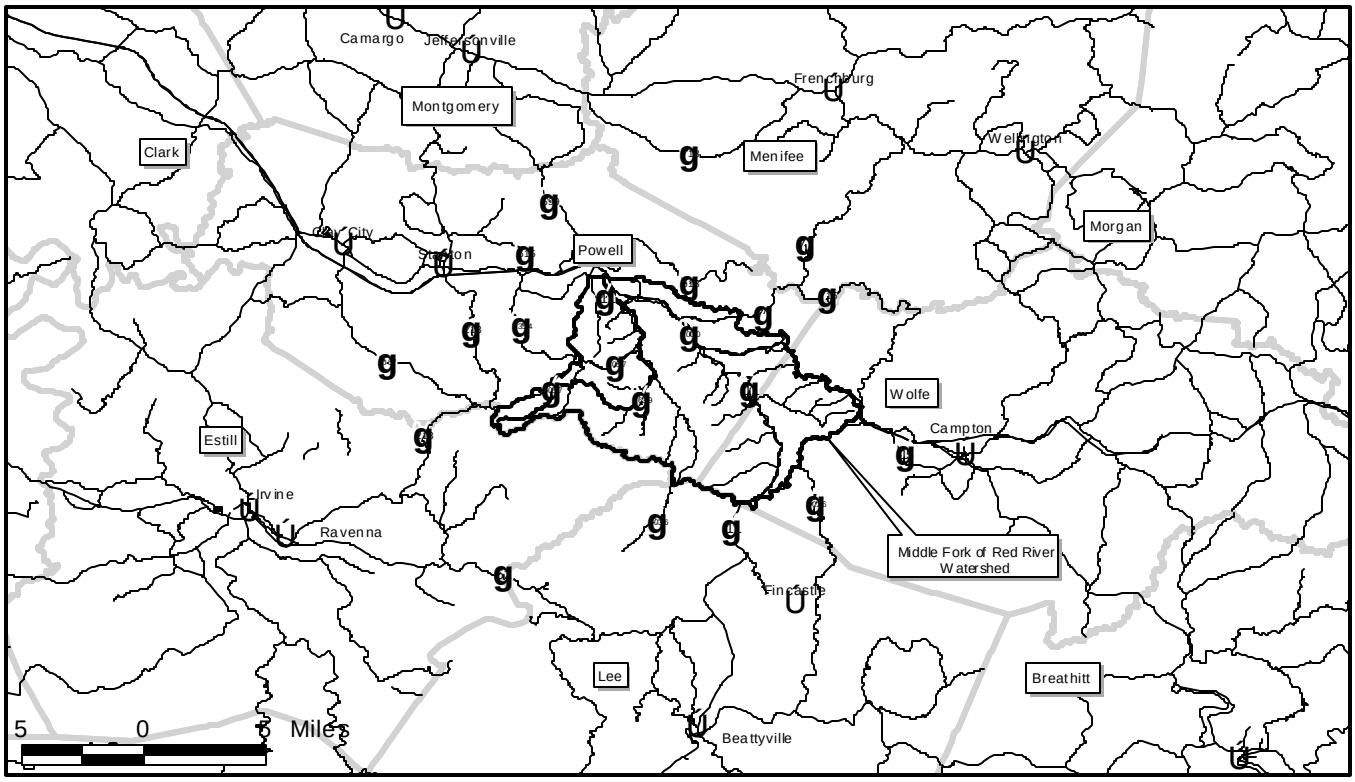
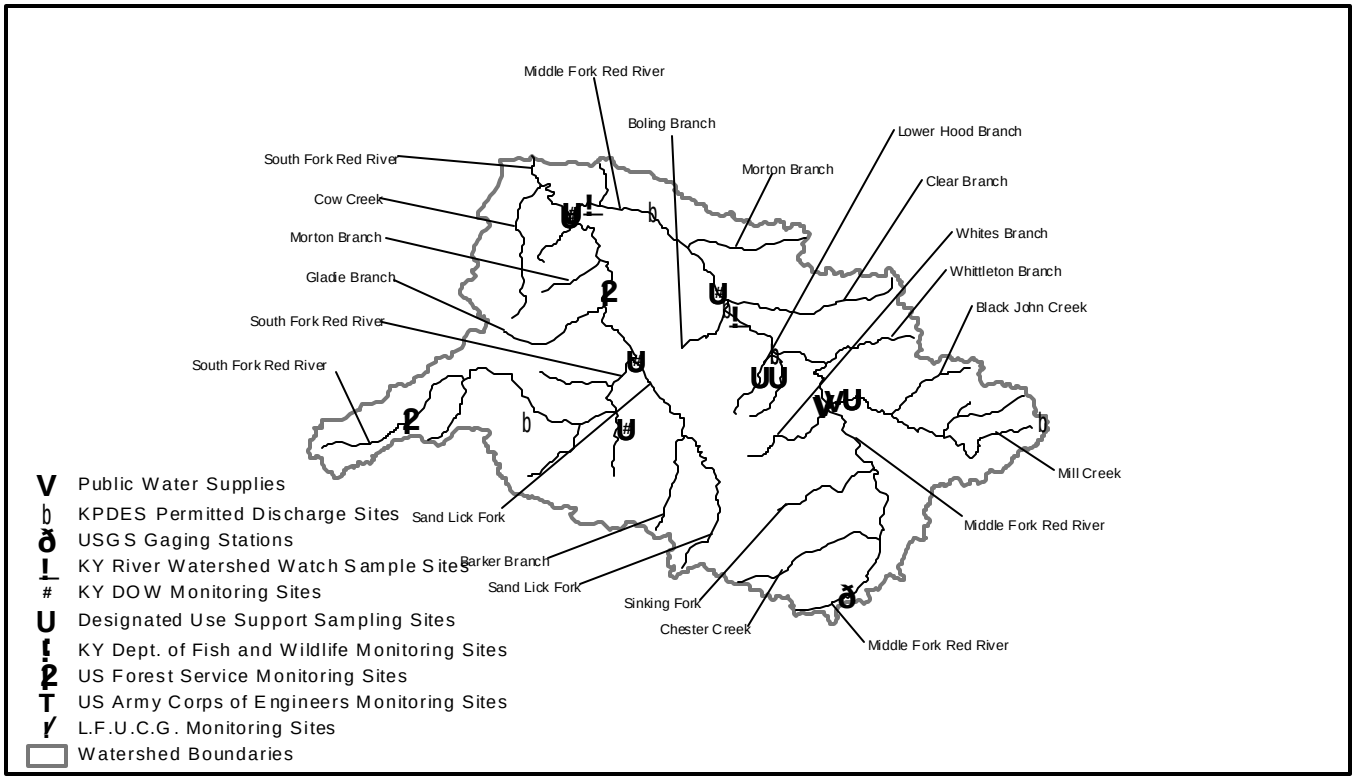
Middle Fork of Red River Watershed
Watershed Number: 05100204140

