

**The Licking River Watershed  
Rapid Watershed Assessment (RWA)  
Hydrologic Unit Code (HUC) 05100101**

**October 2008**



*Photo: Mindy Scott*



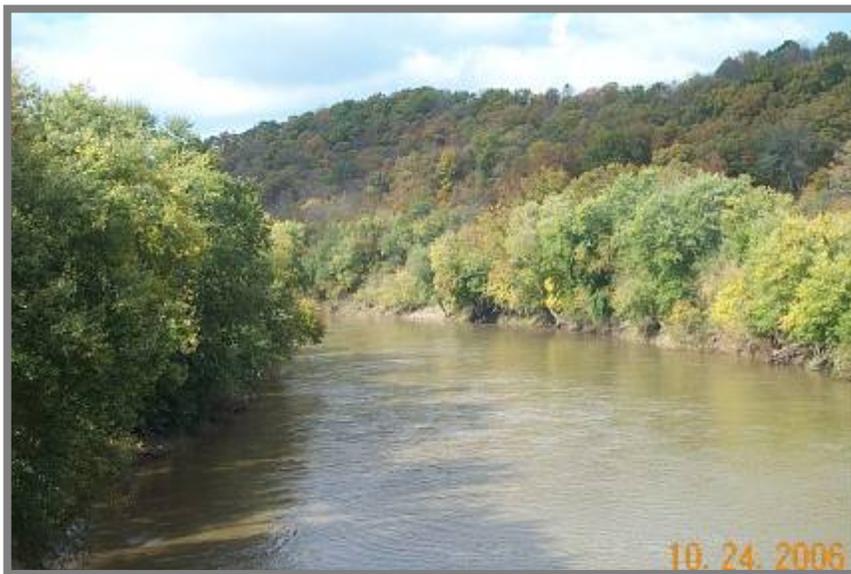
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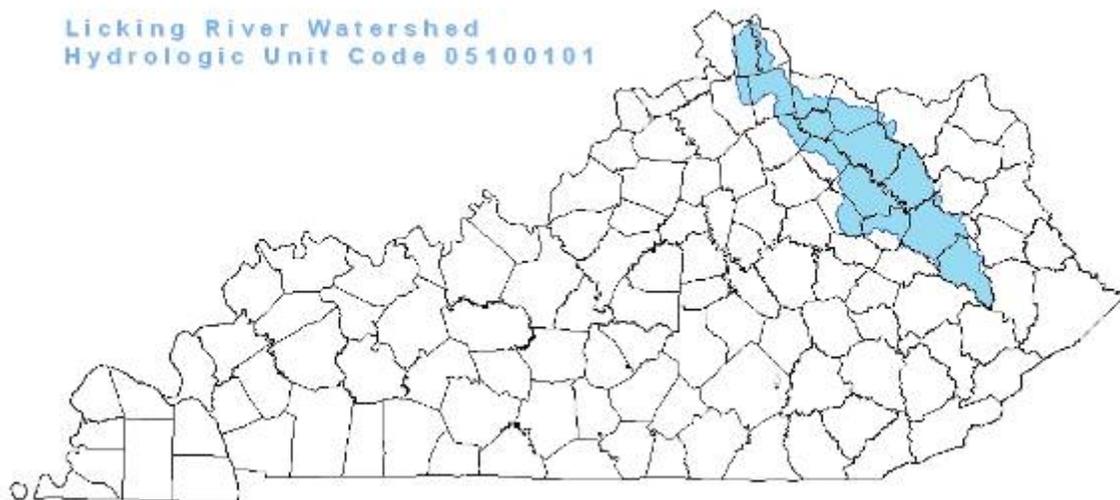
## Overview of Project Area

The Licking River Basin provides a rich and unique landscape that includes a spectrum of soil types, land cover, wildlife species, and agricultural uses. The Licking River is effectively split by Cave Run Lake Dam in Rowan County, separating the River into upper and lower sections. Above the dam, hardwood forests and open grassy woodlands are common as Cave Run Lake is surrounded by the Daniel Boone National Forest. Below the dam in the Lower Licking River, privately-owned agricultural lands predominate and are characterized by rolling pasturelands and smaller woodlands. The river provides habitat for a wide range of rare and sensitive aquatic species including over 50 species of mussels, some of which are federally listed. A tributary of the Ohio River, the Licking River is approximately 320 miles long and drains much of northeastern Kentucky. The course of the river begins in the Cumberland Plateau in southeastern Magoffin County and flows in a northwesterly direction until it reaches the Ohio River near Cincinnati, Ohio. The Licking River receives the North Fork flowing from the east approximately 10 miles northwest of Mount Olivet. The South Fork of the Licking River then joins the main stem just south of Falmouth, Kentucky.



*Licking River at Butler, KY*

*Photo: Mindy Scott*



## Eleven Digit HUCs in Project Area

The 11-digit hydrologic unit codes within the Licking River Watershed (HUC 05100101) vary in size from 12,728 acres in Phillips Creek Watershed to nearly 200,000 acres in the North Fork Licking River Watershed. Ten watersheds are 100 square miles in size or larger with the remaining 19 eleven digit HUCs ranging from 97 to 20 square miles.

11-digit HUC	Watershed Name	Acres	Sq. Miles
05100101220	North Fork Licking River	197,527	309
05100101180	Licking River	159,488	249
05100101150	Slate Creek	147,266	230
05100101130	Triplett Creek	119,787	187
05100101040	Scott Creek	110,352	172
05100101010	Licking River	98,202	153
05100101230	Licking River	79,396	124
05100101250	Grassy Creek	76,902	120
05100101160	Fox Creek	75,014	117
05100101100	North Fork of the Licking River	64,385	101
05100101200	Fleming Creek	61,854	97
05100101270	Licking River	49,765	78
05100101060	Elk Fork	49,273	77
05100101210	Johnson Creek	48,646	76
05100101120	Lick Branch	47,139	74
05100101110	Beaver Creek	46,694	73
05100101290	Banklick Creek	37,260	58
05100101140	Salt Lick Creek	35,927	56
05100101090	Blackwater Creek	33,738	53
05100101080	Grassy Creek	33,437	52
05100101190	Flat Creek	31,998	50
05100101020	Middle Creek of the Licking River	30,581	48
05100101240	Kincaid Creek	29,254	46
05100101070	Caney Creek	26,961	42
05100101170	Locust Creek	21,659	34
05100101280	Cruises Creek	21,259	33
05100101030	Johnson Creek	21,158	33
05100101050	White Oak Creek	13,871	22
05100101260	Phillips Creek	12,728	20
		1,781,521	2,784

These 11-digit watersheds vary greatly in land cover, land use, and population density. The northern HUCs such as Banklick Creek and adjacent Licking River are influenced by urban expansion from the Cincinnati metro area. Fleming Creek, Johnson Creek and the North Fork Licking River are agricultural counties with livestock and hay as the primary agricultural products. Moving south through the watershed, hills and woods predominate in counties such as Rowan, Morgan, and Magoffin. The Cave Run Lake is located south of Morehead, KY in lower Bath County and is an 8,270 acre artificial lake created by a U.S. Army Corps of Engineers dam. The site is a popular boating, fishing and camping destination and lies within the Daniel Boone National Forest. The Cave Run Lake Dam is a demarcation point for many aquatic species in the Licking River system and it is only below the dam that the threatened/endangered mussel species exist.



## History

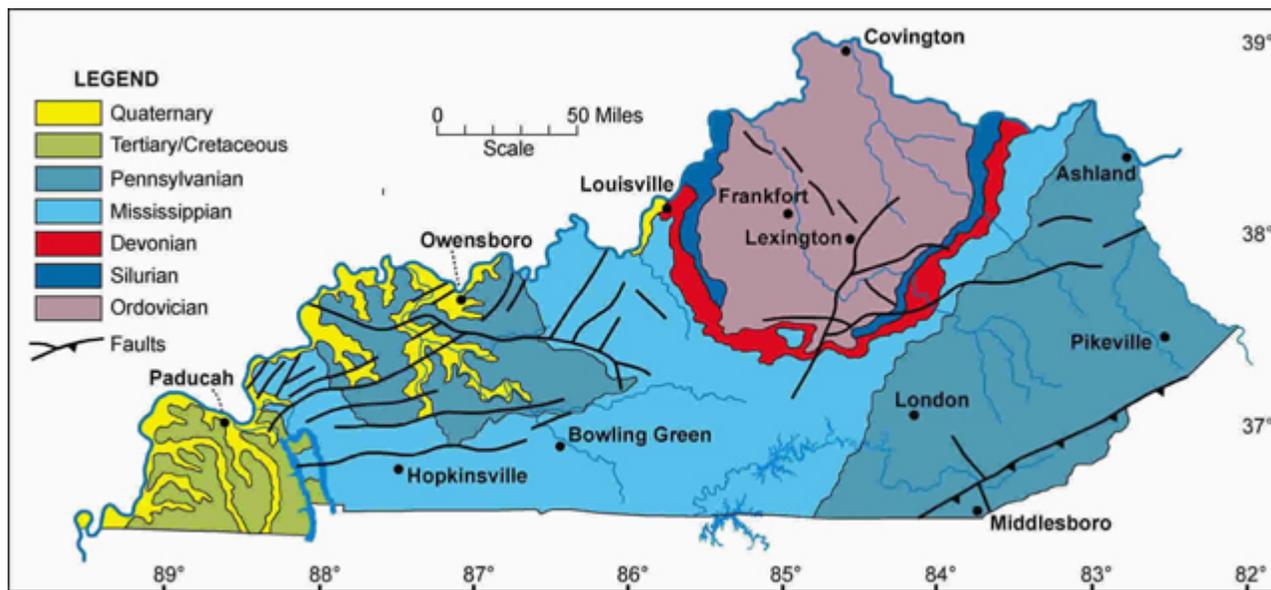
Early explorers to this region called the Licking River by another name – Great Salt Creek – due to the numerous natural salt licks found along the stream’s banks. In the frontier economy, salt was highly valued as a food preservative, spice, and essential mineral. In works of the author Clark Firestone, the Indians called the Licking River “Nepernine” which translates to salt seeping waters. The Licking River was a main transportation corridor for Northern Indiana Tribes and was used to attack and evade settlers. At Blue Licks, the supposed last battle of the Revolutionary War was fought and the site is now a State Park commemorating the conflict between the British Crown, American Indians, and Kentucky settlers.



*A replica of a stockade at Blue Licks State Park near Mr. Olivet, KY. Blue Licks State Park also has the distinction of having a federally threatened plant species growing on the property- the Short’s Goldenrod.*

(Photo: Kentucky State Parks)

**Geology** Known as the “Blue Grass State”, Kentucky is in reality made up of multiple geologic and physiographic regions and the actual Bluegrass physiographic region is limited to the central part of the State which is characterized by limestones and shales from the Ordovician Period (510 to 440 million years ago).



Map source: <http://www.uky.edu/KGS/geoky/>

The geology of the Licking River Watershed is a mixture of Ordovician (north east portion) and small bands of Silurian, Devonian, and Mississippian geologic regions. The soils in the lower Licking are from weathering of limestone which produces productive soils, sink holes, springs and caves. The soils in this area are fertile because the Ordovician limestone contains phosphate minerals and these serve as natural fertilizers. Ordovician and Silurian rocks are surrounded by a ring of Devonian strata (410 to 360 million years old) consisting of limestones, dolostones, and a thick deposit of gray to black shale. This color is the result of organic material trapped within the

rocks which were deposited beneath a sea that covered most of the eastern United States. Oil and natural gas resources can often be found in this Devonian strata region.

The Outer Bluegrass physiographic region is characterized by deeper valleys, with much less flat agricultural land, because the bedrock in this area is mostly composed of more erodible interbedded Ordovician limestones and shales. Mississippian Period geology (360 to 325 million years old) is dominated by limestones, shales, and sandstones. Large cave systems can be found in this geologic region.

The Pennsylvanian Strata defines the edge of the Kentucky Coal Fields physiographic region. The Eastern Kentucky Coal Field is part of the Cumberland Plateau physiographic region (which extends from Pennsylvania to Alabama. The eastern edge of the Eastern Kentucky Coal Field (and Cumberland Plateau) is called the Pottsville or Cumberland Escarpment. This escarpment was formed mainly from resistant Pennsylvanian-age sandstones and conglomerates and is characterized by sheer cliffs, steep-walled gorges, rock shelters, waterfalls, natural bridges and arches, and some of the most scenic areas in Kentucky such as the Natural Bridge State Park, Cumberland Falls State Park, and Red River Gorge are found along this escarpment.

## **Threatened and Endangered Species**

Numerous federally-listed mammal, plant and mussel species are found within the RWA project area and are listed by county in the table below. This list does not show the Kentucky state-listed species but that information can be found on the Kentucky Nature Preserves Commission webpage at: <http://www.naturepreserves.ky.gov/>. The Licking River is known for its diverse populations of freshwater mussels, many of which are state and/or federally listed. The federally endangered fanshell and clubshell species are found in the main channel of the Licking River.



*An assortment of Licking River freshwater mussel species*

*Photo: ( [www.fy.ky.gov](http://www.fy.ky.gov) )*



*Running buffalo clover, a federally listed species – found in Harrison and Montgomery Counties. ( [www.ppd.purdue.edu](http://www.ppd.purdue.edu) )*

**Federally-Listed Species Located in Licking River Watershed Counties**

County	Species Type	Species Name	Federal	Aquatic Species Only
			Status	(Watershed/Stream Order)
Bath	Mussel	<b>Northern Riffleshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
		Clubshell	Endangered	Slate Creek Main Channel
	Mammal	Indiana Bat	Endangered	
Bracken	Mussel	<b>Clubshell</b>	<b>Endangered</b>	<b>North Fork and Licking River Main Channel</b>
		Fanshell	Endangered	
Campbell	Mussel	<i>Clubshell</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<b>Fanshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
		<i>Orange-Foot</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Pimpleback</i>		<i>Ohio River Main Channel (outside RWA area)</i>
		<i>*Pink Mucket</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>*Ring Pink</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Rough Pigtoe</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
Fleming	Mussel	<b>Fanshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
	Plant	Short's Goldenrod	Endangered	
Grant	-	-	-	
Harrison	Mussel	<b>Clubshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
	Mussel	<b>Fanshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
	Plant	Running Buffalo Clover	Endangered	
	Insect	Beaver Cave Beetle	Candidate	
Kenton	Mussel	<i>Catspaw</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<b>Clubshell</b>	<b>Endangered</b>	<b>Ohio and Licking River Main Channel</b>
	Mussel	<b>Fanshell</b>	<b>Endangered</b>	<b>Ohio and Licking River Main Channel</b>
		<i>Northern Riffleshell *</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Orange-Foot Pimpleback*</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Pink Mucket *</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Ring Pink *</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Rough Pigtoe *</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
	Plant	Running Buffalo Clover	Endangered	
Lewis	Mussel	<i>Catspaw</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Fanshell</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Orange-Foot Pimpleback</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
		<i>Pink Mucket</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
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**Federally-Listed Species Located in Licking River Watershed Counties**

County	Species Type	Species Name	Federal	Aquatic Species Only
		<i>Rough Pigtoe</i>	<i>Endangered</i>	<i>Ohio River Main Channel (outside RWA area)</i>
	Plant	Virginia Spiraea	Threatened	
Magoffin	-	-	-	
Mason	-	-	-	
Menifee	Mammal	Indiana Bat	Endangered	
		Virginia Big-Eared Bat	Endangered	
	Plant	White Haired Goldenrod	Endangered	
Montgomery	Mammal	Indiana Bat	Endangered	
	Plant	Running Buffalo Clover	Endangered	
Morgan	Mammal	Indiana Bat	Endangered	
		Virginia Big-Eared Bat	Endangered	
Pendleton	<b>Mussel</b>	<b>Clubshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
		<b>Fanshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
		<b>Northern Riffleshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
	<b>Mussel</b>	<b>Pink Mucket</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
		<b>Rough Pigtoe</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
Robertson	<b>Mussel</b>	<b>Clubshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
		<b>Fanshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
	Plant	Short's Goldenrod	Endangered	
Rowan	Mammal	Virginia Big-eared Bat	Endangered	
	<b>Mussel</b>	<b>Northern Riffleshell</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>
		<b>Pink Mucket</b>	<b>Endangered</b>	<b>Licking River Main Channel</b>

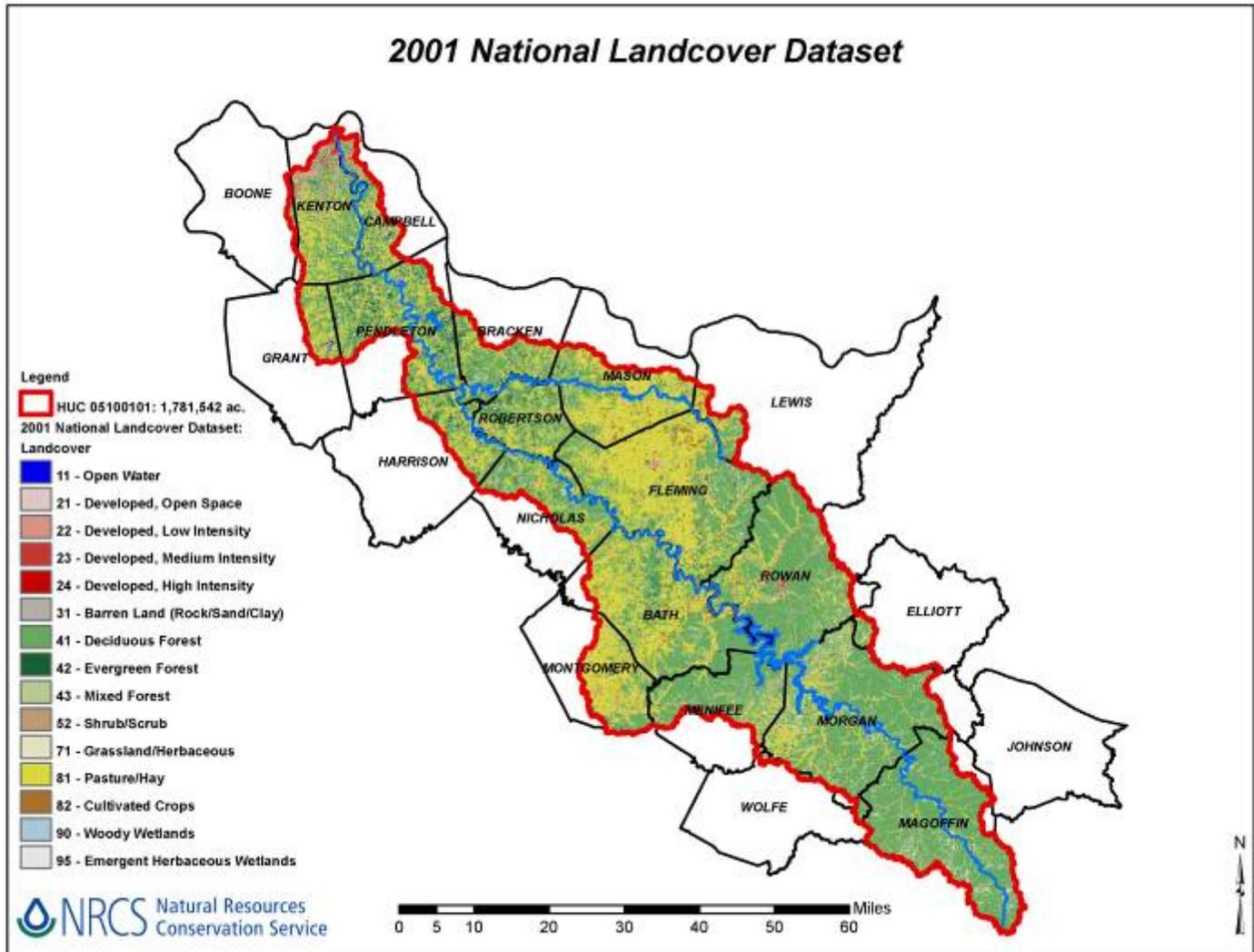


*The Virginia big-eared bat, a federally endangered species found in the RWA area.*

Photo: USFWS

## Land Use / Land Cover

The RWA project area (HUCs 05100101) has a land cover that is predominately forested due to large tracts in Magoffin, Menifee, Morgan, and Rowan Counties. Pasture/haylands are the secondary land cover for the project area and comprise the majority of the central portion of the watershed. Developed (medium and high density) acreage occurs mostly in the northern portion of the Licking Watershed due to the urban influence of Cincinnati, Ohio.



