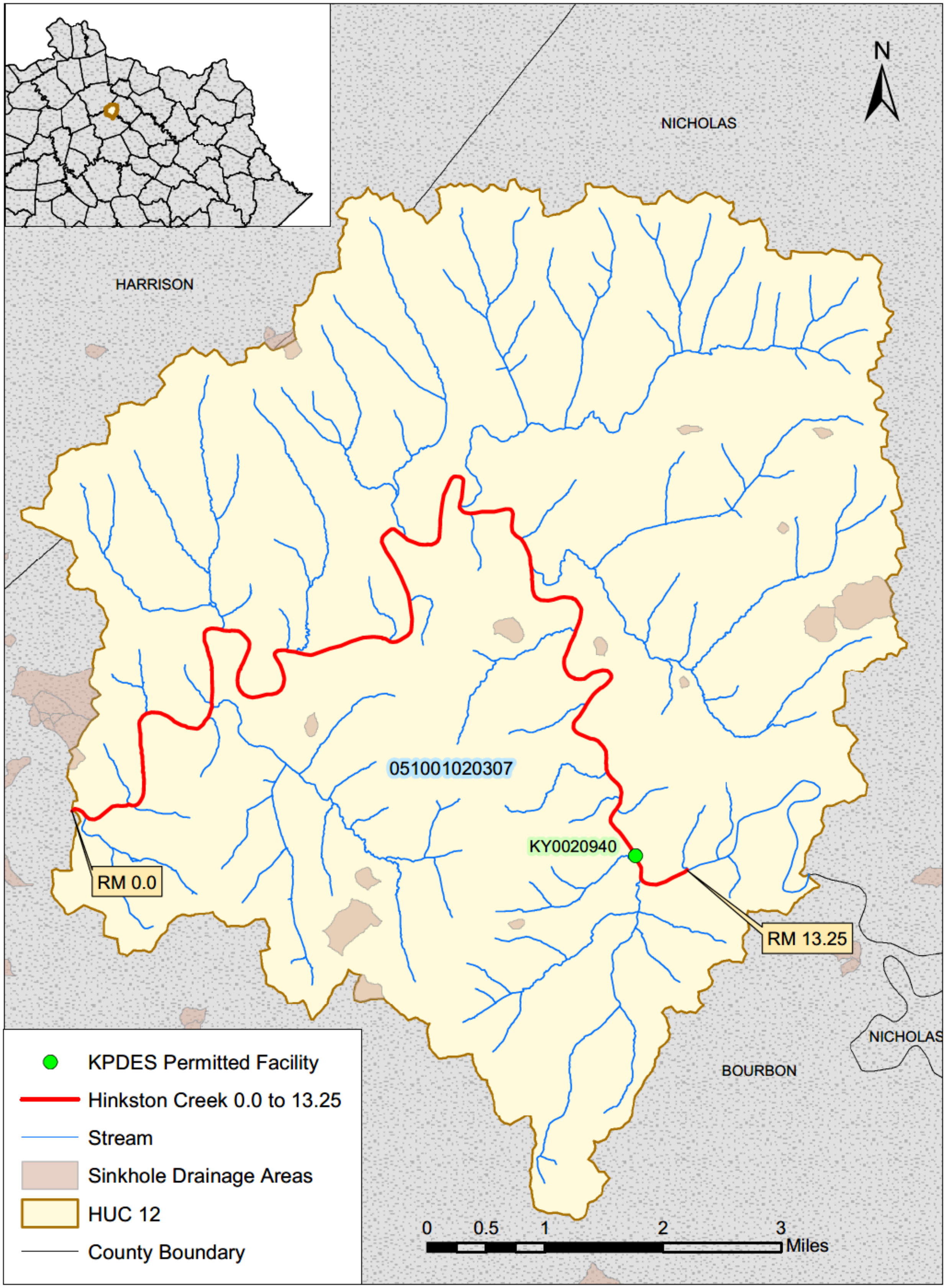


Figure F.18-1 Location of the KPDES-permitted Facility on Hinkston Creek 0.0 to 13.25

Section F.19 Hinkston Creek 21.1 to 31.5

Waterbody ID: KY494298_03

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001020304, 051001020305

County: Bourbon, Nicholas

The Division of Water (DOW) collected samples from station NPSHKC05, located near river mile 29.25, for a watershed-based plan in Hinkston Creek. The station was sampled once every month during the PCR season in 2010. Table F.19-1 summarizes information about this sampling station; Table F.19-2 provides a summary of the data collected from this station.

Table F.19-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
NPSHKC05	38.24722	-84.05556	Hinkston Creek 21.1 to 31.5	29.25

Table F.19-2 DOW Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
NPSHKC05	fecal coliform	6	40	1,680	397

[(1)]The full data set for samples collected at NPSHKC05 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Hinkston Creek 21.1 to 31.5 are presented in Table F.19-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Hinkston Creek.

Table F.19-3 Hinkston Creek 21.1 to 31.5 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Boone Creek-Hinkston Creek and Blacks Creek-Hinkston Creek watersheds is shown in Figure F.19-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Boone Creek-Hinkston Creek and Blacks Creek-Hinkston Creek watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

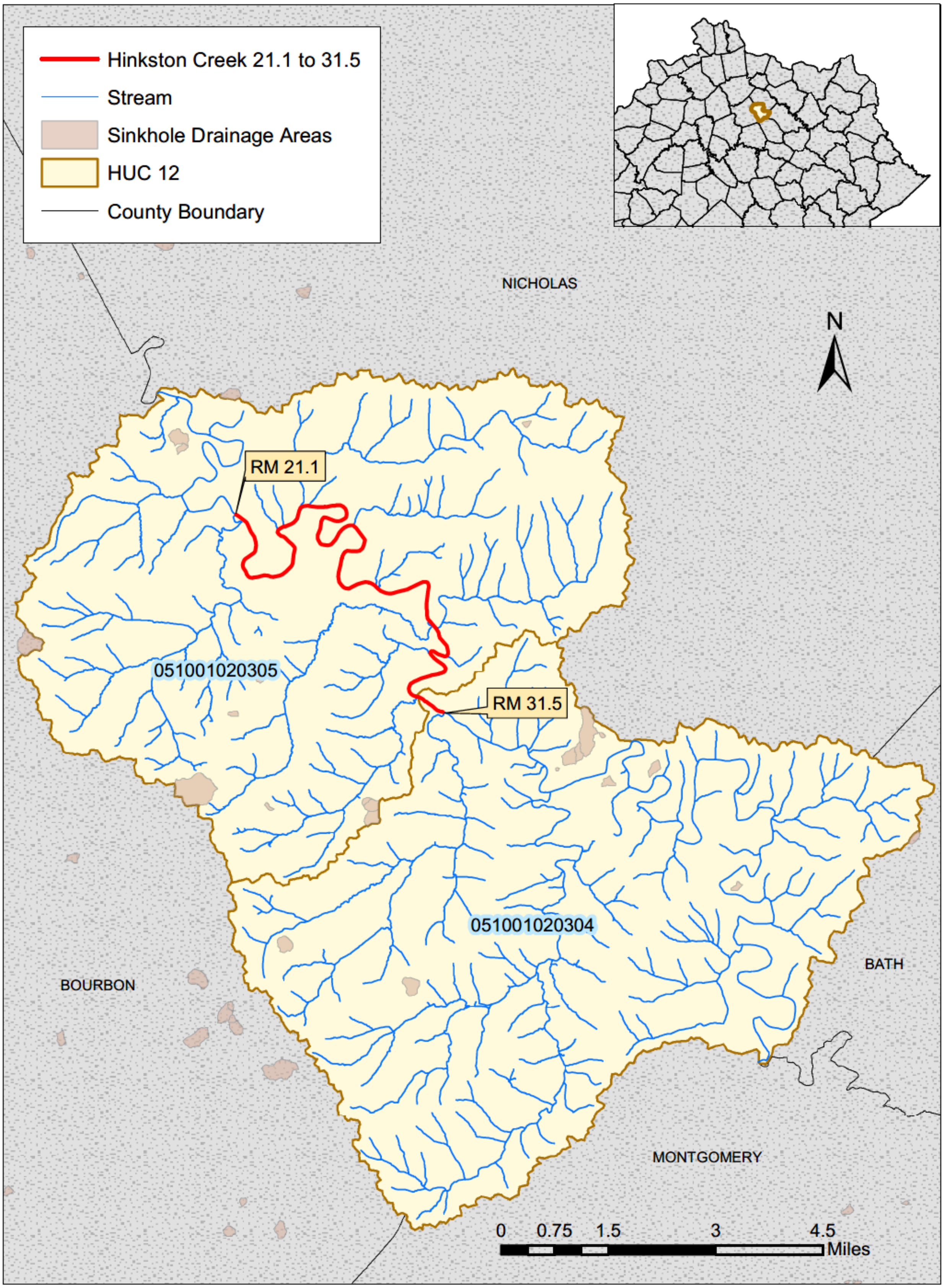


Figure F.19-1 Location of Hinkston Creek 21.1 to 31.5

Section F.20 Hinkston Creek 42.4 to 51.75

Waterbody ID: KY494298_05

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020301, 051001020302, 051001020304

County: Bath, Bourbon, Montgomery

In 2014, the Division of Water (DOW) collected at least one sample during each month of the PCR season at station DOW05016029. Table F.20-1 summarizes information about this sampling station; Table F.20-2 provides a summary of the data collected from this station.

Table F.20-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016029	38.161297	-83.959003	Hinkston Creek 42.4 to 51.75	51.65

Table F.20-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016029	*E. coli*	9	183	20,640	3,083

(1)The full data set for samples collected at DOW05016029 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Hinkston Creek 42.4 to 51.75 are presented in Table F.20-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Hinkston Creek.

Table F.20-3 Hinkston Creek 42.4 to 51.75 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
	LA[(3)]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Grassy Lick Creek, Headwaters Hinkston Creek, and Boone Creek-Hinkston Creek watersheds is shown in Figure F.20-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Grassy Lick Creek, Headwaters Hinkston Creek, and Boone Creek-Hinkston Creek watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

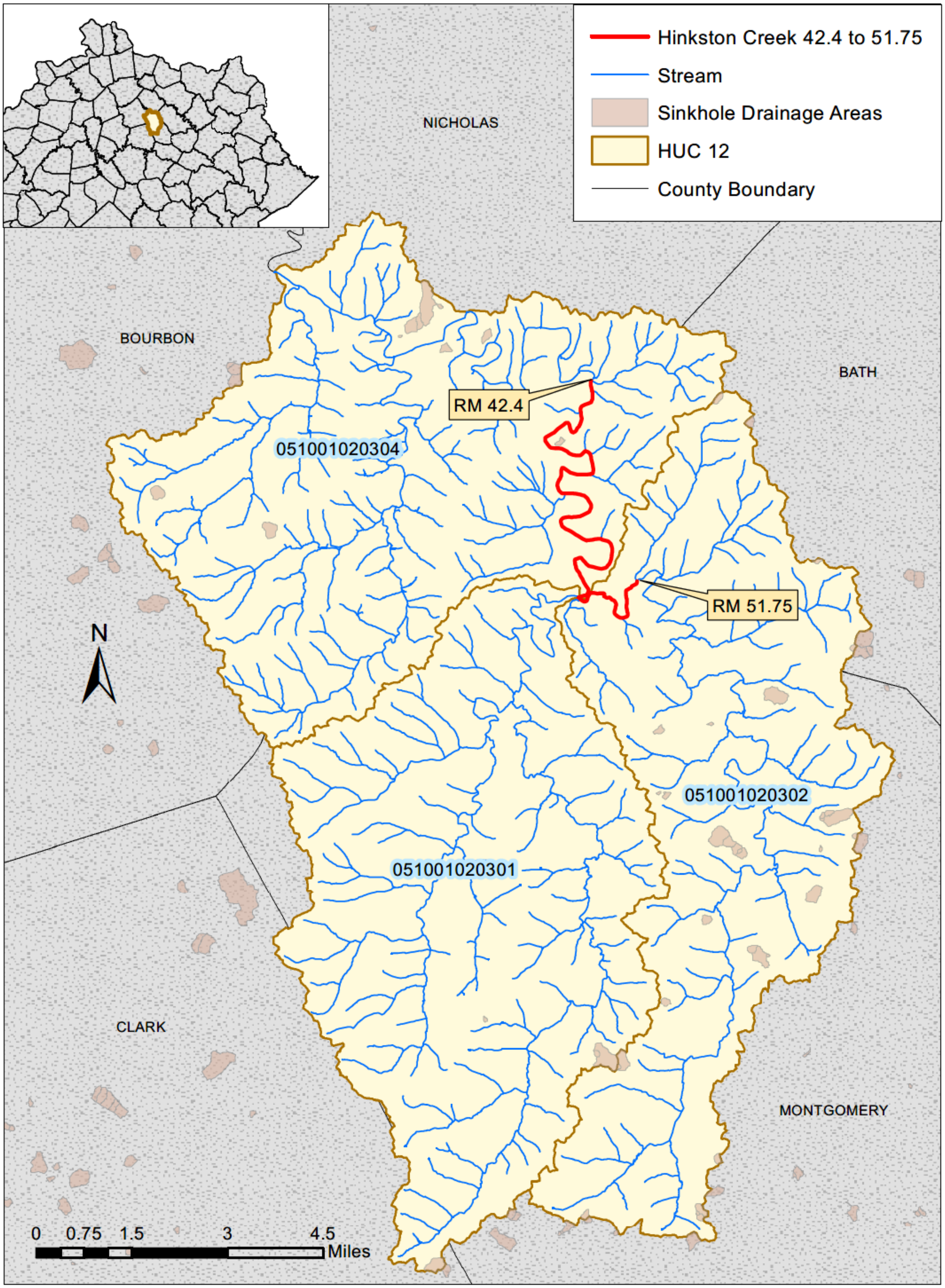


Figure F.20-1 Location of Hinkston Creek 42.4 to 51.75

Section F.21 Hinkston Creek 51.75 to 62.35

Waterbody ID: KY494298_06

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020302

County: Bath, Montgomery

In 2014, the Division of Water (DOW) collected at least one sample during each month of the PCR season at station DOW05016026 for a National Water Quality Initiative Project. Table F.21-1 summarizes information about this sampling station; Table F.21-2 provides a summary of the data collected from this station.

Table F.21-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016026	38.107163	-83.922812	Hinkston Creek 51.75 to 62.35	61.7

Table F.21-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016026	*E. coli*	8	644	17,329	4,541

(1)The full data set for samples collected at DOW05016026 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Hinkston Creek 51.75 to 62.35 are presented in Table F.21-3.

Table F.21-3 Hinkston Creek 51.75 to 62.35 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[5]	Allocations for Tributary Loads to the Segment[6]	MOS[7]
	SWS-WLA[3]	LA[4]			
$Q_S \times WQC \times CF$	$\sum(Q_{SWS} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Hinkston Creek watershed is shown in Figure F.21-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

One facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Hinkston Creek. The directly discharging facility is a sanitary wastewater system (SWS). There are no Municipal Separate Storm Sewer System (MS4) communities or Combined Sewer Overflows (CSOs) discharging directly to this segment of Hinkston Creek. This facility is identified in Table F.21-4 and the location in the Headwaters Hinkston Creek watershed is shown in Figure F.21-1.

Table F.21-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date[(1)]	WLA[(2)] (colonies *E. coli* /day)
KY0104400	Mount Sterling Hinkston Creek STP	3	38.084806	-83.922444	04/30/2023	Q_{SWS}×WQC×CF

[(1)]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[(2)]Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

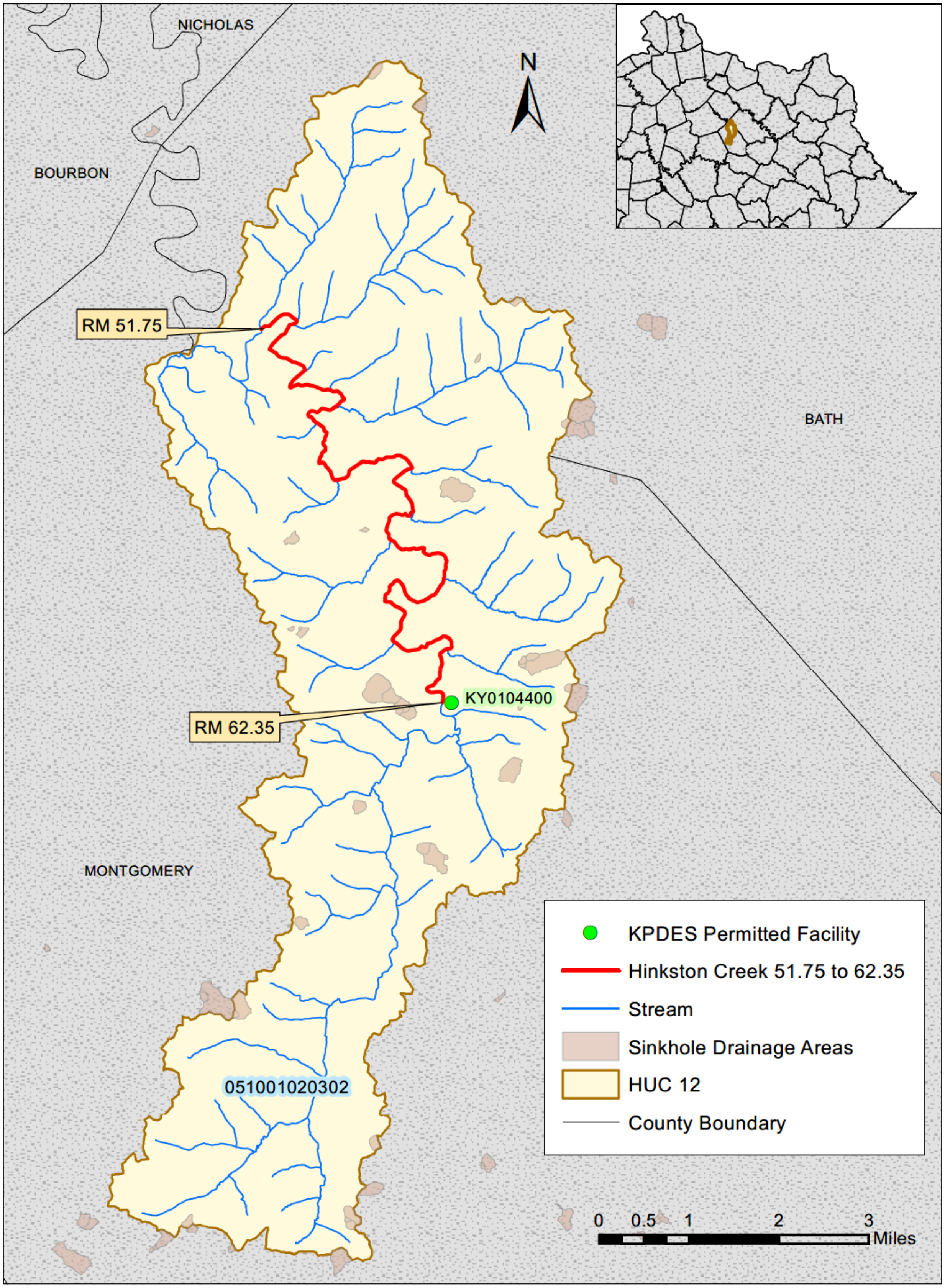


Figure F.21-1 Location of the KPDES-permitted Facility on Hinkston Creek 51.75 to 62.35

Section F.22 Hinkston Creek 62.35 to 69.1

Waterbody ID: KY494298_07

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020302

County: Montgomery

The Division of Water (DOW) collected samples from station NPSHKC11, located near river mile 62.6, for a watershed-based plan in Hinkston Creek. The station was sampled once each month during the PCR season in 2010. Table F.22-1 summarizes information about this sampling station; Table F.22-2 provides a summary of the data collected from this station.

Table F.22-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
NPSHKC11	38.09889	-83.920278	Hinkston Creek 62.35 to 69.1	62.6

Table F.22-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
NPSHKC11	fecal coliform	6	240	1,900	977

(1)The full data set for samples collected at NPSHKC11 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Hinkston Creek 62.35 to 69.1 are presented in Table F.22-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Hinkston Creek.

Table F.22-3 Hinkston Creek 62.35 to 69.1 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
	LA(3)			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
(2)Q_S is the flow (ft^3/s) in the segment.
(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.
(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
(6)The following assumptions provide an implicit MOS:
(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Hinkston Creek watershed is shown in Figure F.22-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

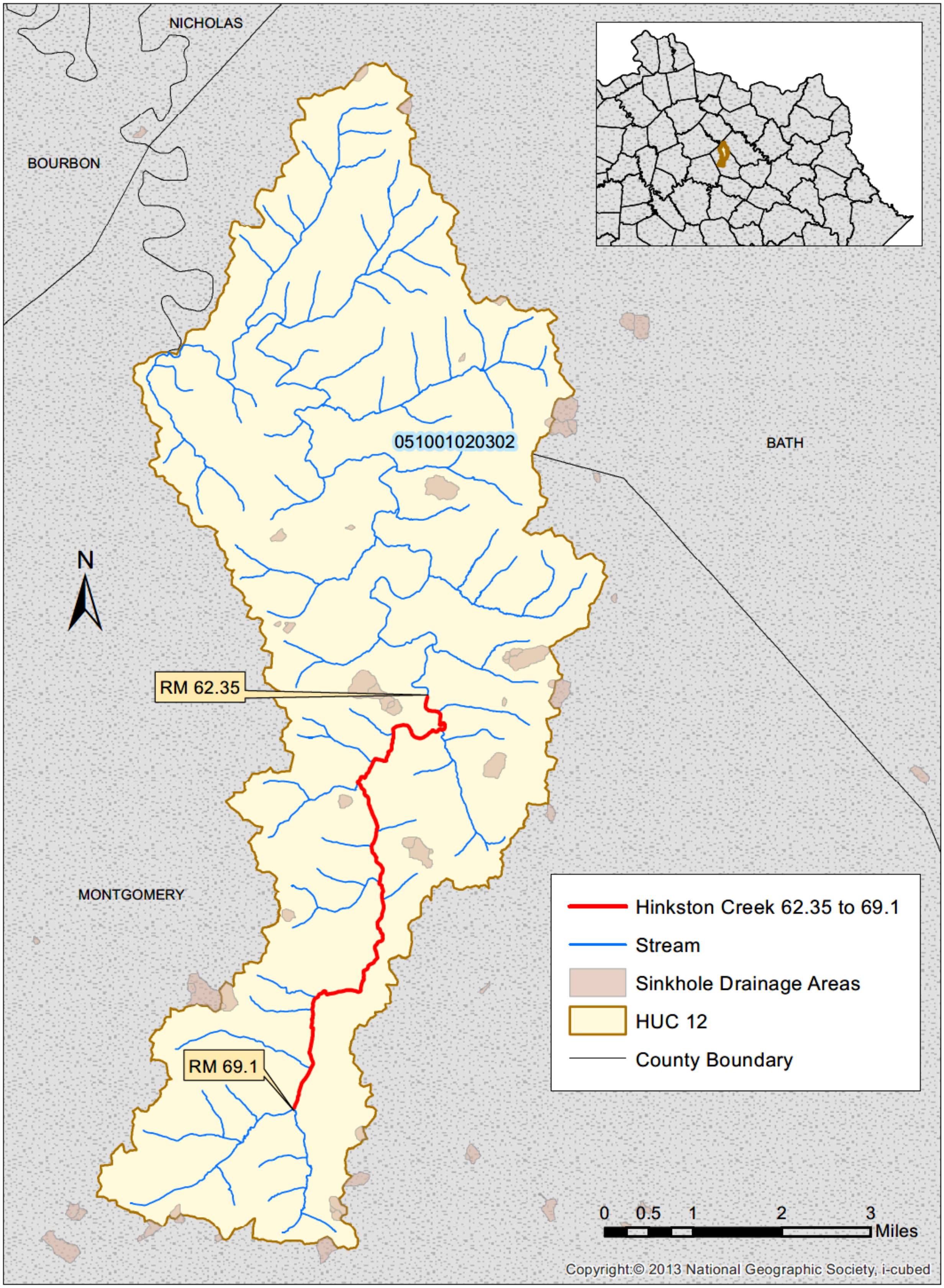


Figure F.22-1 Location of Hinkston Creek 62.35 to 69.1

Section F.23 Hinkston Creek 69.1 to 71.5

Waterbody ID: KY494298_08

Receiving Water: South Fork Licking River

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant/TMDL Pollutant: *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001020302

County: Montgomery

In 2014, the Division of Water (DOW) collected at least one sample during each month of the PCR season at station DOW05016020 for a National Water Quality Initiative Project. Table F.23-1 summarizes information about this sampling station; Table F.23-2 provides a summary of the data collected from this station.

Table F.23-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016020	38.034479	-83.952743	Hinkston Creek 69.1 to 71.5	69.2

Table F.23-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016020	*E. coli*	9	1,090	104,620	21,134

(1)The full data set for samples collected at DOW05016020 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Hinkston Creek 69.1 to 71.5 are presented in Table F.23-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Hinkston Creek.

Table F.23-3 Hinkston Creek 69.1 to 71.5 TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Tributary Loads to the Segment[(4)]	MOS[(5)]
	LA[(3)]		
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[(1)]All loads are colonies/day of *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
[(2)]Q_S is the flow (ft^3/s) in the segment.
[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
[(4)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
[(5)]The following assumptions provide an implicit MOS:
(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Hinkston Creek watershed is shown in Figure F.23-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

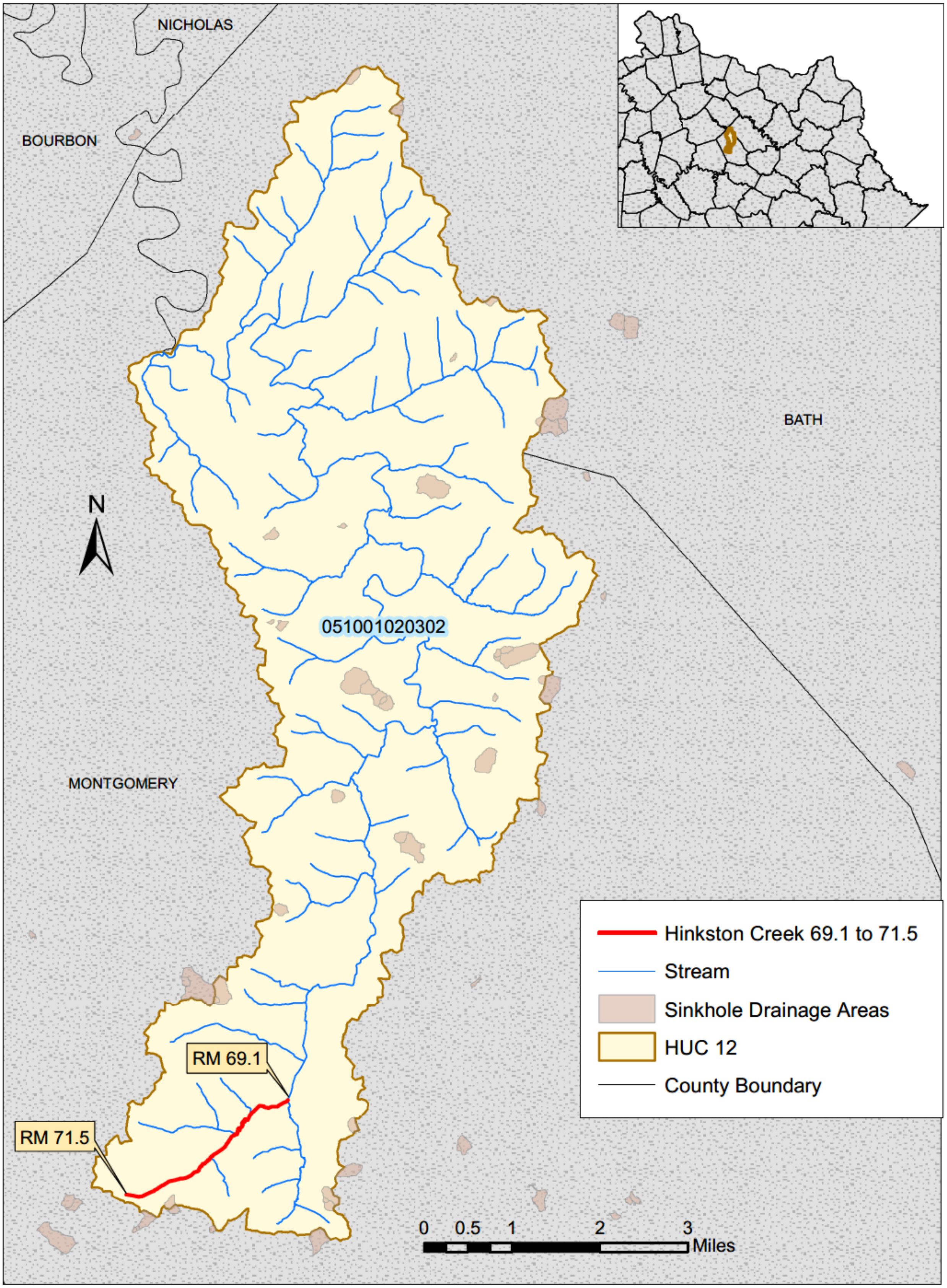


Figure F.23-1 Location of Hinkston Creek 69.1 to 71.5

Section F.24 Hoods Creek 0.0 to 5.9

Waterbody ID: KY494496_01

Receiving Water: Strodes Creek

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant: fecal coliform (both uses) **TMDL Pollutant:** *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001020101

County: Clark

The Division of Water (DOW) collected samples from station DOW05020006, located near river mile 1.8, in 2014. The station was sampled nine times during the PCR season. Table F.24-1 summarizes information about this sampling station; Table F.24-2 provides a summary of the data collected from this station.

Table F.24-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05020006	38.03949	-84.17938	Hoods Creek 0.0 to 5.9	1.8

Table F.24-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05020006	*E. coli*	9	77	20,980	4,584

(1)The full data set for samples collected at DOW05020006 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Hoods Creek 0.0 to 5.9 are presented in Table F.24-3.

Table F.24-3 Hoods Creek 0.0 to 5.9 TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment[5]	MOS[6]
	MS4-WLA[3]	LA[4]		
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

[4]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Hancock Creek-Strodes Creek watershed is shown in Figure F.24-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Hancock Creek-Strodes Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

The City of Winchester and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Hoods Creek. Information about MS4 permits is summarized in Table F.24-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of MS4 areas in the Hancock Creek-Strodes Creek watershed is shown in Figure F.24-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table F.24-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[1]	WLA[2] (colonies/day)
KYG200043	City of Winchester	04/30/2023	$Q_{MS4} \times WQC \times CF$
KYS000003	Kentucky Department of Transportation	09/30/2017	$Q_{MS4} \times WQC \times CF$

[1]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[2]Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

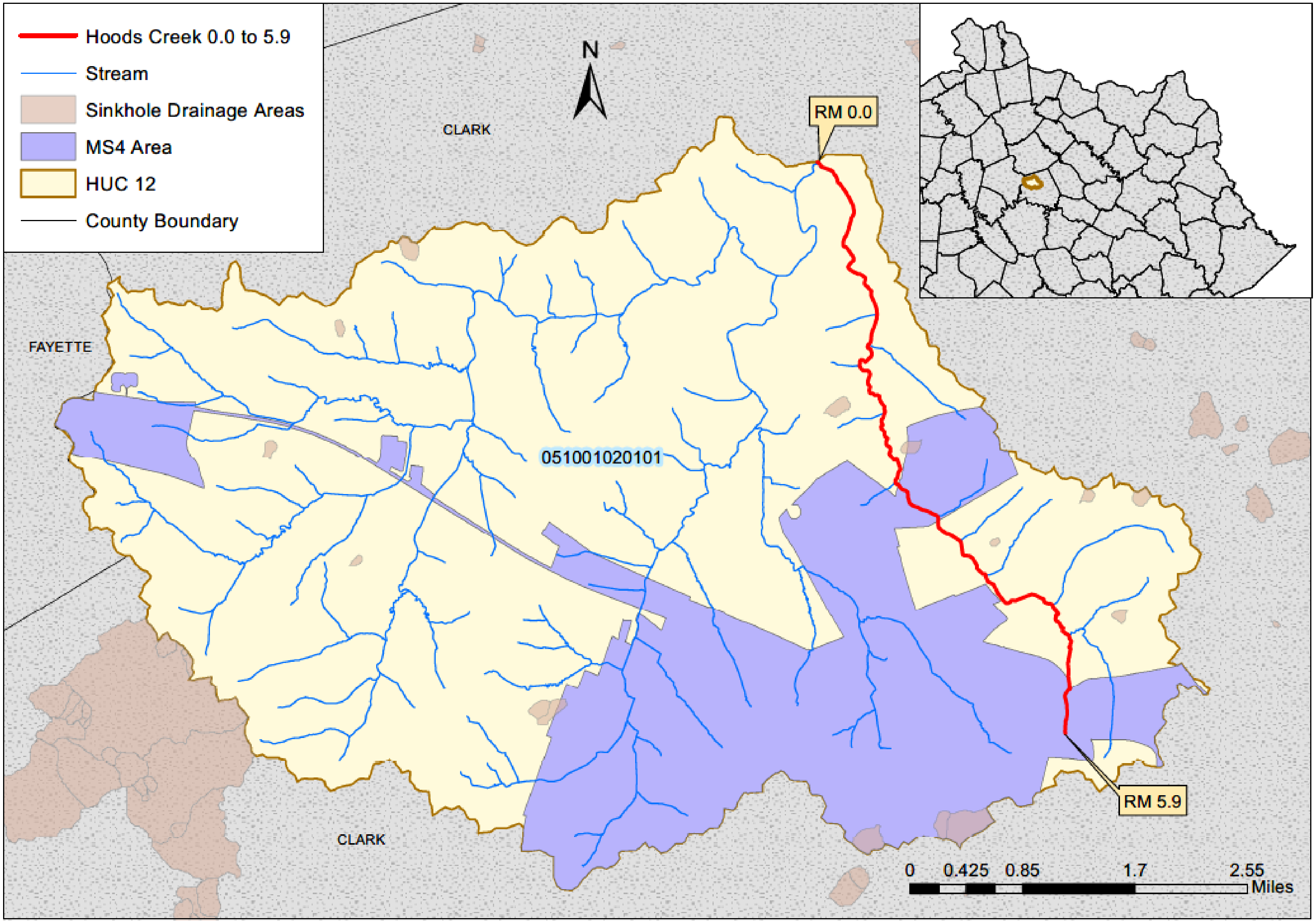


Figure F.24-1 Location of Hoods Creek 0.0 to 5.9

Section F.25 Houston Creek 0.0 to 9.1

Waterbody ID: KY494646_01

Receiving Water: Stoner Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001020204

County: Bourbon

The Division of Water (DOW) collected samples during the PCR season from three stations on this segment. In 2006, seven samples were collected from DOW05017003, eight samples were collected from DOW05017004, and eight samples were collected from DOW05017005. Table F.25-1 summarizes information about this sampling station; Table F.25-2 provides a summary of the data collected from this station.

Table F.25-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017003	38.21542	-84.25005	Houston Creek 0.0 to 9.1	0.18
DOW05017004	38.20585	-84.27908	Houston Creek 0.0 to 9.1	4.53
DOW05017005	38.18198	-84.29113	Houston Creek 0.0 to 9.1	8.44

Table F.25-2 DOW Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017003	*E. coli*	8	29	1,990	346
DOW05017004	*E. coli*	8	97	2,280	771
DOW05017005	*E. coli*	8	29	1,990	346

[(1)]The full data set for samples collected at DOW05017003, DOW05017004, and DOW05017005 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Houston Creek 0.0 to 9.1 are presented in Table F.25-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Houston Creek.

Table F.25-3 Houston Creek 0.0 to 9.1 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment LA[(3)]	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Houston Creek watershed is shown in Figure F.25-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Houston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

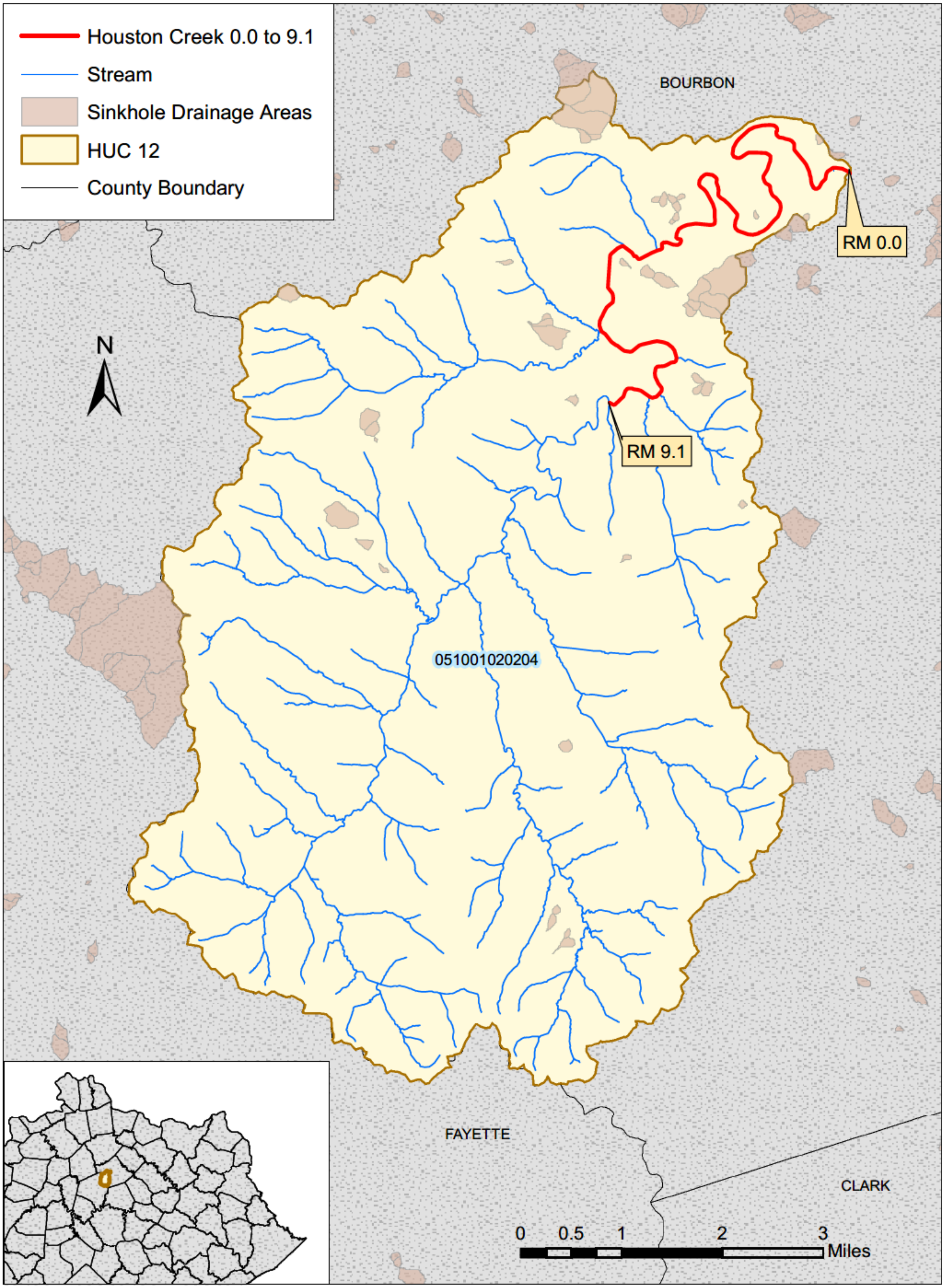


Figure F.25-1 Location of Houston Creek 0.0 to 9.1

Section F.26 Island Fork 0.0 to 3.75

Waterbody ID: KY512940_01

Receiving Water: Rock Fork

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010601

County: Rowan

The Division of Water (DOW) collected samples from station IF - 0.05, located near river mile 0.1, for a watershed-based plan in Triplett Creek. The station was sampled nine times in 2009 and four times in 2010 during the PCR season. Table F.26-1 summarizes information about this sampling station; Table F.26-2 provides a summary of the data collected from this station.

Table F.26-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
IF - 0.05	38.31506	-83.44241	Island Fork 0.0 to 3.75	0.1

Table F.26-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
IF - 0.05	*E. coli*	13	150	7,500	2,706

(1)The full data set for samples collected at IF - 0.05 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Island Fork 0.0 to 3.75 are presented in Table F.26-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Island Fork. The location of the segment within the Upper North Fork Triplett Creek watershed is shown in Figure E.27-1.

Table F.26-3 Island Fork 0.0 to 3.75 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

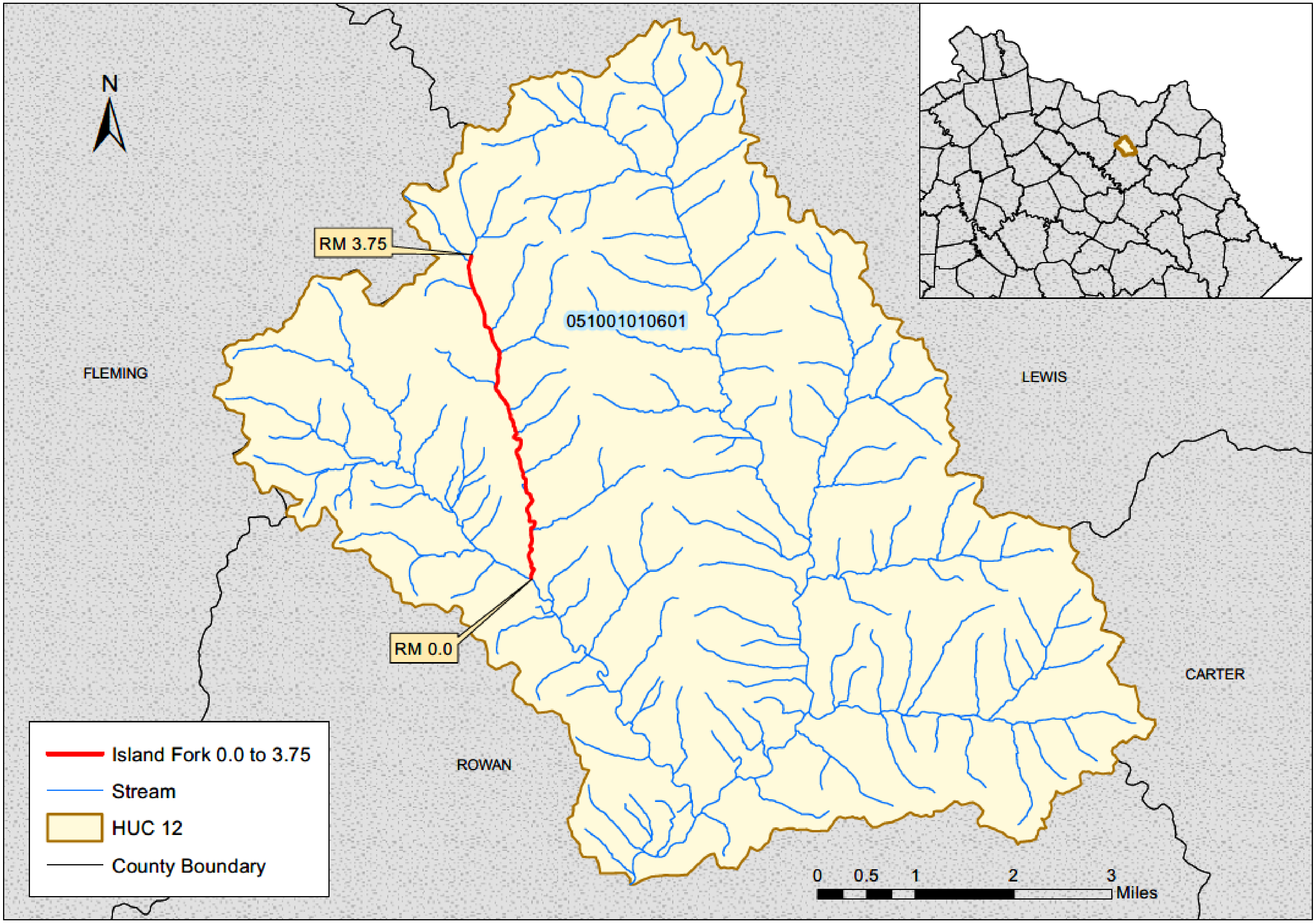


Figure F.26-1 Location of Island Fork 0.0 to 3.75

Section F.27 Johnson Creek 0.0 to 3.25

Waterbody ID: KY495397_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001010105

County: Magoffin

This segment was first listed on Kentucky's 2002 303(d) list based on samples collected by Morehead State University as part of a 319(h) nonpoint source project conducted in 1999. Assessment records give coordinates for the sampling location, but the data could not be located as of this writing. Table F.27-1 summarizes information about this sampling station.

Table F.27-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
Unknown	37.7613	-83.1623	Johnson Creek 0.0 to 3.25	2.5

The TMDL allocations for Johnson Creek 0.0 to 3.25 are presented in Table F.27-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Johnson Creek. The location of the segment within the Johnson Creek watershed is shown in Figure E.28-1.

Table F.27-3 Johnson Creek 0.0 to 3.25 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

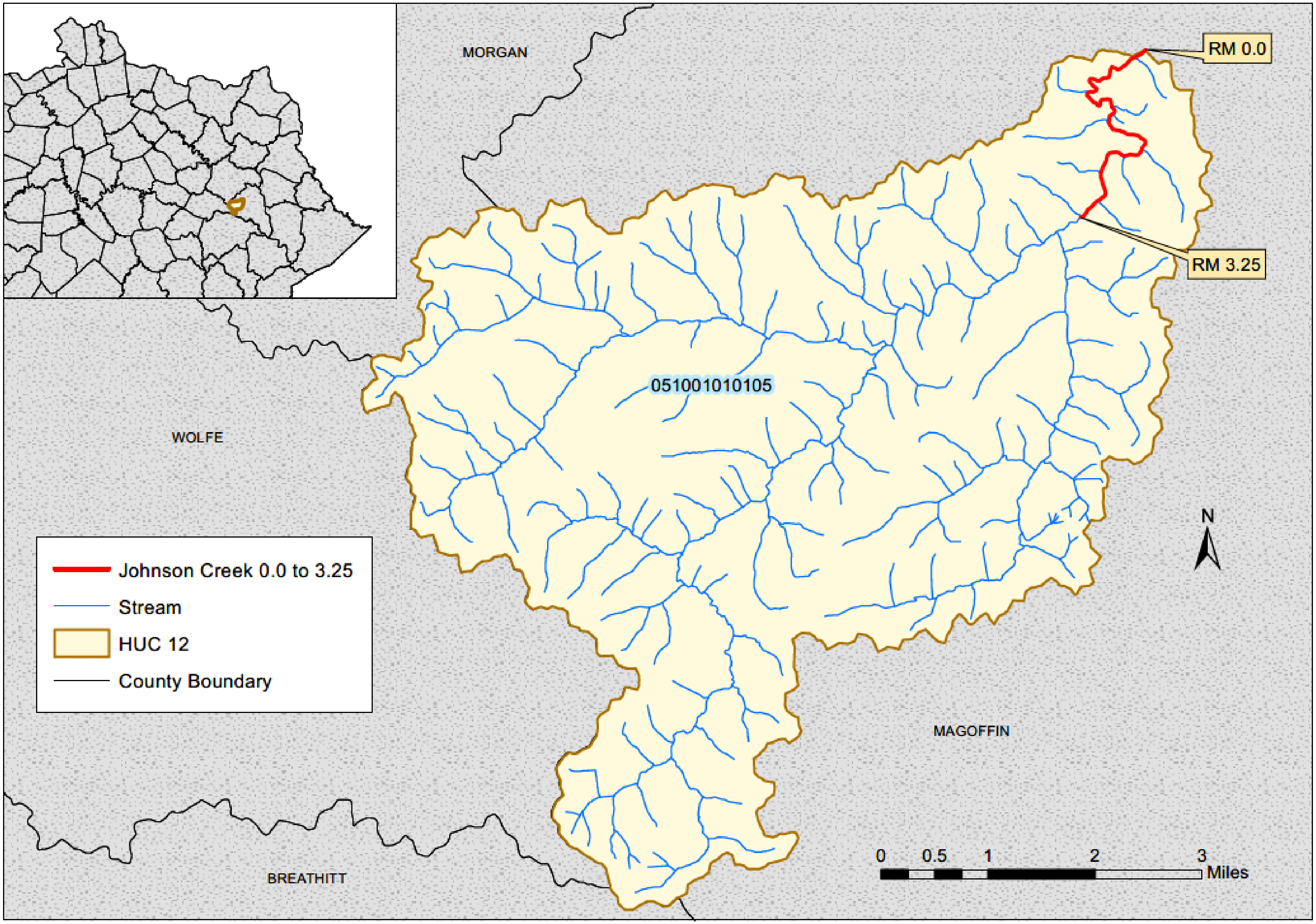


Figure F.27-1 Location of Johnson Creek 0.0 to 3.25

Section F.28 Johnson Creek 0.0 to 0.9

Waterbody ID: KY495398_01

Receiving Water: Strodes Creek

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant: fecal coliform (both uses) **TMDL Pollutant:** *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001010105

County: Clark

The Division of Water (DOW) collected samples from station DOW05020012, located near river mile 0.2, in 2014. The station was sampled one to four times each month during the PCR season. Table F.28-1 summarizes information about this sampling station; Table F.28-2 provides a summary of the data collected from this station.

Table F.28-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05020012	38.091019	-84.195476	Johnson Creek 0.0 to 0.9	0.2

Table F.28-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05020012	*E. coli*	10	38	4,280	1,840

(1)The full data set for samples collected at DOW05020012 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Johnson Creek 0.0 to 0.9 are presented in Table F.28-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Johnson Creek.

Table F.28-3 Johnson Creek 0.0 to 0.9 TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	MOS(5)
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)The following assumptions provide an implicit MOS:

(a)Upstream bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Johnson Creek-Strodes Creek watershed is shown in Figure F.28-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Johnson Creek-Strodes Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

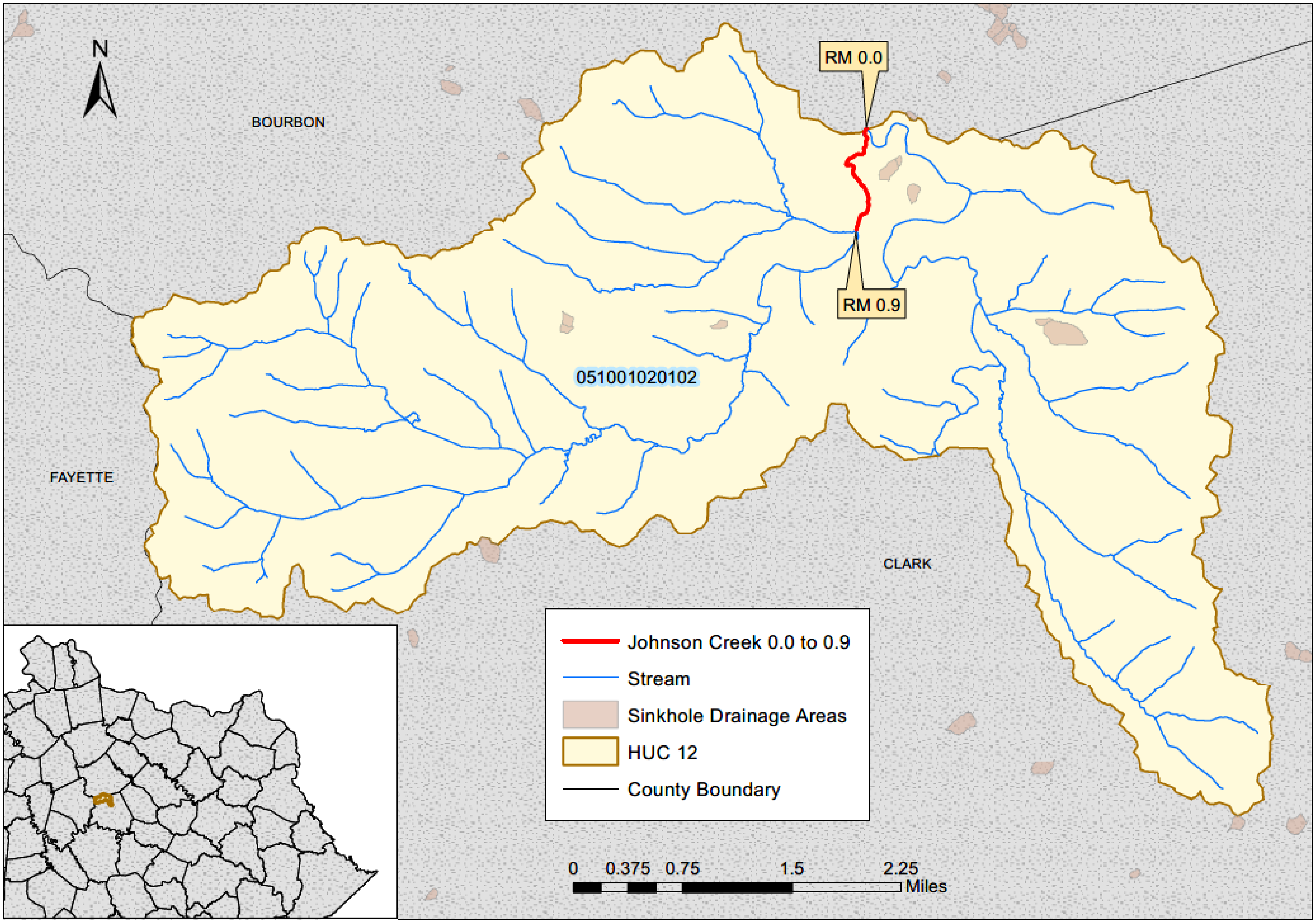


Figure F.28-1 Location of Johnson Creek 0.0 to 0.9

Section F.29 Kennedy Creek 0.0 to 5.6

Waterbody ID: KY495646_01

Receiving Water: Stoner Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020205

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05017024, located near river mile 0.75, in 2009. The station was sampled between one and six times during each month of the PCR season. Table F.29-1 summarizes information about this sampling station; Table F.29-2 provides a summary of the data collected from this station.

Table F.29-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017024	38.19271	-84.24767	Kennedy Creek 0.0 to 5.6	0.75

Table F.29-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017024	*E. coli*	20	2	>2,420	431

(1)The full data set for samples collected at DOW05017024 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Kennedy Creek 0.0 to 5.6 are presented in Table F.29-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Kennedy Creek.

Table F.29-3 Kennedy Creek 0.0 to 5.6 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
	LA(3)			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Kennedy Creek-Stoner Creek watershed is shown in Figure F.29-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Kennedy Creek-Stoner Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

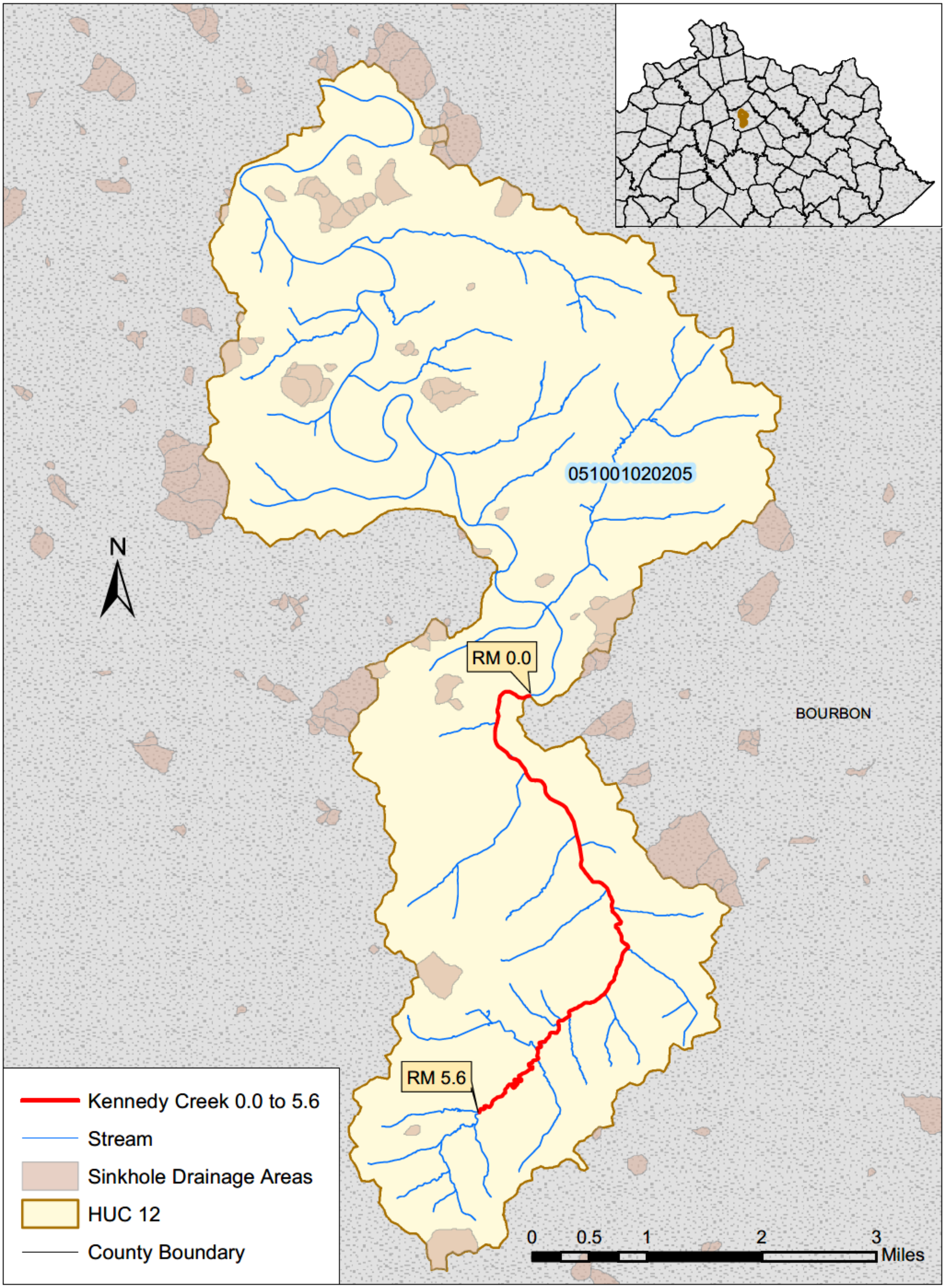


Figure F.29-1 Location of Kennedy Creek 0.0 to 5.6

Section F.30 Licking River 0.0 to 4.65

Waterbody ID: KY513416_01

Receiving Water: Ohio River

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001011306

County: Campbell

The Division of Water (DOW) has collected samples from station LRW001, located near river mile 2.2, since 1999. The station is sampled every five years during the PCR season as part of the DOW five-year rotating schedule for basin monitoring (see also Section 7.2.1, Kentucky Watershed Management Framework). This station has typically been sampled two to six times during a monitoring year. The station was not sampled in 2004. Table F.30-1 summarizes information about this sampling station; Table F.30-2 provides a summary of the data collected from this station.