Location Map



Watershed Features



Geography. The Middle Fork of Red River watershed covers the western tip of Wolfe County and part of eastern Powell County. The land is in the escarpment area of the Eastern Coal Field physiographic region, characterized by hilly terrain and very high rates of surface runoff and moderate groundwater drainage. The watershed is underlain by coals, sandstones, and shales: this geology is generally conducive to productive wells, although water quality may be low for wells that draw from coal layers. Parts of the watershed lie over sandstone aquifers. Other parts lie above interbedded clay shales and siltstones.

Waterways. The Middle Fork of the Red River drains the eastern part of the watershed via numerous tributary creeks and flows into the South Fork of the Red River near Lombard. The South Fork of the Red River drains the western part of the watershed and empties into the Red River at the bottom of the watershed near Bowen.

Land and water use. Land in the watershed is primarily rural and wooded; about 5% is agricultural. The surface waters of the watershed supply the drinking water for Natural Bridge State Park. Five businesses and organizations hold permits for discharges into the creeks. See tables for details.

Agency data assessment. The creeks assessed in 1998-1999 in this watershed fully support all of their designated uses, based on biological and/or water-quality data. However, three streams did not support uses in past years, and TMDL (total maximum daily load) plans for managing these streams have been approved. Brines released during oil well operations raised the levels of chlorides, salinity, and total dissolved solids in these streams and led to their failure to support the aquatic life designated use. See tables for details.

Watershed rankings. The ranking formula provides a preliminary ranking by synthesizing a broad spectrum of watershed characteristics, current conditions, and threats. This watershed ranks in the group with the lowest need for protection and/or restoration. This rating is for the watershed on average: particular sites and particular waters within the watershed may vary widely. See tables for details.