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Land Cover -HUC05100101	Acres	% of Area	Land Cover -HUC05100101	Acres	% of Area
Deciduous Forest	922,925	51.8	Developed, Low Intensity	26,396	1.5
Pasture/Hay	482,913	27.1	Open Water	13,477	0.8
Developed, Open Space	77,763	4.4	Developed, Medium Intensity	7,877	0.4
Grassland/Herbaceous	68,098	3.8	Barren Land (Rock/Sand/Clay)	3,620	0.2
Mixed Forest	59,396	3.3	Woody Wetlands	2,243	0.1
Evergreen Forest	51,186	2.9	Developed, High Intensity	2,035	0.1
Cultivated Crops	31,949	1.8	Emergent Herbaceous Wetlands	1,075	0.1
Shrub/Scrub	30,589	1.7			

## County Data

The Licking River Watershed includes all or part of 20 counties. Agricultural statistics vary with one similarity- federal government payments have increased in all counties from 1997 to 2002.

County (20% or more in project area)	Land in Farms, Acres	No. of Farm	Average Size of Farms	Gov. Payments (1997)	Gov. Payments (2002)	Percent Change, Gov. Payments	Cattle/ Calves, no.	Forage, acres)
Bath	107,574	692	155	\$131,000	\$362,000	Up 176%	24,505	22,949
Bracken	94,393	639	148	\$74,000	\$266,000	Up 259%	13,977	19,413
Campbell	50,383	581	87	\$15,000	\$57,000	Up 280%	8,721	13,149
Fleming	183,585	1,071	171	\$423,000	\$926,000	Up 119%	48,498	42,498
Grant	116,454	1,020	114	67,000	\$146,000	Up 118%	15,344	23,735
Harrison	158,980	1,085	147	\$158,000	\$374,000	Up 137%	33,013	39,840
Kenton	46,479	495	94	\$65,000	\$106,000	Up 63%	7,208	12,202
Magoffin	45,509	345	132	\$7,000	\$28,000	Up 300%	1,776	2,555
Mason	128,123	726	176	\$328,000	\$735,000	Up 124%	26,781	35,604
Menifee	37,012	334	111	\$12,000	\$33,000	Up 175%	3,838	5,712
Montgomery	90,951	676	135	\$168,000	\$259,000	Up 54%	27,540	21,459
Morgan	115,559	804	144	\$25,000	\$118,000	Up 372%	9,671	12,309
Nicholas	105,524	582	181	\$73,000	\$216,000	Up 196%	22,467	26,069
Pendleton	132,402	964	137	\$105,000	\$219,000	Up 109%	15,879	28,089
Robertson	43,061	247	174	\$13,000	\$74,000	Up 469%	4,063	8,166
Rowan	50,825	436	117	33,000	50,000	Up 52%	5,897	11,376
	<b>1,834,565</b>	<b>12,471</b>		<b>\$987,000</b>	<b>\$5,494,000</b>		<b>375,224</b>	<b>405,543</b>

Data source -NASS, 2002 and 1997 Data

County (20% or more in project area)	1997 Total Cropland (acres)	2002 Total Cropland (acres)	2002 Corn for Grain (acres)	2002 Corn for Silage (acres)	2002 Tobacco (acres)	2002 Soybeans (acres)	2002 Market Value Production, average/farm
Bath	81,680	67,380	2,006	524	1,548	1,506	\$107,129
Bracken	54,625	50,250	821	644	1,691	287	\$16,208
Campbell	27,842	28,647	516	218	205	524	\$10,074
Fleming	124,039	110,671	1,777	2,382	1,945	3,442	\$31,698
Grant	71,380	62,453	153	223	1,318	No report	\$12,940
Harrison	115,561	102,821	2,350	869	2,285	2,371	\$19,393
Kenton	24,934	26,577	94	231	399	No report	\$10,730
Magoffin	9,830	14,247	255	n/a	470	No report	\$4,805
Mason	90,397	87,026	2,317	2,461	2,274	3,500	\$30,791
Menifee	17,274	14,130	324	105	467	No report	\$7,759
Montgomery	77,087	56,354	779	430	1,407	93	\$23,146
Morgan	41,498	38,375	338	137	1,339	n/a	\$9,505
Nicholas	66,734	68,154	678	389	1,516	n/a	\$20,404
Pendleton	70,219	69,306	376	n/a	1,148	500	\$9,130
Robertson	25,984	20,300	50	20	568	No report	\$10,065
Rowan	22,232	24,588	416	61	549	n/a	\$12,933
	<b>1,164,509</b>	<b>1,058,284</b>	<b>13,097</b>	<b>8,471</b>	<b>17,811</b>	<b>12,223</b>	<b>\$473,206</b>

## Stakeholder Participation

Numerous agencies and private organizations, as well as local landowners and officials, provided input on this project during the development process. On June 17, 2008 NRCS hosted a meeting for federal/state agencies and conservation organizations to share information and obtain input on resource issues and concerns throughout the Licking River Basin. Stakeholder agencies participating in this meeting by attending or filling out questionnaires include the Kentucky Division of Water (KDOW), U.S. Fish and Wildlife Service (USFWS), Kentucky Department of Fish and Wildlife Resources, Kentucky State Natures Preserves Commission, Kentucky Division of Forestry, Licking River Valley Resources Conservation and Development, Kentucky Waterways Alliance, The Nature Conservancy, and Kentucky Department of Agriculture.

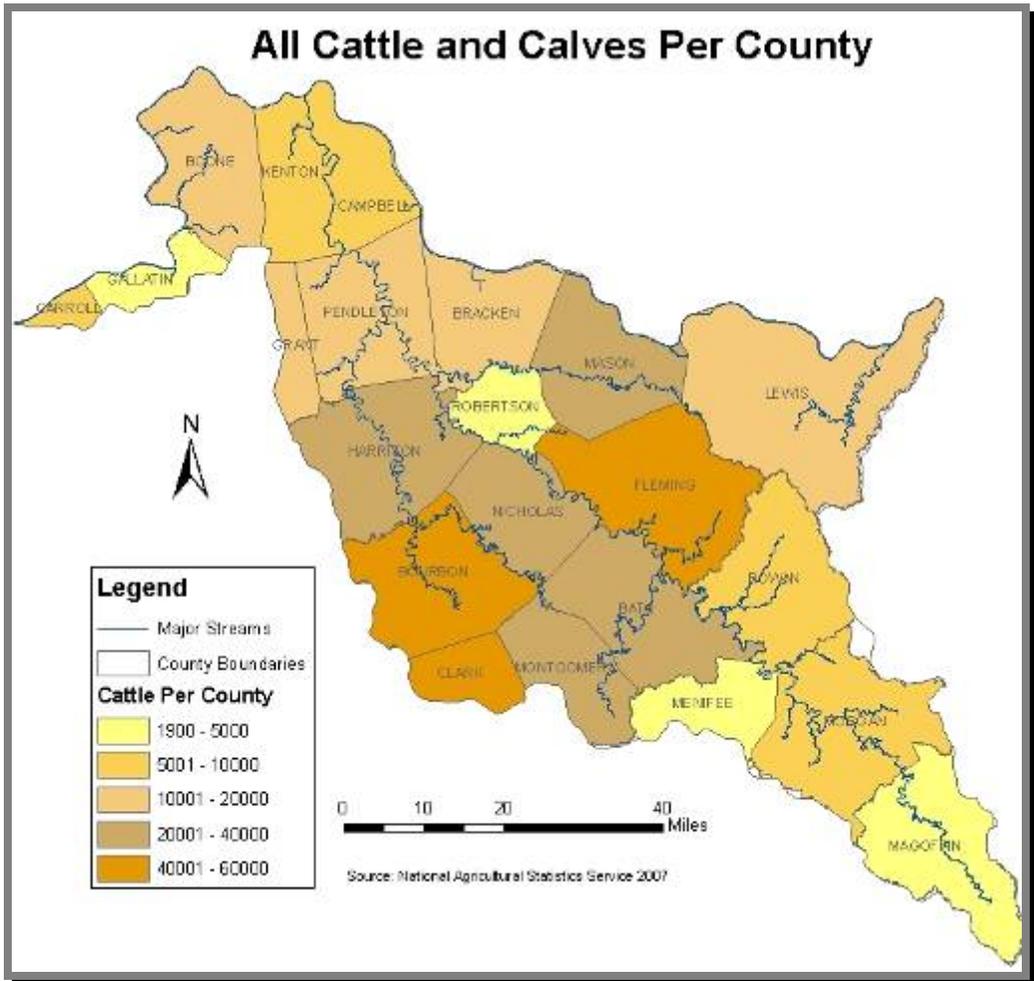
The priority concern identified during the June meeting was water quality issues including non-point pollution, stream sedimentation, and bank erosion. Associated with water quality was the need to protect mussel beds in the lower Licking River. The number one need identified was additional program funding and increased incentives for farmer to exclude cattle from streams, provide proper cattle crossings and install stream buffers. The stakeholders would also like to see the expanded use of NRCS' Wetland Reserve Program, especially targeting watersheds in tributaries upriver from known mussel beds.

In May -July 2008, local conservation districts were provided a questionnaire asking their opinions on current resource concerns and farmer/landowner needs in the Licking Basin. The following table shows the resource concern and the percentage of respondents that had those concerns.

<b>Licking Basin Identified Resource Concerns</b> RC&D 2008 survey of Conservation District Members	<b>Percent</b>
Uncontrolled runoff/ erosion	72%
Streambank erosion /sedimentation of streams	68%
Noxious weeds	48%
Poor water quality	43%
Inadequate water quantity	33%
Poor pasture conditions/ inadequate forage	31%
Management of animal waste	27%
Flooding	10%
Lack of adequate septic systems	8%

According to data obtained from the National Agricultural Statistic Service (NASS) and Kentucky Department of Agriculture, Fleming County has the largest population of cattle within HUC 05100101. Landowners in Fleming County have made many improvements over the past 10 years with regards to livestock management. Although numerous conservation projects have been supported by the Environmental Protection Agency, the Kentucky Division of Water, local conservation districts and NRCS, there is still a need for targeted conservation funding in this watershed.

A comparison of 1997 and 2002 NASS data shows that milk cow populations in HUC 05100101 have declined while beef cow populations have continually increased. Stream exclusion fencing, stream crossings, watering facilities, and buffer strips are conservation practices that are needed throughout the watershed and especially along the Licking River and in subwatersheds immediately above freshwater mussel beds.

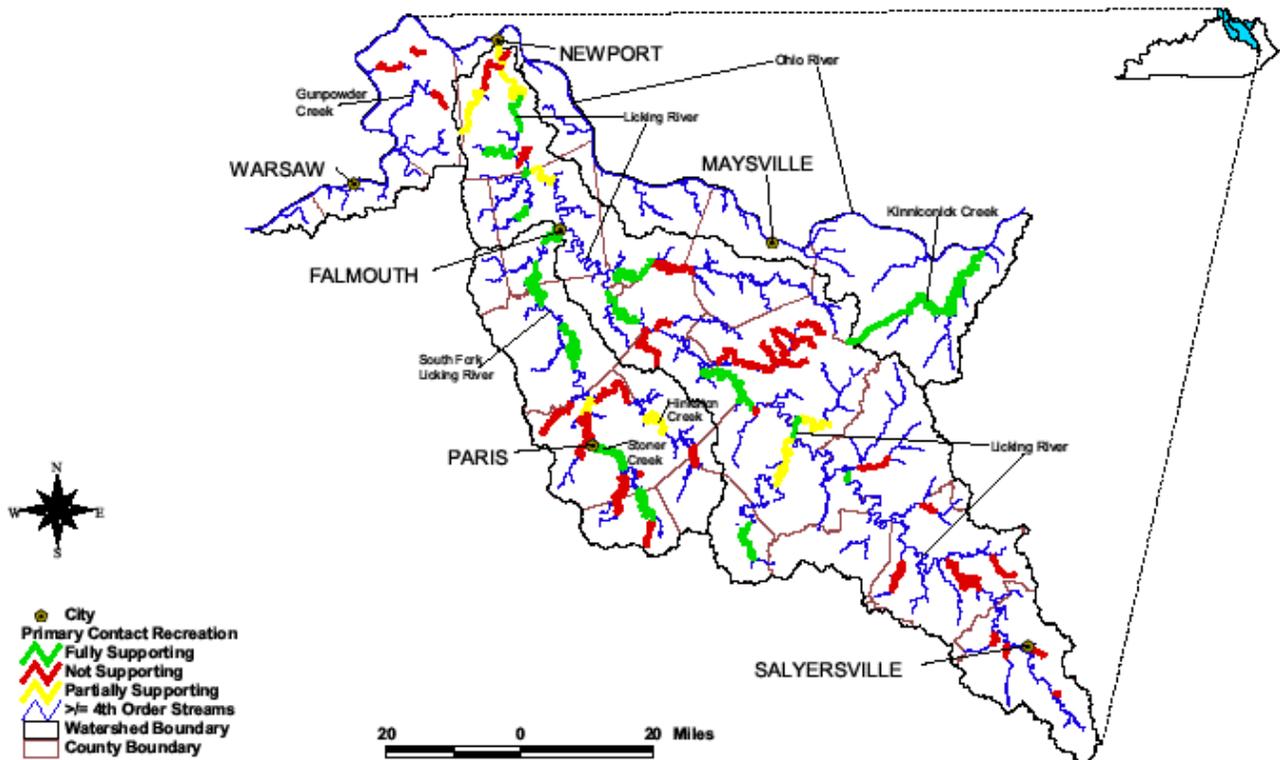


*Map: Kentucky Division of Water with NASS data*



*Cows with free access to streams - a common site throughout the Licking Watershed*

Figure B12. Reach indexing results of streams assessed in the Licking River Basin and adjacent Ohio River minor tributaries for Primary Contact Recreation Use.