Table F.30-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
LRW001	39.0631	-84.495422	Licking River 0.0 to 4.65	2.2

Table F.30-2 DOW Sample Data Summary[1]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
LRW001	*E. coli*	13	14	1,046	216
LRW001	fecal coliform	4	36	3,000	1,019

[1]The full data set for samples collected at LRW001 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[2]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Licking River 0.0 to 4.65 are presented in Table F.30-3.

Table F.30-3 Licking River 0.0 to 4.65 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment			Allocations for Upstream Loads to the Segment[6]	Allocations for Tributary Loads to the Segment[7]	MOS[8]
	MS4-WLA[3]	CSO-WLA[4]	LA[5]			
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{CSO}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{CSO} is the flow (ft^3/s) in the segment due to a CSO entity. Dry weather CSO flows are prohibited. During wet weather events, a CSO entity is compliant with its CSO-WLA if it is compliant with its Long Term Control Plan and KPDES permit.

(5)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(6)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(7)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(8)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

Sanitation District No.1 of Northern Kentucky, Covington, and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of the Licking River. Information about MS4 permits is summarized in Table F.30-4. Information concerning Taylor Mill, Wilder, and Newport MS4 permit coverage can be found as a co-permittee of Sanitation District No.1 of Northern Kentucky's MS4 permit (Permit number KYG200007). Thirty-two Combined Sewer Overflows (CSOs) permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharge directly into this segment of Licking River. CSOs are permitted by KPDES and managed under consent judgments with the state or joint federal/state consent decrees. CSO management plans include enforceable schedules for eliminating or minimizing the impact of the CSOs on water quality. There are no other KPDES-permitted facilities discharging directly to this segment of Licking River. The definitions for MS4 and CSO are found in 401 KAR 5:002. The MS4 areas and CSOs are identified in Table F.30-4. The CSO outfall locations are identified in Table F.30-5. The location of these active KPDES-permitted sources within the DeCoursey Creek-Licking River watershed are shown in Figure F.30-1. MS4 area boundaries for Permit number KYG200007 were provided to DOW in September 2021. All other MS4 area boundaries are from DOW information last updated in 2015. Only those MS4s with coverage areas that include direct drainage to the impaired segment are shown on the map, and boundaries between individual systems are not shown.

Table F.30-4 Summary of Active KPDES-permitted MS4 and CSO Sources as of March 2021

KPDES Permit Number	Facility Name	Outfall Latitude	Outfall Longitude	Permit Expiration Date[(1)]	WLA[(2)] (colonies *E. coli* /day)
KYG200007	Sanitation District No.1 of Northern Kentucky	N/A	N/A	4/30/2023	$Q_{MS4} \times WQC \times CF$
KYG200007	Taylor Mill	N/A	N/A	4/30/2023	$Q_{MS4} \times WQC \times CF$
KYG200007	Wilder	N/A	N/A	4/30/2023	$Q_{MS4} \times WQC \times CF$
KYG200007	Newport	N/A	N/A	4/30/2023	$Q_{MS4} \times WQC \times CF$
KYG200064	Covington	N/A	N/A	4/30/2023	$Q_{MS4} \times WQC \times CF$
KYS000003	Kentucky Department of Transportation	N/A	N/A	09/30/2017	$Q_{MS4} \times WQC \times CF$
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	various	various	06/30/2024	$Q_{CSO} \times WQC \times CF$

[(1)]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.

[(2)]Q_{CSO} is the flow in the segment due to a CSO entity. Q_{MS4} is the flow in the segment due to an

MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

Table F.30-5 CSO Outfall Locations as of March 2021

KPDES Permit Number	Facility Name	Outfall Latitude	Outfall Longitude
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.07773	-84.4978
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08887	-84.5036
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.04943	-84.494
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.04836	-84.4926
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.05383	-84.497
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.05227	-84.496
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.06311	-84.4961
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.05852	-84.4981
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.07236	-84.4942
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.07144	-84.4939
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.06985	-84.4947
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.06757	-84.4947
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.06597	-84.4952
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.07539	-84.4972
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.07354	-84.4954
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.07913	-84.4999
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.07797	-84.4991
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.0773	-84.4986
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08554	-84.5047
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08323	-84.5034

KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08235	-84.5026
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08179	-84.5022
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08119	-84.5017
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08031	-84.5007
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.04	-84.4858
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.03821	-84.487
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08214	-84.5013
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08097	-84.5002
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.08953	-84.5049
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.0582	-84.4984
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.06018	-84.4975
KY0021466	Sanitation District No.1 of Northern Kentucky - Dry Creek	39.07848	-84.4982

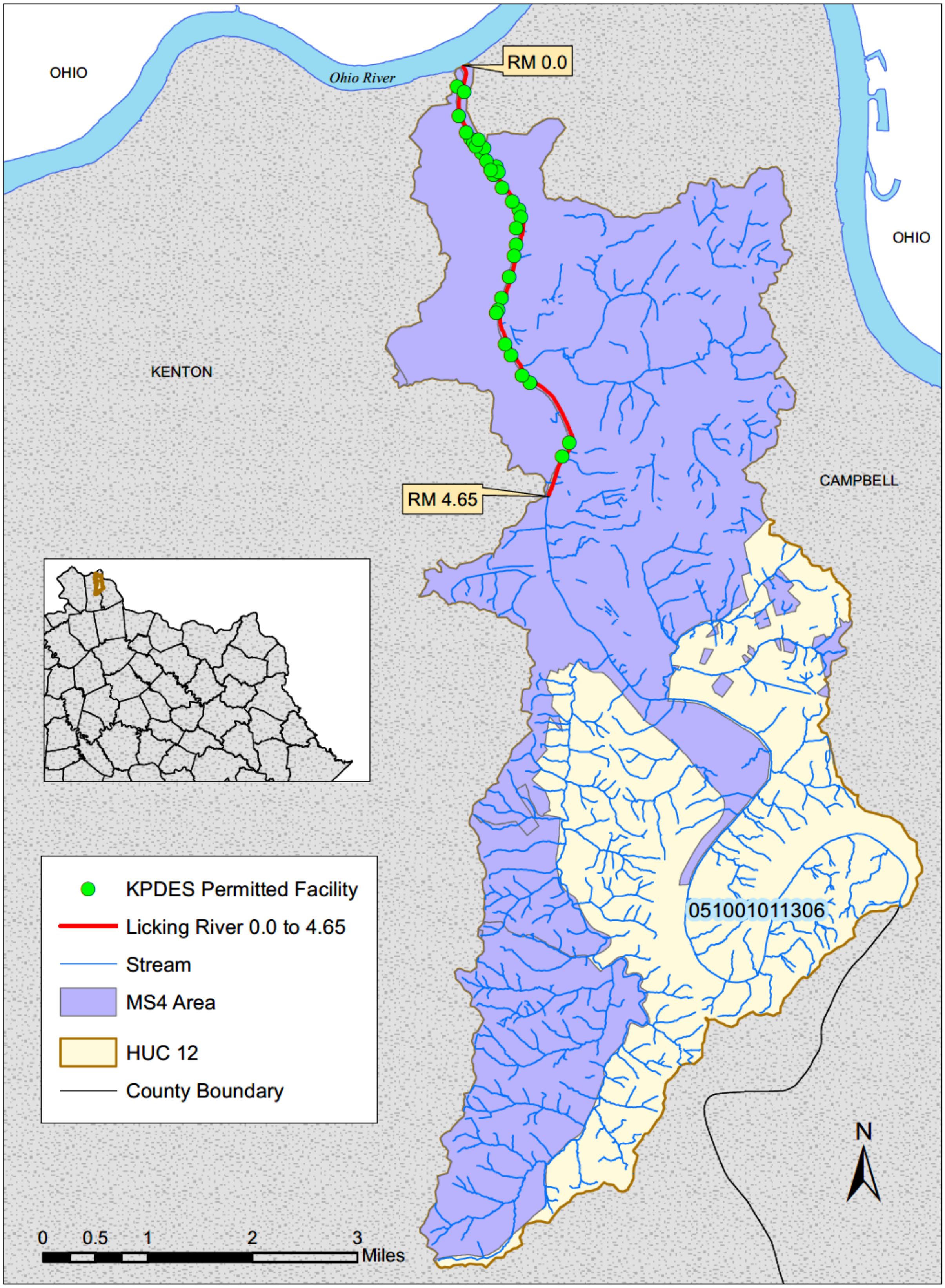


Figure F.30-1 Location of the KPDES-permitted Facilities on Licking River 0.0 to 4.65 (All KPDES-permitted facilities are permit number KY0021466)

Section F.31 Licking River 4.65 to 14.7

Waterbody ID: KY513416_02

Receiving Water: Ohio River

Impaired Use: PCR

Support Status: partial support

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12s: 051001011303, 051001011306

County: Kenton

This segment was first listed on Kentucky's 2002 303(d) list based on samples collected by Morehead State University as part of a 319(h) nonpoint source project conducted in 1999. Assessment records give coordinates for the sampling location, but the data could not be located as of this writing. Table F.31-1 summarizes information about this sampling station.

Table F.31-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
Unknown	38.96917	-84.46611	Licking River 4.65 to 14.7	10.5

The TMDL allocations for Licking River 4.65 to 14.7 are presented in Table F.31-3.

Table F.31-3 Licking River 4.65 to 14.7 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[(5)]	Allocations for Tributary Loads to the Segment[(6)]	MOS[(7)]
	MS4-WLA[(3)]	LA[(4)]			
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

[(4)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(5)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(6)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(7)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

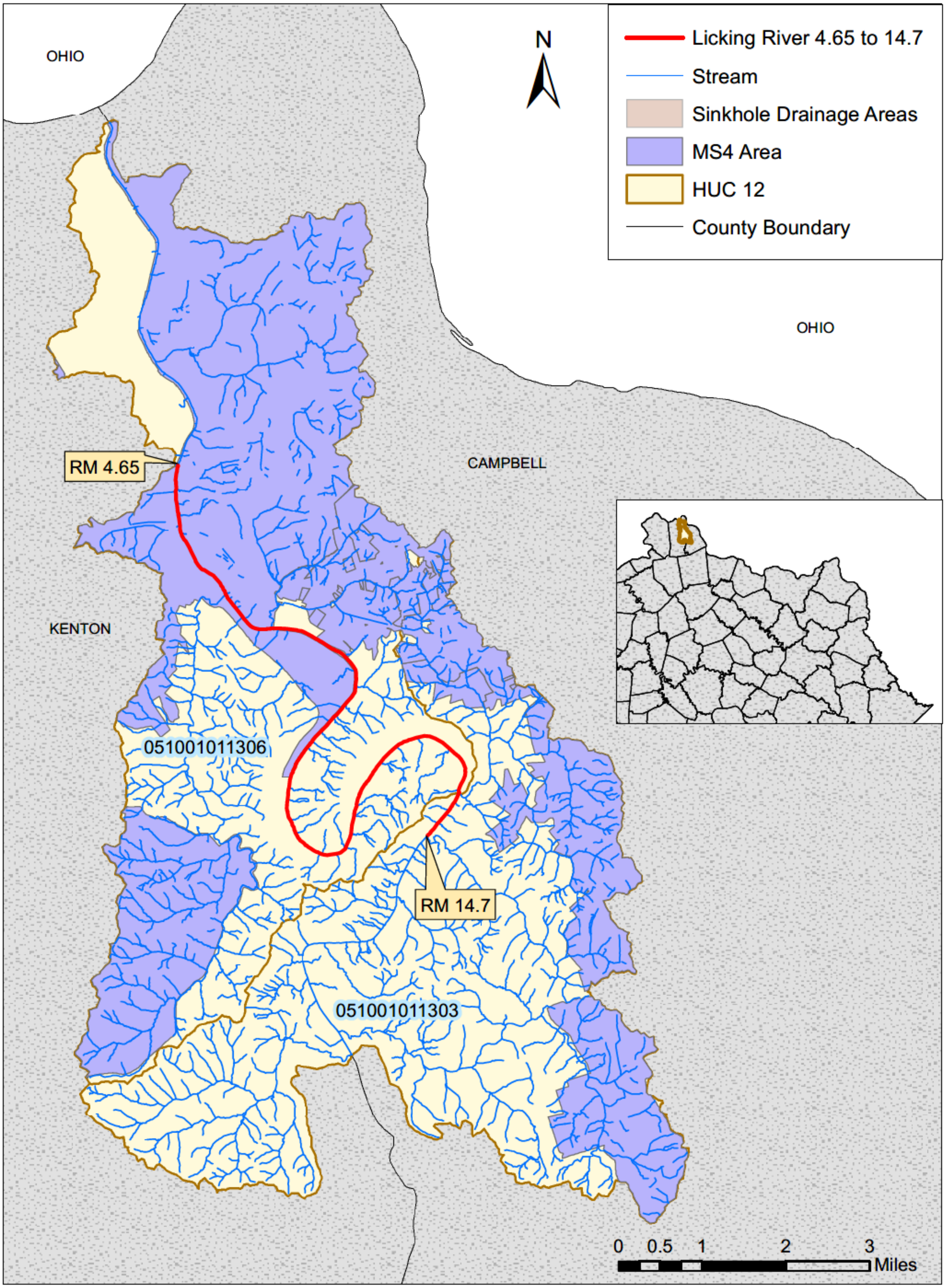
The location of the segment within the Pond Creek-Licking River and DeCoursey Creek-Licking River watersheds is shown in Figure F.31-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Pond Creek-Licking River and DeCoursey Creek-Licking River watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

Sanitation District No.1 of Northern Kentucky, City of Cold Spring, and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of the Licking River. Information about MS4 permits is summarized in Table F.31-4. Information concerning Taylor Mill and Wilder MS4 permit coverage can be found as a co-permittee of Sanitation District No.1 of Northern Kentucky's MS4 permit (Permit number KYG200007). There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 areas within the Pond Creek-Licking River and DeCoursey Creek-Licking River watersheds is shown in Figure F.31-1. MS4 area boundaries for Permit number KYG200007 were provided to DOW in September 2021. All other MS4 area boundaries are from DOW information last updated in 2013. Only those MS4s with coverage areas that include direct drainage to the impaired segment are shown on the map, and boundaries between individual systems are not shown.

Table F.31-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYG200007	Sanitation District No.1 of Northern Kentucky	04/30/2023	Q_{MS4}×WQC×CF
KYG200007	Taylor Mill	04/30/2023	Q_{MS4}×WQC×CF
KYG200007	Wilder	04/30/2023	Q_{MS4}×WQC×CF
KYG200057	City of Cold Spring	04/30/2023	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).



OHIO
OHIO
N
Licking River 4.65 to 14.7
Stream
Sinkhole Drainage Areas
MS4 Area
HUC 12
County Boundary
CAMPBELL
KENTON
RM 4.65
RM 14.7
051001011306
051001011303
0 0.5 1 2 3
Miles

Figure F.31-1 Location of Licking River 4.65 to 14.7

Section F.32 Licking River 223.0 to 240.0

Waterbody ID: KY513416_12

Receiving Water: Ohio River

Impaired Use: PCR, SCR

Support Status: nonsupport (PCR), partial support (SCR)

Listed Pollutant: fecal coliform (both uses) **TMDL Pollutant:** *E. coli* (PCR), fecal coliform (SCR)

HUC 12s: 051001010506

County: Morgan

The Division of Water (DOW) has collected samples from station PRI062, located near river mile 226.5, since 1999. The station typically has been sampled three or more times during the PCR season, although it was not sampled in 2002, 2004, or 2005. Table F.32-1 summarizes information about this sampling station; Table F.32-2 provides a summary of the data collected from this station.

Table F.32-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI062	37.914694	-83.261704	Licking River 223.0 to 240.0	226.5

Table F.32-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI062	*E. coli*	52	20	>2,420	354
PRI062	fecal coliform	13	3	4,800	826

(1)The full data set for samples collected at PRI062 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Licking River 223.0 to 240.0 are presented in Table F.32-3.

Table F.32-3 Licking River 223.0 to 240.0 TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment(5)	Allocations for Tributary Loads to the Segment(6)	MOS(7)
	SWS-WLA(3)	LA(4)			
Q_S×WQC×CF	∑(Q_{SWS}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1) All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

(d)For SCR-impaired segments, SWS sources must meet the PCR criterion year-round.

One facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Licking River. The directly discharging facility is a sanitary wastewater system (SWS). There are no Municipal Separate Storm Sewer System (MS4) communities or Combined Sewer Overflows (CSOs) discharging directly to this segment of Licking River. This facility is identified in Table F.32-4 and the location in the Pleasant Run-Licking River watershed is shown in Figure F.32-1.

Table F.32-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date[(1)]	WLA[(2)] (colonies *E. coli*/day)
KY0089567	West Liberty STP	0.85	37.930556	-83.266389	1/31/2021	Q_{SWS}×WQC×CF

[(1)]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[(2)]Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

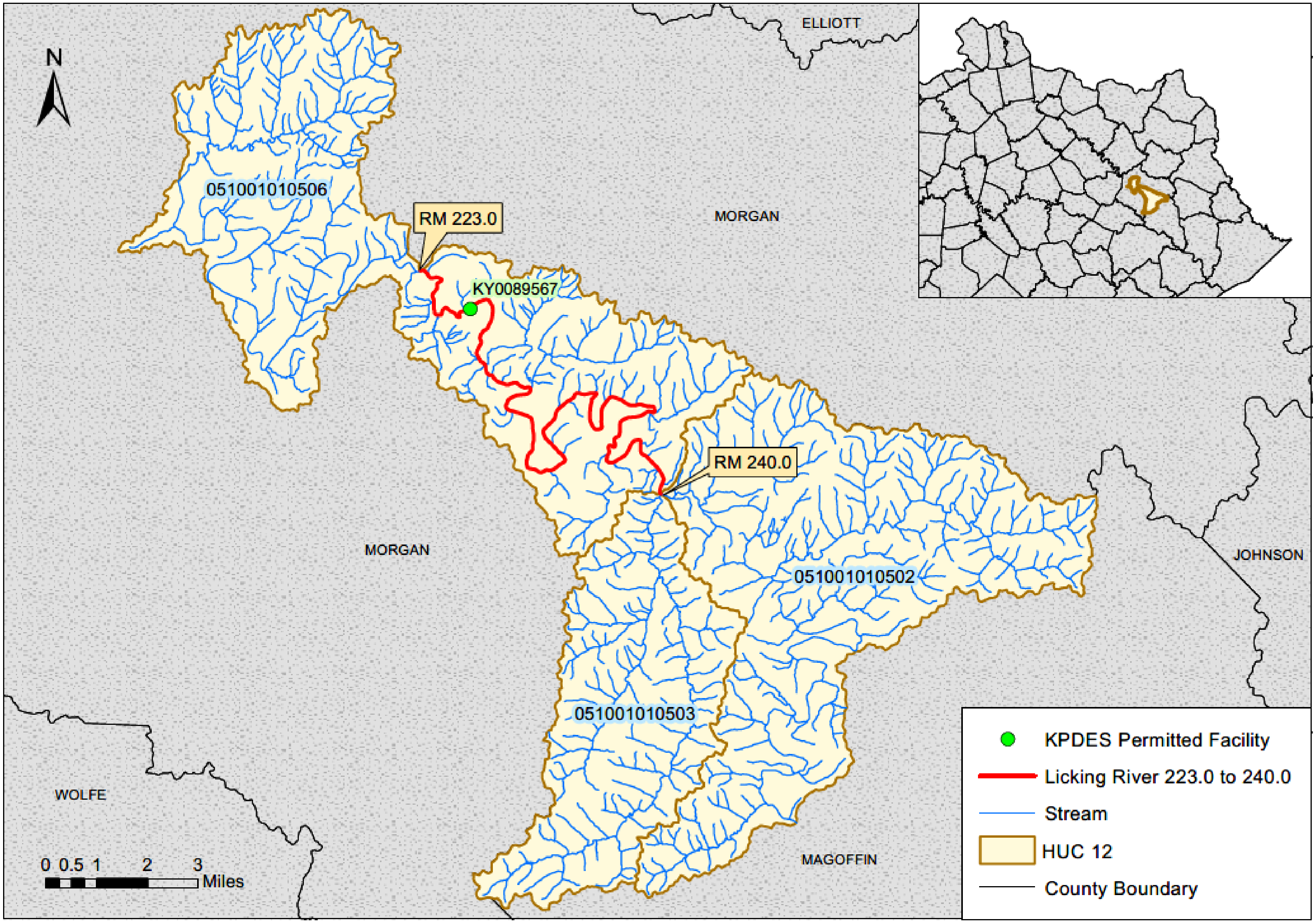


Figure F.32-1 Location of the KPDES-permitted Facility on Licking River 223.0 to 240.0

Section F.33 Little Stoner Creek 0.0 to 5.3

Waterbody ID: KY496870_01

Receiving Water: Stoner Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001020201

County: Clark

In 1999, Northern Kentucky University (NKU) collected one sample during each month of the PCR season at station L - 023. Table F.33-1 summarizes information about this sampling station; Table F.33-2 provides a summary of the data collected from this station.

Table F.33-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 023	38.031584	-84.096181	Little Stoner Creek 0.0 to 5.3	1.3

Table F.33-2 Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 023	fecal coliform	6	550	20,000	4,652

(1)The full data set for samples collected at L - 023 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Little Stoner Creek 0.0 to 5.3 are presented in Table F.33-3.

Table F.33-3 Little Stoner Creek 0.0 to 5.3 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment[5]	MOS[6]
	MS4-WLA[3]	LA[4]		
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

[4]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Stoner Creek watershed is shown in Figure F.33-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Stoner Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

The City of Winchester and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of the Little Stoner Creek. Information about the MS4 permit is summarized in Table F.33-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location in the Headwaters Stoner Creek watershed is shown in Figure F.33-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table F.33-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYG200043	City of Winchester	04/30/2023	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

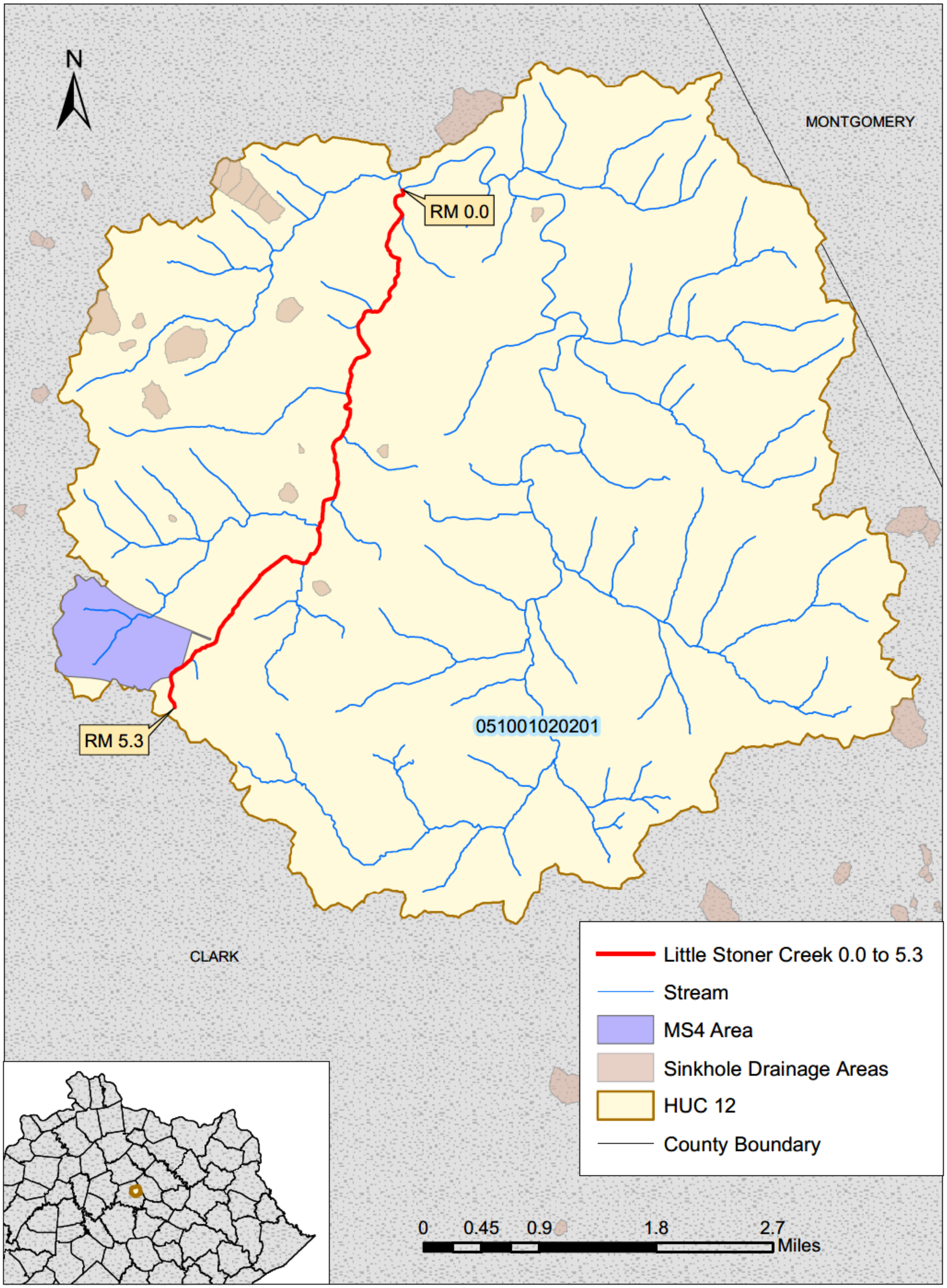


Figure F.33-1 Location of Little Stoner Creek 0.0 to 5.3

Section F.34 Middle Fork of Licking River 0.0 to 2.7

Waterbody ID: KY498128_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001010104

County: Magoffin

Northern Kentucky University collected samples from station L - 011, located near river mile 1.4. The station was sampled one to two times during the PCR season in 1998 and 1999. Table F.34-1 summarizes information about this sampling station; Table F.34-2 provides a summary of the data collected from this station.

Table F.34-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 011	37.74563	-83.13286	Middle Fork of Licking River 0.0 to 2.7	1.4

Table F.34-2 Sample Data Summary[1]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 011	fecal coliform	3	30	720	357

[1]The full data set for samples collected at L - 011 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[2]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Middle Fork of Licking River 0.0 to 2.7 are presented in Table F.34-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Middle Fork of Licking River. The location within the Middle Fork Licking River watershed is shown in Figure F.34-1.

Table F.34-3 Middle Fork of Licking River 0.0 to 2.7 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
	LA(3)			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

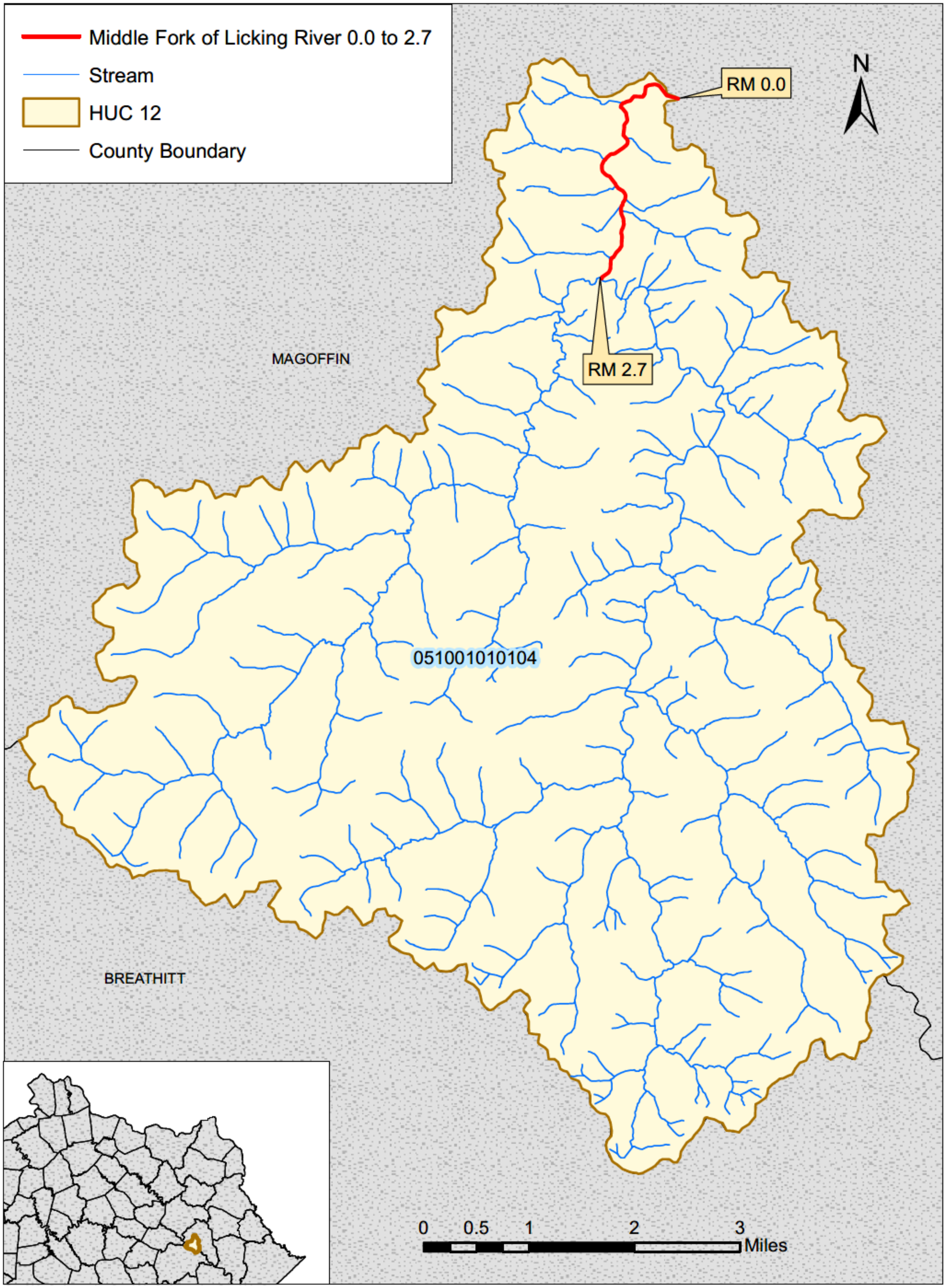


Figure F.34-1 Location of Middle Fork of Licking River 0.0 to 2.7

Section F.35 Morgan Fork 0.0 to 2.8

Waterbody ID: KY514059_01

Receiving Water: Dry Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010605

County: Rowan

The Division of Water (DOW) collected samples from station MF - 0.23, located near river mile 0.8, for a watershed-based plan in Triplett Creek. The station was sampled nine times in 2009 and five times in 2010 during the PCR season. Table F.35-1 summarizes information about this sampling station; Table F.35-2 provides a summary of the data collected from this station.

Table F.35-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
MF - 0.23	38.16093	-83.427	Morgan Fork 0.0 to 2.8	0.8

Table F.35-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
MF - 0.23	*E. coli*	14	40	740	307

(1)The full data set for samples collected at MF - 0.23 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Morgan Fork 0.0 to 2.8 are presented in Table F.35-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Morgan Fork. The location within the Lower Triplett Creek watershed is shown in Figure F.35-1.

Table F.35-3 Morgan Fork 0.0 to 2.8 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

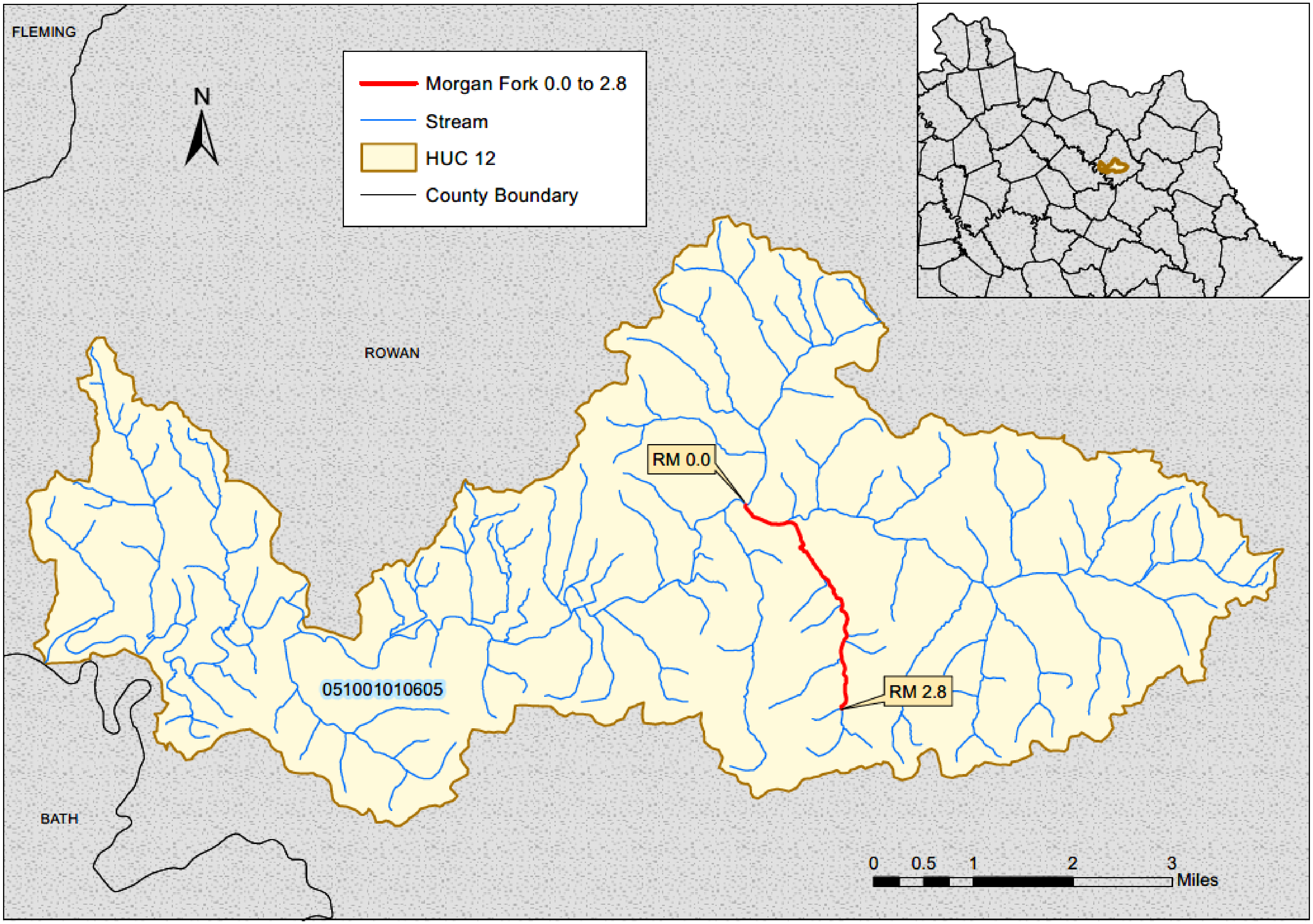


Figure F.35-1 Location of Morgan Fork 0.0 to 2.8

Section F.36 North Fork Licking River 18.55 to 45.5

Waterbody ID: KY499554_02

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12s: 051001011004, 051001011005, 051001011006

County: Bracken, Mason, Robertson

Northern Kentucky University collected samples from station L - 032, located near river mile 22.7. The station was sampled one to two times during the PCR season in 1998, 2001, and 2003. Table F.36-1 summarizes information about this sampling station; Table F.36-2 provides a summary of the data collected from this station.

Table F.36-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 032	38.59073	-84.05107	North Fork Licking River 18.55 to 45.5	22.7

Table F.36-2 Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 032	fecal coliform	5	420	6,300	2,132

(1)The full data set for samples collected at L – 032 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for North Fork Licking River 18.55 to 45.5 are presented in Table F.36-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of North Fork Licking River.

Table F.36-3 North Fork Licking River 18.55 to 45.5 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Clarks Run-North Fork Licking River, Shannon Creek-North Fork Licking River, and Willow Branch-North Fork Licking River watersheds is shown in Figure F.36-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Mill Creek-North Fork Licking River, Clarks Run-North Fork Licking River, Shannon Creek-North Fork Licking River, and Willow Branch-North Fork Licking River watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

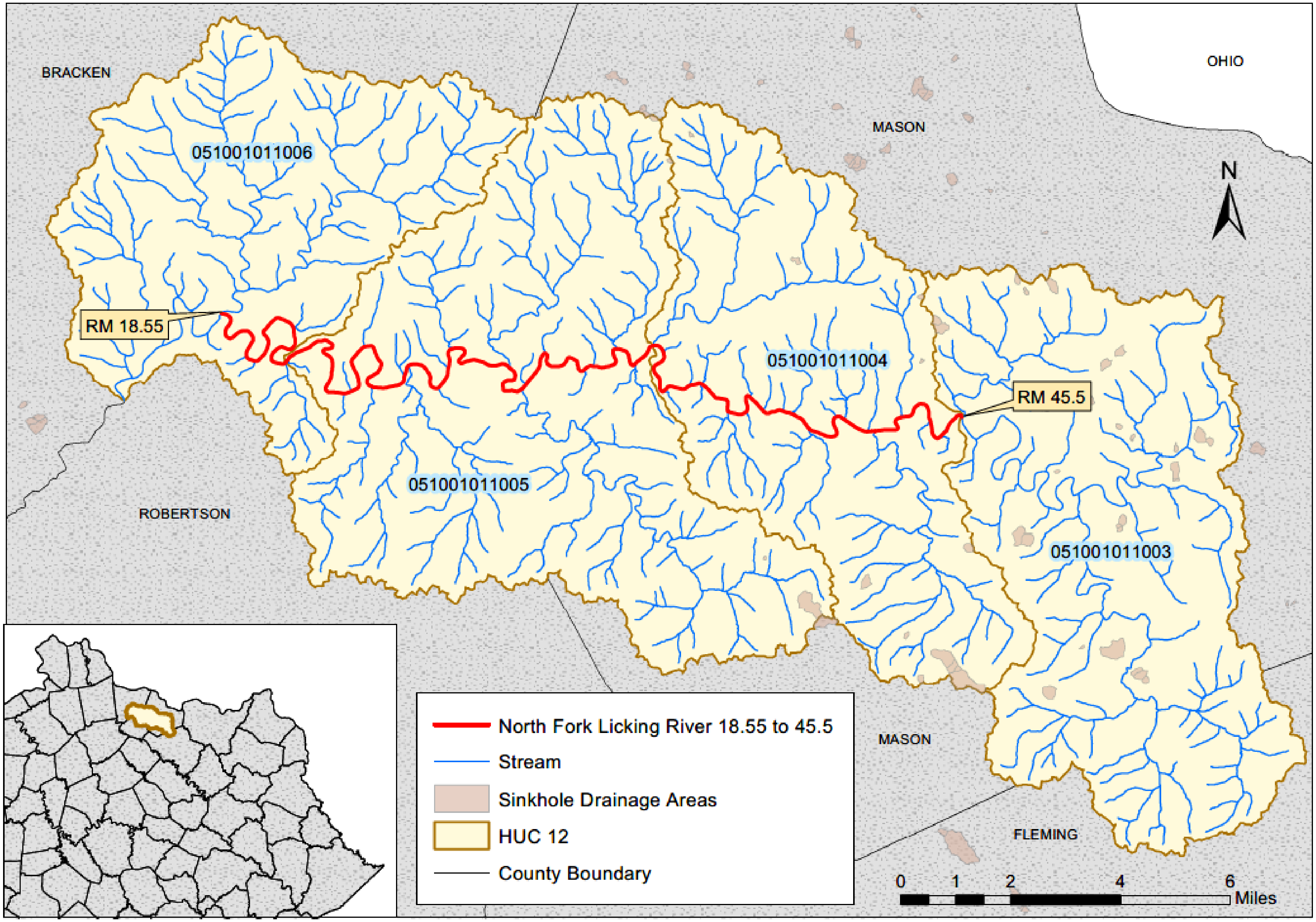


Figure F.36-1 Location of North Fork Licking River 18.55 to 45.5

Section F.37 North Fork Licking River 8.5 to 12.3

Waterbody ID: KY514292_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12s: 051001010303

County: Morgan

The Division of Water (DOW) has collected samples from station LRW009, located near river mile 10.7, since 2004. The station is sampled every five years during the PCR season as part of the DOW five-year rotating schedule for basin monitoring (see also Section 7.2.1, Kentucky Watershed Management Framework). This station has typically been sampled four or more times during a monitoring year. Table F.37-1 summarizes information about this sampling station; Table F.37-2 provides a summary of the data collected from this station.

Table F.37-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
LRW009	38.054984	-83.330717	North Fork Licking River 8.5 to 12.3	10.7

Table F.37-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
LRW009	*E. coli*	17	<1	>2,420	368
LRW009	fecal coliform	4	20	1,200	413

(1)The full data set for samples collected at LRW009 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for North Fork Licking River 8.5 to 12.3 are presented in Table F.37-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of North Fork Licking River.

Table F.37-3 North Fork Licking River 8.5 to 12.3 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
(2)Q_S is the flow (ft^3/s) in the segment.
(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.
(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
(6)The following assumptions provide an implicit MOS:
(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Upper North Fork Licking River watershed is shown in Figure F.37-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Upper North Fork Licking River watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

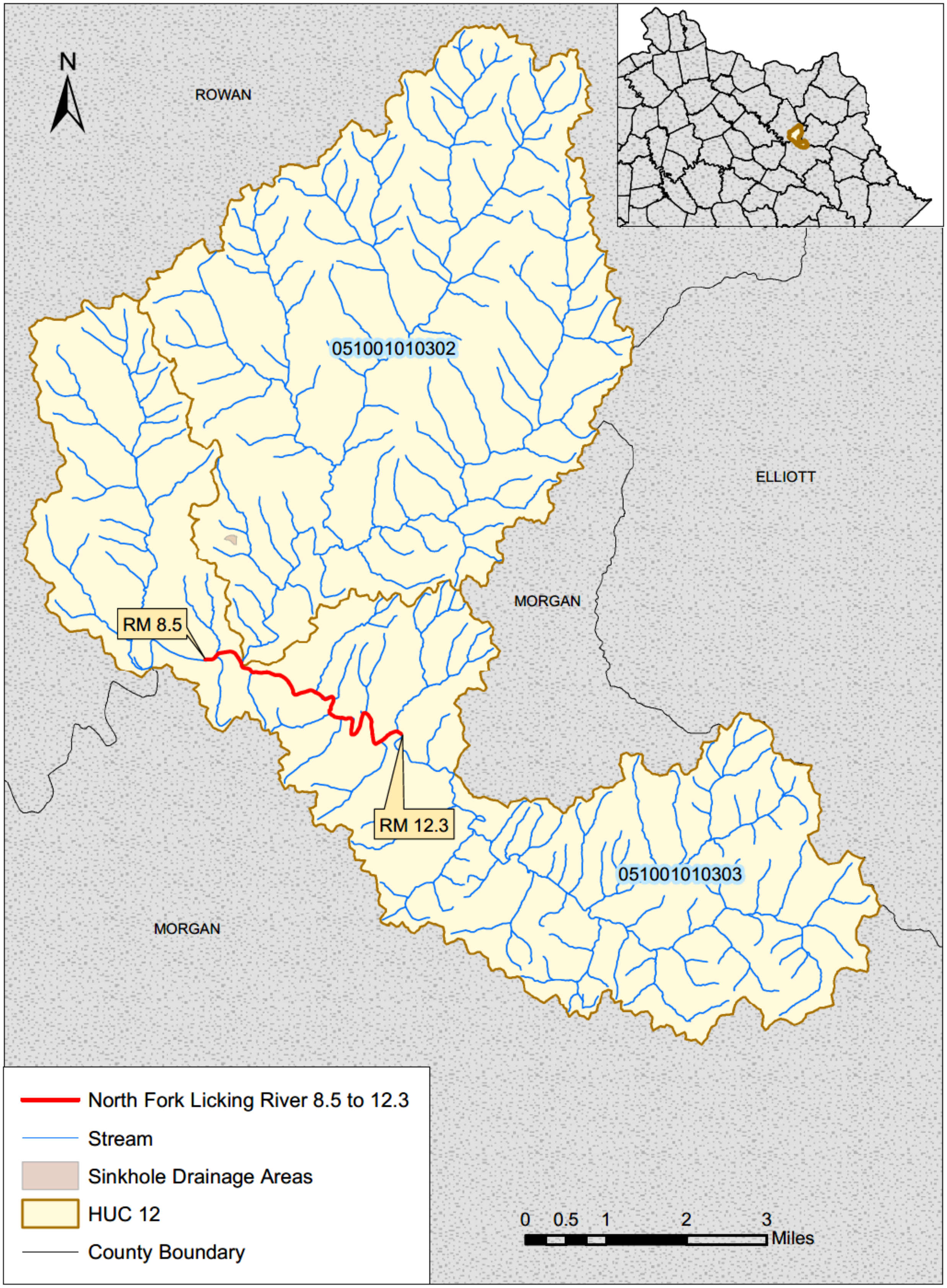


Figure F.37-1 Location of North Fork Licking River 8.5 to 12.3

Section F.38 North Fork Triplett Creek 1.15 to 4.85

Waterbody ID: KY514293_01

Receiving Water: Triplett Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 51001010603

County: Rowan

The Division of Water (DOW) collected samples from station NF - 1.61, located near river mile 1.7, for a watershed-based plan in Triplett Creek. The station was sampled ten times in 2009 and five times in 2010 during the PCR season. Table F.38-1 summarizes information about this sampling station; Table F.38-2 provides a summary of the data collected from this station.

Table F.38-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
NF - 1.61	38.16361	-83.51194	North Fork Triplett Creek 1.15 to 4.85	1.7

Table F.38-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
NF - 1.61	*E. coli*	15	50	1,160	263

(1)The full data set for samples collected at NF - 1.61 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for North Fork Triplett Creek 1.15 to 4.85 are presented in Table F.38-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of North Fork Triplett Creek. The location within the Lower North Fork Triplett Creek watershed is shown in Figure F.38-1.

Table F.38-3 North Fork Triplett Creek 1.15 to 4.85 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

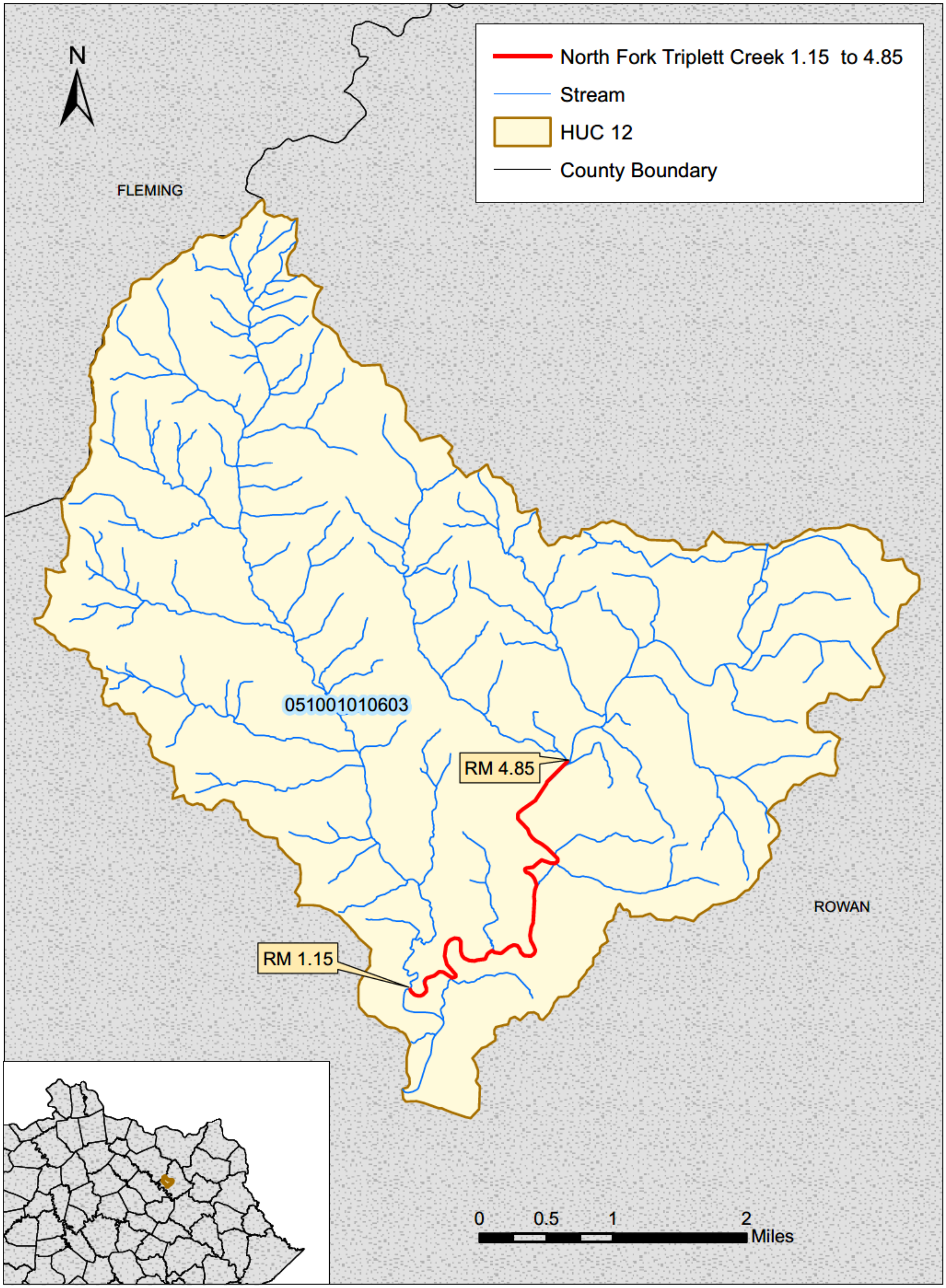


Figure F.38-1 Location of North Fork Triplett Creek 1.15 to 4.85

Section F.39 North Fork Triplett Creek 8.1 to 12.15

Waterbody ID: KY514293_02

Receiving Water: Triplett Creek

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010602

County: Rowan

The Division of Water (DOW) collected samples from station NH - 9.77, located near river mile 11.7, for a watershed-based plan in Triplett Creek. The station was sampled ten times in 2009 and five times in 2010 during the PCR season. Table F.39-1 summarizes information about this sampling station; Table F.39-2 provides a summary of the data collected from this station.

Table F.39-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
NH - 9.77	38.24638	-83.43746	North Fork Triplett Creek 8.1 to 12.15	11.7

Table F.39-2 DOW Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
NH - 9.77	*E. coli*	15	20	940	198

[(1)]The full data set for samples collected at NH - 9.77 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for North Fork Triplett Creek 8.1 to 12.15 are presented in Table F.39-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of North Fork Triplett Creek. The location within the Middle North Fork Triplett Creek watershed is shown in Figure F.39-1.

Table F.39-3 North Fork Triplett Creek 8.1 to 12.15 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

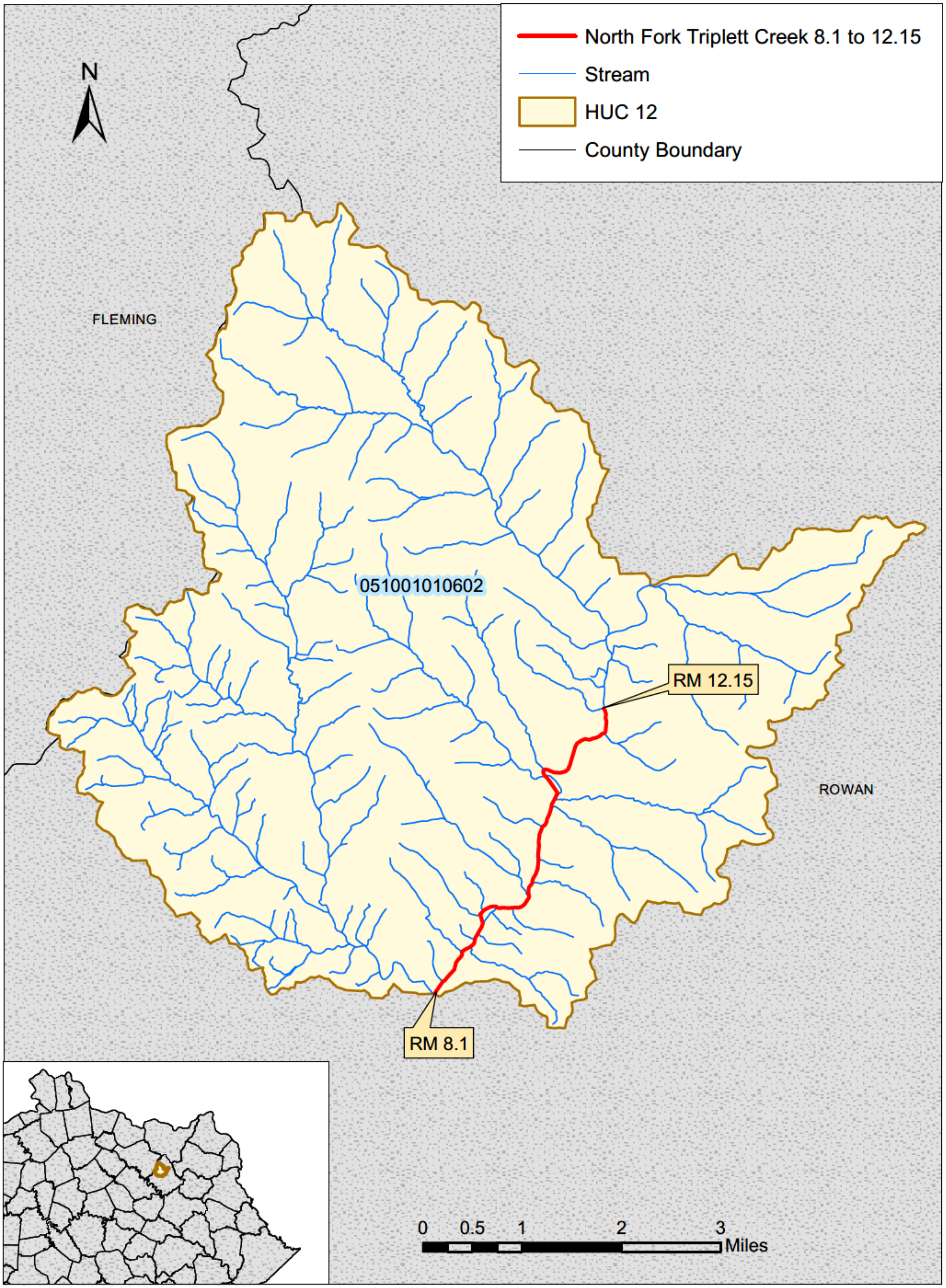


Figure F.39-1 Location of North Fork Triplett Creek 8.1 to 12.15

Section F.40 North Fork Triplett Creek 16.95 to 18.95

Waterbody ID: KY514293_04

Receiving Water: Triplett Creek

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010601

County: Rowan

The Division of Water (DOW) collected samples from station NF - 14.52, located near river mile 17, for a watershed-based plan in Triplett Creek. The station was sampled ten times in 2009 and five times in 2010 during the PCR season. Table F.40-1 summarizes information about this sampling station; Table F.40-2 provides a summary of the data collected from this station.

Table F.40-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
NF - 14.52	38.29397	-83.39085	North Fork Triplett Creek 16.95 to 18.95	17

Table F.40-2 DOW Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
NF - 14.52	*E. coli*	15	<1	310	133

[(1)]The full data set for samples collected at NF - 14.52 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for North Fork Triplett Creek 16.95 to 18.95 are presented in Table F.40-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of North Fork Triplett Creek. The location within the Upper North Fork Triplett Creek watershed is shown in Figure F.40-1.