Volunteer data. Data were collected at one site on the Middle Fork and one on the South Fork. See tables for details.

Watershed Name: Middle Fork of Red River *11-Digit Watershed Identity Number:* 05100204140

This report was prepared by the Kentucky Water Research Institute as a product of the statewide Kentucky Watershed Management process. Information presented in this report was collected from many sources. Reasonable attempts were made to ensure that information and figures are as accurate as possible, but no representation or guarantee is made as to either the correctness or suitability of information for particular purposes. All critical information should be independently verified. Please address questions or corrections to Basin Coordinator, KWRI, Rm. 233 Mining and Minerals Resources Building, University of Kentucky, Lexington, Kentucky 40506-0107.

Summary of Basin Characteristics and Facilities

General Land-use Characteristics:

		Acres	% of Total
Total Land Area (Acres):	37,152		
Residential Area:	6		0.0
Commercial Area:	395		1.1
Industrial Area:	441		1.2
Agricultural Area:	1,798		4.8
Rural and Wooded Area:	34,398		92.7
Other Land-use Area:	64		0.2

Number of Mine Permits:	1
Total Permitted Mining Area (Acres):	5
Number of Identified Wetland Areas:	3
Total Wetland Area (Acres):	2

Withdrawal and Discharge Sites:

Number of Public Water Supplies and Water Withdrawal Sites:	3
Surface Water Withdrawals:	3
Groundwater Withdrawals:	0
No. of Potable Water Treatment Facilities:	2

Number of KPDES Discharge Permits:	6

Sampling Site Statistics:

Number of USGS Gaging Stations:	0
Number of Kentucky Division of Water Sampling Sites:	5
Number of Kentucky Dept. of Fish and Wildlife Sampling Sites:	0
Number of US Forest Service Sampling Sites:	2
Number of US Army Corps of Engineers Sampling Sites:	0
Number of Kentucky River Watershed Watch Sampling Sites:	2
Number of Lexington-Fayette Urban Co. Gov. Sampling Sites:	0

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Watershed Indicators and Ranking Categories:

Protection Ranking	Observed Impacts	Potential Impacts	Restoration Ranking
High	Low	Low	Low

Overall Watershed Ranking: Low

Protection Categories:

Indicator	*Value*	*Units*	*Range of All Watersheds*	*Mean of All Watersheds*
Wetland Areas	2	Acres	0 - 106	12
Surface Drinking Water Sources	3	No. of sources	0 - 14	2
Ground Drinking Water Sources	0	No. of sources	0 - 17	1
Groundwater Sensitivity	3.08	Score	2 - 5	3.21
KY Dept. of Fish and Wildlife Management Areas	0	Acres	0 - 2951	93
U.S. Forest Service Management Areas	36,732	Acres	0 - 155253	12,600
Kentucky State Park Areas	1,928	Acres	0 - 1928	42
Nature Preserves Commission Areas	1,430	Acres	0 - 1430	32
Nature Conservancy Areas	0	Acres	0 - 2473	28
Reference Reach Watersheds	0.00	Score	0 - 100	3.08
Outstanding Resource Watersheds	0.00	Score	0 - 0	0.00
Recognized Stream Resources	4	No. of resources	0 - 8	1
Kentucky Rivers Assessment Scores	0.78	Score	0 - 11	1.80

Observed Impact Categories:

Human Health Impact Categories:

Indicator	*Value*	*Units*	*Range of All Watersheds*	*Mean of All Watersheds*
Flood Declarations	2	Number since 1970	0 - 10	4
Water Supply Inadequacy	0.00	Score	0 - 2	0.22
Observed Impacts to Surface Drinking Water	1.00	Score	1 - 1	1.00
Observed Impacts to Fish Consumption	1.00	Score	1 - 1	1.00
Observed Impacts to Primary Water Contact	1.00	Score	1 - 3	1.33
Contamination Sites Impacting Human Health	1	Number of sites	0 - 71	4

Ecological Health Impact Categories:

Indicator	*Value*	*Units*		
Observed Impacts to Aquatic Life	1.00	Score	1 - 3	1.31
Contamination Sites Impacting Ecological Health	1	Number of sites	0 - 71	4

Potential Impact Categories:

Indicator	*Value*	*Units*	*Range of All Watersheds*	*Mean of All Watersheds*
Potential Contamination Sites	9	Number of sites	1 - 121	12
Potential Pesticide Loading	2	Est. sales in tons	0 - 45	10
Potential Fertilizer Loading	100	Est. tons applied	0 - 2747	394
Agricultural Erosion Potential	0.71	Est. tons erosion / acre	0 - 9	3.20
Livestock Operations Potential Impact	1,665	Animal units	55 - 43826	7,021
KPDES Discharge Violations	37	Number of violations	0 - 541	39
KY Division of Water Citizen Complaints	9	Number of complaints	0 - 53	9
Toxic Release Inventory	0	Score	0 - 11547626	231,638
Population Change Projection	146	Number of persons	-149 - 11030	448
Population Not on Public Sewer Systems	686	Number of persons	12 - 4511	1,114
Mining Area	4	Acres	0 - 6305	355
Surface Water Runoff Potential	61.21	SCS Curve Number	60 - 79	68
KPDES Permitted Discharges	6	Number of sites	0 - 56	6

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Stream and Waterbody Use Support Summary

Total Stream Miles: 74.72	*Number of Segments*	*Stream Miles Assessed*	*Miles * Fully Supporting*	*Miles * Partially Supporting*	*Miles * Not Supporting*	*Miles * Threatened*
Segments Assessed:	7	21.3	21.3	0.0	0.0	0.0
Designated Uses						
Aquatic Life:	7	21.3	21.3	0.0	0.0	0.0
Primary Contact:						
Fish Consumption:						
Drinking Water:	1	0	0	0	0	0

** Blank values indicate no assessed segments for this category.*

Assessed Stream Segments and Waterbodies

*Stream or Waterbody Name **	*Starting Milepoint*	*Ending Milepoint*	*Segment Length (miles)*	*Designated Uses **	*Overall Level of Support*
Lower Hood Branch	0	1.3	1.3	AL	Fully Supporting
Middle Fork Red River	1.8	8.3	6.5	AL	Fully Supporting
Mill Creek Lake	0	0	0	AL, DW	Fully Supporting
Sand Lick Fork	0	1.8	1.8	AL	Fully Supporting
South Fork Red River	3.9	10.1	6.2	AL	Fully Supporting
South Fork Red River	0	3.9	3.9	AL	Fully Supporting
Upper Hood Branch	0	1.6	1.6	AL	Fully Supporting

**Abbreviations: AL - Aquatic Life Support, PC - Primary Contact Recreation, SC - Secondary Contact Recreation, FC - Fish Consumption, DW - Drinking Water Supply, UT - Unnamed Tributary*

Applicable Total Maximum Daily Load (TMDL) Reports:

Stream or Waterbody	*TMDL Report Status*
Sand Lick Fork	Final draft complete
Stump Cave Br.	Final draft complete
South Fork Red River	Final draft complete

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Withdrawal Sites and Discharge Facilities:

Public Water Supplies and Water Withdrawal

Facility	*Origin of Source*	*Type of Facility*	*Permit ID Number*
NATURAL BRIDGE STATE PARK	Surface Water	Water Treatment Plant	0992545
NATURAL BRIDGE STATE PARK	Surface Water	Water Withdrawal Site	0992545
TECUMSCH RESORT/BED/BREAKFAST	Surface Water	Water Treatment Plant	0993349

KPDES Permitted Discharge Facilities

Facility	*Type of Facility*	*KPDES Site ID Number*
DESSIE SCOTT CHILDRENS HOME	RESIDENTIAL CARE	KY0082651
KJC NORTHPOINT TRAINING CENTER	CORRECTIONAL INSTITUTIONS	KY0033901
KTC POWELL CO REST AREA	INSPECTION & FIXED FACILITIE	KY0077895
KY DOP NATURAL BRIDGE ST PK	AMUSEMENT AND RECREATION, NEC	KY0095516
MT PARKWAY STONE	CRUSHED AND BROKEN LIMESTONE	KYG840181

Gaging Stations and Sampling Sites:

US Geological Survey and US Army Corps of Engineers Stream Gaging Stations

Stream Location	*Agency*	*Station ID Number*	*Sampling Parameter*
Middle Fork Red River	USGS	USGS03283305	Flow