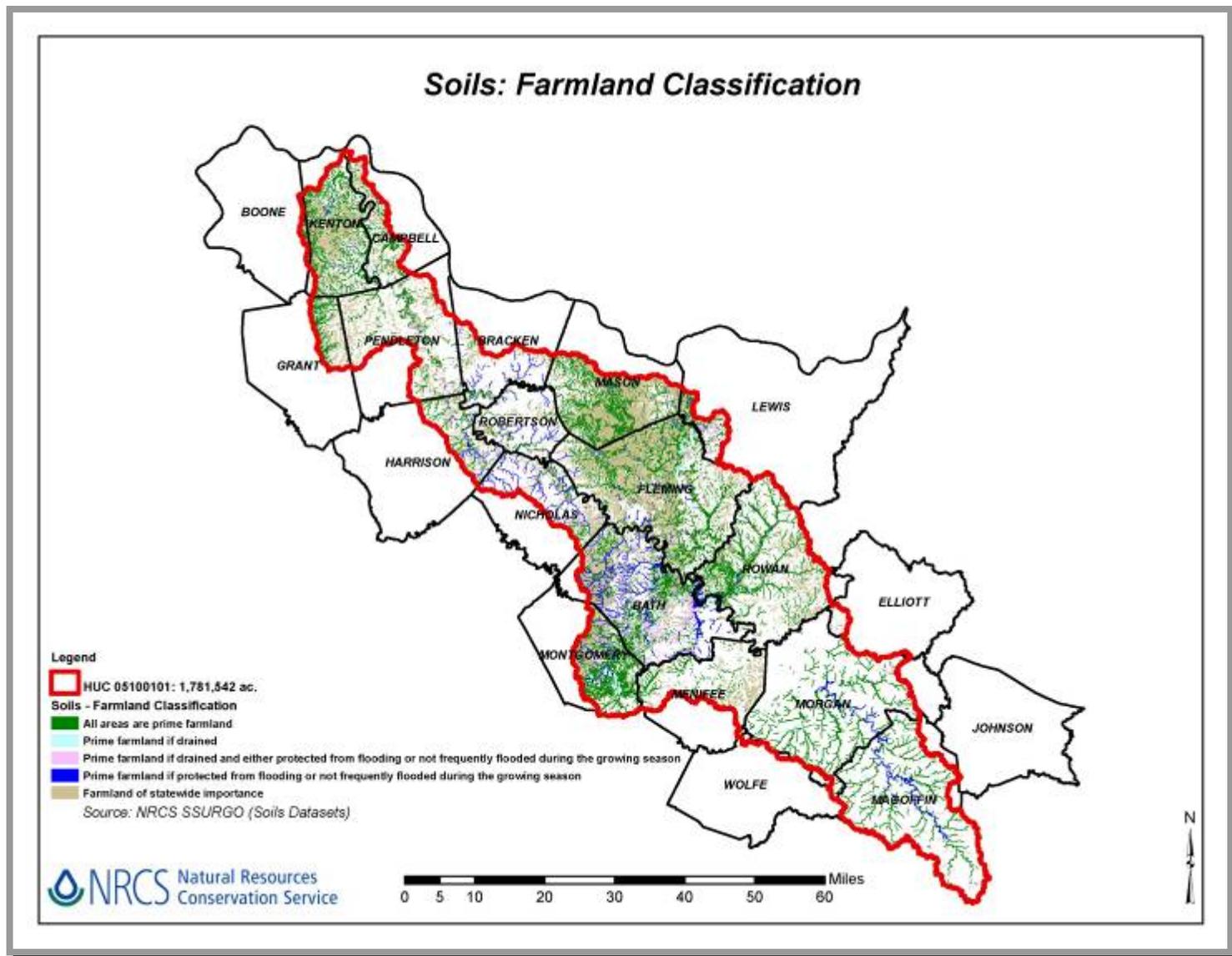


Map Source: Kentucky Division of Water, 305(b) report, 2006

The above map shows stream ratings for primary contact recreation of streams throughout the Licking River Basin. Not supporting primary contact recreation segments are identified in **red** and within HUC 05100101 were located in **Fleming, Nicholas, Robertson, Rowan, Morgan, and Magoffin**. Complete listings of impaired stream segment and impairment causal factors are listed later in this document.

## Prime Farmland Soils

Nearly a quarter of the Licking River Watershed is classified as prime farmland and/or farmland of statewide importance. Prime farmland is defined as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods.” (NRCS Title 430)

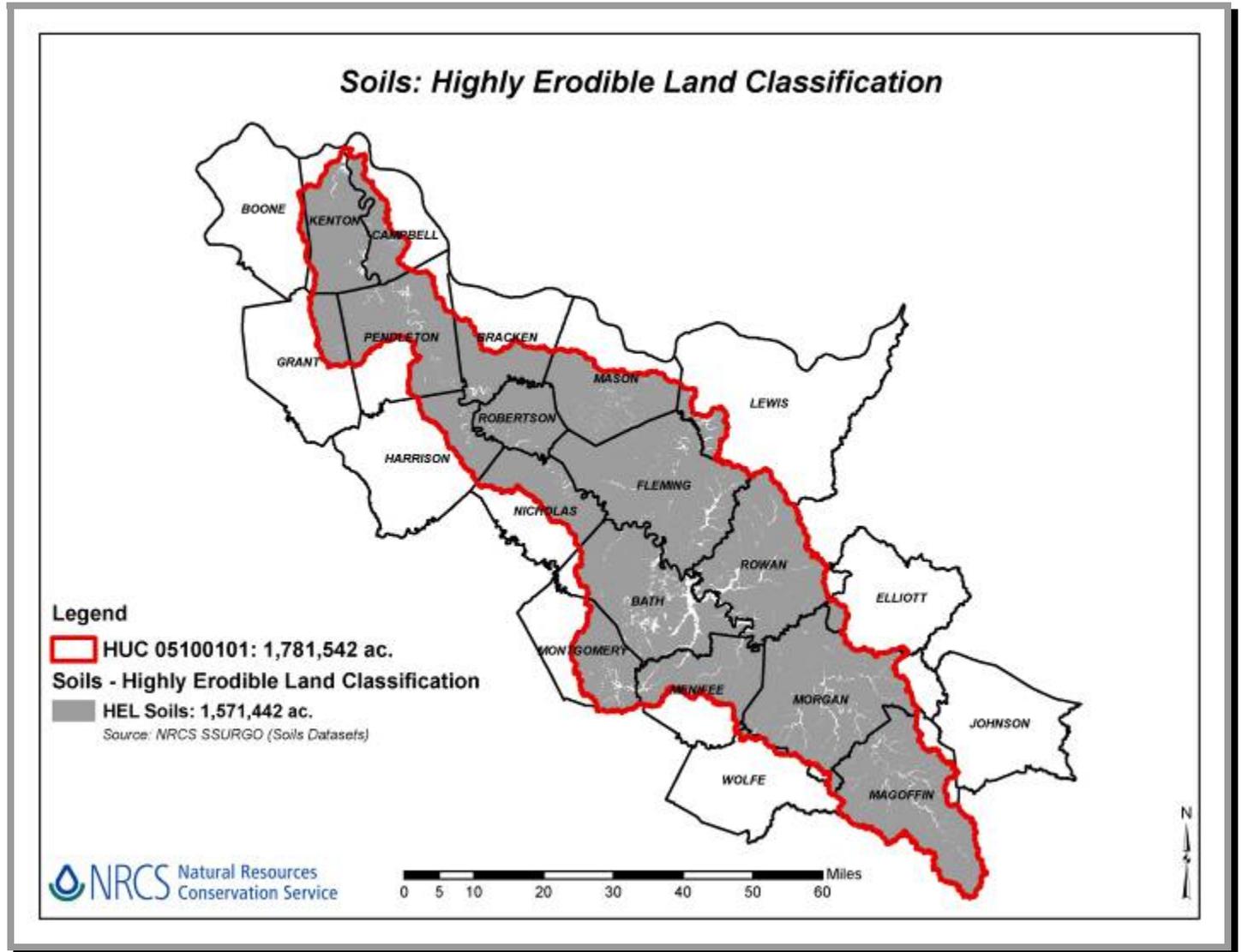


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Soils - Farmland Classification HUC 05100101	Acres	% of Area
All areas are prime farmland	197,961	11.1
Prime farmland if drained	23,459	1.3
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	17,250	1.0
Prime farmland if protected from flooding or not frequently flooded during the growing season	27,749	1.6
Subtotal (Prime):	<b>266,419</b>	<b>15.0</b>
Farmland of statewide importance	167,561	9.4
Subtotal: (Prime or Statewide):	<b>433,980</b>	<b>24.4</b>
Not prime farmland	1,347,562	75.6

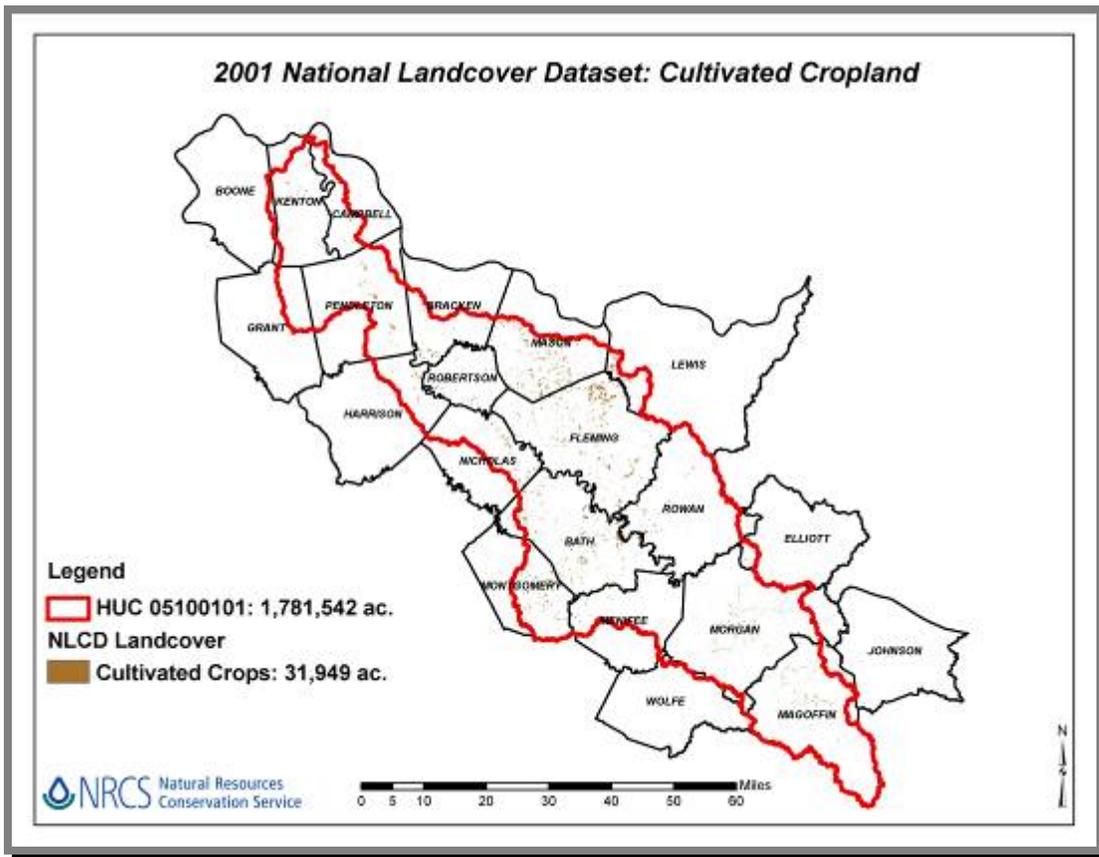
## Highly Erodible Land or HEL

Over 88% of this RWA project area is classified as HEL. The erodibility index (EI) for a soil map unit is determined by dividing the potential erodibility for the soil map unit by the soil loss tolerance (T) value established for the soil according to NRCS technical documents. A soil map unit with an EI of 8 or greater is considered to be highly erodible land (HEL). Potential erodibility is based on default values for rainfall amount and intensity, percent and length of slope, surface texture and organic matter, permeability, and plant cover. Actual erodibility and EI for any specific map unit depends on the actual values for these properties.

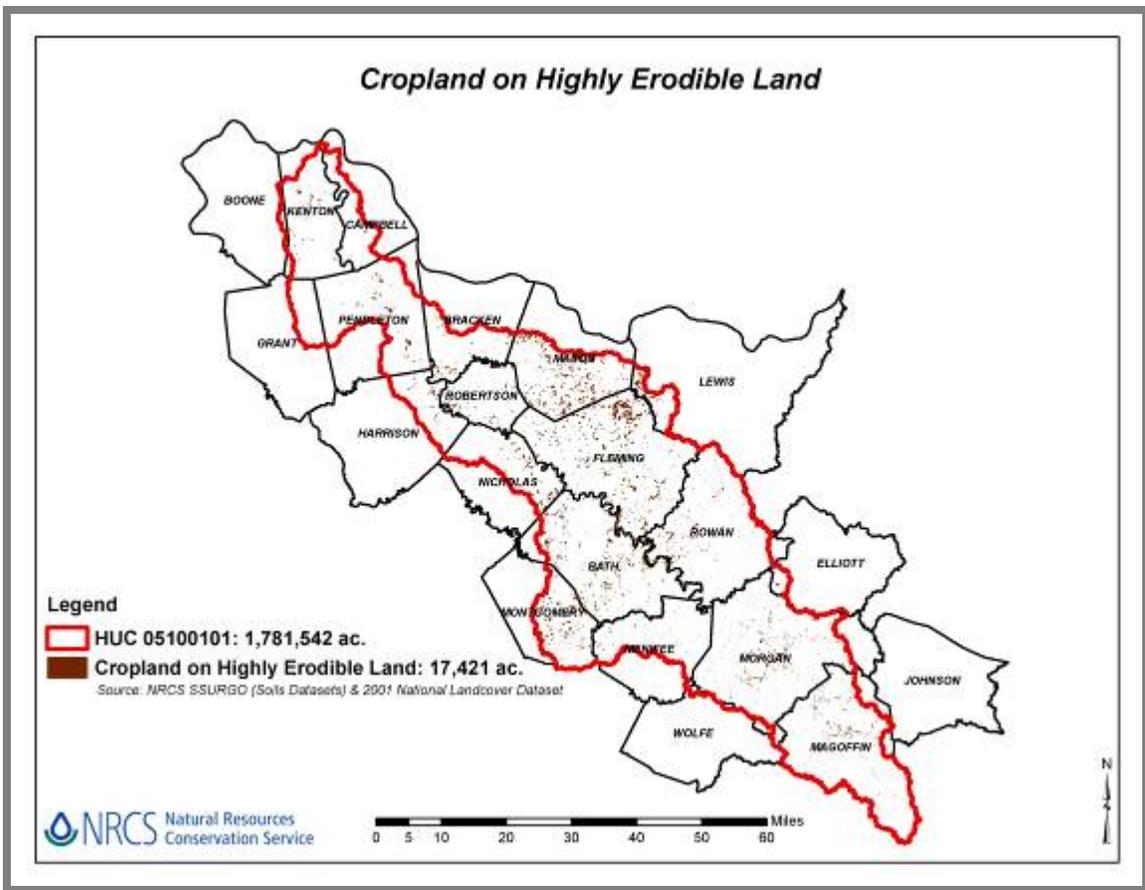


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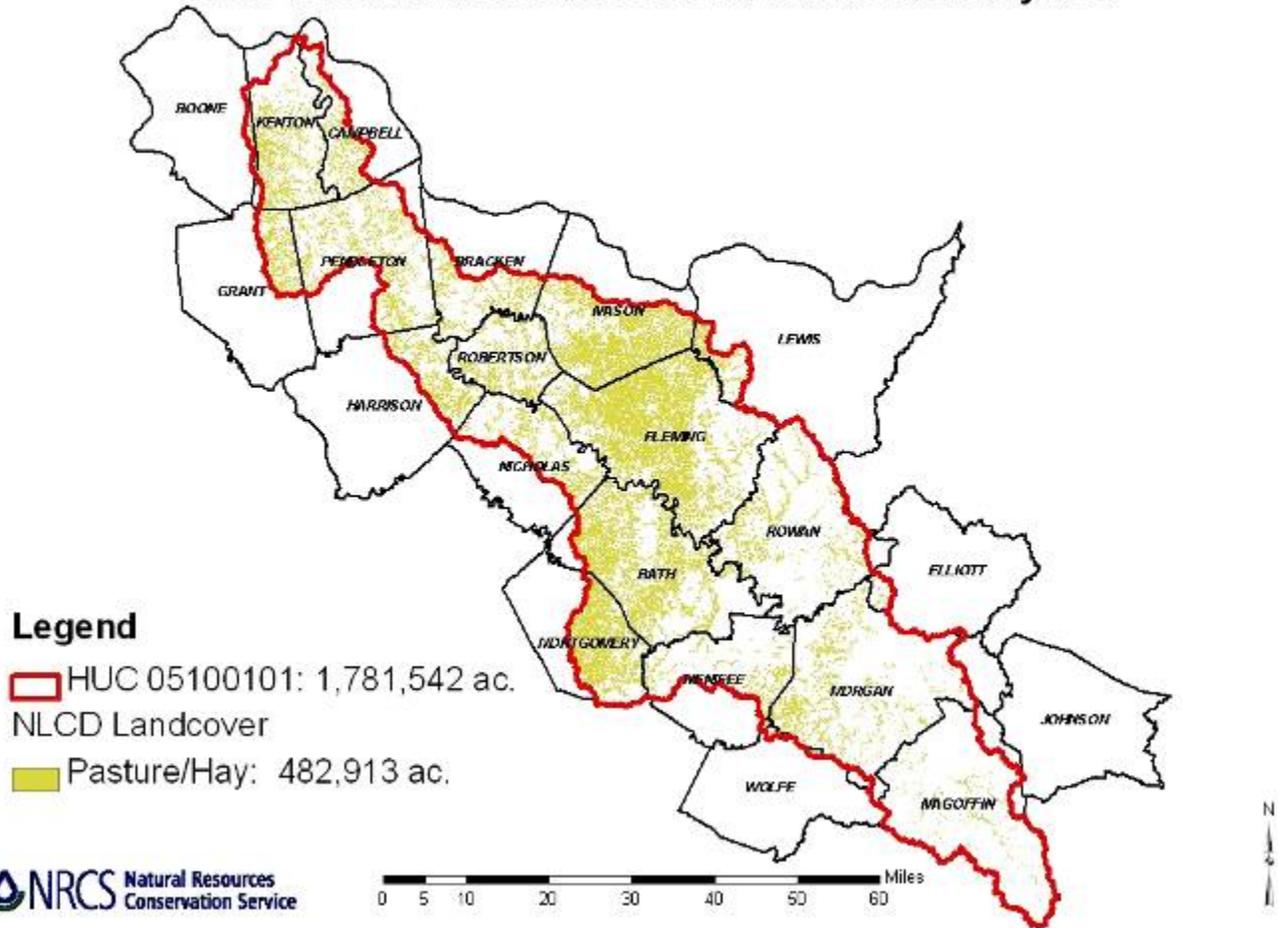
Highly Erodible Land -HUC05100101	Acres	% of Area
Highly erodible land	1,571,470	88.2
Not highly erodible land	187,208	10.5
Not rated (primarily water)	22,864	1.3



Cultivated crops within this project area are less than 2% of the total land base. The majority of cropland acres are in Fleming, Mason, Bath, and Montgomery Counties

