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2000 Kentucky River Watershed Watch Data Collection Effort

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SUMMARY REPORT
2000 KENTUCKY RIVER WATERSHED WATCH
DATA COLLECTION EFFORT

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The Kentucky River Authority

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ABSTRACT

During the summer of 2000, the Kentucky River Authority provided $14,000 for the support of volunteer water quality sampling in the Kentucky River Basin as part of the 2000 Kentucky River Watershed Watch effort. This report summarizes the results of that sampling effort.

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CHAPTER I: INTRODUCTION

1.1 Overview

This report documents the results of the 2000 Kentucky River Watershed Watch sampling effort which was supported by a grant of $14,000 by the Kentucky River Authority. The Kentucky River Watershed Watch is a volunteer organization affiliated with the Kentucky Waterways Alliance with the following goals:

1. To provide current data on general water quality conditions to local stream based organizations working to protect their watershed.
2. To provide widespread screening for potential water quality problems to resource management agencies.
3. To provide auxiliary information to assist resource management agencies in meeting specific operational and management objectives.
4. To identify specific impacts to water quality through targeted observations and measurements.

The Kentucky Water Resources Research Institute and the Kentucky River Watershed Watch steering committee provided coordination and oversight of the sampling effort. The sampling effort was conducted so as to be consistent with the scientific study plan developed by the Kentucky River Watershed Watch scientific advisory board which describes the monitoring objectives, methods, parameters, quality assurance, and data management. A copy of the plan may be found at the project web site: http://water.nr.state.ky.us/watch/2000/plan_of_work.htm. Detailed sampling results for 2000 are posted on the project web site at: http://water.nr.state.ky.us/watch/2000/ky.htm.

1.2 Study Area

The Kentucky River Watershed Watch sampling effort was conducted at 140 different sites across the Kentucky River Basin. The Kentucky River Basin extends over much of the central and eastern portions of the state and is home to approximately 710,000 Kentuckians. The watershed includes all or part of 42 counties and drains over 7,000 square miles with a tributary network of more than 15,000 miles. A map of the watershed is shown in Figure 1.1. For the purpose of watershed management, the River Basin has been subdivided into smaller sub-basins and watersheds using the USGS Hydrologic Unit Code (HUC) classification system. A map showing the 8-digit subbasins and the 11-digit watersheds is shown in Figure 1.2. A more detailed description of the 11-digit HUC watersheds in provided in Figures 1.3-1.5. An index of the 140 sampling sites is provided in Figure 1.6 and Table 1.1

