Total Maximum Daily Load Synopsis

State: Kentucky
Major River Basin: Tennessee
USGS HUC8#: 06040006
Counties: Calloway, Graves, Marshall, and McCracken
Pollutants of Concern: *E. coli*

The Clarks River, United States Geological Survey 8 digit HUC (Hydrologic Unit Code) 06040006, is located in the Jackson Purchase area of western Kentucky (Figure S1). It encompasses parts of four counties (McCracken, Graves, Marshall and Calloway) and covers 546 square miles of land. The southern (upper) most reaches of the basin extend into northern Henry County, Tennessee.

The Kentucky Division of Water (KDOW) contracted with Murray State University's Hancock Biological Station and Center for Reservoir Research (MSU) to monitor for Escherichia coli (*E. coli*, a pathogen indicator) in the Clarks River Watershed. The Clarks River was intensively sampled in the 2005 primary contact recreation season (May–October) for *E. coli*. Additional sampling in 2006 by MSU at Clayton Creek and also by a 319(h) grant to the Jackson Purchase RC&D enhanced efforts in the upper Clarks River watershed. This additional funding made available several more data points for use in the TMDL. This document contains the monitoring results and describes TMDL development for pathogen indicators in the Clarks River watershed as required under Section 303(d) of the Clean Water Act. Table S.1 lists the pathogen indicator impaired segments for which TMDLs are developed in this document.