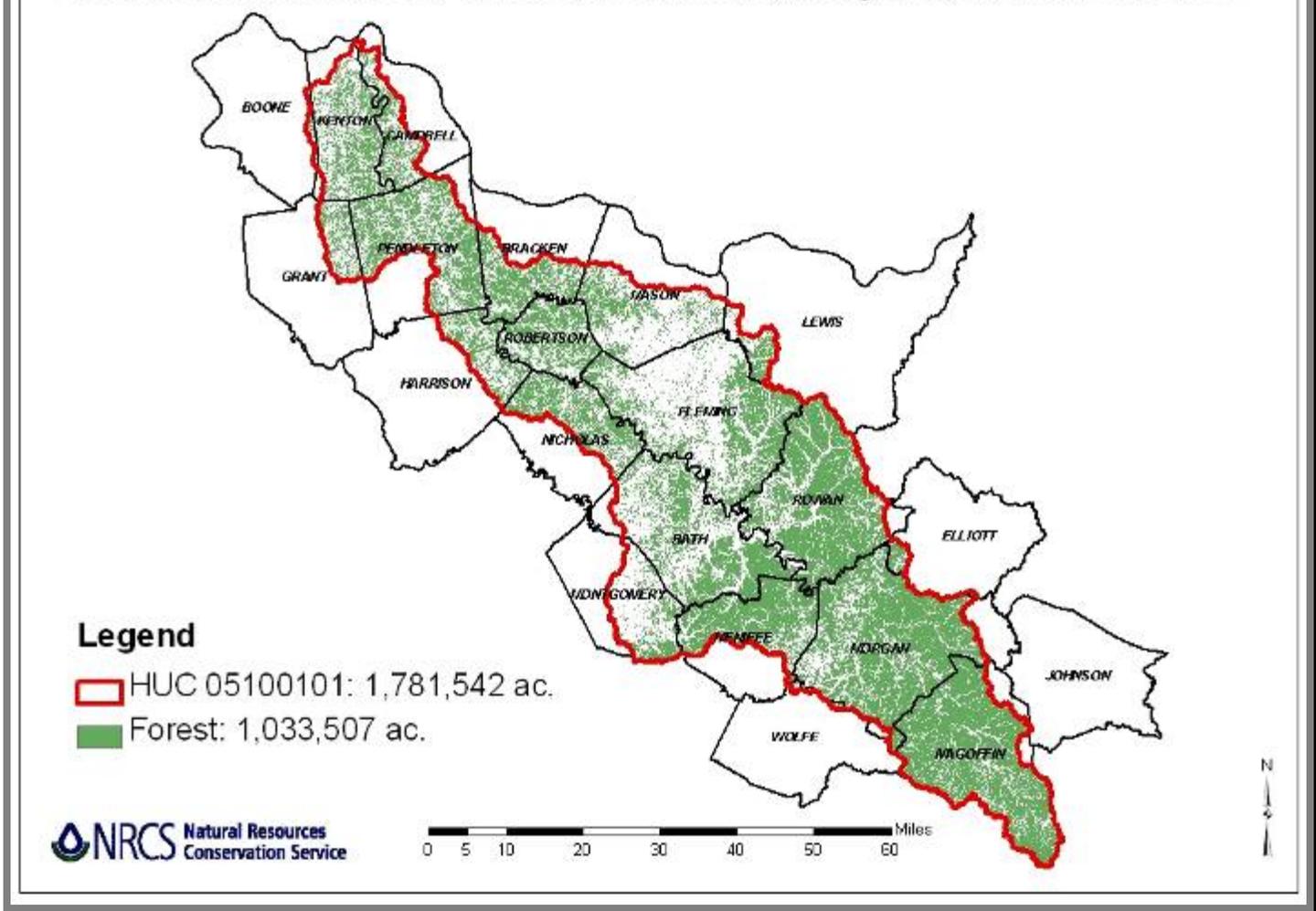


### 2001 National Landcover Dataset: Pasture and Hayland



*The majority of the 482,913 acres of hay/pasturelands are in HUC05100101 are in Fleming, Mason, Bath, and Montgomery Counties.*

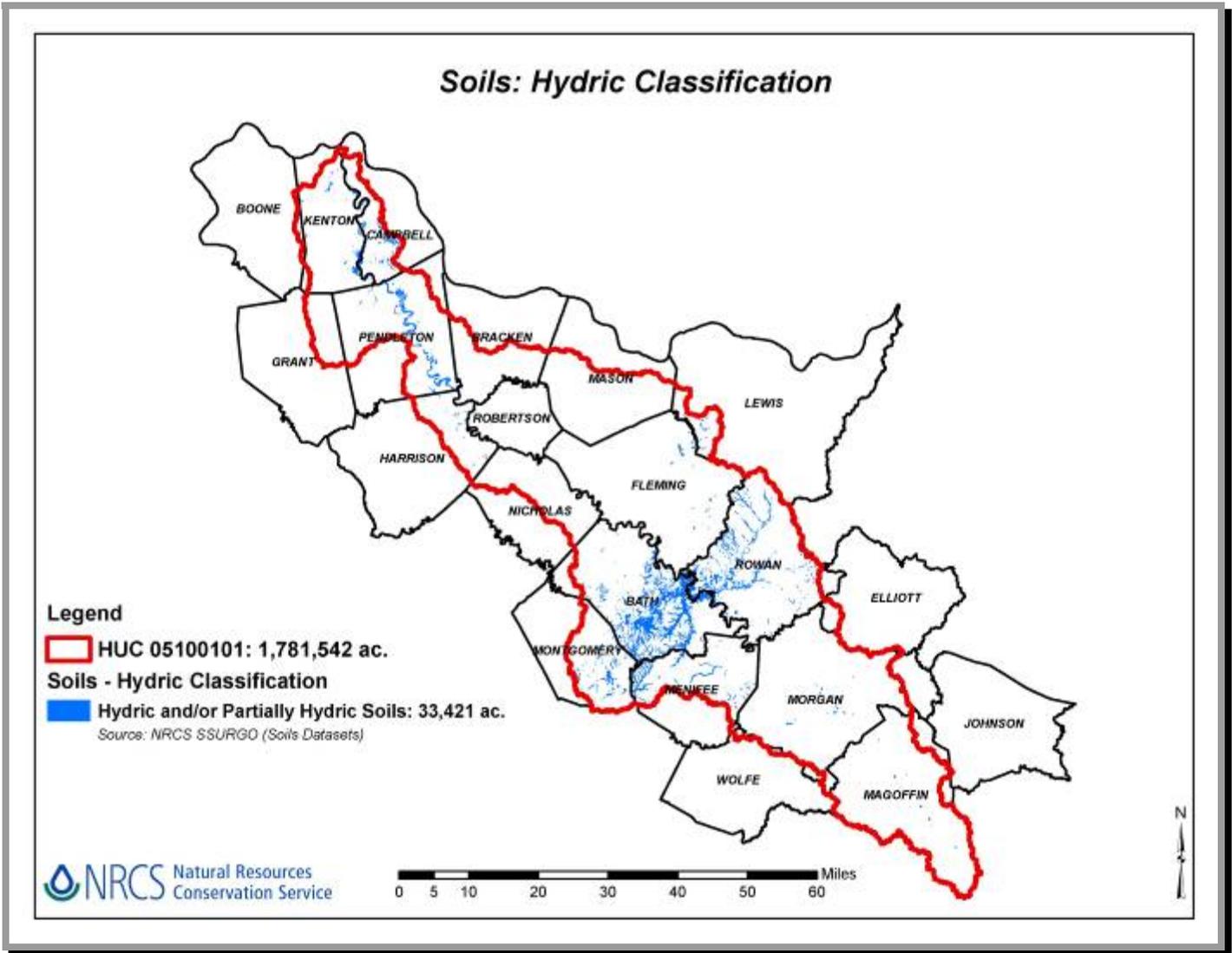
## 2001 National Landcover Dataset: Deciduous, Evergreen, and Mixed Forest



### Program Options for Forest Landowners

NRCS offers multiple conservation programs to assist landowners of forestlands. Both the Wildlife Habitat Incentive Program (WHIP) and the Environmental Quality Improvement Program (EQIP) offer a number of practices to improve woodlands including funding of forest stand improvement (FSI), fencing to exclude livestock from forested land, and installation of ephemeral wetlands that benefit wood ducks, reptiles, amphibians, and two species of federally endangered bats, the Indiana bat and the gray bat. More information on these programs specifically for Kentucky can be found at: <http://www.ky.nrcs.usda.gov/programs/EQIP2008/index2008.html> and <http://www.ky.nrcs.usda.gov/programs/WHIP/WHIP2007.html>.

Karst occurrence in this watershed is common and with this geologic structure comes sinkholes and caves. The WHIP program can also help private landowners protect the declining bat populations by providing funding and installation of bat gates for caves. Disturbance of bats during hibernation is fatal for these creatures and by installing a “bat-friendly” gate, landowners provide bats a safe winter refuge.



SC

Hydric and/or partially hydric soils provide opportunities for landowners to consider the Wetland Reserve Program (WRP) which is discussed in more detail on the following page. The majority of hydric/partially hydric soils are in Montgomery, Bath, Rowan, and Meniffee Counties. Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field.

Hydric Classification HUC 05100101	Acres	% of Area
All hydric	2,781	0.2
Partially hydric	30,640	1.7
Subtotal (Hydric or P. Hydric):	<b>33,421</b>	<b>1.9</b>
Not hydric	1,741,979	97.8
Not rated	6,142	0.3

## **The Wetland Reserve Program (WRP) A Partnership between NRCS and Landowners**



**WRP site prior to restoration**

The Wetlands Reserve Program (WRP) is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. WRP offers landowners an opportunity to establish long-term conservation, wildlife habitat and wetland protection with technical and financial assistance from NRCS.

Landowners who choose to participate in WRP may sell a conservation easement or enter into a cost-share restoration agreement with USDA to restore and protect wetlands. The landowner voluntarily limits future use of the land, yet retains private ownership. With landowner input, NRCS develops a plan for the restoration and maintenance of the wetland. The program offers landowners three options: permanent easements, 30-year easements, and restoration cost-share agreements of a minimum 10-year duration.

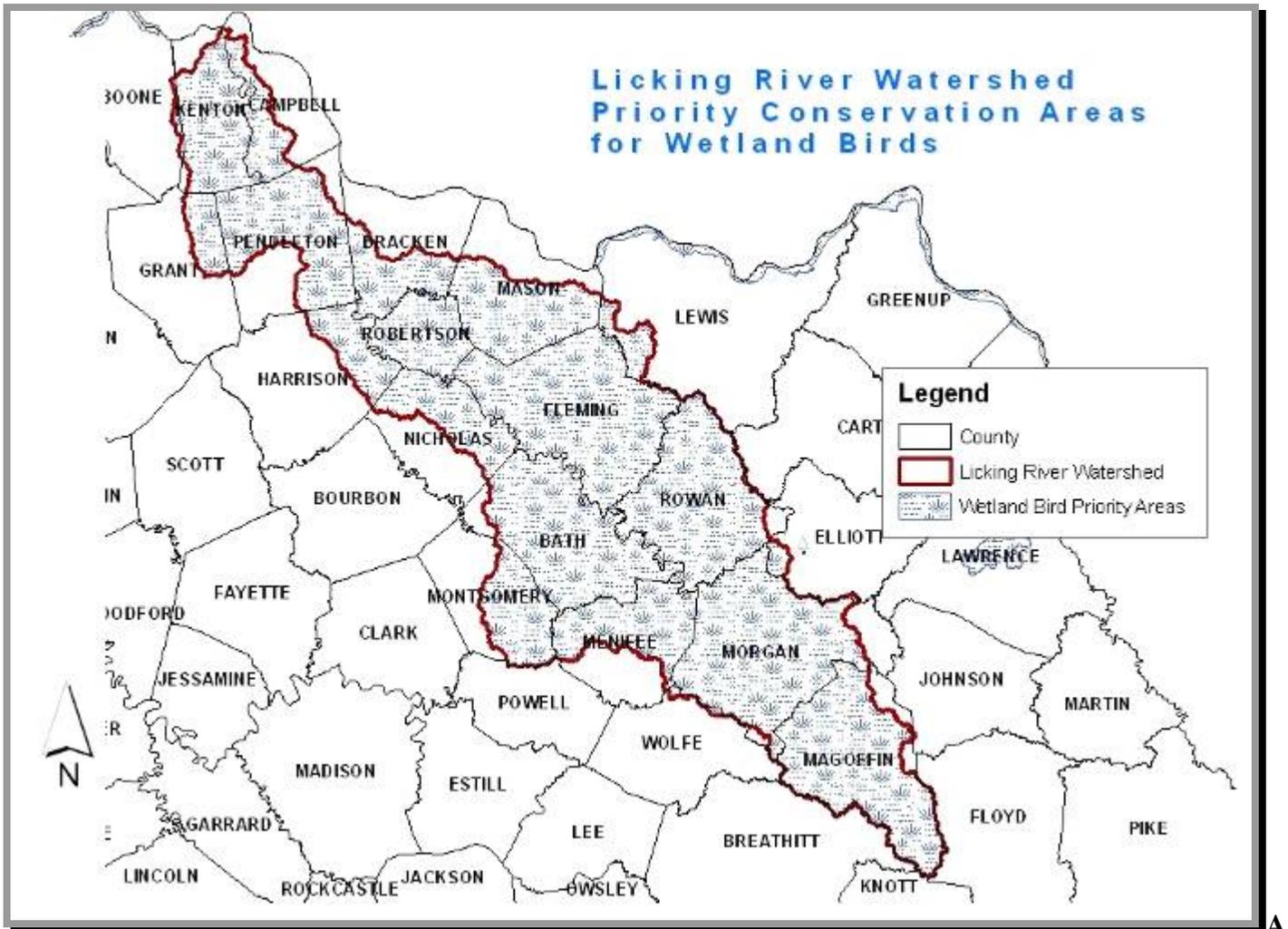
A landowner continues to control access to the land--and may lease the land--for hunting, fishing, and other undeveloped recreational activities. At any time, a landowner may request that additional activities be evaluated to determine if they are compatible uses for the site. This request may include such items as permission to operate water control structures, plant and manage food plots, and manage native grass stands for wildlife. Compatible uses are allowed if they are fully consistent with the protection and enhancement of the wetland.

There are currently no WRP easements within the HUC 05100101, but WRP program staff is hoping to increase program awareness and enrollments in the Licking River Basin. For 2008, KY NRCS designated a portion of the Licking River Watershed as a “special interest area” for targeting additional WRP enrollments. Applications for enrollment in special interest areas have additional points awarded during the NRCS selection process. To date, two WRP projects have been identified with offers made to the landowners: one in Fleming County and one in Bath County. Bath, Montgomery, Menifee, Morgan, and Rowan counties all show potential for additional WRP enrollments.



## Kentucky Bird Priority Conservation Areas

In a 2005 report, the Kentucky Department of Fish and Wildlife Resources (KDFWR) identified geographic areas for the purpose of focusing conservation efforts that would benefit the largest number of “species with greatest conservation need”. The Licking River Watershed has the distinction of having bird priority conservation areas (PCA) for all three habitat types: grassland, wetland, and forestland. The entire Licking River Watershed is included in the wetland bird PCA and forestland bird PCA which highlights the unique natural resources found within this RWA project area.



*Kentucky Department of Fish and Wildlife Resources*



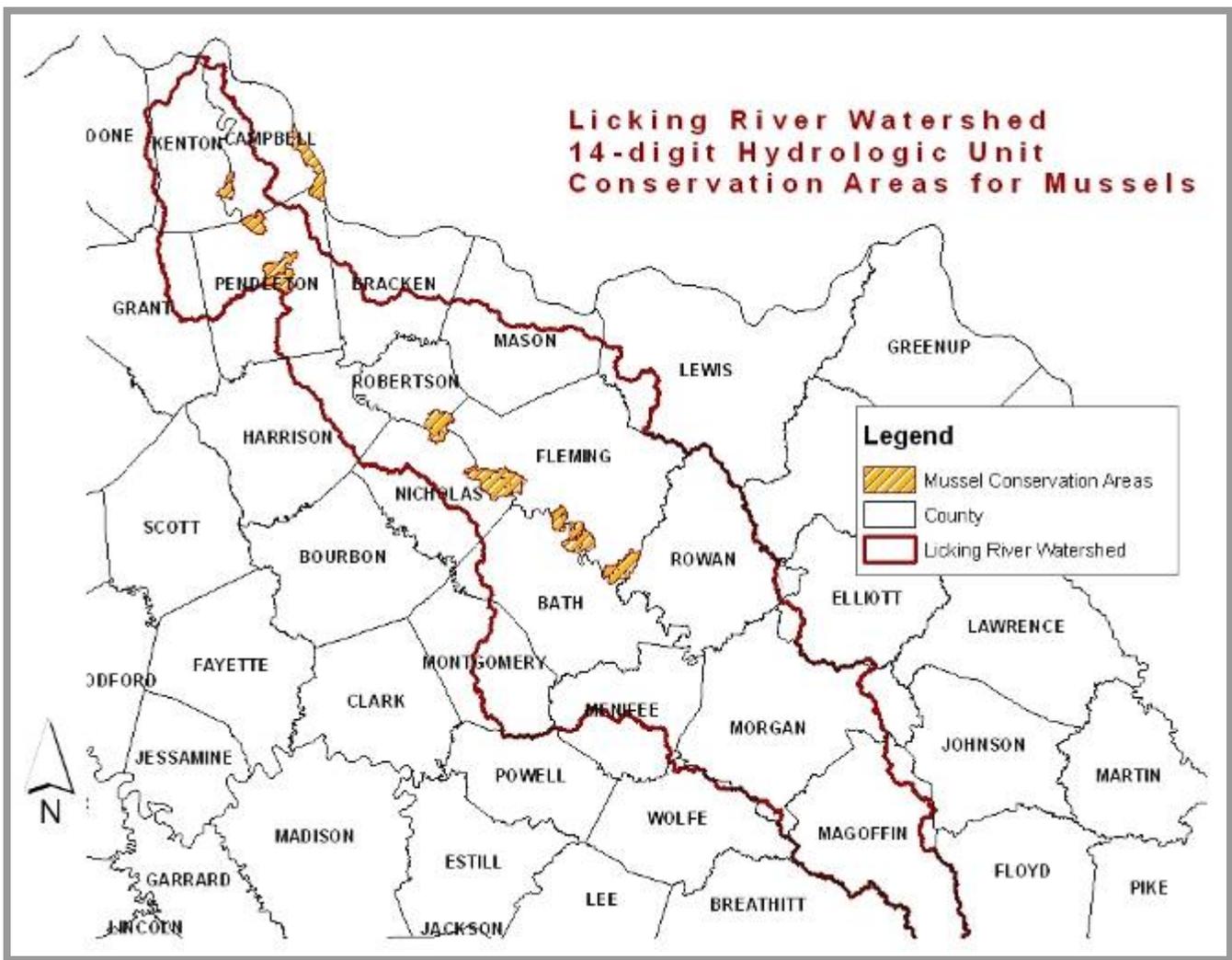
Kentucky Department of Fish and Wildlife Resources



## Bivalve Conservation Areas

The Kentucky Department of Fish and Wildlife Resources (KDFWR) also selected areas in the Licking River Basin as bivalve conservation areas (BCA). Numerous sites along the Licking River provide habitat for more than 50 species of freshwater mussels including state and federally listed species. Eleven species of mussels in the Licking River are considered endangered, and the U.S. Fish and Wildlife Service has documented that the Licking River has one of the last and best populations of fanshell mussel (*Cyprogenia stegaria*) in existence. The diversity of the bivalve population in the Licking is reflected in the colorful common names of species, such as the monkeyface, threehorn wartyback, elktoe, sheepnose, longsolid, and washboard mussels. These small creatures serve as sentinels of overall watershed health as they feed by filtering water for organic debris and plankton, and have specific needs regarding water temperatures, flow regimes and water quality.