Figure 1.1 Kentucky River Basin

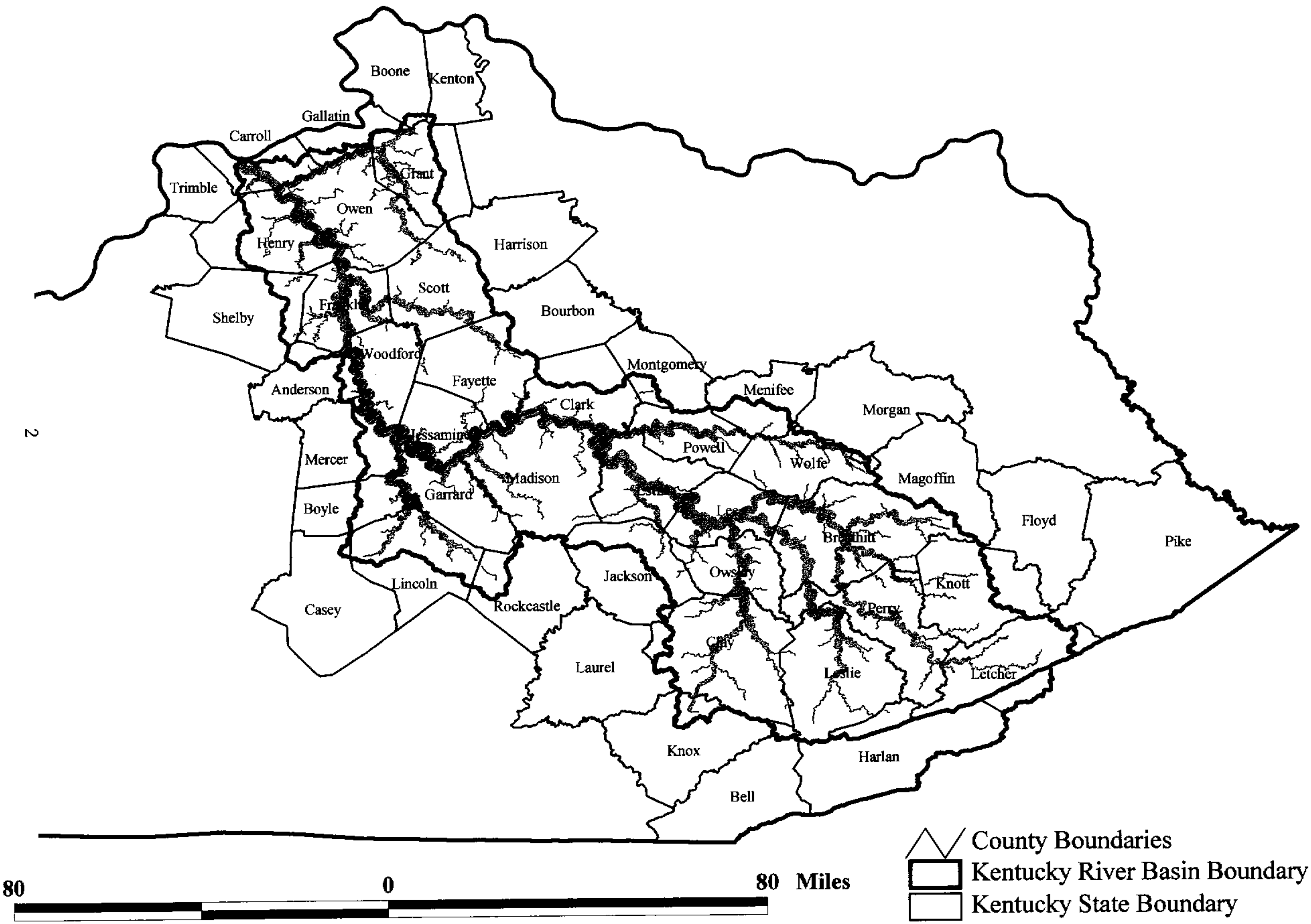


Figure 1.2 Kentucky River Basin 8-Digit HUC Identifications

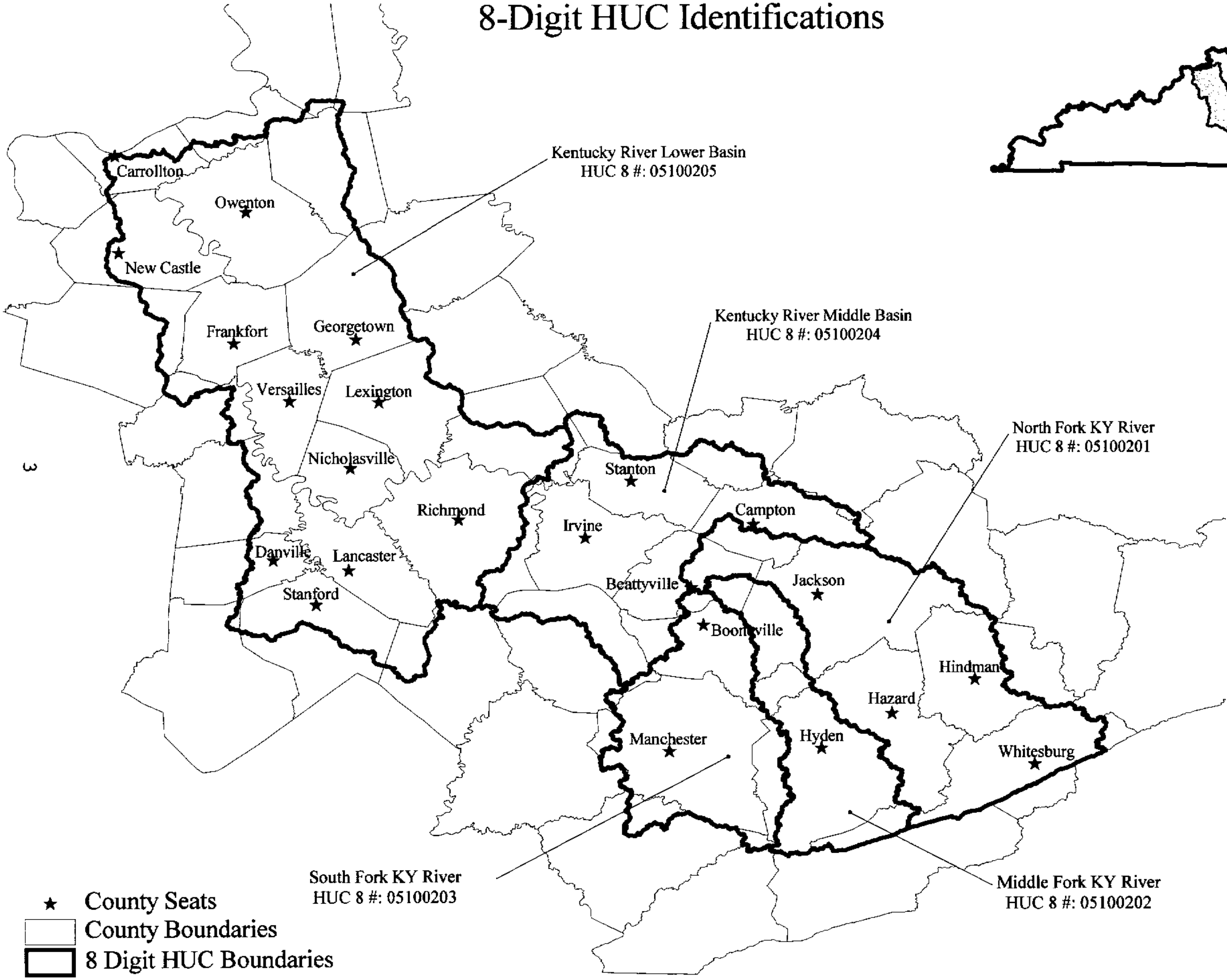


Figure 1.3 Kentucky River Lower Basin
HUC 8 #: 05100205

Figure 1.4 Kentucky River Middle Basin
HUC 8 #: 05100204

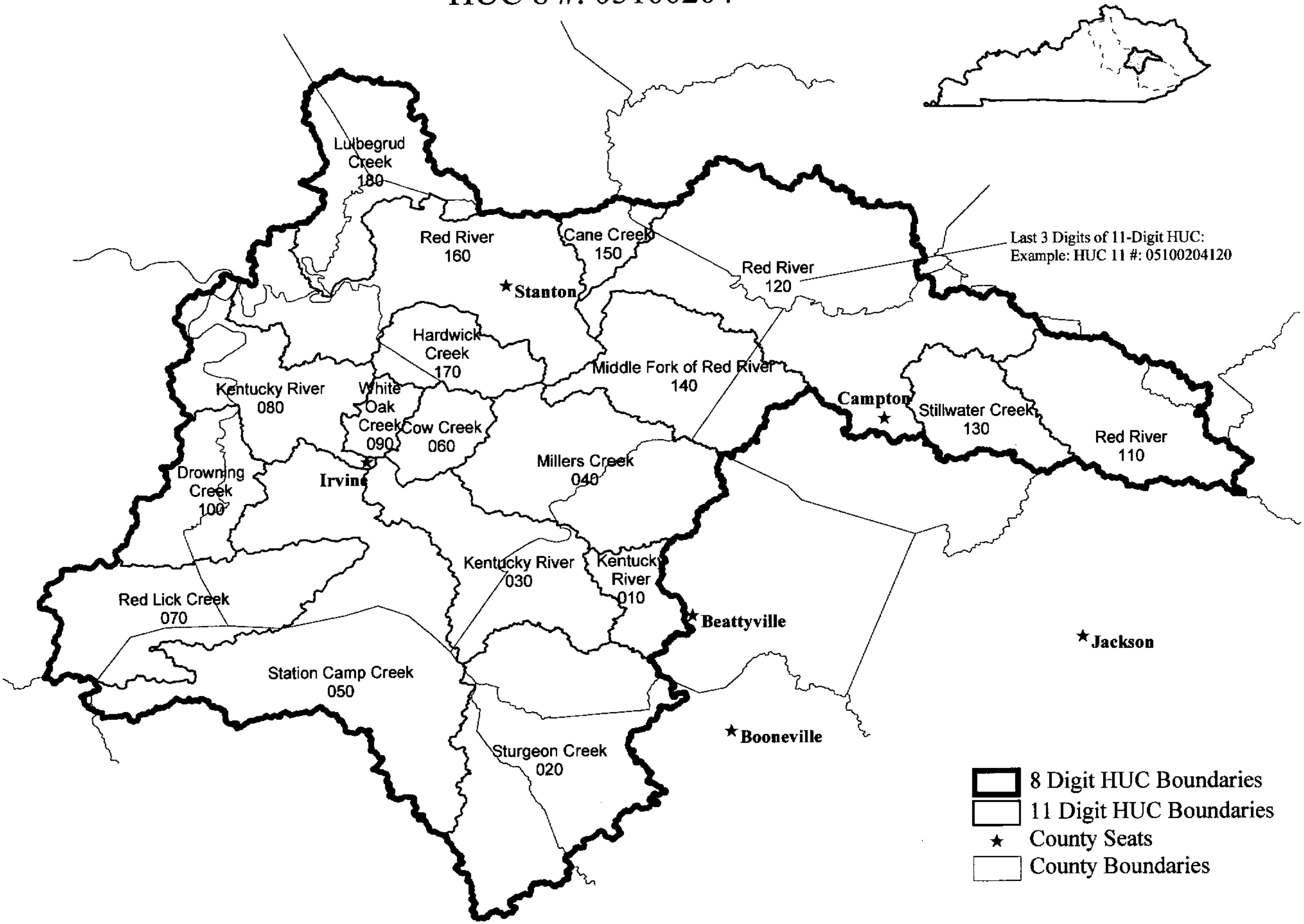


Figure 1.5 Kentucky River Upper Basin

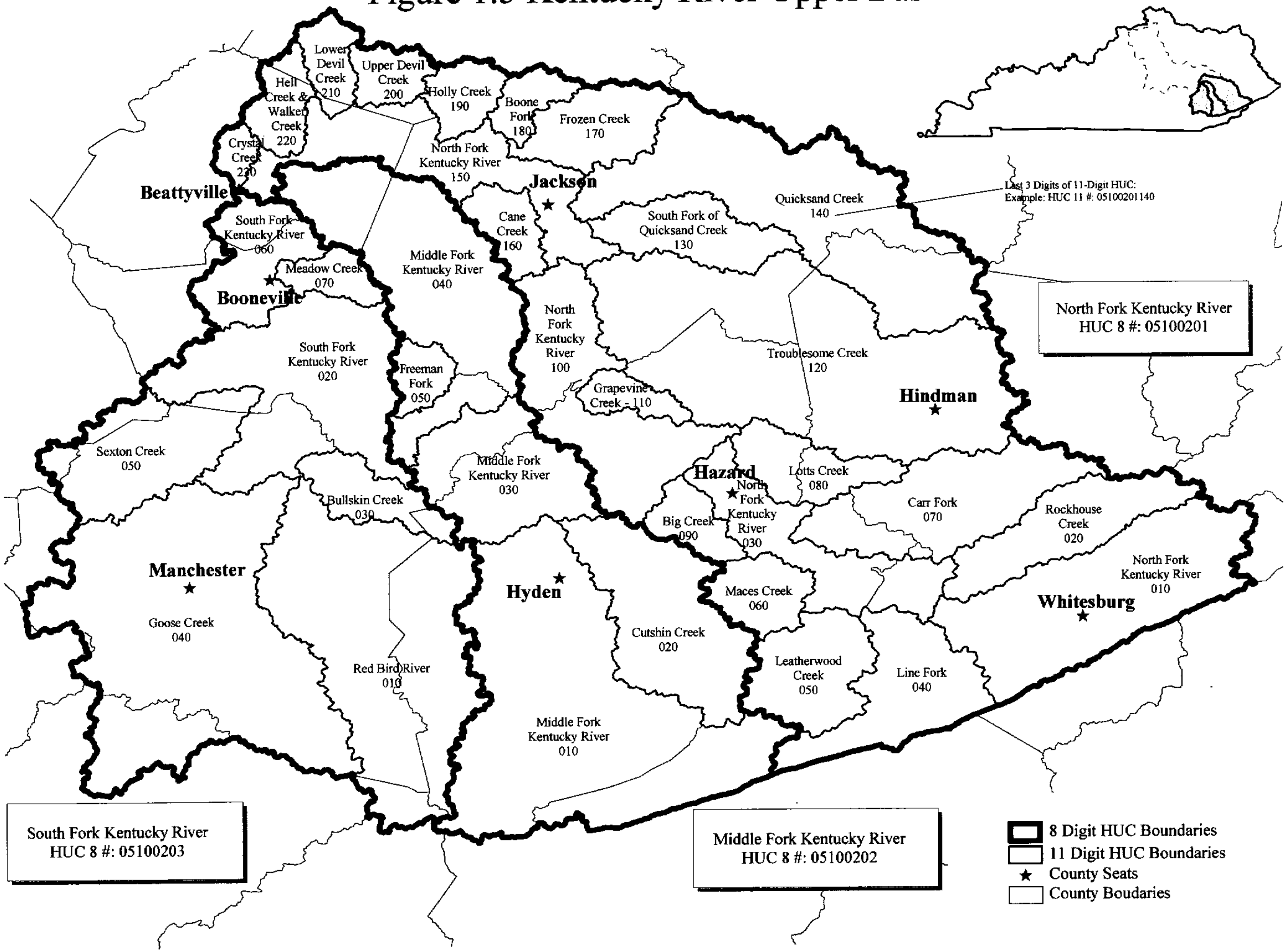


Figure 1.6 2000 KY River Watershed Watch Monitoring Sites

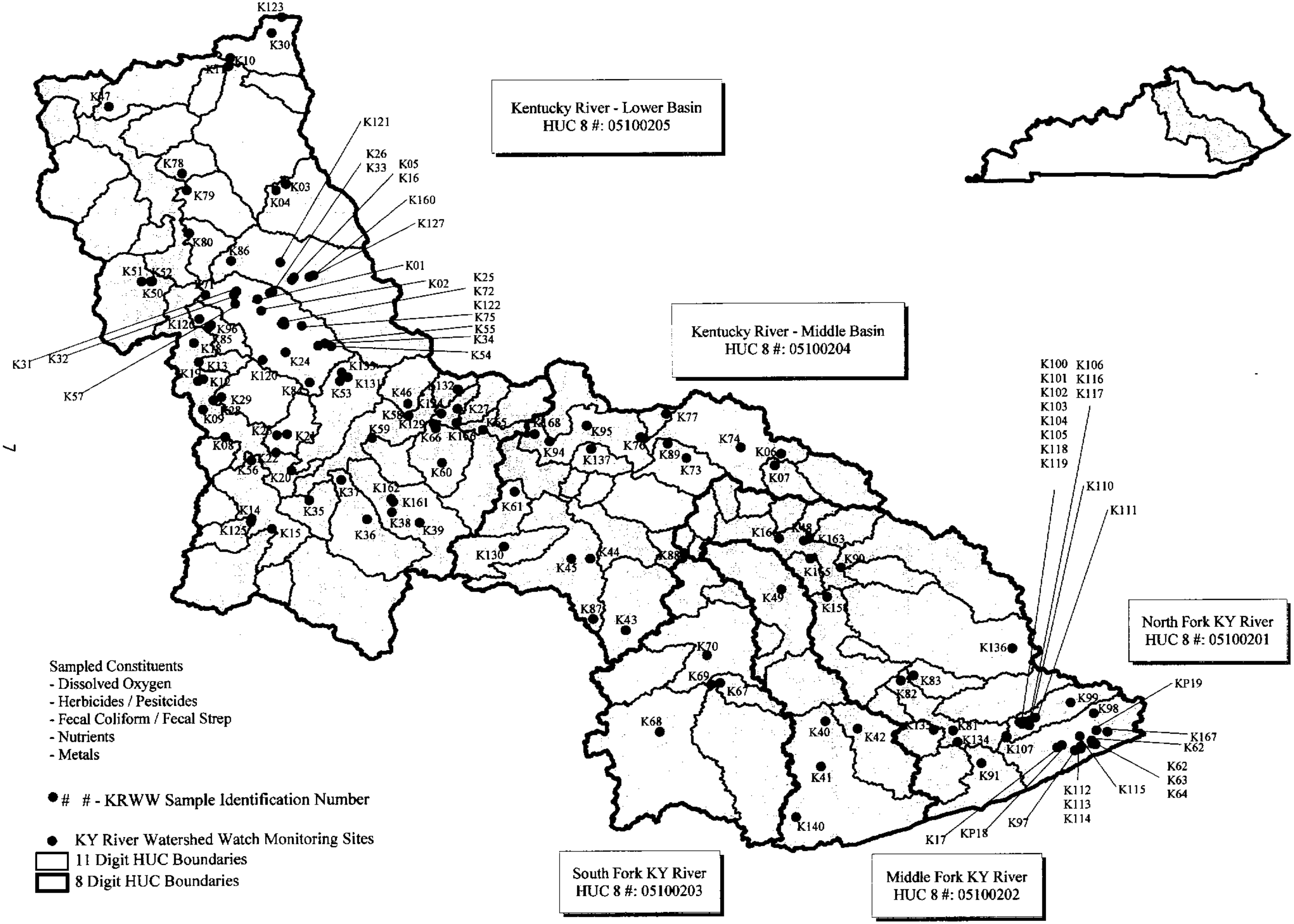


Table 1.1 Kentucky River Watershed Watch Sampling Sites

Sample ID #	Stream Name	Site Location	Longitude (dec. deg.)	Latitude (dec. deg.)
K01	Lee's Branch	100yds North of US 421 bridge	-84.69126	38.16546
K02	Lee's Branch	150yds downstream of Stephens St.	-84.68252	38.13863
K03	Eagle Creek E Fork	Above Hinton Cemetary Rd	-84.62425	38.43077
K04	Eagle Creek W Fork	Burgess Rd. Bridge 1.25mi North	-84.64744	38.41616
K05	Cane Run Ceek	0.2mi upstream of 460 Bridge	-84.61074	38.20944
K06	Red River	Mouth of Big Branch	-83.48420	37.80204
K07	Stillwater Creek	SR 746 Bridge	-83.49858	37.77515
K08	Shawnee Run	600" up from confluence of KY River	-84.76727	37.84721
K09	Landing Run	600" up from confluence of KY River	-84.81915	37.91064
K10	Ten Mile Creek	0.25mi upstream of mouth of Eagle Creek	-84.75343	38.72292
K11	Eagle Creek	Just up from Mouth of Ten Mile Creek	-84.75750	38.70356
K12	Craig Creek	Lillards Ferry Rd. Bridge	-84.81883	37.98117
K13	Grier's Creek	Grier's Creek Rd. 0.5 miles below bridge	-84.82827	38.02069
K14	Clarks Run	N37 38' 21" W 84 43' 19"	-84.70554	37.65786
K15	Hanging Fork Creek	N37 37' 24" W 84 40' 49"	-84.65876	37.63387
K16	North Fork Elkhorn	At Great Crossings	-84.60580	38.21564
K17	North Fork KY River	Whitesburg, at KY 931/15	-82.84696	37.12016
K18	Sharps Branch	0.75mi upstream of Mouth of Sharps	-84.83958	38.06465
K19	Gilbert's Creek	First Crossing of Gilbert's Creek Rd	-84.83014	37.97655
K20	Hickman Creek	Between UT and Mouth of Hickman	-84.61263	37.76886
K21	Town Fork	Just below New WWTP, Nicholasville	-84.62239	37.85299
K22	Jessamine Creek	At SR 29 Bridge	-84.64875	37.81054
K23	Wilmore Tn Branch	Just above Mouth at Jessamine Creek	-84.64642	37.85055
K24	South Elkhorn	Upstream of US 60 near Airport	-84.62588	38.04231
K25	South Elkhorn	Below Dam near Confl of Town Branch	-84.62981	38.11329
K26	South Elkhorn	0.5mi upstrm of SR 341	-84.66193	38.18007
K27	Two Mile Creek	0.5mi south of Elkin Station Rd. Bridge	-84.22552	37.90966
K28	Clear Creek	500m upstream of Mouth of Clear Creek	-84.79488	37.93250
K29	Clear Creek	At KY 33 Bridge	-84.77613	37.93950
K30	Ten Mile Creek	0.5mi upstrm of Verona Mt Zion Rd.	-84.65661	38.77999
K31	South Elkhorn Creek	Just Upstream of SR 1685 Bridge	-84.74018	38.18380
K32	Beals Run	Just below US 421	-84.74615	38.17530
K33	South Elkhorn	210 Ironworks Estate Subdivision UT	-84.65559	38.18278
K34	Wolfe Run	At Valley Park off Cambridge Dr.	-84.54980	38.05682
K35	Sugar Creek	Three Forks 200yds below 1355 bridge	-84.57100	37.69972
K36	Paint Lick Creek	Paint Lick, SR 52 Bridge	-84.43648	37.65488
K37	Paint Lick Creek	Bradshaw Mill off Dry Bridge Road	-84.49661	37.74660
K38	Silver Creek	Ruthton	-84.37839	37.67118
K39	Silver Creek	below I-75 bridge	-84.31316	37.64672
K40	Middle Fork	Just Below Mouth of Asher Branch	-83.38252	37.18252
K41	Middle Fork	Below Mouth of Greasy Creek	-83.39265	37.07819
K42	Cutshin Creek	At gaging station at Wooton, KY	-83.30801	37.16488
K43	Sturgeon Creek	SR 30 Bridge over Sturgeon Creek	-83.84233	37.39500
K44	Station Camp Creek	Rt 89 Bridge	-83.92341	37.56082
K45	Station Camp Creek	Rt 1209 Bridge	-83.96619	37.56083
K46	Boone Creek	By Iriquois Hunt Club	-84.34068	37.92189
K47	Eagle Creek	Happy Hollow Trailer Park Lot D61	-85.03471	38.61184
K48	North Fork KY River	Martha Lane Collins Br (KY 541)	-83.43162	37.60086
K49	Middle Fork KY River	Under KY 30 Bridge	-83.48359	37.48774
K50	Benson Creek	Downstream of Red Bridge	-84.93866	38.20760
K51	Benson Creek	At Red Bridge Falls	-84.96000	38.20760
K52	South Fork Benson Creek	At Riffle Above Red Bridge	-84.93618	38.20746
K53	W Hickman Creek	Behind Tates Creek Shopping Center	-84.49927	37.97457
K54	McConnell Springs	McConnell Spring, Fayette Co.	-84.51903	38.05539
K55	Town Branch	Jimmy Campbell Lane Bridge	-84.53362	38.06256
K56	Dix River	0.25mi N of Dix Dam	-84.70655	37.79246
K57	Spring Stn	At spring	-84.74323	38.15527
K58	Boone Creek	Mouth of Boone Creek	-84.33864	37.89437
K59	Tates Creek	Below mouth of Long Branch	-84.42403	37.84343
K60	Dreaming Creek	Mouth of Dreaming near Otter Creek	-84.26101	37.78503
K61	Drowning Creek	100yds upstream of SR52 bridge	-84.09609	37.71704
K62	North Fork KY River	Mayking, at Old Regular Baptist Church	-82.76715	37.13512
K63	Pine Creek	At Mayking Baptist Church	-82.76511	37.12901
K64	Creekam Creek	At Mouth of Creekam Creek & Pert Fork	-82.75797	37.12697
K65	Muddy Creek	SR 1986 Bridge at Doylesville	-84.16759	37.86022

Table 1.1 Kentucky River Watershed Watch Sampling Sites

Sample ID #	Stream Name	Site Location	Longitude (dec. deg.)	Latitude (dec. deg.)
K66	Otter Creek	RR crossing on 388 near Boonesboro	-84.27546	37.86482
K67	Bullskin Creek	At mouth of Little Bullskin Creek	-83.62553	37.27257
K68	Goose Creek	At mouth of Sutton Branch	-83.76523	37.15973
K69	Goose Creek	Below Mouth of Jacks Branch	-83.64610	37.26858
K70	Bishops Branch	At mouth	-83.65597	37.33676
K71	South Fork Elkhorn	US 68 Harrodsburg Rd. Bridge	-84.81264	38.17618
K72	Steele's Branch	Redd Rd. Bridge off Old Frankfort Pk	-84.62871	38.10645
K73	Mdl Fork	KY 715 Bridge over Middle Fork	-83.70271	37.79348
K74	Swift Camp Creek	At Swift Camp Creek Camp	-83.57722	37.81748
K75	Town Branch	Yarnellton Rd. Bridge	-84.58790	38.10353
K76	Red River	East of Stanton	-83.80894	37.84209
K77	Cane Creek	Gordon Property at Meniffee Co Line	-83.74999	37.89573
K78	Sevren Creek	.25mi below US 127	-84.86606	38.45655
K79	Cedar Creek	Cedar Creekeek below Sawbridge Creek	-84.85513	38.41764
K80	Elkhorn Creek	Strohmeir Rd. at old Iron Bridge	-84.84982	38.31881
K81	North Fork KY River	Fusonia below Fort Branch	-83.08705	37.16030
K82	North Fork KY River	Perry Co Park	-83.20780	37.27592
K83	Lotts Creek	550 bridge	-83.17841	37.28781
K84	South Elkhorn	Tributary A of South Elkhorn Creek	-84.56950	37.97250
K85	Glen Creek	Intersection of Steel Rd and McCracken, Glenn's Creek Baptist Church	-84.80528	38.10066
K86	North Fork Elkhorn Creek	Switzer Bridge	-84.75245	38.25380
K87	War Fork Creek	Below bridge on Jack's Ridge (warfork Rd.)	-83.91670	37.42106
K88	Crystal Creek	Right off main st. in Beattyville onto Locust Rd. 0.4 mi on right	-83.70777	37.57303
K89	South Fork of Red River	40 yds upstream of Hwy 11/15 bridge	-83.74633	37.82657
K90	Quicksand Creek	Off bridge on Hwy 15 next to junction with Hwy 30	-83.34614	37.53823
K91	Bates Fork	Bates Fork and Turkey Creek	-83.02194	37.08417
K94	Red River - Lower	Red River at Twin Creek	-84.01583	37.83296
K95	Red River	Below bridge on Hwy 15 Clay City	-83.93072	37.86907
K96	Graddy Springs	Spring on Greenwood Farm, Steele Rd.	-84.79900	38.10630
K97	North Fork Kentucky River	Ermine, KY	-82.80577	37.11340
K98	Millstone Creek	Millstone Transfer Station	-82.76200	37.19860
K99	Rockhouse Creek	Rockhouse Creek and Love's Branch	-82.81580	37.22370
K100	Rockhouse Creek	Below Doty Creek	-82.92800	37.17500
K101	Rockhouse Creek	Above Doty Creek	-82.92800	37.17500
K102	Doty Creek	Mouth of Doty	-82.92800	37.17500
K103	Rockhouse Creek	Below Blair Branch	-82.92517	37.18067
K104	Rockhouse Creek	Above Blaire Branch	-82.92517	37.18067
K105	Blair Branch	Mouth of Blair Branch	-82.92517	37.18067
K106	Blair Branch	Mouth of Tooter Branch	-82.91133	37.17150
K107	Rockhouse Creek	Below Crases Branch	-82.96350	37.14483
K108	Rockhouse Creek	Above Crases Branch	-82.96350	37.14483
K109	Rockhouse Creek	Mouth of Crases Branch	-82.96350	37.14483
K110	Rockhouse Creek	Below Ison	-82.91083	37.18267
K111	Rockhouse Creek	Above Ison	-82.89733	37.18933
K112	North Fork Kentucky River	Below Colly Creek	-82.79278	37.11667
K113	North Fork Kentucky River	Above Colly Creek	-82.79278	37.12222
K114	Colly Creek	At the mouth	-82.79278	37.11917
K115	Allen Branch	At the mouth	-82.79472	37.14611
K116	Blair Branch	Above Tooter Branch	-82.91133	37.17150
K117	Blair Branch	Below Ison Branch	-82.91133	37.17150
K118	Doty Creek	Left Fork	-82.93400	37.17917
K119	Doty Creek	Right Fork	-82.93400	37.17917
K120	Unnamed Trib-Elkhorn Creek	Sycamore Estates, Woodford Co	-84.68000	38.02500
K121	South Fork Elkhorn	Hopewell Farm	-84.63778	38.25000
K122	South Fork Elkhorn	Brown's Mill Road, Bridge #1	-84.63389	38.10889
K123	South Fork Elkhorn	Brown's Mill Road, Bridge #2	-84.63264	38.81667
K124	Kentucky River	At Fort Boonesborough State Park, Boonesboro Beach	-84.26250	37.89880
K125	Clark's Run	At the Dix River	-84.70800	37.65000
K126	Glenn's Creek	Millville School	-84.82694	38.12056
K127	North Elkhorn	at Dog Pound	-84.56913	38.21628
K129	Otter Creek	100 yds dwnstrm of Bridge on Routh 388	-84.28000	37.87500
K130	McCarter's Branch	At Red Lick Creek	-84.12000	37.59000
K131	Hickman Creek	Above Woodfield Retention Basin	-84.48083	37.98422
K132	West Hickman Creek	Veteran's Park, Lexington	-84.22500	37.95500

Table 1.1 Kentucky River Watershed Watch Sampling Sites

Sample ID #	Stream Name	Site Location	Longitude (dec. deg.)	Latitude (dec. deg.)
K133	Unnamed Trib - West Hickman Creek	Zandale/Lansdowne	-84.49500	37.99500
K134	Leatherwood Creek	Leatherwood Creek behind Cornettsville Fire Dept.	-83.07694	37.13389
K135	Left Fork	Maces Creek Road, Viper School	-83.13194	37.16167
K136	Troublesome Creek	Knott Co. Central	-82.95000	37.35000
K137	Hardwick's Creek	1057 bridge, 2.5 mi. south of Clay City	-83.92050	37.81500
K140	Middle Fork	Upstream of Hyden, near Rye Cove Branch	-83.45030	36.96130
K156	Four Mile Creek	Confluence of Kentucky River and Four Mile Creek	-84.22750	37.87690
K157	Kentucky River	At Fort Boonesborough State Park, Boonesboro Beach	-84.26250	37.89880
K158	Howards Creeks	Confluence of Kentucky River and Howards Creek	-83.37800	37.47000
K160	North Elkhorn	Route 25 north of Georgetown, at the boat dock	-84.56000	38.22000
K161	Silver Creek	Hagans Mill Bridge	-84.37500	37.69500
K162	Silver Creek	Taylor's Fork and Silver Creek	-84.38000	37.70200
K163	Frozen Creek	Confluence of North Fork Kentucky River	-83.42000	37.60500
K165	Cane Creek	100' below confluence of Cane Creek and Lindon Fork	-83.41667	37.55848
K166	War Creek	Above confluence with North Fork Kentucky River	-83.48889	37.60556
K167	Boone Fork	HWY15 - KY 205 Intersection	-82.73000	37.15556
K168	Lulbegrud Creek	Bridge on Route 1028 at Log Lick Creek in Clark County	-84.05000	37.85000
KP18	Boone Fork	At Kona	-82.83645	37.12530
KP19	Sandlick	At Whitesburg	-82.75594	37.15902
KL1	North Fork Kentucky River	Appalshop, Near Heritage Chair Factory	-82.82444	37.11694
KL2	Little Dry Fork	Route 15 near Hazard, at Little Dry Fork Road	-82.85767	37.14117
KL3	Sandlick Creek	At the Sandlick Firehall	-82.82500	37.16433
KL4	Crafts Colly	On Magnolia Road	-82.80500	37.17150
KL5	Company Fork	At the trail along Bony Piles	-82.79417	37.16800
KL6	Company Fork	At the trail along Bony Piles	-82.79417	37.16783
KL7	Millstone Creek	Near millstone Transfer Station	-82.76100	37.19983
KL8	Crafts Colly		-82.80467	37.16767
KL9	Company Fork	Fork Road	-82.79000	37.17500
KL10	Camp Branch	Near Donnie Proffitt's property and Golden Oak property	-82.81717	37.20617
KL11	Camp Branch	Tipple Driveway	-82.82267	37.20267

1.3 Sample Data and Collection Dates

Water quality data were collected across the basin at five different times extending through the spring, summer, and fall of 2000. A listing of the sample dates and types of data collected during each sample period is provided in Table 1.2

Table 1.2 Basinwide Sample Data and Collection Dates

Type of Data Collected	Sample Dates	Sites	Samples
1. Herbicide/Pesticide	6/12/00-6/28/00	4	4
2. Focused Fecal Coliform	6/5/00-6/30/00	26	91
3. Synoptic Fecal Coliform.	7/7/00-7/12/00	69	69
4. Follow Up Fecal Coliform	7/29/00-8/4/00	22	22
5a. Chemical/Nutrients	9/10/00-9/18/00	86	86
5b. Chemical/Nutrients/Metals	9/10/00-9/18/00	39	39

In addition to the basin wide sampling effort, separate focused sampling was conducting in Letcher County during March and September of 2000. A listing of the sample dates and types of data collected during each sample period is provided in Table 1.3 Finally, a summary of the types and number of samples collected at each data collection site is provided in Table 1.4.