Table F.40-3 North Fork Triplett Creek 16.95 to 18.95 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
	LA(3)			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

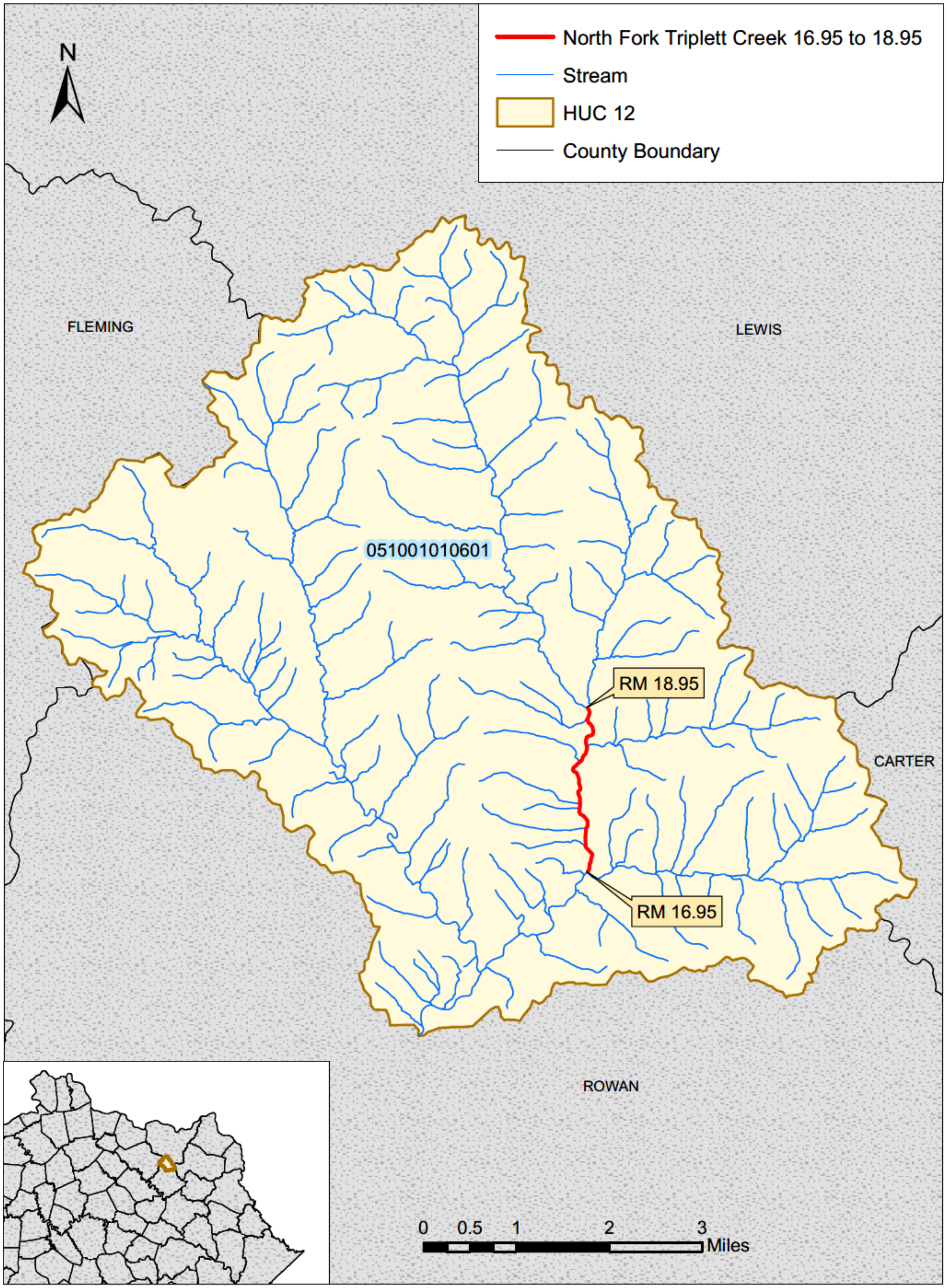


Figure F.40-1 Location of North Fork Triplett Creek 16.95 to 18.95

Section F.41 Phillips Creek 0.0 to 5.4

Waterbody ID: KY500540_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001011302

County: Campbell

Northern Kentucky University collected samples from station L - 153, located near river mile 1.6. The station was sampled two to three times during the PCR season in 2001 and 2003. Table F.41-1 summarizes information about this sampling station; Table F.41-2 provides a summary of the data collected from this station.

Table F.41-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 153	38.832687	-84.436412	Phillips Creek 0.0 to 5.4	1.6

Table F.41-2 Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 153	*E. coli*	1	30	30	30
L - 153	fecal coliform	4	150	1,500	685

(1)The full data set for samples collected at L - 153 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Phillips Creek 0.0 to 5.4 are presented in Table F.41-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Phillips Creek. The location within the Phillips Creek-Licking River watershed is shown in Figure F.41-1.

Table F.41-3 Phillips Creek 0.0 to 5.4 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
	LA[(3)]			
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

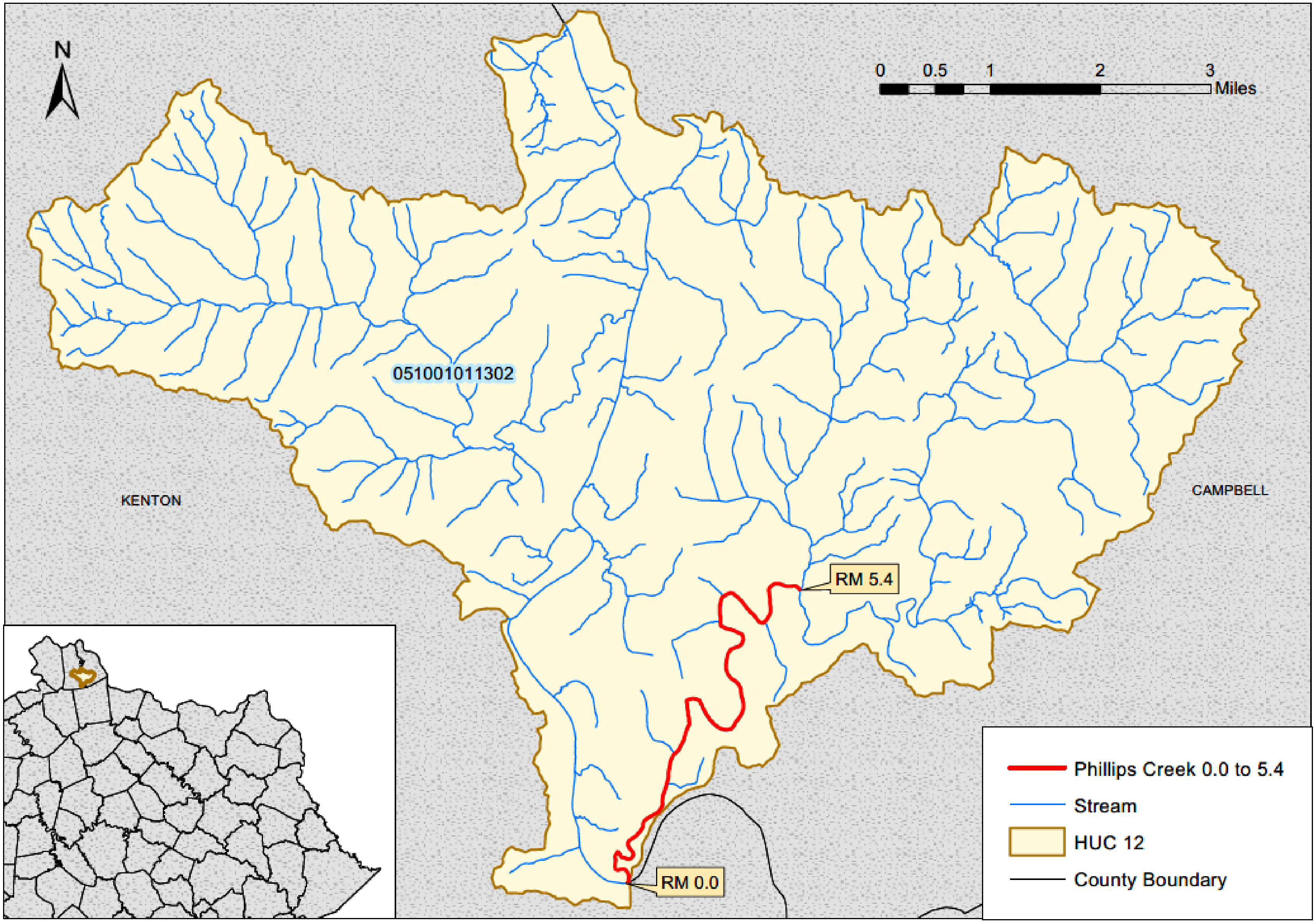


Figure F.41-1 Location of Phillips Creek 0.0 to 5.4

Section F.42 Plum Lick Creek 0.0 to 5.9

Waterbody ID: KY500972_01

Receiving Water: Boone Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020304

County: Bourbon, Montgomery

The Division of Water (DOW) collected samples from station DOW05016037, located near river mile 0.1, in 2010. The station was sampled nine times during the PCR season. Table F.42-1 summarizes information about this sampling station; Table F.42-2 provides a summary of the data collected from this station.

Table F.42-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016037	38.17759	-84.03114	Plum Lick Creek 0.0 to 5.9	0.1

Table F.42-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016037	*E. coli*	9	413	2,602	1,349

(1)The full data set for samples collected at DOW05016037 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Plum Lick Creek 0.0 to 5.9 are presented in Table F.42-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Plum Lick Creek.

Table F.42-3 Plum Lick Creek 0.0 to 5.9 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment LA[(3)]	Allocations for Tributary Loads to the Segment[(4)]	MOS[(5)]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(5)]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Boone Creek-Hinkston Creek watershed is shown in Figure F.42-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Boone Creek-Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

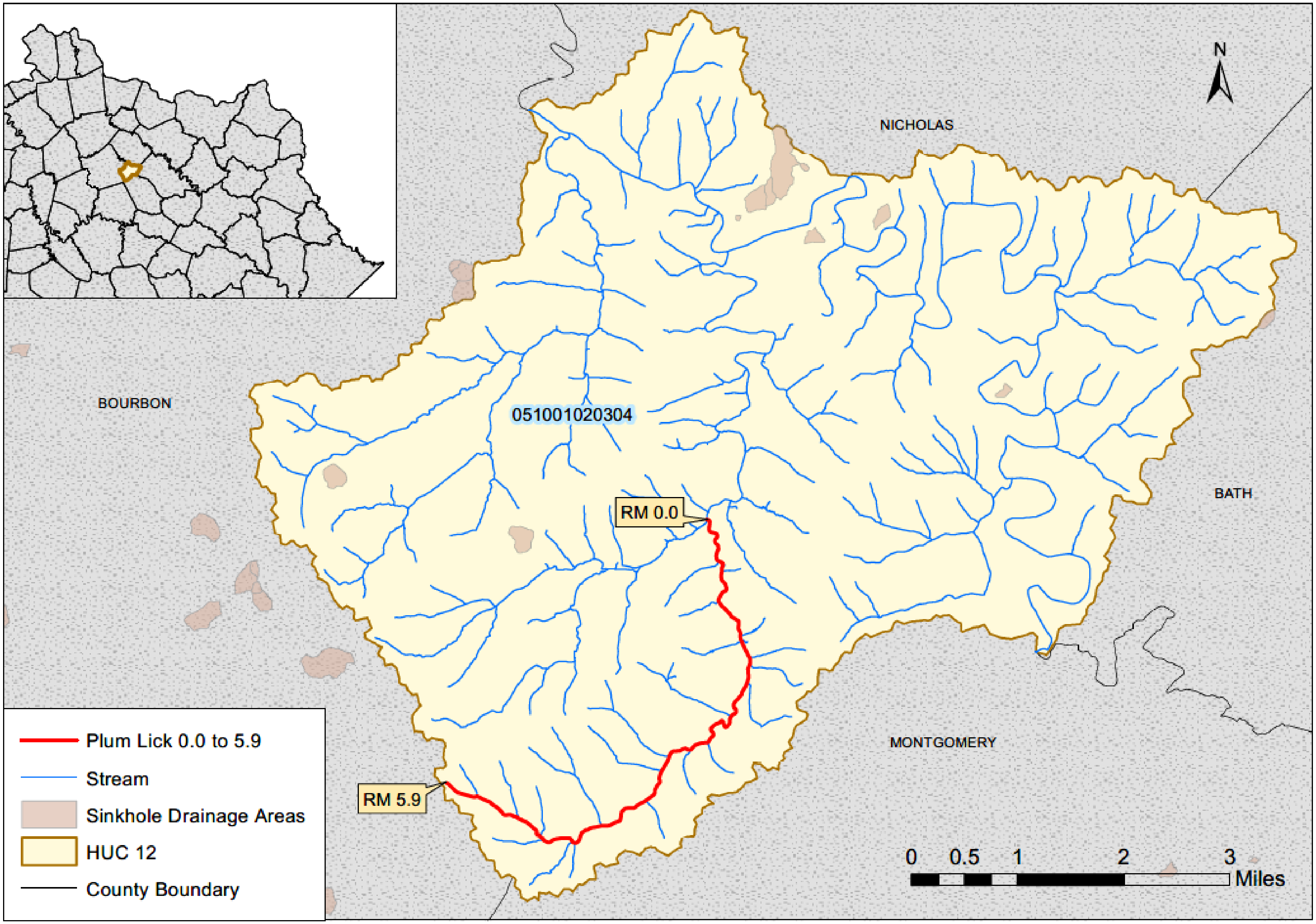


Figure F.42-1 Location of Plum Lick Creek 0.0 to 5.9

Section F.43 Pond Lick Branch 0.0 to 1.75

Waterbody ID: KY514696_01

Receiving Water: North Fork Triplett Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010602

County: Rowan

The Division of Water (DOW) collected samples from station PL - 0.10, located near river mile 0.1, for a watershed-based plan in Triplett Creek. The station was sampled eleven times in 2009 and five times in 2010 during the PCR season. Table F.43-1 summarizes information about this sampling station; Table F.43-2 provides a summary of the data collected from this station.

Table F.43-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PL - 0.10	37.64569	-82.9876	Pond Lick Branch 0.0 to 1.75	0.1

Table F.43-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PL - 0.10	*E. coli*	16	<1	3,700	366

(1)The full data set for samples collected at PL - 0.10 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Pond Lick Branch 0.0 to 1.75 are presented in Table F.43-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Pond Lick Branch. The location within the Middle North Fork Triplett Creek watershed is shown in Figure F.43-1.

Table F.43-3 Pond Lick Branch 0.0 to 1.75 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

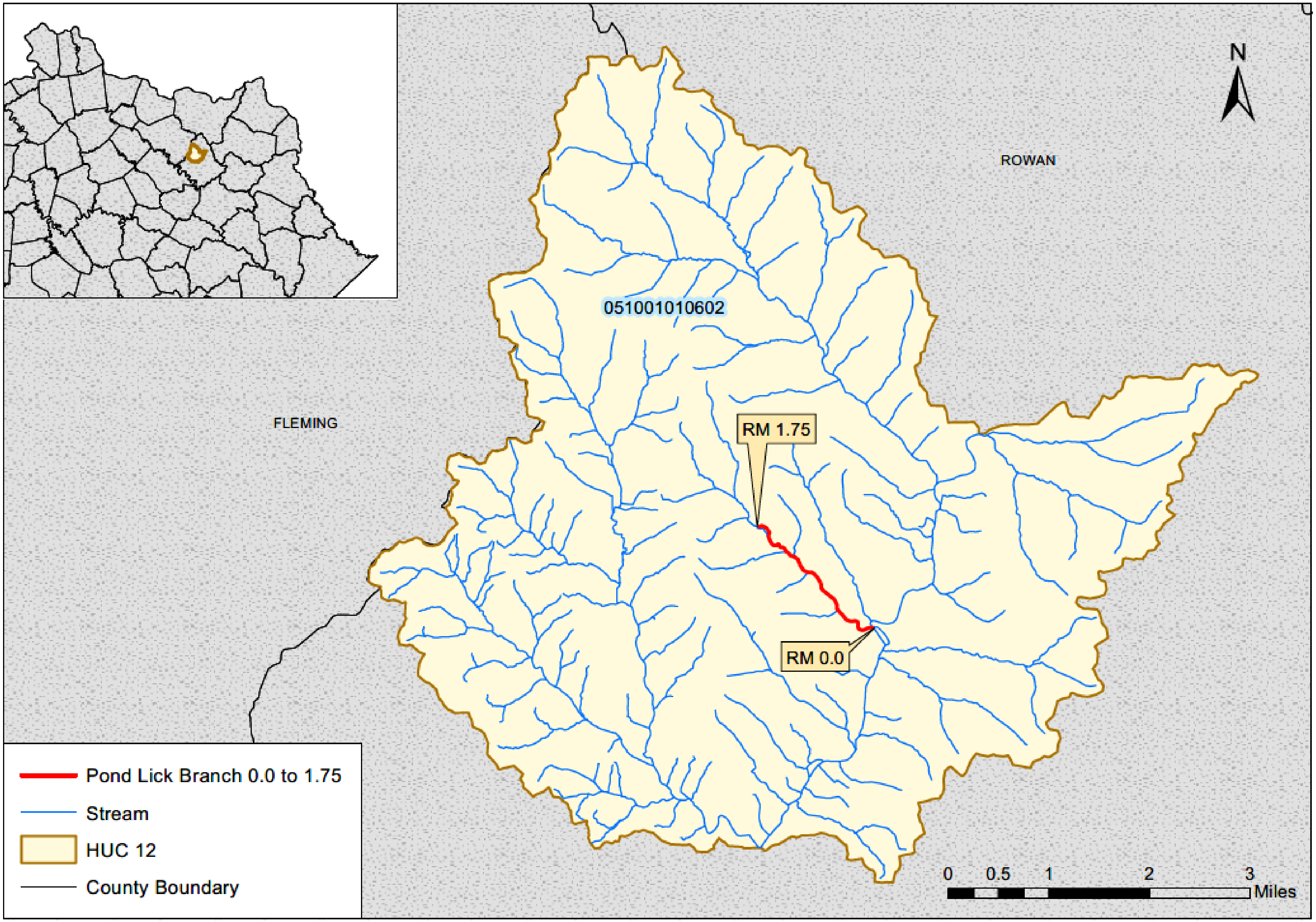


Figure F.43-1 Location of Pond Lick Branch 0.0 to 1.75

Section F.44 Puncheon Camp Creek 0.0 to 1.15

Waterbody ID: KY501442_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001010102

County: Magoffin

Northern Kentucky University collected samples from station L - 009, located near river mile 0.9. The station was sampled one to two times during the PCR season in 1998, 1999, and 2002. Table F.44-1 summarizes information about this sampling station; Table F.44-2 provides a summary of the data collected from this station.

Table F.44-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 009	37.64569	-82.9876	Puncheon Camp Creek 0.0 to 1.15	0.9

Table F.44-2 Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 009	fecal coliform	4	<1	1,440	435

(1)The full data set for samples collected at L - 009 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Puncheon Camp Creek 0.0 to 1.15 are presented in Table F.44-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Puncheon Camp Creek. The location within the Puncheon Camp Creek-Licking River watershed is shown in Figure F.44-1.

Table F.44-3 Puncheon Camp Creek 0.0 to 1.15 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

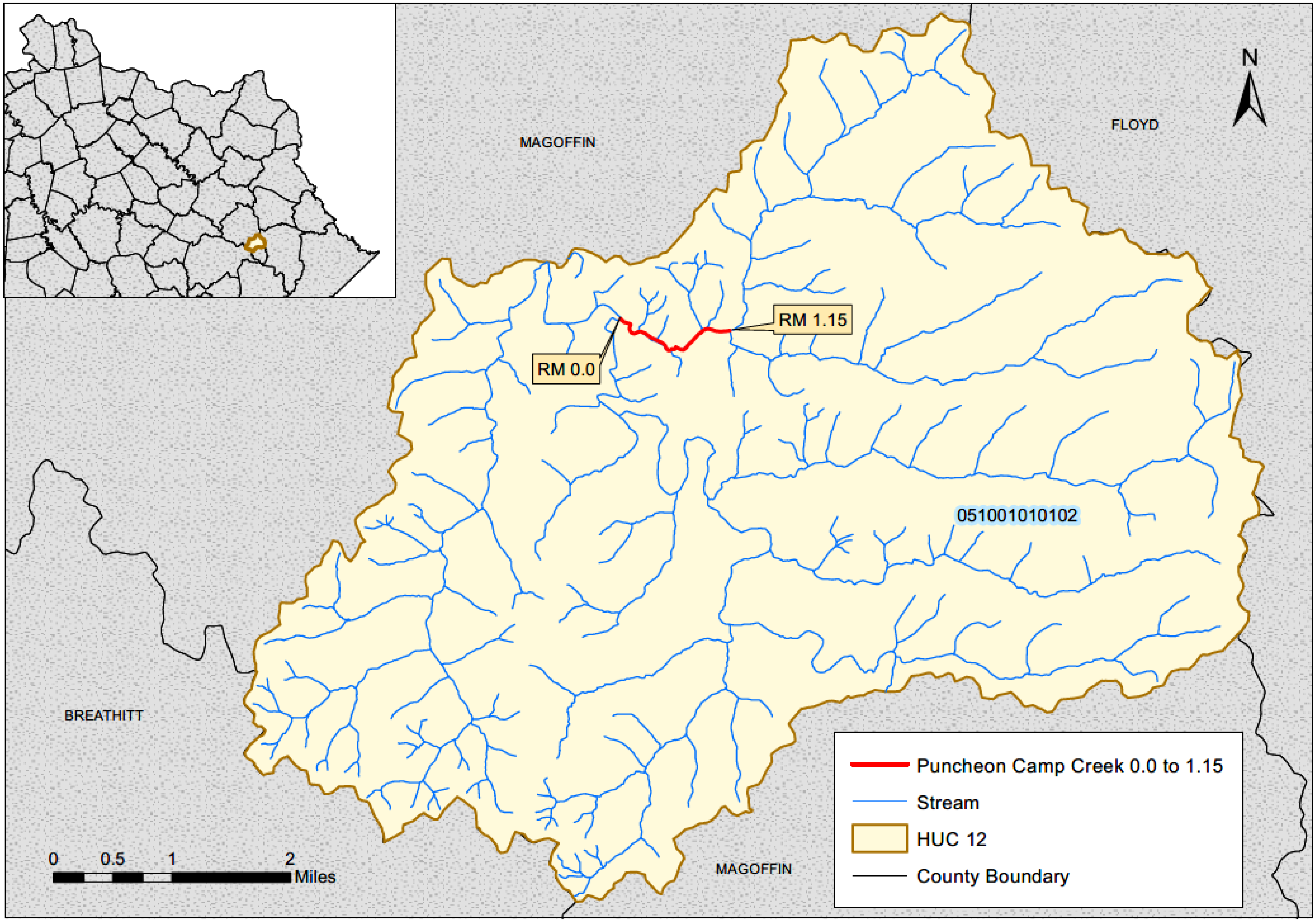


Figure F.44-1 Location of Puncheon Camp Creek 0.0 to 1.15

Section F.45 Rock Fork 0.0 to 4.0

Waterbody ID: KY515026_01

Receiving Water: North Fork Triplett Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010601

County: Rowan

The Division of Water (DOW) collected samples from station RF - 0.15 for a watershed-based plan in Triplett Creek. The station was sampled nine times in 2009 and five times in 2010 during the PCR season. F.45-1 summarizes information about this sampling station; Table F.45-2 provides a summary of the data collected from this station.

Table F.45-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
RF - 0.15	38.28032	-83.41332	Rock Fork 0.0 to 4.0	0.2

Table F.45-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
RF - 0.15	*E. coli*	14	90	1,820	446

(1)The full data set for samples collected at RF - 0.15 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Rock Fork 0.0 to 4.0 are presented in Table F.45-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Rock Fork. The location within the Upper North Fork Triplett Creek watershed is shown in Figure F.45-1.

Table F.45-3 Rock Fork 0.0 to 4.0 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

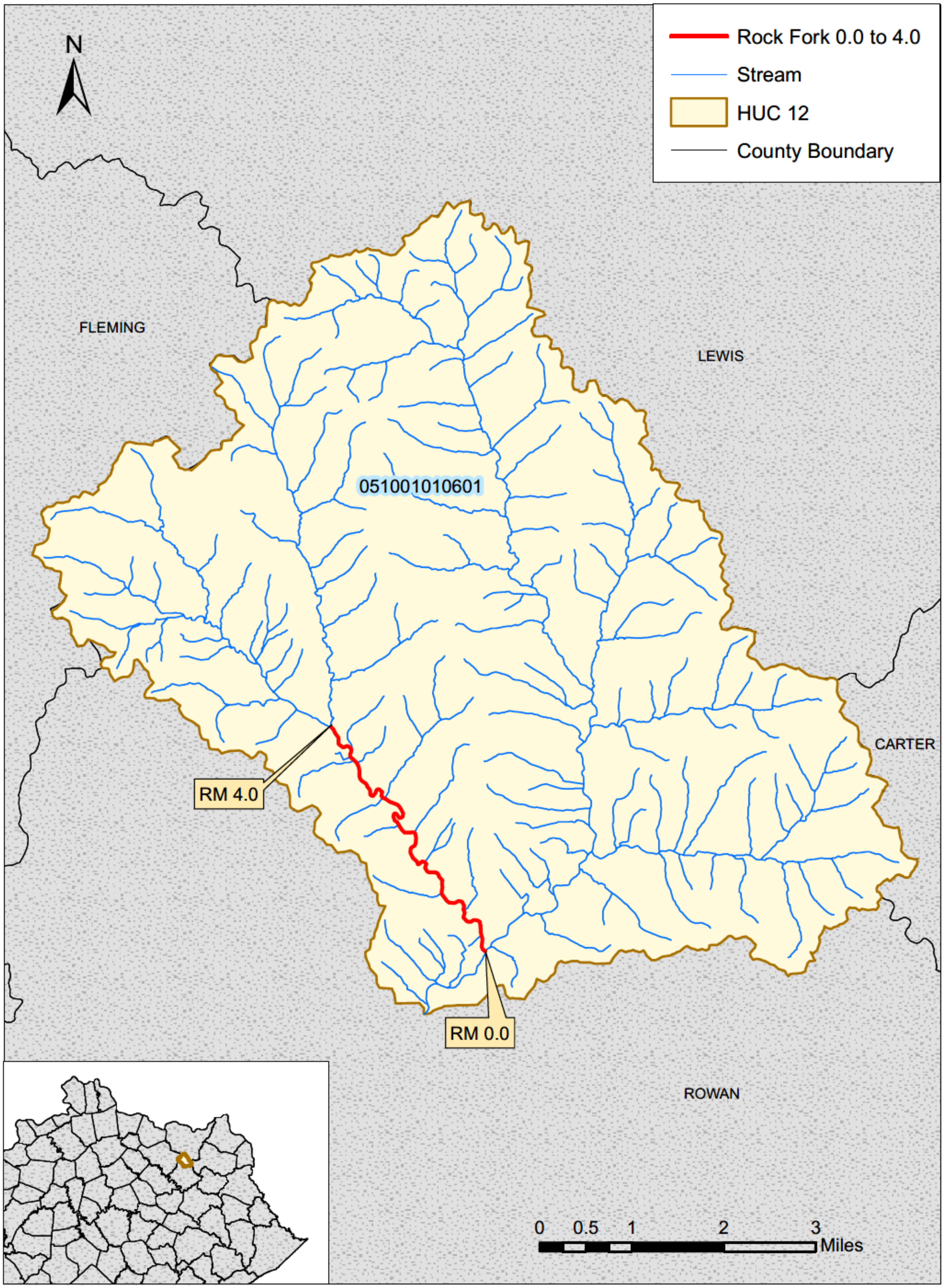


Figure F.45-1 Location of Rock Fork 0.0 to 4.0

Section F.46 Slate Creek 0.0 to 13.55

Waterbody ID: KY515470_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: partial support

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001010705

County: Bath

The Division of Water (DOW) has collected samples from station PRI093, located near river mile 10.1, since 2002. The station typically has been sampled three or more times during the PCR season, although it was not sampled in 2005. Table F.46-1 summarizes information about this sampling station; Table F.46-2 provides a summary of the data collected from this station.

Table F.46-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI093	38.141506	-83.728511	Slate Creek 0.0 to 13.55	10.1

Table F.46-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI093	*E. coli*	55	27	3,740	531
PRI093	fecal coliform	5	30	1,300	406

(1)The full data set for samples collected at PRI093 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Slate Creek 0.0 to 13.55 are presented in Table F.46-3.

Table F.46-3 Slate Creek 0.0 to 13.55 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment(5)	Allocations for Tributary Loads to the Segment(6)	MOS(7)
	SWS-WLA(3)	LA(4)			
$Q_S \times WQC \times CF$	$\sum(Q_{SWS} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the White Oak Creek-Slate Creek watershed is shown in Figure F.46-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the White Oak Creek-Slate Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

One facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Slate Creek. The directly discharging facility is a sanitary wastewater system (SWS). There are no Municipal Separate Storm Sewer System (MS4) communities or Combined Sewer Overflows (CSOs) discharging directly to this segment of Slate Creek. The definitions for MS4 and CSO are found in 401 KAR 5:002. This facility is identified in Table F.46-4 and the location in the White Oak Creek-Slate Creek watershed is shown in Figure F.46-1.

Table F.46-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KY0024287	Owingsville STP	0.22	38.1333	-83.7455	3/31/2025	Q_{SWS}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

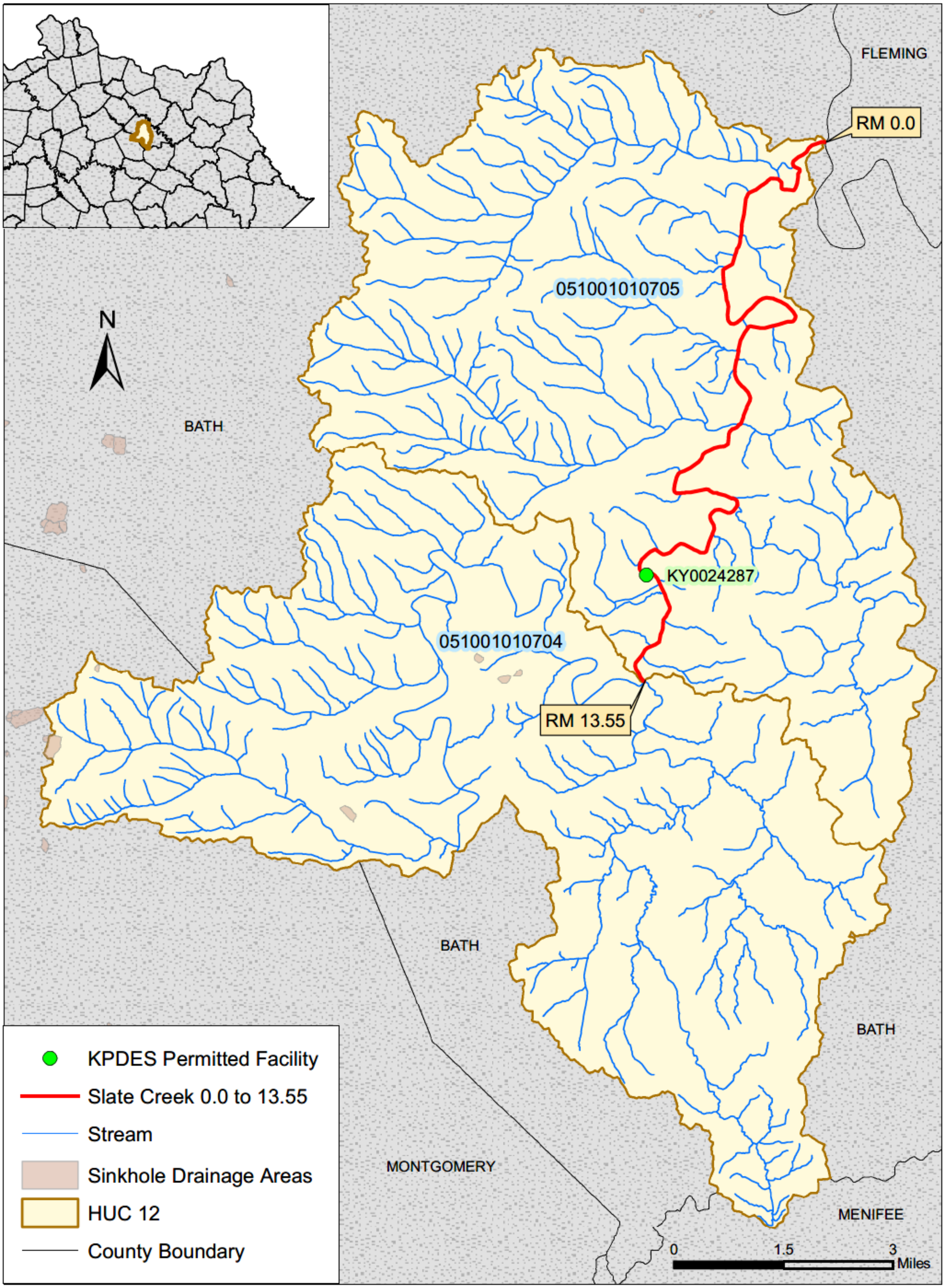


Figure F.46-1 Location of the KPDES-permitted Facility on Slate Creek 0.0 to 13.55

Section F.47 Somerset Creek 0.0 to 4.45

Waterbody ID: KY503876_01

Receiving Water: Hinkston Creek

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020303

County: Nicholas

The Division of Water (DOW) collected samples from station NPSHKC07, located near river mile 2.55, for a watershed-based plan in Hinkston Creek. The station was sampled four times during the PCR season in 2010. Table F.47-1 summarizes information about this sampling station; Table F.47-2 provides a summary of the data collected from this station.

Table F.47-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
NPSHKC07	38.231709	-84.00556	Somerset Creek 0.0 to 4.45	2.55

Table F.47-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
NPSHKC07	fecal coliform	4	60	1,400	460

(1)The full data set for samples collected at NPSHKC07 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Somerset Creek 0.0 to 4.45 are presented in Table F.47-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Somerset Creek.

Table F.47-3 Somerset Creek 0.0 to 4.45 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment LA[(3)]	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
[(2)]Q_S is the flow (ft^3/s) in the segment.
[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.
[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
[(6)]The following assumptions provide an implicit MOS:
(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Somerset Creek watershed is shown in Figure F.47-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Somerset Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

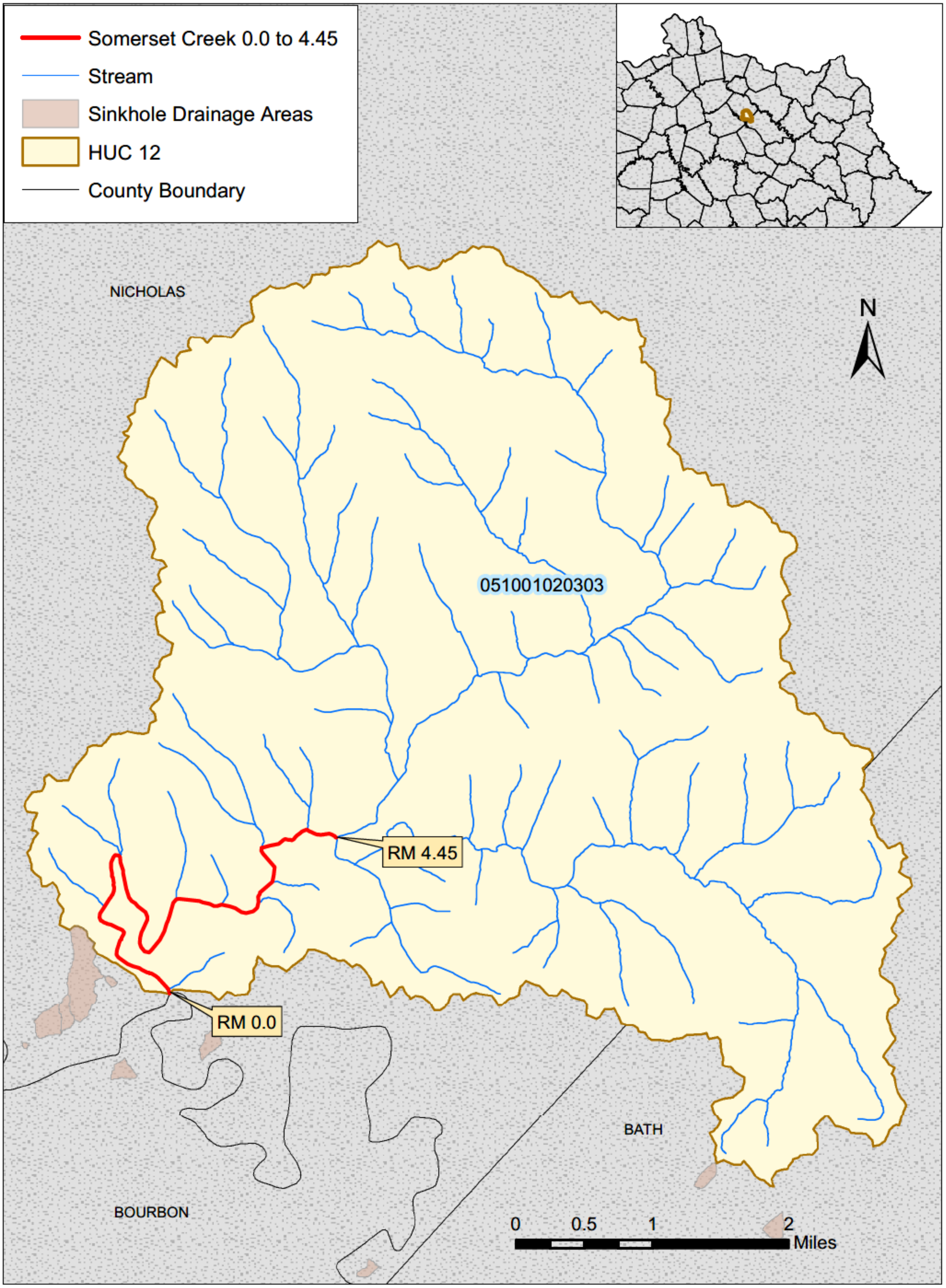


Figure F.47-1 Location of Somerset Creek 0.0 to 4.45

Section F.48 Somerset Creek 0.0 to 5.85

Waterbody ID: KY503875_01

Receiving Water: Grassy Lick Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020301

County: Montgomery

The Division of Water (DOW) collected samples from station NPSHKC09, located near river mile 0.05, for a watershed-based plan in Hinkston Creek. The station was sampled once each month during the PCR season in 2010. Table F.48-1 summarizes information about this sampling station; Table F.48-2 provides a summary of the data collected from this station.

Table F.48-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
NPSHKC09	38.134928	-83.99456	Somerset Creek 0.0 to 5.85	0.05

Table F.48-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
NPSHKC09	fecal coliform	6	40	3,880	1,377

(1)The full data set for samples collected at NPSHKC09 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Somerset Creek 0.0 to 5.85 are presented in Table F.48-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Somerset Creek.

Table F.48-3 Somerset Creek 0.0 to 5.85 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Grassy Lick Creek watershed is shown in Figure F.48-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Grassy Lick Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

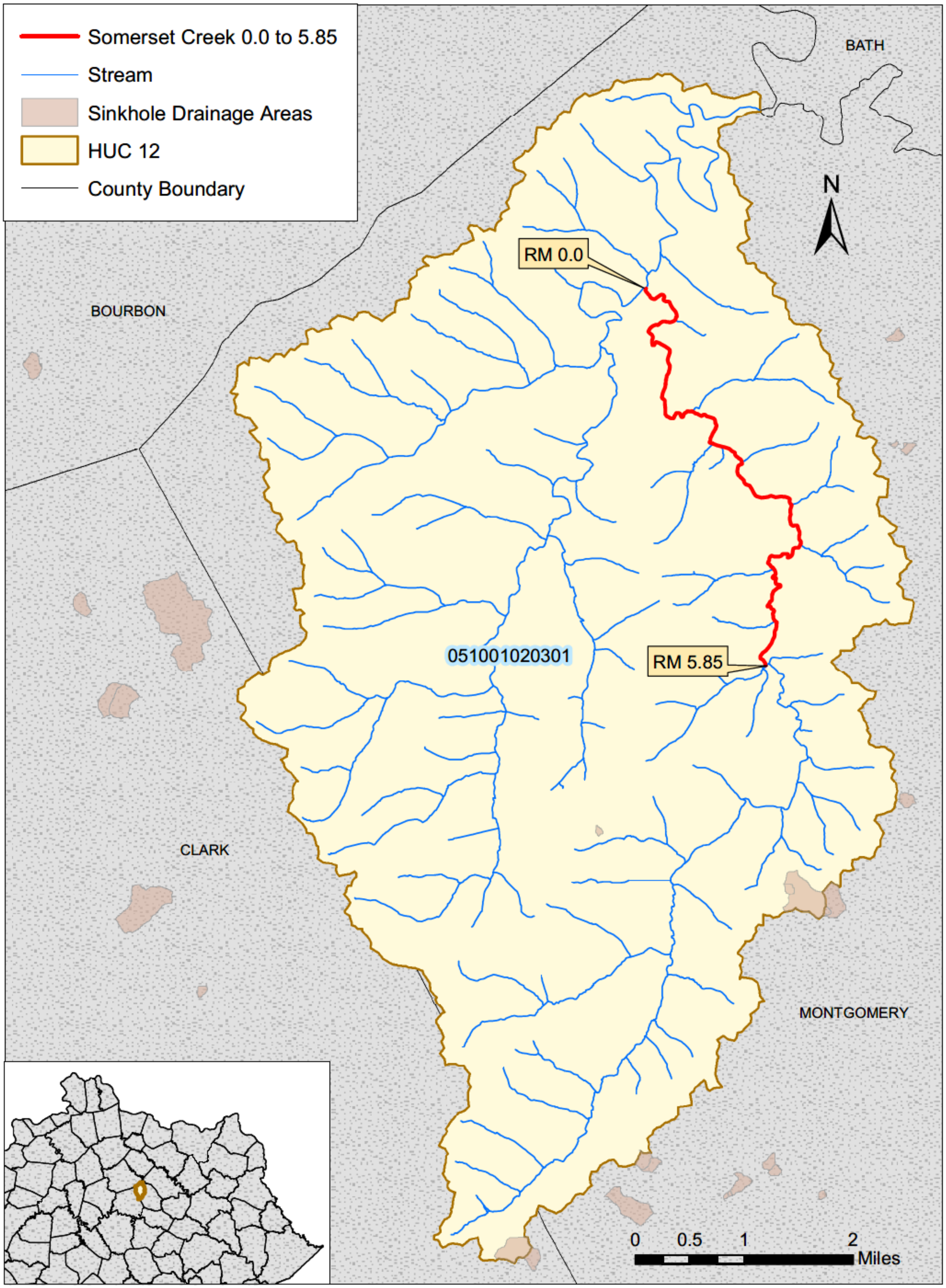


Figure F.48-1 Location of Somerset Creek 0.0 to 5.85

Section F.49 South Fork Licking River 11.6 to 16.95

Waterbody ID: KY503932_03

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051001020502

County: Pendleton

The Division of Water (DOW) has collected samples from station PRI059, located near river mile 12, since 1999. The station typically has been sampled three or more times during the PCR season, although it was not sampled in 2004, 2005, 2007, 2008, 2010, or 2012. Table F.49-1 summarizes information about this sampling station; Table F.49-2 provides a summary of the data collected from this station.

Table F.49-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI059	38.603337	-84.400595	South Fork Licking River 11.6 to 16.95	12

Table F.49-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI059	*E. coli*	39	9	>2,420	248
PRI059	fecal coliform	33	10	7,000	653

(1)The full data set for samples collected at PRI059 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for South Fork Licking River 11.6 to 16.95 are presented in Table F.49-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of South Fork Licking River.

Table F.49-3 South Fork Licking River 11.6 to 16.95 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Snake Lick Creek-South Fork Licking River watershed is shown in Figure F.49-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Snake Lick Creek-South Fork Licking River watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

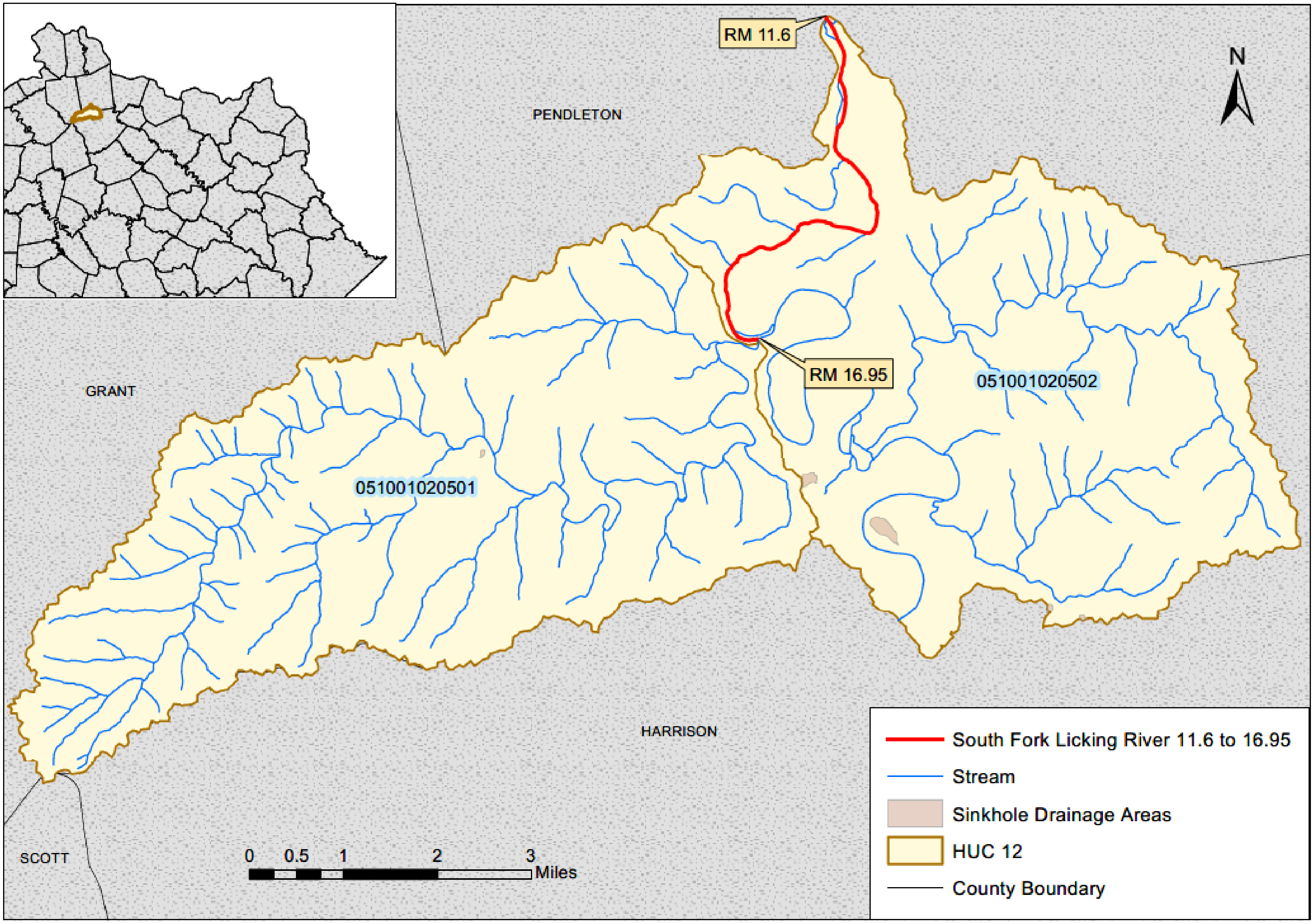


Figure F.49-1 Location of South Fork Licking River 11.6 to 16.95

Section F.50 Stoner Creek 0.0 to 5.55

Waterbody ID: KY504482_01

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051001020206

County: Bourbon

The Division of Water (DOW) has collected samples from station PRI101, located near river mile 0.7, since 1999. The station typically has been sampled three or more times during the PCR season, although it was not sampled in 2005, 2007, 2012, and 2013. Table F.50-1 summarizes information about this sampling station; Table F.50-2 provides a summary of the data collected from this station.

Table F.50-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI101	38.302979	-84.249757	Stoner Creek 0.0 to 5.55	0.7

Table F.50-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI101	*E. coli*	42	7	>2,420	257
PRI101	fecal coliform	35	10	50,000	1,734

(1)The full data set for samples collected at PRI101 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Stoner Creek 0.0 to 5.55 are presented in Table F.50-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Stoner Creek. The location within the Flat Run-Stoner Creek watershed is shown in Figure F.50-1.

Table F.50-3 Stoner Creek 0.0 to 5.55 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

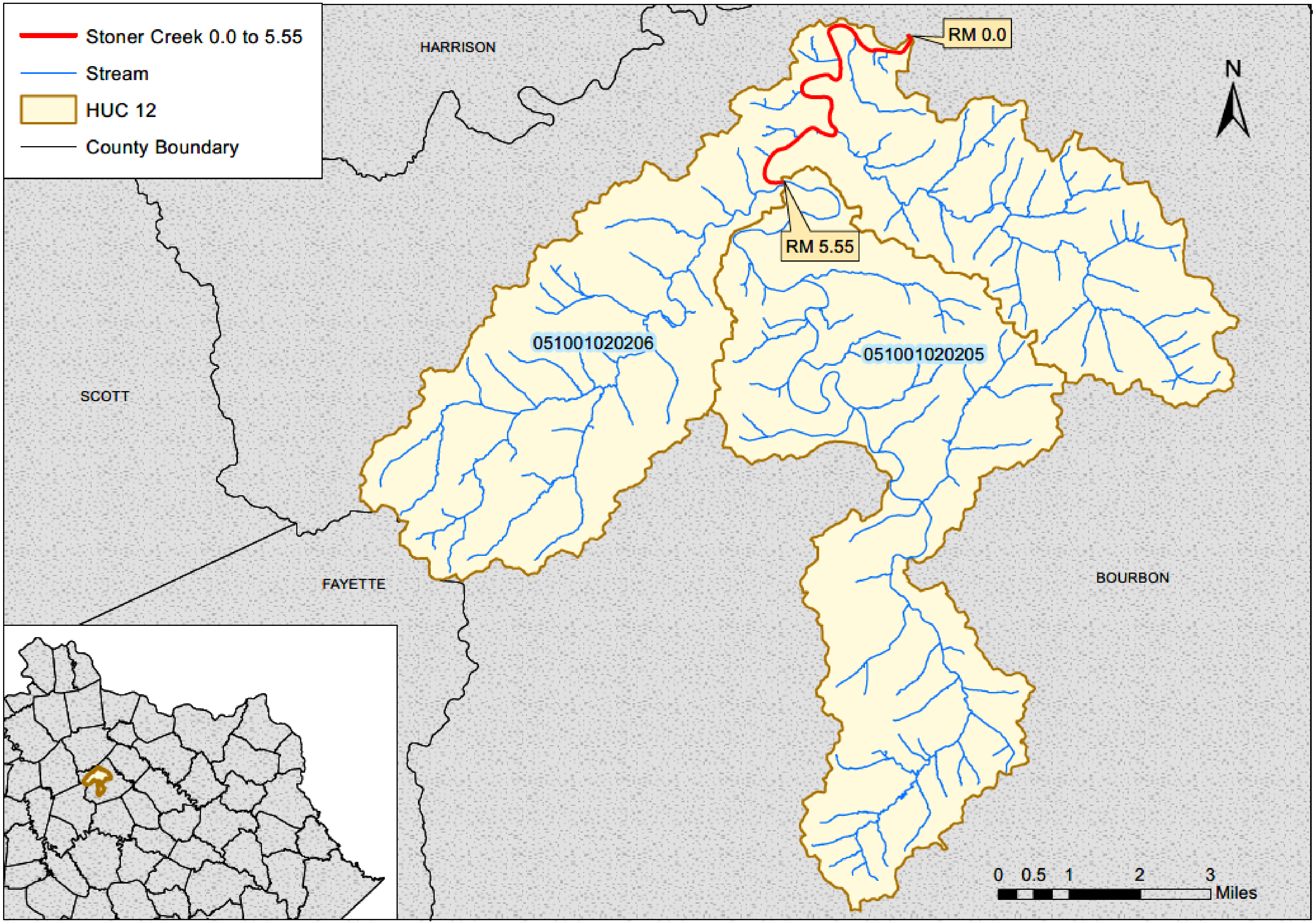


Figure F.50-1 Location of Stoner Creek 0.0 to 5.55

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region identified an area of sinkholes that transfers drainage from the Houston Creek watershed to Cooper Run. However, both of these areas are upstream contributors to Stoner Creek 0.0 to 5.55 and do not result in an expansion of the area drained by this segment. The dye tracing studies did not identify any karst areas outside the Stoner Creek watershed boundary that are contributing drainage to the segment (see Figure F.50-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

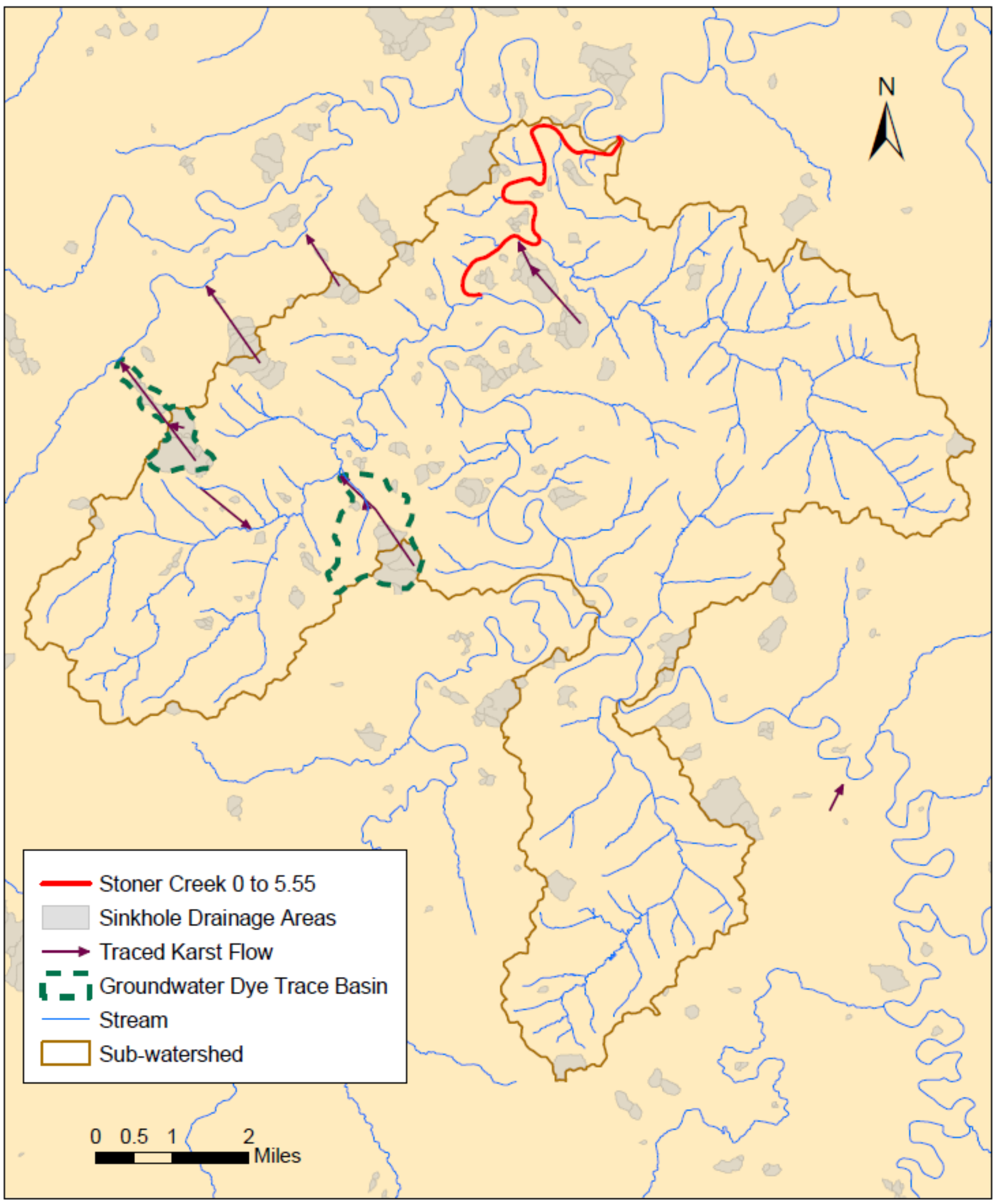


Figure F.50-2 Karst Influence in the Region of Stoner Creek 0.0 to 5.55

Section F.51 Stoner Creek 5.55 to 15.0

Waterbody ID: KY504482_02

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020205

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05017023, located near river mile 5.85, in 2009. The station was sampled between two and five times during each month of the PCR season. Table F.51-1 summarizes information about this sampling station; Table F.51-2 provides a summary of the data collected from this station.

Table F.51-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017023	38.27516	-84.26944	Stoner Creek 5.55 to 15.0	5.85

Table F.51-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017023	*E. coli*	20	68	1,986	517

(1)The full data set for samples collected at DOW05017023 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Stoner Creek 5.55 to 15.0 are presented in Table F.51-3.

Table F.51-3 Stoner Creek 5.55 to 15.0 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[5]	Allocations for Tributary Loads to the Segment[6]	MOS[7]
	SWS-WLA[3]	LA[4]			
Q_S×WQC×CF	∑(Q_{SWS}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

[4]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[5]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[6]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[7]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

One facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Stoner Creek. The directly discharging facility is a sanitary wastewater system (SWS). There are no Municipal Separate Storm Sewer System (MS4) communities or Combined Sewer Overflows (CSOs) discharging directly to this segment of Stoner Creek. This facility is identified in Table F.51-4 and the location in the Kennedy Creek-Stoner Creek watershed is shown in Figure F.51-1.