KY Division of Water Sampling Sites

Stream Name	*Type of Sampling*
Middle Fork Red River	Other Monitoring
South Fork Red River	Other Monitoring
Sand Lick	Other Monitoring
South Fork Red River	Other Monitoring
Middle Fork Red River	Physical/Chemical Monitoring

US Forest Service Sampling Sites

11-Digit HUC	*HUC Name*	*US Forest Service Site ID*
05100204140	Middle Fork of Red River	0510020430002
05100204140	Middle Fork of Red River	0510020406025

KY River Watershed Watch Sampling Sites

Stream Name	*KRWW Sample ID No.*	*Site Description*
Mdl Fork	K73	KY 715 Bridge over Middle Fork
South Fork of Red River	K89	40 yds upstream of Hwy 11/15 bridge

Watershed Name: Middle Fork of Red River *11-Digit Watershed Identity Number:* 05100204140

Results from 1999 KY River Watershed Watch Sampling:

Conventional Parameters:

Sample ID Number: K73 *Stream:* Middle Fork

Physical Data (May):

pH	7.7
Temperature	0
Dissolved Oxygen	8

Alkalinity	130
Total Hardness	144
Chlorides	32.1
Conductivity	353
Total Organic Carbon	2.3
Total Suspended Solids	

Fecal Data (July / August):

	Coliform Count	*Strep Count*	*Coliform/Strep Ratio*
July	10	220	0.045
August			

Sample ID Number: K89 *Stream:* South Fork of Red River

Physical Data (May):

pH	7.7
Temperature	0
Dissolved Oxygen	8.2

Alkalinity	
Total Hardness	
Chlorides	
Conductivity	
Total Organic Carbon	
Total Suspended Solids	

Fecal Data (July / August):

	Coliform Count	*Strep Count*	*Coliform/Strep Ratio*
July	10	660	0.015
August			

Note: Most indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm). Temperature is in Celsius degrees. Alkalinity and hardness are as mg/L of calcium carbonate. Bacterial counts are in colonies per 100 milliliters. Conductivity units are micro-mhos per centimeter.

Nutrient Parameters:

Sample ID Number: K73 *Stream:* Middle Fork

Ammonia	0.09	*Orthophosphate as Phosphate*	0.020	*Sulfate*	6.2
Ammonia Nitrogen	0.07	*Orthophosphate as Phosphorus*	0.007		
Total Kjeldahl Nitrogen as NH3					
Total Kjeldahl Nitrogen as N		*Total Recoverable Phosphorus*			
Nitrate					
Nitrate Nitrogen					

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Sample ID Number: K89 *Stream:* South Fork of Red River

Ammonia		*Orthophosphate as Phosphate*		*Sulfate*	
Ammonia Nitrogen					
Total Kjeldahl Nitrogen as NH3		*Orthophosphate as Phosphorus*			
Total Kjeldahl Nitrogen as N		*Total Recoverable Phosphorus*			
Nitrate					
Nitrate Nitrogen					

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Metals and Mineral Parameters:

Sample ID Number: K73 *Stream:* Middle Fork

Aluminum	0.31	*Calcium*	42.76	*Lead*		*Selenium*		*Thallium*	
Antimony		*Chromium*		*Lithium*		*Silicon*	1.48	*Vanadium*	
Barium	0.08	*Cobalt*	0.007	*Magnesium*	5.84	*Sodium*	17.22	*Zinc*	
Beryllium		*Copper*		*Manganese*	0.14	*Strontium*	0.13		
Boron	0.10	*Iron*	0.38	*Potassium*	3.39	*Sulfur*	1.59		

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Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Sample ID Number: K89 *Stream:* South Fork of Red River

Aluminum		*Calcium*		*Lead*		*Selenium*		*Thallium*	
Antimony		*Chromium*		*Lithium*		*Silicon*		*Vanadium*	
Barium		*Cobalt*		*Magnesium*		*Sodium*		*Zinc*	
Beryllium		*Copper*		*Manganese*		*Strontium*			
Boron		*Iron*		*Potassium*		*Sulfur*			

Note: All indicators are in milligrams per liter (mg/L) which is equivalent to parts per million (ppm).

Pesticide/Herbicide Parameters:

Sample ID No.	*Stream*	*2,4-D*	*Chlorpyrifos*	*Triazines*
K73	Middle Fork			
K89	South Fork of Red River			

Note: All indicators are in micrograms per liter which is equivalent to parts per billion (ppb).