Table 1.3 Letcher County Sample Data and Collection Dates

Type of Date Collected	Sample Dates	Sites	Samples
1. Metals Data	3/7/00-3/18/00	K97,K98,K99	9
2a. Fecal Coliform/Strep	3/26/00-3/31/00	K100-K115	39
2b. Fecal Coliform/Strep	8/28/00-9/6/00	KP18-KP19	6
3. AMD Data	6/28/00-9/6/00	KL1-KL11	31

1.4 Baseflow Conditions

In order to provide a basis for interpreting the sample results it is important to understand the associated stream conditions during the sampling effort. For example, data collected during low flow or dry conditions may be more indicative of the impact of points discharges while data collected following a storm may be more reflective of the impacts of non-point pollutant discharges. An indication of the stream conditions during the sampling period may be obtained by examination of USGS streamflow records. For the purposes of this study, five separate USGS gauging stations were selected for use in providing an indication of the streamflow conditions during the sampling period. The names, station numbers, and locations of each of these stations is shown in Figure 1.7. Streamflow plots for each station showing the times of the different sampling efforts are shown in Figures 1.8-1.12.

Table 1.4 Types and Number of Samples

	Field Physical / Chemical Data	Pesticide / Herbicide Sampling	Focused Fecal Coliform Sampling	Synoptic Fecal Coliform Sampling - July 2000	Follow up Fecal Coliform Sampling	Chemical Sampling - September 2000	Nutrient Sampling - Sept 2000	Metals Sampling - September 2000	Letcher Fecal Sampling	Physical / Chemical Data	Letcher Metals / AMD Sampling
Sample ID #	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples
K01	6		5	1		1	1			7	
K02	2			1	1	1	1	1		3	
K03	1			1		1	1	1		2	
K04	1			1		1	1			2	
K05	3		5	1		1	1			4	
K06	1			1		1	1			2	
K07	1			1		1	1			2	
K12	2			1	1	1	1			3	
K13	2			1	1	1	1			3	
K14	1			1		1	1			2	
K15	1			1		1	1			2	
K16	1			1		1	1			2	
K18	1			1						1	
K19	1			1						1	
K21	7		5	1	1	1	1			8	
K22	7		5	1	1	1	1			8	
K23	7		5	1	1	1	1			8	
K25	2			1	1					2	
K26	1			1		1	1			2	
K27	1			1		1	1			2	
K28	2			1	1	1	1			3	
K29	2			1	1	1	1			3	
K31	1			1		1	1			2	
K32	6		5	1						6	
K33	1			1		1	1			2	
K34	1			1		1	1			2	
K35	1			1						1	
K36	2			1	1					2	
K37	1			1						1	
K38	1			1						1	
K39	2			1	1					2	
K40	1									1	
K42	1							1		1	
K43				1		1	1	1		1	
K44	1			1		1	1	1		2	
K45	1			1		1	1	1		2	
K46								1			
K47								1			
K48	1					1	1	1		2	
K49											
K50	1			1		1	1	1		2	
K51	1			1		1	1			2	
K52	1			1		1	1			2	
K53				1		1	1			1	
K54	1			1		1	1			2	
K55				1		1	1	1		1	
K56	1			1		1	1			2	
K57	1			1		1	1			2	
K59						1	1			1	
K60						1	1			1	
K61						1	1			1	
K62	1									1	
K63	1									1	
K64											
K65	1						1			2	
K66	1					1				1	
K67						1	1			1	
K68						1	1			1	
K69						1	1			1	
K70						1	1			1	
K71						1	1			1	
K72	5		5	1	1	1	1			6	
K73				1		1	1			1	
K74				1		1	1			1	
K75				1		1	1			1	
K76						1	1			1	
K77	1					1	1			2	
K78	1									1	
K79	1									1	
K80	1									1	
K81						1	1	1		1	
K82	6		3			1	1	1		7	
K83	6		3			1	1	1		7	
K84						1	1			1	
K85				1		1	1	1		1	

Sample ID #	Field Physical / Chemical Data	Pesticide / Herbicide Sampling	Focused Fecal Coliform Sampling	Synoptic Fecal Coliform Sampling - July 2000	Follow up Fecal Coliform Sampling	Chemical Sampling - September 2000	Nutrient Sampling - Sept 2000	Metals Sampling - September 2000	Letcher Fecal Sampling	Physical / Chemical Data	Letcher Metals Sampling - March 2000
	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples	# Samples
K86	1			1		1	1			2	
K87				1	1	1	1			1	
K89						1	1			1	
K90						1	1			1	
K94						1	1			1	
K95						1	1			1	
K96				1		1	1			1	
K97	6									3	3
K98	6									3	3
K99	6									3	3
K100	7		3						3	7	
K101	7		3						3	7	
K102	6		3						3	6	
K103	6		3						3	6	
K104	6		3						3	6	
K105	6		3						3	6	
K106	6		3						3	6	
K107	7		3						3	7	
K108	7		3						3	7	
K109	4		3						3	4	
K110	7		3						2	7	
K111	7		3						2	7	
K112	3								2	3	
K113	3								2	3	
K114	2								2	2	
K115	3								2	3	
K116	5		1							5	
K117	4		3							4	
K118	6		3							6	
K119	6		3							6	
K120	3	1		1	1	1	1	1		4	
K121	1	1		1		1	1	1		2	
K122	1	1		1		1	1			2	
K123	1	1		1		1	1	1		2	
K124	1		4					1		1	
K125	1					1	1	1		2	
K126	2			1	1	1	1	1		3	
K127	2			1	1	1	1	1		3	
K129	2			1	1	1	1			3	
K130	2			1	1	1	1	1		3	
K131	1			1		1	1	1		2	
K132	2			1	1	1	1	1		3	
K133	1			1						1	
K134	1					1	1	1		2	
K135	5					1	1	1		6	
K136	1					1	1	1		2	
K137	1			1						1	
K140	1					1	1	1		2	
K156	1			1	1	1	1	1		2	
K157	1			1	1	1	1	1		2	
K158	1			1	1	1	1	1		2	
K160				1							
K161	1			1		1	1	1		2	
K162	1			1		1	1	1		2	
K163	1					1	1	1		2	
K165	1					1	1	1		2	
K166	1					1	1	1		2	
K167	1					1	1	1		2	
K168	1			1		1	1	1		2	
KP18									3		
KP19									3		
KL1	3										
KL2	3									3	
KL3	3									3	
KL4	3									3	
KL5	3									3	
KL6	3									3	
KL7	3									3	
KL8	3									3	
KL9	3									3	
KL10	3									3	
KL11										3	
# Sites Sampled per Event out of Total 147 Sites	115	4	26	69	22	86	86	39	18	139	3