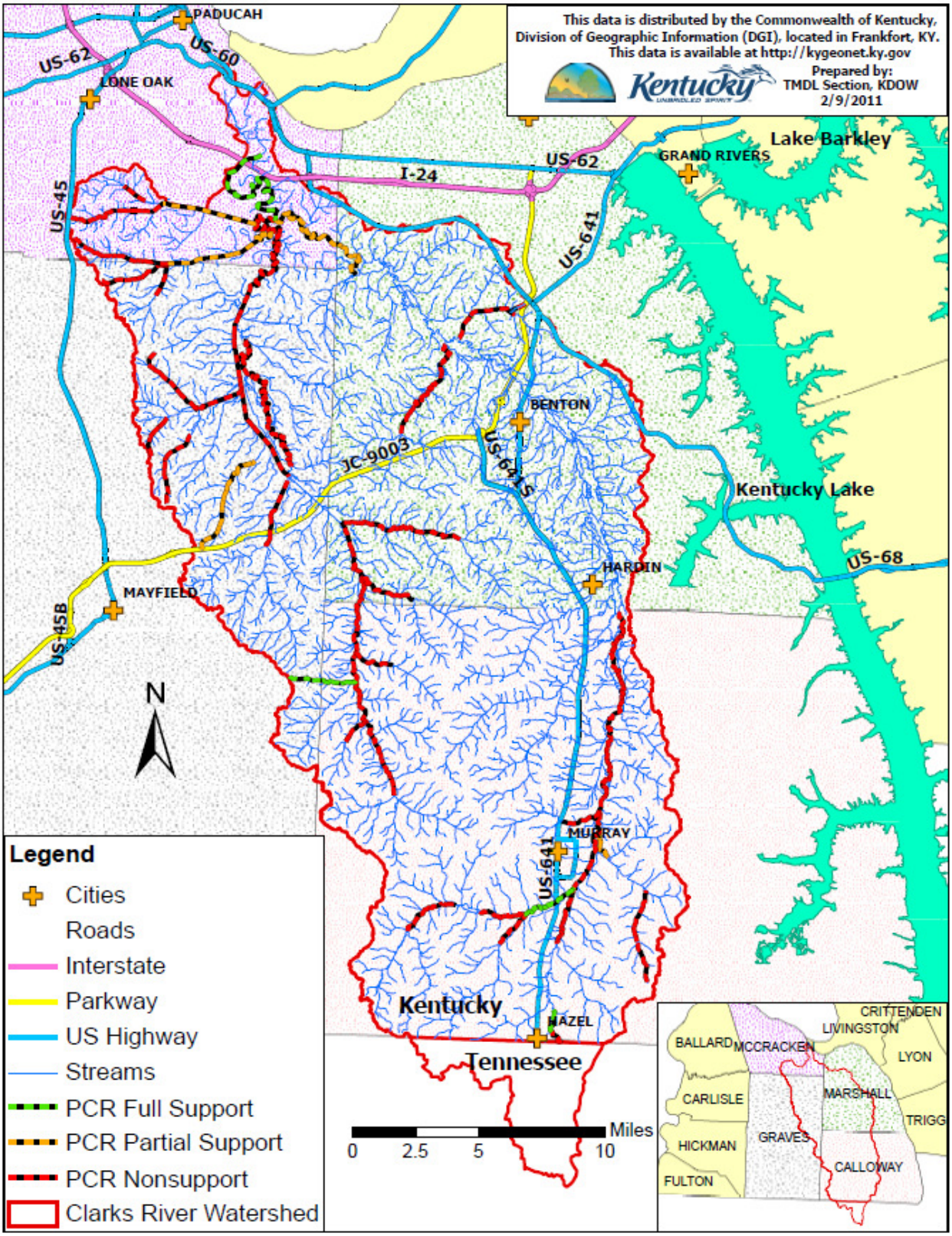

Figure S1. Location of the Clarks River watershed (USGS HUC 06040006)

Table S.1 Impaired Waterbodies Addressed in this TMDL Document

Waterbody Name	Pollutant[3]	County	GNIS Number	Suspected Sources	Impaired[3] Use (Support Status)
Bee Creek 0.0 to 0.7	*E. coli*	Calloway	KY486666_01	Source Unknown	PCR (NS)
Bee Creek 0.7 to 2.0	*E. coli*	Calloway	KY486666_02	Source Unknown	PCR (NS)
[1]Blizzard Pond 4.8 to 5.8	*E. coli*	McCracken	KY487484_02	Package Plant or Other Permitted Small Flows Discharges	PCR (NS)
Blizzard Pond Drainage Canal 0.0 to 3.7	*E. coli*	McCracken	KY487484_01	Source Unknown	PCR (PS)
Camp Creek 0.0 to 5.4	*E. coli*	McCracken	KY488685_00	Source Unknown	PCR (PS)
[1]Camp Creek 5.4 to 9.5	*E. coli*	Graves	KY488685_02	Source Unknown	PCR (NS)
Chestnut Creek 0.0 to 3.0	*E. coli*	Marshall	KY489424_00	Source Unknown	PCR (NS)
Clarks River 13.2 to 20.6	*E. coli*	McCracken	KY489552_02	Source Unknown	PCR (PS)
[2]Clarks River 50.9 to 55.6	Fecal Coliform	Calloway	KY489552_07	Package Plant or Other Permitted Small Flows Discharges	PCR (NS)
Clarks River 55.6 to 64.7	*E. coli*	Calloway	KY489552_08	Agriculture	PCR (NS)
Clarks River 64.7 to 66.8	*E. coli*	Calloway	KY489552_09	Source Unknown	PCR (NS)
Clayton Creek 3.3 to 7.7	*E. coli*	Calloway	KY489601_02	Source Unknown	PCR (NS)
[1]Clayton Creek Relict Channel 0.0 to 1.2	*E. coli*	Calloway	KY489552-63.7_01	Source Unknown	PCR (PS)
Damon Creek 0.0 to 1.8	*E. coli*	Calloway	KY490545_01	Animal Feeding Operations (NPS)	PCR (NS)
Duncan Creek 0.0 to 2.5	*E. coli*	Marshall	KY491300_00	Source Unknown	PCR (NS)
[1]East Fork Clarks River 0.0 to 2.7	*E. coli*	Calloway	KY491450_01	Source Unknown	PCR (NS)
[1]East Fork Clarks River 7.1 to 8.0	*E. coli*	Calloway	KY491450_03	Source Unknown	PCR (NS)
[1]Farley Branch of Middle Fork Clarks River 0.0 to 2.2	*E. coli*	Calloway	KY491983_01	Source Unknown	PCR (NS)