Table F.51-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date[1]	WLA[2] (colonies *E. coli* /day)
KY0090654	Paris STP	2.7	38.22361	-84.252778	9/30/2023	Q_{SWS}×WQC×CF

[1]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[2]Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

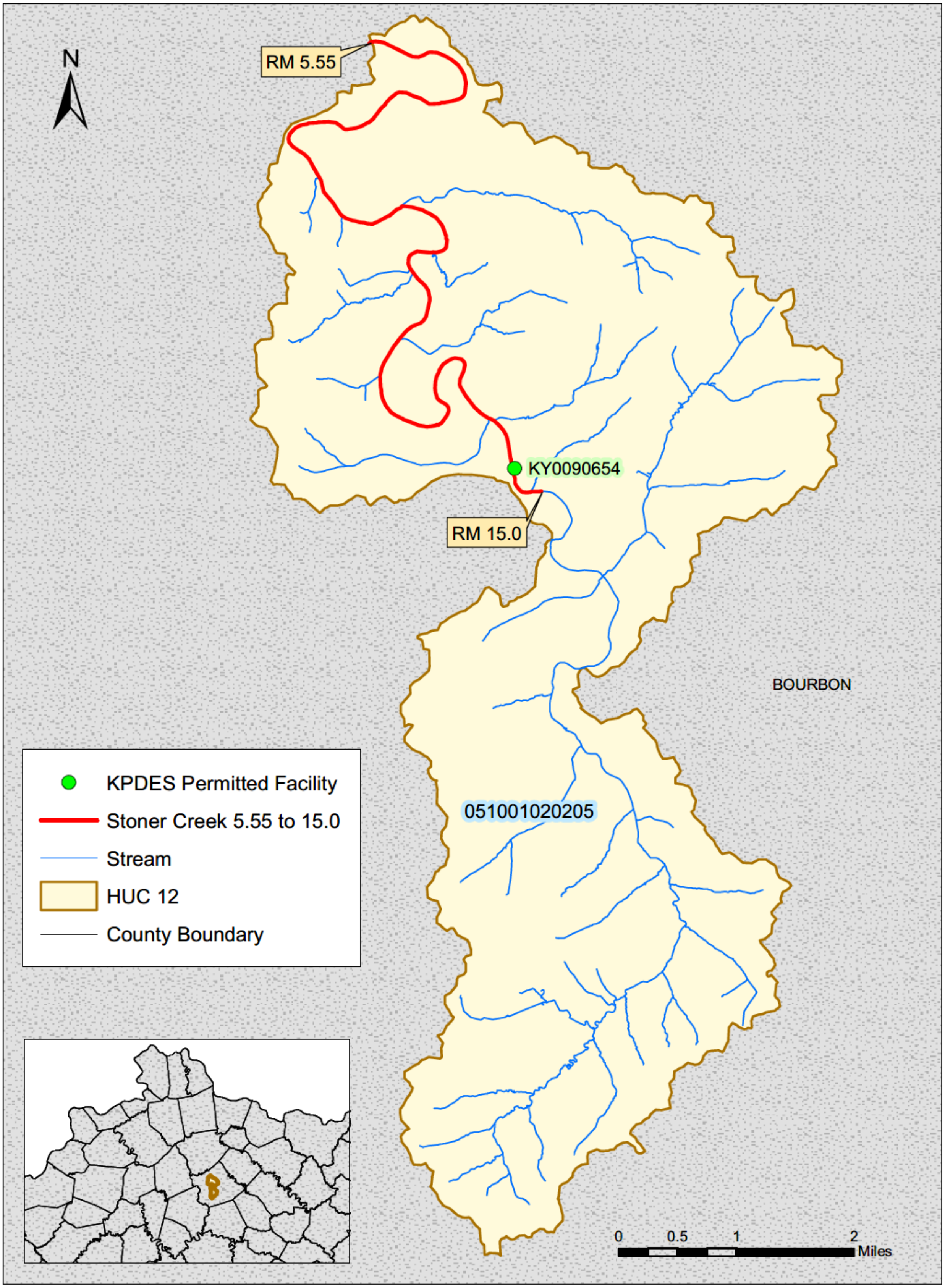


Figure F.51-1 Location of KPDES-permitted facility on Stoner Creek 5.55 to 15.0

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region did not identify any karst areas outside the Stoner Creek watershed boundary that are contributing drainage to the segment (see Figure F.51-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

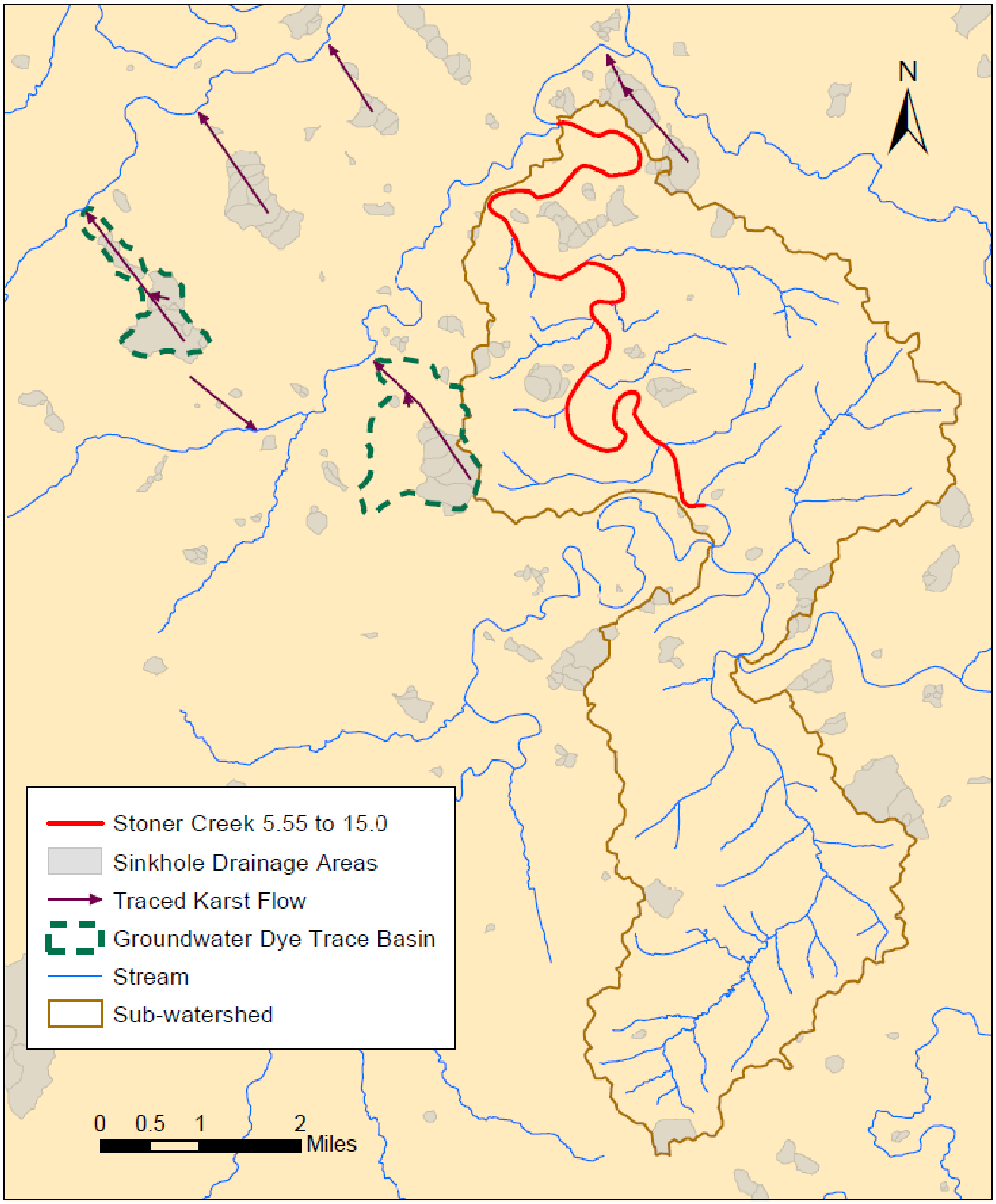


Figure F.51-2 Karst Influence in the Region of Stoner Creek 5.55 to 15.0

Section F.52 Stoner Creek 17.3 to 23.5

Waterbody ID: KY504482_04

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020203

County: Bourbon

Northern Kentucky University (NKU) collected samples from May through October 1999 at station L - 017. Table F.52-1 summarizes information about this sampling station; Table F.52-2 provides a summary of the data collected from this station.

Table F.52-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 017	38.1914	-84.18107	Stoner Creek 17.3 to 23.5	23.5

Table F.52-2 Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 017	*E. coli*	6	55	3,500	839

(1)The full data set for samples collected at L - 017 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Stoner Creek 17.3 to 23.5 are presented in Table F.52-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Stoner Creek. The location within the Harrods Creek-Stoner Creek watershed is shown in Figure F.52-1.

Table F.52-3 Stoner Creek 17.3 to 23.5 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment LA[(3)]	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

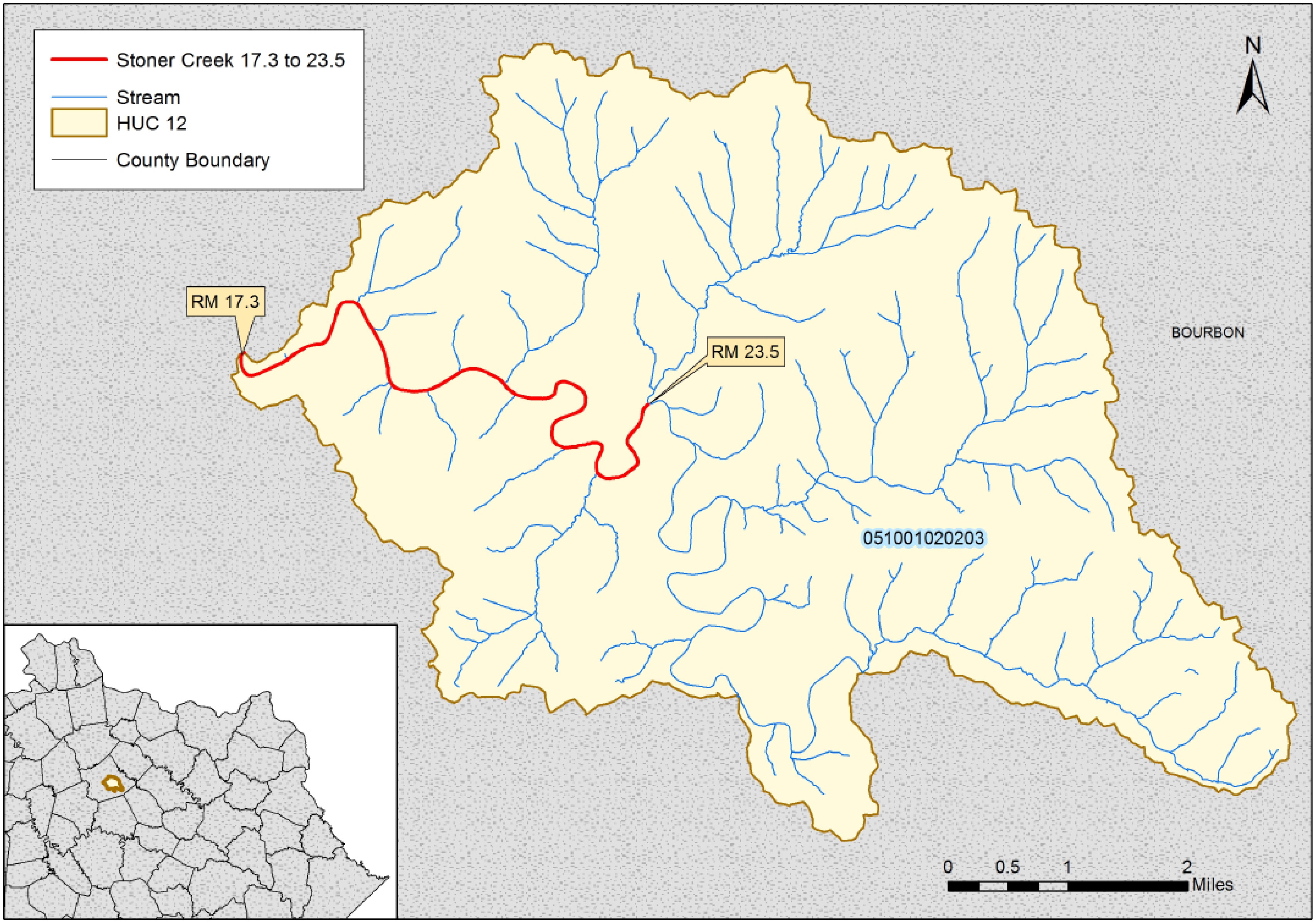


Figure F.52-1 Location of Stoner Creek 17.3 to 23.5

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region did not identify any karst areas outside the Stoner Creek watershed boundary that are contributing drainage to the segment (see Figure F.52-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

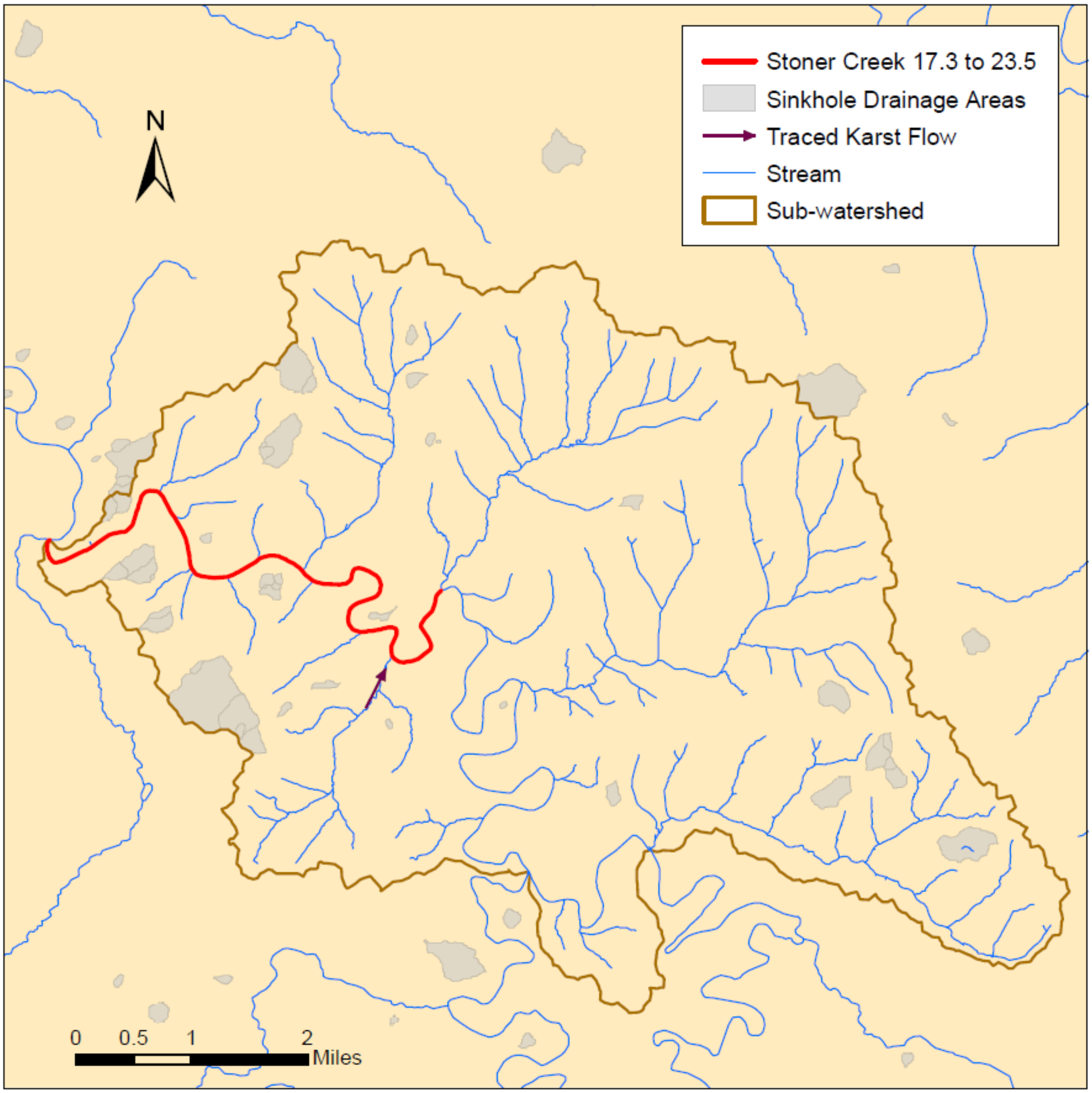


Figure F.52-2 Karst Influence in the Region of Stoner Creek 17.3 to 23.5

Section F.53 Stoner Creek 35.7 to 45.1

Waterbody ID: KY504482_05

Receiving Water: South Fork Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020202

County: Clark

The Division of Water (DOW) collected samples from station DOW05017027, located near river mile 43.15, in 2009. The station was sampled between one and five times during each month of the PCR season. Table F.53-1 summarizes information about this sampling station; Table F.53-2 provides a summary of the data collected from this station.

Table F.53-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017027	38.11449	-84.13813	Stoner Creek 35.7 to 45.1	43.15

Table F.53-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017027	*E. coli*	17	155	2,760	907

(1)The full data set for samples collected at DOW05017027 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Stoner Creek 35.7 to 45.1 are presented in Table F.53-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Stoner Creek.

Table F.53-3 Stoner Creek 35.7 to 45.1 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment LA[(3)]	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Donaldson Creek-Stoner Creek watershed is shown in Figure F.53-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Donaldson Creek-Stoner Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

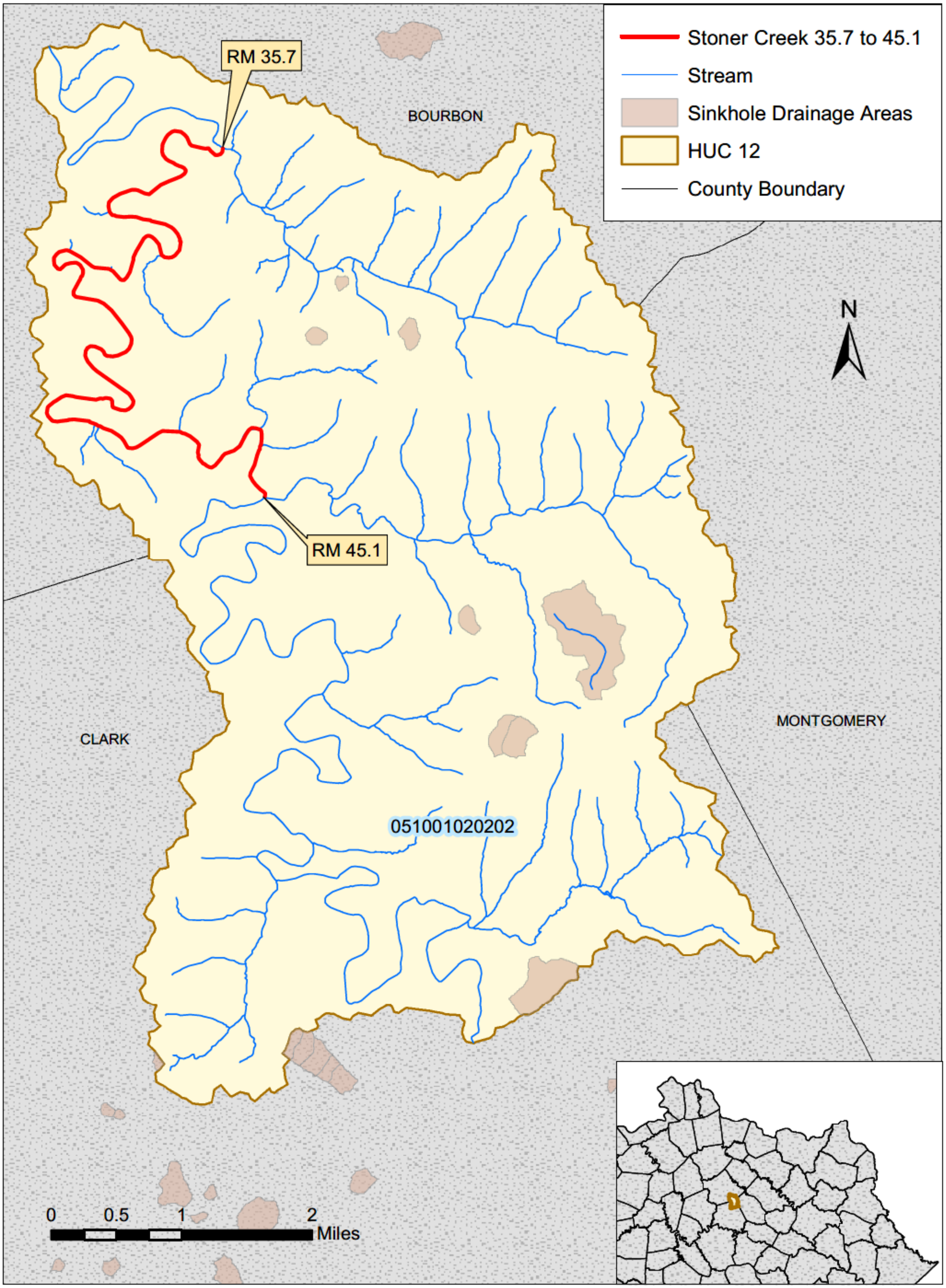


Figure F.53-1 Location of Stoner Creek 35.7 to 45.1

Section F.54 Strodes Creek 2.7 to 7.95

Waterbody ID: KY504593_01

Receiving Water: Stoner Creek

Impaired Use: PCR

Support Status: partial support

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001020104

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05020014, located near river mile 4.1, in 2014. The station was sampled one to four times each month during the PCR season. Table F.54-1 summarizes information about this sampling station; Table F.54-2 provides a summary of the data collected from this station.

Table F.54-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05020014	38.134482	-84.161346	Strodes Creek 2.7 to 7.95	4.1

Table F.54-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05020014	*E. coli*	11	66	27,230	2,890

(1)The full data set for samples collected at DOW05020014 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Strodes Creek 2.7 to 7.95 are presented in Table F.54-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Strodes Creek.

Table F.54-3 Strodes Creek 2.7 to 7.95 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
	LA(3)			
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Pretty Run-Strodes Creek watershed is shown in Figure F.54-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Pretty Run-Strodes Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

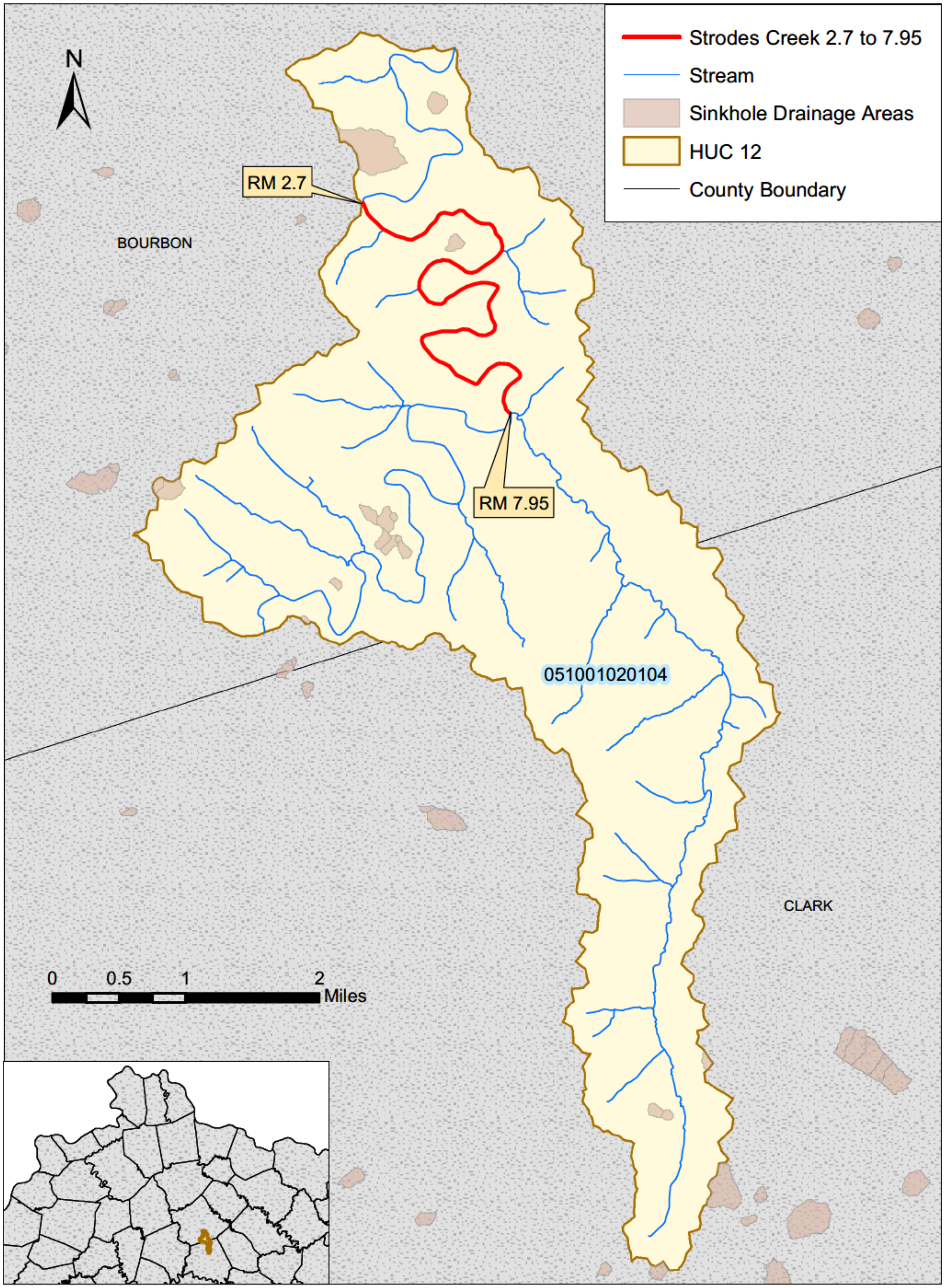


Figure F.54-1 Location of Strodes Creek 2.7 to 7.95

Section F.55 Strodes Creek 7.95 to 19.3

Waterbody ID: KY504593_02

Receiving Water: Stoner Creek

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant: *E. coli* (PCR), fecal coliform (PCR and SCR)

TMDL Pollutant: *E. coli* (PCR), fecal coliform (SCR)

HUC 12s: 051001020102, 051001020104

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05020013, located near river mile 10.6, in 2014. The station was sampled one to four times each month during the PCR season. Table F.55-1 summarizes information about this sampling station; Table F.55-2 provides a summary of the data collected from this station.

Table F.55-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05020013	38.109913	-84.178008	Strodes Creek 7.95 to 19.3	10.6

Table F.55-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05020013	*E. coli*	11	57	34,480	4,016

(1)The full data set for samples collected at DOW05020013 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Strodes Creek 7.95 to 19.3 are presented in Table F.55-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Strodes Creek.

Table F.55-3 Strodes Creek 7.95 to 19.3 TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1) All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2) Q_S is the flow (ft^3/s) in the segment.

(3) Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4) $Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5) $Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6) The following assumptions provide an implicit MOS:

(a) Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b) There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Johnson Creek-Strodes Creek and Pretty Run-Strodes Creek watersheds is shown in Figure F.55-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Johnson Creek-Strodes Creek and Pretty Run-Strodes Creek watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

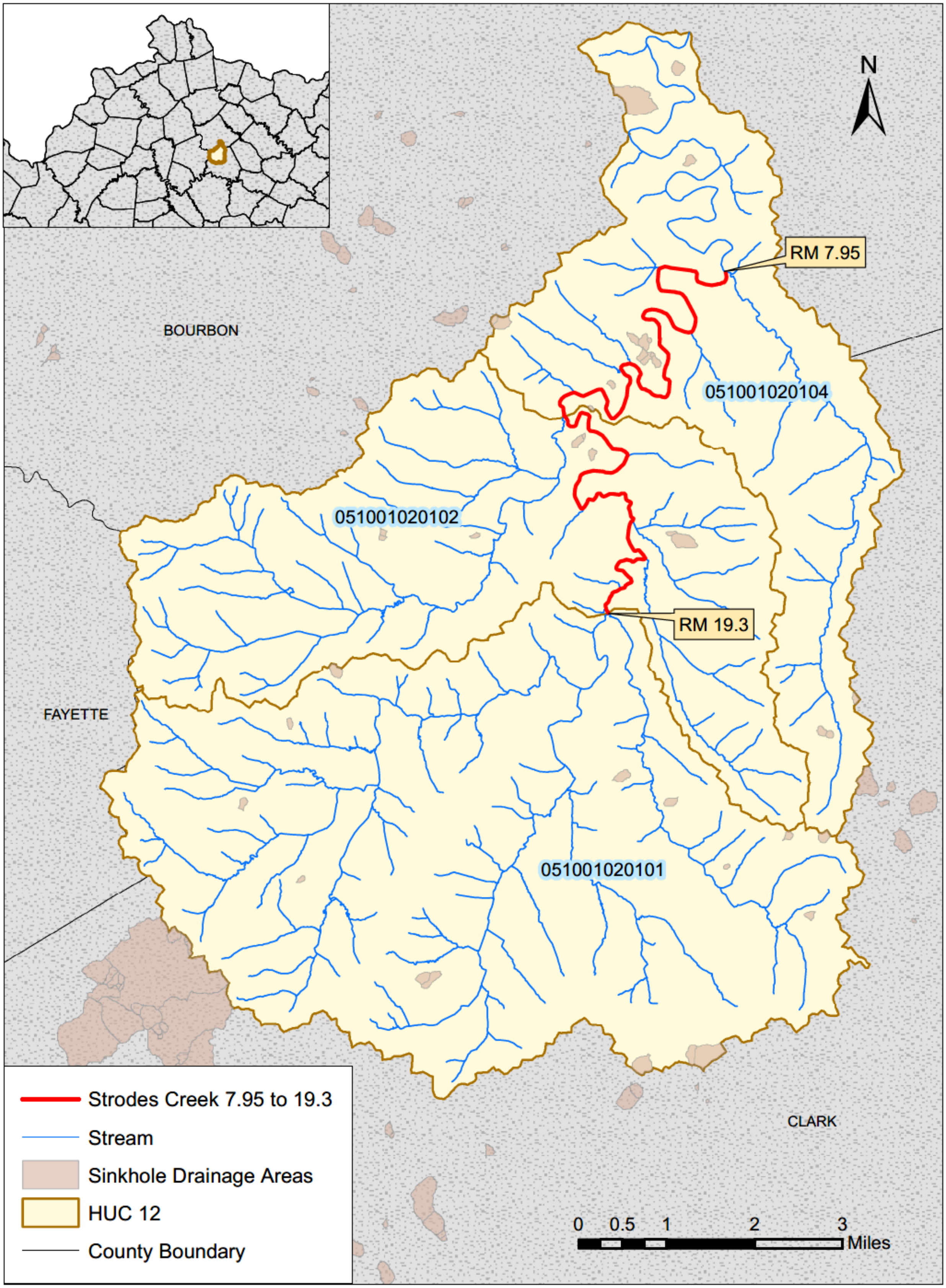


Figure F.55-1 Location of Strodes Creek 7.95 to 19.3

Section F.56 Strodes Creek 19.3 to 26.5

Waterbody ID: KY504593_03

Receiving Water: Stoner Creek

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant: *E. coli* (PCR), fecal coliform (PCR and SCR)

TMDL Pollutant: *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001020101

County: Clark

The Division of Water (DOW) collected samples from two stations on this segment in 2014. Seven samples were collected at station DOW05020002 during the PCR season. Station DOW05020010 was sampled between one and four times during each month of the PCR season. Table F.56-1 summarizes information about this sampling station; Table F.56-2 provides a summary of the data collected from this station.

Table F.56-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05020002	38.03102	-84.19672	Strodes Creek 19.3 to 26.5	22.3
DOW05020010	38.035838	-84.195557	Strodes Creek 19.3 to 26.5	21.8

Table F.56-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05020002	*E. coli*	7	1,067	15,531	6,427
DOW05020010	*E. coli*	11	36	1,918	581

(1)The full data set for samples collected at DOW05020002 and DOW05020010 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Strodes Creek 19.3 to 26.5 are presented in Table F.56-3.

Table F.56-3 Strodes Creek 19.3 to 26.5 TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment			Allocations for Upstream Loads to the Segment(6)	Allocations for Tributary Loads to the Segment(7)	MOS(8)
	MS4-WLA(3)	SWS-WLA(4)	LA(5)			
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{SWS} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1) All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(5)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(6)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(7)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(8)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

(d)For SCR-impaired segments, SWS sources must meet the PCR criterion year-round.

The location of the segment within the Hancock Creek-Strodes Creek watershed is shown in Figure F.56-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Hancock Creek-Strodes Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

The City of Winchester and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Strodes Creek. Information about each MS4 permit is summarized in Table F.56-4. One other facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Strodes Creek. This directly discharging facility is a sanitary wastewater system (SWS) and is summarized in Table F.56-4. There are no CSOs discharging directly to this segment of Strodes Creek. The location in the Hancock Creek-Strodes Creek watershed is shown in Figure F.56-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table F.56-4 Summary of Active KPDES-permitted Sources as of March 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date(1)	WLA(2) (colonies/day)
KYG200043	City of Winchester	N/A	N/A	N/A	04/30/2023	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	N/A	N/A	N/A	09/30/2017	Q_{MS4}×WQC×CF
KY0037991	Strodes Creek STP	7.2	38.035425	-84.19511	7/31/2016	Q_{SWS}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

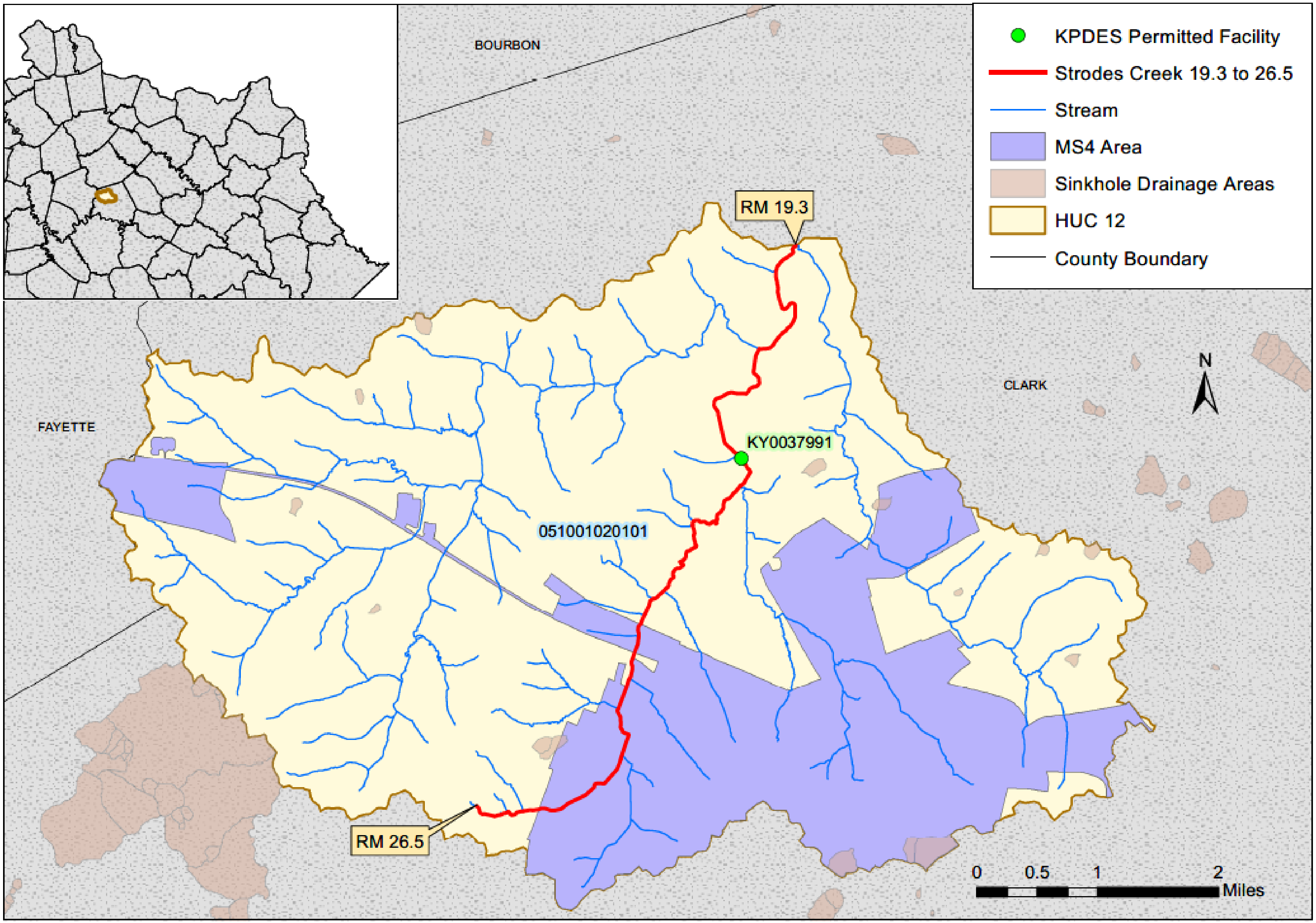


Figure F.56-1 Location of the KPDES-permitted Facility on Strodes Creek 19.3 to 26.5

Section F.57 Triplett Creek 0.0 to 5.85

Waterbody ID: KY516023_01

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051001010605

County: Rowan

The Division of Water (DOW) collected samples from station TC - 0.74, located near river mile 2.3, for a watershed-based plan in Triplett Creek. The station was sampled eight times in 2009 and four times in 2010 during the PCR season. Table F.57-1 summarizes information about this sampling station; Table F.57-2 provides a summary of the data collected from this station.

Table F.57-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
TC - 0.74	38.14859	-83.54747	Triplett Creek 0.0 to 5.85	2.3

Table F.57-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
TC - 0.74	*E. coli*	12	20	8,100	1,297

(1)The full data set for samples collected at TC - 0.74 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Triplett Creek 0.0 to 5.85 are presented in Table F.57-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Triplett Creek. The location within the Lower Triplett Creek watershed is shown in Figure F.57-1.

Table F.57-3 Triplett Creek 0.0 to 5.85 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

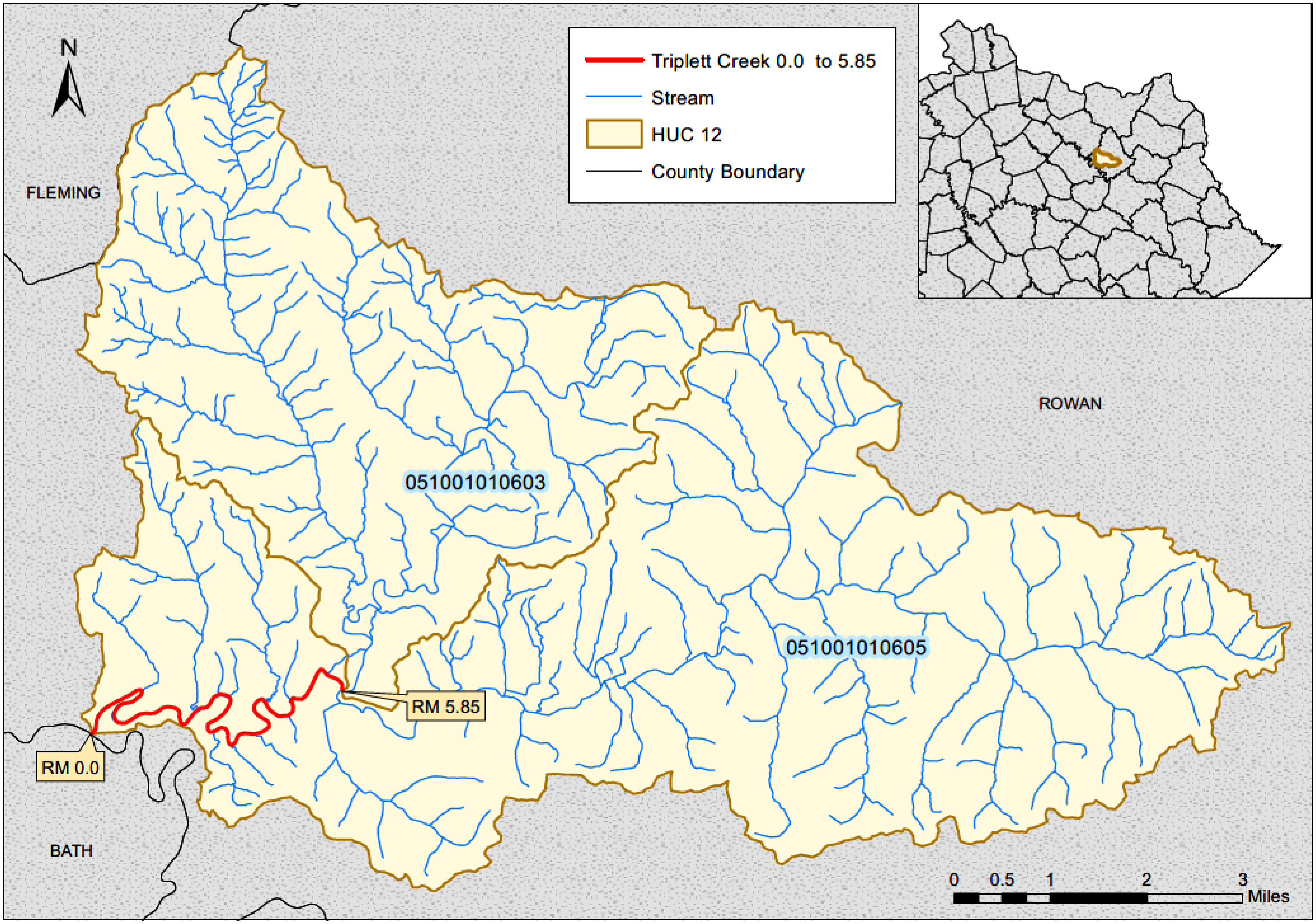


Figure F.57-1 Location of Triplett Creek 0.0 to 5.85

Section F.58 Triplett Creek 5.85 to 12.3

Waterbody ID: KY516023_02

Receiving Water: Licking River

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant/TMDL Pollutant: *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001010605

County: Rowan

The Division of Water (DOW) has collected samples from station LRW007, located near river mile 10.6, since 2004. The station is sampled every five years during the PCR season as part of the DOW five-year rotating schedule for basin monitoring (see also Section 7.2.1, Kentucky Watershed Management Framework). This station has typically been sampled four or more times during a monitoring year. Table F.58-1 summarizes information about this sampling station; Table F.58-2 provides a summary of the data collected from this station.

Table F.58-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
LRW007	38.153643	-83.455028	Triplett Creek 5.85 to 12.3	10.6

Table F.58-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
LRW007	*E. coli*	15	47	1,414	300
LRW007	fecal coliform	4	200	3,600	1,460

(1)The full data set for samples collected at LRW007 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Triplett Creek 5.85 to 12.3 are presented in Table F.58-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Triplett Creek. The location within the Lower Triplett Creek watershed is shown in Figure F.58-1.

Table F.58-3 Triplett Creek 5.85 to 12.3 TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1] All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2] Q_S is the flow (ft^3/s) in the segment.

[3] Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4] $Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5] $Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6] The following assumptions provide an implicit MOS:

(a) Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b) There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

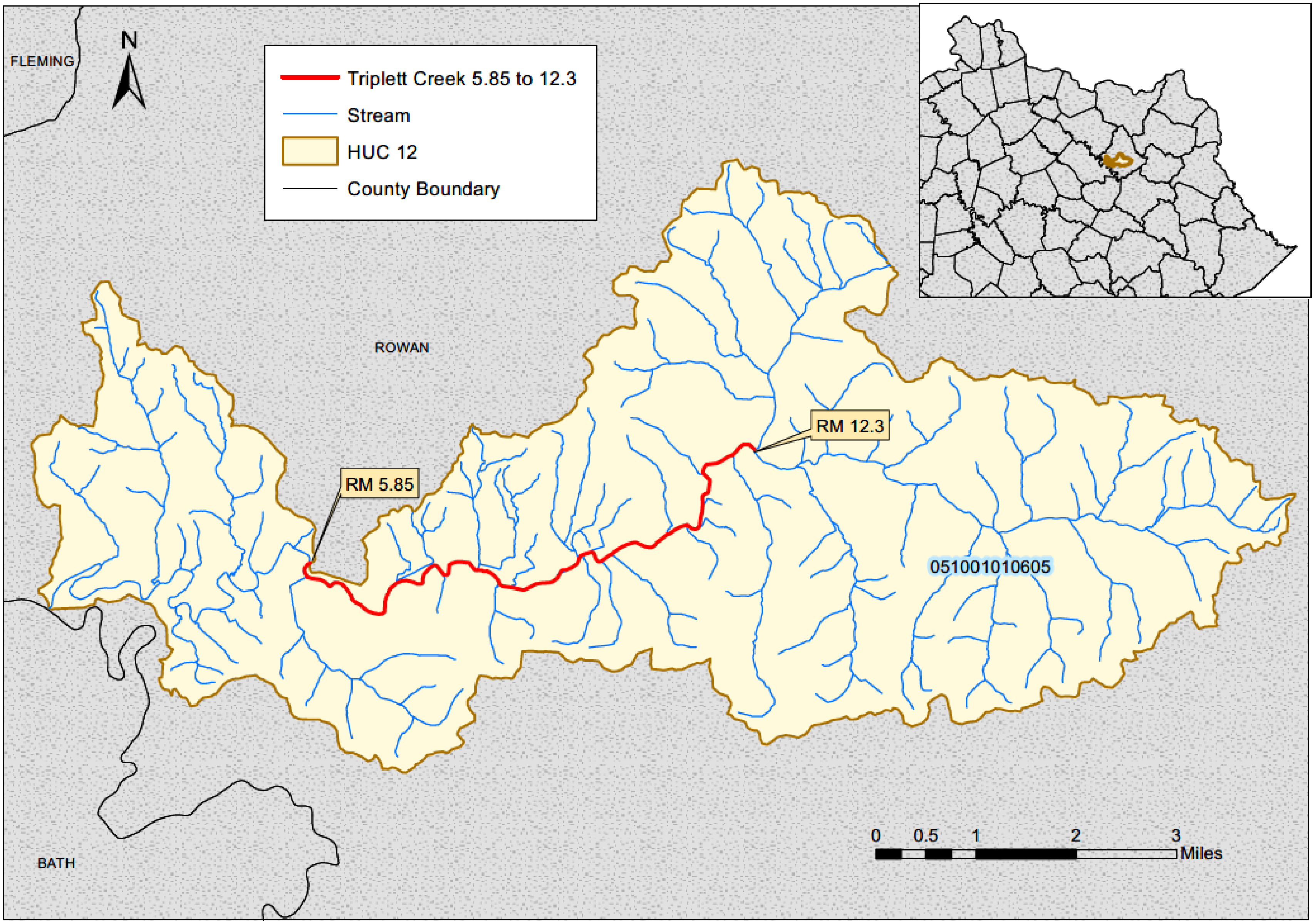


Figure F.58-1 Location of Triplett Creek 5.85 to 12.3

Section F.59 Triplett Creek 12.3 to 13.8

Waterbody ID: KY516023_03

Receiving Water: Licking River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010605

County: Rowan

The Division of Water (DOW) collected samples from stations TC - 14.5 and TC - 14.99 for a watershed-based plan in Triplett Creek. Each station was sampled ten times in 2009 and five times in 2010 during the PCR season. Table F.59-1 summarizes information about this sampling station; Table F.59-2 provides a summary of the data collected from this station.

Table F.59-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
TC - 14.5	38.191578	-83.41601	Triplett Creek 12.3 to 13.8	14.65
TC - 14.99	38.19623	-83.40859	Triplett Creek 12.3 to 13.8	15.2

Table F.59-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
TC - 14.5	*E. coli*	15	40	480	177
TC - 14.99	*E. coli*	15	30	430	111

(1)The full data set for samples collected at TC - 14.5 and TC - 14.99 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Triplett Creek 12.3 to 13.8 are presented in Table F.59-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Triplett Creek. The location within the Lower Triplett Creek watershed is shown in Figure F.59-1.

Table F.59-3 Triplett Creek 12.3 to 13.8 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
	LA[(3)]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

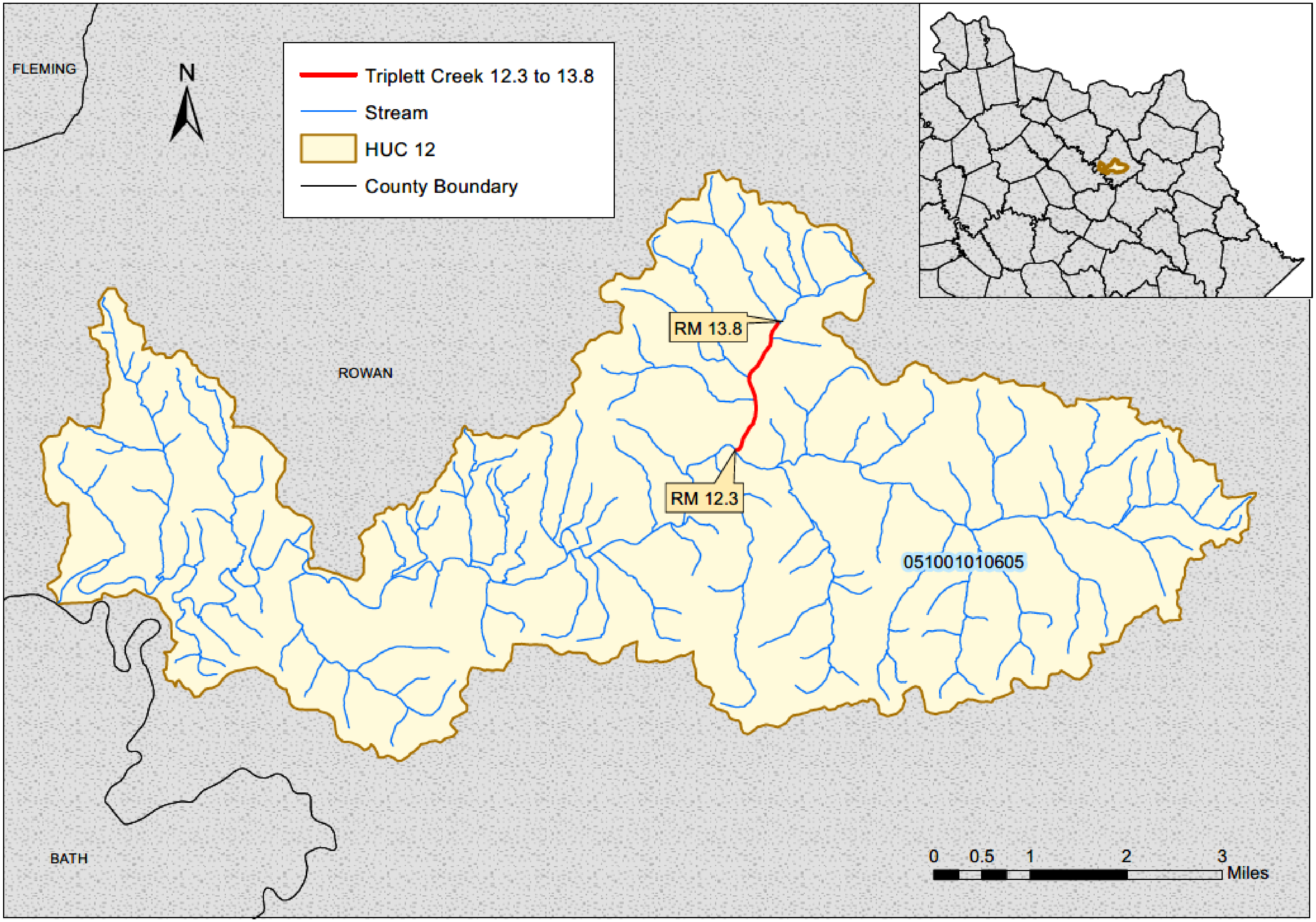


Figure F.59-1 Location of Triplett Creek 12.3 to 13.8

Section F.60 UT of Blacks Creek 0.0 to 1.7

Waterbody ID: KY487421-2.7_01

Receiving Water: Blacks Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020305

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05016040, located near river mile 0.25, in 2010. The station was sampled eight times during the PCR season. Table F.60-1 summarizes information about this sampling station; Table F.60-2 provides a summary of the data collected from this station.

Table F.60-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016040	38.24624	-84.11141	UT of Blacks Creek 0.0 to 1.7	0.25

Table F.60-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016040	*E. coli*	8	259	24,192	7,789

(1)The full data set for samples collected at DOW05016040 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Blacks Creek 0.0 to 1.7 are presented in Table F.60-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of UT of Blacks Creek.

Table F.60-3 UT of Blacks Creek 0.0 to 1.7 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[(4)]	Allocations for Tributary Loads to the Segment[(5)]	MOS[(6)]
	LA[(3)]			
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(5)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(6)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Blacks Creek-Hinkston Creek watershed is shown in Figure F.60-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Blacks Creek-Hinkston Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

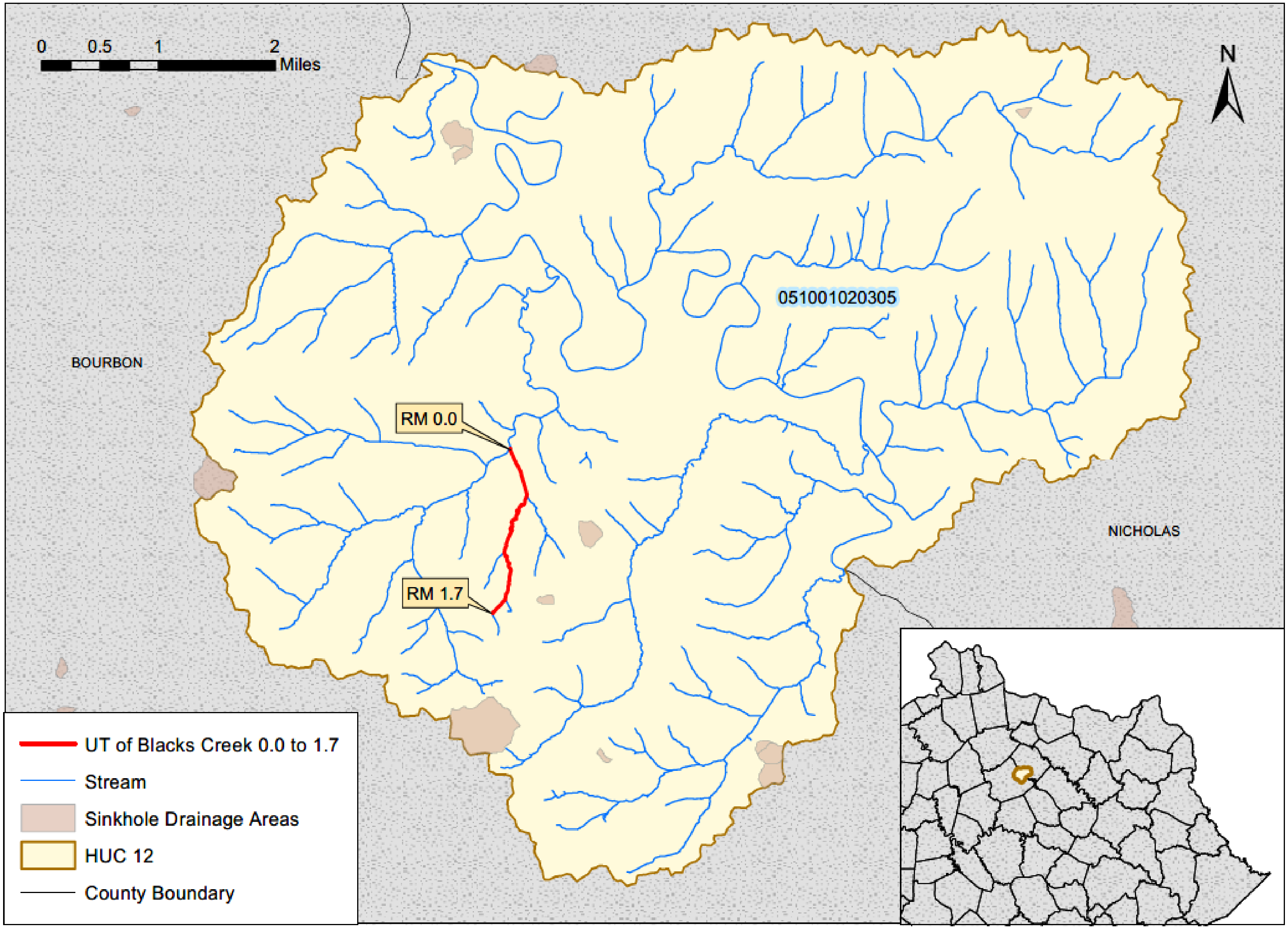


Figure F.60-1 Location of UT of Blacks Creek 0.0 to 1.7

Section F.61 UT of Blacks Creek 0.0 to 2.3

Waterbody ID: KY487421-3.0_01

Receiving Water: Blacks Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020305

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05016033, located near river mile 0.05, in 2010. The station was sampled eight times during the PCR season. Table F.61-1 summarizes information about this sampling station; Table F.61-2 provides a summary of the data collected from this station.

Table F.61-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05016033	38.24762	-84.11714	UT of Blacks Creek 0.0 to 2.3	0.05

Table F.61-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05016033	*E. coli*	8	488	>2,420	1,359

(1)The full data set for samples collected at DOW05016033 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Blacks Creek 0.0 to 2.3 are presented in Table F.61-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of UT of Blacks Creek. The location within the Blacks Creek-Hinkston Creek watershed is shown in Figure F.61-1.

Table F.61-3 UT of Blacks Creek 0.0 to 2.3 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Tributary Loads to the Segment[(4)]	MOS[(5)]
	LA[(3)]		
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(5)]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

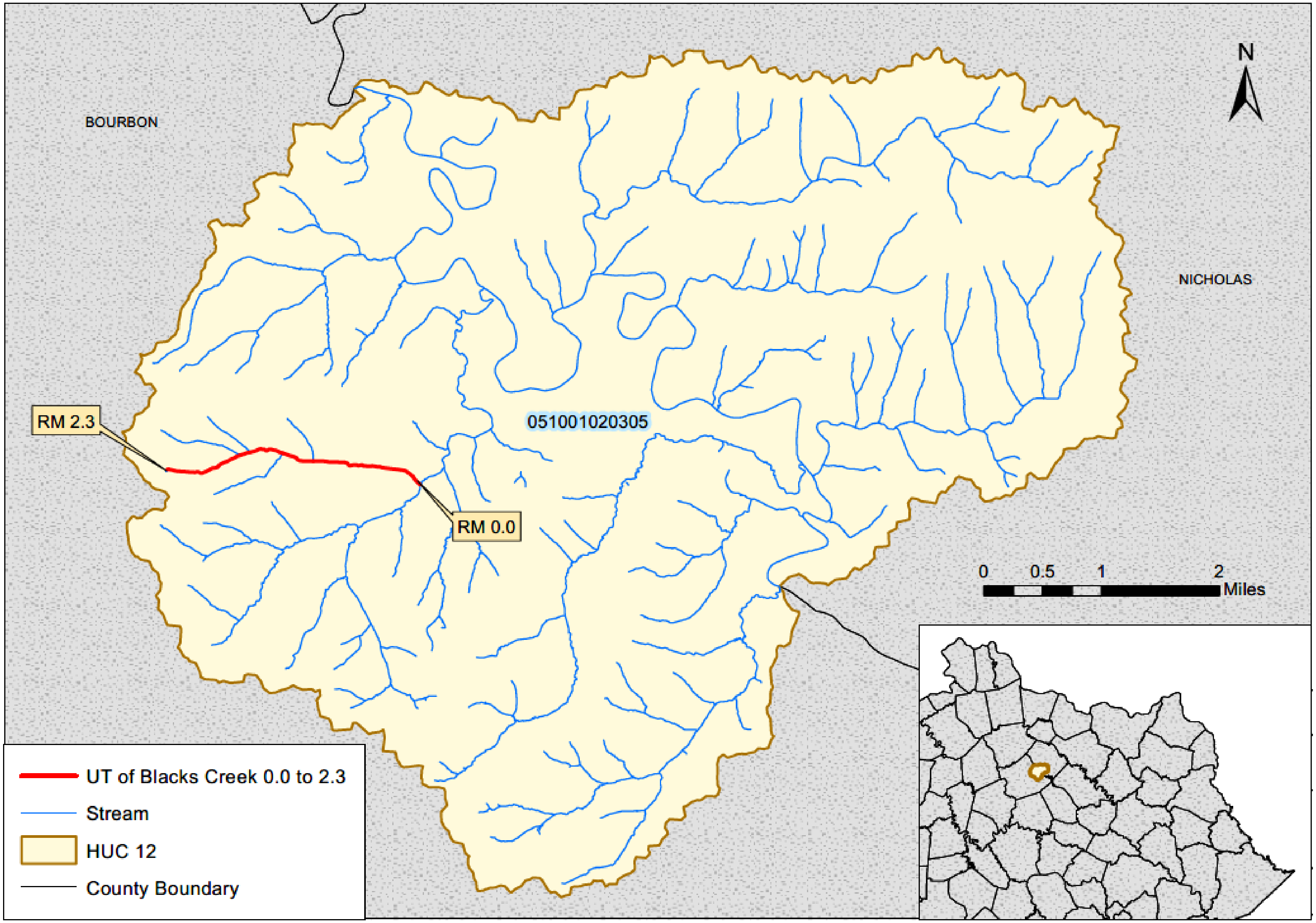


Figure F.61-1 Location of UT of Blacks Creek 0.0 to 2.3

Section F.62 UT of Cooper Run 0.0 to 3.8

Waterbody ID: KY490062-5.85_01

Receiving Water: Cooper Run

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020206

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05017016, located near river mile 1.1, in 2010. The station was sampled seven times during the PCR season. Table F.62-1 summarizes information about this sampling station; Table F.62-2 provides a summary of the data collected from this station.