Named stream segments within these critical mussel conservation areas include: **Indiana Run, Haven Branch, Forge Creek, Fishtrap Creek, Three Lick Branch, Sap Branch, Little Indian Creek, Sandy Branch and the Licking River.** Focusing conservation efforts in these watersheds are imperative in order to protect freshwater mussel species in this basin.



Kentucky Department of Fish and Wildlife Resources

Multiple private and public entities are focusing their attention on the Licking River including the Nature Conservancy, the Kentucky Division of Water, KDFWR, and U.S. Fish and Wildlife Service (USFWS). The USFWS is currently working with private landowners in the Beaver Creek, Greasy Creek and North Fork of the Licking watersheds to improve water quality.



The federally endangered Pink Mucket, also known as the Pearly Mussel (*Lampsilis abrupta*)



The federally endangered Eastern Fanshell (*Cyprogenia stegaria*)

Mussel Photos: Chris Todd, USFWS

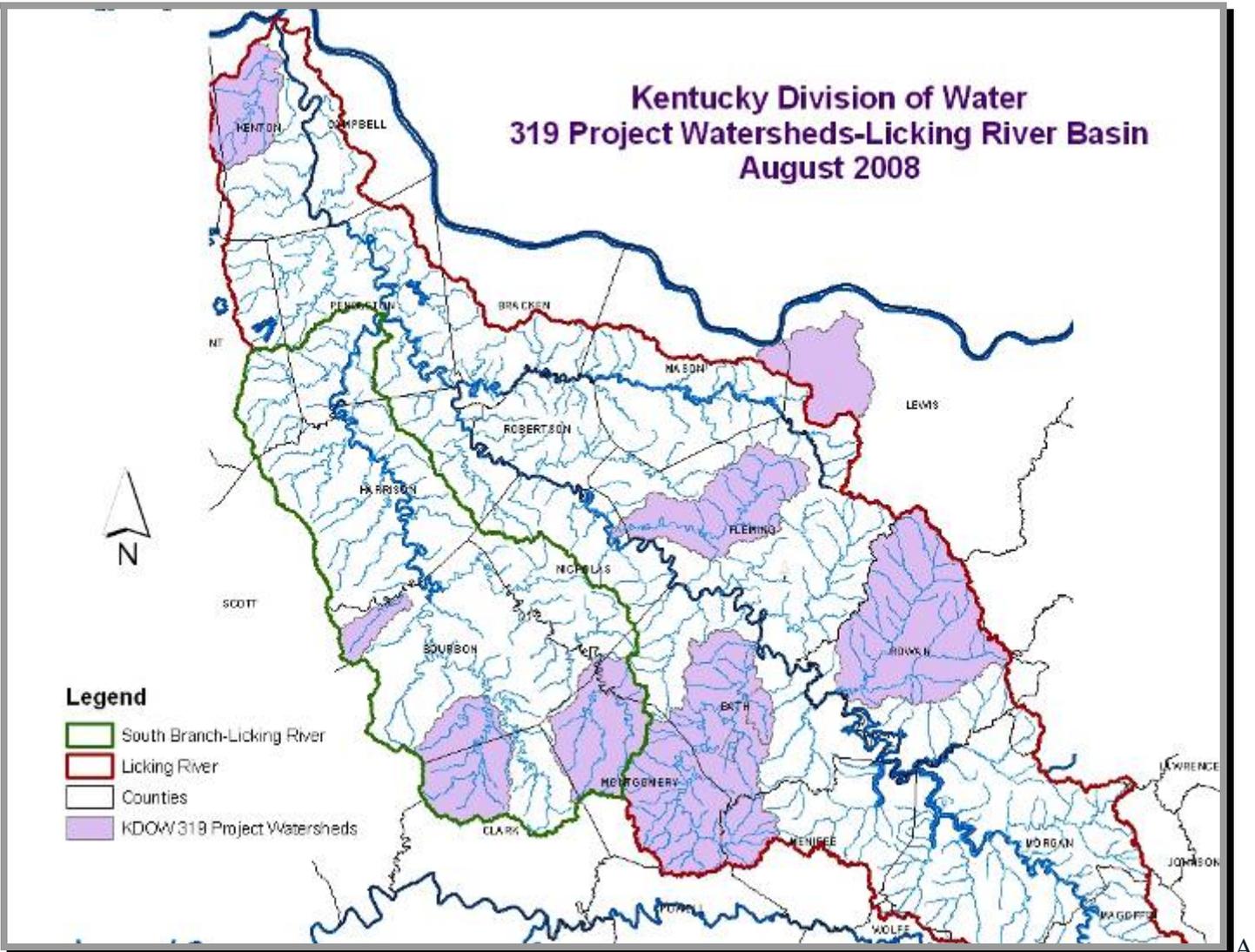
## Partnerships, Projects, and Progress

State and federal agencies are working together to focus conservation efforts within the Licking Basin, and Kentucky Division of Water has taken the lead in implementing projects to specifically improve water quality. KDOW has funded multiple projects using EPA's 319 program. Eleven digit hydrologic units in HUC 05100101 with 319 projects include: **Fleming Creek (200)**, **Slate Creek (150)**, **Triplett Creek (130)**, and **Banklick Creek (290)**. Projects include a Fleming Creek Clean Water Action Plan, Slate Creek Watershed Demonstration Project, the Olympia Watershed Project, and the Preston Watershed Demonstration Project. Under a 60% federal/ 40% non-federal match, the 319 projects in this RWA project area have a total budget in excess of \$7 million.

Non-government conservation organization such as the Nature Conservancy, Southern Conservation Corporation, and Licking River Watershed Watch are also actively working to improve watershed health through water monitoring, public education, land purchases and/or conservation projects. For example, in 2007 the Southern Conservation Corporation acquired over 100 acres of land adjacent to the Licking River via a grant from the USFWS and Kentucky State Nature Preserves Commission. The property has 4500 feet of frontage along the Licking River and 3000 feet along Beaver Creek. The SCC selected this location as it is upstream from sensitive freshwater mussel habitat, and is currently restoring the property by planting native vegetation.

The US Fish and Wildlife Service Partner's for Fish and Wildlife Program provides technical and financial assistance to private landowners for conserving, protecting and restoring habitat. In 2007, the Kentucky Partners Program designated the Licking River as one of only eight Partners for Fish and Wildlife "Focus Areas" in the state.

**Kentucky Division of Water  
319 Project Watersheds-Licking River Basin  
August 2008**



Project Name	Project Status	Total Project Budget (60% federal/40% non-federal match)	11-digit HUC Number	11-Digit HUC Name	County
Fleming Creek Clean Water Action Plan (CWAP)	Completed	\$68,700	5100101200	Fleming Creek	Fleming
Slate Creek Watershed Demonstration Project	Completed	\$110,000	5100101150	Slate Creek	Bath, Menifee, and Montgomery
Fleming Creek Clean Water Action Plan (CWAP)	Completed	\$38,333	5100101200	Fleming Creek	Fleming
NPS High Priority Watershed Council Development Project	Completed	\$120,400	5100101290, 05090201130	Banklick Creek & Cabin Creek	Boone/Kenton & Mason/Lewis

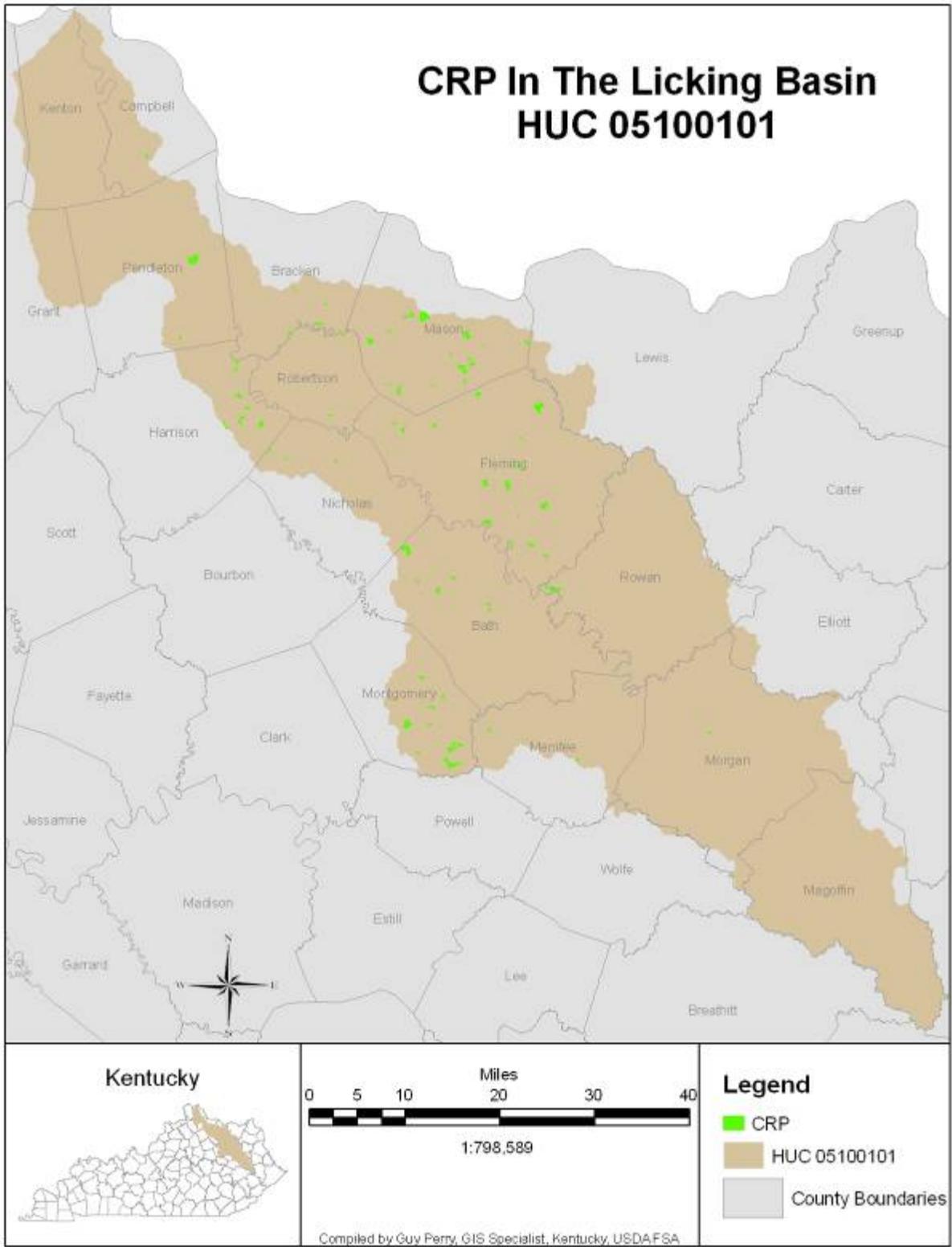
Preston Watershed Demonstration Project	Completed	\$391,667	5100101150	Slate Creek	Bath
Fleming Creek Clean Water Action Plan (CWAP)	Completed	\$36,700	5100101200	Fleming Creek	Fleming
Fleming Creek Clean Water Action Plan (CWAP)	Completed	\$874,343	5100101200	Fleming Creek	Fleming
Fleming Creek Clean Water Action Plan (CWAP)	Completed	\$833,333	5100101200	Fleming Creek	Fleming
Olympia Watershed Improvement Project	Ongoing	\$950,000	5100101150	Slate Creek	Bath
Developing Watershed Implementation Plans; Creating a formula for success in the Salt and Licking River Basins	Ongoing	\$590,564	05100101130, 05100101200, 05100102030	Triplett, Fleming, and Strodes Creeks	Rowan, Fleming, and Clark Counties
Fleming Creek CWAP	Ongoing	\$968,071	5100101200	Fleming Creek	Fleming
Banklick Creek Watershed Based Planning, Implementation, & Results	Ongoing	\$1,000,000	5100101290	Banklick Creek & all tributaries	Boone & Kenton
Triplett Creek Watershed Based Plan	Project has not begun	\$1,097,695	5100101130	Triplett Creek	Rowan

## Conservation Reserve Program (CRP)

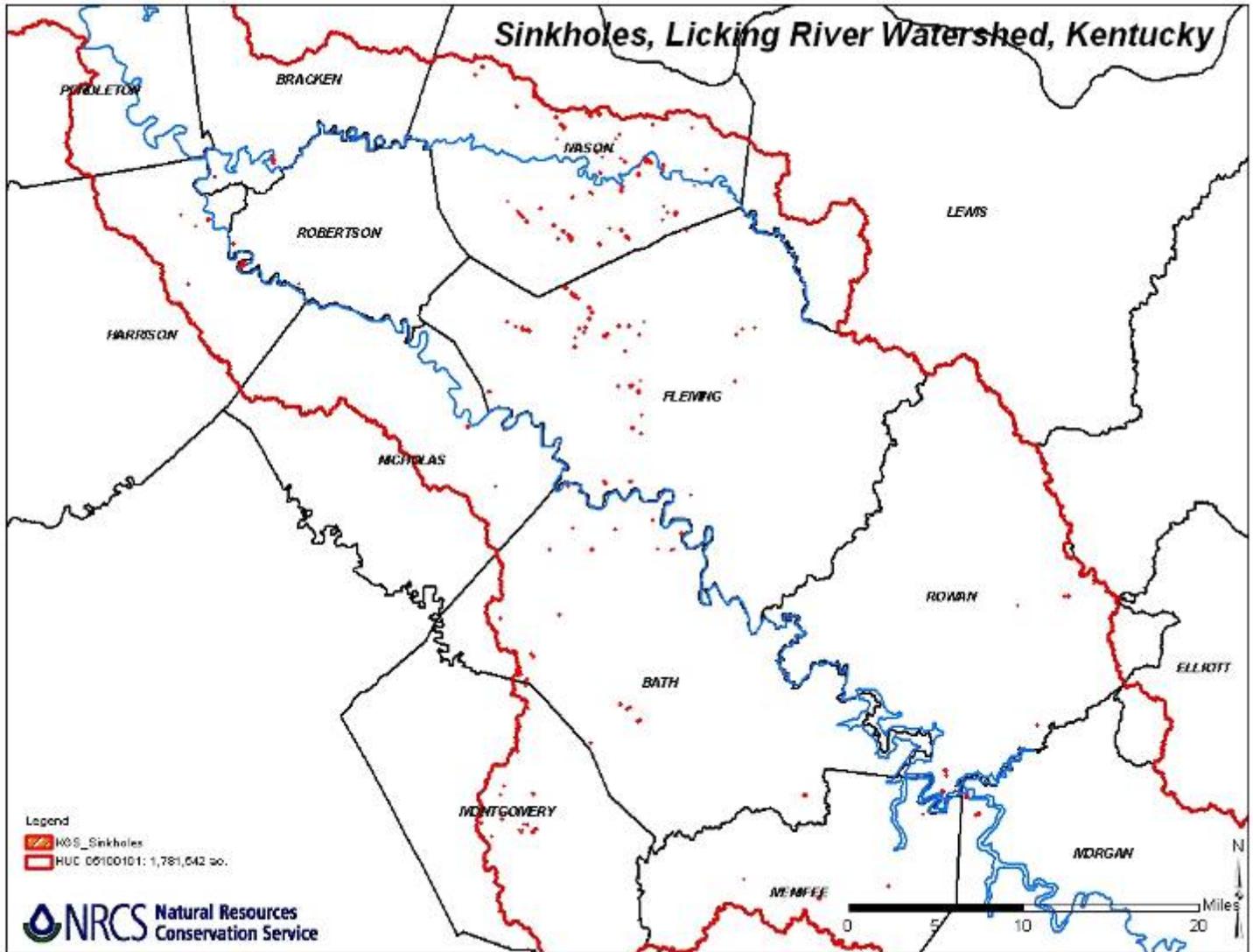
The Conservation Reserve Program (CRP) provides technical and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with Federal, State, and tribal environmental laws, and encourages environmental enhancement. CRP is administered by the Farm Service Agency, with NRCS providing technical assistance in eligibility determinations, conservation planning and practice implementation.