Waterbody Name	Pollutant[3]	County	GNIS Number	Suspected Sources	Impaired[3] Use (Support Status)
[1]Haskell Branch 1.2 to 4.5	*E. coli*	Graves	KY493854_01	Source Unknown	PCR (NS)
Middle Fork Creek of Clarks River 0.2 to 6.0	*E. coli*	Marshall	KY498118_00	Agriculture	PCR (NS)
[1]Middle Fork of Clarks River 2.7 to 4.8	*E. coli*	Calloway	KY498115_02	Source Unknown	PCR (NS)
[1]Middle Fork of Clarks River 6.15 to 9.1	*E. coli*	Calloway	KY498115_03	Source Unknown	PCR (NS)
Panther Creek 0.0 to 3.0	*E. coli*	Graves	KY500155_01	Source Unknown	PCR (NS)
[1]Sand Lick Branch 0.0 to 1.2	*E. coli*	Calloway	KY502926_01	Source Unknown	PCR (NS)
[1]Soldier Creek 0.0 to 5.7	*E. coli*	Marshall	KY503868_01	Source Unknown	PCR (NS)
[1]South Fork Camp Creek 0.0 to 1.3	*E. coli*	Graves	KY503908_01	Source Unknown	PCR (NS)
[1]Spring Creek 0.0 to 2.0	*E. coli*	Calloway	KY504124_01	Source Unknown	PCR (NS)
[1]Spring Creek 3.6 to 5.4	*E. coli*	Calloway	KY504124_02	Source Unknown	PCR (NS)
[1]Trace Creek 0.95 to 5.9	*E. coli*	Graves	KY505419_01	Source Unknown	PCR (PS)
[1]Turkey Creek 0.0 to 3.4	*E. coli*	Graves	KY505595_01	Source Unknown	PCR (NS)
[1]UT South Fork Camp Creek 0.0 to 3.0	*E. coli*	Graves	KY503908-0.05_01	Source Unknown	PCR (NS)
[1]UT Chestnut Creek 0.0 to 0.7	*E. coli*	Marshall	KY489424-2.8_00	Source Unknown	PCR (NS)
[1]UT Blizzard Pond Drainage Canal 0.0 to 4.2	*E. coli*	McCracken	KY487484-1.3_01	Source Unknown	PCR (NS)
[1]West Fork Clarks River Relict Channel 0.0 to 13.8	*E. coli*	Graves	KY506427_01	Source Unknown	PCR (NS)
West Fork of Clarks River 0.0 to 10.4	*E. coli*	McCracken	KY506426_01	Agriculture, Urban Runoff/Storm Sewers	PCR (NS)
[1]West Fork of Clarks River 10.4 to 13.1	*E. coli*	Graves	KY506426_02	Source Unknown	PCR (NS)
West Fork of Clarks River 13.1 to 17.2	*E. coli*	Graves	KY506426_03	Source Unknown	PCR (NS)

Waterbody Name	Pollutant[3]	County	GNIS Number	Suspected Sources	Impaired[3] Use (Support Status)
West Fork of Clarks River 20.1 to 28.4	*E. coli*	Marshall	KY506426_04	Source Unknown	PCR (NS)
[1]West Fork of Clarks River 28.4 to 29.15	*E. coli*	Calloway	KY506426_05	Source Unknown	PCR (NS)
[1]West Fork of Clarks River 29.15 to 31.35	*E. coli*	Calloway	KY506426_06	Source Unknown	PCR (NS)
[1]West Fork of Clarks River 31.35 to 34.2	*E. coli*	Calloway	KY506426_07	Source Unknown	PCR (NS)

Note: [1]Indicates a new listing not on the draft 2010-303(d) list.
[2]Re-assessment of this segment is recommended prior to either delisting or TMDL development for it.
[3]Pollutants and Support Status reflect the most recent assessments, which have not made it into the 303(d) listing process yet. In most cases, a previous impairment for fecal coliform has been updated to *E. coli* and support status reflects the level of *E. coli* impairment.

Kentucky Water Quality Criteria (WQC):

The WQC in 401 KAR 10:031 (Kentucky's Surface Water Standards) for the PCR use are based on both fecal coliform and *E. coli*. Per 401 KAR 10:031:

"The following criteria shall apply to waters designated as primary contact recreation use during the primary contact recreation season of May 1 through October 31: Fecal coliform content or Escherichia coli content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for Escherichia coli."

Both the geomean and instantaneous criteria of 130 and 240 *E. coli* colonies/100 ml, respectively, were applied to calculate allowable loadings to bring the watershed into compliance with the PCR designated use. The loading requiring the greatest percent reduction was set as the TMDL for a segment.