Table F.62-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017016	38.22042	-84.32846	UT of Cooper Run 0.0 to 3.8	1.1

Table F.62-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017016	*E. coli*	7	461	24,192	4,412

(1)The full data set for samples collected at DOW05017016 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Cooper Run 0.0 to 3.8 are presented in Table F.62-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of UT of Cooper Run. The location within the Flat Run-Stoner Creek watershed is shown in Figure F.62-1.

Table F.62-3 UT of Cooper Run 0.0 to 3.8 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Tributary Loads to the Segment[4]	MOS[5]
	LA[3]		
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[5]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

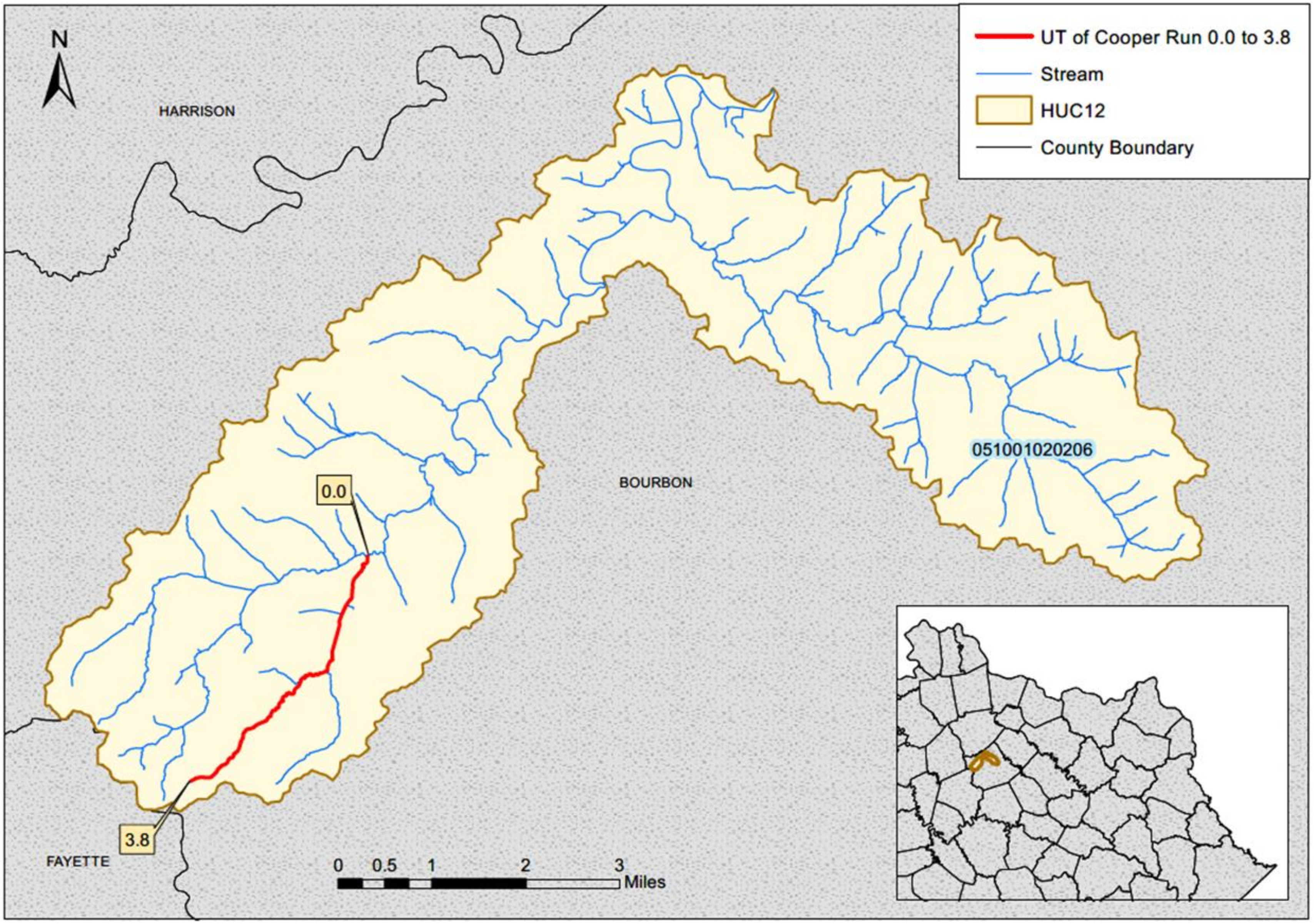


Figure F.62-1 Location of UT of Cooper Run 0.0 to 3.8

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region did not identify any karst areas outside the HUC 12 boundary that are contributing drainage to the segment (see Figure F.62-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

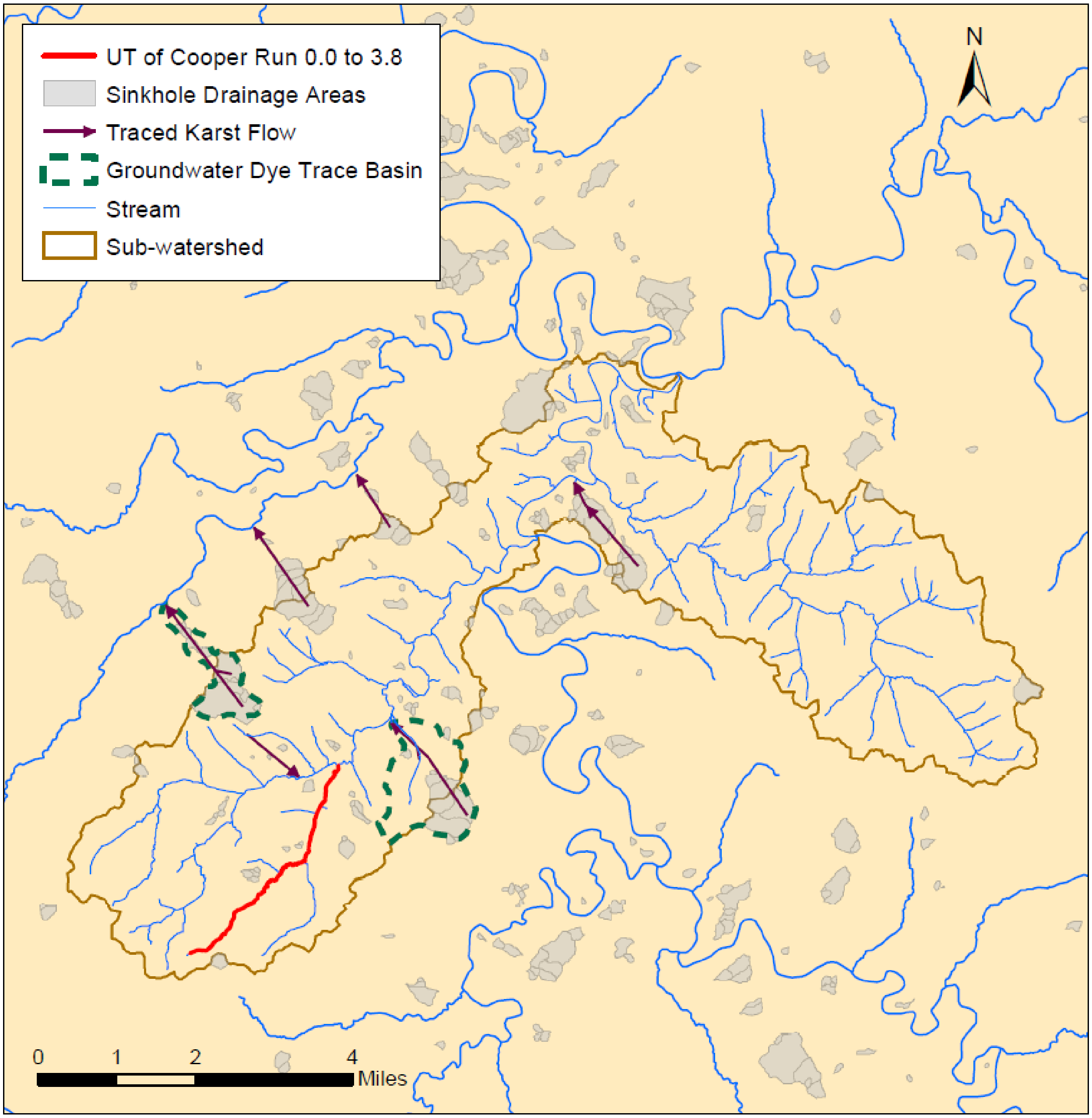


Figure F.62-2 Karst Influence in the Region of UT of Cooper Run 0.0 to 3.8

Section F.63 UT of Cooper Run 0.0 to 1.0

Waterbody ID: KY490062-6.95_01

Receiving Water: Cooper Run

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020206

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05017014, located near river mile 0.2, in 2010. The station was sampled seven times during the PCR season. Table F.63-1 summarizes information about this sampling station; Table F.63-2 provides a summary of the data collected from this station.

Table F.63-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017014	38.23304	-84.34145	UT of Cooper Run 0.0 to 1.0	0.2

Table F.63-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017014	*E. coli*	7	1,300	24,192	5,575

(1)The full data set for samples collected at DOW05017014 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Cooper Run 0.0 to 1.0 are presented in Table F.63-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of UT of Cooper Run. The location within the Flat Run-Stoner Creek watershed is shown in Figure F.63-1.

Table F.63-3 UT of Cooper Run 0.0 to 1.0 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment	MOS(4)
	LA(3)	
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
(2)Q_S is the flow (ft^3/s) in the segment.
(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
(4)The following assumptions provide an implicit MOS:
(a)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

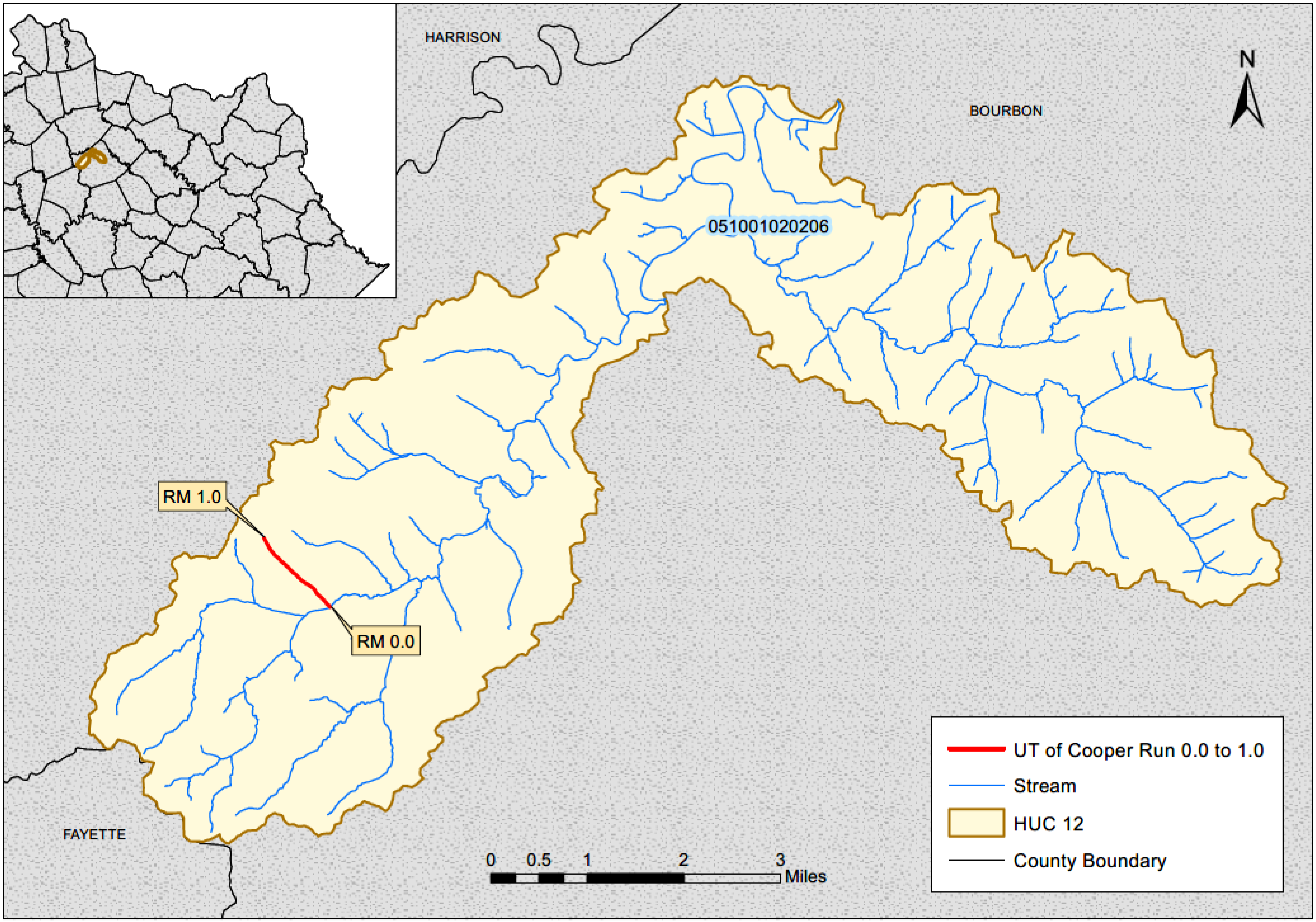


Figure F.63-1 Location of UT of Cooper Run 0.0 to 1.0

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region did not identify any karst areas outside the HUC 12 boundary that are contributing drainage to the segment (see Figure F.63-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

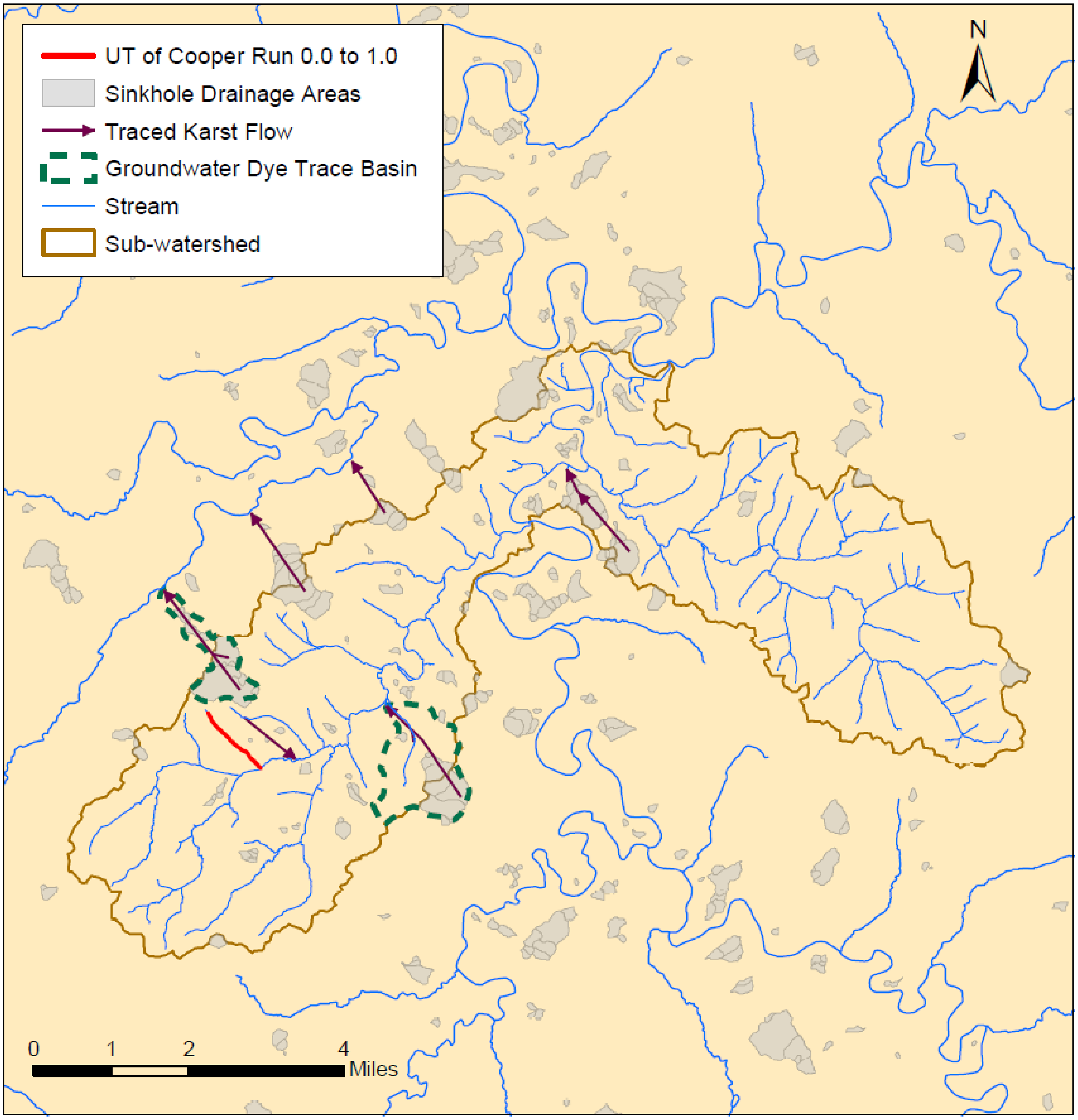


Figure F.63-2 Karst Influence in the Region of UT of Cooper Run 0.0 to 1.0

Section F.64 UT of Cooper Run 0.0 to 3.05

Waterbody ID: KY490062-7.25_01

Receiving Water: Cooper Run

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020206

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05017015, located near river mile 0.1, in 2010. The station was sampled nine times during the PCR season. Table F.64-1 summarizes information about this sampling station; Table F.64-2 provides a summary of the data collected from this station.

Table F.64-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017015	38.22975	-84.34472	UT of Cooper Run 0.0 to 3.05	0.1

Table F.64-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017015	*E. coli*	9	99	24,192	2,945

(1)The full data set for samples collected at DOW05017015 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Cooper Run 0.0 to 3.05 are presented in Table F.64-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of UT of Cooper Run. The location within the Flat Run-Stoner Creek watershed is shown in Figure F.64-1.

Table F.64-3 UT of Cooper Run 0.0 to 3.05 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment	Allocations for Tributary Loads to the Segment[(4)]	MOS[(5)]
	LA[(3)]		
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(4)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(5)]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

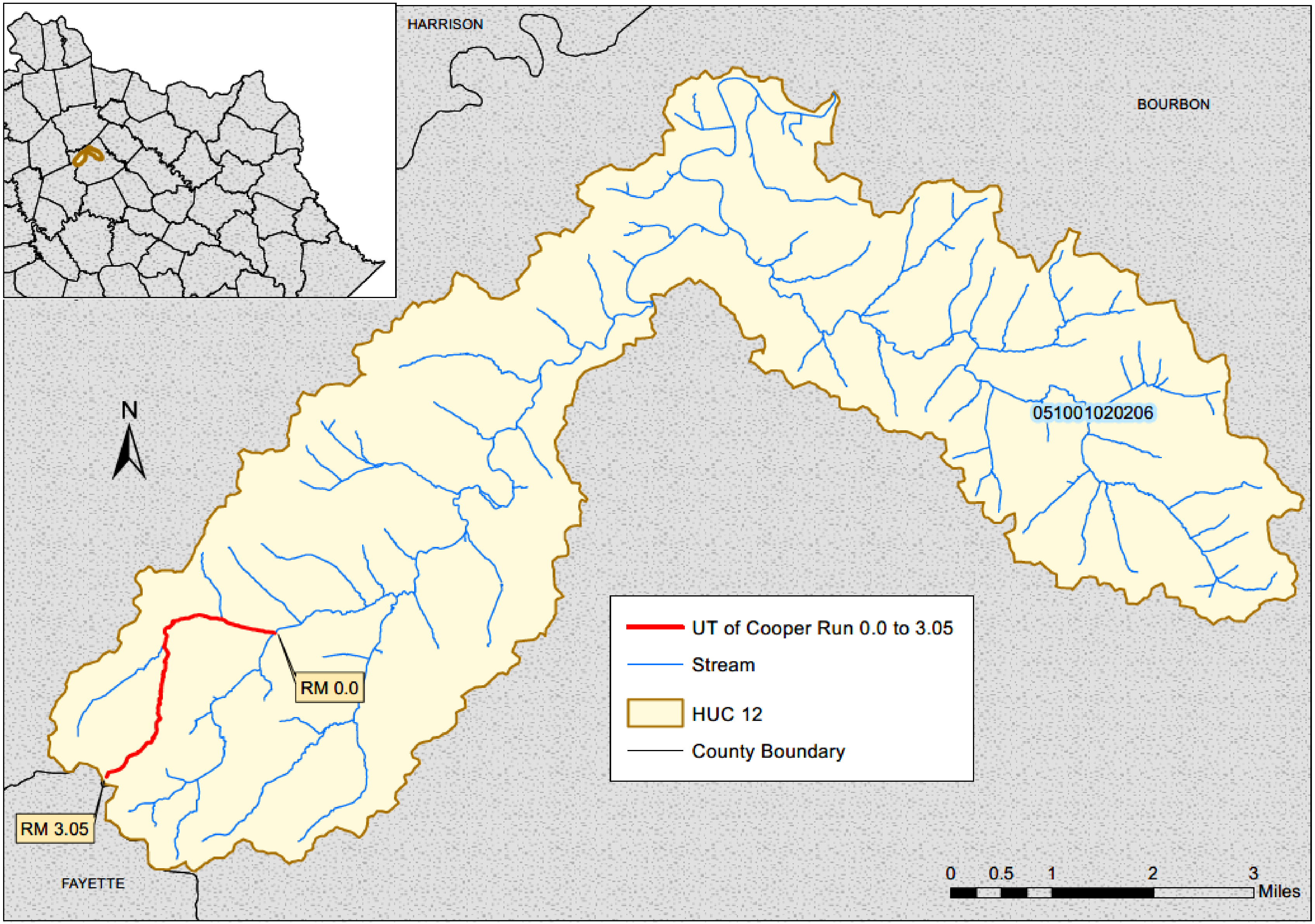


Figure F.64-1 Location of UT of Cooper Run 0.0 to 3.05

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region did not identify any karst areas outside the HUC 12 boundary that are contributing drainage to the segment (see Figure F.64-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

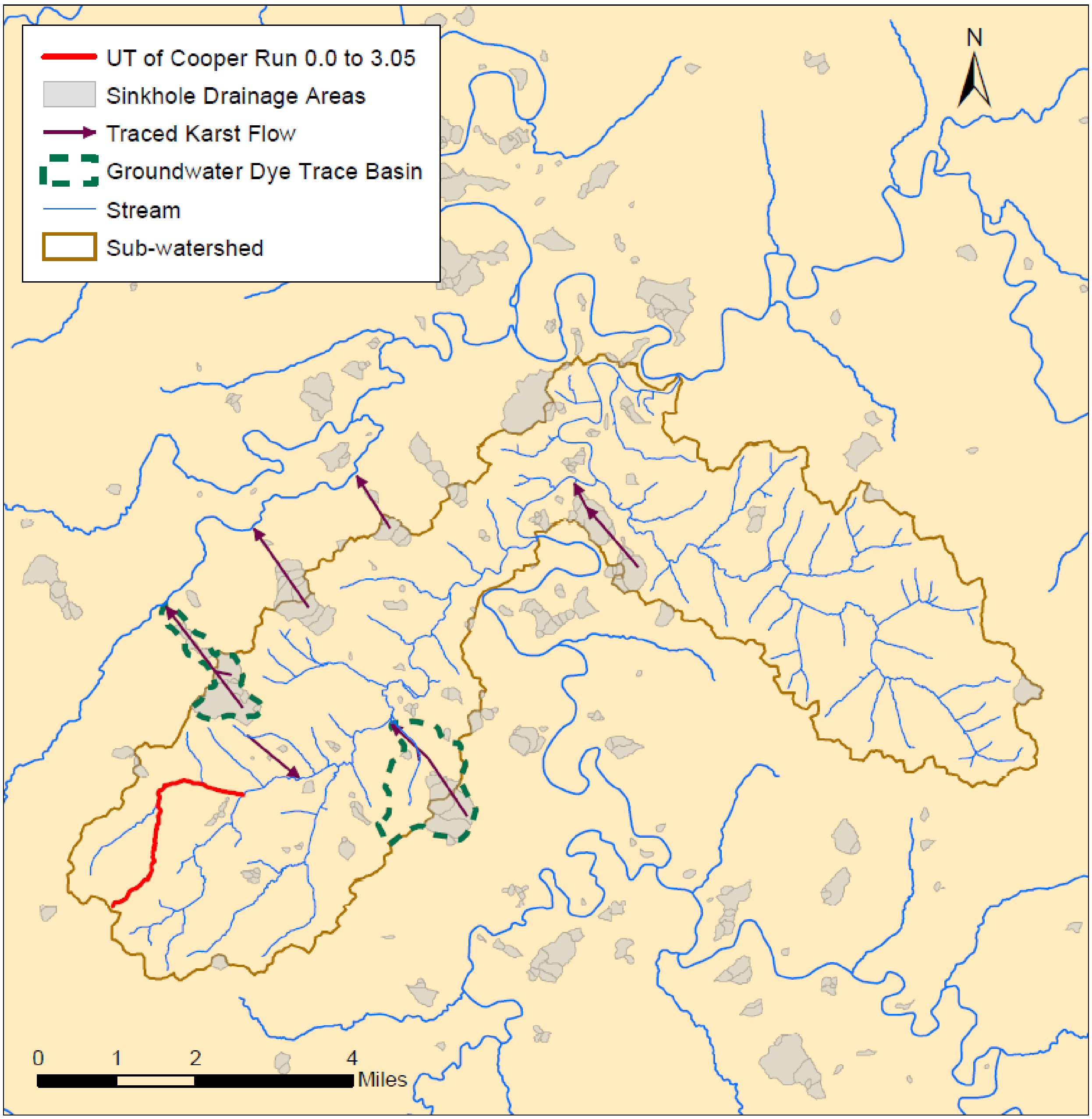


Figure F.64-2 Karst Influence in the Region of UT of Cooper Run 0.0 to 3.05

Section F.65 UT of Flat Run 0.0 to 2.1

Waterbody ID: KY492217-3.9_01

Receiving Water: Flat Run

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001020206

County: Bourbon

The Division of Water (DOW) collected samples from station DOW05017020, located near river mile 0.2, in 2010. The station was sampled six times during the PCR season. Table F.65-1 summarizes information about this sampling station; Table F.65-2 provides a summary of the data collected from this station.

Table F.65-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05017020	38.26856	-84.212	UT of Flat Run 0.0 to 2.1	0.2

Table F.65-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria2	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05017020	*E. coli*	6	631	24,192	9,499

(1)The full data set for samples collected at DOW05017020 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Flat Run 0.0 to 2.1 are presented in Table F.65-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of UT of Flat Run.

Table F.65-3 UT of Flat Run 0.0 to 2.1 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Tributary Loads to the Segment(4)	MOS(5)
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
(2)Q_S is the flow (ft^3/s) in the segment.
(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
(4)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
(5)The following assumptions provide an implicit MOS:
(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Flat Run-Stoner Creek watershed is shown in Figure F.65-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Flat Run-Stoner Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

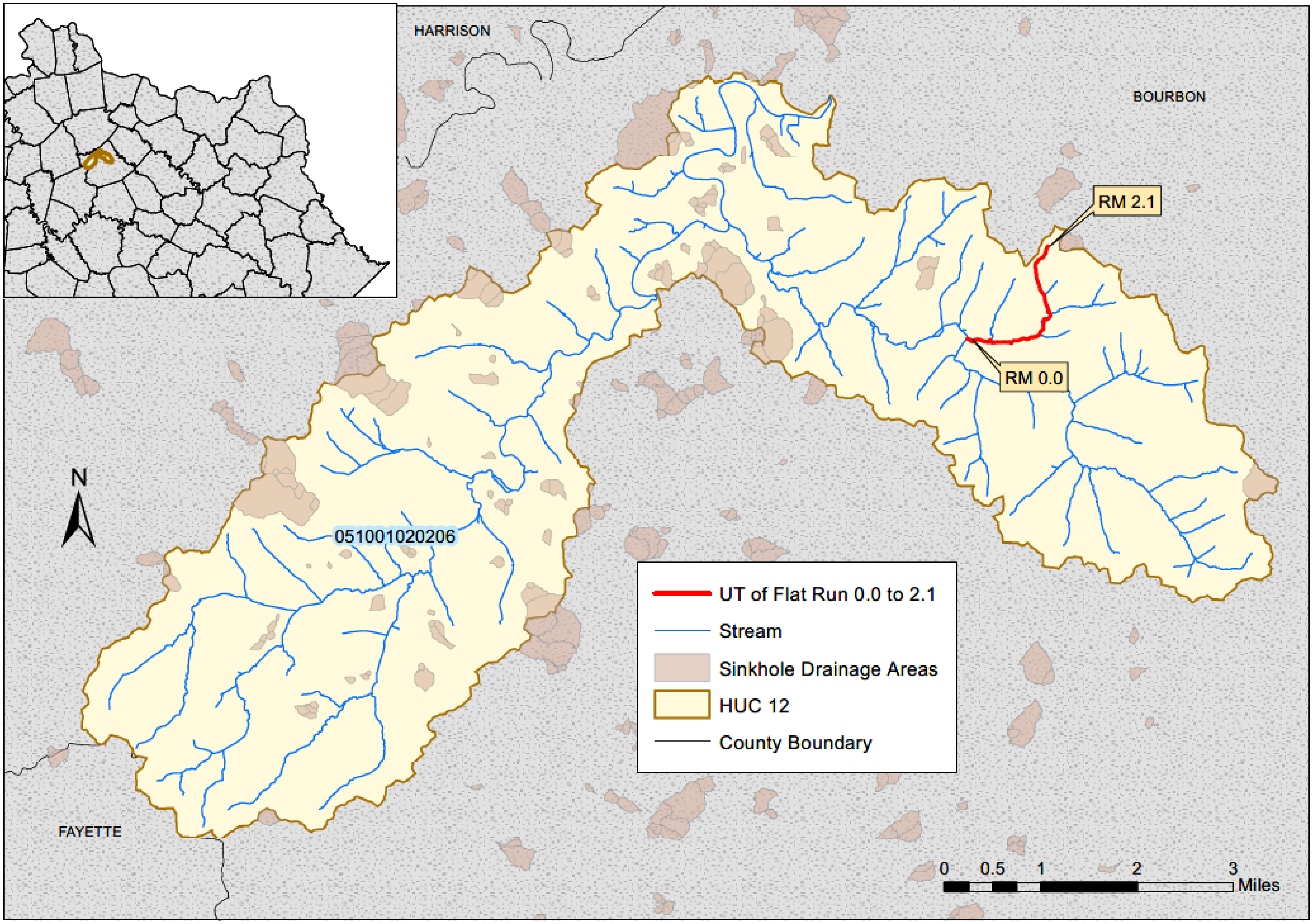


Figure F.65-1 Location of UT of Flat Run 0.0 to 2.1

Section F.66 UT of Greenbrier Creek 0.0 to 1.35

Waterbody ID: KY493317-2.7_01

Receiving Water: Greenbrier Creek Reservoir

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010703

County: Montgomery

The Division of Water (DOW) collected samples from station DOW05032019 located near river mile 0.5, in 2015. The station was sampled five times during the PCR season. Table F.66-1 summarizes information about this sampling station; Table F.66-2 provides a summary of the data collected from this station.

Table F.66-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05032019	38.01662	-83.88364	UT of Greenbrier Creek 0.0 to 1.35	0.5

Table F.66-2 DOW Sample Data Summary[1]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05032019	*E. coli*	5	241	>2,420	1,984

[1]The full data set for samples collected at DOW05032019 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[2]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Greenbrier Creek 0.0 to 1.35 are presented in Table F.66-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of UT of Greenbrier Creek.

Table F.66-3 UT of Greenbrier Creek 0.0 to 1.35 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Tributary Loads to the Segment[4]	MOS[5]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[5]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Spencer Creek-Slate Creek watershed is shown in Figure F.66-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Spencer Creek-Slate Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

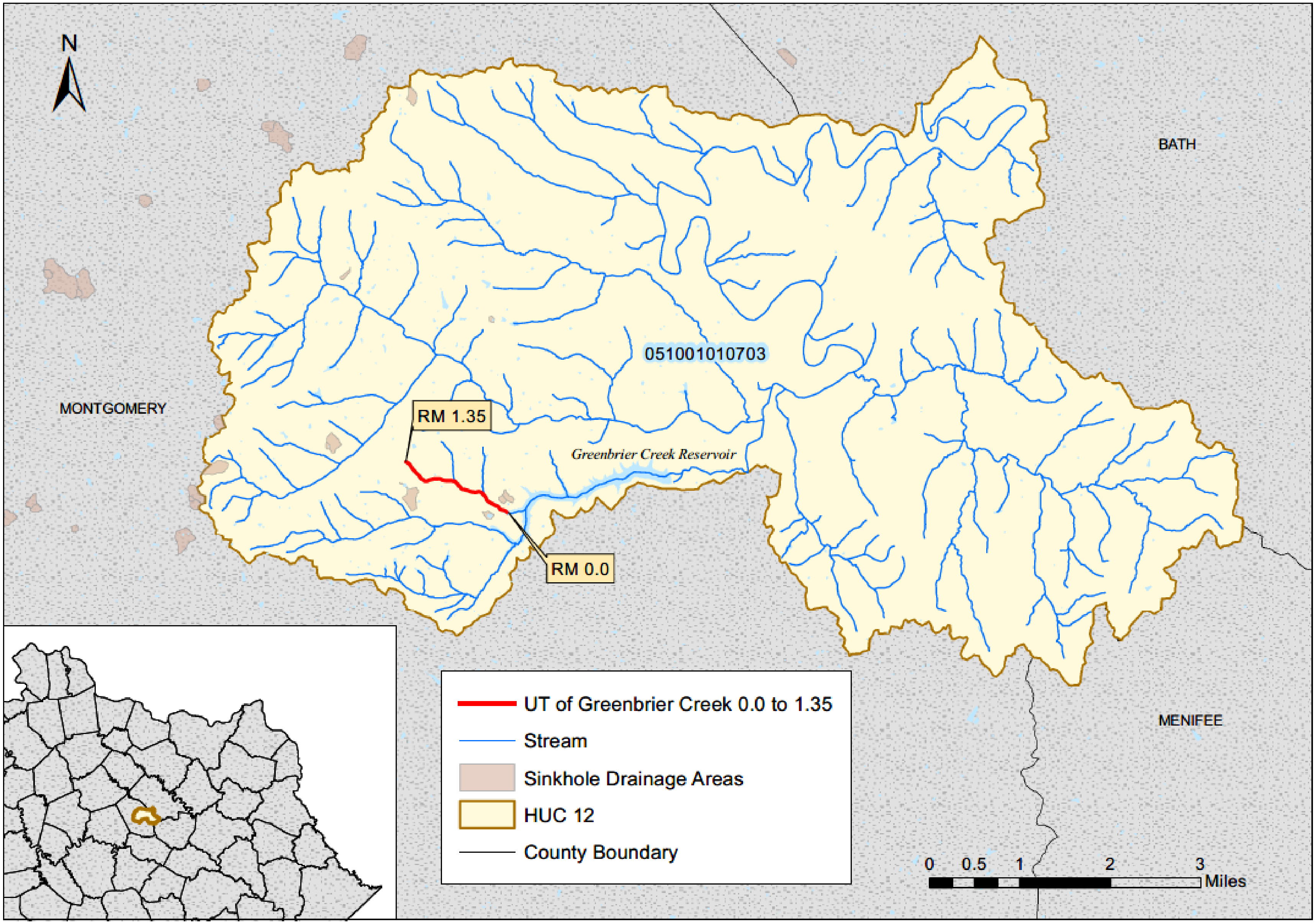


Figure F.66-1 Location of UT of Greenbrier Creek 0.0 to 1.35

Section F.67 UT of Greenbrier Creek 0.0 to 3.25

Waterbody ID: KY493317-3.2_01

Receiving Water: Greenbrier Creek Reservoir

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051001010703

County: Montgomery

The Division of Water (DOW) collected samples from station DOW05032018, located near river mile 0.4, in 2015. The station was sampled five times during the PCR season. Table F.67-1 summarizes information about this sampling station; Table F.67-2 provides a summary of the data collected from this station.

Table F.67-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05032018	38.0131	-83.88595	UT of Greenbrier Creek 0.0 to 3.25	0.4

Table F.67-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05032018	*E. coli*	5	66	>2,420	1,176

(1)The full data set for samples collected at DOW05032018 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Greenbrier Creek 0.0 to 3.25 are presented in Table F.67-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of UT of Greenbrier Creek.

Table F.67-3 UT of Greenbrier Creek 0.0 to 3.25 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Tributary Loads to the Segment(4)	MOS(5)
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
(2)Q_S is the flow (ft^3/s) in the segment.
(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
(4)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
(5)The following assumptions provide an implicit MOS:
(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Spencer Creek-Slate Creek watershed is shown in Figure F.67-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Spencer Creek-Slate Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

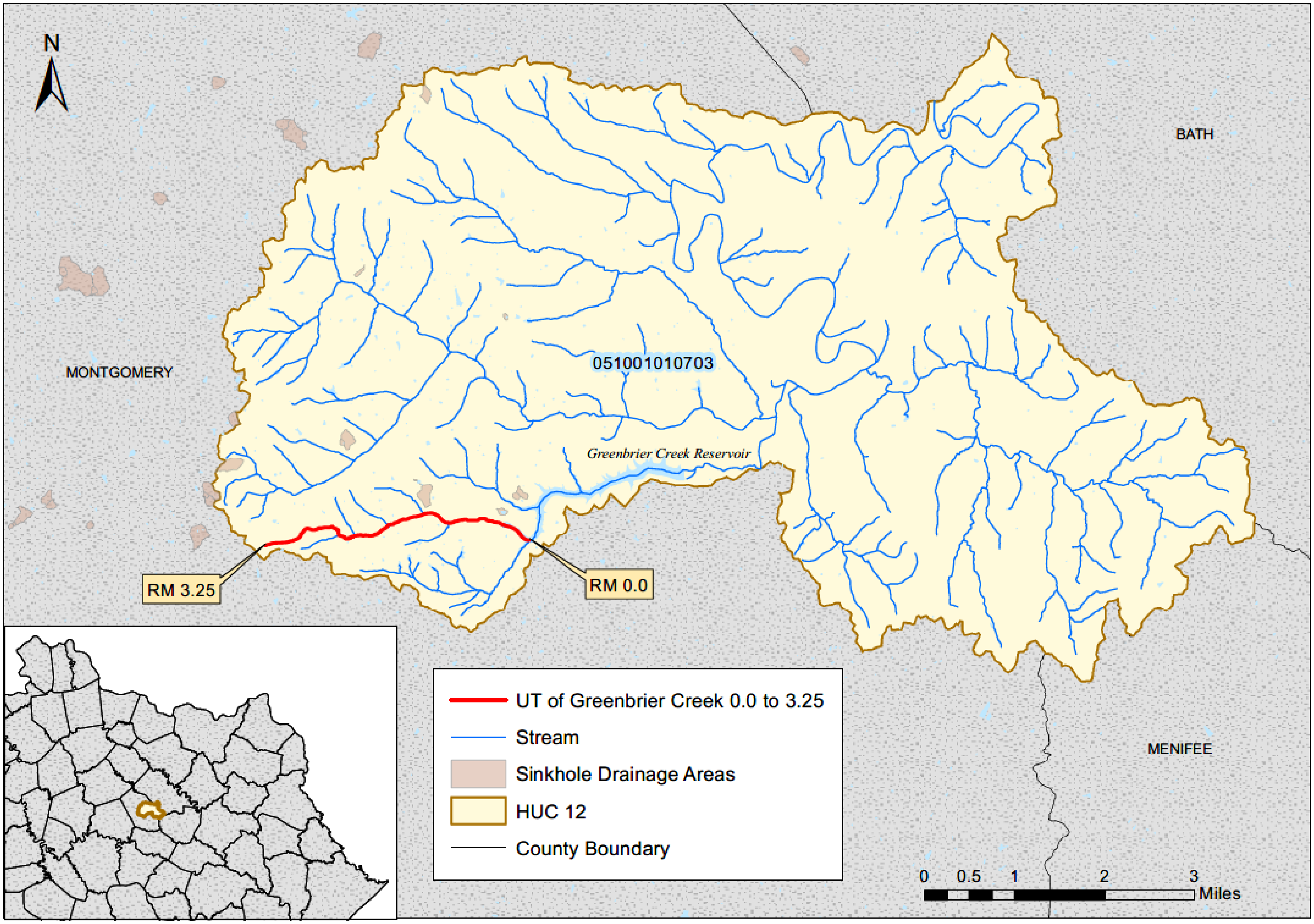


Figure F.67-1 Location of UT of Greenbrier Creek 0.0 to 3.25

Section F.68 UT of Hancock Creek 0.0 to 3.72

Waterbody ID: KY493672-4.2_01

Receiving Water: Hancock Creek

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant: fecal coliform (both uses) **TMDL Pollutant:** *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001020101

County: Clark

The Division of Water (DOW) collected samples from two stations on this segment in 2014. Samples were collected at stations, DOW05020004 and DOW05020017, between seven and ten times during the PCR season. Table F.68-1 summarizes information about this sampling station; Table F.68-2 provides a summary of the data collected from this station.

Table F.68-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05020004	38.02988	-84.2361	UT of Hancock Creek 0.0 to 3.72	0.3
DOW05020017	38.01717	-84.2361	UT of Hancock Creek 0.0 to 3.72	1.3

Table F.68-2 DOW Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05020004	*E. coli*	10	66	>2,420	837
DOW05020017	*E. coli*	7	86	17,329	5,046

[(1)]The full data set for samples collected at DOW05020004 and DOW05020017 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Hancock Creek 0.0 to 3.72 are presented in Table F.68-3.

Table F.68-3 UT of Hancock Creek 0.0 to 3.72 TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment(5)	MOS(6)
	MS4-WLA(3)	LA(4)		
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1) All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2) Q_S is the flow (ft^3/s) in the segment.

(3) Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4) Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5) $Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6) The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The City of Winchester and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of UT of Hancock Creek. Information about each MS4 permit is summarized in Table F.68-4. There are no other KPDES-permitted facilities discharging directly to this segment of UT of Hancock Creek. The location in the Hancock Creek-Strodes Creek watershed is shown in Figure F.68-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table F.68-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies/day)
KYG200043	City of Winchester	04/30/2023	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

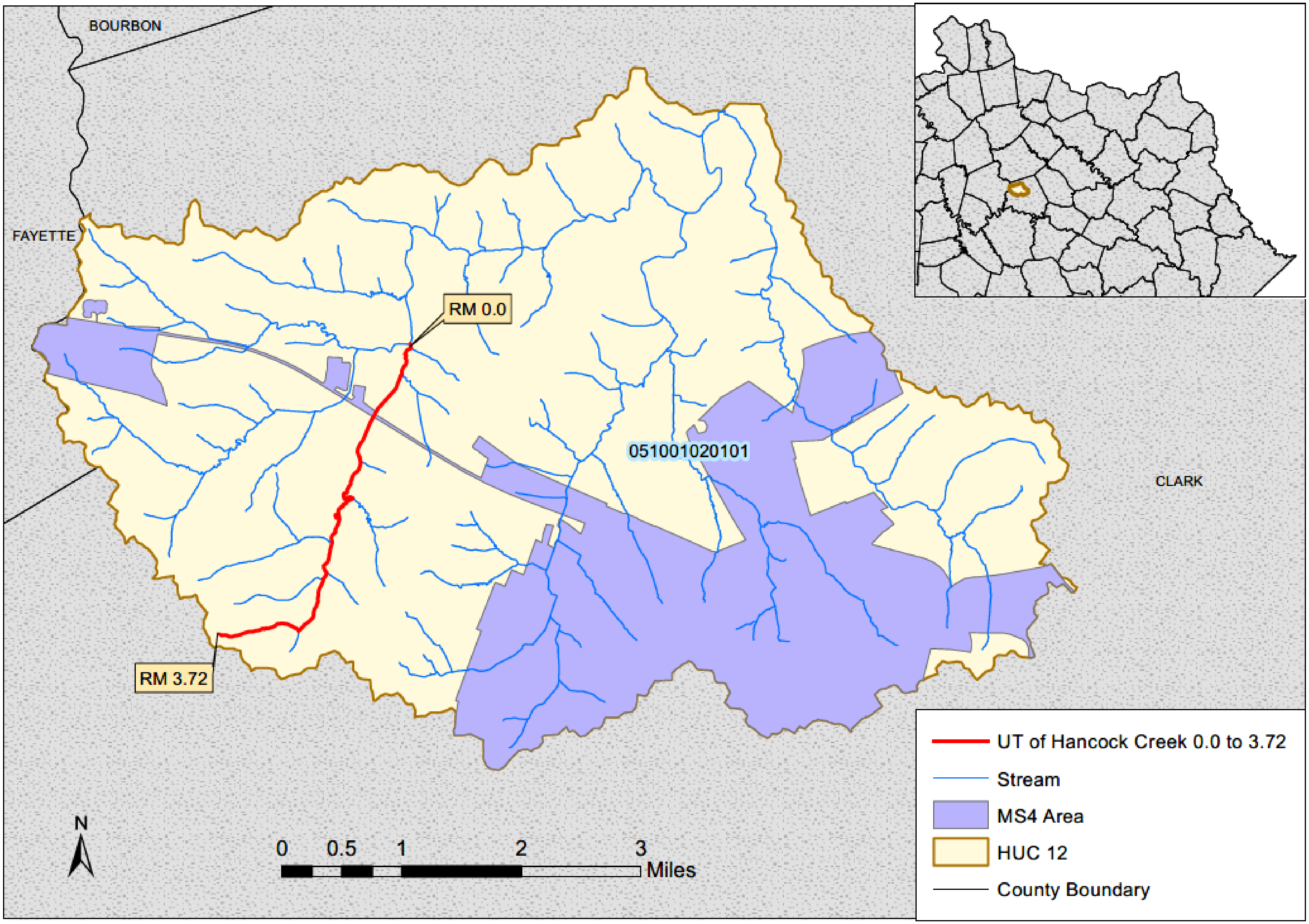


Figure F.68-1 Location of UT of Hancock Creek 0.0 to 3.72

The segment is located in an area where karst features such as sinkholes and springs exist. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing in the region did not identify any karst areas outside the HUC 12 boundary that are contributing drainage to the segment (see Figure F.68-2). For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

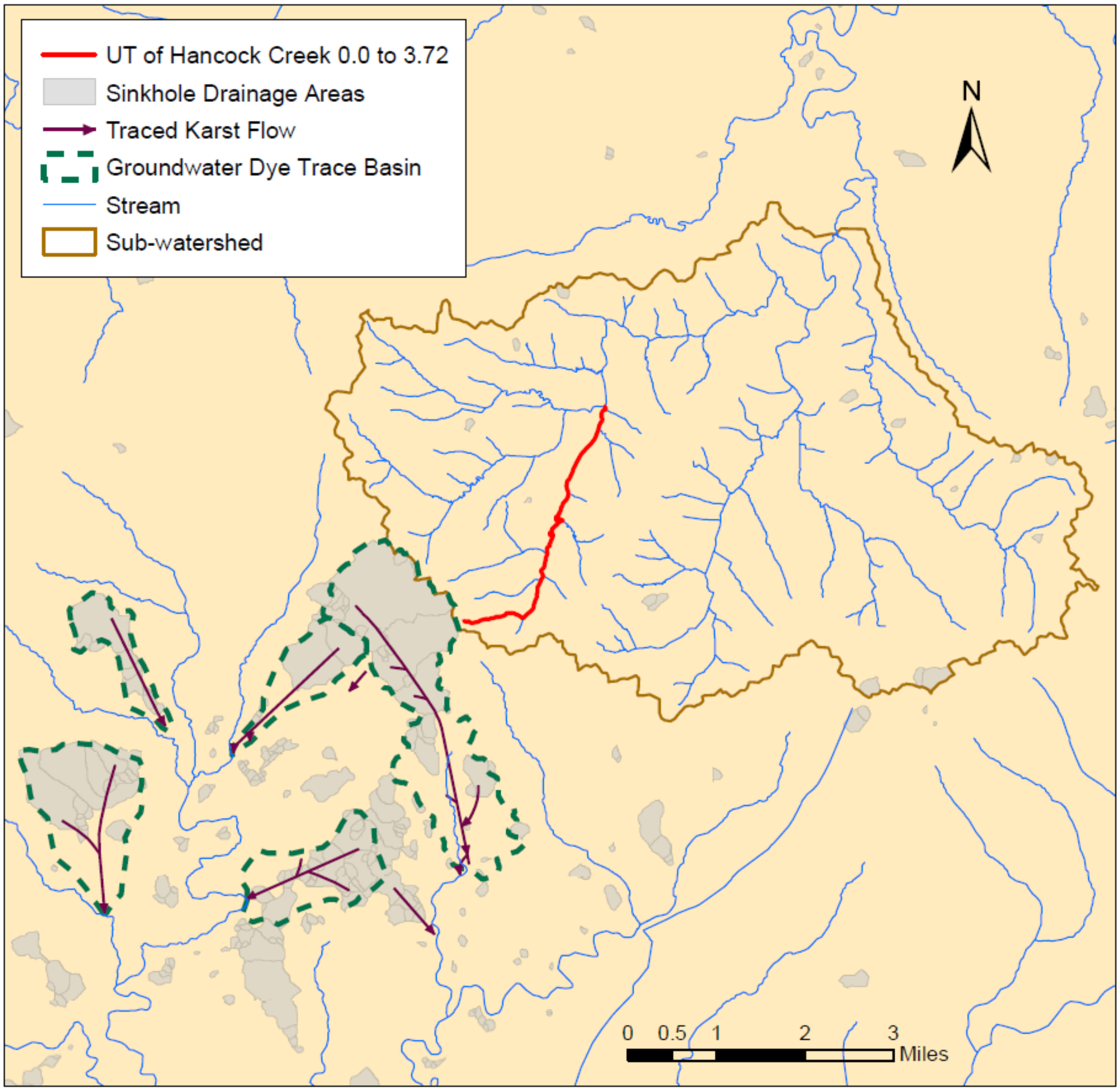


Figure F.68-2 Karst Influence in the Region of UT of Hancock Creek 0.0 to 3.72

Section F.69 UT of Strodes Creek 0.0 to 3.7

Waterbody ID: KY504593-22.2_01

Receiving Water: Strodes Creek

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant/ TMDL Pollutant: *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001020101

County: Clark

The Division of Water (DOW) collected samples from two stations on this segment in 2014. Samples were collected at stations, DOW05020003 and DOW05020016, between one and four times during each month of the PCR season. Table F.69-1 summarizes information about this sampling station; Table F.69-2 provides a summary of the data collected from this station.

Table F.69-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05020003	38.02907	-84.19449	UT of Strodes Creek 0.0 to 3.7	0.3
DOW05020016	38.013875	-84.184172	UT of Strodes Creek 0.0 to 3.7	1.7

Table F.69-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05020003	*E. coli*	11	24	>2,420	462
DOW05020016	*E. coli*	11	187	24,890	5,940

(1)The full data set for samples collected at DOW05020003 and DOW05020016 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Strodes Creek 0.0 to 3.7 are presented in Table F.69-3.

Table F.69-3 UT of Strodes Creek 0.0 to 3.7 TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment(5)	MOS(6)
	MS4-WLA(3)	LA(4)		
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1) All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Hancock Creek-Strodes Creek watershed is shown in Figure F.69-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Hancock Creek-Strodes Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

The City of Winchester and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for UT of Strodes Creek. Information about this MS4 permit is summarized in Table F.69-4. There are no other KPDES-permitted discharges of bacteria into this segment of UT of Strodes Creek. The location in the Hancock Creek-Strodes Creek watershed is shown in Figure F.69-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table F.69-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[1]	WLA[2] (colonies/day)
KYG200043	City of Winchester	04/30/2023	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

[1]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[2]Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

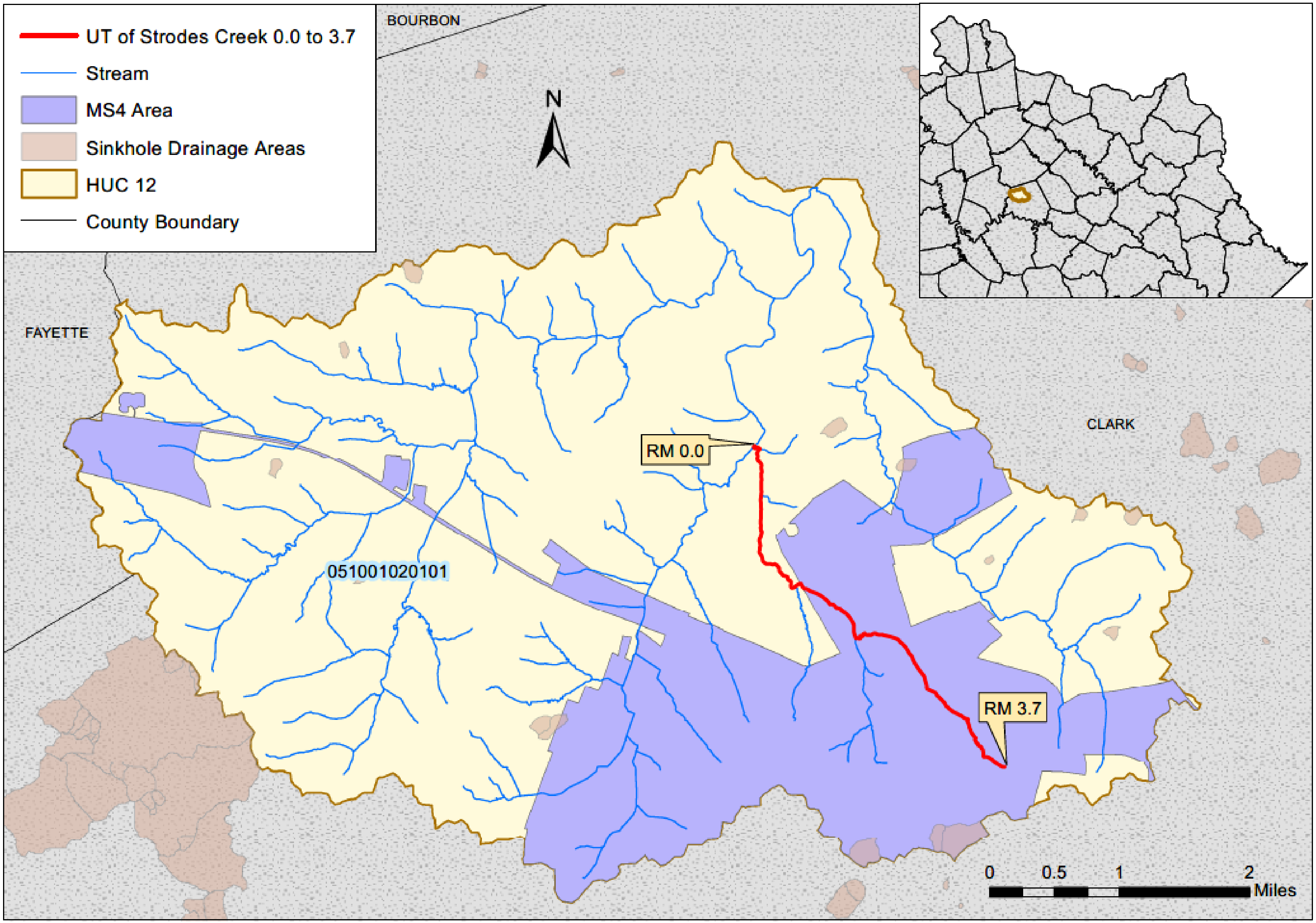


Figure F.69-1 Location of UT of Strodes Creek 0.0 to 3.7

Section F.70 Williams Creek 0.0 to 5.8

Waterbody ID: KY506817_01

Receiving Water: Elk Fork

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051001010201

County: Morgan

Northern Kentucky University collected samples from station L - 053, located near river mile 2.45. The station was sampled one time during the PCR season in 1998. Additional data could not be located. Table F.70-1 summarizes information about this sampling station; Table F.70-2 provides a summary of the data collected from this station.

Table F.70-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
L - 053	37.9191	-83.14351	Williams Creek 0.0 to 5.8	2.45

Table F.70-2 Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
L - 053	fecal coliform	1	9,600	9,600	9,600

(1)The full data set for samples collected at L - 053 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Williams Creek 0.0 to 5.8 are presented in Table F.70-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Williams Creek. The location within the Williams Creek watershed is shown in Figure F.70-1.