Figure 1.7 KY River Basin
USGS Selected Gaging Stations

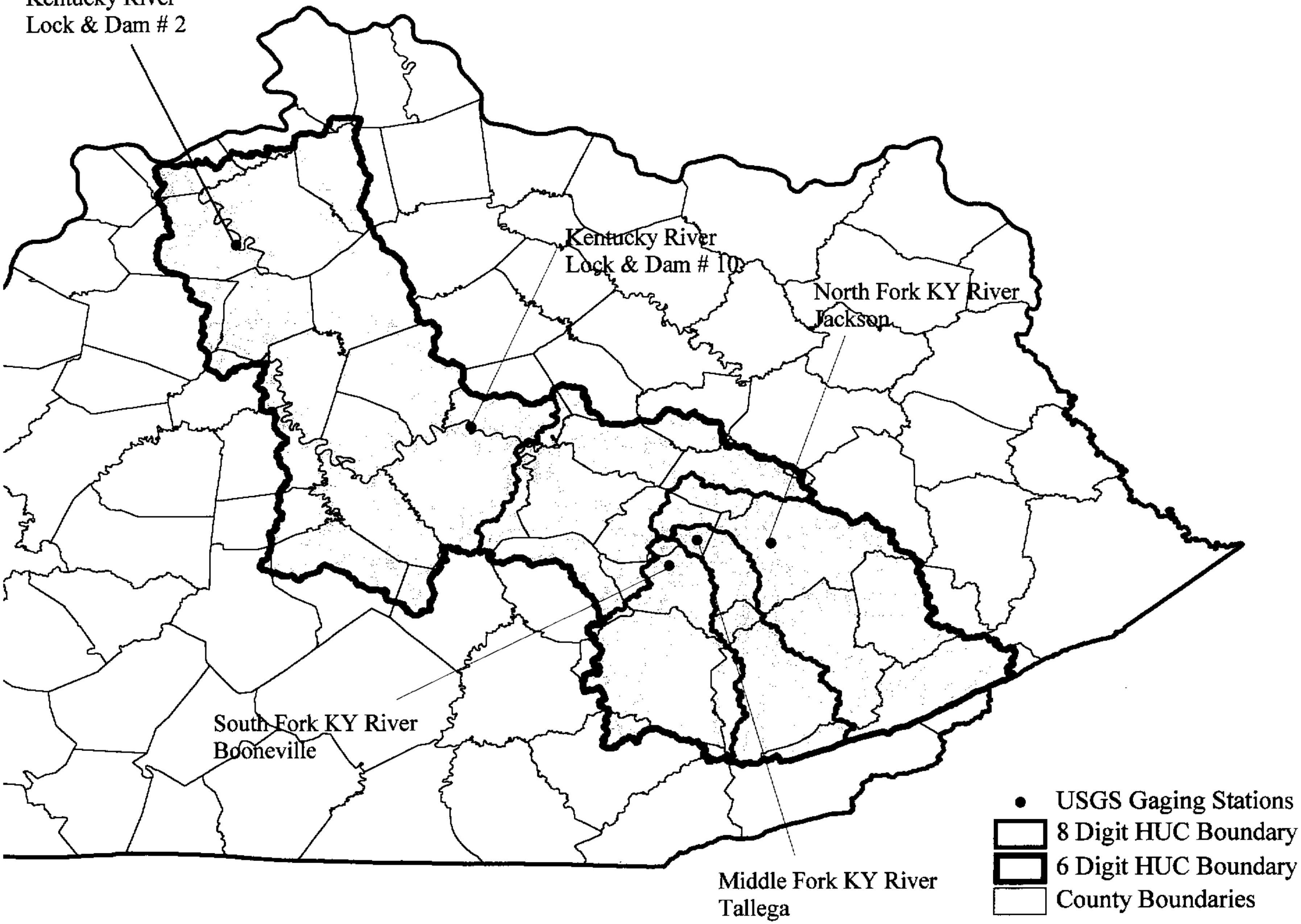


Figure 1.8 North Fork Kentucky River - Jackson 2000 Flow Values

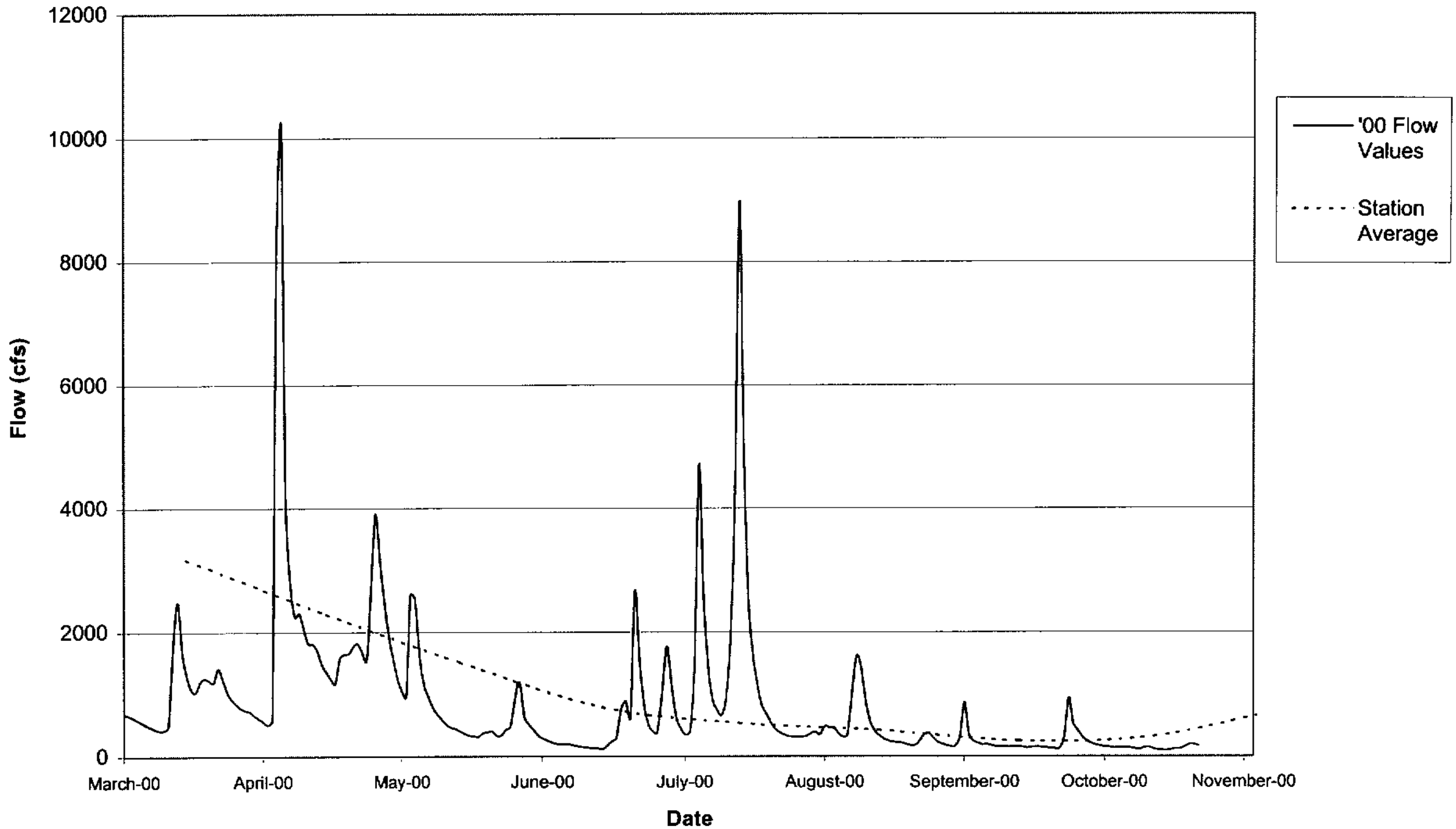


Figure 1.9 Middle Fork Kentucky River - Tallega
2000 Flow Values

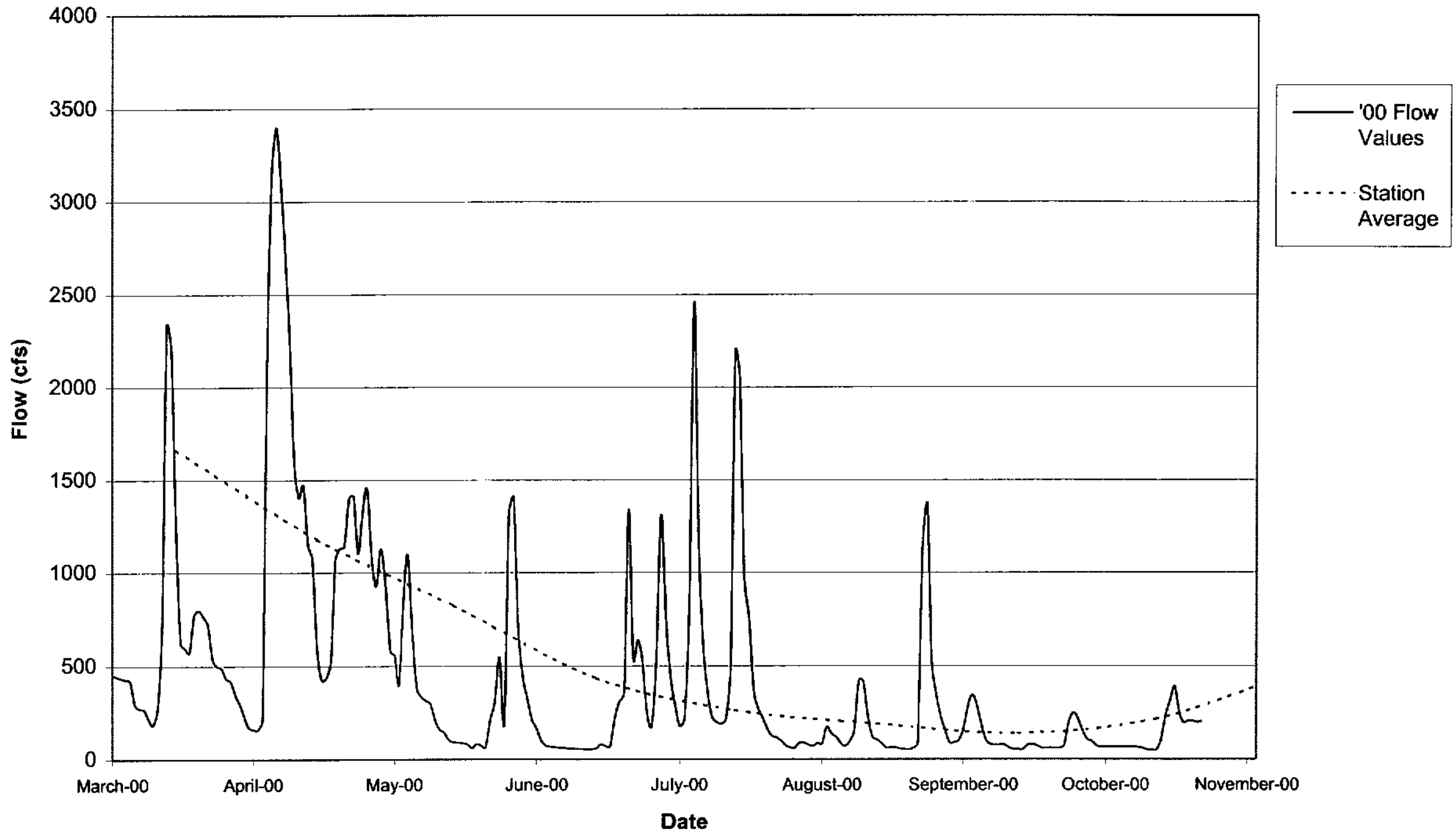


Figure 1.10 South Fork Kentucky River - Booneville
2000 Flow Values

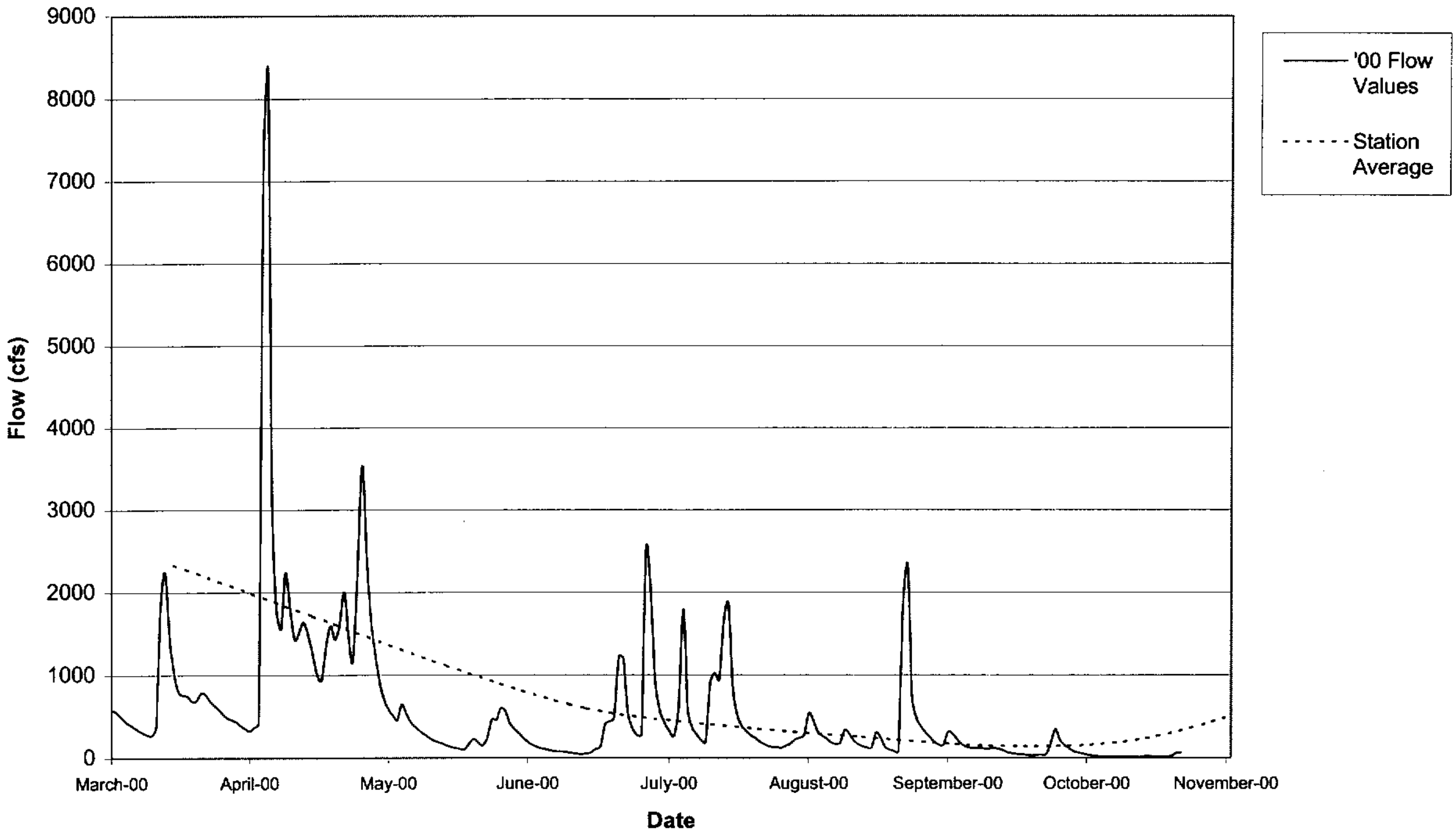


Figure 1.11 Kentucky River - Lock & Dam # 10
2000 Flow Values

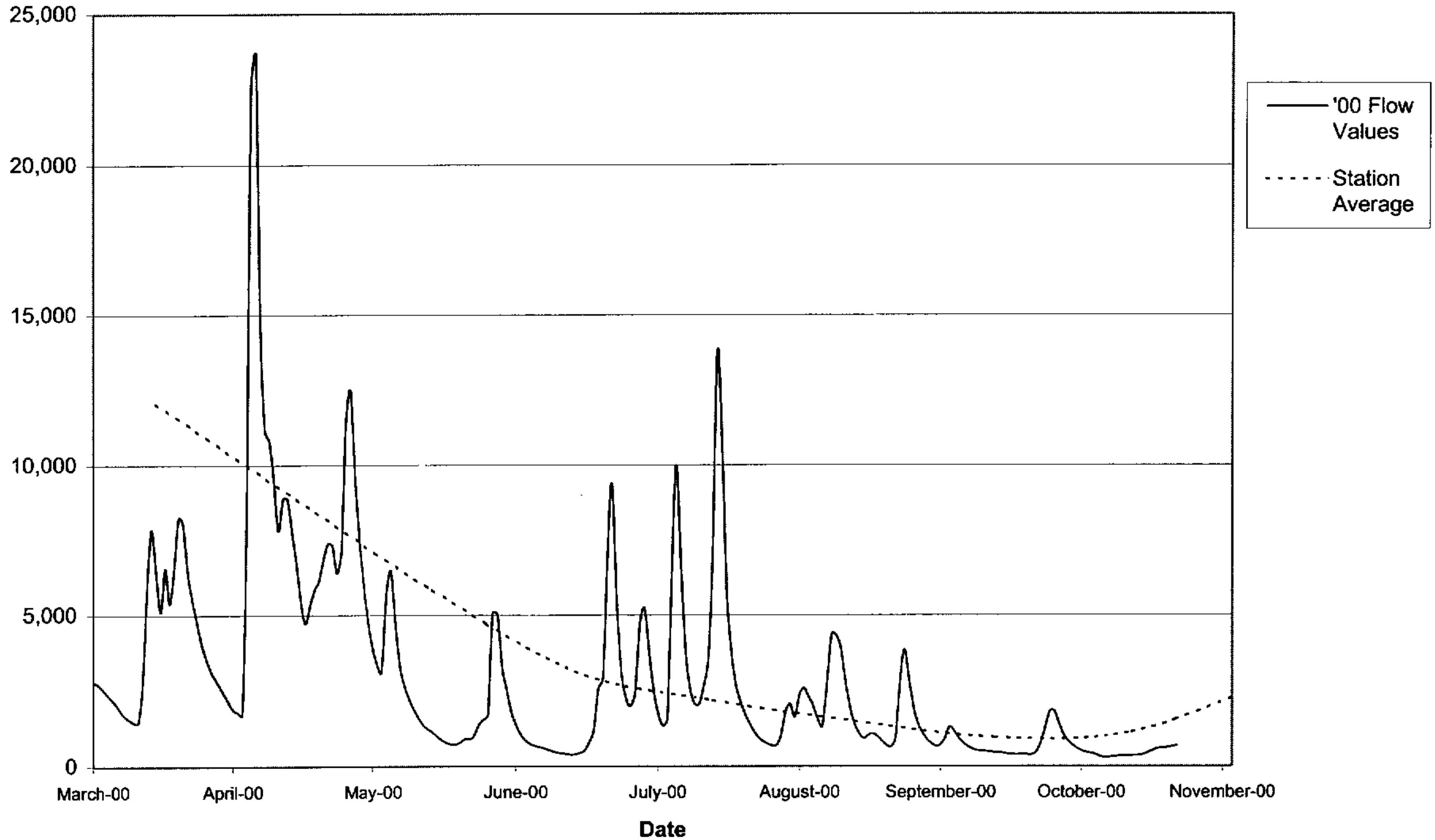
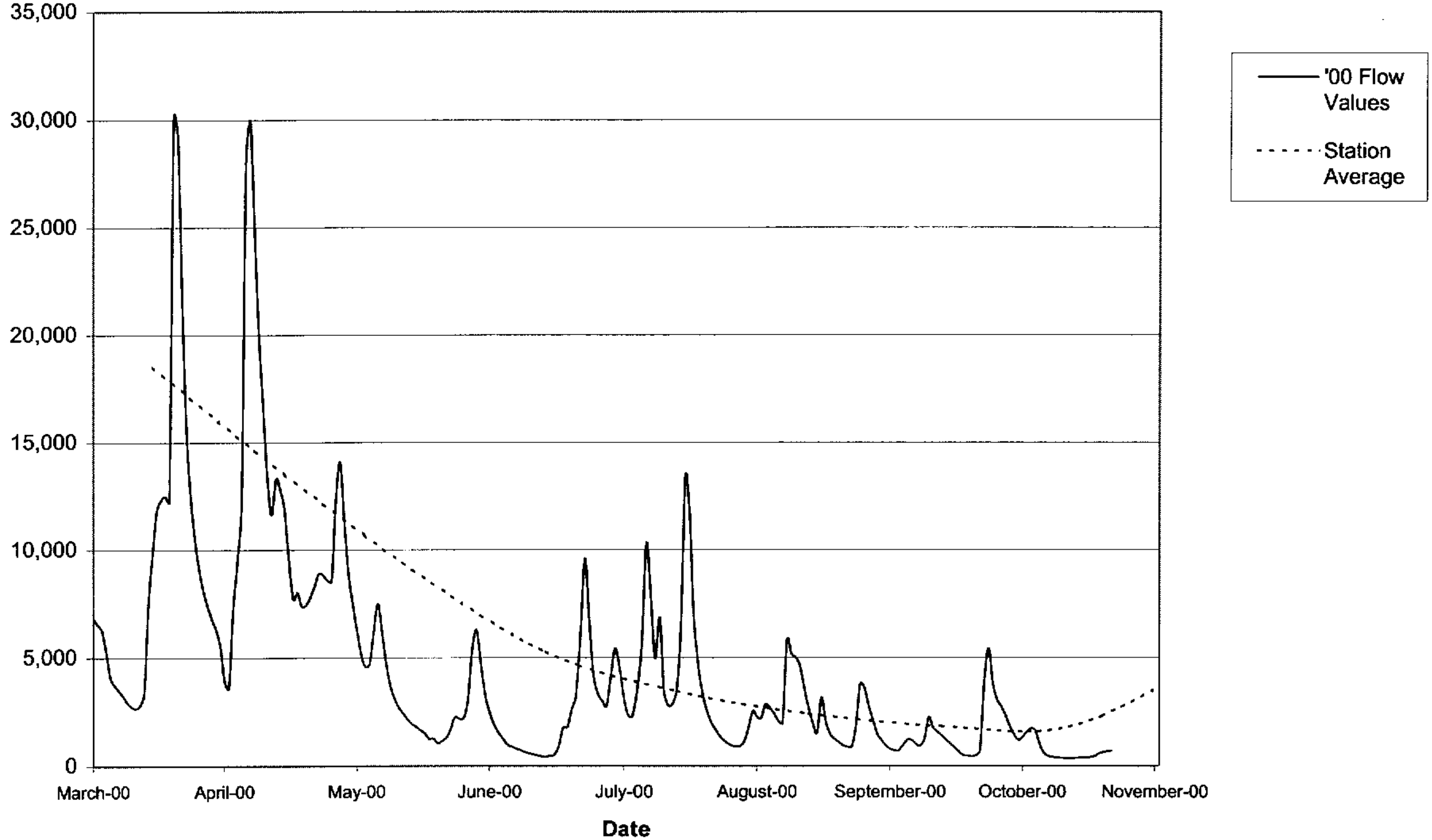


Figure 1.12 Kentucky River - Lock & Dam # 2
2000 Flow Values



CHAPTER 2: DATA COLLECTION AND ANALYSIS

2.1 Physical/Chemical Field Data

General physical/chemical field data (flow, water temperature, pH, and dissolved oxygen) were collected at each sample site during five separate basinwide sample periods. A summary of the physical/chemical data collected during this period is provided in Table 2.1. With the exception of stations K14, K21, K130, K135, and K168, all stations had oxygen levels greater than 5.0. For the observed stream temperatures, all dissolved oxygen values should be less than 10. Thus, sites with readings in excess of 10 are most likely due to measurement error. With the exception of stations K01, K32, K54, K72, and K124, all stations had pH values greater than 6.

2.2 Herbicide/Pesticide Indicators

Five separate herbicides/pesticides were used to evaluate the possibility of potential pollution from rural and/or urban land uses in the Kentucky River Basin. The herbicide/pesticides included: 2,4-D, Alachlor, Chloropyrifos, Metolachlor, and Triazine. 2,4-D is a chlorinated phenoxy compound which functions as a systemic herbicide that is used to control many types of broadleaf weeds. It is used in cultivated agriculture, in pasture and rangeland applications, forest management, home, garden, and to control aquatic vegetation. Alachlor is an aniline herbicide used to control annual grasses and broadleaf weeds in field corn, soybeans, and peanuts. It is a selective systemic herbicide, absorbed by gernminating shoots and by roots. It works by interferring with a plant's ability to produce protein and by interfering with root elongation. Chloropyrifos is a broad-spectrum organophosphate insecticide. Chloropyrifos is effective in controlling cutworms, corn rootworms, cockroaches, grubs, flea beetles, flies, termites, fire ants, and lice. It is used as an insecticide on grain, field, fruit, nut, and vegetable crops, as well as on lawns and ornamental plants. Metolachlor is usually applied to crops before plants emerge from the soil, and is used to control certain broadleaf and annual grassy weeds in field corn, soybeans, peanuts, grain sorghum, potatoes, pod crops, cotton, safflower, stone fruits, nut grees, highway rights-of-way and woody ornamentals. It inhibits protein synthesis; thus, high-protein crops (e.g. soy) can be adversely affected by excessive metolachlor application. Additives may be inlcuded in product formulations to help protect sensitive crops (i.e. sorghum) from injury. Triazine (or Atrazine) is a selective triazine herbicide used to control broadleaf and grassy weeds in corn and other crops, and in conifer reforestation plantings. It is also used as a nonselective herbicide on non-cropped industrial lands and on fallow lands. Over 64 million acres of cropland were treated with atrazine in the U.S. in 1990. For a more thorough discussion of each of these products, see Appendix A.