TMDL Components and Target:
A TMDL calculation is performed as follows:

$$TMDL = WLA + LA + MOS$$
(Equation 1)

The WLA has three components:

$$WLA = SWS\text{-}WLA + MS4\text{-}WLA + Future\ Growth\text{-}WLA$$
(Equation 2)

Definitions:
TMDL: the WQC, expressed as a load. This is defined as a geomean concentration of 130 and instantaneous concentration of 240 *E. coli* colonies/100 ml.
MOS: the Margin of Safety, which can be an implicit or explicit additional reduction applied to sources of pollutants that accounts for uncertainties in the relationship between effluent limits and water quality.
TMDL Target: the TMDL minus the MOS.
WLA: the Wasteload Allocation, which is the allowable loading of pollutants into the stream from KPDES-permitted sources such as SWSs and MS4s.
SWS-WLA: the WLA for KPDES-permitted sources, which have discharge limits for bacteria (including wastewater treatment plants, package plants and home units).
Future Growth-WLA: the allowable loading for future KPDES-permitted sources, including new SWSs, expansion of existing SWSs, new storm water sources, and growth of existing storm water sources (such as MS4s).
MS4-WLA: the WLA for KPDES-permitted municipal separate storm water sewer systems (including, but not limited to cities, counties, KYTC, universities and military bases).
Remainder: the TMDL minus the MOS and minus the SWS-WLA (also equal to Future Growth-WLA plus the MS4-WLA and the LA).
LA: the Load Allocation, which is the allowable loading of pollutants into the stream from sources not permitted by KPDES and from natural background.
Seasonality: Yearly factors that affect the relationship between pollutant inputs and the ability of the stream to meet its designated uses.
Critical Condition: The period when the pollutant conditions are expected to be at their worst.
MAF: the Mean Annual Flow as defined by USGS.
Adjusted MAF: the MAF plus SWS-WLA design flows.
Critical Flow: the flow used to calculate the TMDL as a load (is equivalent to the Adjusted MAF for MAF TMDLS)
Existing Conditions: the load that exists in the watershed at the time of TMDL development (i.e., sampling) and is causing the impairment.
Percent Reduction: the reduction needed to bring the existing conditions in line with the TMDL Target.
Load: Concentration * Flow * Conversion Factor in colonies per day (colonies/day)
Concentration: colonies per 100 milliliters (colonies/100ml)
Flow (i.e. stream discharge): cubic feet per second (cfs)
Conversion Factor: the value which converts the product of Concentration and Flow to Load (in units of colonies per day); it is derived from the calculation of the following components: (28.31685) L/cf * 86400sec/day * 1000ml/L)/ (100 ml) and is equal to 24465758.4.

Calculation Procedure:

1) The MOS, if an explicit value, is calculated and subtracted from the TMDL first, giving the TMDL Target;
2) Percent reductions are calculated to show the difference between Existing Conditions and the TMDL Target;
3) The SWS-WLA is calculated and subtracted from the TMDL Target, leaving the Remainder;

4) The Future Growth-WLA is calculated and subtracted from the Remainder;
5) If there is a MS4 present upstream of the impaired segment, the MS4-WLA is subtracted from the Remainder based on percent landcover, leaving the LA.

Margin of Safety:
There are two methods for incorporating a MOS in the TMDL analysis: implicitly include the MOS using conservative assumptions, or explicitly set aside a (numerical) portion of the TMDL as the MOS and divide the remainder of the allowable load (i.e., the TMDL Target load) between the LA and WLA. For this TMDL, a 10% explicit MOS (i.e., 10% of the WQC— 13 or 24 *E. coli* colonies/100 ml for geomean and instantaneous WQC, respectively-- but expressed as a load where possible) was reserved to address uncertainties involving loading from non-SWS sources. SWS sources have an implicit MOS based on the fact that they seldom operate at their design flow. The explicit MOS load was calculated using the following equation:

13 geomean or 24 instantaneous (colonies/100ml)	×	Critical Flow (cfs)	×	Conversion Factor 24465758.4	=	MOS (colonies/day)

WLA:
The WLA is the portion of the TMDL allocated to KPDES-permitted sources within the watershed(s).

The SWS-load was calculated using the following equation:

130 geomean or 240 instantaneous (colonies/100ml)	×	Design Flow (cfs)	×	Conversion Factor 24465758.4	=	SWS-WLA (colonies/day)

The individual SWS-WLAs for each facility that discharges to an impaired segment are summed to create a final SWS-WLA for that segment.