The Conservation Reserve Program goal is to reduce soil erosion and sedimentation in streams and lakes, plus improve water quality, establish wildlife habitat, and enhance forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Federal cost sharing is provided to establish the conservation practices.

Landowners in this RWA project area have voluntarily enrolled **1,679 acres** in the Conservation Reserve Program (CRP). If the current high land rental rates and strong row crop prices continue, it is assumed that many landowners will return their acres to production once the contracts expire.



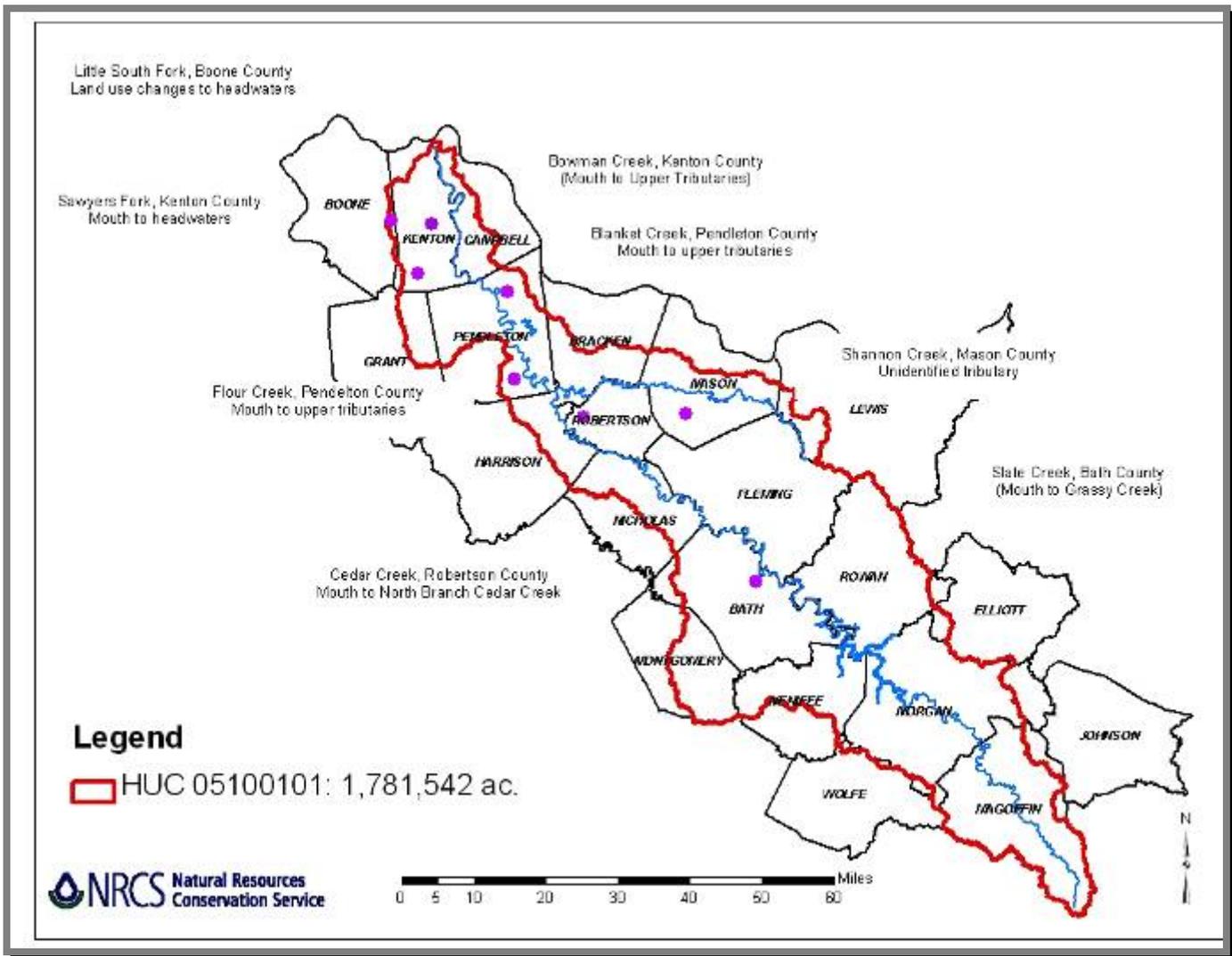
**Map: Guy Perry, FSA**



*Data source: KY Geological Survey, derived from 1:24,000 USGS topographic maps*

## Sinkhole Occurrence in the Licking River Basin

The mid-portion of the Licking River Watershed is underlain with karst, a terrain characterized by subsurface limestone and sinkholes. Karst regions are especially susceptible to rapid groundwater pollution due to the direct connection between surface and subsurface waters. Karst landscapes are also characterized by sinking streams, closed depressions, shallow subterranean drainage, large springs, and caves. There are an estimated 232 sinkholes in HUC 05100101 encompassing 253 acres. These areas provide a critical opportunity to apply ground water protection through the application of NRCS conservation practices.



## Special Use Waters

Special Use Waters are rivers, streams and lakes listed in Kentucky Administrative Regulations that are worthy of additional protection. These include:

**Outstanding state resource waters** are those surface waters designated by the Environmental and Public Protection Cabinet and include certain unique waters of the commonwealth, including those with federally threatened or endangered species.

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

**Exceptional waters** refer to certain waterbodies whose quality exceeds that necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water. Waters placed in this category are reference reach waters, Kentucky Wild Rivers, some outstanding state resource waters and waters with "excellent" fish or macroinvertebrate communities. (<http://www.water.ky.gov/sw/specialwaters/>).

Special Use Waters in the Licking River Basin										
Waterbody Name	County	Zone	Up stream mile point	Down stream mile point	Length in miles	Cold water habitat	Exceptional waters	Reference reach stream	Outstanding state resource water	Federally endangered and threatened species
Blackwater Creek	Morgan	Eaton Creek to Greasy Fork	11.4	3.8	7.6		Y	Y		
Blanket Creek (Exceptional Water Candidate)	Pendleton	Mouth to UT	1.9	0	1.9		Y			
Botts Fork	Menifee	Mouth to Land Use Change	2.1	0	2.1		Y			
Bowman Creek (Exceptional Water Candidate)	Kenton	Mouth to UT	6	0	6		Y			
Brushy Fork	Menifee	Cave Run Lake Backwaters to Headwaters	5	0.6	4.4		Y			
Brushy Fork	Pendleton	Mouth to Headwaters	5.7	0	5.7		Y	Y		
Bucket Branch	Morgan	Mouth to Headwaters	1.9	0	1.9		Y	Y		
Cedar Creek (Exceptional Water Candidate)	Robertson	Mouth to North Branch of Cedar Creek	1.7	0	1.7		Y			
Craney Creek	Rowan, Morgan	Mouth to Headwaters	10	0	10	Y	Y			
Devils Fork	Morgan, Elliott, Rowan	Mouth to Headwaters	7.8	0	7.8		Y	Y		
Four Creek (Exceptional Water Candidate)	Pendleton	Mouth to UT	2.2	0	2.2		Y			
Grover's Creek	Pendleton	Kincaid Lake Backwaters to Unidentified Tributary	3.4	0.5	2.9		Y	Y		
Licking River	Bath, Menifee, Rowan	River Mile 176.8 to River Mile 169.6	176.8	169.6	7.2	Y				
Licking River	Bath, Rowan, Fleming	SR 211 to Unnamed Road off Slatey Point Road	165	154.5	10.5		Y		Y	

Waterbody Name	County	Zone	Up stream mile point	Down stream mile point	Length in miles	Cold water habitat	Exceptional waters	Reference reach stream	Outstanding state resource water	Federally endangered and threatened species
Licking River	Kenton, Campbell, Pendleton, Harrison, Robertson, Fleming	River Mile 115.0 to River Mile 18.9	115	18.9	96.1				Y	<b>Fanshell (Cyprogenia stegaria)</b>
Little South Fork (Exceptional Water Candidate)	Boone	Land Use Change to Headwaters	5.9	1.2	4.7		Y			
Minor Creek	Morgan, Rowan	River Mile 2.8 to Mouth	2.8	0	2.8	Y				
North Fork of Licking River	Morgan	Cave Run Lake Backwaters to Devils Fork	14.2	9.9	4.3		Y	Y		
Sawyers Fork (Exceptional Water Candidate)	Kenton	Mouth to Headwaters	3.3	0	3.3		Y			
Shannon Creek Unidentified tributary (EWC)	Mason	Mouth to Headwaters	2.2	0	2.2		Y			
Slabcamp Creek	Rowan	Basin including Stonecoal Branch	3.4	0	3.4	Y				
Slabcamp Creek	Rowan	Mouth to Headwaters	3.4	0	3.4		Y			
Slate Creek (Exceptional Water Candidate)	Bath	Mouth to Mill Creek	13.6	0	13.6		Y			
South Fork of Grassy Creek	Pendleton	Mouth to Grassy Creek	19.6	0	19.6		Y	Y		
Welch Fork	Menifee	Mouth to First Road Crossing	1	0	1		Y	Y		
West Creek	Robertson	Mouth to Headwaters	9.5	0	9.5		Y	Y		

Data from [http://nrecapps.ky.gov/special\\_waters/specialwaters.htm](http://nrecapps.ky.gov/special_waters/specialwaters.htm)

## Water Quality

### Watershed Watch Group

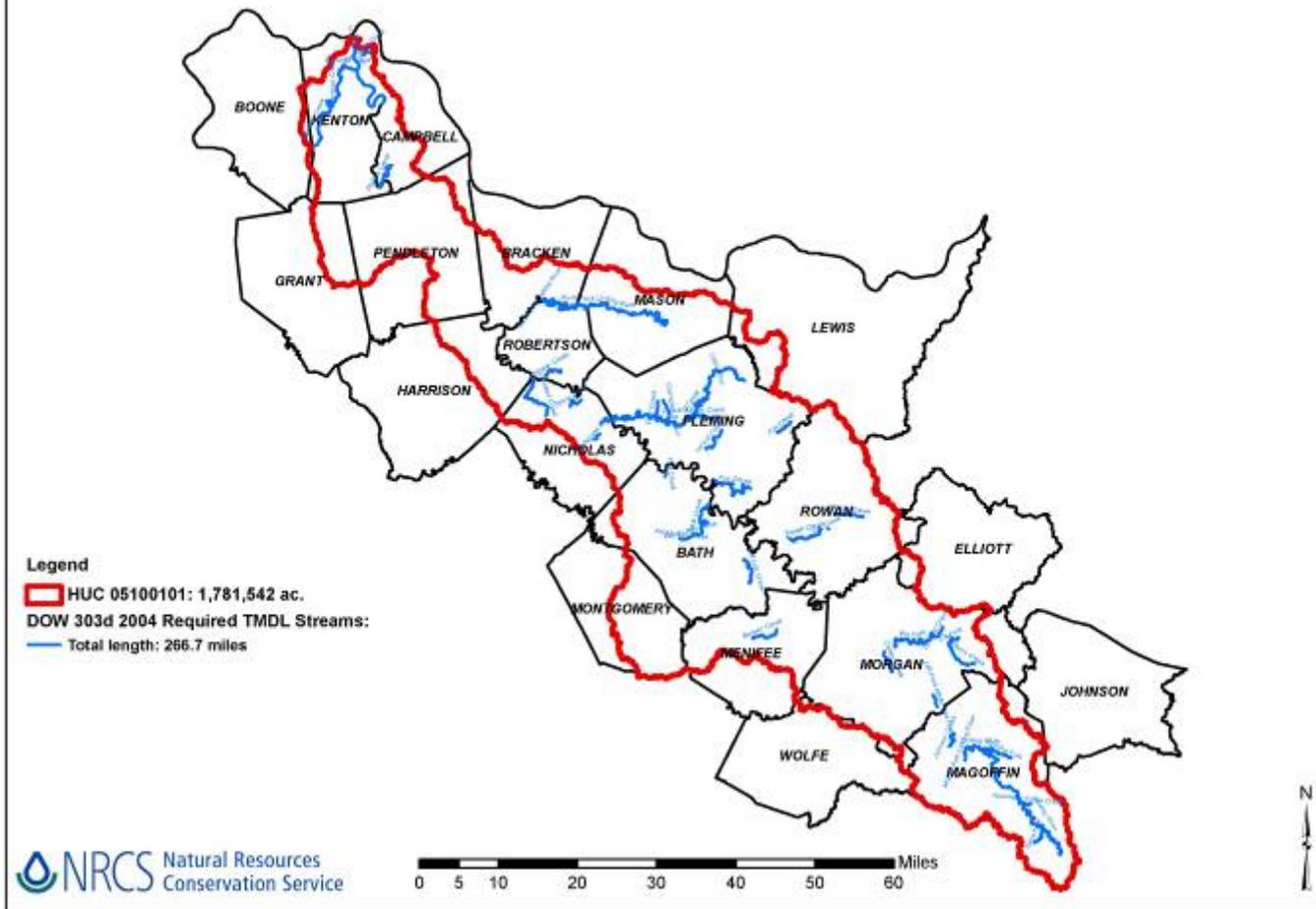
The Licking River Watershed Watch (LRWW) is a non-profit organization that tracks water quality throughout the Licking River Watershed multiples times per year. Sampling includes testing for *E. coli* bacteria. *E. coli* is short for *Escherichia coli*, a bacterium that normally resides in the colon of humans and animals. Because *E. coli* are always present in human and animal feces, they are used as an indicator of fecal pollution in the microbiological surveillance of water quality. Several strains of this bacterium are known to produce toxins in humans that can cause moderate to severe diarrhea. One strain of *E. coli* called “O157” can cause severe diarrhea and kidney damage in humans. Sources of bacteria in the Licking RWA project area include livestock (run off from pastures or direct access to streams), failing septic systems, straight-pipes, and discharges from municipal sewage plants. Exceedences ranged from 240 colonies per milliliter to over 31,000 colonies per ml. Additional LRWW water quality information can be found at: <http://www.lickingriver.org/>

<b>Licking River Watershed Watch <i>E. coli</i> Data</b>			
<b>Sampling Dates: May 2006 &amp; 2007, July 2006 &amp; 2007, Sept. 2006 &amp; 2007</b>			
<b>County</b>	<b>Number of Samples Taken</b>	<b>Number of Samples Showing Exceedences of <i>E. coli</i> bacteria</b>	<b>Percent of Samples Taken with Exceedences of <i>E. coli</i> bacteria</b>
<b>Bath</b>	<b>16</b>	<b>2</b>	<b>12.50%</b>
<b>Boone</b>	<b>154</b>	<b>82</b>	<b>53.25%</b>
<b>Campbell</b>	<b>52</b>	<b>33</b>	<b>63.46%</b>
<b>Fleming</b>	<b>20</b>	<b>13</b>	<b>65.00%</b>
<b>Harrison</b>	<b>15</b>	<b>3</b>	<b>20.00%</b>
<b>Kenton</b>	<b>28</b>	<b>12</b>	<b>42.86%</b>
<b>Lewis</b>	<b>4</b>	<b>4</b>	<b>100.00%</b>
<b>Magoffin</b>	<b>32</b>	<b>28</b>	<b>87.50%</b>
<b>Montgomery</b>	<b>11</b>	<b>11</b>	<b>100.00%</b>
<b>Nicholas</b>	<b>32</b>	<b>6</b>	<b>18.75%</b>
<b>Pendleton</b>	<b>33</b>	<b>5</b>	<b>15.15%</b>
<b>Robertson</b>	<b>11</b>	<b>4</b>	<b>36.36%</b>
<b>Rowan</b>	<b>33</b>	<b>14</b>	<b>42.42%</b>
<b>Totals:</b>	<b>510</b>	<b>249</b>	<b>48.82%</b>

### Total Daily Maximum Load

A total maximum daily load, or TMDL, estimates the maximum amount of a pollutant that a water body can receive and still meet water quality standards. A TMDL is required when a stream is assessed as being impaired. An impaired stream means the stream does not meet one or more of its designated uses. Designated uses may include supporting aquatic life, swimming, wading, drinking water supply use, fish consumption, etc. Once a Kentucky stream is determined to be impaired, a TMDL is required to be developed by the Kentucky Division of Water. The 303(d) List and the subsequent TMDL are requirements of the Clean Water Act, and Kentucky has a total of 63 approved Total Maximum Daily Load (TMDL) reports statewide. Within the RWA project area, there is one completed and approved TMDL and this is for Fleming Creek due to high levels of pathogens (Fleming and Nicholas counties); however, 266.7 miles of stream have been identified as required TMDL streams.

## KY Division of Water - 303d Required TMDL Streams



**TMDL Streams and Stream Miles - HUC 05100101**

Stream name	Miles	Stream name	Miles	Stream name	Miles
Allison Creek	3.79	Flat Creek	0.87	Prickly Ash Creek	3.29
Banklick Creek	19.34	Fleming Creek	39.51	Puncheon Camp Creek	1.20
Beaver Creek	4.49	Fox Creek	12.74	Salt Lick Creek	5.72
Burning Fork	3.19	Johnson Creek	6.77	Scrubgrass Creek	1.54
Caney Creek	4.17	Left Fork White Oak Creek	1.86	Slate Creek	6.96
Christy Creek	4.33	Licking River	50.58	Stony Creek	2.93
Craintown Branch	3.42	Locust Creek	4.58	Straight Creek	1.89
Crooked Creek	8.60	Logan Run	0.28	Threemile Creek	2.43
Doty Creek	2.26	Middle Fork Licking River	2.66	Trace Fork	3.07
Dry Creek	0.34	North Fork Licking River	33.80	Triplett Creek	6.19
Elk Fork	12.92	Phillips Creek	5.31	Williams Creek	5.61



Photo: Allen Arthur

*Feedlot and manure piles up hill from an unbuffered stream - Licking River Basin.*



Photo: Allen Arthur

*Cows watering and feeding adjacent to a stream - a common site within the Licking River Watershed*

## Climate

Below is a summary of averages for five counties within the project area. Climatic data can be accessed for each county at <http://www.thinkkentucky.gov> or by querying data files at [www.noaa.gov](http://www.noaa.gov).