2.3 Herbicide/Pesticide Samples

Herbicide/pesticide data were collected at four new sample sites during the period 6/12/00-6/28/00. The locations of each of the sites is shown in Figure 2.1. A summary of the results for the herbicide/pesticide data collection effort is provided in Table 2.2.

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K01	6/14/00	Cloudy	Low	-	7.0	1.4
K01	6/19/00	Turbid	Low	-	5.5	9.0
K01	6/26/00	Turbid	Low	-	6.0	5.4
K01	6/27/00	Very turbid	Low	-	5.0	-
K01	6/30/00	Slightly turbid	Low	-	5.5	6.6
K01	7/7/00	Clear	Low	-	-	-
K01	9/10/00	Clear	Low	-	-	-
K02	7/7/00	Clear	Low	-	-	-
K02	8/1/00	Clear	Low	-	-	-
K02	9/10/00	Slightly cloudy	Low	-	-	-
K03	7/10/00		Ponded	35	8	7
K03	9/10/00	Oily film on surface, smell	Ponded	23	7.5	7
K04	7/10/00		Ponded	35	7.5	8
K04	9/10/00		Ponded	23	7.5	5.6
K05	7/10/00		Normal	23	7.7	3.7
K05	7/31/00		Normal	22	7.5	2.8
K05	8/9/00		Normal	24	7.5	6
K05	9/10/00		Normal	23	7.5	7.6
K06	7/29/00	Sligh greenish tint	Normal	-	-	-
K06	9/10/00	Murky, bottom not visible, little sign of flow	Low	-	-	-
K07	7/29/00	Light brownish tint	Normal	-	-	-
K07	9/10/00	Clear - looks good	Low	-	-	-
K12	7/12/00	Crawdads, snails, crabs present	Ponded	21	7.5	8.75
K12	7/29/00		Ponded	-	-	-
K12	9/12/00		Low	-	8.5	-
K13	7/12/00	Murky	Low	19	8.2	7.5
K13	7/29/00		Low	-	-	-
K13	9/12/00		Normal	24	8.3	-
K14	7/10/00	Clear, surface algae and foam	Low	24	7.5	3.6
K14	9/9/00	Clear, flowing, small fish present	Low	22	8.5	9.5
K18	7/10/00	Low, trickling flow, mossy growth in pooled areas	Low	-	-	-

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K19	7/10/00	Low, trickling flow, mossy growth in pooled areas	Low	-	-	-
K21	6/5/00	Algae abundant	Normal	-	-	-
K21	6/10/00	Dark green algae mats along bank	Normal	-	-	-
K21	6/16/00	Algae abundant	Normal	-	-	-
K21	6/22/00	Good flow	Normal	-	-	-
K21	6/30/00	Bottom covered with algae	Low	-	-	-
K21	7/8/00		Normal	21.1	7.6	4.7
K21	7/29/00		Normal	-	-	-
K21	9/9/00	Clear, 2 cm foam bubbles	Low	25.6	7.7	6.5
K22	6/5/00	Algae abundant	Low	-	-	-
K22	6/10/00	Heavy algae growth	Normal	18	7.8	6.2
K22	6/16/00	Heavy algae growth	Low	-	-	-
K22	6/22/00	Algae abundant	Normal	-	-	-
K22	6/30/00	Algae abundant	Low	-	-	-
K22	7/8/00	Algae on bank, clear center channel	Normal	18.9	7.7	7.6
K22	7/29/00	Almost no water in creek	Ponded	-	-	-
K22	9/9/00	Clear, very low flow	Ponded	17.8	7.3	6.5
K23	6/10/00	1-5 cm foam on surface	Normal	18	8.0	7.0
K23	6/5/00		Normal	-	-	-
K23	6/16/00		Normal	-	-	-
K23	6/22/00	Good flow	Normal	-	-	-
K23	6/30/00	Bottom muddy	Low	-	-	-
K23	7/8/00	Cloudy	Normal	19.5	7.7	7.2
K23	7/29/00		Low	-	-	-
K23	9/9/00	2-4 cm foam flecks	Normal	17.8	7.7	6.5
K25	7/8/00	Bank Full	Normal	-	7.7	7
K25	7/29/00	Low turbidity	Bank full	-	7.5	6.4
K26	7/10/00	Water almost clear, bed covered in silt, little aquatic life	Low	24	7.75	5.6
K26	9/10/00		Normal	24	7.5	6.3
K27	7/10/00	Low but not stagnant, slightly cloudy, algae present	Low	22	7.5	5
K29	7/7/00	Flow clear, bottom coated in ligyht silt	Normal	21	7.5	8

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K29	7/29/00		Low	-	7.7	6.6
K29	9/10/00	Still, film on surface, several black bass	Ponded	22	7.5	6.8
K31	7/13/00	Clear, free flowing	Normal	-	-	-
K31	9/10/00		Normal	19	-	-
K32	6/13/00	Very cloudy, algae abundant	Ponded	-	7.0	6.0
K32	6/19/00	Slightly turbid	Normal	-	5.5	13.0
K32	6/26/00	Turbid, algae very abundant	Low	-	6.0	10.0
K32	6/27/00	Slightly turbid	Normal	-	5.0	-
K32	6/30/00	Turbid, algae very abundant	Ponded	-	5.5	20.0
K32	7/13/00	Minimal flow	Ponded	-	-	-
K33	7/10/00	Water clear	Ponded	-	-	-
K33	9/10/00		Ponded	23	8	5.6
K34	7/8/00		Normal	-	8	8.2
K34	9/10/00	Clear, slow flow, many fish	Normal	-	8.5	10
K35	7/8/00	Very low flow	Low	19	8	6.4
K36	7/8/00	Turbid water	Normal	22	8	5. 2
K36	8/1/00	Very turbid, visibility limited to 1 ft.	Bank full	23	7.5	5.2
K37	7/8/00	Very turbid, visibility limited to 2 ft.	Normal	21	8	7.2
K38	7/8/00	Very turbid, visibility limited to 2 ft.	Normal	23	8.5	8
K39	7/8/00	Very turbid, visibility limited to 2 ft.	Normal	22	7.5	6.4
K39	8/1/00	Very turbid, visibility limited to 1 ft.	Bank full	23	7.5	5.4
K40	7/28/00		Normal	-	-	-
K42	7/28/00		Normal	-	-	-
K43	9/18/00		Low	13	7	8.9
K44	7/10/00		Normal	25	7.5	7.6
K44	9/17/00	Clear, low	Low	20	7.8	8
K45	7/10/00		Normal	22	7.8	8
K45	9/17/00		Low	20	7.8	7.8
K48	7/29/00	Moderate flow rate, water clean	Normal	24	7.5	7.6
K48	9/10/00	Low, clear, bottom visible	Low	22	7.75	7.2
K50	7/8/00	Clear and flowing	-	-	-	-

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K50	9/10/00	Clear	Ponded	-	-	-
K51	7/8/00	Clear and flowing	Normal	-	-	-
K51	9/10/00	Clear, plant growth	Ponded	-	-	-
K52	7/8/00	Clear and flowing	Normal	-	-	-
K52	9/10/00	Clear, algae covering bed	Low	-	-	-
K53	9/9/00	Clear	Normal	22	-	-
K54	7/12/00	Lots of plants in current flow path	Normal	16	5.6	6.75
K54	9/8/00	Cloudy and silty	Normal	18.9	7.3	6.94
K55	9/8/00	Murky, dark water	Normal	21.1	7.1	7.85
K56	7/7/00		Normal	16	7.5	7.7
K56	9/8/00		Low	-	8	8.1
K57	7/7/00		Normal	15	8	7.9
K57	9/10/00		Low	-	8.5	8.2
K59	9/9/00	Little flow	Low	-	8	10
K60	9/10/00		Normal	-	7.5	5.5
K61	9/10/00	Slow moving water	Ponded	-	7.5	5.5
K62	7/29/00	Normal, clear	Normal	-	-	-
K63	7/29/00	Normal, clear	Normal	-	-	-
K65	9/9/00	Pond-like areas	Low	-	8	8
K67	9/9/00		Low	-	-	-
K68	9/9/00	Slightly murky	Normal	25	-	-
K69	9/9/00	Slightly murky	Low	25	-	-
K70	9/9/00		Low	-	-	-
K71	9/9/00	Swift current, clear water	Normal	-	7.25	7.5
K72	6/27/00	Turbid	Normal	-	5.0	-
K72	6/13/00	Slightly cloudy	Low	-	5.5	7.4
K72	6/19/00	Very turbid	Low	-	5.0	9.4
K72	6/26/00	Slightly turbid	Normal	-	7.4	5.5
K72	6/30/00	Slightly turbid	Normal	-	6.0	8.6
K72	9/10/00	Clear, flowing	Normal	23	7.8	7.2
K73	7/29/00		-	-	-	-

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K73	9/10/00	Relatively clear, slightly brownish, shiny surface near bank	Low	-	7.5	-
K74	7/29/00	Slight brownish tint	-	-	-	-
K74	9/10/00	Clear, slightly brownish	Low	-	-	-
K75	9/10/00	Clear, flowing	Normal	-	7.9	
K76	9/10/00	Brownish cast, visibility 12", some algae present	Low	23	7.4	14
K77	9/10/00	Cloudy and silty	Low	23	7.7	17
K81	9/9/00	Muddy	Normal	-	-	-
K82	6/19/00	Highly discolored	Normal	-	-	-
K82	6/21/00	Murky	Normal	-	7.8	5.7
K82	6/26/00	Murky	Normal	-	-	-
K82	6/28/00	Muddy as a clay bank	Bank Full	-	-	-
K82	6/30/00	Muddy	Normal	-	-	-
K82	9/19/00		Low	-	-	-
K83	6/19/00	Muddy		-	-	-
K83	6/21/00		Normal	-	7.8	6.8
K83	6/26/00	Opaque with grey tinge	Normal	-	-	-
K83	6/28/00	Muddy as a clay bank	Bank Full	-	-	-
K83	6/30/00		Normal	-	-	-
K83	9/14/00		Normal	-	-	-
K84	9/9/00	Pools, plants present, rotten smell	Low	21	-	-
K85	7/8/00	Crawfish present	-	-	8	7
K85	9/9/00		-	-	7.5	7.4
K86	7/8/00	Water flowing well, brownish color	Normal		7.3	6.2
K86	9/10/00	Water warm	Low	-	-	-
K87	7/10/00		Normal	24	7.7	7.4
K87	7/29/00		Normal	21	7.8	6.8
K87	9/17/00	Very low / clear	Low	15	7.5	8.6
K89	9/10/00	Mostly clear, slightly brownish	Low	-	7.5	-
K90	7/29/00	Moderate flow, slightly murky water	Normal	22	7.5	6.6
K90	9/10/00	Water clear, bottom visible	Low	21	7.5	7.2
K91	7/29/00	Clear	Normal	-	-	-

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K94	9/11/00	Moderately clear	Low	-	7.7	-
K95	9/11/00	Cloudy	Normal	-	7.5	-
K96	7/8/00	Water clear and very cold	Normal	-	6.75	7
K96	9/9/00	Water cold	Normal	-	6.7	6
K97	3/7/00	Low and clear	Low	-	-	-
K97	3/11/00	Normal flow and clear	Normal	-	-	-
K97	3/18/00	Swollen and discolored, swiftly flowing water	Normal	-	-	-
K98	3/7/00	Low and clear	Low	-	-	-
K98	3/11/00	Swollen and discolored, swiftly flowing water	Bank Full	-	-	-
K98	3/18/00	Normal flow and clear	Normal	-	-	-
K99	3/7/00	Silt-ridden, low	Low	-	-	-
K99	3/11/00	Swiftly-flowing, swollen, muddy water due to large sediment load	Bank Full	-	-	-
K99	3/18/00		Bank Full	-	-	-
K100	3/29/00	Normal flow and clear	Normal	-	-	-
K100	3/31/00	Normal flow and clear	Normal	-	-	-
K100	6/19/00	Cloudy	Low	-	-	-
K100	6/21/00	Clear	Low	-	7.2	7.0
K100	6/26/00	Muddy	Low	-	6.0	7.4
K100	6/28/00	Muddy / Fast	Bank Full	-	7.4	7.0
K100	6/30/00	Murky	Bank Full	-	7.5	7.0
K101	3/29/00	Normal flow and clear	Normal	-	-	-
K101	3/31/00	Normal flow and clear	Normal	-	-	-
K101	6/19/00	Cloudy	Low	-	-	-
K101	6/21/00	Clear	Low	-	7.3	6.5
K101	6/26/00	Muddy	Low	-	7.3	6.0
K101	6/28/00	Muddy / Fast	Bank Full	-	7.4	7.0
K101	6/30/00	Murky	Bank Full	-	7.3	7.5
K102	3/29/00	Normal flow and clear	Normal	-	-	-
K102	3/31/00	Low and clear	Low	-	-	-
K102	6/19/00	Cloudy	Low	-	-	-
K102	6/26/00	Muddy	Low	-	7.3	7.0

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K102	6/28/00	Muddy / Swift	Bank Full	-	7.4	7.5
K102	6/30/00	Clear	Low	-	7.4	7.5
K103	3/29/00	Normal flow and clear	Normal	-	-	-
K103	3/31/00	Normal flow and clear	Normal	-	-	-
K103	6/21/00	Clear	Low	-	7.3	8.0
K103	6/26/00	Milky	Low	-	7.3	8.0
K103	6/28/00	Muddy / Fast	Bank Full	-	7.5	8.0
K103	6/30/00	Murky	Bank Full	-	7.4	8.0
K104	3/29/00	Normal flow and clear	Normal	-	-	-
K104	3/31/00	Normal flow and clear	Normal	-	-	-
K104	6/21/00	Clear	Low	-	7.3	7.5
K104	6/26/00	Milky	Low	-	7.3	7.0
K104	6/28/00	Muddy / Fast	Bank Full	-	7.4	7.5
K104	6/30/00	Murky	Bank Full	-	7.4	7.5
K105	3/29/00	Normal flow and clear	Normal	-	-	-
K105	3/31/00	Low and clear	Low	-	-	-
K105	6/21/00	Clear	Low	-	7.2	8.5
K105	6/26/00	Milky	Low	-	7.2	7.5
K105	6/28/00	Muddy / Swift	Bank Full	-	7.4	8.0
K105	6/30/00	Clear	Low	-	7.2	7.5
K106	3/29/00	Normal flow and clear	Normal	-	-	-
K106	3/31/00	Normal flow and clear	Normal	-	-	-
K106	6/21/00	Clear	Low	-	7.4	8.0
K106	6/26/00	Milky	Low	-	7.6	7.0
K106	6/28/00	Muddy / Swift	Bank Full	-	7.5	7.0
K106	6/30/00	Murky	Bank Full	-	7.5	7.5
K107	3/29/00	Normal flow and clear	Normal	-	-	-
K107	3/31/00	Normal flow and clear	Normal	-	-	-
K107	6/19/00	Clear, very low	Low	-	-	-
K107	6/21/00	Clear	Low	-	7.4	9.0
K107	6/26/00	Muddy and flowing swiftly	Normal	-	7.4	8.0

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K107	6/28/00	Muddy / Fast	Bank Full	-	7.5	8.0
K107	6/30/00	Murky	Bank Full	-	7.4	8.0
K108	3/29/00	Normal flow and clear	Normal	-	-	-
K108	3/31/00	Normal flow and clear	Normal	-	-	-
K108	6/19/00	Clear, very low	Low	-	-	-
K108	6/21/00	Clear	Low	-	7.4	9.0
K108	6/26/00	Muddy and flowing swiftly	Normal	-	7.4	8.0
K108	6/28/00	Muddy / Fast	Bank Full	-	7.5	8.0
K108	6/30/00	Murky	Bank Full	-	7.4	8.5
K109	3/31/00	Low and clear	Low	-	-	-
K109	6/26/00	Low and clear	Ponded	-	7.5	7.5
K109	6/28/00	Fast / Murky	Bank Full	-	7.5	8.0
K109	6/30/00	Clear	Normal	-	7.5	7.0
K110	3/26/00	Clear and normal flow	Normal	-	-	-
K110	3/31/00	Normal flow and clear	Normal	-	-	-
K110	6/19/00	Cloudy	Low	-	-	-
K110	6/21/00	Clear	Low	-	7.4	8.0
K110	6/26/00	Muddy	Low	-	7.4	7.0
K110	6/28/00	Muddy / Fast	Bank Full	-	7.5	7.5
K110	6/30/00	Murky	Bank Full	-	7.4	7.5
K111	3/26/00	Clear and normal flow	Normal	-	-	-
K111	3/31/00	Normal flow and clear	Normal	-	-	-
K111	6/19/00	Cloudy	Low	-	-	-
K111	6/21/00	Cloudy	Low	-	7.5	6.5
K111	6/26/00	Muddy	Low	-	7.5	6.0
K111	6/28/00	High / Muddy	Bank Full	-	7.5	7.0
K111	6/30/00	Murky	Bank Full	-	7.4	7.0
K112	3/26/00	Normal flow and clear	Normal	-	-	-
K112	3/31/00	Low and clear	Low	-	-	-
K113	3/26/00	Normal flow and clear	Normal	-	-	-
K113	3/31/00	Low and clear	Low	-	-	-