Future Growth WLA:
The amount set aside for future growth is determined using Table S.2:

Table S.2 Future Growth

Percent Developed Area in the Subwatershed	Future Growth WLA Percentage
≥25%	5%
≥20% – <25%	4%
≥15% – <20%	3%
≥10% – <15%	2%
≥5% – <10%	1%
<5%	0.5%

The Future Growth WLA is calculated using the following formula:

Remainder	×	Future Growth-WLA percentage	=	Future Growth-WLA

MS4-WLA:
The MS4-WLA is calculated using the following equation:

(TMDL - MOS - SWS-WLA)	×	% of (developed acres in MS4 boundary)/(total acres in subwatershed)	=	MS4-WLA

LA:
The LA is calculated using the following equation:

Remainder	-	Future Growth WLA	-	MS4-WLA	=	LA

The available sampling data were insufficient to apportion the existing loading among the various LA sources; therefore, it is attributed to all LA sources.

Seasonality:
Seasonality considers yearly factors such as temporal variations on source behavior and stream loading than can affect the relationship between pollutant inputs and the ability of the stream to meet its designated uses. This TMDL addresses seasonality by only using samples collected within the PCR season (May - October).

Critical Condition:
The critical condition for nonpoint source pathogen loadings is typically an extended dry period followed by a rainfall runoff event. During the dry weather period, pathogens and bacteria build up on the land surface, and are washed off by subsequent rainfall. Conversely, the critical condition for point source loading typically occurs during periods of low stream flow when dilution is minimized. The Clarks River watershed contains both types of sources; therefore the critical condition for each PCR-impaired segment is defined by the geomean or sample showing the highest exceedance.

Existing Condition:
The maximum exceedance or greatest geomean of all samples collected along a segment was selected to represent existing conditions. This concentration was converted to a load using the following equation:

Maximum Exceedance or Greatest Geomean (colonies/100ml)	×	Critical Flow (cfs)	×	Conversion Factor 24465758.4	=	Existing Load (colonies/day)

Percent Reduction:
A 'percent reduction' was calculated for informational purposes only to illustrate the difference between existing conditions and the TMDL Target at the time the streams were sampled.

TMDLs Calculated as a Daily Load:
Federal guidelines of the Clean Water Act require a TMDL to be expressed in terms of a daily load. Due to the limited amount of data available, particularly the absence of stream gages or in-stream flow data, a method was developed utilizing the WQC and Mean Annual Flow (MAF) as outlined in the *Pathogen TMDL [Standard Operating Procedure] SOP* (KDOW, 2009) to convert bacteria concentrations to loads. The USGS has generated a MAF value for streams across Kentucky. The MAF values were calculated using the equation found in the USGS Water-Resources Investigations Report 02-4206 "Estimating Mean Annual Stream flow of Rural Streams in Kentucky" (http://ky.water.usgs.gov/pubs/wrir_2002_4206.pdf). The MAF values can be found on the Hydrology of Kentucky webpage (http://kygeonet.ky.gov/kyhydro/main.htm). The MAF was determined at the downstream end of each impaired segment. Once obtained, SWS inputs (i.e. WWTP, home unit, etc., design capacity) were added to the MAF to generate an Adjusted MAF, which is also the critical flow. The critical flow is then multiplied by the WQC minus the MOS (10%) times the appropriate conversion factors to obtain the TMDL Target (i.e., the allowable daily load). The TMDLs for each segment are shown in Table S.3.