Table F.70-3 Williams Creek 0.0 to 5.8 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
	LA[3]			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a) Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

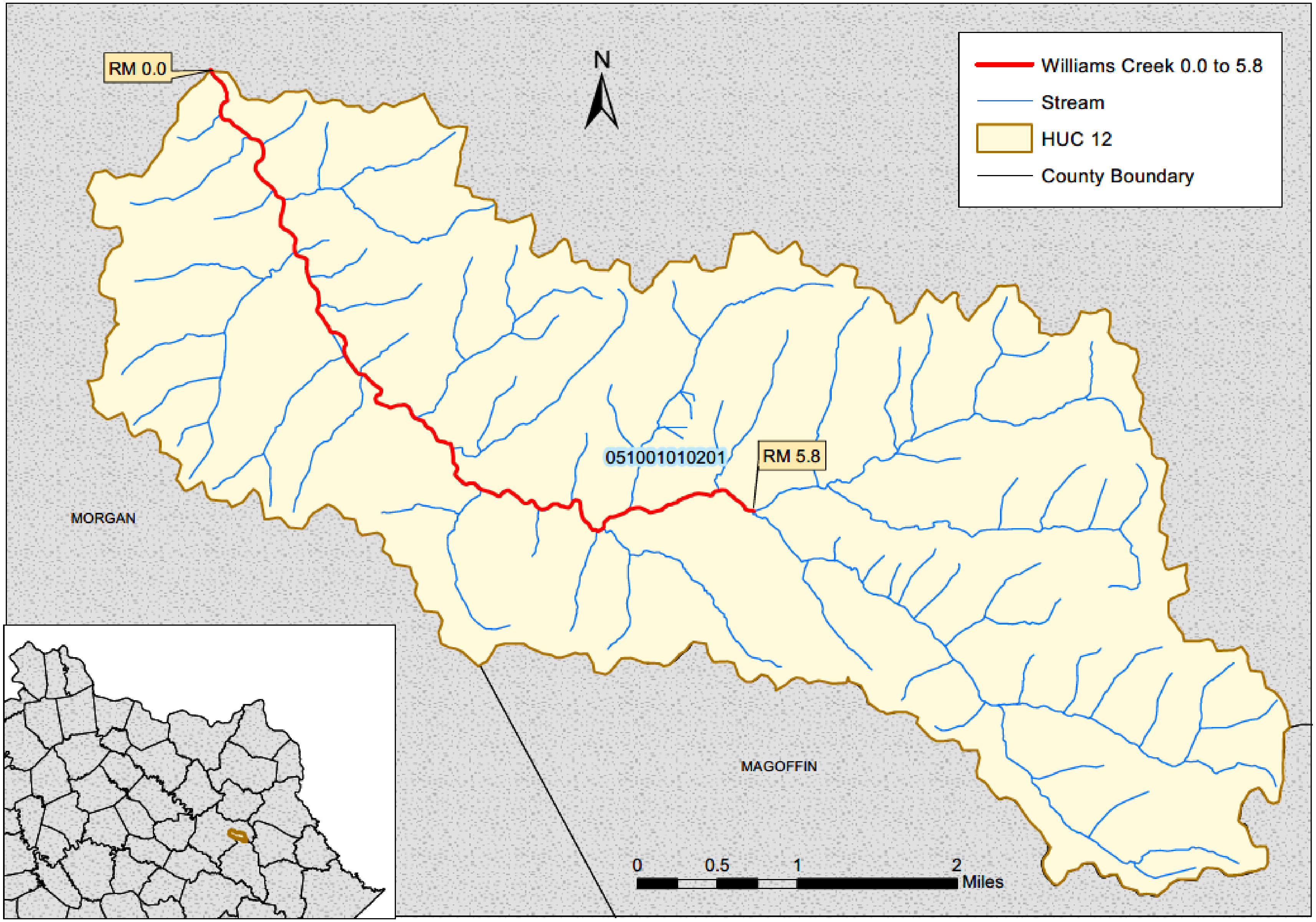


Figure F.70-1 Location of Williams Creek 0.0 to 5.8

Section F.71 Woodruff Creek 0.0 to 3.8

Waterbody ID: KY507110_01

Receiving Water: Strodes Creek

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant: fecal coliform (both uses) **TMDL Pollutant:** *E. coli* (PCR), fecal coliform (SCR)

HUC 12: 051001020102

County: Clark

The Division of Water (DOW) collected samples from station DOW05020007, located near river mile 0.7, in 2014. The station was sampled nine times during the PCR season. Table F.71-1 summarizes information about this sampling station; Table F.71-2 provides a summary of the data collected from this station.

Table F.71-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW05020007	38.06202	-84.17772	Woodruff Creek 0.0 to 3.8	0.7

Table F.71-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW05020007	*E. coli*	9	25	81,640	9,932

(1)The full data set for samples collected at DOW05020007 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Woodruff Creek 0.0 to 3.8 are presented in Table F.71-3. As of March 2021, there are no KPDES-permitted discharges of bacteria into this segment of Woodruff Creek.

Table F.71-3 Woodruff Creek 0.0 to 3.8 TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Tributary Loads to the Segment[4]	MOS[5]
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1] All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2] Q_S is the flow (ft^3/s) in the segment.

[3] Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[4] $Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[5] The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Johnson Creek-Strodes Creek watershed is shown in Figure F.71-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Johnson Creek-Strodes Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

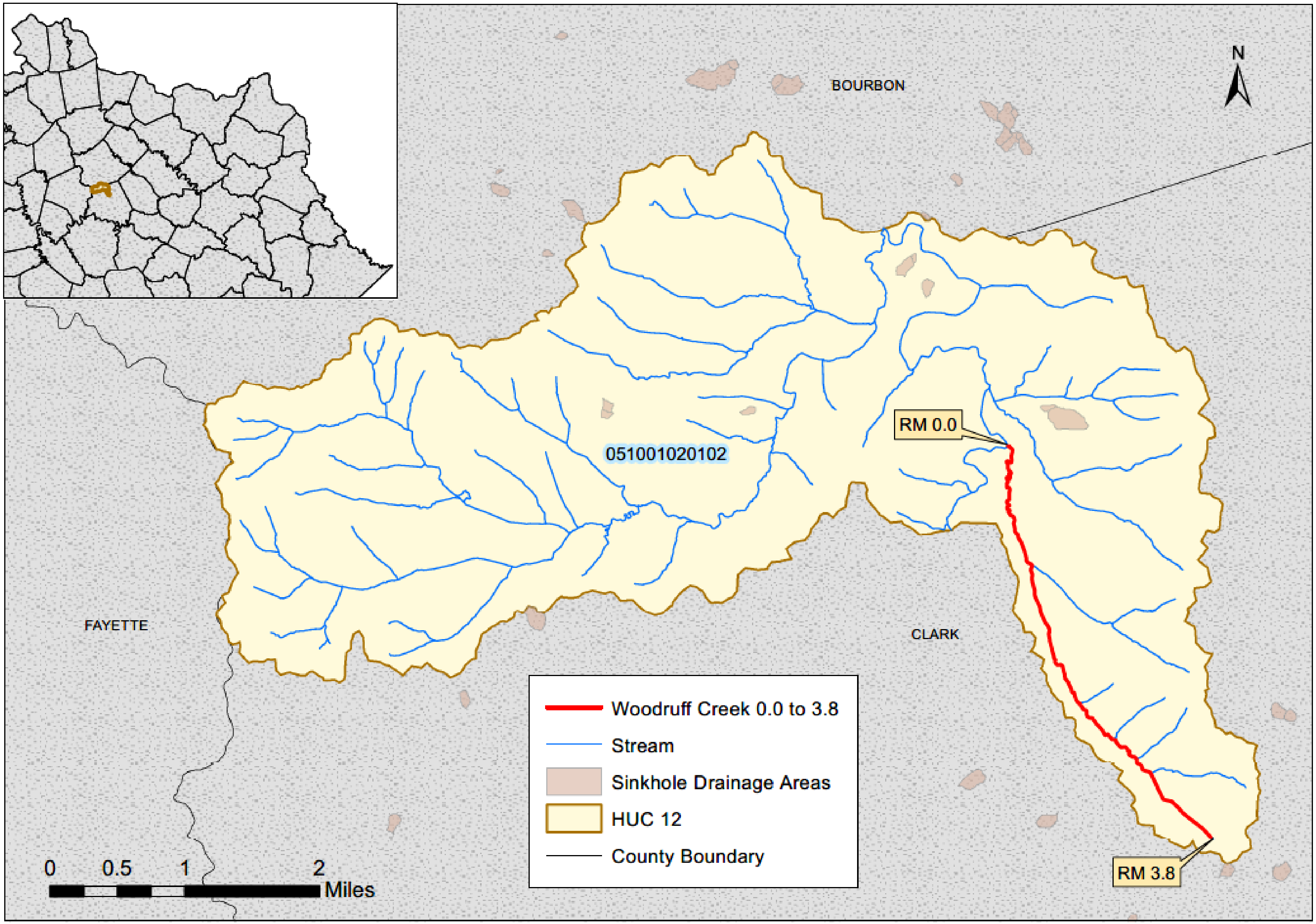


Figure F.71-1 Location of Woodruff Creek 0.0 to 3.8

APPENDIX K

Appendix K
Salt River Basin

HUC 8s: 05140102, 05140103

Level IV Ecoregions: Crawford-Mammoth Cave Uplands, Eastern Highland Rim, Hills of the Bluegrass, Inner Bluegrass, Knobs-Norman Upland, Mitchell Plain, Outer Bluegrass

Drainage Area Within Kentucky: 2,918.22 square miles

Counties: Anderson, Boyle, Bullitt, Casey, Green, Hardin, Henry, Jefferson, Larue, Marion, Mercer, Nelson, Oldham, Shelby, Spencer, Taylor, Washington

Major Cities: Radcliff, Jeffersontown, Bardstown, Eminence, Harrodsburg, Lawrenceburg, Lebanon, Mount Washington, Shelbyville, Shepherdsville, Springfield, La Grange, Hillview, Middletown

The Salt River basin is located in north central Kentucky. A majority of the Salt River basin lies within the Outer Bluegrass physiographic region, with a small area in the east extending into the Inner Bluegrass physiographic region. The western portion of the Salt River basin lies within the Knobs physiographic region (extending north to south). A small area in the far west of the Salt River basin extends into the Western Pennyroyal physiographic region. The Salt River originates in Boyle Co., with the headwaters located near Parksville, Kentucky. The Salt River flows north and turns west just south of Lawrenceburg, Kentucky. The Salt River joins the Ohio River near West Point, Kentucky, having drained an area of nearly 3,000 square miles.

Table K.1. provides a summary of the stream segments in the Salt River basin that have been included on the Kentucky 2016 303(d) list for impairment due to fecal coliform and/or *E. coli*. Table K.1 identifies which listed waters will not have a TMDL developed at this time and provides a footnote explaining the rationale such as the development of an alternative restoration plan. The locations of the stream segments are shown in Figure K.1.

The river miles for each TMDL segment in this appendix match the 2016 303(d) list. Since the National Hydrography Dataset (NHD) is continually updated to maintain accurate waterbody information, the river mile information in this appendix may not reflect the current 1:24K NHD for Kentucky. River mile information for stream segments is updated in each new 303(d) list submitted to EPA.

Table K.1 2016 303(d) List Bacteria-impaired Stream Segments in the Salt River Basin

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Beech Creek 2.85 to 18.6	KY486700_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Spencer, Shelby

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Beech Creek 2.85 to 18.6	KY486700_01	SCR (nonsupport)	Fecal Coliform	Fecal Coliform	Source Unknown	Spencer, Shelby
Beech Fork 39.5 to 50.4	KY486703_02	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture	Washington
Big Bee Lick Creek 0.0 to 4.2	KY486674_01	PCR (nonsupport)	*E. coli*	*E. coli*	Urban Runoff/Storm Sewers	Jefferson
Big South Fork 0.0 to 12.65	KY487258_01	PCR (partial support)	Fecal Coliform	*E. coli*	Agriculture	Marion
Blue Spring Ditch 0.0 to 2.1	KY504133_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Brashears Creek 0.0 to 13.0	KY487840_01	PCR (partial support)	*E. coli*	*E. coli*	Agriculture, Non-Point Source	Spencer
Brush Creek 0.0 to 5.0[2]	KY488079_01	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Mercer
Cartwright Creek 0.0 to 6.6[3]	KY489030_01	PCR (nonsupport)	Fecal Coliform	TMDL not included in this document	Agriculture	Washington
Chaplin River 0.0 to 23.1	KY489350_01	PCR (nonsupport)	*E. coli*	*E. coli*	Agriculture	Nelson, Washington
Cheese Lick 1.45 to 5.2[2]	KY489380_01	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Anderson, Mercer
Cheese Lick 5.2 to 8.2[2]	KY489380_02	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Anderson
Fern Creek 0.0 to 1.3	KY492042_01	PCR (nonsupport)	*E. coli*	*E. coli*	Illegal Dumps or Other Inappropriate Waste Disposal, Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Fern Creek 1.3 to 4.4	KY492042_02	PCR (nonsupport)	*E. coli*	*E. coli*	Illegal Dumps or Other Inappropriate Waste Disposal, Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Fern Creek 4.4 to 5.9	KY492042_03	PCR (nonsupport)	*E. coli*	*E. coli*	Illegal Dumps or Other Inappropriate Waste Disposal, Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Fishpool Creek 0.0 to 1.9	KY492132_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Greasy Ditch 0.0 to 2.6	KY493242_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Little Bee Lick Creek 0.0 to 2.6	KY2743838_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Log Lick 0.0 to 4.20[2]	KY496970_01	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Mercer
Mud Creek 0.0 to 4.35	KY498984_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson, Bullitt
Northern Ditch 0.0 to 7.3	KY499598_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Otter Creek 0.0 to 2.9	KY500024_01	PCR (partial support)	Fecal Coliform	*E. coli*	Source Unknown	Larue
Pond Creek 5.2 to 8.1	KY501046_01	PCR (nonsupport)	Fecal Coliform	*E. coli*	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges, Unspecified Urban Stormwater	Jefferson
Rolling Fork 0.0 to 37.75	KY502293_01	PCR (nonsupport)	*E. coli*	*E. coli*	Source Unknown	Hardin, Nelson
Rolling Fork 37.75 to 40.7	KY502293_02	PCR (nonsupport)	Fecal Coliform	*E. coli*	Source Unknown	Larue, Nelson
Salt Block Creek 0.0 to 3.35	KY502818_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Salt River 11.7 to 25.9	KY502830_01	PCR (nonsupport)	*E. coli*	*E. coli*	Source Unknown	Bullitt
Salt River 77.8 to 88.9	KY502830_05	PCR (nonsupport)	*E. coli*	*E. coli*	Source Unknown	Anderson
Southern Ditch 0.0 to 5.75	KY503998_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Southern Ditch 5.75 to 9.0	KY503998_02	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson

Waterbody Name	Waterbody ID	Impaired Use (Support Status)	Listed Pollutant	TMDL Pollutant[1]	Suspected Source(s)	County
Sulphur Creek 0.0 to 6.8[2]	KY504729_01	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Anderson, Washington
Sulphur Creek 6.8 to 10.0[2]	KY504729_02	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Anderson, Washington
UT of Blue Spring Ditch 0.0 to 2.6	KY504133-1.85_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
UT of Cheese Lick 0.0 to 1.5[2]	KY489380-5.2_01	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Grazing in Riparian or Shoreline Zones, Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Mercer
UT of Sulphur Creek 0.0 to 1.2[2]	KY504729-0.75_01	PCR (nonsupport)	*E. coli*	TMDL not included in this document	Livestock (Grazing or Feeding Operations), Non-Point Source, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	Anderson, Washington
Wetwoods Creek (Slop Ditch) 2.2 to 4.25	KY503711_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson
Wilson Creek 0.0 to 5.6	KY506904_01	PCR (nonsupport)	*E. coli*	*E. coli*	Municipal Point Source Discharges, Urban Runoff/Storm Sewers	Jefferson

[1]Segments with PCR impairment due to fecal coliform have a TMDL calculated for *E. coli* in this document.
[2]A TMDL is not included for this segment because an alternative restoration plan has been developed.
[3]A TMDL is not included because this segment will be proposed for delisting on a future 303(d) list. The original listing was in error.

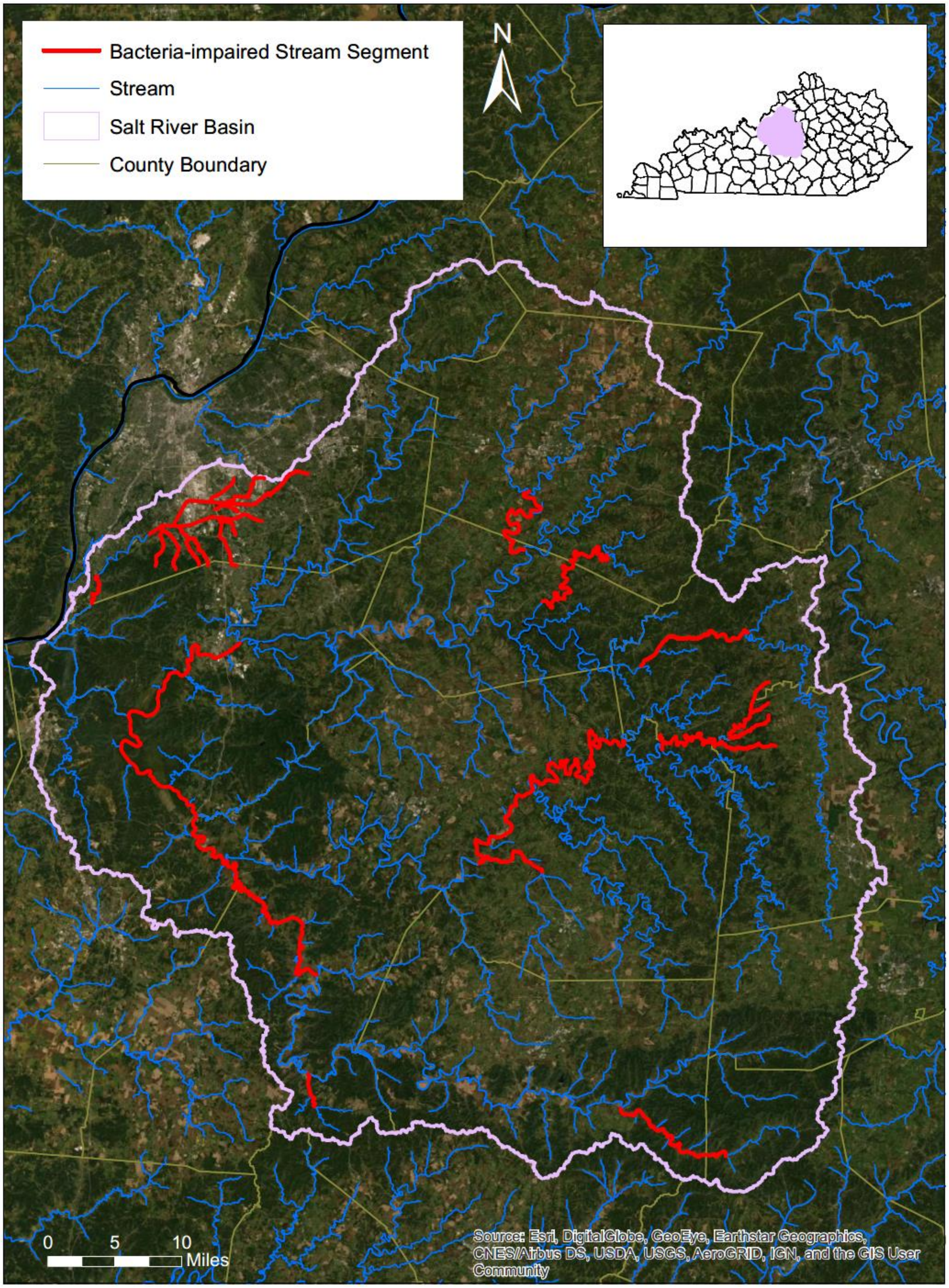


Figure K.1 Location of the Salt River Basin and 2016 303(d) List Bacteria-impaired Streams

Land cover data is summarized in Table K.2, and its geographic distribution is shown in Figure K.2. Deciduous forest is the predominant class of land cover in the Salt River basin, accounting for approximately 45 percent. The next three classes by magnitude are pasture/hay, cultivated crops, and open developed. Land cover classes are described in Appendix P of the core TMDL document.

Table K.2 Land Cover Classes in the Salt River Basin (NLCD 2011)

Land Cover	Percent of Total Area	Square Miles	Acres
Open Water	0.50	14.56	9,321.44
Developed, Open	5.21	151.98	97,269.04
Developed, Low Intensity	2.09	60.98	39,024.89
Developed, Medium Intensity	0.99	28.93	18,516.35
Developed, High Intensity	0.55	16.08	10,293.85
Barren Land (Rock, Sand, Clay)	0.12	3.40	2,174.31
Deciduous Forest	44.61	1,301.79	833,148.35
Evergreen Forest	2.74	79.91	51,144.83
Mixed Forest	0.88	25.77	16,491.69
Shrub/Scrub	0.12	3.36	2,147.85
Grassland/Herbaceous	3.20	93.38	59,765.14
Pasture/Hay	30.44	888.32	568,523.03
Cultivated Crops	7.26	211.89	135,611.93
Woody Wetlands	1.21	35.33	22,608.14
Emergent Herbaceous Wetlands	0.09	2.53	1,619.95

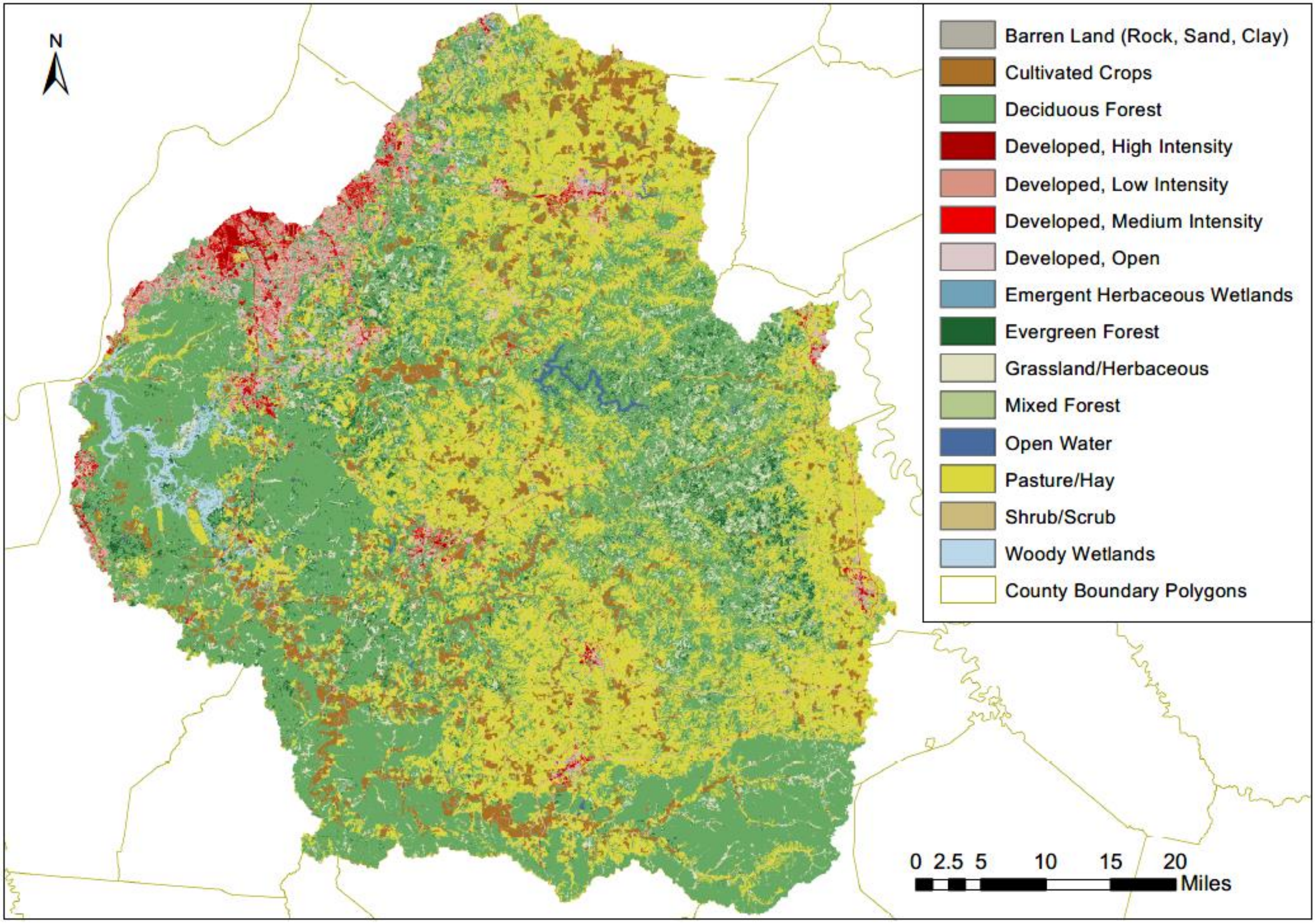


Figure K.2 Land Cover Classes in the Salt River Basin

Section K.1 Beech Creek 2.85 to 18.6

Waterbody ID: KY486700_01

Receiving Water: Salt River

Impaired Use: PCR, SCR

Support Status: nonsupport (both uses)

Listed Pollutant: fecal coliform (both uses) **TMDL Pollutant:** *E. coli* (PCR), fecal coliform (SCR)

HUC 12s: 051401020305

County: Spencer, Shelby

U.S. Army Corps of Engineers (USACE) collected samples from station 2TAR11102, located at river mile 7.4, from 2002 to 2005. Table K.1-1 summarizes information about this sampling station; Table K.1-2 provides a summary of the data collected from this station.

Table K.1-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
2TAR11102	38.05413	-85.224314	Beech Creek 2.85 to 18.6	7.4

Table K.1-2 Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
2TAR11102	fecal coliform	12	40	53,000	12,740

(1)The full data set for samples collected at 2TAR11102 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Beech Creek 2.85 to 18.6 are presented in Table K.1-3. As of April 2021, there are no KPDES-permitted discharges of bacteria into this segment of Beech Creek. The location within the Beech Creek-Salt River watershed is shown in Figure K.1-1.

Table K.1-3 Beech Creek 2.85 to 18.6 TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1) All loads are colonies/day of either *E. coli* or fecal coliform. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2) Q_S is the flow (ft^3/s) in the segment.

(3) Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4) $Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5) $Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6) The following assumptions provide an implicit MOS:

(a) Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b) There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

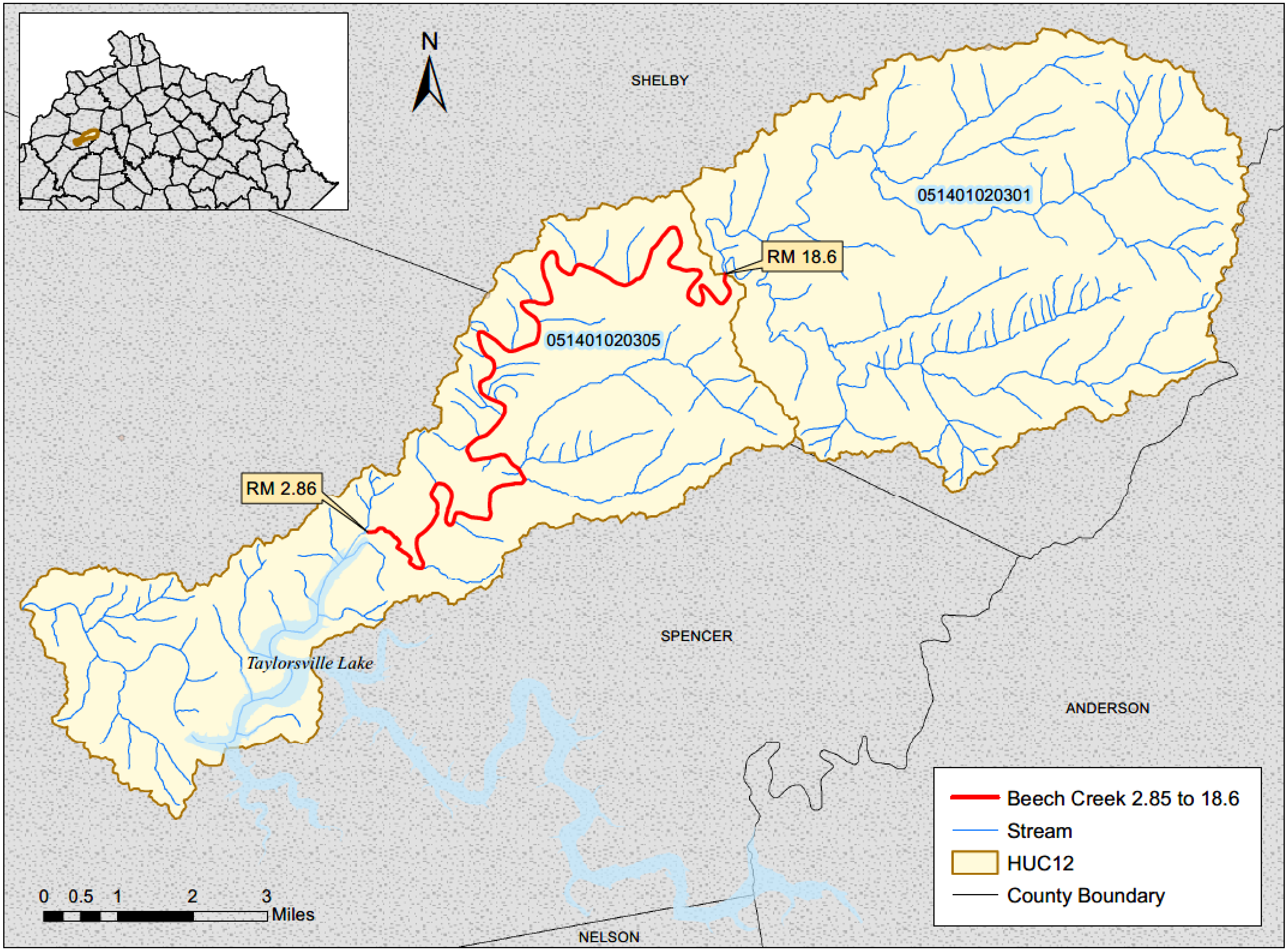


Figure K.1-1 Location of Beech Creek 2.85 to 18.6

Section K.2 Beech Fork 39.5 to 50.4

Waterbody ID: KY486703_02

Receiving Water: Rolling Fork

Impaired Uses: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051401030304

County: Washington

The Division of Water (DOW) has collected samples from station PRI041, located near river mile 48.7, since 1999. The station typically has been sampled two to six times during the PCR season, although it was not sampled in 2005. Table K.2-1 summarizes information about this sampling station; Table K.2-2 provides a summary of the data collected from this station.

Table K.2-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI041	37.83258	-85.296143	Beech Fork 39.5 to 50.4	48.7

Table K.2-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI041	*E. coli*	61	11	>2,420	562
PRI041	fecal coliform	35	8	6,200	603

(1)The full data set for samples collected at PRI041 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Beech Fork 39.5 to 50.4 are presented in Table K.2-3. As of April 2021, there are no KPDES-permitted discharges of bacteria into this segment of Beech Creek.

Table K.2-3 Beech Fork 39.5 to 50.4 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.
[2]Q_S is the flow (ft^3/s) in the segment.
[3]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.
[4]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.
[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.
[6]The following assumptions provide an implicit MOS:
(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.
(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Short Creek-Beech Fork watershed is shown in Figure K.2-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Short Creek-Beech Fork watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

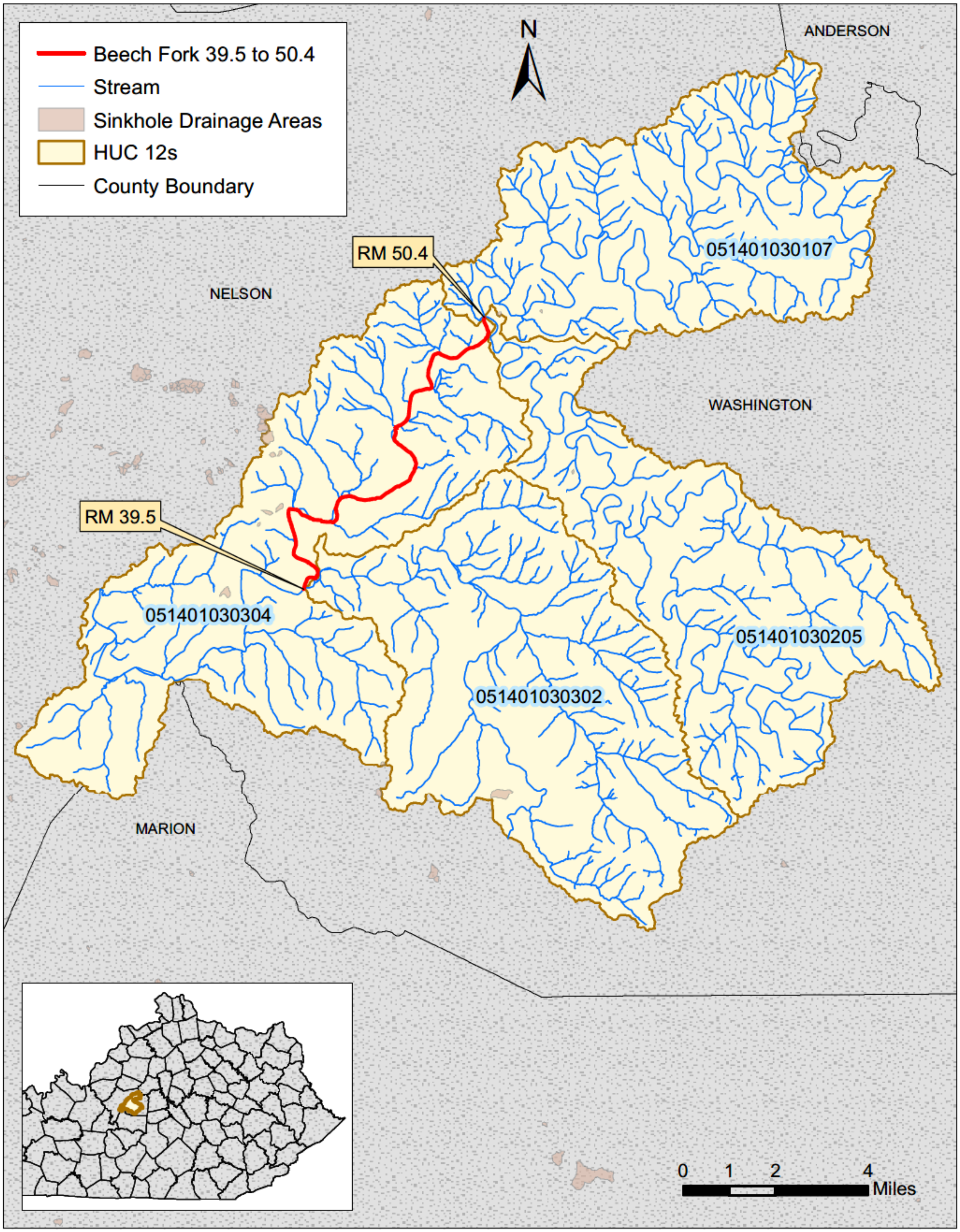


Figure K.2-1 Location of Beech Fork 39.5 to 50.4

Section K.3 Big Bee Lick Creek 0.0 to 4.2

Waterbody ID: KY486674_01

Receiving Water: Southern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021203

County: Jefferson

The Division of Water (DOW) has collected samples from station DOW12032020, located near river mile 0.6, in 2011. The station was sampled one to five times during each month of the PCR season. Table K.3-1 summarizes information about this sampling station; Table K.3-2 summarizes the data collected from this station.

Table K.3-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032020	38.1182	-85.77846	Big Bee Lick Creek 0.0 to 4.2	0.6

Table K.3-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032020	*E. coli*	14	185	21,420	2,928

(1)The full data set for samples collected at DOW12032020 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Big Bee Lick Creek 0.0 to 4.2 are presented in Table K.3-3.

Table K.3-3 Big Bee Lick Creek 0.0 to 4.2 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[5]	Allocations for Tributary Loads to the Segment[6]	MOS[7]
	MS4-WLA[3]	LA[4]			
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Big Bee Lick Creek. Information about MS4 permits is summarized in Table K.3-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The definitions for MS4 and CSO are found in 401 KAR 5:002. The location of the MS4 area and the segment within the Southern Ditch-Pond Creek watershed is shown in Figure K.3-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.3-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	$Q_{MS4} \times WQC \times CF$
KYS000003	Kentucky Department of Transportation	09/30/2017	$Q_{MS4} \times WQC \times CF$

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

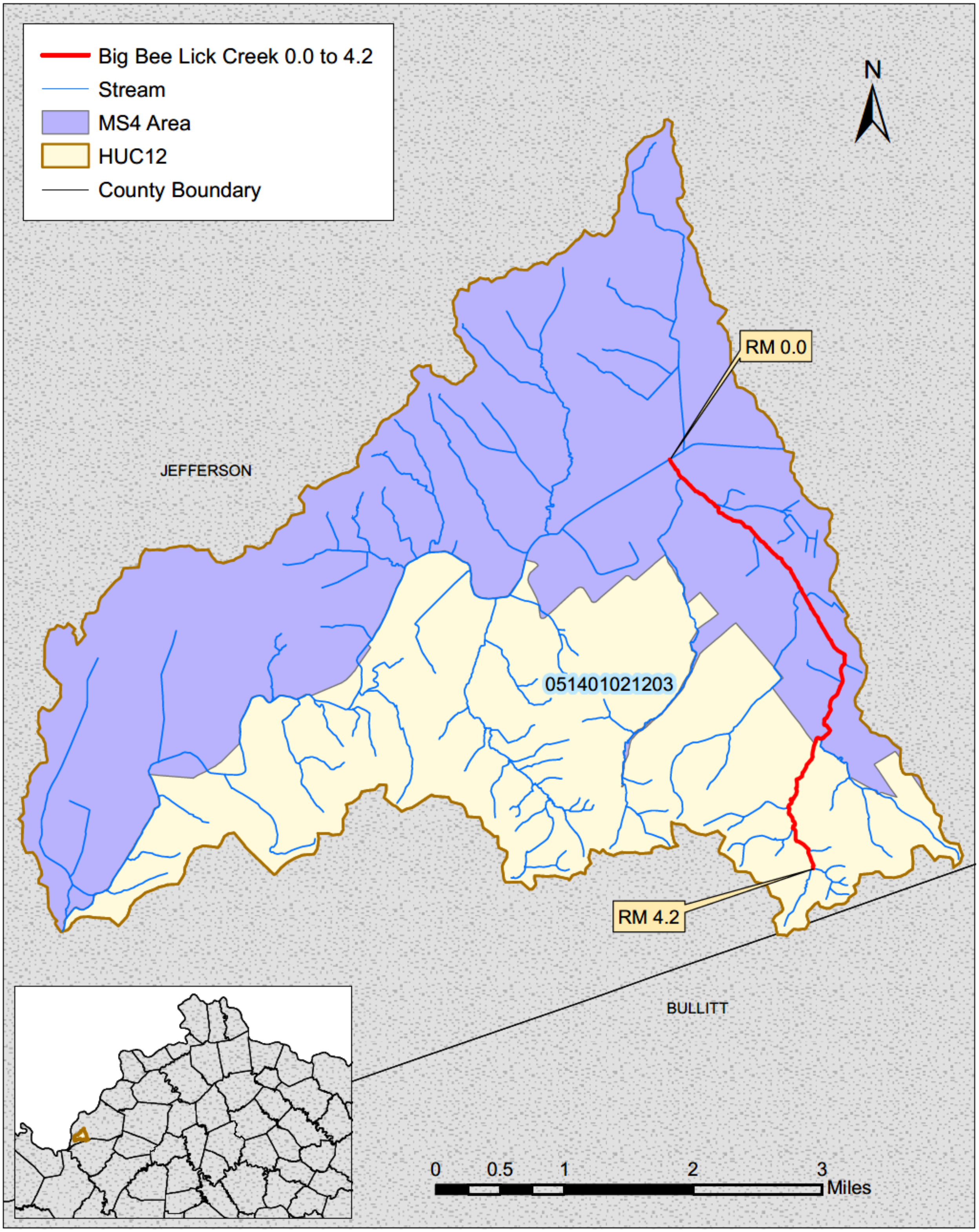


Figure K.3-1 Location of Big Bee Lick Creek 0.0 to 4.2

Section K.4 Big South Fork 0.0 to 12.65

Waterbody ID: KY487258_01

Receiving Water: Rolling Fork

Impaired Use: PCR

Support Status: partial support

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12s: 051401030401, 051401030402

County: Marion

The Division of Water (DOW) collected samples from station SRW009, located just past river mile 2.1, in 1999. The station was sampled five times during the PCR season. Table K.4-1 summarizes information about this sampling station; Table K.4-2 summarizes the data collected from this station.

Table K.4-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
SRW009	37.4884	-85.1324	Big South Fork 0.0 to 12.65	2.1

Table K.4-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
SRW009	fecal coliform	5	60	540	334

(1)The full data set for samples collected from SRW009 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Big South Fork 0.0 to 12.65 are presented in Table K.4-3.

Table K.4-3 Big South Fork 0.0 to 12.65 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment(5)	Allocations for Tributary Loads to the Segment(6)	MOS(7)
	SWS-WLA(3)	LA(4)			
Q_S×WQC×CF	∑(Q_{SWS}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a) Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b) Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c) There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Lower Big South Fork and Upper Big South Fork watersheds is shown in Figure K.4-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Lower Big South Fork and Upper Big South Fork watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

One facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Big South Fork. The directly discharging facility is a sanitary wastewater system. There are no MS4 communities or CSOs discharging directly to this segment of Big South Fork. This facility is identified in Table K.4-4 and the location within the Lower Big South Fork and Upper Big South Fork watersheds is shown in Figure K.4-1.

Table K.4-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date[(1)]	WLA[(2)] (colonies/day)
KY0090719	Bradfordsville STP	0.04	37.4894	-85.1597	8/31/2025	Q_{SWS}×WQC×CF

[(1)]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.

[(2)]Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

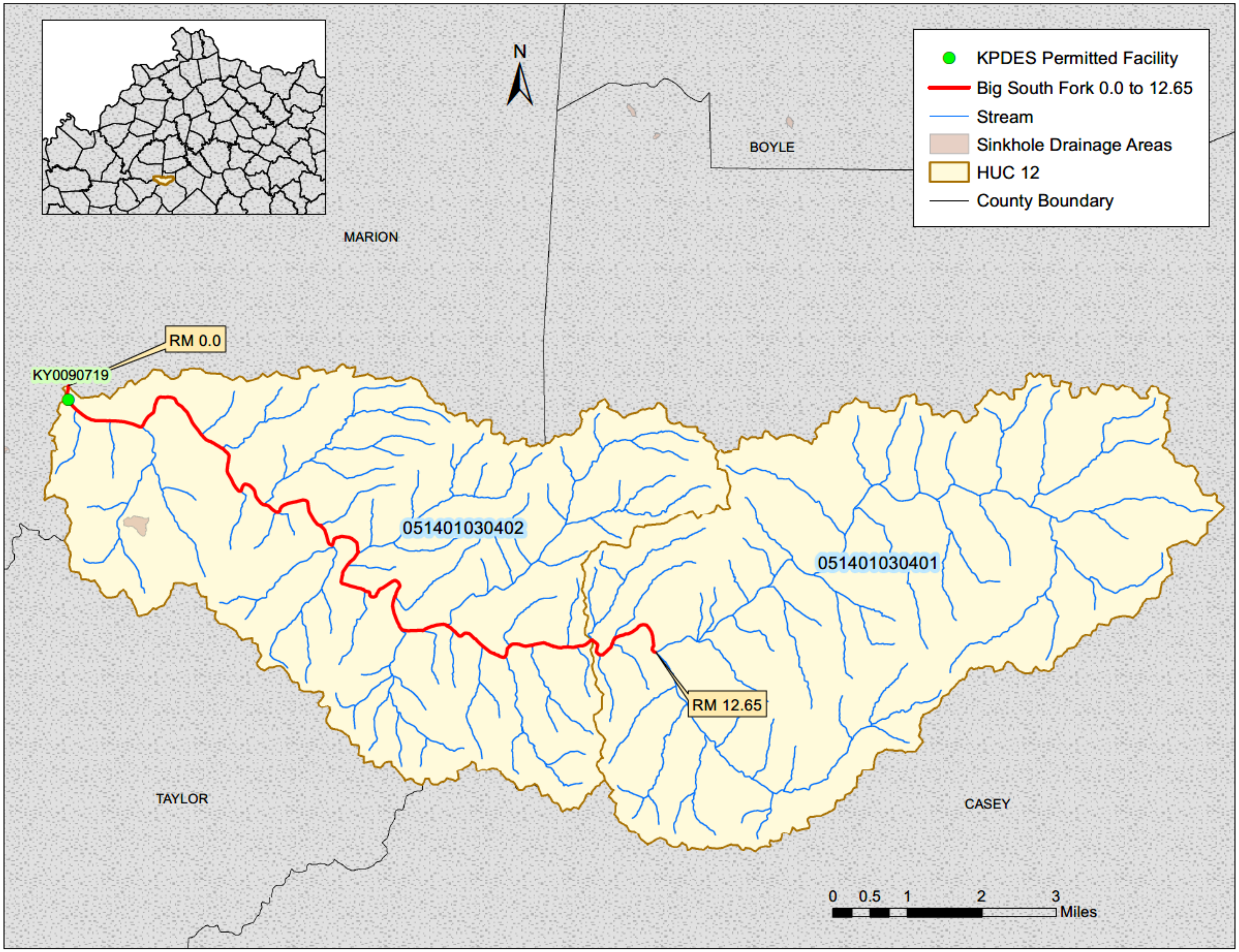


Figure K.4-1 Location the KPDES-permitted Facility on Big South Fork 0.0 to 12.65

Section K.5 Blue Spring Ditch 0.0 to 2.1

Waterbody ID: KY504133_01

Receiving Water: Northern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021201

Counties: Jefferson

The Division of Water (DOW) has collected samples from station DOW12032019, located near river mile 0.5, in 2011. The station was sampled one to five times during each month of the PCR season. Table K.5-1 summarizes information about this sampling station; Table K.5-2 provides a summary of the data collected from this station.

Table K.5-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032019	38.15286	-85.6886	Blue Spring Ditch 0.0 to 2.1	0.5

Table K.5-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032019	*E. coli*	19	5	5,172	825

(1)The full data set for samples collected from DOW12032019 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Blue Spring Ditch 0.0 to 2.1 are presented in Table K.5-3.

Table K.5-3 Blue Spring Ditch 0.0 to 2.1 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[5]	Allocations for Tributary Loads to the Segment[6]	MOS[7]
	MS4-WLA[3]	LA[4]			
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Northern Ditch watershed is shown in Figure K.5-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Northern Ditch Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Blue Spring Ditch. Information about MS4 permits is summarized in Table K.5-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area within the Northern Ditch watershed is shown in Figure K.5-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.5-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

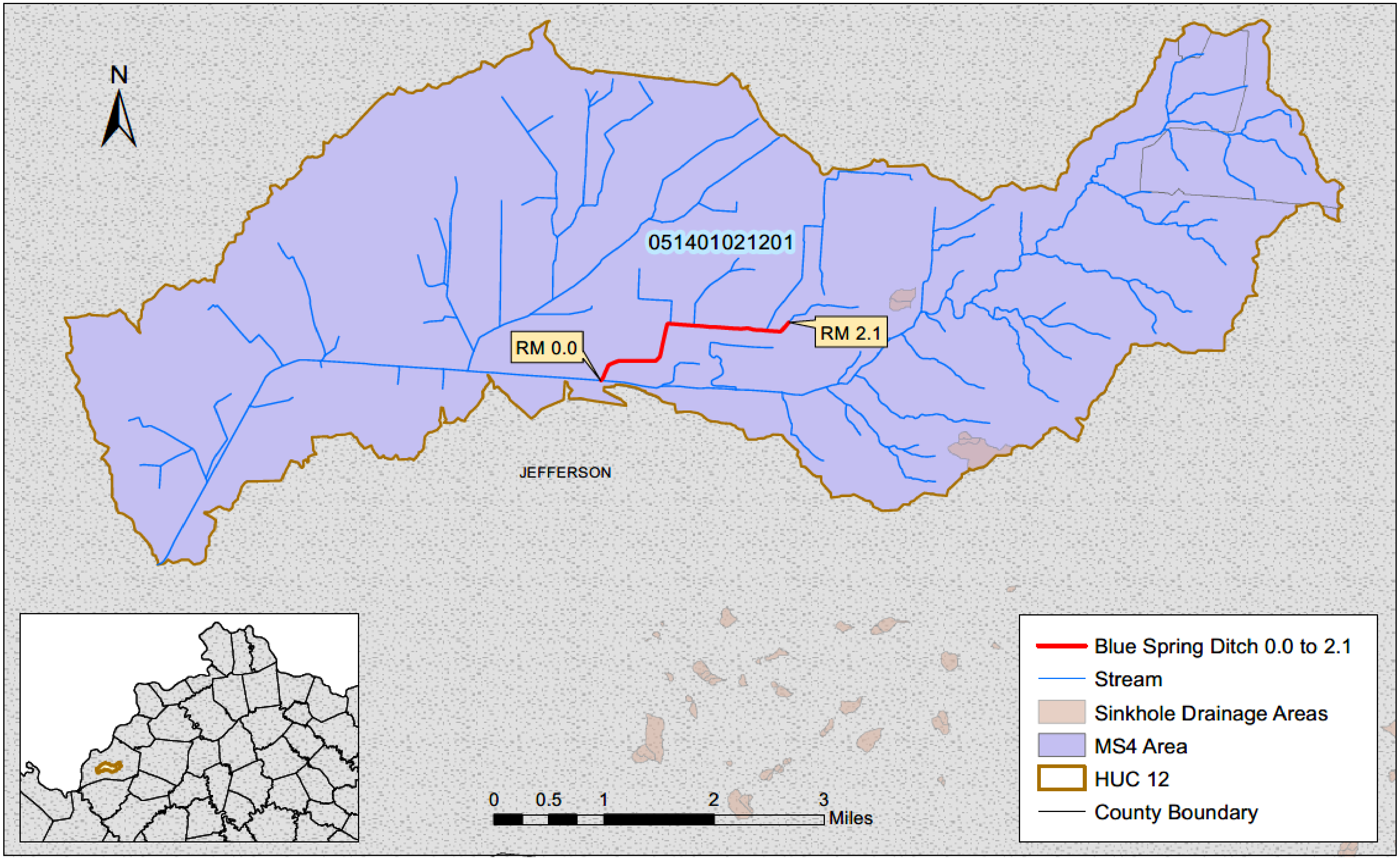


Figure K.5-1 Location of Blue Spring Ditch 0.0 to 2.1

Section K.6 Brashears Creek 0.0 to 13.0

Waterbody ID: KY487840_01

Receiving Water: Salt River

Impaired Use: PCR

Support Status: partial support

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051401020505

County: Spencer

The Division of Water (DOW) has collected samples from station PRI105, located near river mile 0.3, since 2003. The station typically has been sampled one to six times during the PCR season, although it was not sampled in 2005. Table K.6-1 summarizes information about this sampling station; Table K.6-2 provides a summary of the data collected from this station.

Table K.6-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI105	38.03037	-85.35173	Brashears Creek 0.0 to 13.0	0.3

Table K.6-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI105	*E. coli*	56	15	>2,420	317
PRI105	fecal coliform	12	24	1,400	458

(1)The full data set for samples collected from PRI105 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Brashears Creek 0.0 to 13.0 are presented in Table K.6-3. As of April 2021, there are no KPDES-permitted discharges of bacteria into this segment of Brashears Creek.

Table K.6-3 Brashears Creek 0.0 to 13.0 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Guist Creek-Brashears Creek watershed is shown in Figure K.6-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Guist Creek-Brashears Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

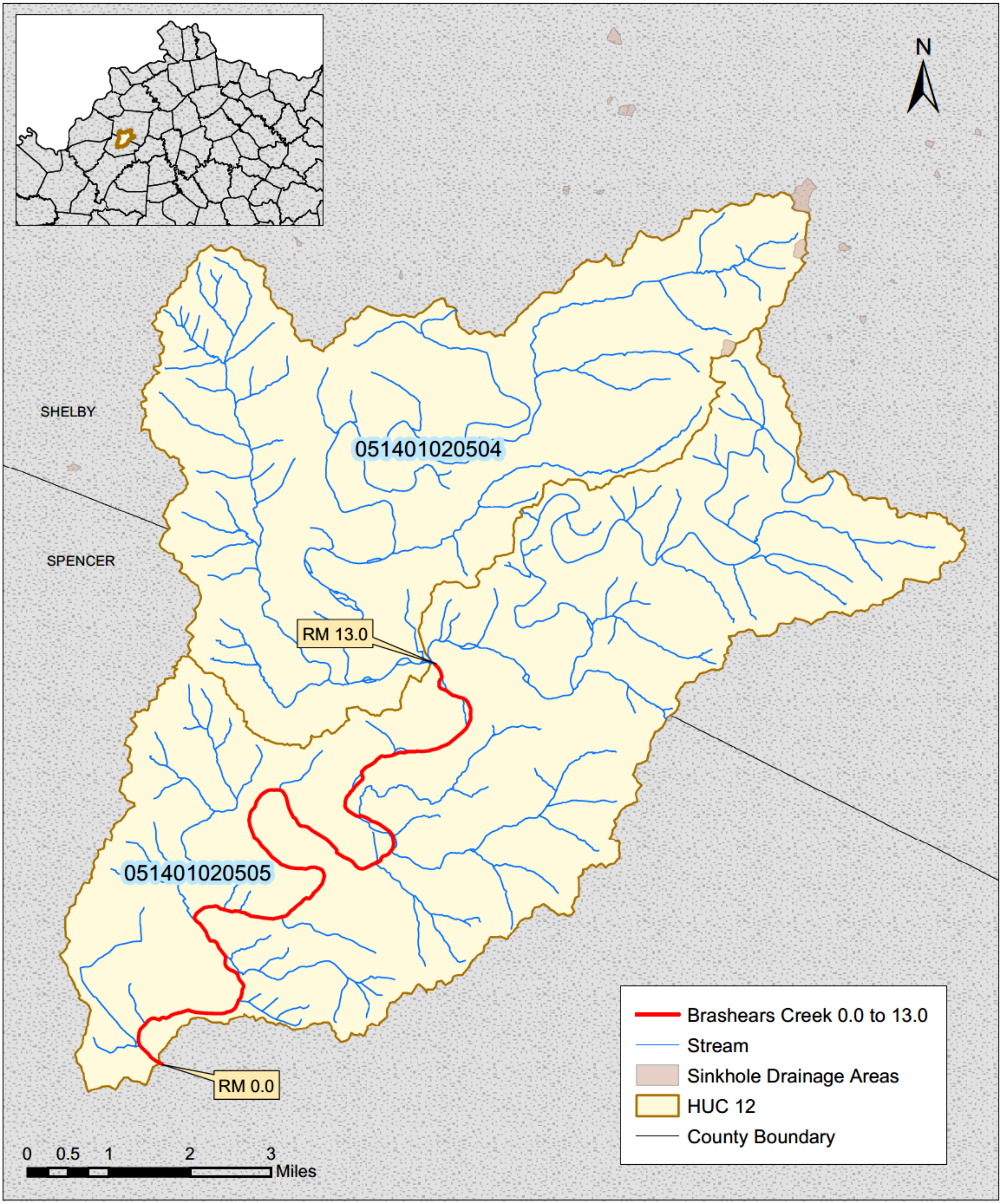


Figure K.6-1 Location of Brashears Creek 0.0 to 13.0

Section K.7 Chaplin River 0.0 to 23.1

Waterbody ID: KY489350_01

Receiving Water: Beech Fork

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401030107

County: Nelson, Washington

The Division of Water (DOW) has collected samples from station SRW002, located near river mile 17.1, since 1999. The station is sampled every five years during the PCR season as part of the DOW five-year rotating schedule for basin monitoring (see also Section 7.2.1, Kentucky Watershed Management Framework). The station has been sampled four to six times during a monitoring year. Table K.7-1 summarizes information about this sampling station; Table K.7-2 provides a summary of the data collected from this station.

Table K.7-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
SRW002	37.89118	-85.199303	Chaplin River 0.0 to 23.1	17.1

Table K.7-2 DOW Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
SRW002	*E. coli*	14	13	>2,420	589
SRW002	fecal coliform	12	10	2,800	466

[(1)]The full data set for samples collected from station SRW002 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Chaplin River 0.0 to 23.1 are presented in Table K.7-3. As of April 2021, there are no KPDES-permitted discharges of bacteria into this segment of Chaplin River. The location within the Water Run-Chaplin River watershed is shown in Figure K.7-1.