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K114	3/31/00	Normal flow and clear	Normal	-	-	-
K115	3/26/00	Normal flow and clear	Bank Full	-	-	-
K115	3/31/00	Milky sheen on surface, white algae abundant on bed	Normal	-	-	-
K116	6/19/00	Muddy	Normal	-	-	-
K116	6/21/00	Clear	Low	-	7.4	8.0
K116	6/26/00	Milky	Low	-	7.5	7.0
K116	6/28/00	Muddy / Swift	Bank Full	-	7.4	7.5
K116	6/30/00	Murky	Low	-	7.5	7.4
K117	6/21/00	Clear	Low	-	7.4	8.0
K117	6/26/00	Milky	Low	-	7.4	7.0
K117	6/28/00	Muddy / Swift	Bank Full	-	7.4	7.5
K117	6/30/00	Murky	Bank Full	-	7.5	7.5
K118	6/19/00	Clear	Low	-	-	-
K118	6/21/00	Clear	Low	-	7.3	7.0
K118	6/26/00	Low and clear	Low	-	7.3	7.0
K118	6/28/00	Murky / Swift	Bank Full	-	7.4	7.5
K118	6/30/00	Clear	Low	-	7.4	7.5
K119	6/19/00	Clear	Low	-	-	-
K119	6/21/00	Clear	Low	-	7.4	7.0
K119	6/26/00	Clear	Low	-	7.4	7.0
K119	6/28/00	Murky / Swift	Bank Full	-	7.4	7.5
K119	6/30/00	Clear	Low	-	7.3	7.5
K120	4/1/00		Normal	-	8.5	10
K120	7/7/00	Low flow and moss	Low	70.5 F	8	8.5
K120	7/29/00		Low	19	8	7.8
K120	9/10/00	Slow and shallow flow, heavy vegetation	Low	21	8	7.4
K121	7/8/00	Clear	-	20	7.75	5.4
K121	9/10/00	Clear to slight turbidity, 7.4 ft^3/s	Low	21	7.5	5
K122	7/8/00	Water flow is in a ditch	Normal	21	7.5	5.4
K122	9/10/00	Slight turbidity, 11.5 ft^3/s	Low	20.5	7.5	5.6

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K123	7/8/00	Stream flow in a ditch, water smells slightly	Normal	21	7.5	6.7
K123	9/10/00	Slight turbidity, 44.2 ft^3/s	Low	20.5	7.5	6.6
K124	6/21/00		Normal	-	7.5	9.0
K124	6/24/00	Turbid, light brown color	Normal	25.1	7.7	7.7
K124	6/26/00	Very turbid, coal deposits on beach	Normal	-	5.5	6.4
K124	6/28/00		Normal	23	6.5	-
K125	9/13/00		Ponded	-	7.8	6
K126	7/8/00		Normal	59 F	8.5	8
K126	7/29/00	Slightly turbid, muddy	Normal	19	8	7.4
K126	9/10/00	Clear, flowing	Normal	18	7.75	7.2
K127	7/10/00		Normal	25	7.5	9
K127	7/31/00		Normal	21	7.5	6
K127	9/10/00		Normal	21	8	7.6
K129	7/8/00		Normal	-	8.5	9
K129	7/29/00		Normal	23	8	6.2
K129	9/8/00	Slightly cloudy	Normal	25	8.5	10.5
K130	7/7/00	Slightly turbid, good flow	Normal	25	7.6	6.8
K130	7/29/00		Low	24	7.5	5.8
K130	9/10/00		Low	22	7.2	4.4
K131	7/10/00	Algae covering rocks, floating on surface	Ponded	-	-	-
K131	9/9/00	Clear	Normal	22	-	-
K132	7/10/00	Water clear, lots of silt	Low	81 F	8.5	8.4
K132	7/29/00		Low	-	-	-
K132	9/9/00	Clear, flowing slowly, bed heavily silted	Low	23	-	-
K133	7/11/00		Normal	-	-	-
K134	7/29/00	Water clear	Normal	-	8	-
K134	9/9/00	Clear	Low	-	-	-
K135	7/29/00		Normal	20	8.2	4
K135	9/9/00	Low, calm	Low	-	-	-
K136	7/28/00	Clear, flowing	Normal	-	-	-

Table 2.1 - Kentucky River Watershed Watch Physical / Chemical Field Data

SampleID#	Collection Date	Sampler's Description and Comments	Flow Conditions*	Water Temperature* (C)	pH*	Dissolved Oxygen* (mg/L)
K136	9/10/00	Low, calm	Low	-	-	-
K137	7/29/00	Clear, calm	Low	-	7.5	17
K140	9/9/00	Some sulfur visible on standing water	Bank Full	20	7.5	-
K156	7/7/00		Bank full	-	8	9.4
K156	9/8/00	Clear, clean	Normal	-	7.5	6.4
K157	7/7/00	Swift current	Bank full	-	7.5	8.6
K157	9/8/00	Pools, low current	Low	-	7.5	8.6
K158	7/7/00		Bank full	-	7.5	8.3
K158	9/8/00	Clear	Normal	-	8	8.5
K161	7/8/00		Normal	-	8.5	10
K161	9/8/00		Low	20	8	8
K162	7/8/00		Normal	-	8.5	12
K162	9/8/00		Low	18	8	8
K163	7/28/00	Clear, moderate flow	Normal	-	-	-
K163	9/10/00	Clear, good flow	Normal	23	-	-
K165	7/29/00	Milky flow	Low	-	-	-
K165	9/10/00	Clear, good flow	Low	-	-	-
K166	7/29/00	Clear and flowing	Low	-	-	-
K166	9/10/00	Low flow, clear	Low	-	-	-
K167	7/29/00	Clear, moderate flow	Normal	-	-	-
K167	9/10/00	Clear, good flow	Normal	22	-	-
K168	7/24/00		Normal	23	8	4.5
K168	9/8/00	Water slightly cloudy	Normal	22	7.8	6

<u>Notes</u>

1. (*) - Dashed values indicates no data available
2. Based on observed temperature values, the dissolved oxygen reading should be < 10. Values in excess of 10 are assumed to be attributed to measurement error.

Figure 2.1 Herbicide / Pesticide Sampling Locations

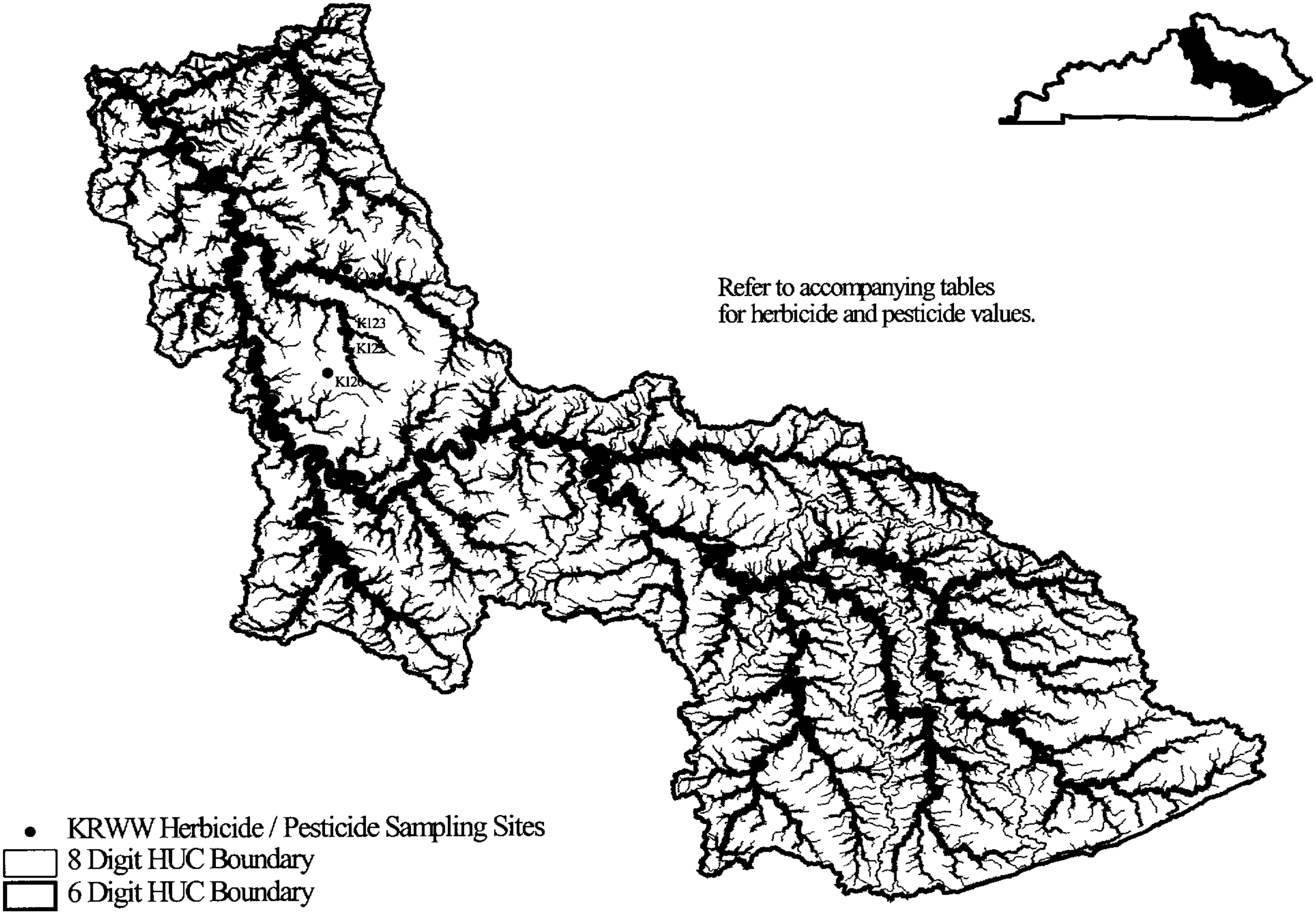


Table 2.2 Kentucky River Watershed Watch 2000 Pesticide / Herbicide Sampling

Sample ID #	Collection Date	2.4-D by Immunoassay, ug/L	Alachlor by Immunoassay, ug/L	Chlorpyrifos by Immunoassay, ug/L	Metolachlor by Immunoassay, ug/L	Triazines by Immunoassay, ug/L
K120	6/12/00	Less than MDL	Less than MDL	Less than MDL	Less than MDL	Less than MDL
K121	6/25/00	Less than MDL	Less than MDL	Less than MDL	Less than MDL	Less than MDL
K122	6/28/00	Less than MDL	Less than MDL	Less than MDL	Less than MDL	0.11
K123	6/28/00	Less than MDL	Less than MDL	Less than MDL	Less than MDL	0.1

The collected samples did not register the occurrence of any of these substances above the minimum detection limits (i.e., 0.9 microg/l for 2,4-D; 0.06 microg/l for Alachlor, 0.1 microg/l for Chlorphyrifos, 0.08 microg/l for Metolachlor, and 0.06 microg/l for Triazine) except for stations K122 and K123 which yielded Triazine values of 0.11 and 0.10 respectively.

2.4 Bacteriological Data

Two separate indicators were used to evaluate the possibility of bacteriological contamination in the streams of the Kentucky River Basin. These included fecal coliform and fecal streptococci.

2.4.1 Fecal Coliform

Total coliform bacteria are a collection of relatively harmless microorganisms that live in large numbers in the intestines of man and warm- and cold-blooded animals. They aid in the digestion of food. A specific subgroup of this collection is the fecal coliform bacteria, the most common member being *Escherichia coli.* These organisms may be separated from the total coliform group by their ability to grow at elevated temperatures and are associated only with the fecal material of warm-blooded animals.

The presence of fecal coliform bacteria in aquatic environments indicates that the water has been contaminated with the fecal material of man or other animals. At the time this occurred, the source water may have been contaminated by pathogens or disease producing bacteria or viruses which can also exist in fecal material. Waterborne pathogenic diseases include typhoid fever, viral and bacterial gastroenteritis, and hepatitis A. The presence of fecal contamination is an indicator that a potential health risk exists for individuals exposed to this water. Fecal coliform bacteria may occur in ambient water as a result of the overflow of domestic sewage or non-point sources of human and animal waste. The state criteria for fecal coliform are based on the designated use of the particular stream and may be summarized as follows:

Primary Contact Recreation (swimming from May 1 thru Oct 31): fecal coliform shall not exceed 200 colonies per 100 ml as a monthly geometric mean based on not less than 5 samples per month; nor exceed 400 colonies per 100 ml in 20 percent or more of all samples taken during the month. [note as a result of the sampling frequency requirement with the first criteria, the state of Kentucky uses the 400 colonies per 100 ml criteria for classifying streams in the 305(b) report].

Secondary Contact Recreation (fishing and boating): fecal coliform content shall not exceed 1000 colonies per 100 ml as a monthly geometric mean based on not less than 5 samples per month; nor exceed 2000 colonies per 100 ml in 20 percent or more of all samples taken during the month.

Domestic Water Supply: fecal coliform content shall not exceed 2000 colonies per 100 ml as a monthly geometric mean based on not less than 5 samples per month.

2.4.2. Fecal Streptococci and the FC/FS Ratio

In the mid-70s, a general hypothesis was established that the ratio of two indicator bacteria in fecal wastes – fecal coliforms (FC) and fecal streptococci (FS) – was characteristic of particular animal wastes. In human wastes, the fecal coliform/streptococci ratio (FC/FS ratio) was determined to be greater than 4.0. In domesticated animals, like cattle, the ratio was identified to range between 0.1 and 4.0. In wild animals, the ratio was less than 0.1. Since that time, many attempts have been made to use the ratio to determine the source of fecal bacteria in contaminated waters. However, such applications should be limited to those cases where the following conditions are strictly enforced (Coyne and Howell, 1994):

1) Sampling needs to occur soon after manure deposition (within 24 hours if possible) because the fecal bacteria die off at different rates.
2) It becomes difficult to distinguish fecal streptococci in wastes from fecal streptococci that are naturally present in the soil and water when fewer than 100 fecal streptococci/100 ml of water are present, thus comparisons should generally only be done when the fecal strep values are greater than 100.
3) The water pH needs to be between 4 and 9 because fecal coliforms die off quicker than fecal streptococci in acid or alkaline water.
4) In typical agricultural settings, the FC/FS ratio from a single sample has little diagnostic use. The conclusions drawn must be carefully evaluated because so many environmental factors affect it. For example, warm shallow streams, high in organic carbon, permit fecal coliform re-growth and increase the FC/FS ratio. Samples taken in these conditions can give misleading values. Consequently, the mean FC/FS ratio for a site can be largely meaningless when the range of FC/FS ratios is so great.

2.5 Bacteriological Sampling

Three different sets of fecal coliform/fecal strep sampling were conducted in the Kentucky River basin during the summer of 2000. These included targeted or focused sampling, synoptic sampling, and follow-up sampling. The results of each sampling effort are discussed in following sections.

2.5.1 Focused Fecal Coliform/Fecal Strep Sampling

As a result of the occurrence of elevated fecal coliform/fecal strep values at numerous measured sites during the summer of 1999, several sites were selected for multiple focused fecal coliform/fecal strep sampling during June of 2000. The locations of each of the sites are shown in Figure 2.2 and compared on the basis of the geometic means of the collected data. The maximum fecal coliform count is shown in parentheses. The individual results for each site and for each sample are shown in Table 2.3. As can be seen from both the figure and the table, numerous sites across the basin continue to experience significant fecal coliform contamination.