Table S.3 TMDLs for Impaired Segments

Waterbody Name	Existing Load (*E. coli* colonies/day)	**Total TMDL** (*E. coli* colonies/ day)	**MOS** (*E. coli* colonies / day)	TMDL Target (*E. coli* colonies/ day)	% reduction	**SWS-WLA** (*E. coli* colonies/day)	Remainder (*E. coli* colonies/ day)	**MS4 WLA** (*E. coli* colonies/ day)	**Future Growth WLA**[1] (*E. coli* colonies/ day)	**LA** (*E. coli* colonies/ day)
Bee Creek 0.0 to 0.7	1.59E+13	**1.35E+11**	**1.35E+10**	1.21E+11	99.2%	**7.95E+10 (Bee Creek WWTP 7.95E+10)**	4.17E+10	**1.21E+10**	**2.09E+09**	**2.75E+10**
Bee Creek 0.7 to 2.0	1.02E+13	**5.05E+10**	**5.05E+09**	4.54E+10	99.6%	**0**	4.54E+10	**1.31E+10**	**2.27E+09**	**3.00E+10**
Blizzard Pond 4.8 to 5.8	2.77E+12	**2.35E+10**	**2.35E+09**	2.12E+10	99.2%	**6.36E+08 (Great Oaks Subdivision 6.36E+08)**	2.05E+10	**N/A**[3]	**2.05E+08**	**2.03E+10**
Blizzard Pond Drainage Canal 0.0 to 3.7	1.28E+13	**1.09E+11**	**1.09E+10**	9.78E+10	99.2%	**6.63E+08 (Freemont Baptist Mission 2.73E+07), (Great Oaks Subdivision 6.36E+08)**	9.72E+10	**N/A**[3]	**9.72E+08**	**9.62E+10**
Camp Creek 0.0 to 5.4	1.04E+13	**1.12E+11**	**1.12E+10**	1.00E+11	99.0%	**0**	1.00E+11	**N/A**[3]	**5.02E+08**	**9.99E+10**
Camp Creek 5.4 to 9.5	8.76E+11	**2.88E+10**	**2.88E+09**	2.59E+10	97.0%	**0**	2.59E+10	**N/A**[3]	**1.29E+08**	**2.58E+10**
Chestnut Creek 0.0 to 3.0	1.24E+13	**6.15E+10**	**6.15E+09**	5.54E+10	99.6%	**1.65E+09 (Marshall County High School and Technical Center 2.73E+08), (Marshall County Sanitation District #2 1.36E+09), (Memory Lane Trailer Court 1.82E+07)**	5.37E+10	**N/A**[3]	**5.37E+08**	**5.32E+10**
Clarks River 13.2 to 20.6	1.45E+13	**2.46E+12**	**2.46E+11**	2.21E+12	84.7%	**9.24E+10 (Bee Creek WWTP 7.95E+10), (Benton STP 9.08E+09), (East Calloway Elementary School 7.27E+07), (Golden Acres Subdivision 2.27E+08), (Hardin STP 1.29E+09), (Marshall County High School and Technical Center 2.73E+08), (Marshall County Sanitation District #2 1.36E+09), (Memory Lane Trailer Court 1.82E+07), (Murray Mobile Home & RV Park 6.36E+07), (North Calloway Elementary School 7.27E+07), (South 641 Water District 2.73E+08), (South Marshall Elementary and Middle School 5.45E+07), (Southwest Calloway Elementary School 7.27E+07)**	2.12E+12	**4.04E+10**	**2.12E+10**	**2.06E+12**[2]
Clarks River 55.6 to 64.7	3.59E+13	**1.18E+12**	**1.18E+11**	1.06E+12	97.0%	**8.00E+10 (Bee Creek WWTP 7.95E+10), (East Calloway Elementary School 7.27E+07), (Murray Mobile Home and RV Park 6.36E+07), (North Calloway Elementary School 7.27E+07), (South 641 Water District 2.73E+08), (Southwest Calloway Elementary School 7.27E+07)**	9.18E+11	**4.03E+10**	**1.96E+10**	**9.21E+11**[2]