Table K.7-3 Chaplin River 0.0 to 23.1 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment LA[3]	Allocations for Upstream Loads to the Segment[4]	Allocations for Tributary Loads to the Segment[5]	MOS[6]
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

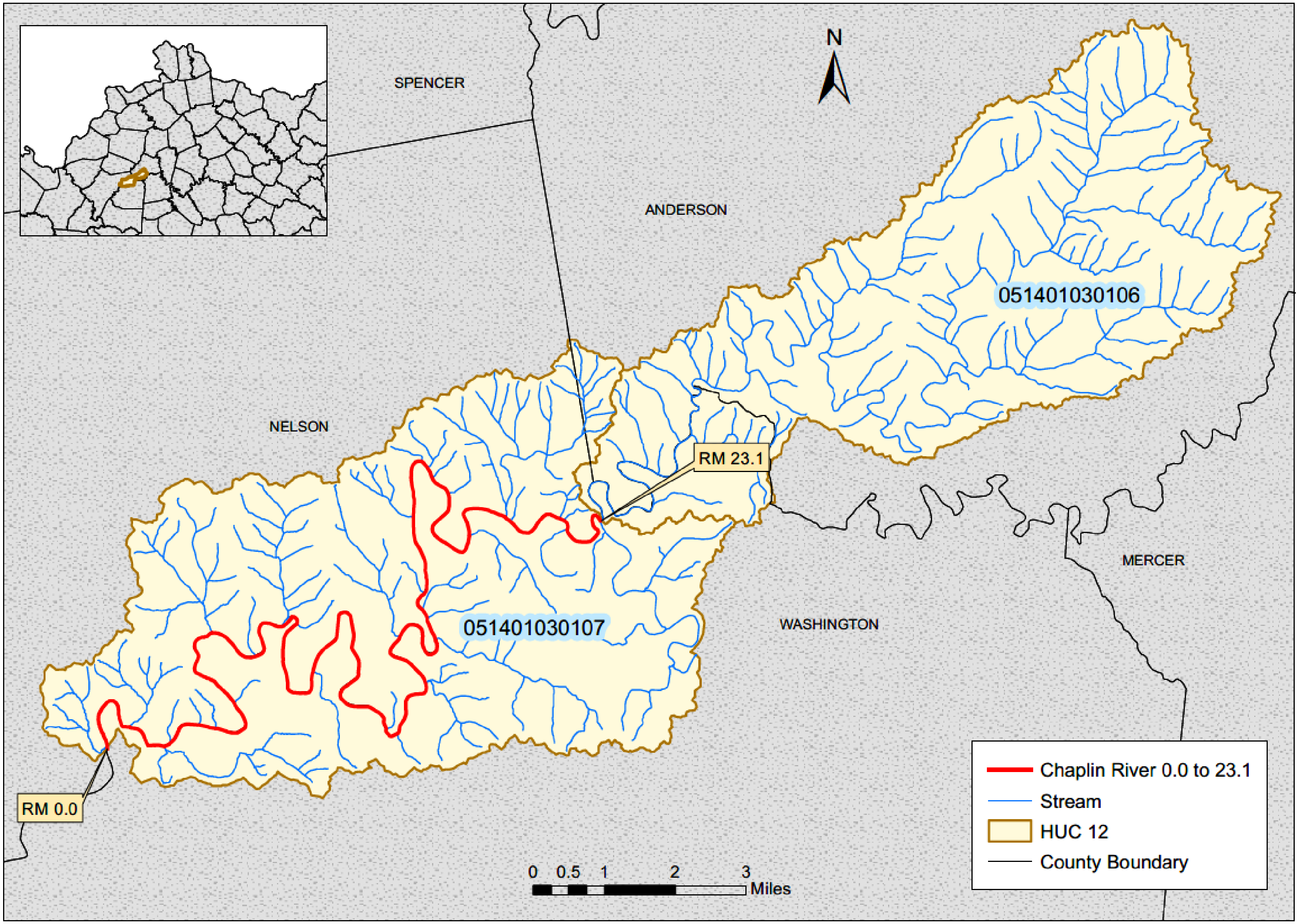


Figure K.7-1 Location of Chaplin River 0.0 to 23.1

Section K.8 Fern Creek 0.0 to 1.3

Waterbody ID: KY492042_01

Receiving Water: Northern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051401021201

County: Jefferson

The Division of Water (DOW) collected samples at station DOW12032032, located near river mile 0.1, in 2011. The station was sampled one to five times during each month of the PCR season. Table K.8-1 summarizes information about this sampling station; Table K.8-2 provides a summary of the data collected from this station.

Table K.8-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032032	38.15007	-85.65451	Fern Creek 0.0 to 1.3	0.1

Table K.8-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032032	*E. coli*	18	167	1,935	604

(1)The full data set for samples collected from station DOW12032032 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Fern Creek 0.0 to 1.3 are presented in Table K.8-3.

Table K.8-3 Fern Creek 0.0 to 1.3 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment(5)	Allocations for Tributary Loads to the Segment(6)	MOS(7)
	MS4-WLA(3)	LA(4)			
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Northern Ditch watershed is shown in Figure K.8-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Northern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Fern Creek. Information about MS4 permits is summarized in Table K.8-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within the Northern Ditch watershed in Figure K.8-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.8-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[1]	WLA[2] (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

[1]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[2]Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

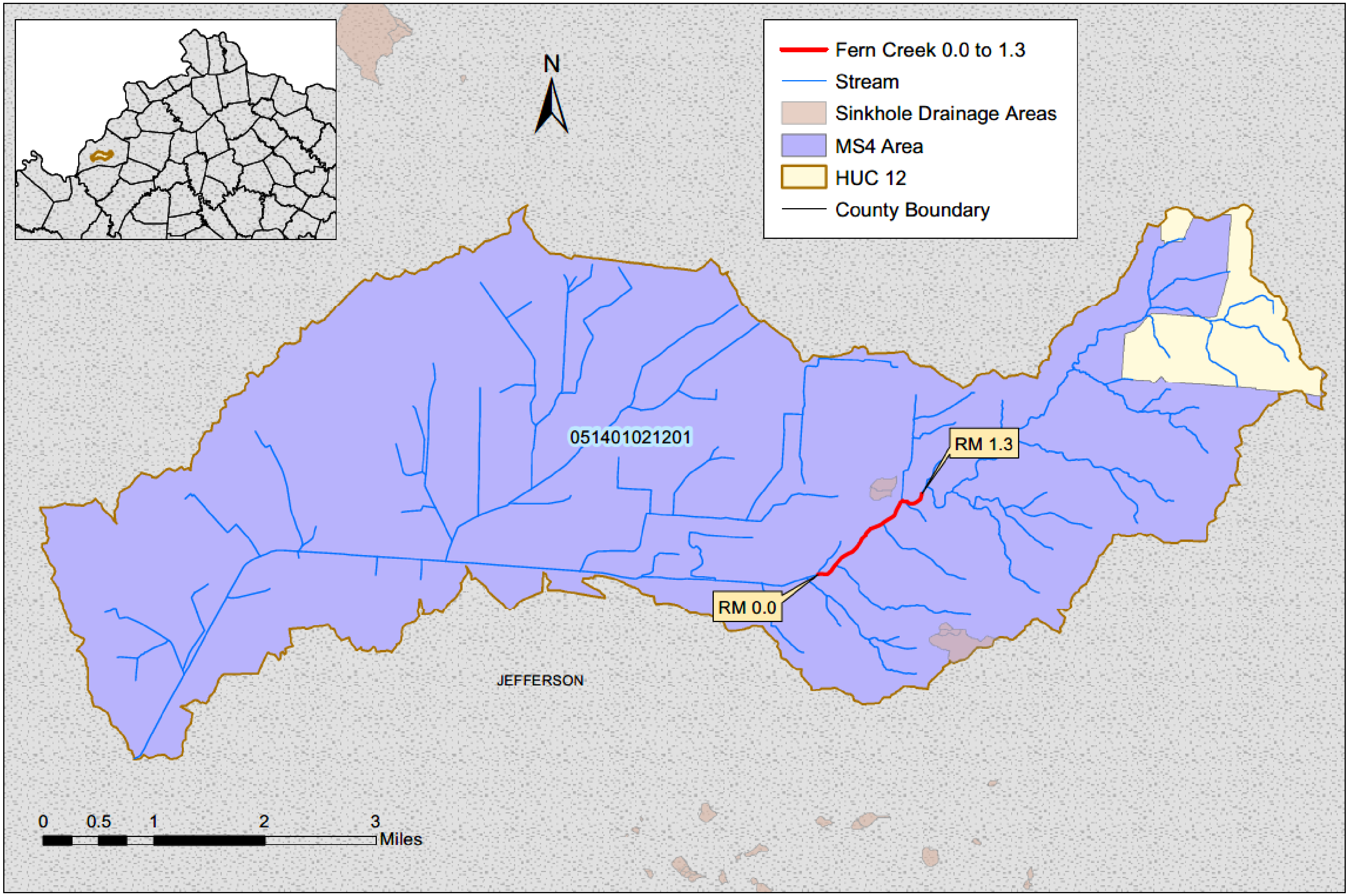


Figure K.8-1 Location of Fern Creek 0.0 to 1.3

Section K.9 Fern Creek 1.3 to 4.4

Waterbody ID: KY492042_02

Receiving Water: Jefferson

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021201

County: Jefferson

The Division of Water (DOW) collected samples at station DOW12032011, located near river mile 1.3, in 2011. The station was sampled two to six samples during each month of the PCR season. K.9-1 summarizes information about this sampling station; Table K.9-2 provides a summary of the data collected from this station.

Table K.9-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032011	38.15965	-85.63945	Fern Creek 1.3 to 4.4	1.3

Table K.9-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032011	*E. coli*	20	64	1,396	339

(1)The full data set for samples collected from station DOW12032011 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Fern Creek 1.3 to 4.4 are presented in Table K.9-3.

Table K.9-3 Fern Creek 1.3 to 4.4 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment(5)	Allocations for Tributary Loads to the Segment(6)	MOS(7)
	MS4-WLA(3)	LA(4)			
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Northern Ditch watershed is shown in Figure K.9-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Northern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Fern Creek. Information about MS4 permits is summarized in Table K.9-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within the Northern Ditch watershed in Figure K.9-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.9-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[(1)]	WLA[(2)] (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

[(1)]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[(2)]Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

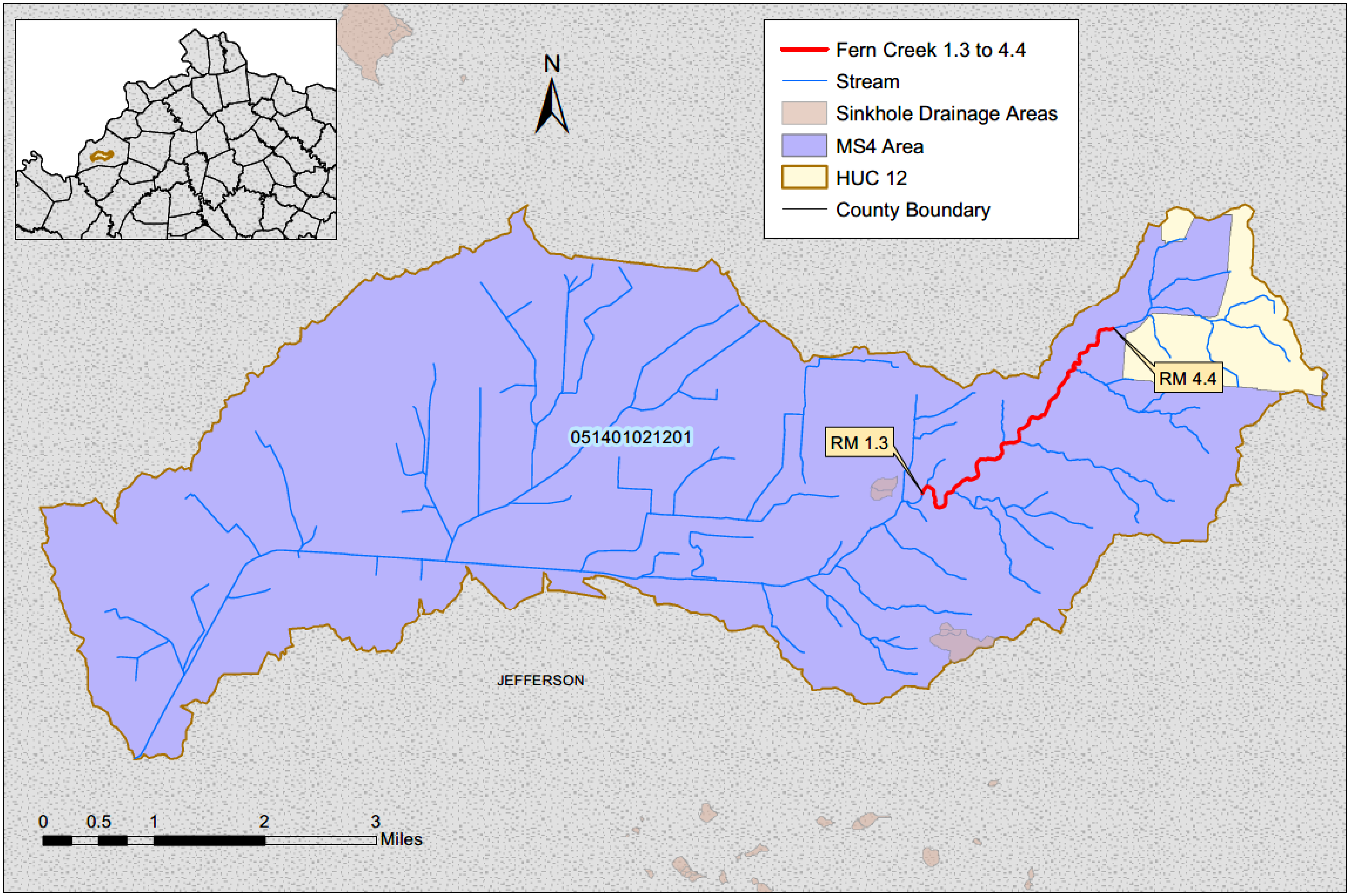


Figure K.9-1 Location of Fern Creek 1.3 to 4.4

Section K.10 Fern Creek 4.4 to 5.9

Waterbody ID: KY492042_03

Receiving Water: Northern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021201

County: Jefferson

The Division of Water (DOW) collected samples at station DOW12032032, located near river mile 0.1, in 2011. The station was sampled one to five samples during each month of the PCR season. Table K.10-1 summarizes information about this sampling station; Table K.10-2 provides a summary of the data collected from this station.

Table K.10-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032032	38.15007	-85.65451	Fern Creek 4.4 to 5.9	0.1

Table K.10-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032032	*E. coli*	18	167	1,935	604

(1)The full data set for samples collected from DOW12032032 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Fern Creek 4.4 to 5.9 are presented in Table K.10-3.

Table K.10-3 Fern Creek 4.4 to 5.9 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[5]	Allocations for Tributary Loads to the Segment[6]	MOS[7]
	MS4-WLA[3]	LA[4]			
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Northern Ditch watershed is shown in Figure K.10-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Northern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Fern Creek. Information about MS4 permits is summarized in Table K.10-4. Information concerning MSD (JEFFERSONTOWN) permit coverage can be found as a co-permittee of MSD's MS4 permit (Permit number KYS000001). There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within the Northern Ditch watershed in Figure K.10-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.10-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000001	MSD (JEFFERSONTOWN)	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

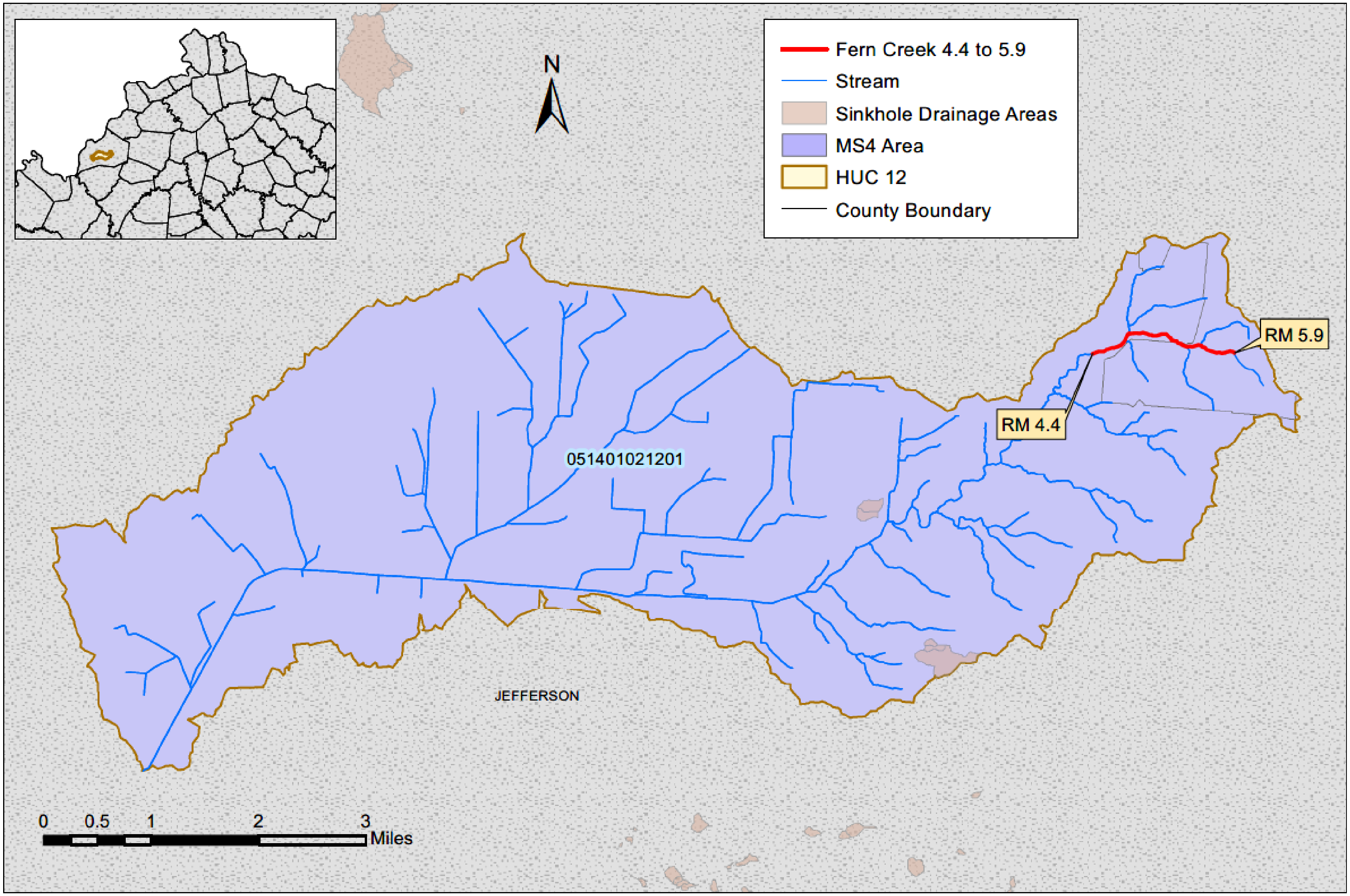


Figure K.10-1 Location of Fern Creek 4.4 to 5.9

Section K.11 Fishpool Creek 0.0 to 1.9

Waterbody ID: KY492132_01

Receiving Water: Southern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021202

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032044, located near river mile 0.2, in 2011. The station was sampled one to six times during each month of the PCR season. Table K.11-1 summarizes information about this sampling station; Table K.11-2 provides a summary of the data collected from this station.

Table K.11-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032044	38.13206	-85.70136	Fishpool Creek 0.0 to 1.9	0.2

Table K.11-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032044	*E. coli*	17	25	3,873	718

(1)The full data set for samples collected from DOW12032044 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Fishpool Creek 0.0 to 1.9 are presented in Table K.11-3.

Table K.11-3 Fishpool Creek 0.0 to 1.9 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment(5)	Allocations for Tributary Loads to the Segment(6)	MOS(7)
	MS4-WLA(3)	LA(4)			
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Southern Ditch watershed is shown in Figure K.11-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Southern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Fishpool Creek. Information about MS4 permits is summarized in Table K.11-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within the Headwaters Southern Ditch watershed in Figure K.11-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.11-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

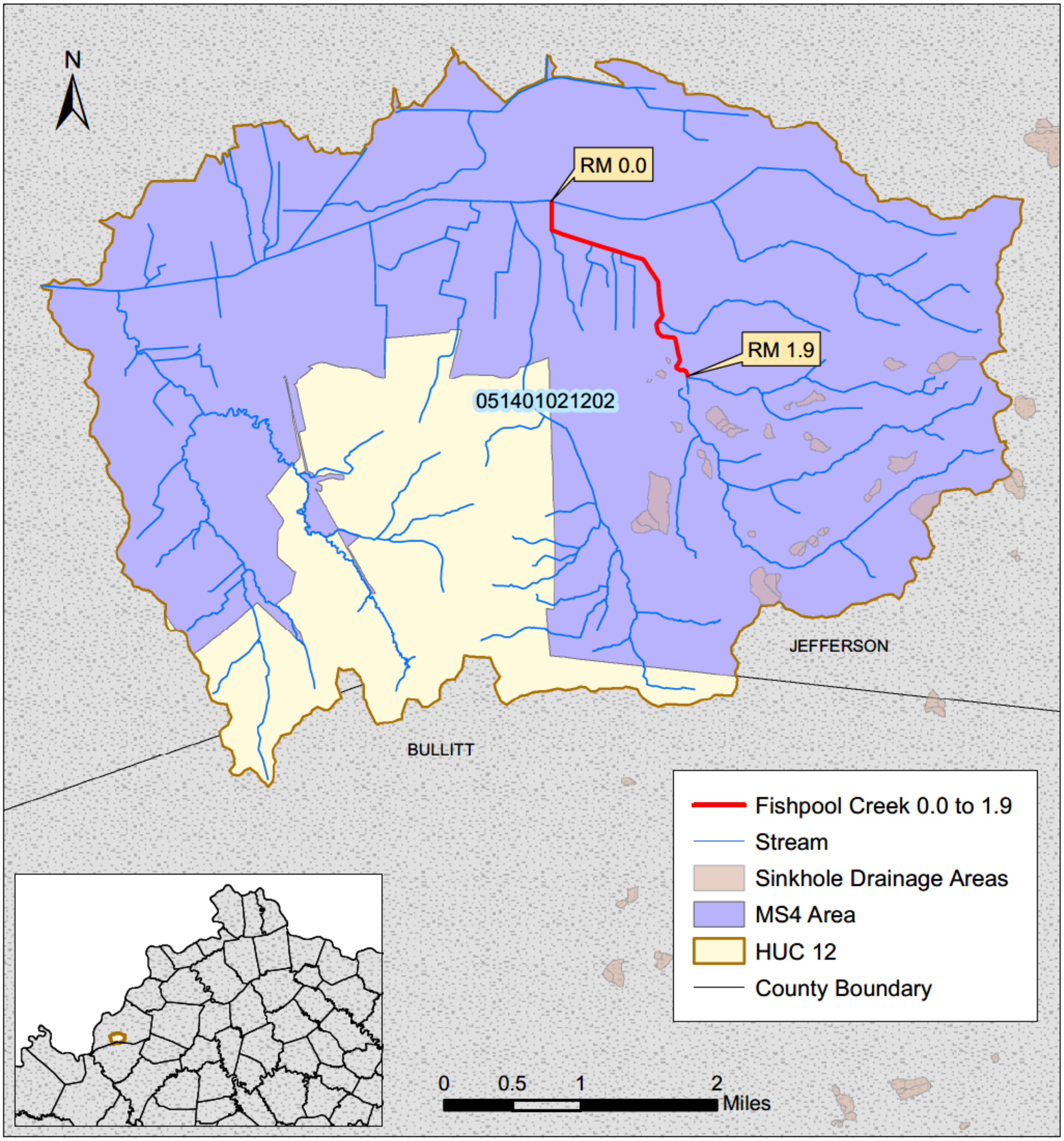


Figure K.11-1 Location of Fishpool Creek 0.0 to 1.9

Section K.12 Greasy Ditch 0.0 to 2.6

Waterbody ID: KY493242_01

Receiving Water: Northern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021201

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032024, located near river mile 0.4, in 2011. The station was sampled one to five times during each month of the PCR season. Table K.12-1 summarizes information about the sampling station; Table K.12-2 provides a summary of the data collected from this station.

Table K.12-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032024	38.15669	-85.71457	Greasy Ditch 0.0 to 2.6	0.4

Table K.12-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032024	*E. coli*	19	43	12,033	2,324

(1)The full data set for samples collected from DOW12032024 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Greasy Ditch 0.0 to 2.6 are presented in Table K.12-3.

Table K.12-3 Greasy Ditch 0.0 to 2.6 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment(5)	Allocations for Tributary Loads to the Segment(6)	MOS(7)
	MS4-WLA(3)	LA(4)			
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Northern Ditch watershed is shown in Figure K.12-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Northern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Greasy Ditch. Information about MS4 permits is summarized in Table K.12-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within the Northern Ditch watershed in Figure K.12-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.12-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[1]	WLA[2] (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

[1]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[2]Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

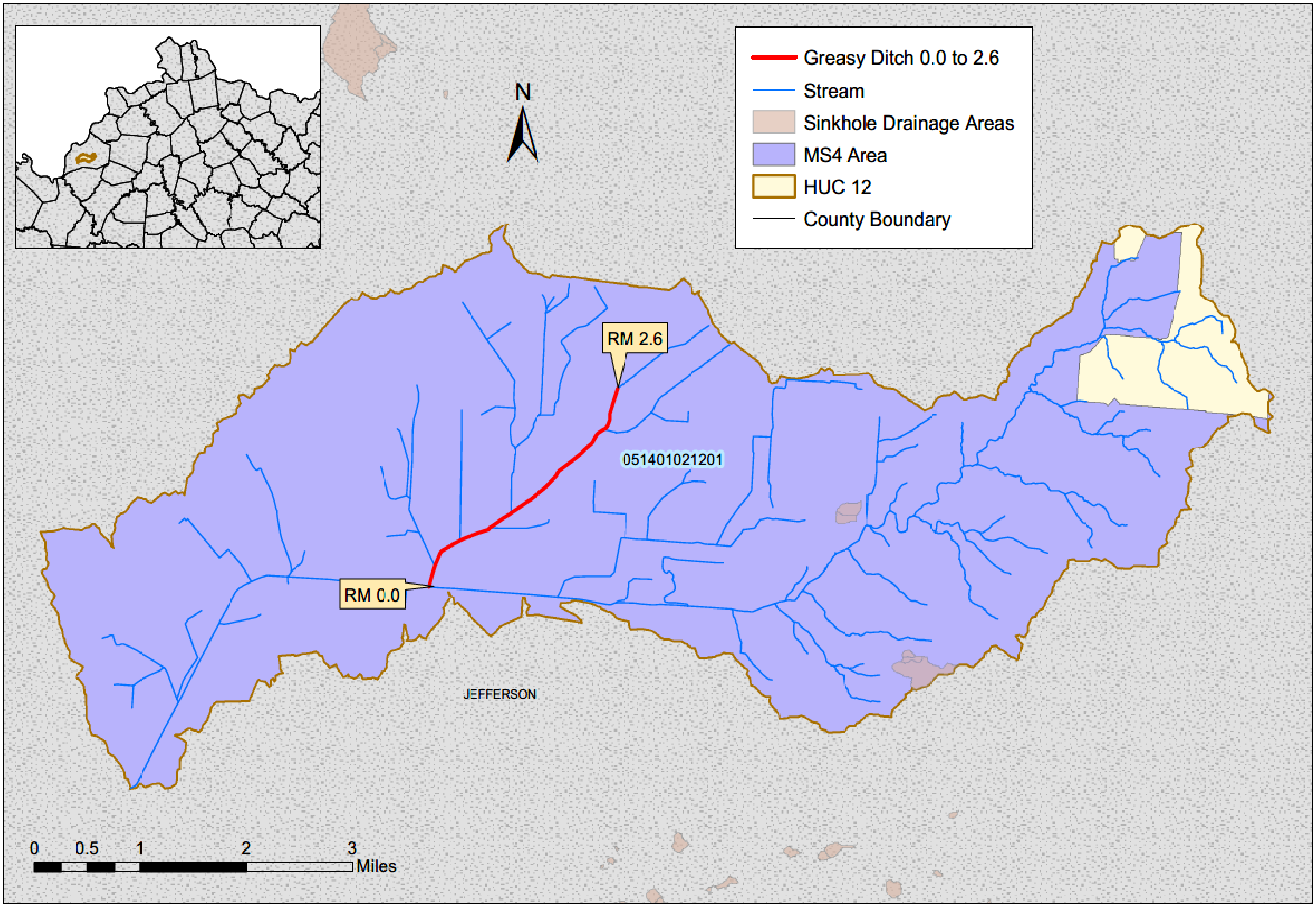


Figure K.12-1 Location of Greasy Ditch 0.0 to 2.6

Section K.13 Little Bee Lick Creek 0.0 to 2.6

Waterbody ID: KY2743838_01

Receiving Water: Wilson Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021202

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032041, located near river mile 0.01, in 2011. The station was sampled one to four times during each month of the PCR season. Table K.13-1 summarizes information about this sampling station; Table K.13-2 provides a summary of the data collected from this station.

Table K.13-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032041	38.11198	-85.74842	Little Bee Lick Creek 0.0 to 2.6	0.01

Table K.13-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032041	*E. coli*	13	<1	24,192	6,180

(1)The full data set for samples collected from DOW12032041 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Little Bee Lick Creek 0.0 to 2.6 are presented in Table K.13-3.

Table K.13-3 Little Bee Lick Creek 0.0 to 2.6 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment[5]	MOS[6]
	MS4-WLA[3]	LA[4]		
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

[4]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a) Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Southern Ditch watershed is shown in Figure K.13-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Southern Ditch watershed watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Little Bee Lick Creek. Information about MS4 permits is summarized in Table K.13-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within the Headwaters Southern Ditch watershed in Figure K.13-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.13-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

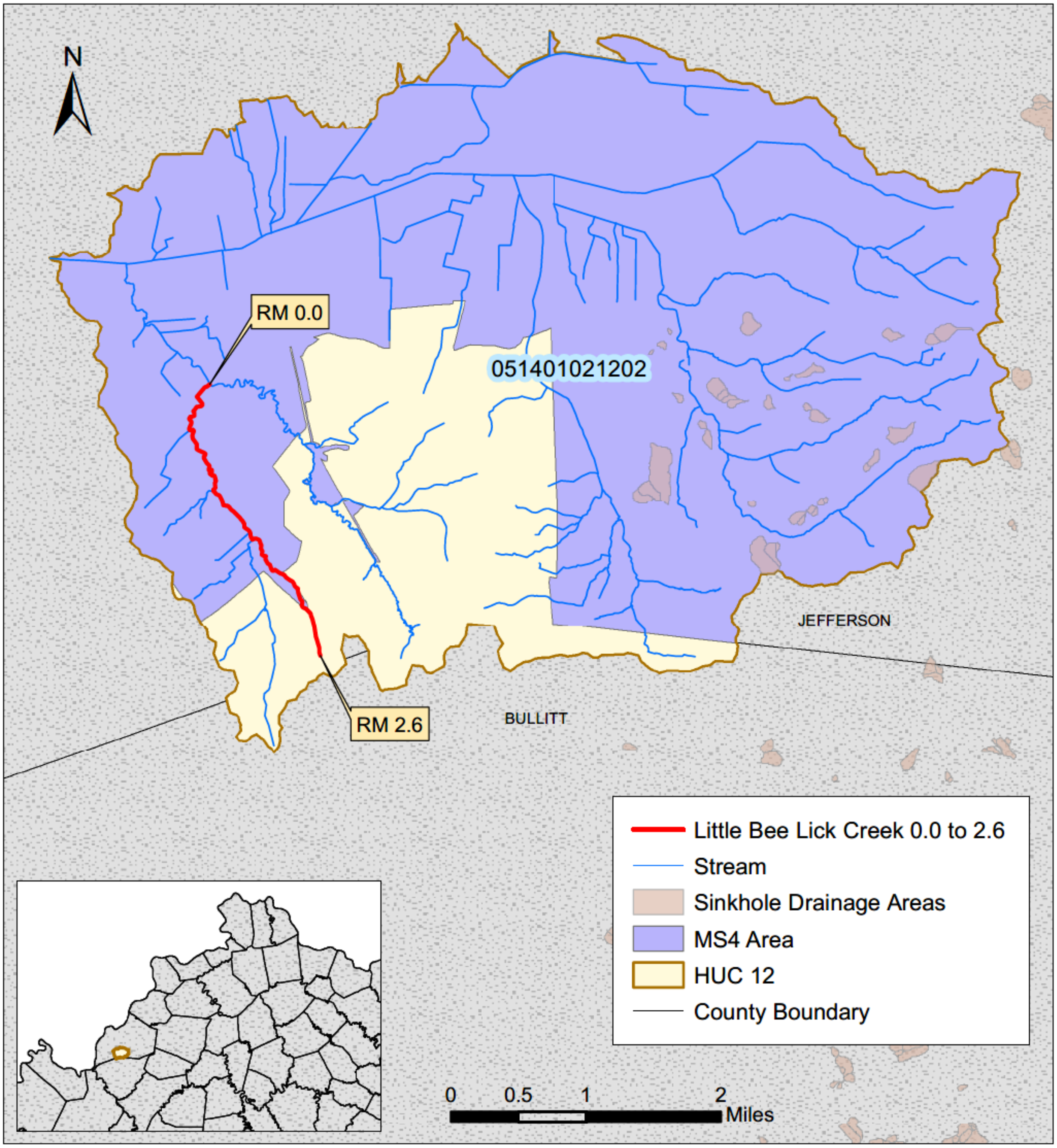


Figure K.13-1 Location of Little Bee Lick Creek 0.0 to 2.6

Section K.14 Mud Creek 0.0 to 4.35

Waterbody ID: KY498984_01

Receiving Water: Southern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021202

County: Jefferson, Bullitt

The Division of Water (DOW) collected samples from station DOW12032043, located near river mile 0.02, in 2011. The station was sampled two to seven times during each month of the PCR season. Table K.14-1 summarizes information about this sampling station; Table K.14-2 provides a summary of the data collected from this station.

Table K.14-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032043	38.13425	-85.70676	Mud Creek 0.0 to 4.35	0.02

Table K.14-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032043	*E. coli*	20	30	4,884	880

(1)The full data set for samples collected from DOW12032043 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Mud Creek 0.0 to 4.35 are presented in Table K.14-3.

Table K.14-3 Mud Creek 0.0 to 4.35 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment(5)	MOS(6)
	MS4-WLA(3)	LA(4)		
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Southern Ditch watershed is shown in Figure K.14-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Southern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD, Bullitt County Fiscal Court, and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Mud Creek. Information about MS4 permits is summarized in Table K.14-4. Information concerning Bullitt County Fiscal Court (HILLVIEW) permit coverage can be found as a co-permittee of Bullitt County Fiscal Court's MS4 permit (Permit number KYG200039). There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within the Headwaters Southern Ditch watershed in Figure K.14-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.14-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYG200039	Bullitt County Fiscal Court	4/30/2023	Q_{MS4}×WQC×CF
KYG200039	Bullitt County Fiscal Court (HILLVIEW)	4/30/2023	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

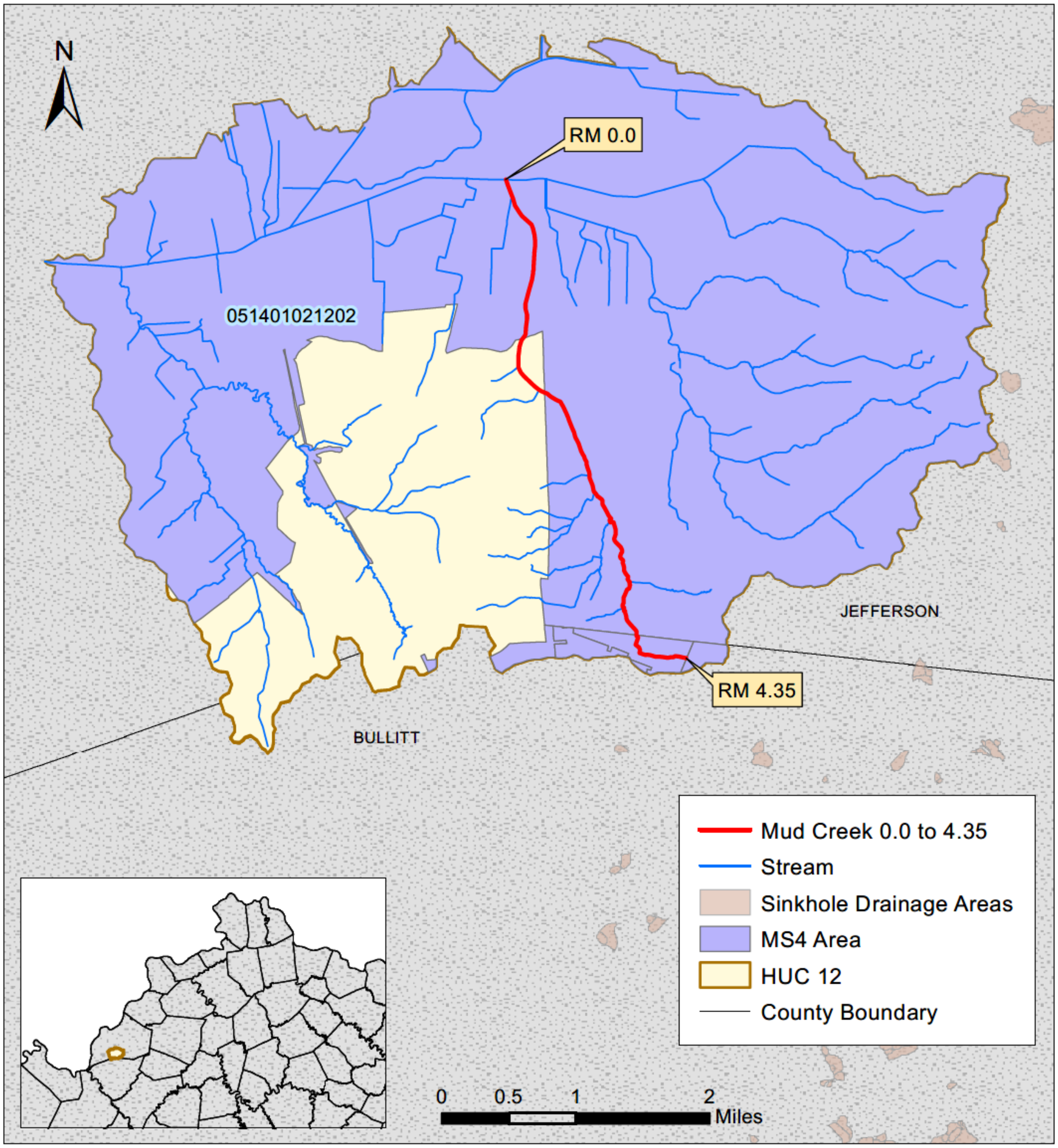


Figure K.14-1 Location of Mud Creek 0.0 to 4.35

Section K.15 Northern Ditch 0.0 to 7.3

Waterbody ID: KY499598_01

Receiving Water: Southern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021201

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032031, located near river mile 0.1, in 2011. The station was sampled two to four times during each month of the PCR season. Table K.15-1 summarizes information about this sampling station; Table K.15-2 provides a summary of the data collected from this station.

Table K.15-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032031	38.12608	-85.7693	Northern Ditch 0.0 to 7.3	0.1

Table K.15-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032031	*E. coli*	16	51	3,654	924

(1)The full data set for samples collected at DOW12032031 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Northern Ditch 0.0 to 7.3 are presented in Table K.15-3.

Table K.15-3 Northern Ditch 0.0 to 7.3 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[(5)]	Allocations for Tributary Loads to the Segment[(6)]	MOS[(7)]
	MS4-WLA[(3)]	LA[(4)]			
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

[(1)]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[(2)]Q_S is the flow (ft^3/s) in the segment.

[(3)]Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

[(4)]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[(5)]$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

[(6)]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[(7)]The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Northern Ditch watershed is shown in Figure K.15-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Northern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Northern Ditch. Information about MS4 permits is summarized in Table K.15-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within in the Northern Ditch watershed in Figure K.15-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.15-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[1]	WLA[2] (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

[1]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[2]Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

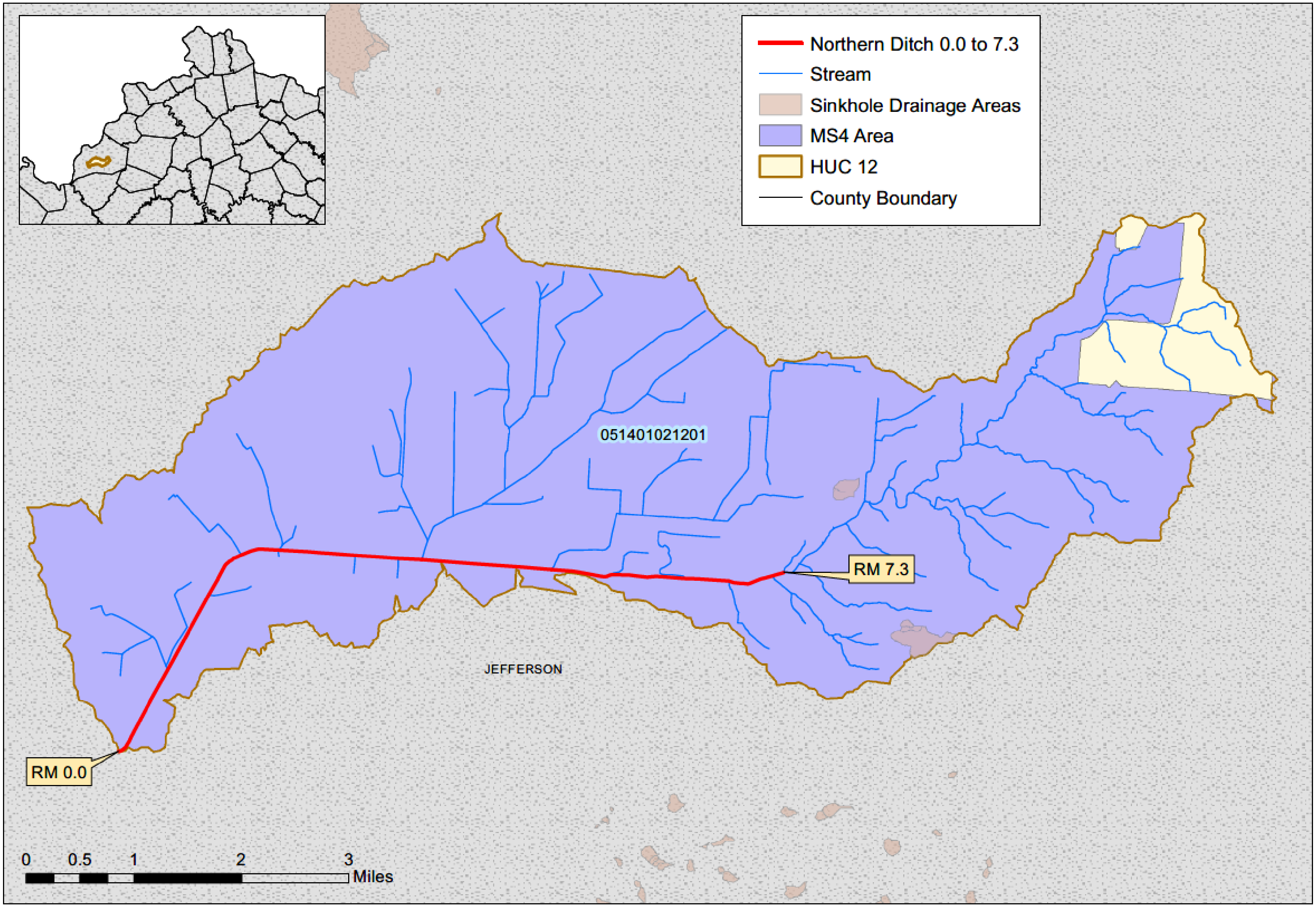


Figure K.15-1 Location of Northern Ditch 0.0 to 7.3

Section K.16 Otter Creek 0.0 to 2.9

Waterbody ID: KY500024_01

Receiving Water: Rolling Fork

Impaired Use: PCR

Support Status: partial support

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12: 051401030503

County: Larue

The Division of Water (DOW) collected samples from station SRW015, located near river mile 1.7, in 2004. The station was sampled once during each month of the PCR season. Table K.16-1 summarizes information about this sampling station; Table K.16-2 provides a summary of the data collected from this station.

Table K.16-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
SRW015	37.5084	-85.5818	Otter Creek 0.0 to 2.9	1.7

Table K.16-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
SRW015	fecal coliform	6	3	20,000	3,515

(1)The full data set for samples collected at SRW015 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Otter Creek 0.0 to 2.9 are presented in Table K.16-3. As of April 2021, there are no KPDES-permitted discharges of bacteria into this segment of Otter Creek.

Table K.16-3 Otter Creek 0.0 to 2.9 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
	LA(3)			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Otter Creek-Rolling Fork watershed is shown in Figure K.16-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Otter Creek-Rolling Fork watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

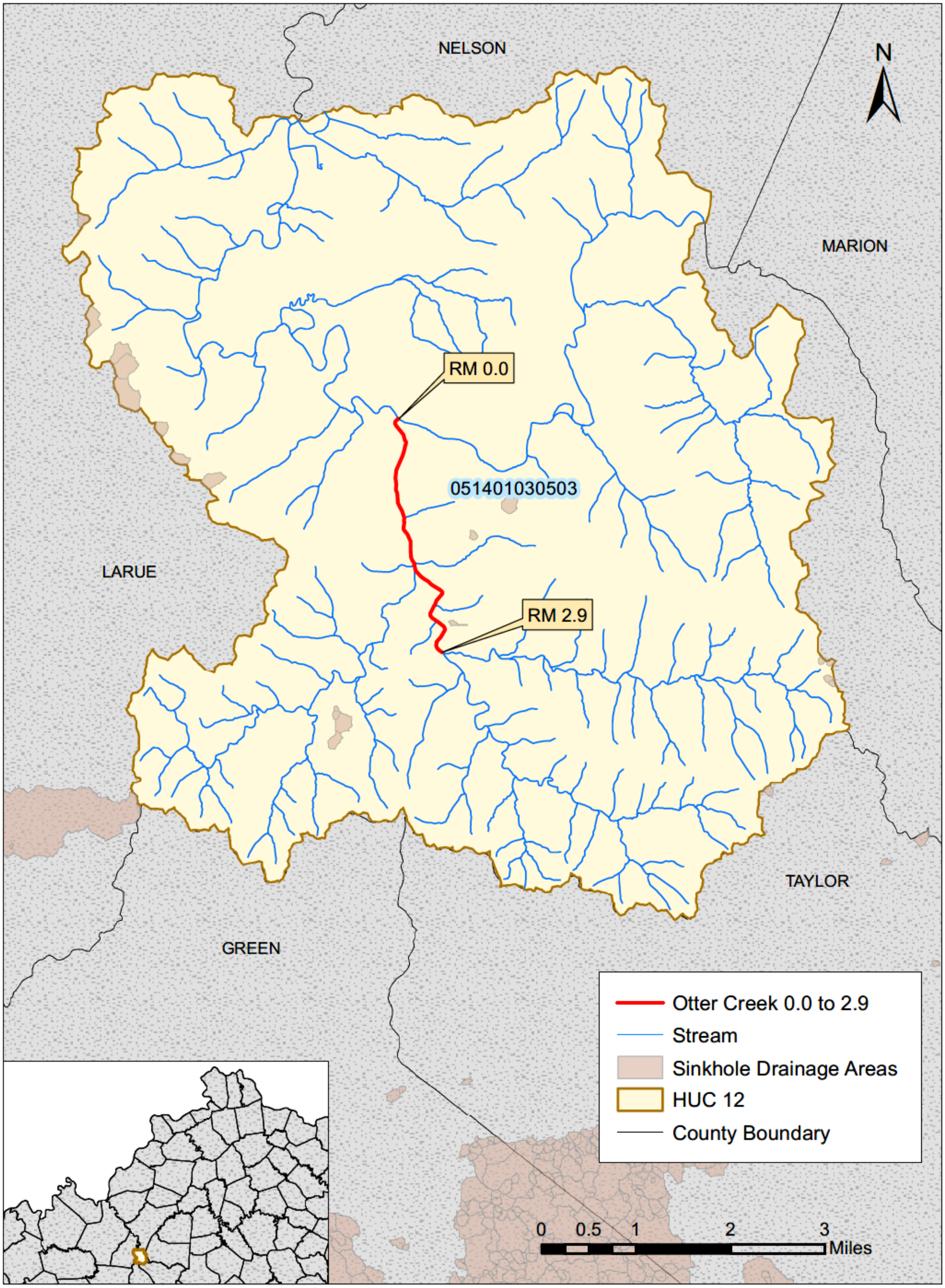


Figure K.16-1 Location of Otter Creek 0.0 to 2.9

Section K.17 Pond Creek 5.2 to 8.1

Waterbody ID: KY501046_01

Receiving Water: Salt River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12s: 051401021205

County: Jefferson

The Louisville Metropolitan Sewer District (MSD) collected samples from station USGS03302030, located near river mile 6.6, from 1991 to 1998. The station was sampled three to seven times each year during the PCR season. Table K.17-1 summarizes information about this sampling station; Table K.17-2 provides a summary of the data collected from this station.

Table K.17-1 Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
USGS03302030	38.05405	-85.87137	Pond Creek 5.2 to 8.1	6.6

Table K.17-2 Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
USGS03302030	fecal coliform	42	3	12,600	1,433

[(1)]The full data set for samples collected at USGS03302030 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Pond Creek 5.2 to 8.1 are presented in Table K.17-3.

Table K.17-3 Pond Creek 5.2 to 8.1 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment(5)	Allocations for Tributary Loads to the Segment(6)	MOS(7)
	MS4-WLA(3)	LA(4)			
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Brier Creek-Pond Creek watershed is shown in Figure K.17-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Brier Creek-Pond Creek watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Pond Creek. Information about MS4 permits is summarized in Table K.17-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area is shown within in the Brier Creek-Pond Creek watershed in Figure K.17-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.17-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

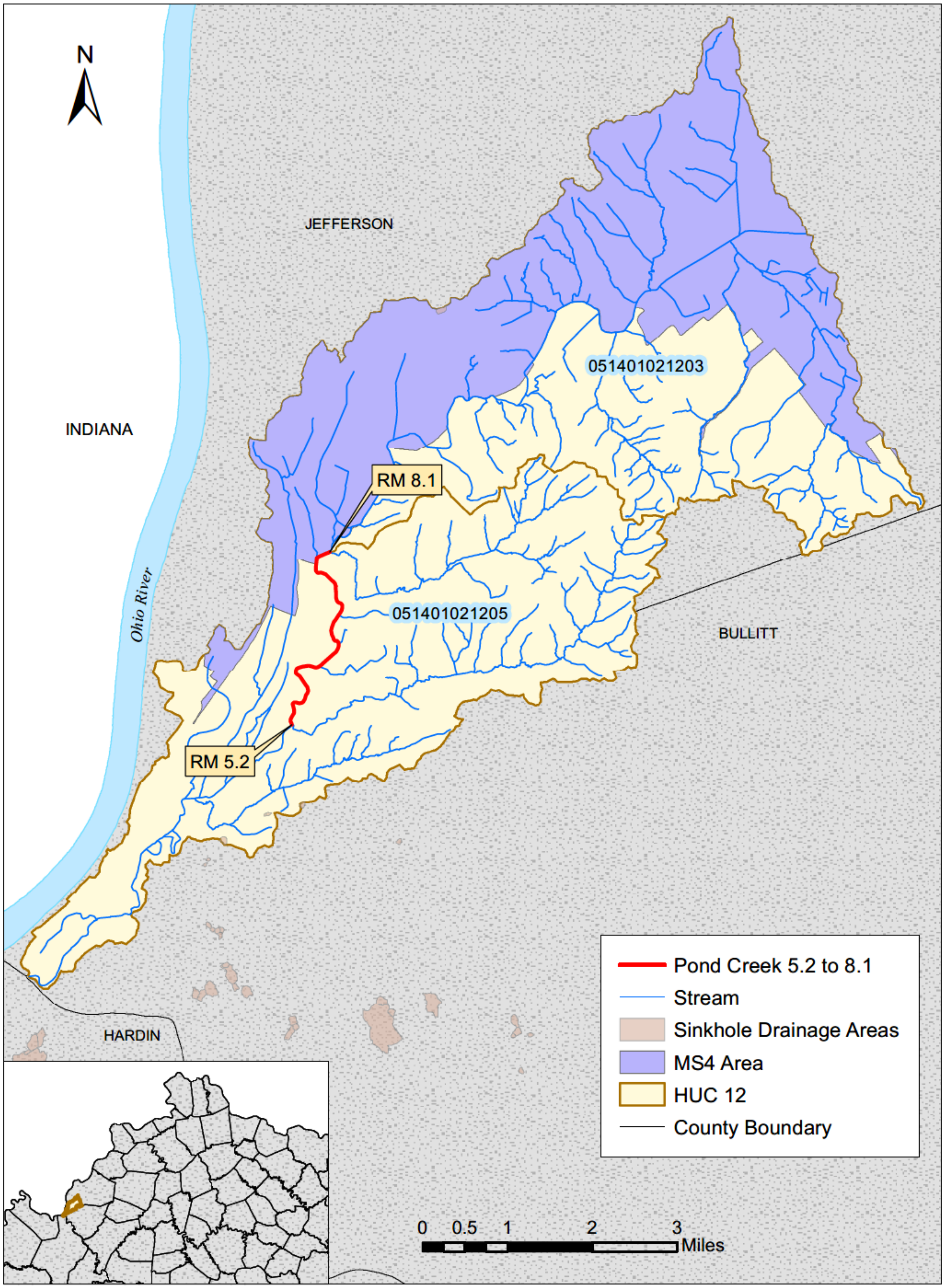


Figure K.17-1 Location of Pond Creek 5.2 to 8.1

Section K.18 Rolling Fork 0.0 to 37.75

Waterbody ID: KY502293_01

Receiving Water: Salt River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051401030602, 051401030603, 051401030605, 051401030505, 051401030506

County: Hardin, Nelson

The Division of Water (DOW) has collected samples from station PRI057, located near river mile 12.2, since 1999. The station was not sampled in 2005. The station is typically sampled one to six times during the PCR season. Table K.18-1 summarizes information about this sampling station; Table K.18-2 provides a summary of the data collected from this station.

Table K.18-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI057	37.82267	-85.74787	Rolling Fork 0.0 to 37.75	12.2

Table K.18-2 DOW Sample Data Summary[(1)]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI057	*E. coli*	55	18	>2,420	615
PRI057	fecal coliform	30	10	20,000	1,469

[(1)]The full data set for samples collected at PRI057 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[(2)]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Rolling Fork 0.0 to 37.75 are presented in Table K.18-3.

Table K.18-3 Rolling Fork 0.0 to 37.75 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[5]	Allocations for Tributary Loads to the Segment[6]	MOS[7]
	SWS-WLA[3]	LA[4]			
Q_S×WQC×CF	∑(Q_{SWS}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Cedar Creek-Rolling Fork, Paradise Lake-Rolling Fork, Wilson Creek, Younger Creek-Rolling Fork, and Knob Creek-Rolling Fork watersheds is shown in Figure K.18-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Cedar Creek-Rolling Fork, Paradise Lake-Rolling Fork, Wilson Creek, Younger Creek-Rolling Fork, and Knob Creek-Rolling Fork watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

One facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Rolling Fork. The directly discharging facility is a sanitary wastewater system (SWS). There are no Municipal Separate Storm Sewer System (MS4) communities or Combined Sewer Overflows (CSOs) discharging directly to this segment of Rolling Fork. This facility is identified in Table K.18-4 and the location in the Cedar Creek-Rolling Fork, Paradise Lake-Rolling Fork, Wilson Creek, Younger Creek-Rolling Fork, and Knob Creek-Rolling Fork watersheds is shown in Figure K.18-1.

Table K.18-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date(1)	WLA(2) (colonies *E. coli*/day)
KY0104043	Lebanon Junction STP	0.35	37.823611	-85.7425	8/31/2021	Q_{SWS}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.

(2)Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

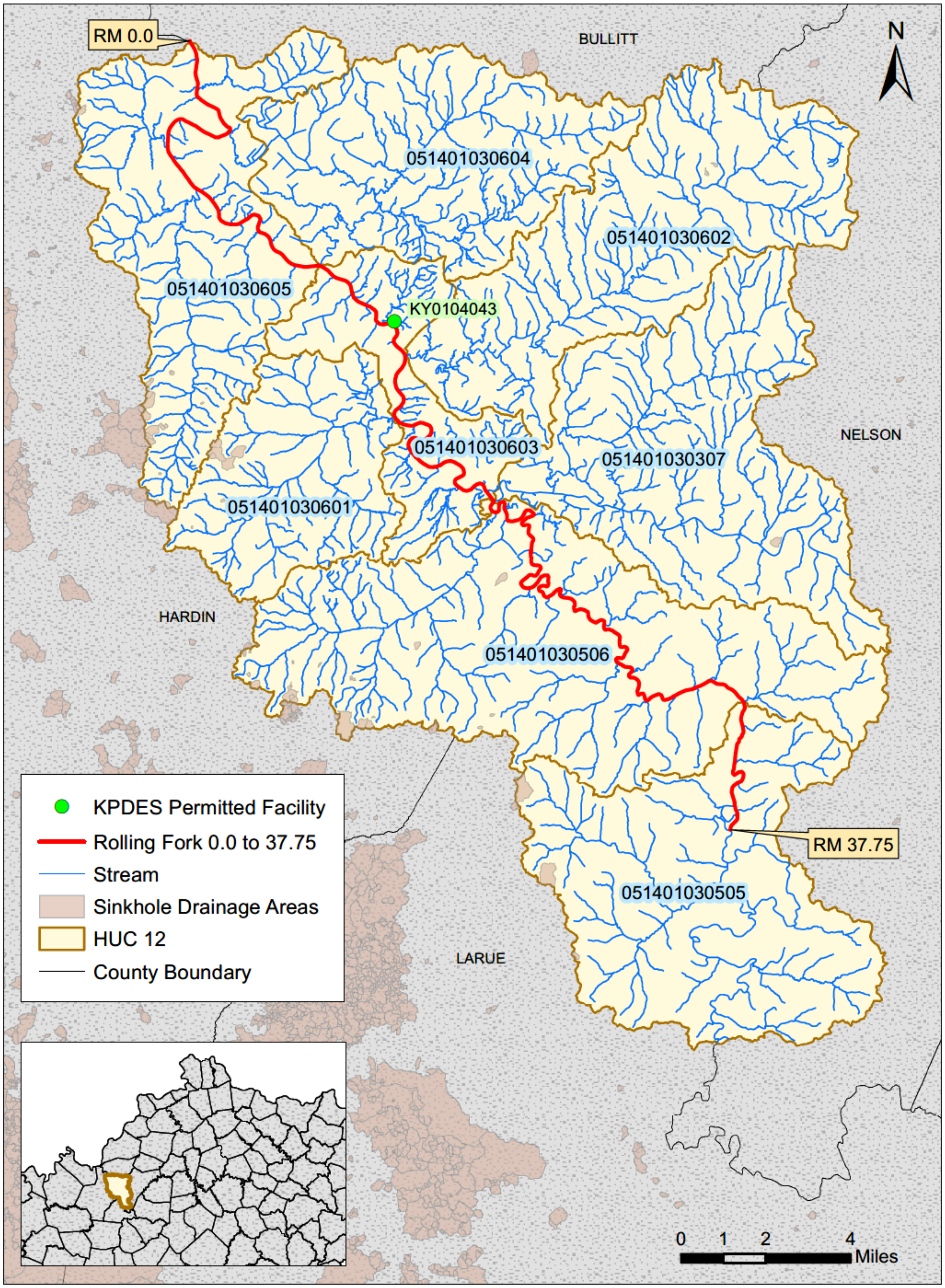


Figure K.18-1 Location of the KPDES-permitted Facility on Rolling Fork 0.0 to 37.75

Section K.19 Rolling Fork 37.75 to 40.7

Waterbody ID: KY502293_02

Receiving Water: Salt River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant: fecal coliform **TMDL Pollutant:** *E. coli*

HUC 12s: 051401030505

County: Larue, Nelson

The Division of Water (DOW) collected samples from station SRW017, located near river mile 37.8, since 2002. The station is sampled every five years during the PCR season as part of the DOW five-year rotating schedule for basin monitoring (see also Section 7.2.1, Kentucky Watershed Management Framework). The station was not sampled in 2009. The station typically has been sampled three to six times during a monitoring year. Table K.19-1 summarizes information about this sampling station; Table K.19-2 provides a summary of the data collected from this station.