Figure 2.2 Focus Fecal Coliform / Fecal Strep Sampling Locations

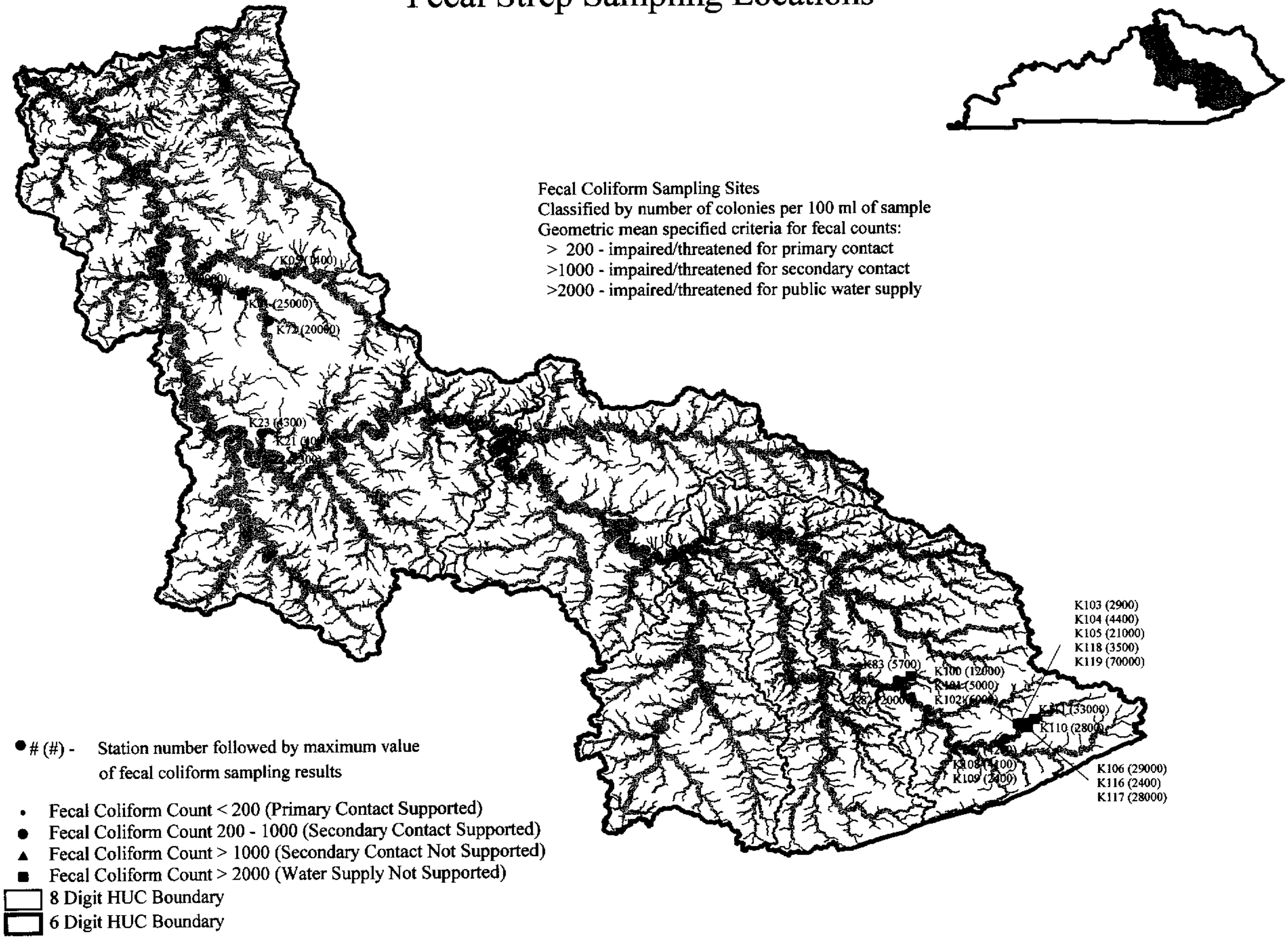


Table 2.3 Kentucky River Watershed Watch Focused Fecal Coliform / Fecal Strep Sampling Results

Sample ID #	Collection Date	Fecal Coliform Count	Fecal Strep Count*	Fecal / Strep Ratio*
K01	6/14/00	3200	3100	1.032
K01	6/19/00	590	6000	0.098
K01	6/26/00	867	429	<0.045
K01	6/27/00	25000	43000	.581
K01	6/30/00	-	600	-
K05	7/31/00	1400	900	1.556
K05	8/9/00	270	1200	.225
K05	8/16/00	60	250	.24
K05	8/21/00	500	2500	.2
K05	8/28/00	450	500	.9
K21	6/5/00	60	170	.353
K21	6/10/00	310	670	.463
K21	6/16/00	4000	5900	.678
K21	6/22/00	10	450	<0.043
K21	6/30/00	-	400	-
K22	6/5/00	60	240	0.250
K22	6/10/00	100	530	.189
K22	6/16/00	2300	10000	.23
K22	6/22/00	11	451	<0.044
K22	6/30/00	-	300	-
K23	6/5/00	300	620	.484
K23	6/10/00	140	620	.226
K23	6/16/00	4300	18000	.239
K23	6/22/00	11	230	<0.02
K23	6/30/00	-	300	-
K32	6/14/00	650	630	1.032
K32	6/19/00	550	3000	0.183
K32	6/26/00	869	231	<0.03
K32	6/27/00	60000	>60000	>1
K32	6/30/00	-	800	-
K72	6/14/00	290	1600	.181
K72	6/19/00	20000	6000	3.333
K72	6/26/00	12	1306	<0.045
K72	6/27/00	9000	40000	.225
K72	6/30/00	-	1300	-
K82	6/19/00	14000	30000	0.467
K82	6/21/00	20000	600	33.333
K82	6/26/00	1900	500	3.800
K83	6/19/00	5700	60000	0.095
K83	6/21/00	5000	600	8.333
K83	6/26/00	700	1400	0.500
K100	6/19/00	12000	8000	1.500
K100	6/21/00	1500	600	2.500
K100	6/26/00	4500	2800	1.607
K101	6/19/00	5000	7000	0.714
K101	6/21/00	2300	600	3.833
K101	6/26/00	3900	200	19.500

Table 2.3 Kentucky River Watershed Watch Focused Fecal Coliform / Fecal Strep Sampling Results

Sample ID #	Collection Date	Fecal Coliform Count	Fecal Strep Count*	Fecal / Strep Ratio*
K102	6/19/00	6000	20000	0.300
K102	6/21/00	1000	600	1.667
K102	6/26/00	700	400	1.750
K103	6/19/00	2000	6000	0.333
K103	6/21/00	700	600	1.167
K103	6/26/00	2900	1500	1.933
K104	6/19/00	2900	9000	0.322
K104	6/21/00	1500	600	2.500
K104	6/26/00	4400	1200	3.667
K105	6/19/00	21000	25000	0.840
K105	6/21/00	16000	600	26.667
K105	6/26/00	2600	3600	0.722
K106	6/19/00	29000	65000	0.446
K106	6/21/00	2400	600	4.000
K106	6/26/00	3700	2900	1.276
K107	6/19/00	320	9000	0.036
K107	6/21/00	250	450	0.556
K107	6/26/00	4200	3200	1.313
K108	6/19/00	340	1000	0.340
K108	6/21/00	270	600	0.450
K108	6/26/00	4100	2700	1.519
K109	6/19/00	2300	6000	0.383
K109	6/21/00	2400	600	4.000
K109	6/26/00	600	1900	0.316
K110	6/19/00	2800	7000	0.400
K110	6/21/00	150	500	0.300
K110	6/26/00	2800	1900	1.474
K111	6/19/00	33000	35000	0.943
K111	6/21/00	7000	600	11.667
K111	6/26/00	1100	900	1.222
K116	6/26/00	2400	2500	0.960
K117	6/19/00	28000	57000	0.491
K117	6/21/00	2000	600	3.333
K117	6/26/00	1900	5200	0.365
K118	6/19/00	3500	25000	0.140
K118	6/21/00	700	600	1.167
K118	6/26/00	500	2900	0.172
K119	6/19/00	70000	15000	4.667
K119	6/21/00	1800	600	3.000
K119	6/26/00	1200	1400	0.857
K124	6/21/00	130	170	0.765
K124	6/24/00	11	428	<0.044
K124	6/26/00	200	300	0.667
K124	6/28/00	80	90	.889

Notes

1. (*) - Dashed values indicates no data available

2.5.2 Synoptic Fecal Coliform/Fecal Strep Sampling

As in past years, a synoptic round of fecal coliform/fecal strep samples were collected at targeted sample locations during the month of July. The sample locations and associated summary results are shown in Figure 2.3. The range of corresponding fecal coliform/fecal strep ratios are highlighted in Figure 2.4. Only a handful of stations had FC/FS ratios in excess of 4.0. The individual results for each site are shown in Table 2.4.

2.5.3 Follow Up Fecal Coliform/Fecal Strep Sampling

Based on the observation of high readings at 22 of the synoptic sites, an additional round of fecal coliform/fecal strep samples were collected between 7/29/00 – 8/4/00. The sample locations and associated values are highlighted in Figure 2.5. The results of this sampling effort are provided in Table 2.5.

2.6 Physical/Chemical Sampling

General chemical data (alkalinity, chlorides, conductivity, total organic carbon, total suspended solids, and total hardness) were collected at all sample locations during the month of September. The locations of the sampling sites are shown in Figure 2.6 The individual results for each sample are shown in Table 2.6.

2.7 Nutrient Sampling

In addition to general chemical data, general nutrient data (nitrogen, phosphorus, and sulfate) were also collected at each sample site during the month of September. The spatial distribution of total phosphorus loads across the basin is shown in Figure 2.7. Several stations had phosphorus readings in excess of 0.1 mg/l. A summary of the nutrient data collected during this period is provided in Table 2.7. Eight stations had phosphorus readings in excess of 1.0 mg/l. These loadings were mainly associated with streams draining the Lexington area (e.g., North Elkhorn, South Elkhorn, Jessamine Creek, and Hickman Creek). These readings are similar to readings from previous sampling efforts and represent a continuing nutrient problem in the central bluegrass region. The highest recorded phosphorus reading was 1.84 mg/l which occurred at station K21 (Hickman Creek south of Nicholasville).

2.8 Significance of Nutrient Results

Oxygen demanding materials and plant nutrients are the most common substances discharged to the environment by man's activities, through wastewater facilities and by agricultural, residential, and stormwater runoff. The most important plant nutrients, in terms of water quality, are phosphorus and nitrogen. In general, increasing nutrient concentrations are undesirable due to the potential for accelerated growth of aquatic plants, including algae. Nuisance plant growth can create imbalances in the aquatic community, as well as aesthetic and access issues. High densities of phytoplankton (algae) can cause wide fluctuations in pH and dissolved oxygen.

Figure 2.3 Kentucky River Basin
Synoptic Fecal Coliform Counts

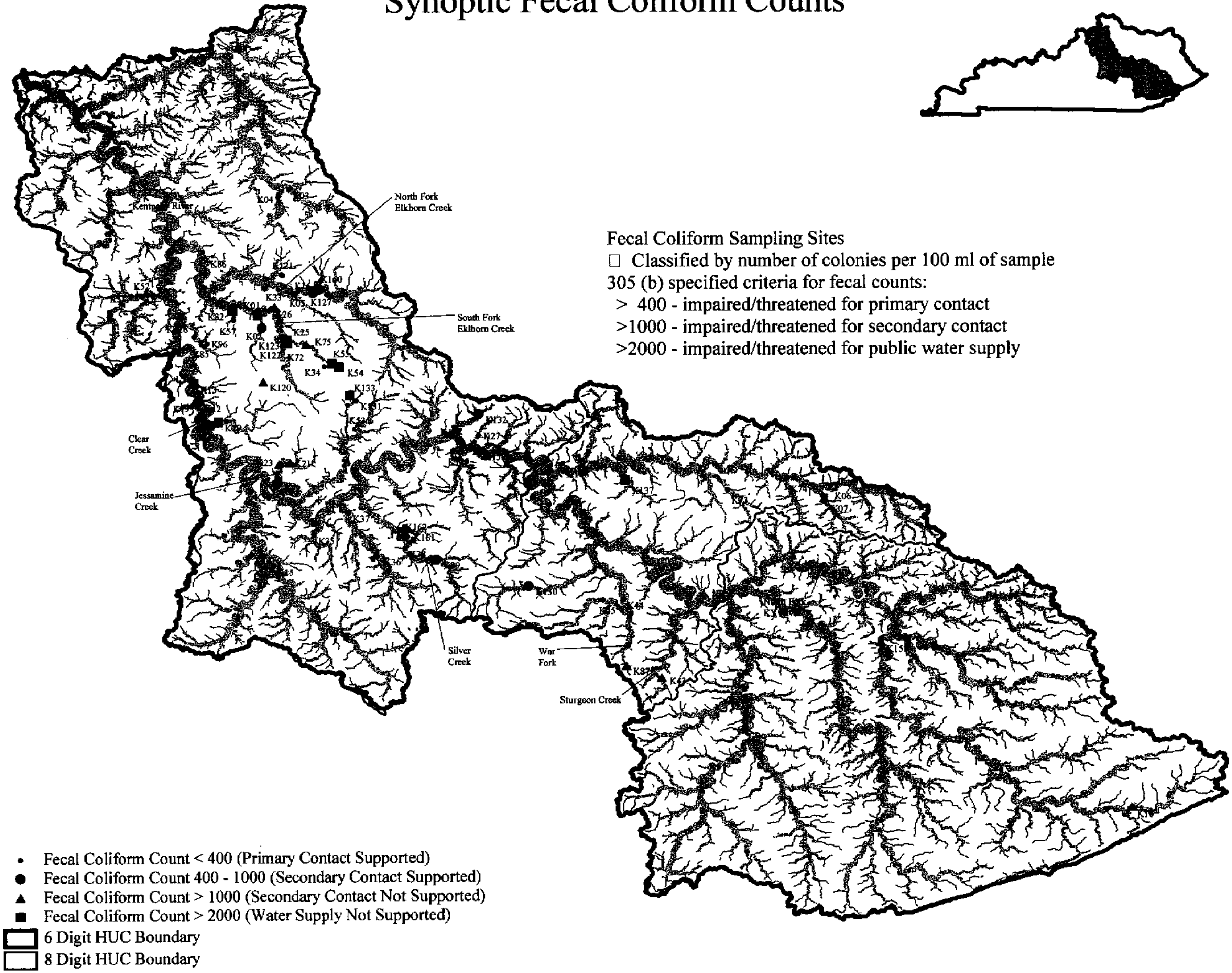


Figure 2.4 Kentucky River Basin Synoptic Fecal Coliform / Fecal Streptococci Ratios

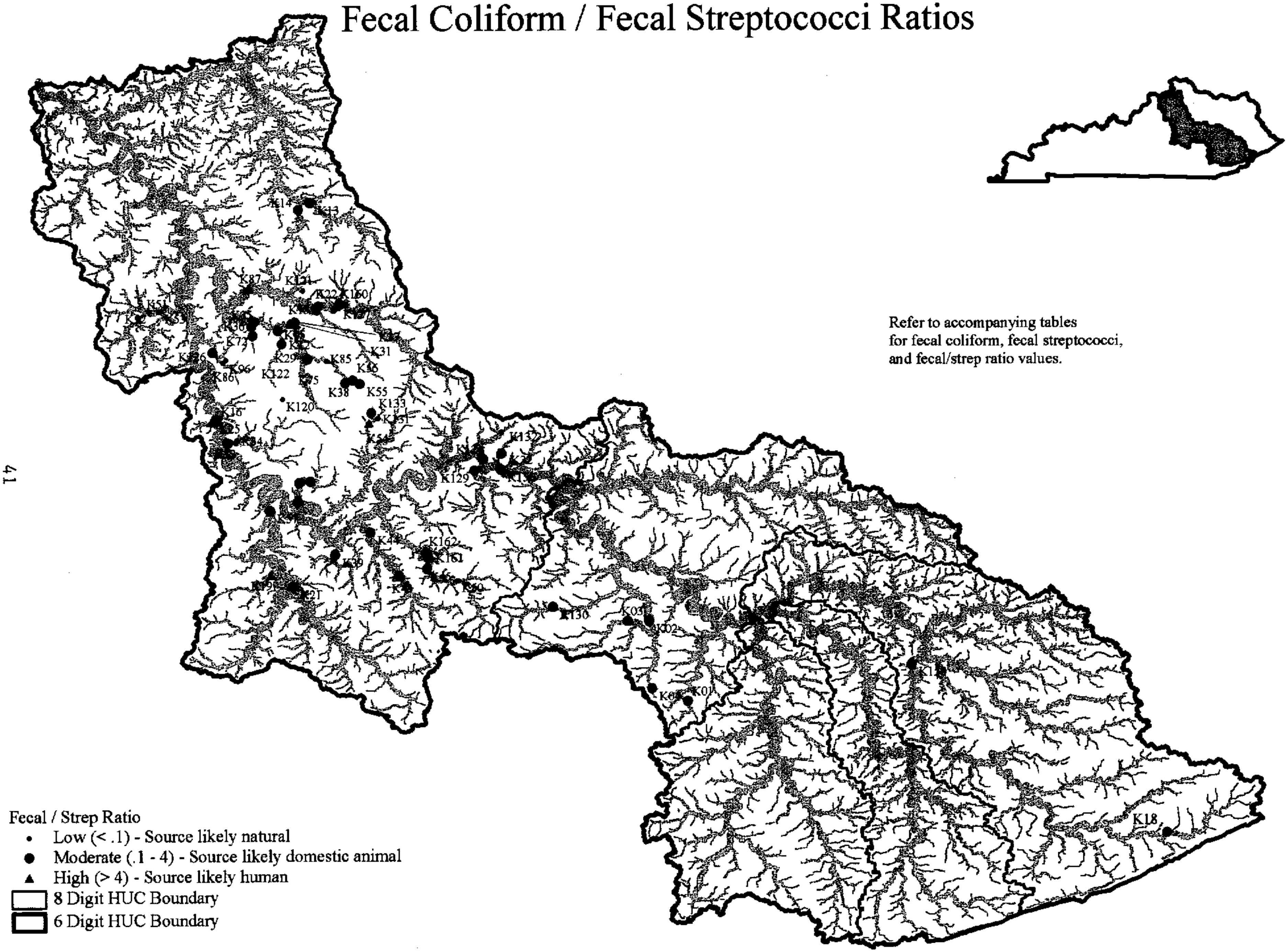


Table 2.4 Kentucky River Watershed Watch Synoptic Fecal Coliform / Fecal Strep Sampling

Sample ID #	Collection Date	Fecal Coliform Count	Fecal Strep Count*	Fecal / Strep Ratio*
K01	7/7/00	2200	1800	1.222
K02	7/7/00	1000	700	1.429
K03	7/10/00	90	480	.188
K04	7/10/00	80	120	.667
K05	7/10/00	140	500	.28
K06	7/29/00	270	600	.45
K07	7/29/00	1100	400	2.75
K12	7/12/00	1000	6000	.167
K13	7/12/00	10000	9000	1.111
K14	7/10/00	190	350	.543
K15	7/10/00	150	550	.273
K16	7/10/00	70	230	.304
K18	7/10/00	2000	2000	1
K19	7/10/00	>10	1500	<10
K21	7/8/00	30	550	.055
K22	7/8/00	130	1700	.076
K23	7/8/00	110	420	.262
K25	7/8/00	2100	420	5
K26	7/10/00	120	270	.444
K27	7/10/00	190	700	.271
K28	7/7/00	2400	1100	2.182
K29	7/7/00	20000	4200	4.762
K31	7/13/00	150	800	.188
K32	7/13/00	3500	1300	2.692
K33	7/10/00	1400	3000	.467
K34	7/8/00	10	1800	<0.006
K35	7/8/00	20	130	.154
K36	7/8/00	320	690	.464
K37	7/8/00	160	250	.64
K38	7/8/00	130	240	.542
K39	7/8/00	560	1400	.4
K43	7/7/00	1200	9000	.133
K44	7/10/00	60	290	.207
K45	7/10/00	40	280	.143
K50	7/8/00	10	170	<0.059
K51	7/8/00	10	190	<0.059
K52	7/8/00	10	220	<0.053
K53	7/7/00	10	1300	<0.008
K54	7/12/00	38000	1500	25.33
K55	7/7/00	4000	2400	1.667
K56	7/7/00	50	230	.217
K57	7/7/00	260	570	.456
K72	7/7/00	1600	2600	.615
K73	7/29/00	40	800	.05
K74	7/29/00	250	1100	.227