Waterbody Name	Existing Load (*E. coli* colonies/day)	**Total TMDL** (*E. coli* colonies/ day)	**MOS** (*E. coli* colonies / day)	TMDL Target (*E. coli* colonies/ day)	% reduction	**SWS-WLA** (*E. coli* colonies/day)	Remainder (*E. coli* colonies/ day)	**MS4 WLA** (*E. coli* colonies/ day)	**Future Growth WLA**[1] (*E. coli* colonies/ day)	**LA** (*E. coli* colonies/ day)
Clarks River 64.7 to 66.8	1.09E+14	**7.53E+11**	**7.53E+10**	6.78E+11	99.4%	**4.18E+08 (East Calloway Elementary School 7.27E+07), (South 641 Water District 2.73E+08), (Southwest Calloway Elementary School 7.27E+07)**	6.77E+11	**1.83E+10**	**6.77E+09**	**6.52E+11**[2]
Clayton Creek 3.3 to 7.7	3.82E+12	**5.28E+10**	**5.28E+09**	4.76E+10	98.8%	**0**	4.76E+10	**N/A**[3]	**4.76E+08**	**4.71E+10**
Clayton Creek Relict Channel 0.0 to 1.2	4.88E+11	**3.83E+10**	**3.83E+09**	3.45E+10	92.9%	**1.36E+08 (East Calloway Elementary School 7.27E+07), (Murray Mobile Home and RV Park 6.36E+07)**	3.43E+10	**N/A**[3]	**6.87E+08**	**3.36E+10**
Damon Creek 0.0 to 1.8	2.25E+12	**4.40E+10**	**4.40E+09**	3.96E+10	98.2%	**0**	3.96E+10	**N/A**[3]	**1.98E+08**	**3.94E+10**
Duncan Creek 0.0 to 2.5	1.45E+12	**8.93E+10**	**8.93E+09**	8.03E+10	94.5%	**0**	8.03E+10	**N/A**[3]	**4.02E+08**	**7.99E+10**
East Fork Clarks River 0.0 to 2.7	4.80E+11	**3.29E+11**	**3.29E+10**	2.96E+11	38.3%	**2.73E+08 (South 641 Water District 2.73E+08)**	2.96E+11	**N/A**[3]	**2.96E+09**	**2.93E+11**[2]
East Fork Clarks River 7.1 to 8.0	5.12E+11	**1.06E+11**	**1.06E+10**	9.51E+10	81.4%	**0**	9.51E+10	**N/A**[3]	**9.51E+08**	**9.42E+10**[2]
Farley Branch 0.0 to 2.2	3.22E+11	**1.10E+11**	**1.10E+10**	9.94E+10	69.1%	**0**	9.94E+10	**N/A**[3]	**9.94E+08**	**9.84E+10**[2]
Haskell Branch 1.2 to 4.5	3.17E+10	**2.17E+10**	**2.17E+09**	1.96E+10	38.3%	**0**	1.96E+10	**N/A**[3]	**9.78E+07**	**1.95E+10**
Middle Fork Creek of Clarks River 0.2 to 6.0	6.98E+12	**1.71E+11**	**1.71E+10**	1.54E+11	97.8%	**0**	1.54E+11	**N/A**[3]	**1.54E+09**	**1.53E+11**
Middle Fork of Clarks River 2.7 to 4.8	8.43E+11	**2.40E+11**	**2.40E+10**	2.16E+11	74.4%	**7.27E+07 (Southwest Calloway Elementary School 7.27E+07)**	2.16E+11	**N/A**[3]	**2.16E+09**	**2.13E+11**
Middle Fork of Clarks River 6.15 to 9.1	1.91E+12	**1.41E+11**	**1.41E+10**	1.27E+11	93.3%	**0**	1.27E+11	**N/A**[3]	**1.27E+09**	**1.26E+11**
Panther Creek 0.0 to 3.0	7.85E+11	**1.64E+11**	**1.64E+10**	1.48E+11	81.2%	**0**	1.48E+11	**N/A**[3]	**7.40E+08**	**1.47E+11**
Sand Lick Branch 0.0 to 1.2	2.11E+11	**2.41E+10**	**2.41E+09**	2.17E+10	89.7%	**0**	2.17E+10	**N/A**[3]	**2.17E+08**	**2.15E+10**
Soldier Creek 0.0 to 5.7	8.40E+11	**1.52E+11**	**1.52E+10**	1.37E+11	83.7%	**0**	1.37E+11	**N/A**[3]	**6.84E+08**	**1.36E+11**
South Fork Camp Creek 0.0 to 1.3	1.24E+12	**4.58E+10**	**4.58E+09**	4.12E+10	96.7%	**0**	4.12E+10	**N/A**[3]	**2.06E+08**	**4.10E+10**
Spring Creek 0.0 to 2.0	2.54E+13	**1.24E+11**	**1.24E+10**	1.12E+11	99.6%	**0**	1.12E+11	**N/A**[3]	**5.60E+08**	**1.11E+11**
Spring Creek 3.6 to 5.4	1.59E+10	**8.81E+09**	**8.81E+08**	7.93E+09	50.0%	**0**	7.93E+09	**N/A**[3]	**3.96E+07**	7.89E+09
Trace Creek 0.95 to 5.9	2.01E+11	**4.93E+10**	**4.93E+09**	4.44E+10	77.9%	**0**	4.44E+10	**N/A**[3]	**2.22E+08**	**4.42E+10**