Table K.19-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
SRW017	37.64938	-85.59773	Rolling Fork 37.75 to 40.7	37.8

Table K.19-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
SRW017	*E. coli*	9	77	>2,420	801
SRW017	fecal coliform	6	42	1,000	496

(1)The full data set for samples collected at SRW017 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Rolling Fork 37.75 to 40.7 are presented in Table K.19-3. As of April 2021, there are no KPDES-permitted discharges of bacteria into this segment of Rolling Fork.

Table K.19-3 Rolling Fork 37.75 to 40.7 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment LA(3)	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
Q_S×WQC×CF	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Knob Creek-Rolling Fork watershed is shown in Figure K.19-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Knob Creek-Rolling Fork watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

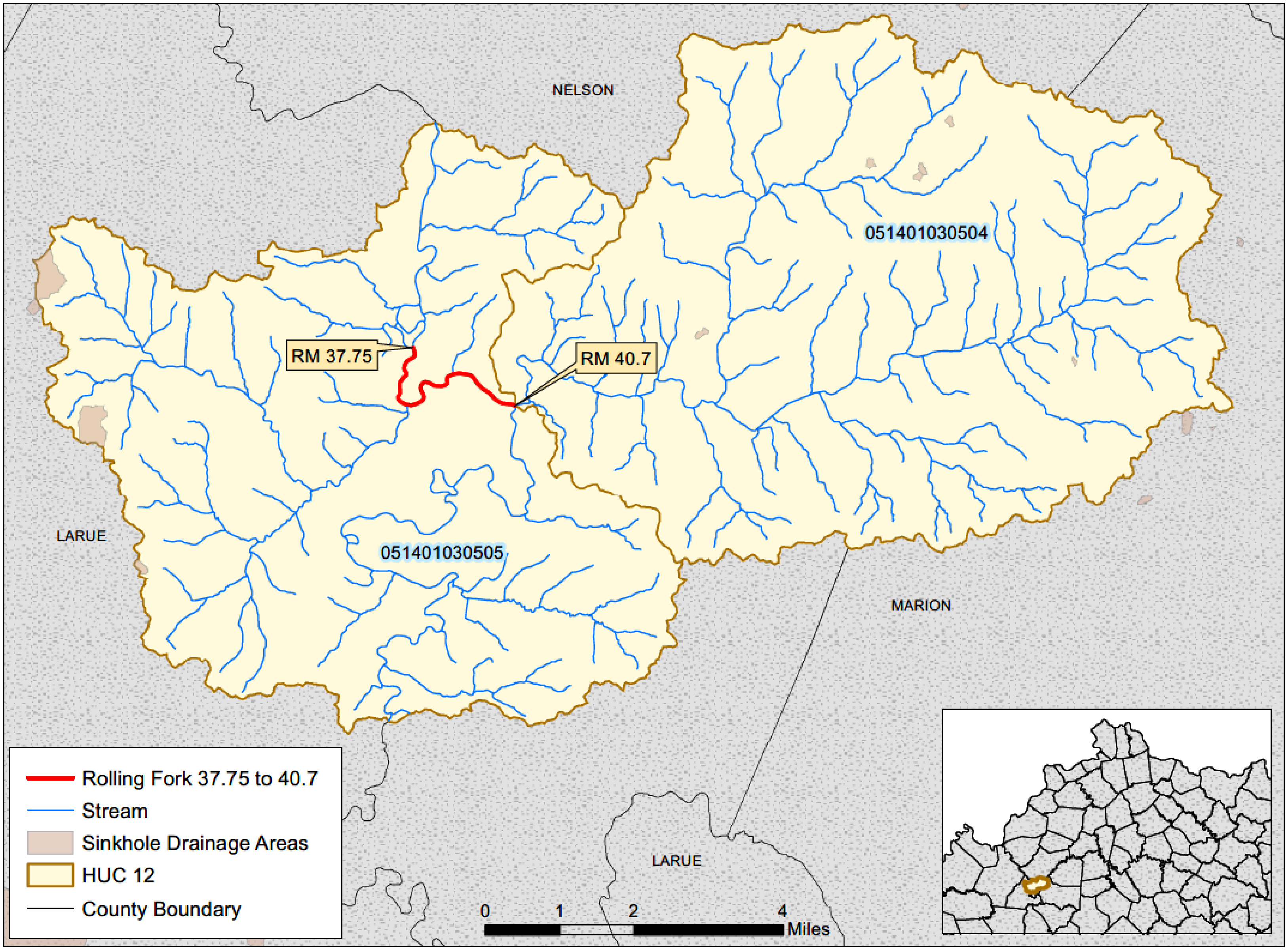


Figure K.19-1 Location of Rolling Fork 37.75 to 40.7

Section K.20 Salt Block Creek 0.0 to 3.35

Waterbody ID: KY502818_01

Receiving Water: Bee Lick Creek/Southern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021203

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032040, located near river mile 0.7, in 2011. The station was sampled one to six times during each month of the PCR season in 2002. Table K.20-1 summarizes information about this sampling station; Table K.20-2 provides a summary of the data collected from this station.

Table K.20-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032040	38.11428	-85.78699	Salt Block Creek 0.0 to 3.35	0.7

Table K.20-2 DOW Sample Data Summary[1]

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032040	*E. coli*	15	292	24,192	3,852

[1]The full data set for samples collected at DOW12032040 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
[2]The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Salt Block Creek 0.0 to 3.35 are presented in Table K.20-3.

Table K.20-3 Salt Block Creek 0.0 to 3.35 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment			Allocations for Tributary Loads to the Segment[7]	MOS[8]
	MS4-WLA[3]	SWS-WLA[4]	LA[5]		
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{SWS}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(5)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Salt Block Creek. Information about MS4 permits is summarized in Table K.20-4. One other facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Salt Block Creek. The directly discharging facility is a sanitary wastewater system (SWS). This SWS is an individual family residence with an on-site wastewater treatment system. This facility, the MS4 area, and the location of the segment within the Southern Ditch-Pond Creek watershed is shown in Figure K.20-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.20-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date[1]	WLA[2] (colonies *E. coli* /day)
KYS000001	MSD	N/A	N/A	N/A	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	N/A	N/A	N/A	09/30/2017	Q_{MS4}×WQC×CF
KYG400052	Residence	0.0005	38.091111	-85.791667	8/31/2023	Q_{SWS}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.

(2) Q_{MS4} is the flow in the segment due to an MS4 entity. Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

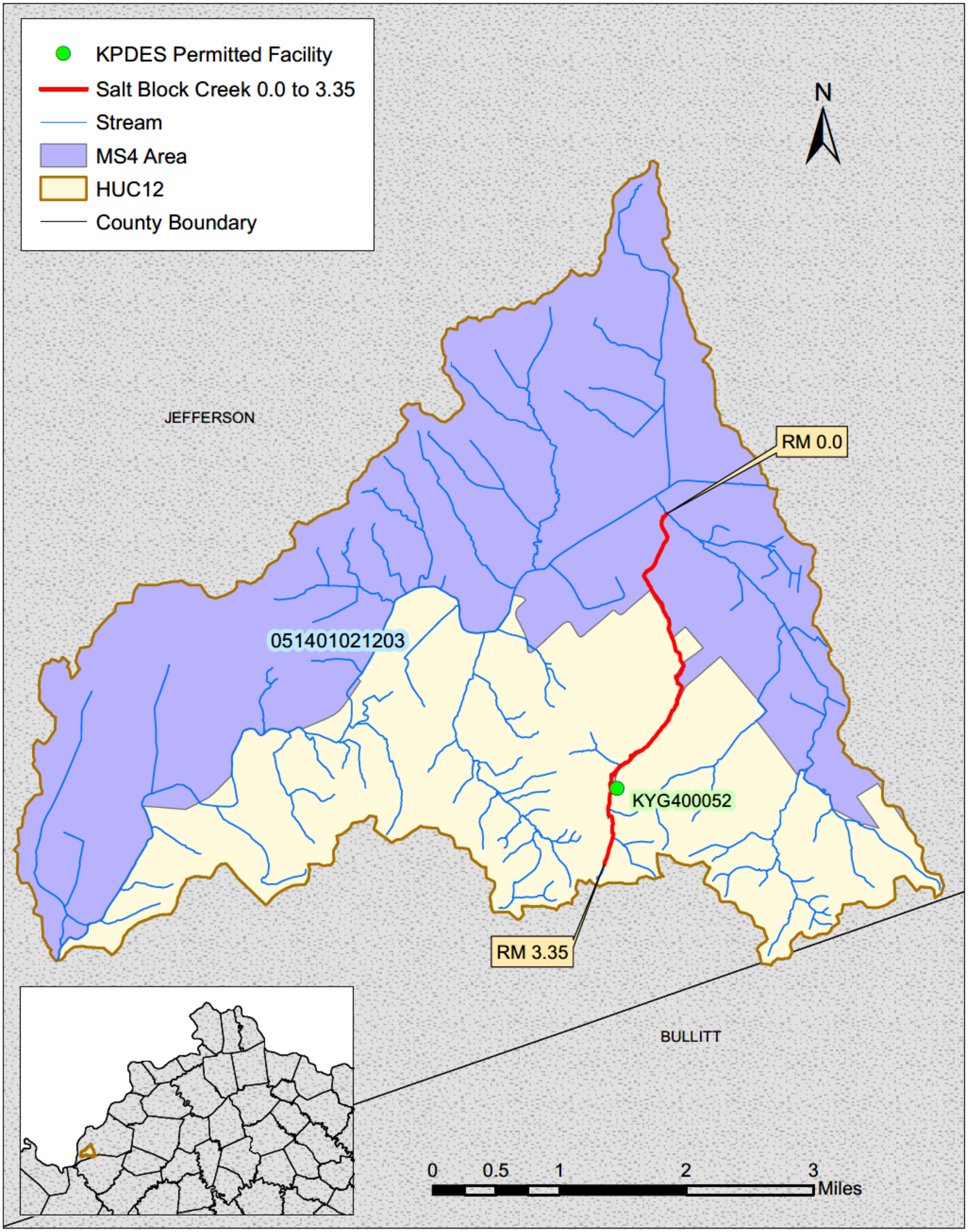


Figure K.20-1 Location of the KPDES-permitted Facility on Salt Block Creek 0.0 to 3.35

Section K.21 Salt River 11.7 to 25.9

Waterbody ID: KY502830_01

Receiving Water: Ohio River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051401021103, 051401021104

County: Bullitt

The Division of Water (DOW) has collected samples from station PRI029, located near river mile 23.3, since 1999. The station typically has been sampled two to seven times during the PCR season, although it was not sampled in 2005. Table K.21-1 summarizes information about this sampling station; Table K.21-2 provides a summary of the data collected from this station.

Table K.21-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI029	37.98517	-85.717199	Salt River 11.7 to 25.9	23.3

Table K.21-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI029	*E. coli*	56	7	>2,420	413
PRI029	fecal coliform	36	20	12,000	1,128

(1)The full data set for samples collected at PRI029 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Salt River 11.7 to 25.9 are presented in Table K.21-3.

Table K.21-3 Salt River 11.7 to 25.9 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment			Allocations for Upstream Loads to the Segment[6]	Allocations for Tributary Loads to the Segment[7]	MOS[8]
	MS4-WLA[3]	SWS-WLA[4]	LA[5]			
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{SWS} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(5)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(6)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(7)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(8)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)Although all sources are provided an allocation at the Water Quality Standard, not all sources discharge at this maximum allocation at the same time.

(c)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

Bullitt County Fiscal Court and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of the Salt River. Information about MS4 permits is summarized in Table K.21-4. Information concerning City of Shepherdsville's permit coverage can be found as a co-permittee of Bullitt County Fiscal Court's MS4 permit (Permit number KYG200039). One other facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Salt River. The directly discharging facility is a sanitary wastewater system (SWS). This facility is identified in Table K.21-4. The location of this facility and the MS4 area in the Woodland Creek-Salt River and Bullitt Lick Creek-Salt River watersheds is shown in Figure K.21-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.21-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYG200039	Bullitt County Fiscal Court	N/A	N/A	N/A	4/30/2023	Q_{MS4}×WQC×CF
KYG200039	Bullitt County Fiscal Court (SHEPHERDSVILLE)	N/A	N/A	N/A	4/30/2023	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	N/A	N/A	N/A	09/30/2017	Q_{MS4}×WQC×CF
KY0027359	Shepherdsville STP	5.034	37.985556	-85.72	9/30/2023	Q_{SWS}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2) Q_{MS4} is the flow in the segment due to an MS4 entity. Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

The location of the segment within the Woodland Creek-Salt River and Bullitt Lick Creek-Salt River watersheds is shown in Figure K.21-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Woodland Creek-Salt River and Bullitt Lick Creek-Salt River watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

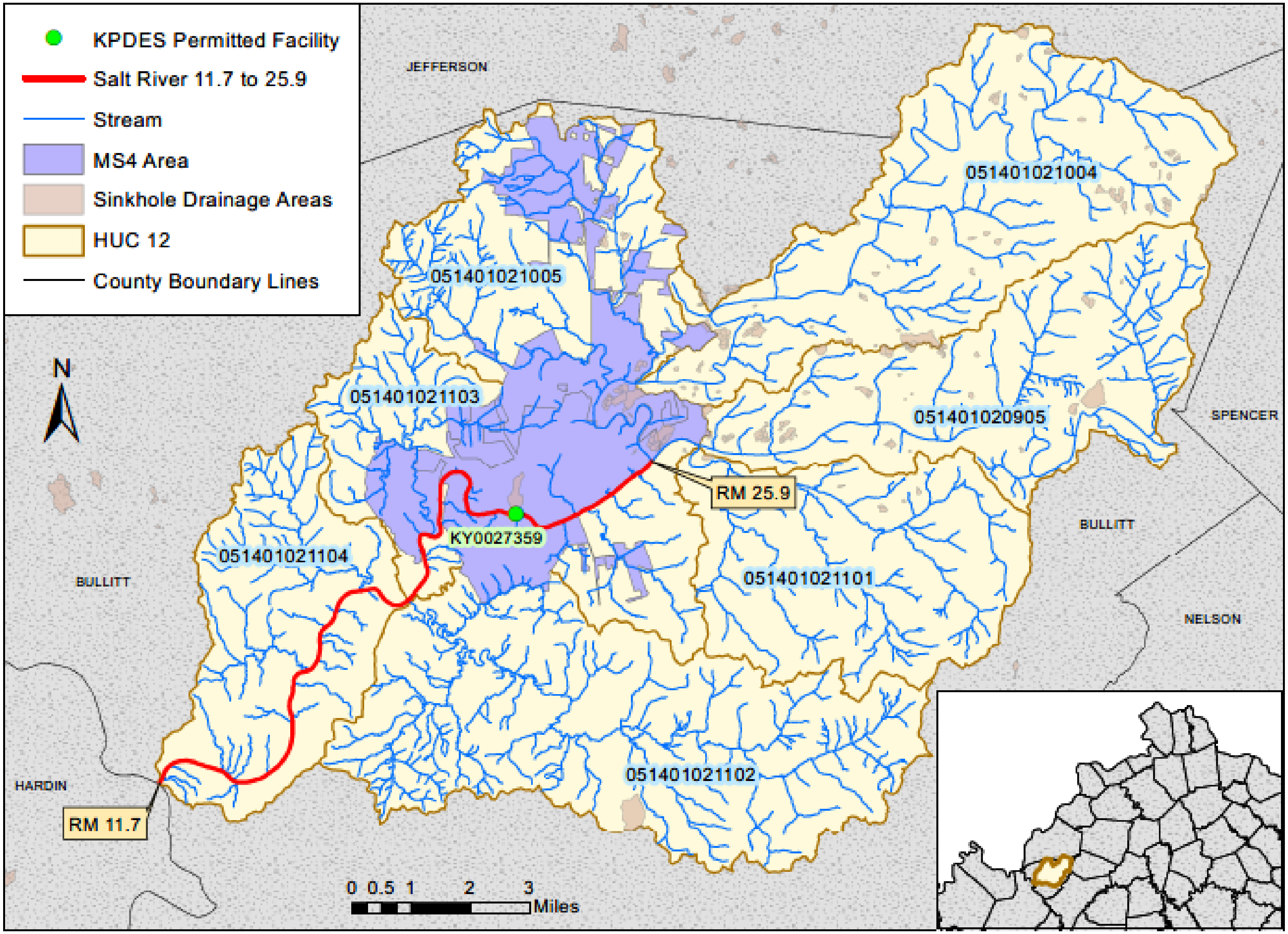


Figure K.21-1 Location of KPDES-permitted Facility on Salt River 11.7 to 25.9

Section K.22 Salt River 77.8 to 88.9

Waterbody ID: KY502830_05

Receiving Water: Ohio River

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051401020201, 051401020202

County: Anderson

The Division of Water (DOW) has collected samples from station PRI052, located near river mile 82.8, since 1999. The station typically has been sampled one to eleven times during the PCR season, although it was not sampled in 2005. Table K.22-1 summarizes information about this sampling station; Table K.22-2 provides a summary of the data collected from this station.

Table K.22-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
PRI052	38.00232	-85.060223	Salt River 77.8 to 88.9	82.8

Table K.22-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
PRI052	*E. coli*	60	2	20,000	896
PRI052	fecal coliform	42	8	6,800	471

(1)The full data set for samples collected at PRI052 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Salt River 77.8 to 88.9 are presented in Table K.22-3. As of April 2021, there are no KPDES-permitted discharges of bacteria into this segment of Salt River. The location within the Willow Creek-Salt River and Timber Creek-Salt River watersheds is shown in Figure K.22-1.

Table K.22-3 Salt River 77.8 to 88.9 *E. Coli* TMDL Allocations(1)

TMDL(2)	Allocations for Direct Loads to the Segment	Allocations for Upstream Loads to the Segment(4)	Allocations for Tributary Loads to the Segment(5)	MOS(6)
	LA(3)			
$Q_S \times WQC \times CF$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Upstream} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(4)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

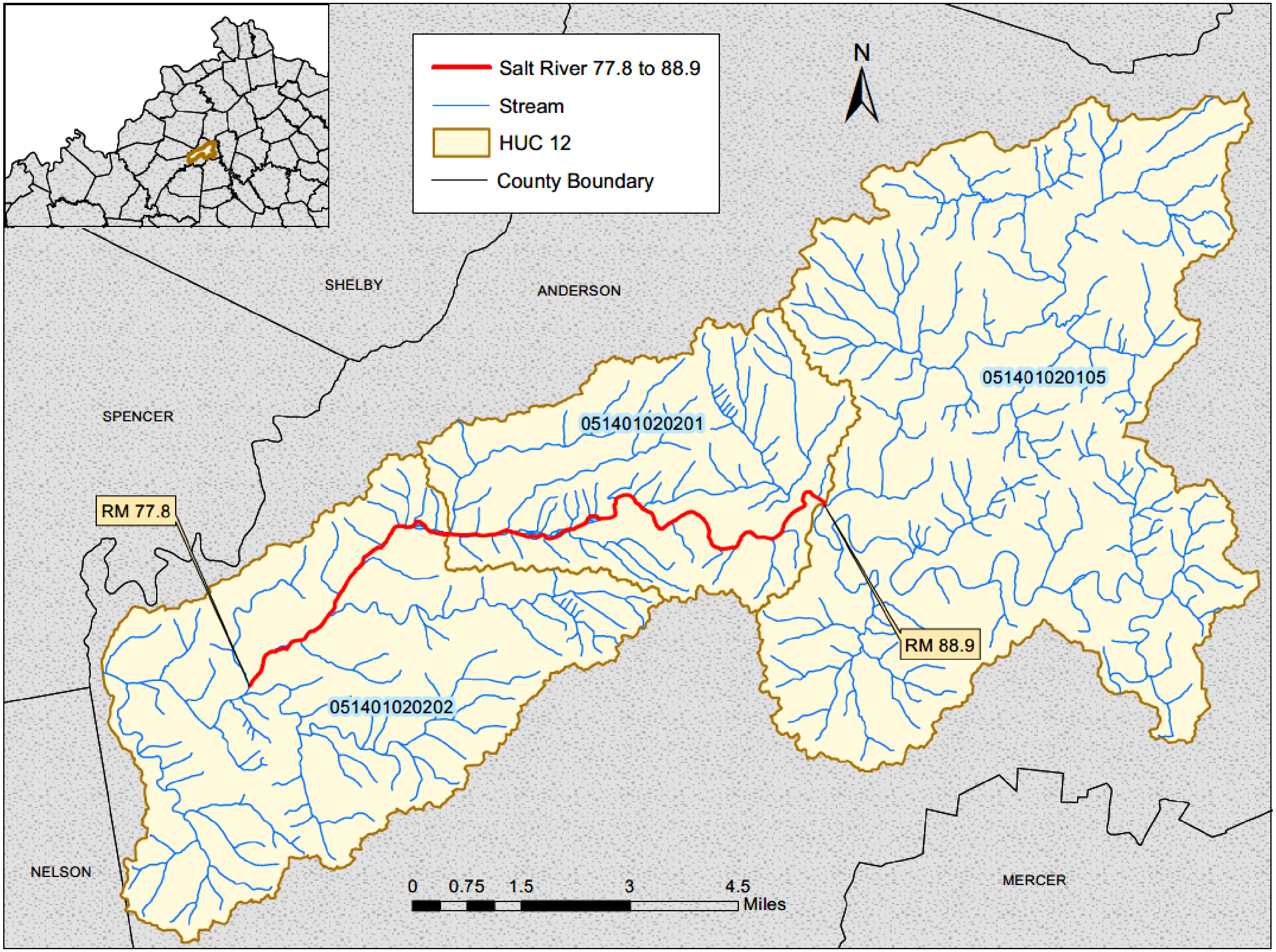


Figure K.22-1 Location of Salt River 77.8 to 88.9

Some karst features such as sinkholes and springs exist in the Hammond Creek-Salt River watershed (HUC 051401020105) and in neighboring watersheds that are part of the Kentucky River basin (see Figure K.22-2). The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. Dye tracing studies in the region did not identify any areas outside the Hammond Creek-Salt River HUC boundary that are contributing drainage to the segment. For more detailed information about karst geology, see Section 3.2, Karst.

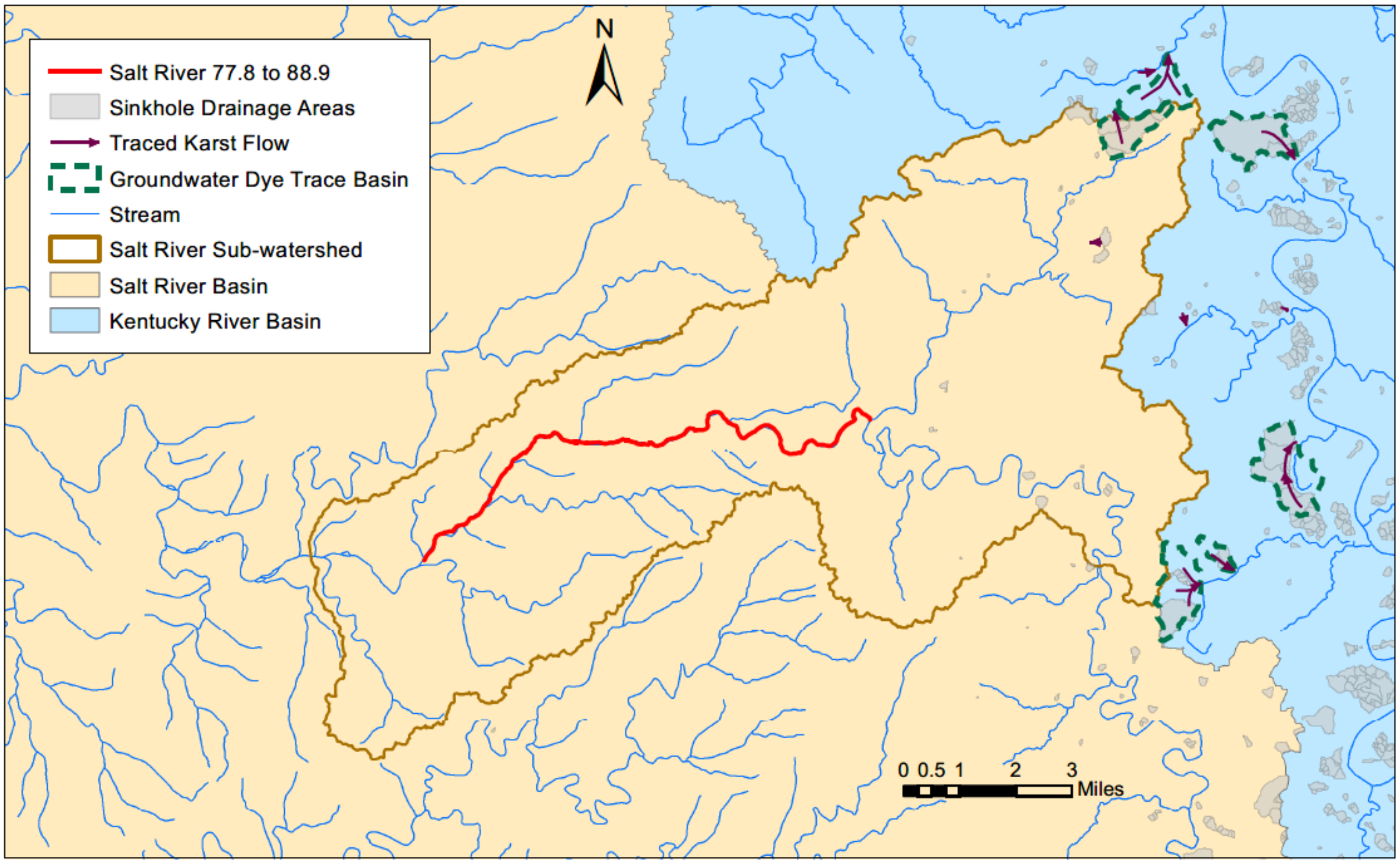


Figure K.22-2 Karst Influence in the Region of Salt River 77.8 to 88.9

Section K.23 Southern Ditch 0.0 to 5.75

Waterbody ID: KY503998_01

Receiving Water: Pond Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12s: 051401021202, 051401021203

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032002, located near river mile 0.4, in 2011. The station was sampled two to five times during each month of the PCR season. Table K.23-1 summarizes information about this sampling station; Table K.23-2 provides a summary of the data collected from this station.

Table K.23-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032002	38.11995	-85.79578	Southern Ditch 0.0 to 5.75	0.4

Table K.23-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032002	*E. coli*	20	29	29,090	2,822

(1)The full data set for samples collected at DOW12032002 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Southern Ditch 0.0 to 5.75 are presented in Table K.23-3.

Table K.23-3 Southern Ditch 0.0 to 5.75 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment		Allocations for Upstream Loads to the Segment[(5)]	Allocations for Tributary Loads to the Segment[(6)]	MOS[(7)]
	MS4-WLA[(3)]	LA[(4)]			
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Upstream}$×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Upstream}$ is the flow contribution (ft^3/s) from upstream of the segment. This load includes both WLA and LA sources upstream of the impaired segment.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Upstream and tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Southern Ditch-Pond Creek and Headwaters Southern Ditch watersheds is shown in Figure K.23-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Southern Ditch-Pond Creek and Headwaters Southern Ditch watersheds. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Southern Ditch. Information about MS4 permits is summarized in Table K.23-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment.
The location of the MS4 area in the Southern Ditch-Pond Creek and Headwaters Southern Ditch watersheds is shown in Figure K.23-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.23-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[(1)]	WLA[(2)] (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

[(1)]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[(2)]Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

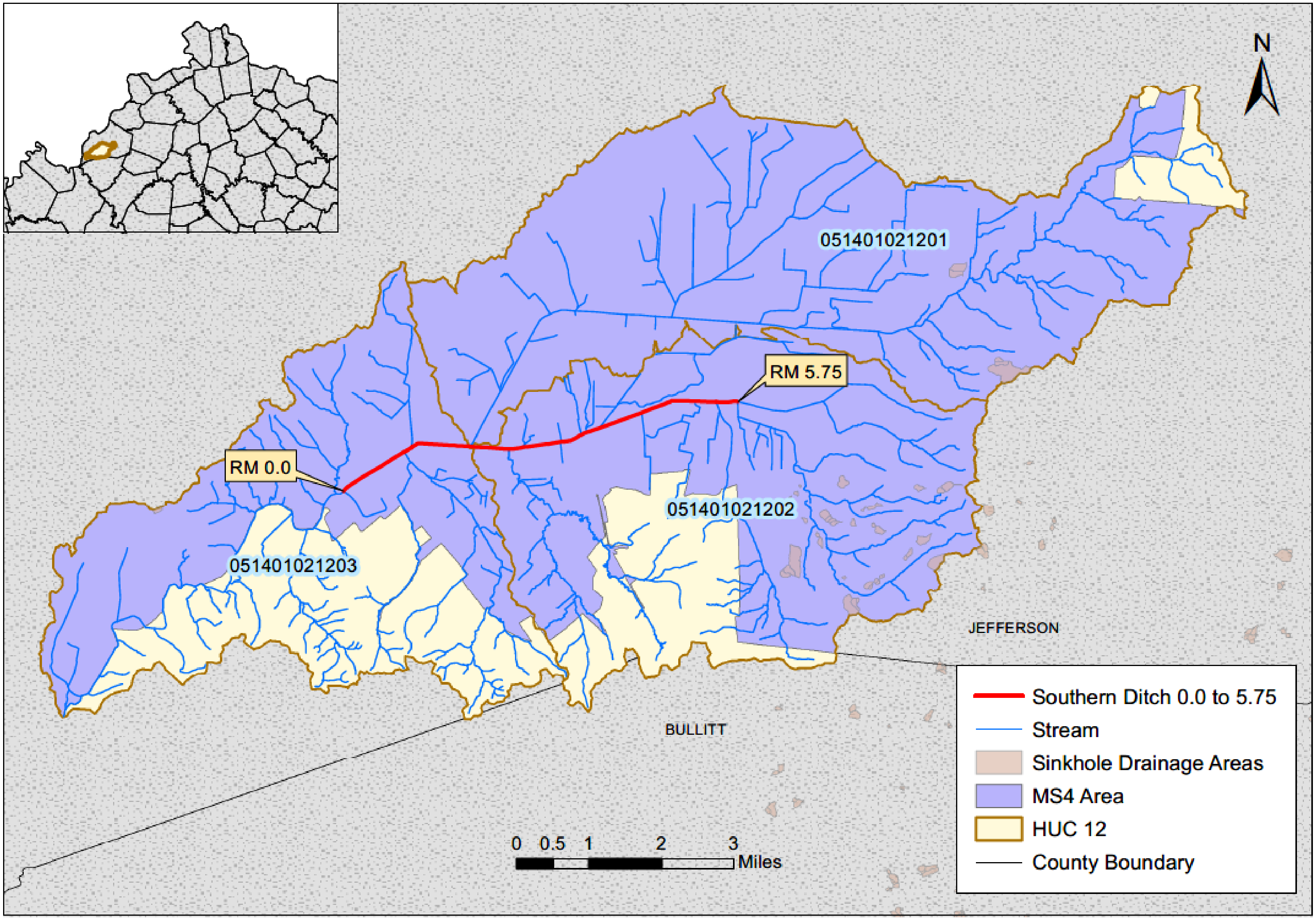


Figure K.23-1 Location of Southern Ditch 0.0 to 5.75

Section K.24 Southern Ditch 5.75 to 9.0

Waterbody ID: KY503998_02

Receiving Water: Pond Creek

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021202

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032045 located near river mile 6.0, in 2011. The station was sampled one to five times during each month of the PCR season. Table K.24-1 summarizes information about this sampling station; Table K.24-2 provides a summary of the data collected from this station.

Table K.24-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032045	38.13379	-85.69724	Southern Ditch 5.75 to 9.0	6.0

Table K.24-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032045	*E. coli*	12	31	5,794	1,530

(1)The full data set for samples collected at DOW12032045 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Southern Ditch 5.75 to 9.0 are presented in Table K.24-3.

Table K.24-3 Southern Ditch 5.75 to 9.0 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment[5]	MOS[6]
	MS4-WLA[3]	LA[4]		
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

[4]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Southern Ditch watershed is shown in Figure K.24-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Southern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Southern Ditch. Information about MS4 permits is summarized in Table K.24-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment.
The location of the MS4 area in the Headwaters Southern Ditch watershed is shown in Figure K.24-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.24-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[1]	WLA[2] (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

[1]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[2]Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

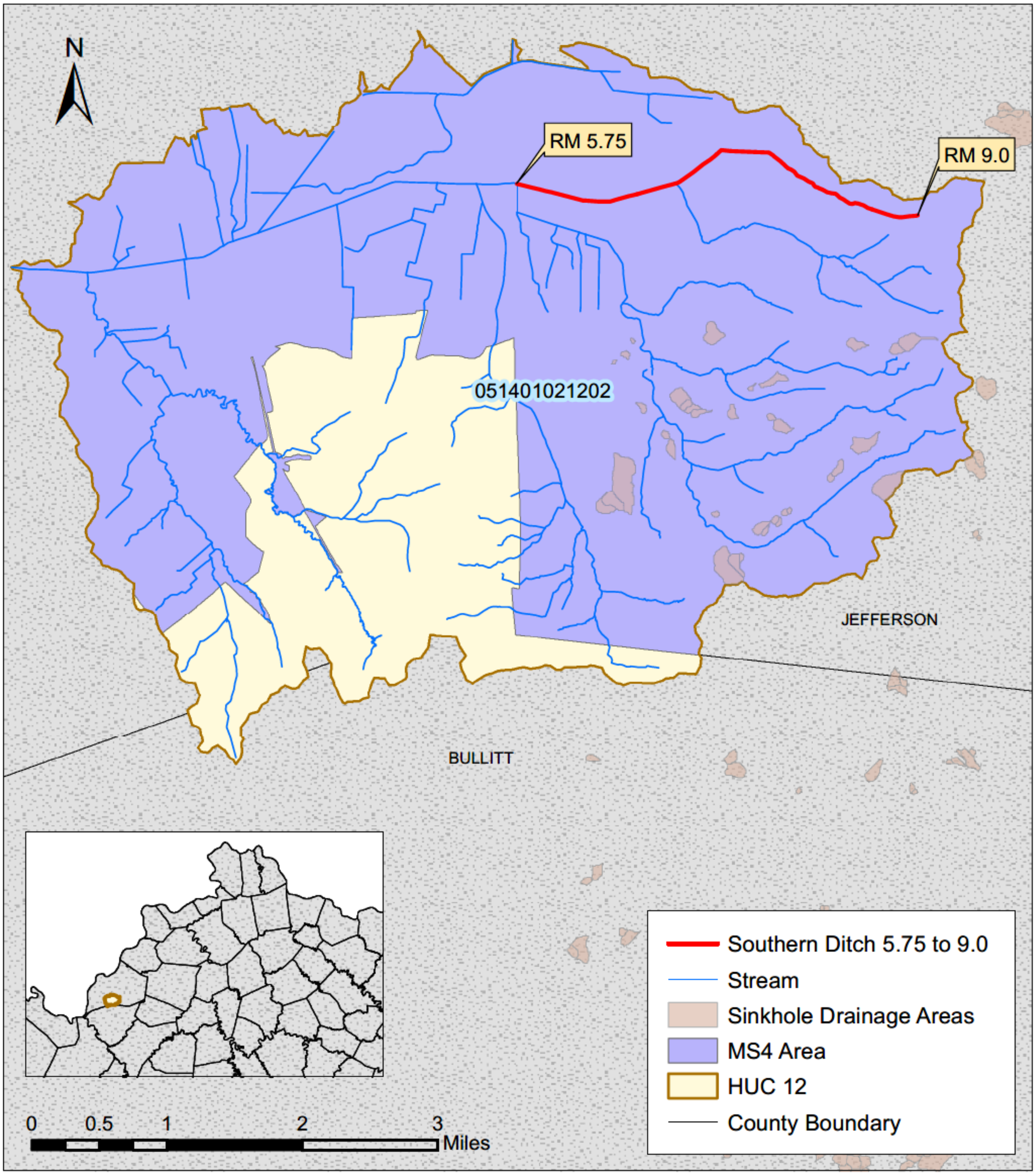


Figure K.24-1 Location of Southern Ditch 5.75 to 9.0

Section K.25 UT of Blue Spring Ditch 0.0 to 2.6

Waterbody ID: KY504133-1.85_01

Receiving Water: Blue Spring Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021201

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032046, located near river mile 0.3, in 2011. The station was sampled ten times during the PCR season. Table K.25-1 summarizes information about this sampling station; Table K.25-2 provides a summary of the data collected from this station.

Table K.25-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032046	38.16082	-85.66549	UT of Blue Spring Ditch 0.0 to 2.6	0.3

Table K.25-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032046	*E. coli*	10	52	6,867	1,550

(1)The full data set for samples collected at DOW12032046 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for UT of Blue Spring Ditch 0.0 to 2.6 are presented in Table K.25-3.

Table K.25-3 UT of Blue Spring Ditch 0.0 to 2.6 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment[5]	MOS[6]
	MS4-WLA[3]	LA[4]		
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

[1]All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

[2]Q_S is the flow (ft^3/s) in the segment.

[3]Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

[4]Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

[5]$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

[6]The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Northern Ditch watershed is shown in Figure K.25-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Northern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of UT of Blue Spring Ditch. Information about MS4 permits is summarized in Table K.25-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area in the Northern Ditch watershed is shown in Figure K.25-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.25-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date[1]	WLA[2] (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

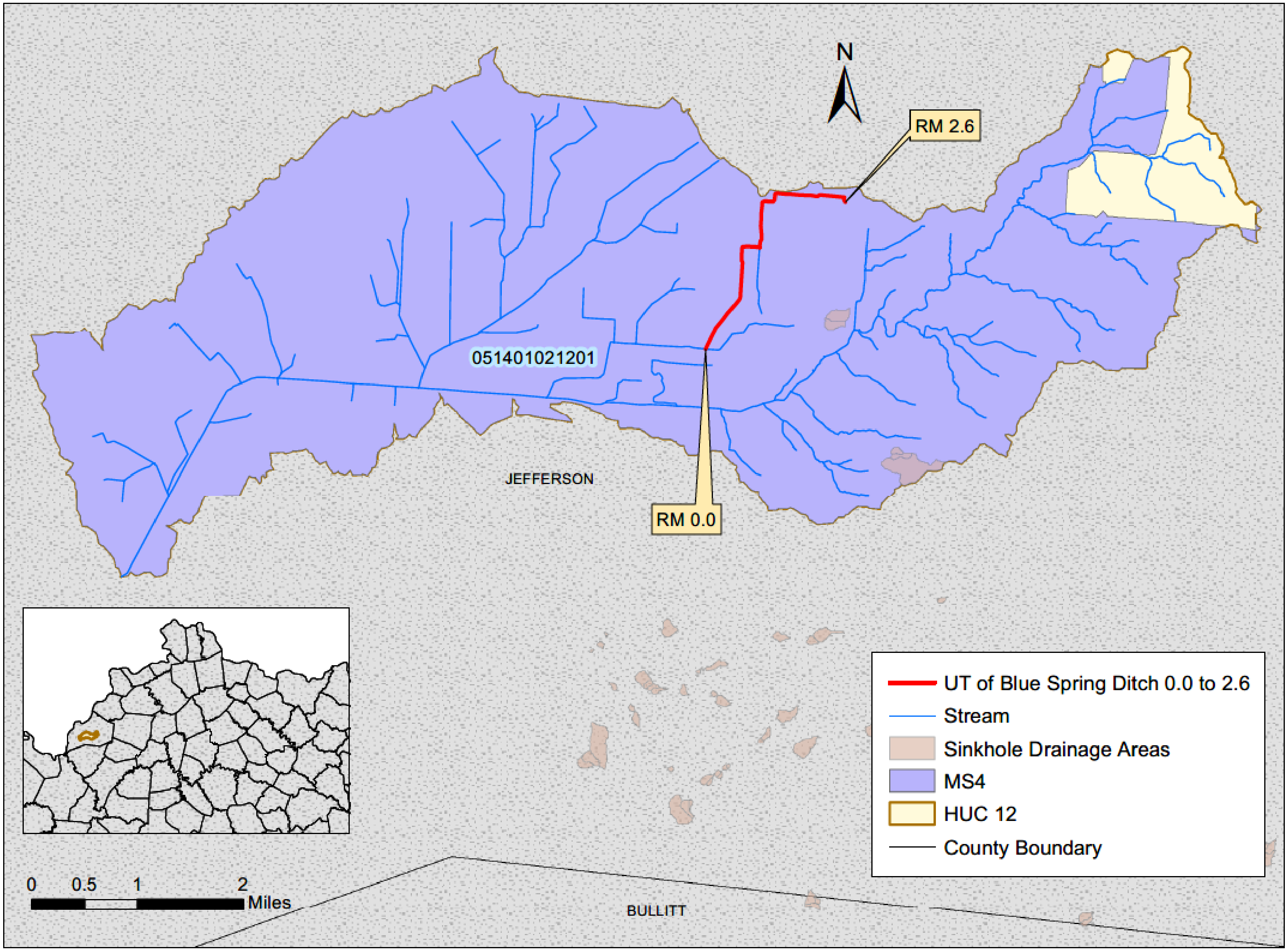


Figure K.25-1 Location of UT of Blue Spring Ditch 0.0 to 2.6

Section K.26 Wetwoods Creek (Slop Ditch) 2.2 to 4.25

Waterbody ID: KY503711_01

Receiving Water: UT of Southern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021202

County: Jefferson

The Division of Water (DOW) collected samples from two stations on this segment in 2010. The station, DOW12032036, was sampled nine times and the station, DOW12032037, was sampled thirteen times during the PCR season. Table K.26-1 summarizes information about this sampling station; Table K.26-2 provides a summary of the data collected from this station.

Table K.26-1 DOW Sample Site Locations

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032036	38.14277	-85.68355	Wetwoods Creek (Slop Ditch) 2.2 to 4.25	0.1
DOW12032037	38.14783	-85.69997	Wetwoods Creek (Slop Ditch) 2.2 to 4.25	1.2

Table K.26-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria[2]	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032036	*E. coli*	9	134	>2,420	834
DOW12032037	*E. coli*	13	213	>2,420	1,185

(1)The full data set for samples collected at DOW12032036 and DOW12032037 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Wetwoods Creek (Slop Ditch) 2.2 to 4.25 are presented in Table K.26-3.

Table K.26-3 Wetwoods Creek (Slop Ditch) 2.2 to 4.25 *E. Coli* TMDL Allocations[1]

TMDL[2]	Allocations for Direct Loads to the Segment		Allocations for Tributary Loads to the Segment[5]	MOS[6]
	MS4-WLA[3]	LA[4]		
Q_S×WQC×CF	∑(Q_{MS4}×WQC×CF)	∑(Q_{LA}×WQC×CF)	∑($Q_{Tributary}$×WQC×CF)	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(5)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(6)The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Southern Ditch watershed is shown in Figure K.26-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Southern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Wetwoods Creek (Slop Ditch). Information about MS4 permits is summarized in Table K.26-4. There are no other Kentucky Pollutant Discharge Elimination System (KPDES) permitted discharges of bacteria into the segment. The location of the MS4 area in the Headwaters Southern Ditch watershed is shown in Figure K.26-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.26-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Permit Expiration Date(1)	WLA(2) (colonies *E. coli* /day)
KYS000001	MSD	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	09/30/2017	Q_{MS4}×WQC×CF

(1)Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
(2)Q_{MS4} is the flow in the segment due to an MS4 entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

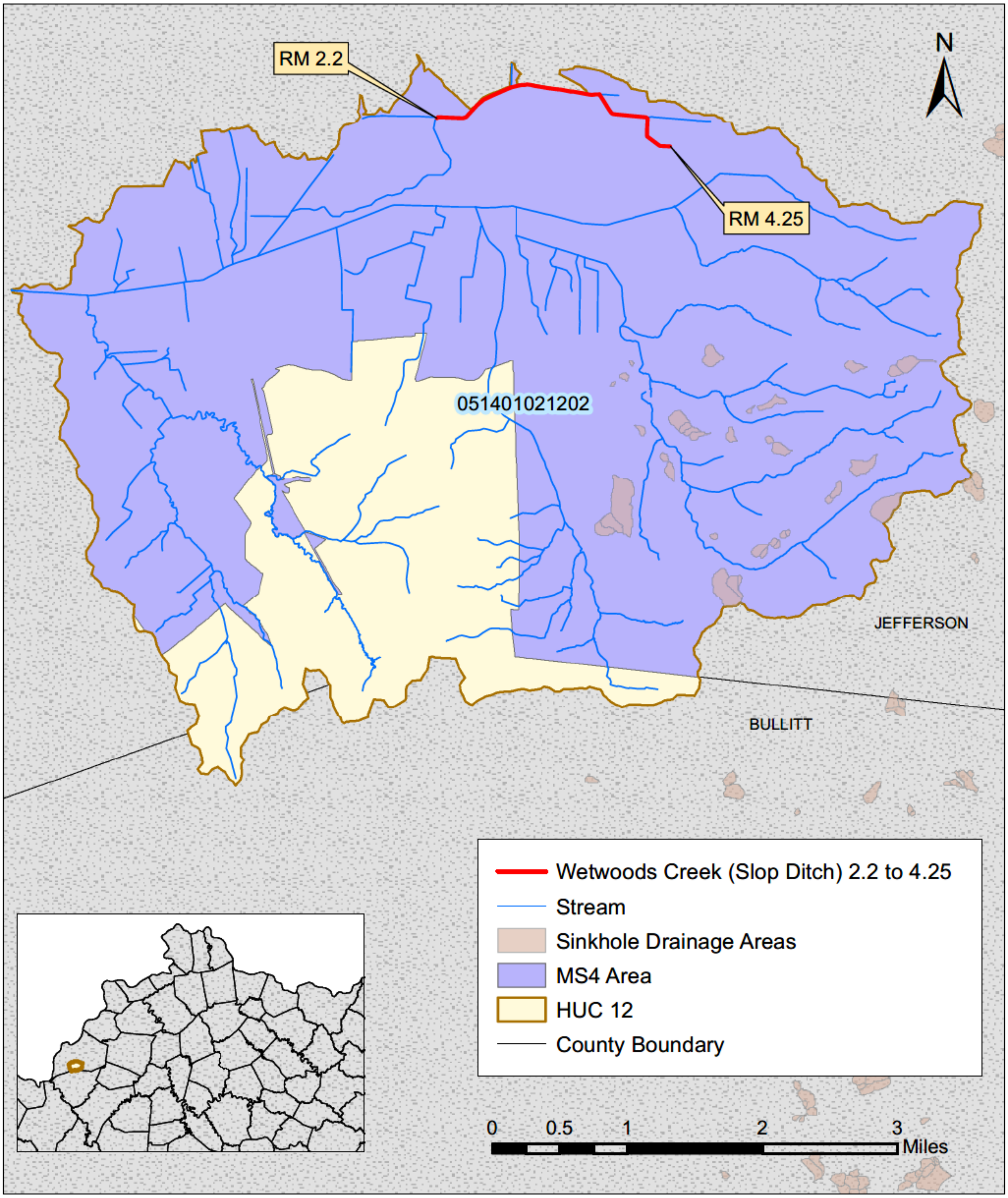


Figure K.26-1 Location of Wetwoods Creek (Slop Ditch) 2.2 to 4.25

Section K.27 Wilson Creek 0.0 to 5.6

Waterbody ID: KY506904_01

Receiving Water: Southern Ditch

Impaired Use: PCR

Support Status: nonsupport

Listed Pollutant/TMDL Pollutant: *E. coli*

HUC 12: 051401021202

County: Jefferson

The Division of Water (DOW) collected samples from station DOW12032005, located near river mile 0.05, in 2011. The station was sampled two to four times during each month of the PCR season. Table K.27-1 summarizes information about this sampling station; Table K.27-2 provides a summary of the data collected from this station.

Table K.27-1 DOW Sample Site Location

Station Name	Latitude	Longitude	Stream Segment	River Mile
DOW12032005	38.1247	-85.7597	Wilson Creek 0.0 to 5.6	0.05

Table K.27-2 DOW Sample Data Summary(1)

Station Name	Indicator Bacteria(2)	Number of Observations	Minimum (colonies/ 100 ml)	Maximum (colonies/ 100 ml)	Average (colonies/ 100 ml)
DOW12032005	*E. coli*	16	96	17,329	2,910

(1)The full data set for samples collected at DOW12032005 may be obtained by submitting a request of records under the Kentucky Open Records Act (KORA) to EEC.KORA@ky.gov.
(2)The numeric water quality criteria (WQC) for indicator bacteria can be found in Section 1.3 of this document.

The TMDL allocations for Wilson Creek 0.0 to 5.6 are presented in Table K.27-3.

Table K.27-3 Wilson Creek 0.0 to 5.6 *E. Coli* TMDL Allocations[(1)]

TMDL[(2)]	Allocations for Direct Loads to the Segment			Allocations for Tributary Loads to the Segment[(6)]	MOS[(7)]
	MS4-WLA[(3)]	SWS-WLA([4])	LA[(5)]		
$Q_S \times WQC \times CF$	$\sum(Q_{MS4} \times WQC \times CF)$	$\sum(Q_{SWS} \times WQC \times CF)$	$\sum(Q_{LA} \times WQC \times CF)$	$\sum(Q_{Tributary} \times WQC \times CF)$	Implicit

(1)All loads are colonies/day of *E. coli*. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day). The symbol "∑" indicates that the total allocation is the sum of all the individual allowable loads.

(2)Q_S is the flow (ft^3/s) in the segment.

(3)Q_{MS4} is the flow (ft^3/s) in the segment due to an MS4 entity. The MS4-WLA is not an end-of-pipe limit. The MS4-WLA is an aggregate of the in-stream contribution of all MS4 outfalls within the MS4 jurisdiction, not the storm water contribution from individual MS4 outfalls. The MS4-WLA will be addressed through the MS4 permit and implemented through the Storm Water Quality Management Plan (SWQMP). An MS4 permittee is compliant with its MS4-WLA if it is compliant with its KPDES permit.

(4)Q_{SWS} is the flow (ft^3/s) in the segment due to a SWS entity. New or expanded SWS sources will be allowed to discharge to the segment contingent upon them meeting the PCR bacterial WQCs found in 401 KAR 10:031. SWS-WLAs will be translated into KPDES permit limits as an *E. coli* effluent gross limit of 130 colonies/100 ml as a monthly average (geometric mean) and 240 colonies/100 ml as a maximum weekly average (geometric mean).

(5)Q_{LA} is the flow (ft^3/s) in the segment due to a LA source.

(6)$Q_{Tributary}$ is the flow contribution (ft^3/s) from a tributary to the segment. This load includes both WLA and LA sources on tributaries to the impaired segment.

(7)The following assumptions provide an implicit MOS:

(a)Tributary bacterial concentrations are at the maximum allowable limit; there is no dilution capacity from these areas.

(b)There is no bacteria die-off; in reality bacteria concentrations diminish downstream from their source. Thus, bacteria loads to the upper portion of a segment will diminish prior to reaching the lower portion of the segment.

The location of the segment within the Headwaters Southern Ditch watershed is shown in Figure K.27-1. Some karst features such as sinkholes exist in this watershed. The sink features may capture surface drainage and channel it underground to resurface later at one or more springs. These discharging springs may occur outside the watershed where the drainage originated. However, unless karst dye trace studies indicate otherwise, groundwater catchment is presumed to correspond to the topographic watershed boundaries of surface drainage. No dye tracing information is available from the area of the Headwaters Southern Ditch watershed. For more detailed information about karst geology, see Section 3.2, Karst, of the Core TMDL.

MSD and the Kentucky Department of Transportation have Municipal Separate Storm Sewer System (MS4) permit coverage for this segment of Wilson Creek. Information about MS4 permits is summarized in Table K.27-4. One other facility permitted under the Kentucky Pollutant Discharge Elimination System (KPDES) discharges treated effluent directly into this segment of Wilson Creek. This directly discharging facility is an individual family residence with an on-site wastewater treatment system. The facility and location of the MS4 area in the Headwaters Southern Ditch watershed is shown in Figure K.27-1. The MS4 area boundaries are from DOW information last updated in 2014.

Table K.27-4 Summary of Active KPDES-permitted Sources as of April 2021

KPDES Permit Number	Facility Name	Design Flow (MGD)	Outfall Latitude	Outfall Longitude	Permit Expiration Date[1]	WLA[2] (colonies *E. coli* /day)
KYS000001	MSD	N/A	N/A	N/A	01/31/2022	Q_{MS4}×WQC×CF
KYS000003	Kentucky Department of Transportation	N/A	N/A	N/A	09/30/2017	Q_{MS4}×WQC×CF
KYG402753	Residence	0.0005	38.0932	-85.72629	8/31/2023	Q_{SWS}×WQC×CF

[1]Permit expiration dates identify the permits in effect when the draft TMDL was written, including any permits that may be expired (but not terminated) or in administrative continuance. Permits issued after the approval of this TMDL will address the TMDL.
[2]Q_{MS4} is the flow in the segment due to an MS4 entity. Q_{SWS} is the flow in the segment due to a SWS entity. The recreational use bacterial WQCs are found in 401 KAR 10:031. CF is the conversion factor (24,465,758.4 s-ml/ft^3-day) to change the product of bacterial concentration (colonies/100 ml) and flow (ft^3/s) into a load (colonies/day).

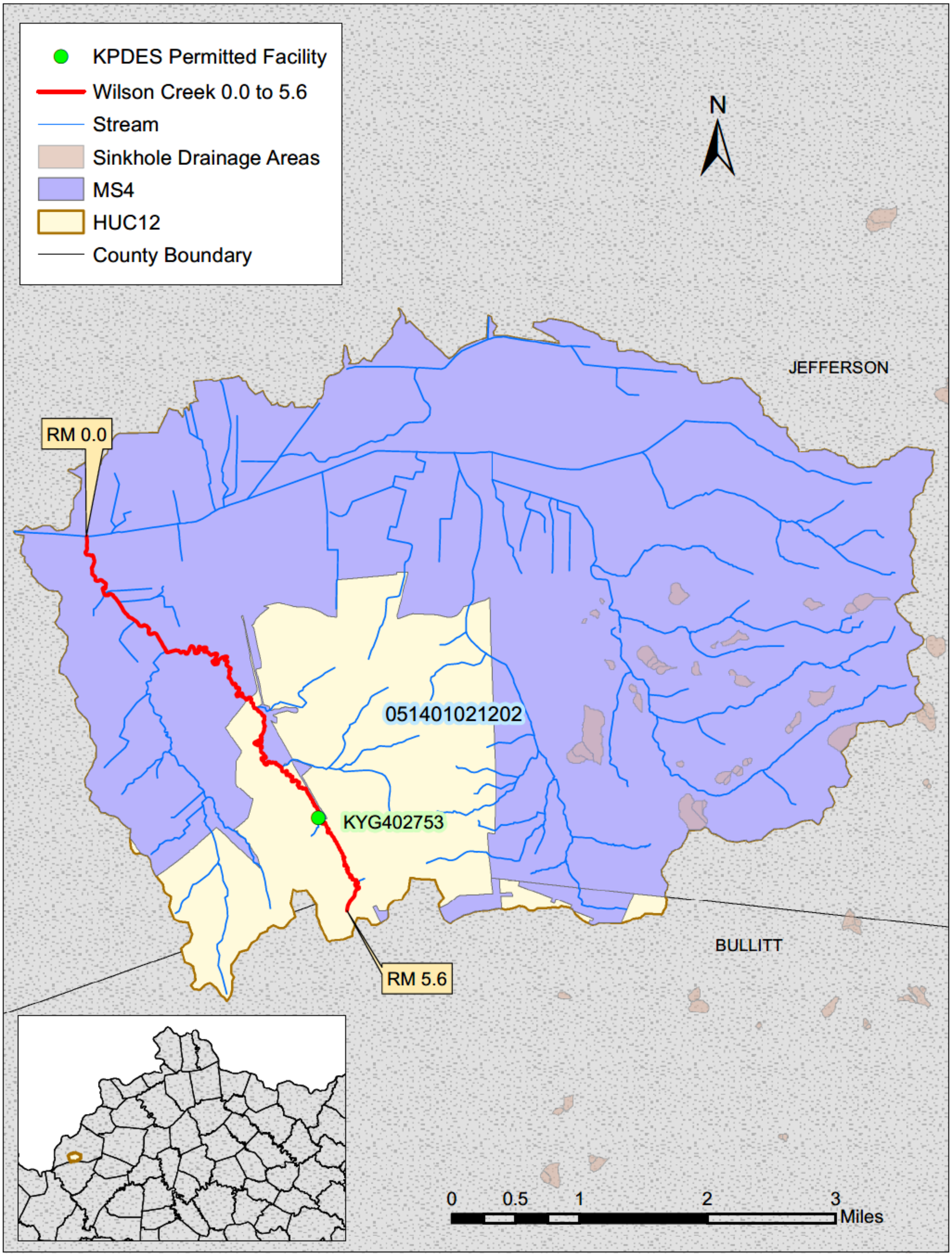


Figure K.27-1 Location of the KPDES-permitted Facility on Wilson Creek 0.0 to 5.6