<b>Climatic Data Summary for Kentucky Counties in RWA</b> <b>Averaged data from 5 RWA counties</b> <b>(www.thinkkentucky.gov)</b>	
Normal Temperature (30 year record)	55 degrees F
Average Annual, 2006	56 degrees F
Record Highest	103 degrees F
Record Lowest	-20 degrees F
Normal Precipitation (30 year average)	46 inches
Mean Annual Snowfall (30 year average)	17 inches
Total precipitation, 2006	54 inches
Mean number of days precipitation	131
Mean number of days thunderstorms	43
Prevailing Winds	South

## Kentucky Impaired Waters List

### 51 % of Identified Segments - Suspected Source Inputs from Agriculture

Section 303(d) of the Clean Water Act states that water bodies with impaired uses must be placed on a state impaired waters list. The 303(d) portion of the Kentucky Division of Water's bi-annual report lists assessed waters including all waters not supporting one or more designated uses and requiring the future development of a Total Maximum Daily Load (TMDL).

The following pages list stream segments within the RWA project area that are impaired and the causes of impairment. KDOW has compiled a huge amount of water quality data for not only the Licking Basin but also state-wide. This information can be accessed at: <http://www.water.ky.gov/sw/tmdl/303d.htm> and includes 303d reports from 1990 – 2006.

The following information was taken from the Kentucky Division of Waters draft 2008 Section 303(d) list of impaired waters, and the abbreviations for the designated uses column ("Uses") are:

- WAH - Warm Water Aquatic Habitat
- CAH - Aquatic Habitat
- PCR - Primary Contact Recreation
- SCR - Secondary Contact Recreation
- FC - Fish Consumption
- DWS - Domestic Water Supply

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Allison Creek 0.0 to 4.9	4.9 miles	KY485886_00	Fleming	WAH	Nutrient/ Eutrophication Biological Indicators	Animal Feeding Operations (NPS)
Allison Creek 0.0 to 4.9	4.9 miles	KY485886_00	Fleming	WAH	Organic Enrichment (Sewage) Biological Indicators	Animal Feeding Operations (NPS)
Allison Creek 0.0 to 4.9	4.9 miles	KY485886_00	Fleming	WAH	Phosphorus (Total)	Animal Feeding Operations (NPS)
Banklick Creek 0.0 to 3.5	3.5 miles	KY486315_01	Kenton	PCR	Fecal Coliform	Municipal Point Source Discharges, Unspecified Urban Stormwater
Banklick Creek 0.0 to 3.5	3.5 miles	KY486315_01	Kenton	WAH	Nutrient/ Eutrophication Biological Indicators	Municipal Point Source Discharges
Banklick Creek 0.0 to 3.5	3.5 miles	KY486315_01	Kenton	WAH	Organic Enrichment (Sewage) Biological Indicators	Municipal Point Source Discharges
Banklick Creek 0.0 to 3.5	3.5 miles	KY486315_01	Kenton	WAH	Sedimentation/ Siltation	Highways, Roads, Bridges, Infrastructure (New Construction), Urban Runoff/Storm Sewers
Banklick Creek 3.5 to 8.2	4.7 miles	KY486315_02	Kenton	PCR	Fecal Coliform	Agriculture, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Banklick Creek 3.5 to 8.2	4.7 miles	KY486315_02	Kenton	WAH	Nutrient/ Eutrophication Biological Indicators	Agriculture
Banklick Creek 3.5 to 8.2	4.7 miles	KY486315_02	Kenton	WAH	Organic Enrichment (Sewage) Biological Indicators	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Banklick Creek 3.5 to 8.2	4.7 miles	KY486315_02	Kenton	WAH	Sedimentation/ Siltation	Agriculture
Banklick Creek 8.2 to 19.2	11 miles	KY486315_03	Kenton	PCR	Fecal Coliform	Agriculture, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Banklick Creek 8.2 to 19.2	11 miles	KY486315_03	Kenton	WAH	Nutrient/ Eutrophication Biological Indicators	Agriculture

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Banklick Creek 8.2 to 19.2	11 miles	KY486315_03	Kenton	WAH	Organic Enrichment (Sewage) Biological Indicators	On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Beaver Creek 10.0 to 14.4	4.4 miles	KY510489_00	Menifee	WAH	Sedimentation/ Siltation	Managed Pasture Grazing, Non-irrigated Crop Production
Blackwater Creek 3.8 to 11.7	7.9 miles	KY510765_01	Morgan	PCR	Fecal Coliform	Source Unknown
Broke Leg Creek 0.0 to 1.0	1 miles	KY510936_01	Morgan	WAH	Cause Unknown	Source Unknown
Broke Leg Creek 1.0 to 4.4	3.4 miles	KY510936_02	Morgan	WAH	Sedimentation/ Siltation	Highway/Road/Bridge Runoff (Non-construction Related), Upstream Source, Runoff from Forest/Grassland/Parkland
Brushy Fork 0.0 to 5.8	5.8 miles	KY488131_01	Pendleton	WAH	Sedimentation/ Siltation	Agriculture, Streambank Modifications/destabilization, Runoff from Forest/Grassland/Parkland, Crop Production (Crop Land or Dry Land)
Burning Fork 0.0 to 3.25	3.25 miles	KY488450_01	Magoffin	PCR	Fecal Coliform	Source Unknown
Burning Fork 0.0 to 3.25	3.25 miles	KY488450_01	Magoffin	WAH	Sedimentation/ Siltation	Loss of Riparian Habitat, Municipal (Urbanized High Density Area)
Caney Creek 0.0 to 4.2	4.2 miles	KY511201_00	Morgan	WAH	Sedimentation/ Siltation	Impacts from Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Silviculture Harvesting, Loss of Riparian Habitat

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Caney Creek 0.0 to 4.2	4.2 miles	KY511201_00	Morgan	WAH	Turbidity	Impacts from Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Silviculture Harvesting, Loss of Riparian Habitat
Caskey Fork 0.0 to 2.3	2.3 miles	KY489059_01	Morgan	WAH	Cause Unknown	Source Unknown
Cave Run Lake	8270 acres	KY511277_00	Rowan	FC	Methyl mercury	Atmospheric Deposition - Toxics, Source Unknown
Cave Run Lake	8270 acres	KY511277_00	Rowan	PCR, SCR, WAH	pH	Source Unknown, Upstream Source
Christy Creek 0.0 to 4.3	4.3 miles	KY511363_00	Rowan	WAH	Cause Unknown	Non-irrigated Crop Production
Christy Creek 0.0 to 4.3	4.3 miles	KY511363_00	Rowan	WAH	Sedimentation/ Siltation	Non-irrigated Crop Production
Clarks Run 0.0 to 2.1	2.1 miles	KY489555_01	Mason	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land)
Coffee Creek 0.0 to 4.1	4.1 miles	KY489772_01	Morgan	WAH	Sedimentation/ Siltation	Agriculture, Streambank Modifications/destabilization, Channelization, Channel Erosion/Incision from Upstream Hydro-modifications
Craintown Branch 0.0 to 3.6	3.6 miles	KY490277_00	Fleming	WAH	Phosphorus (Total)	Animal Feeding Operations (NPS)

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Crane Creek 0.0 to 2.9	2.9 miles	KY511622_01	Fleming	WAH	Sedimentation/ Siltation	Agriculture, Streambank Modifications/destabilization, Sand/gravel/rock Mining or Quarries, Loss of Riparian Habitat, Crop Production (Crop Land or Dry Land)
Crooked Creek 0.0 to 9.1	9.1 miles	KY490377_00	Nicholas	PCR	Fecal Coliform	Source Unknown
Doe Run Lake	51 acres	KYCLN082_00	Kenton	WAH	Dissolved Gas Super-saturation	Source Unknown, Upstream Source
Doe Run Lake	51 acres	KYCLN082_00	Kenton	WAH	Nutrient/ Eutrophication Biological Indicators	Source Unknown, Upstream Source
Doe Run Lake	51 acres	KYCLN082_00	Kenton	WAH	Oxygen, Dissolved	Source Unknown, Upstream Source
Doty Branch 0.0 to 2.3	2.3 miles	KY492236-12.8_01	Fleming	WAH	Nutrient/ Eutrophication Biological Indicators	Agriculture, Animal Feeding Operations (NPS)
Dry Creek 0.0 to 2.5	2.5 miles	KY511917_01	Rowan	WAH	Nutrient/ Eutrophication Biological Indicators	Urban Runoff/Storm Sewers
Dry Creek 0.0 to 2.5	2.5 miles	KY511917_01	Rowan	WAH	Organic Enrichment (Sewage) Biological Indicators	Urban Runoff/Storm Sewers
Dry Creek 0.0 to 2.5	2.5 miles	KY511917_01	Rowan	WAH	Sedimentation/ Siltation	Highway/Road/Bridge Runoff (Non-construction Related), Urban Runoff/Storm Sewers
Elk Fork 0.0 to 4.9	4.9 miles	KY512038_01	Morgan	WAH	Sedimentation/ Siltation	Agriculture, Silviculture Activities, Habitat Modification - other than Hydro-modification

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Elk Fork 12.6 to 14.7	2.1 miles	KY512038_03	Morgan	WAH	Sedimentation/ Siltation	Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Silviculture Harvesting, Loss of Riparian Habitat
Elk Fork 12.6 to 14.7	2.1 miles	KY512038_03	Morgan	WAH	Turbidity	Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Loss of Riparian Habitat
Elk Fork 4.9 to 10.5	5.6 miles	KY512038_02	Morgan	WAH	Sedimentation/ Siltation	Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Silviculture Harvesting, Loss of Riparian Habitat
Elk Fork 4.9 to 10.5	5.6 miles	KY512038_02	Morgan	WAH	Turbidity	Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Loss of Riparian Habitat
Fannins Branch 1.5 to 3.4	1.9 miles	KY491979_01	Morgan	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land)
Flat Creek 0.0 to 0.9	0.9 miles	KY492182_00	Bath	PCR	Fecal Coliform	Source Unknown
Fleming Creek 12.8 to 16.0	3.2 miles	KY492236_02	Fleming	WAH	Nutrient/ Eutrophication Biological Indicators	Agriculture
Fleming Creek 20.8 to 39.4	18.6 miles	KY492236_04	Fleming	WAH	Nutrient/ Eutrophication Biological Indicators	Animal Feeding Operations (NPS)

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Fleming Creek 20.8 to 39.4	18.6 miles	KY492236_04	Fleming	WAH	Organic Enrichment (Sewage) Biological Indicators	Urban Runoff/Storm Sewers
Fleming Creek 20.8 to 39.4	18.6 miles	KY492236_04	Fleming	WAH	Phosphorus (Total)	Animal Feeding Operations (NPS), Urban Runoff/Storm Sewers
Fleming Creek 0.0 to 12.8	12.8 miles	KY492236_01	Fleming	WAH	Nutrient/ Eutrophication Biological Indicators	Animal Feeding Operations (NPS)
Fleming Creek 0.0 to 12.8	12.8 miles	KY492236_01	Fleming	WAH	Phosphorus (Total)	Animal Feeding Operations (NPS)
Fox Creek 0.0 to 10.1	10.1 miles	KY512230_01	Fleming	PCR, SCR	Fecal Coliform	Source Unknown
Fox Creek 0.0 to 10.1	10.1 miles	KY512230_01	Fleming	WAH	Sedimentation/ Siltation	Grazing in Riparian or Shoreline Zones, Natural Sources
Fox Creek 20.1 to 22.7	2.6 miles	KY512230_02	Fleming	WAH	Nutrient/ Eutrophication Biological Indicators	Dredging (E.g., for Navigation Channels), Silviculture Activities, Natural Sources
Fox Creek 20.1 to 22.7	2.6 miles	KY512230_02	Fleming	WAH	Sedimentation/ Siltation	Dredging (E.g., for Navigation Channels), Silviculture Activities, Natural Sources
Grassy Creek 4.6 to 10.0	5.4 miles	KY512382_01	Morgan	WAH	Nutrient/ Eutrophication Biological Indicators	Source Unknown
Grassy Creek 4.6 to 10.0	5.4 miles	KY512382_01	Morgan	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land)
Johnson Creek 0.0 to 3.1	3.1 miles	KY495397_00	Magoffin	PCR	Fecal Coliform	Source Unknown
Johnson Creek 0.0 to 3.5	3.5 miles	KY495400_01	Robertson	PCR	Fecal Coliform	Source Unknown
Kincaid Lake	183 acres	KYCLN045_00	Pendleton	WAH	Dissolved Gas Super-saturation	Agriculture
Kincaid Lake	183 acres	KYCLN045_00	Pendleton	WAH	Nutrient/ Eutrophication Biological Indicators	Agriculture

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Kincaid Lake	183 acres	KYCLN045_00	Pendleton	WAH	Oxygen, Dissolved	Agriculture
Lees Creek 0.0 to 4.3	4.3 miles	KY496181_01	Mason	WAH	Nutrient/ Eutrophication Biological Indicators	Crop Production (Crop Land or Dry Land), Grazing in Riparian or Shoreline Zones
Lees Creek 0.0 to 4.3	4.3 miles	KY496181_01	Mason	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land)
Left Fork White Oak Creek 0.0 to 1.8	1.8 miles	KY496271_00	Morgan	WAH	Sedimentation/ Siltation	Impacts from Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Silviculture Harvesting, Loss of Riparian Habitat
Left Fork White Oak Creek 0.0 to 1.8	1.8 miles	KY496271_00	Morgan	WAH	Turbidity	Impacts from Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Loss of Riparian Habitat
Lick Creek 0.0 to 2.1	2.1 miles	KY496483_01	Magoffin	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land), Wet Weather Discharges (Non-Point Source), Unrestricted Cattle Access, Rural (Residential Areas), Loss of Riparian Habitat, Livestock (Grazing or Feeding Operations), Impervious Surface/Parking Lot Runoff, Grazing

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Licking River 0.0 to 4.8	4.8 miles	KY513416_01	Campbell	PCR	Fecal Coliform	Sanitary Sewer Overflows (Collection System Failures), Urban Runoff/Storm Sewers
Licking River 224.3 to 241.3	17 miles	KY513416_11	Morgan	PCR/SCR	Fecal Coliform	Source Unknown
Licking River 265.0 to 271.6	6.6 miles	KY513416_12	Magoffin	WAH	Nutrient/ Eutrophication Biological Indicators	Silviculture Activities
Licking River 265.0 to 271.6	6.6 miles	KY513416_12	Magoffin	WAH	Organic Enrichment (Sewage) Biological Indicators	Urban Runoff/Storm Sewers, Wet Weather Discharges (Non-Point Source)
Licking River 265.0 to 271.6	6.6 miles	KY513416_12	Magoffin	WAH	Sedimentation/ Siltation	Grazing in Riparian or Shoreline Zones, Wet Weather Discharges (Non-Point Source), Urban Runoff/Storm Sewers, Streambank Modifications/destabilization, Loss of Riparian Habitat
Licking River 265.0 to 271.6	6.6 miles	KY513416_12	Magoffin	WAH	Turbidity	Silviculture Activities, Silviculture Reforestation, Silviculture Harvesting
Licking River 31.0 to 37.6	6.6 miles	KY513416_04	Kenton	PCR	Fecal Coliform	Source Unknown
Licking River 4.8 to 14.9	10.1 miles	KY513416_02	Campbell	PCR	Fecal Coliform	Source Unknown
Licking River 174.4 to 180.8	6.4 miles	KY513416_10	Rowan	SCR	Fecal Coliform	Source Unknown
Licking River 294.1 to 302.4	8.3 miles	KY513416_14	Magoffin	WAH	Sedimentation/ Siltation	Surface Mining
Little Beaver Creek 0.0 to 3.3	3.3 miles	KY496612_01	Harrison	WAH	Nutrient/ Eutrophication Biological Indicators	Crop Production (Crop Land or Dry Land), Grazing in Riparian or Shoreline Zones

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Little Beaver Creek 0.0 to 3.3	3.3 miles	KY496612_01	Harrison	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land), Highway/Road/Bridge Runoff (Non-construction Related), Grazing in Riparian or Shoreline Zones
Locust Creek 0.0 to 11.8	11.8 miles	KY496939_01	Fleming	WAH	Nutrient/ Eutrophication Biological Indicators	Crop Production (Crop Land or Dry Land), Grazing in Riparian or Shoreline Zones
Locust Creek 0.0 to 11.8	11.8 miles	KY496939_01	Fleming	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land)
Logan Run 0.0 to 2.3	2.3 miles	KY496986_00	Fleming	WAH	Nutrient/ Eutrophication Biological Indicators	Agriculture
Mash Fork 0.0 to 3.0	3 miles	KY497650_01	Magoffin	WAH	Cause Unknown	Source Unknown
Middle Fork Licking River 0.0 to 2.5	2.5 miles	KY498128_00	Magoffin	PCR	Fecal Coliform	Agriculture, On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)
North Fork Licking River 18.5 to 52.5	34 miles	KY499554_02	Bracken	PCR	Fecal Coliform	Agriculture
North Fork Licking River 18.5 to 52.5	34 miles	KY499554_02	Bracken	WAH	Sedimentation/ Siltation	Agriculture
North Fork Licking River 12.0 to 13.1	1.1 miles	KY514292_02	Morgan	WAH	Sedimentation/ Siltation	Highway/Road/Bridge Runoff (Non-construction Related), Upstream Source
North Fork Licking River 8.4 to 12.0	3.6 miles	KY514292_01	Morgan	PCR	Fecal Coliform	Source Unknown
Oldfield Fork 0.0 to 3.6	3.6 miles	KY499901_01	Morgan	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land)
Phillips Creek 0.0 to 5.3	5.3 miles	KY500540_00	Campbell	PCR	Fecal Coliform	Source Unknown
Prickly Ash Creek 0.0 to 3.1	3.1 miles	KY514770_00	Bath	WAH	Nutrient/ Eutrophication Biological Indicators	Agriculture