Waterbody Name	Existing Load (*E. coli* colonies/day)	**Total TMDL** (*E. coli* colonies/ day)	**MOS** (*E. coli* colonies / day)	TMDL Target (*E. coli* colonies/ day)	% reduction	**SWS-WLA** (*E. coli* colonies/day)	Remainder (*E. coli* colonies/ day)	**MS4 WLA** (*E. coli* colonies/ day)	**Future Growth WLA**[1] (*E. coli* colonies/ day)	**LA** (*E. coli* colonies/ day)
Turkey Creek 0.0 to 3.4	7.03E+10	**2.35E+10**	**2.35E+09**	2.11E+10	69.9%	**0**	2.11E+10	**N/A**[3]	**1.06E+08**	**2.10E+10**
UT South Fork Camp Creek 0.0 to 3.0	1.55E+12	**3.82E+10**	**3.82E+09**	3.43E+10	97.8%	**0**	3.43E+10	**N/A**[3]	**3.43E+08**	**3.40E+10**
UT Chestnut Creek 0.0 to 0.7	2.01E+11	**3.12E+09**	**3.12E+08**	2.81E+09	98.6%	**1.36E+09 (Marshall County Sanitation District #2 1.36E+09)**	1.45E+09	**N/A**[3]	**5.80E+07**	**1.39E+09**
UT Blizzard Pond Drainage Canal 0.0 to 4.2	5.64E+11	**1.47E+10**	**1.47E+09**	1.32E+10	97.7%	**0**	1.32E+10	**N/A**[3]	**6.61E+07**	**1.31E+10**
West Fork of Clarks River 0.0 to 10.4	1.67E+13	**1.66E+12**	**1.66E+11**	1.49E+12	91.1%	**1.57E+09 (Freemont Baptist Mission 2.73E+07), (Great Oaks Subdivision 6.36E+08), (Symsonia Water and Sewer 9.08E+08)**	1.49E+12	**N/A**[3]	**7.47E+09**	**1.49E+12**
West Fork of Clarks River 10.4 to 13.1	3.71E+13	**1.18E+12**	**1.18E+11**	1.06E+12	97.1%	**0**	1.06E+12	**N/A**[3]	**5.30E+09**	**1.05E+12**
West Fork of Clarks River 13.1 to 17.2	8.08E+12	**1.01E+12**	**1.01E+11**	9.09E+11	88.7%	**0**	9.09E+11	**N/A**[3]	**4.55E+09**	**9.05E+11**
West Fork of Clarks River 20.1 to 28.4	1.35E+13	**5.44E+11**	**5.44E+10**	4.89E+11	96.4%	**0**	4.89E+11	**N/A**[3]	**2.45E+09**	**4.87E+11**
West Fork of Clarks River 28.4 to 29.15	3.11E+12	**2.47E+11**	**2.47E+10**	2.22E+11	92.9%	**0**	2.22E+11	**N/A**[3]	**2.22E+09**	**2.20E+11**
West Fork of Clarks River 29.15 to 31.35	1.16E+12	**2.31E+11**	**2.31E+10**	2.08E+11	82.1%	**0**	2.08E+11	**N/A**[3]	**2.08E+09**	**2.06E+11**
West Fork of Clarks River 31.35 to 34.2	2.47E+12	**1.51E+11**	**1.51E+10**	1.36E+11	94.5%	**0**	1.36E+11	**N/A**[3]	**1.36E+09**	**1.34E+11**
West Fork Clarks River Relict Channel 0.0 to 13.8	4.33E+11	**7.99E+10**	**7.99E+09**	7.19E+10	83.4%	**0**	7.19E+10	**N/A**[3]	**3.59E+08**	**7.15E+10**

[1]Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.
[2]The LA includes loadings entering KY from TN. To comply with this TMDL, KY expects waters entering the state from TN to meet the Water Quality Standards in 401 KAR 10:031 (i.e. geomean of 130 and instantaneous value of 240 *E. coli* colonies/100 ml).
[3]N/A indicates that there is no MS4 area in the subwatershed.

Translation of WLAs into Permit Limits:

All KPDES-permitted point sources must meet permit limits based on the Water Quality Standards 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 and 240 colonies/100 ml as a maximum weekly average.

MS4-WLAs will be addressed through the KDOW storm water permitting program.