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Puncheon Camp Creek 0.0 to 1.1	1.1 miles	KY501442_00	Magoffin	PCR	Fecal Coliform	Source Unknown
Rock Fork 0.0 to 4.0	4 miles	KY515026_01	Rowan	WAH	Nutrient/ Eutrophication Biological Indicators	Crop Production (Crop Land or Dry Land)
Rock Fork 0.0 to 4.0	4 miles	KY515026_01	Rowan	WAH	Sedimentation/ Siltation	Crop Production (Crop Land or Dry Land), Dredging (E.g., for Navigation Channels)
Salt Lick Creek 3.0 to 8.0	5 miles	KY515191_01	Bath	WAH	Sedimentation/ Siltation	Non-irrigated Crop Production, Rangeland Grazing
Scrubgrass Creek 0.0 to 1.6	1.6 miles	KY503123_00	Nicholas	WAH	Cause Unknown	Source Unknown
Slate Creek 0.0 to 13.6	13.6 miles	KY515470_01	Bath	PCR	Fecal Coliform	Source Unknown
Spruce Creek 0.0 to 1.7	1.7 miles	KY504170_01	Montgomery	WAH	Sedimentation/ Siltation	Grazing in Riparian or Shoreline Zones
Stony Creek 0.0 to 3.0	3 miles	KY504500_00	Nicholas	WAH	Cause Unknown	Source Unknown
Straight Creek 0.0 to 1.8	1.8 miles	KY504549_00	Morgan	WAH	Sedimentation/ Siltation	Impacts from Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Silviculture Harvesting, Loss of Riparian Habitat
Straight Creek 0.0 to 1.8	1.8 miles	KY504549_00	Morgan	WAH	Turbidity	Impacts from Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Loss of Riparian Habitat

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Threemile Creek 0.1 to 4.7	4.6 miles	KY505251_00	Campbell	PCR	Fecal Coliform	Sanitary Sewer Overflows (Collection System Failures), Source Unknown
Threemile Creek 0.1 to 4.7	4.6 miles	KY505251_00	Campbell	WAH	Nutrient/ Eutrophication Biological Indicators	Sanitary Sewer Overflows (Collection System Failures)
Threemile Creek 0.1 to 4.7	4.6 miles	KY505251_00	Campbell	WAH	Organic Enrichment (Sewage) Biological Indicators	Sanitary Sewer Overflows (Collection System Failures)
Trace Fork 0.0 to 3.1	3.1 miles	KY505437_00	Magoffin	WAH	Sedimentation/ Siltation	Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Silviculture Harvesting, Loss of Riparian Habitat
Trace Fork 0.0 to 3.1	3.1 miles	KY505437_00	Magoffin	WAH	Total Dissolved Solids	Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Silviculture Harvesting
Trace Fork 0.0 to 3.1	3.1 miles	KY505437_00	Magoffin	WAH	Turbidity	Abandoned Mine Lands (Inactive), Surface Mining, Subsurface (Hardrock) Mining, Streambank Modifications/destabilization, Loss of Riparian Habitat
Triplett Creek 5.9 to 12.3	6.4 miles	KY516023_01	Rowan	PCR/ SCR	Fecal Coliform	Agriculture, Source Unknown, Unspecified Urban Stormwater, Municipal Point Source Discharges
Triplett Creek 5.9 to 12.3	6.4 miles	KY516023_01	Rowan	WAH	Nutrient/ Eutrophication Biological Indicators	Agriculture
Triplett Creek 5.9 to 12.3	6.4 miles	KY516023_01	Rowan	WAH	Organic Enrichment (Sewage) Biological Indicators	Municipal Point Source Discharges, Urban Runoff/Storm Sewers

**HUC 05100101 Impairments, Kentucky Division of Water, 2008**

Waterbody & Segment	Total Size	Waterbody ID	County	Use	Impairment	Suspected Source(s)
Triplett Creek 5.9 to 12.3	6.4 miles	KY516023_01	Rowan	WAH	Sedimentation/ Siltation	Agriculture, Municipal Point Source Discharges, Impacts from Hydrostructure Flow Regulation/modification, Highways, Roads, Bridges, Infrastructure (New Construction)
UT to Mill Creek 0.0 to 4.0	4 miles	KY498265-7.0_01	Fleming	WAH	Phosphorus (Total)	Dairies (Outside Milk Parlor Areas), Unrestricted Cattle Access, Livestock (Grazing or Feeding Operations)
UT to Mill Creek 0.0 to 4.0	4 miles	KY498265-7.0_01	Fleming	WAH	Sedimentation/ Siltation	Dairies (Outside Milk Parlor Areas), Unrestricted Cattle Access, Loss of Riparian Habitat, Livestock (Grazing or Feeding Operations), Highway/Road/Bridge Runoff (Non-construction Related)
UT to Mill Creek 0.0 to 4.0	4 miles	KY498265-7.0_01	Fleming	WAH	Total Kjeldahl Nitrogen (TKN)	Dairies (Outside Milk Parlor Areas), Unrestricted Cattle Access, Livestock (Grazing or Feeding Operations)
UT to UT to Lees Creek 0.0 to 1.6	1.6 miles	KY496181-4.3_01	Mason	WAH	Nitrate/ Nitrite (Nitrite + Nitrate as N)	Grazing in Riparian or Shoreline Zones, Unrestricted Cattle Access, Loss of Riparian Habitat, Livestock (Grazing or Feeding Operations)

## Demographics

The counties within the RWA project area (if 20% or more of the county in HUC 08500101) vary significantly in population and income levels. The lower portion of the Licking Watershed is characterized by urban growth from the Covington, KY / Cincinnati, OH metro area while the southern portion of the watershed is wooded with large tracts of US Forest property. The central part of the watershed is predominately rural. Population numbers, population growth, and income levels reflect this gradient of demographic change starting at the urbanized northern region, through the highly agricultural central portion of the watershed, and ending in the hilly, wooded, southern counties of Morgan and Magoffin.

Counties	Population 1990	Population 2000	Population 2007	Change 1990-2000	Change 2000-2007
Bath	9,692	11,085	11,592	14.40%	4.60%
Bracken	7,766	8,279	8,574	6.60%	3.60%
Campbell	83,866	88,616	86,858	5.70%	-2.00%
Fleming	12,292	13,792	14,695	12.20%	6.50%
Harrison	16,248	17,983	18,552	10.70%	3.20%
Grant	15,737	22,384	25,161	42.2%	12.4%
Kenton	142,005	151,464	156,675	6.70%	3.40%
Magoffin	13,077	13,332	13,186	2.00%	-1.10%
Mason	16,666	16,800	17,190	0.80%	2.30%
Menifee	5,092	6,556	6,764	28.80%	3.20%
Montgomery	19,561	22,554	25,228	15.30%	11.90%
Morgan	11,648	13,948	14,236	19.70%	2.10%
Nicholas	6,725	6,813	6,889	1.30%	1.10%
Pendleton	12,062	14,390	15,058	19.30%	4.60%
Robertson	2,124	2,266	2,202	6.70%	-2.80%
Rowan	20,353	22,094	22,559	8.60%	2.10%

*Data: USDA – Economics Research Service; US Census Bureau; US Labor Department*

Counties	Personal Income, 2000	Personal Income, 2005	Personal Income % Change	Unemployment Rate %, 2006	Median Home Price 2006
Bath	\$19,045	\$20,238	6.3%	7.7%	\$49,600
Bracken	\$21,294	\$23,299	9.4%	5.7%	\$56,650
Campbell/Kenton, and Pendleton	\$28,626	\$33,137	15.8%	4.9%	\$119,250
Fleming	\$18,663	\$19,868	6.5%	6.5%	\$55,000
Grant	\$18,776	\$20,321	6.8%	5.5%	\$93,000
Harrison	\$22,007	\$28,272	10.1%	5.5%	\$93,000
Magoffin	\$15,710	\$18,867	20.1%	10.3%	\$23,000
Mason	\$21,915	\$25,337	15.6%	5.3%	\$82,500
Menifee	\$15,590	\$16,646	15.5%	8.4%	\$51,714
Montgomery	\$20,831	\$23,294	11.8%	6.0%	\$96,000
Morgan	\$14,047	\$16,850	20.0%	8.8%	\$36,000
Nicholas	\$21,342	\$23,117	8.3%	6.9%	\$64,975
Robertson	\$18,221	\$19,540	7.2%	5.3%	not available
Rowan	\$17,227	\$21,510	24.9%	5.7%	\$93,000

## NRCS Conservation Program Statistics

NRCS tracks implementation of programs in a system called Performance Results System (PRS). This database provides trend data on conservation measures implemented by year. Results by eight-digit HUC for the RWA project area from 2004-2007 are shown in the tables below.

HUC 05100101							
Code	Practice	Units	2004	2005	2006	2007	Totals
313	Waste Storage Facility	no	28	46	22	22	118
313,317,359	Total Waste Storage	no	29	46	22		97
327	Conservation Cover	ac	52	152	67	148	419
328	Conservation Crop Rotation	ac	723	1740	17	1278	3758
329	Residue/Tillage Mgmt.	ac				624	624
329A	Residue Management, No-Till/Strip Till	ac	180	309	668	77	1234
329B	Residue Management, Mulch Till	ac		167		246	413
329A-C	Residue Management	ac	180	476	668	323	1647
330	Contour Farming	ac	663	1084	1109	1698	4554
338	Prescribed Burning	ac			30		30
340	Cover Crop	ac	267	483	703	864	2317
342	Critical Area Planting	ac	4	13	17	6	40
344	Residue Management, Seasonal	ac	166	319	462	783	1730
362	Diversion	ft		1250			1250
378	Pond	no		8	16	10	34
382	Fence	ft	28970	52399	150532	134837	366738
383	Filter Strip	ac				2	2
386	Field Border	ft	3685		6800	26325	36810
391	Riparian Forest Buffer	ac	26	120	106	134	386
393	Filter Strip	ac	71	4	21		96
395,644,645	Total Wildlife Habitat Management	ac			546	2946	3492
412	Grassed Waterway	ac	128	57	17	70	272
472	Use Exclusion	ac	26		16	429	471
490	Tree/Shrub Site Preparation	ac			3	4	7
511	Forage Harvest Management	ac	1682	2216	2311	2339	8548
512	Pasture and Hay Planting	ac	1679	2308	5748	1556	11291
516	Pipeline	ft	13610	55199	90567	68497	227873
528	Prescribed Grazing	ac		633	2703	2872	6208
528A	Prescribed Grazing	ac	3280	4099	1064	669	9112
558	Roof Runoff Structure	no	10	1			11
560	Access Road	ft		2200			2200
562	Recreation Area Improvement	ac	28				28
561	Heavy Use Area Protection	ac	7	2		4	13
570	Runoff Management System	ac	1	2		2	5
574	Spring Development	no	1	4	3	7	15
575	Animal Trails and Walkways	ft	210	546	5550	900	7206
580	Streambank and Shoreline Protection	ft			609	947	1556
590	Nutrient Management	ac	4848	6584	5526	6095	23053
595	Pest Management	ac	6037	7138	2649	6421	22245
606	Subsurface Drain	ft	950	4800	2175	1300	9225
612	Tree/Shrub Establishment	ac	1	33	4	20	58
614	Watering Facility	no	15	82	176	118	391
633	Waste Utilization	ac	990	1550	778	1083	4401
644,645	Total Wildlife Habitat	ac	218	437			655
645	Upland Wildlife Habitat Management	ac	218	437	546	2946	4147
648	Wildlife Watering Facility	no		4	1		5
666,612	Forest Re-established or improved	ac	149	112	122	961	1344

## Information Sources

### Web Sites

#### **Geology**

U.S. Geological Survey at [www.usgs.gov](http://www.usgs.gov)

Kentucky Geological Survey at <http://www.uky.edu/KGS/geoky/>

#### **Kentucky Division of Water TMDL data, Impaired Streams, Exceptional and High Quality Streams, Exceptional Value and Special Use Waters**

<http://www.water.ky.gov>

[www.watersheds.ky.gov/basins/licking/](http://www.watersheds.ky.gov/basins/licking/)

#### **Water quality, monitoring, and treatment information**

<http://www.lickingriver.org>

<http://www.watersheds.ky.gov/basins/licking/>

<http://www.kwalliance.org>

<http://www.watersheds.ky.gov/basins/licking/>

<http://www.epa.gov>

<http://www.scorecard.org/env-releases/water>

#### **Land Use / Land Cover 2001 information**

<http://landcover.usgs.gov/>

#### **National Elevation Dataset (NED) information**

<http://ned.usgs.gov/>

#### **Wildlife, Federally Threatened and Endangered Species, Species Recovery Information, National Wetlands Inventory, Conservation Priority Areas**

<http://www.fws.gov>

<http://www.kdfwr.state.ky.us>

State Threatened and Endangered Species, Kentucky State Nature Preserves Commission-

<http://www.naturepreserves.ky.gov/>

#### **The Nature Conservancy**

<http://www.nature.org/>,

<http://www.nature.org/wherewework/northamerica/states/kentucky/preserves/art10920.html>

#### **Social and Census Data**

[http://www.nass.usda.gov/Census\\_of\\_Agriculture/index.asp](http://www.nass.usda.gov/Census_of_Agriculture/index.asp)

<http://www.census.gov>

<http://thinkkentucky.com>

[www.city-data.com](http://www.city-data.com)

[www.epodunk.com/](http://www.epodunk.com/)

#### **Soil Survey spatial and tabular data**

<http://soildatamart.nrcs.usda.gov/>

<http://www.nrcs.gov>

<http://www.nrcs.gov/Kentucky>,

### **Area background, history, flooding, and general information on the watershed**

[http://en.wikipedia.org/wiki/Licking\\_River](http://en.wikipedia.org/wiki/Licking_River)  
[www.britannica.com/EBchecked/topic/339733/Licking-River](http://www.britannica.com/EBchecked/topic/339733/Licking-River)  
[www.encyclopedia.com](http://www.encyclopedia.com)  
[www.gopaddling.com/](http://www.gopaddling.com/)  
[www.answers.com/topic/licking-river-kentucky](http://www.answers.com/topic/licking-river-kentucky)  
[www.nkyviews.com/campbell/newport\\_licking\\_scenes.htm](http://www.nkyviews.com/campbell/newport_licking_scenes.htm)  
[www.trails.com](http://www.trails.com)  
[www.answers.com/topic/licking-river](http://www.answers.com/topic/licking-river)  
[www.newweb.erh.noaa.gov/](http://www.newweb.erh.noaa.gov/)  
[www.nku.edu](http://www.nku.edu)  
[www.trailsrus.com/wildlife/licking\\_river.html](http://www.trailsrus.com/wildlife/licking_river.html)  
[www.placenames.com](http://www.placenames.com)  
[www.treesearch.fs.fed.us/pubs/10468](http://www.treesearch.fs.fed.us/pubs/10468)  
[www.lickingriveroutfitters.com](http://www.lickingriveroutfitters.com)  
[www.kentuckycrosswords.com/Learn/Rivers.htm](http://www.kentuckycrosswords.com/Learn/Rivers.htm)  
[www.watersheds.ky.gov/homepage\\_repository/](http://www.watersheds.ky.gov/homepage_repository/)  
[www.fs.fed.us/r8/boone/resources/water/watershed.shtml](http://www.fs.fed.us/r8/boone/resources/water/watershed.shtml)  
[www.uky.edu/WaterResources/Watershed](http://www.uky.edu/WaterResources/Watershed)  
[www.kyppa.org/Features.htm](http://www.kyppa.org/Features.htm)  
[www.kwalliance.org](http://www.kwalliance.org)  
[www.kyhometown.com](http://www.kyhometown.com)  
[www.city-data.com](http://www.city-data.com)  
[www.falmouthkentucky.com](http://www.falmouthkentucky.com)  
[www.falmouthoutlook.com](http://www.falmouthoutlook.com)  
[www.cynthianaky.com](http://www.cynthianaky.com)  
[www.epodunk.com/](http://www.epodunk.com/)  
[www.kywebcams.com](http://www.kywebcams.com)

### **NRCS Performance Results System**

<http://ias.sc.egov.usda.gov/prshome/>  
[www.nrcs.usda.gov/programs](http://www.nrcs.usda.gov/programs)  
[www.nrcs.usda.gov/Kentucky/programs](http://www.nrcs.usda.gov/Kentucky/programs)

### **Climate and weather information**

[www.weather.gov](http://www.weather.gov)  
[www.noaa.gov](http://www.noaa.gov)  
[www.wunderground.gov](http://www.wunderground.gov)  
[www.weatherchannel.gov](http://www.weatherchannel.gov)  
[www.thinkkentucky.gov](http://www.thinkkentucky.gov)  
[www.kentucky.gov](http://www.kentucky.gov)

### **Reports:**

The Licking River Region in Kentucky, Status and Trends, Kentucky Division of Water, 1998

303(d) List of Waters, Kentucky Division of Water, 1998

303(d) List of Waters, Kentucky Division of Water, 2002

303(d) List of Waters, Kentucky Division of Water, 2004

2006 Integrated Report to Congress on the Condition of Water Resources in Kentucky Volume II, 303(d) List of Surface Waters, Kentucky Division of Water, 2006

2008 Integrated Report to Congress on the Condition of Water Resources in Kentucky Volume II, 303(d) List of Surface Waters, Kentucky Division of Water, 2008

S. E. McMurray and G.A. Schuster. 1996. Reproduction in a freshwater unionid (Mollusca: Bivalvia) community downstream of Cave Run Reservoir in the Licking River at Moores Ferry, Kentucky.

B.E. Daniels and G.A. Schuster. 2000. Assessment of a freshwater mussel (Mollusca: Bivalvia) community in the Licking River, at Butler, Pendleton County, Kentucky. Kentucky. Kentucky Division of Water