Table 2.4 Kentucky River Watershed Watch Synoptic Fecal Coliform / Fecal Strep Sampling

Sample ID #	Collection Date	Fecal Coliform Count	Fecal Strep Count*	Fecal / Strep Ratio*
K75	7/7/00	1300	3000	.433
K85	7/8/00	10	3500	<0.003
K86	7/8/00	10	570	<0.018
K87	7/10/00	1700	270	6.296
K96	7/8/00	10	140	<0.071
K120	7/7/00	1900	3100	.613
K121	7/8/00	10	1500	<0.007
K122	7/8/00	10	2100	<0.005
K123	7/8/00	10	2800	<0.004
K126	7/8/00	370	550	.673
K127	7/10/00	1000	100	10
K129	7/8/00	180	380	.474
K130	7/10/00	440	1700	.259
K131	7/10/00	10	18000	<0.001
K132	7/10/00	550	20000	.028
K133	7/11/00	40000	78000	.513
K137	7/29/00	2400	17000	.141
K156	7/7/00	1500	580	2.586
K157	7/7/00	1500	1700	.882
K158	7/7/00	1300	1900	.684
K160	7/7/00	700	580	1.207
K161	7/8/00	370	450	.822
K162	7/8/00	170	320	.531
K168	7/29/00	330	1400	.236

Notes

1. (*) - Dashed values indicates no data available

Figure 2.5 Follow-up Fecal Coliform / Fecal Strep Sampling Locations

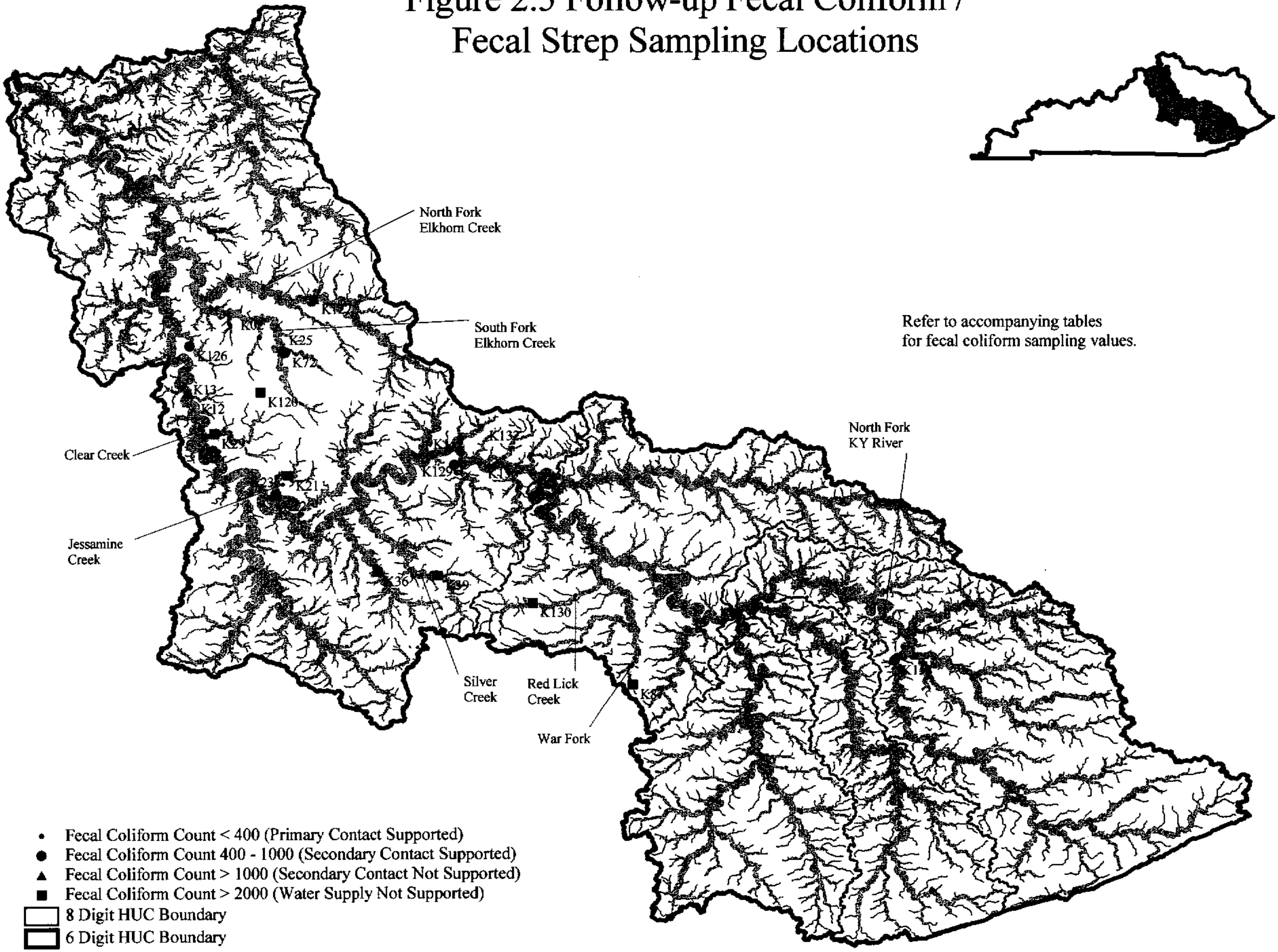


Table 2.5 Kentucky River Watershed Watch Follow Up Fecal Coliform / Fecal Strep Sampling Results

Sample ID #	Collection Date	Fecal Coliform Count	Fecal Strep Count*	Fecal / Strep Ratio*
K02	7/31/00	340	1400	.243
K12	7/29/00	73000	55000	1.327
K13	7/29/00	1500	400	3.75
K21	7/29/00	3400	700	4.857
K22	7/29/00	15000	8000	1.875
K23	7/29/00	310	300	1.033
K25	7/29/00	260	400	.65
K28	7/29/00	150	1000	.15
K29	7/29/00	18000	27000	.667
K36	8/1/00	6000	3200	1.875
K39	8/1/00	3000	2900	1.034
K72	8/11/00	1000	2000	.5
K87	7/29/00	3000	4300	.698
K120	7/29/00	23000	56000	.411
K126	7/29/00	500	2000	.25
K127	7/31/00	1300	600	2.167
K129	7/29/00	700	350	2
K130	7/29/00	4000	1700	2.353
K132	7/29/00	350	430	.814
K156	8/4/00	40	140	.286
K157	8/4/00	30	80	.375
K158	8/4/00	410	500	.82

Notes

1. (*) - Dashed values indicates no data available

Figure 2.6 Kentucky River Basin
Physical / Chemical Sampling Locations

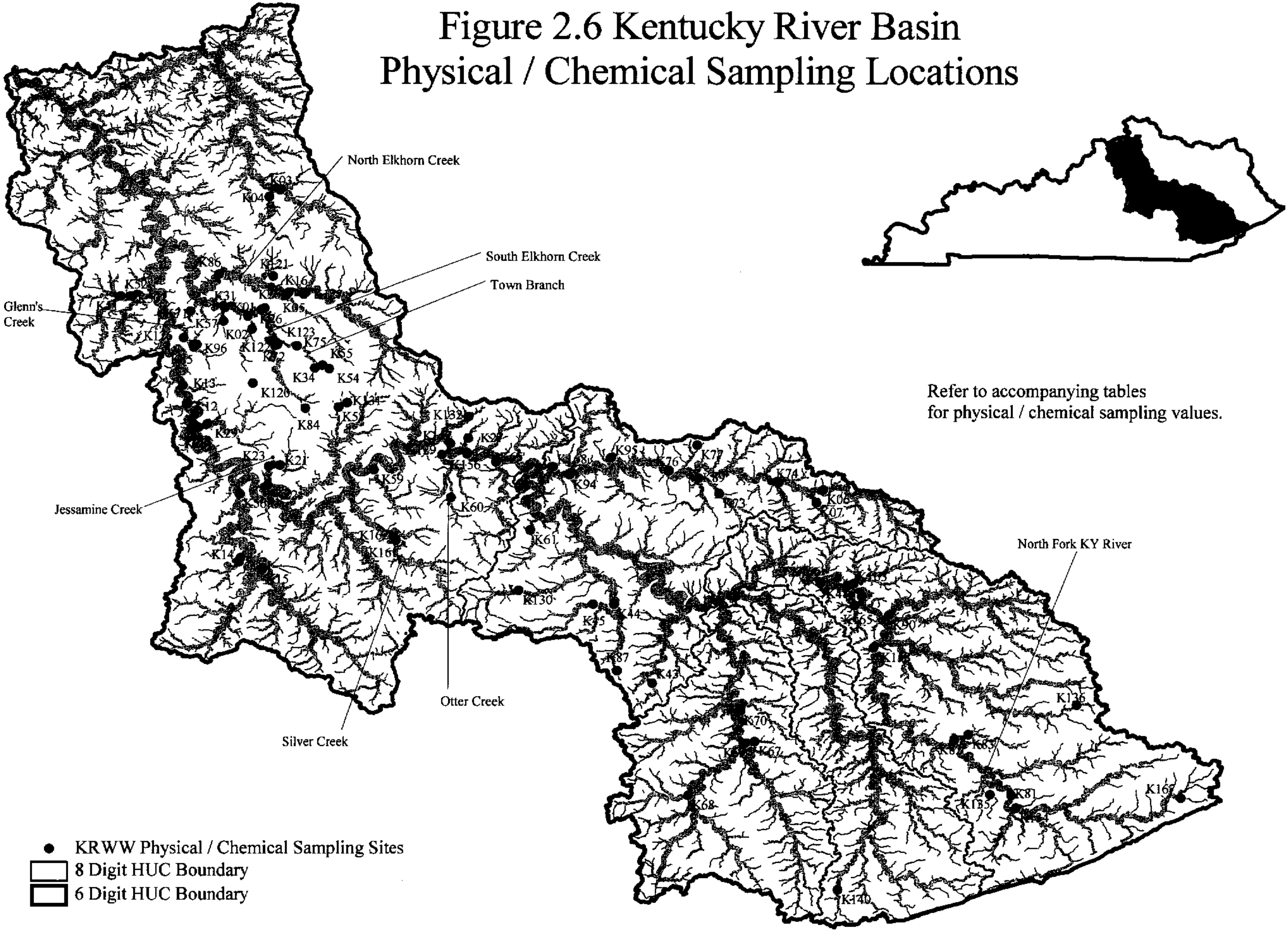


Table 2.6 Kentucky River Watershed Watch Physical / ChemicalSampling Results - September 2000

Sample ID #	Collection Date	Alkalinity*	Chloride*	Conductivity*	Total Organic Carbon*	Total Suspended Solids	Total Hardness* (by Titration)
K01	9/10/00	198	45.8	602	8.1	12	226
K02	9/10/00	225	12.2	397	2.4	25	252
K03	9/10/00	139	68.3	455	7.5	Less Than MDL	138
K04	9/10/00	163	16.9	383	5.4	60	180
K05	9/10/00	214	43.9	606	3.2	Less Than MDL	276
K06	9/10/00	57	7.4	237	2.8	Less Than MDL	104
K07	9/10/00	87	12.3	651	2.4	16	318
K12	9/12/00	205	24.6	528	3.5	Less Than MDL	252
K13	9/12/00	198	72.7	685	2.7	Less Than MDL	248
K14	9/9/00	150	358	1656	7.0	Less Than MDL	228
K15	9/9/00	143	10.0	313	5.3	20	158
K16	9/10/00	187	80.4	722	4.3	10	256
K21	9/9/00	120	52.3	917	7.0	Less Than MDL	188
K22	9/9/00	214	23.1	570	3.9	8	270
K23	9/9/00	146	57.5	930	6.4	8	228
K26	9/10/00	76	29.6	340	3.9	9	112
K27	9/10/00	168	15.3	405	3.2	25	200
K28	9/10/00	187	10.9	395	2.1	Less Than MDL	200
K29	9/10/00	220	18.4	540	3.3	8	262
K31	9/10/00	124	85.4	796	4.2	Less Than MDL	240
K33	9/10/00	293	23.8	620	4.2	118	322
K34	9/10/00	184	47.3	554	2.1	4	242
K43	9/18/00	50	5.0	136	2.8	5	62
K44	9/17/00	140	4.7	299	1.2	Less Than MDL	150
K45	9/17/00	125	4.4	266	1.0	19	132
K48	9/10/00	147	12.2	1019	2.6	14	510
K50	9/10/00	130	16.9	346	3.9	25	160
K51	9/10/00	141	10.3	337	4.0	11	164
K52	9/10/00	134	12.1	332	3.6	Less Than MDL	156
K53	9/9/00	113	48.7	423	6.7	16	158

Table 2.6 Kentucky River Watershed Watch Physical / ChemicalSampling Results - September 2000

Sample ID #	Collection Date	Alkalinity*	Chloride*	Conductivity*	Total Organic Carbon*	Total Suspended Solids	Total Hardness* (by Titration)
K54	9/8/00	74	21.5	255	3.9	59	144
K55	9/8/00	121	38.5	424	4.1	12	156
K56	9/10/00	123	11.6	333	2.8	Less Than MDL	160
K57	9/10/00	220	18.7	526	1.6	Less Than MDL	252
K59	9/9/00	167	77.3	827	5.0	14	280
K60	9/10/00	105	111	1138	8.8	12	224
K61	9/10/00	214	23.8	648	4.6	Less Than MDL	330
K65	9/9/00	145	7.4	323	5.9	4	24
K67	9/9/00	61	3.9	199	1.5	10	90
K68	9/9/00	79	19.0	404	2.0	Less Than MDL	162
K69	9/9/00	83	15.4	449	2.1	7	170
K70	9/9/00	61	12.8	314	2.2	5	128
K71	9/9/00	184	26.6	503	2.4	Less Than MDL	230
K72	9/10/00	204	31.8	539	2.8	13	244
K73	9/10/00	114	30.0	314	2.2	Less Than MDL	122
K74	9/10/00	42	10.4	137	2.2	Less Than MDL	54
K75	9/10/00	143	74.3	726	3.3	Less Than MDL	240
K76	9/10/00	80	9.3	233	3.3	9	100
K77	9/10/00	110	2.3	221	1.4	13	110
K81	9/9/00	155	18.4	794	2.4	40	290
K82	9/19/00	135	16.8	727	3.5	Less Than MDL	260
K83	9/14/00	259	17.1	1414	1.9	Less Than MDL	454
K84	9/10/00	268	20.4	552	4.1	9	266
K85	9/9/00	140	56.2	610	4.1	6	200
K86	9/10/00	179	55.4	601	3.6	6	234
K87	9/17/00	81	8.5	193	1.7	19	90
K89	9/10/00	133	21.1	316	2.2	8	142
K90	9/10/00	158	5.2	627	2.8	Less Than MDL	318
K94	9/11/00	83	11.0	253	2.7	11	110
K95	9/11/00	79	10.4	235	2.5	8	104

Table 2.6 Kentucky River Watershed Watch Physical / ChemicalSampling Results - September 2000

Sample ID #	Collection Date	Alkalinity*	Chloride*	Conductivity*	Total Organic Carbon*	Total Suspended Solids	Total Hardness* (by Titration)
K96	9/10/00	242	7.5	523	0.8	13	272
K120	9/10/00	225	28.8	577	1.5	14	268
K121	9/10/00	145	21.6	406	3.4	11	182
K122	9/10/00	149	22.9	422	6.2	16	184
K123	9/10/00	143	60.5	651	5.3	12	216
K125	9/13/00	168	28.4	488	6.8	14	208
K126	9/10/00	154	55.1	625	4.0	5	210
K127	9/10/00	169	54.5	653	3.7	Less Than MDL	228
K129	9/8/00	149	60.8	814	5.5	7	240
K130	9/10/00	109	18.1	383	4.1	5	160
K131	9/9/00	359	35.8	977	2.5	7	508
K132	9/9/00	185	47.5	471	4.3	28	218
K134	9/9/00	154	52.2	664	1.8	Less Than MDL	190
K135	9/9/00	113	53.8	936	2.0	Less Than MDL	430
K136	9/10/00	208	44.4	695	3.3	17	184
K140	9/8/00	166	20.4	640	1.8	8	120
K156	9/8/00	90	9.6	433	2.5	Less Than MDL	180
K157	9/8/00	88	9.5	423	2.4	13	184
K158	9/8/00	150	12.2	399	2.6	5	190
K161	9/8/00	136	23.7	439	5.7	7	178
K162	9/8/00	159	24.3	446	4.7	6	192
K163	9/10/00	80	7.6	405	2.1	9	182
K165	9/10/00	120	21.1	347	2.4	5	144
K166	9/10/00	-	Not Analyzed	-	1.7	Less Than MDL	109
K167	9/10/00	97	19.9	334	1.6	Less Than MDL	132
K168	9/8/00	125	12.4	402	3.3	Less Than MDL	178

Notes
1. (*) - Dashed values indicates no data available

Figure 2.7 Kentucky River Basin
Total Recoverable Phosphorus

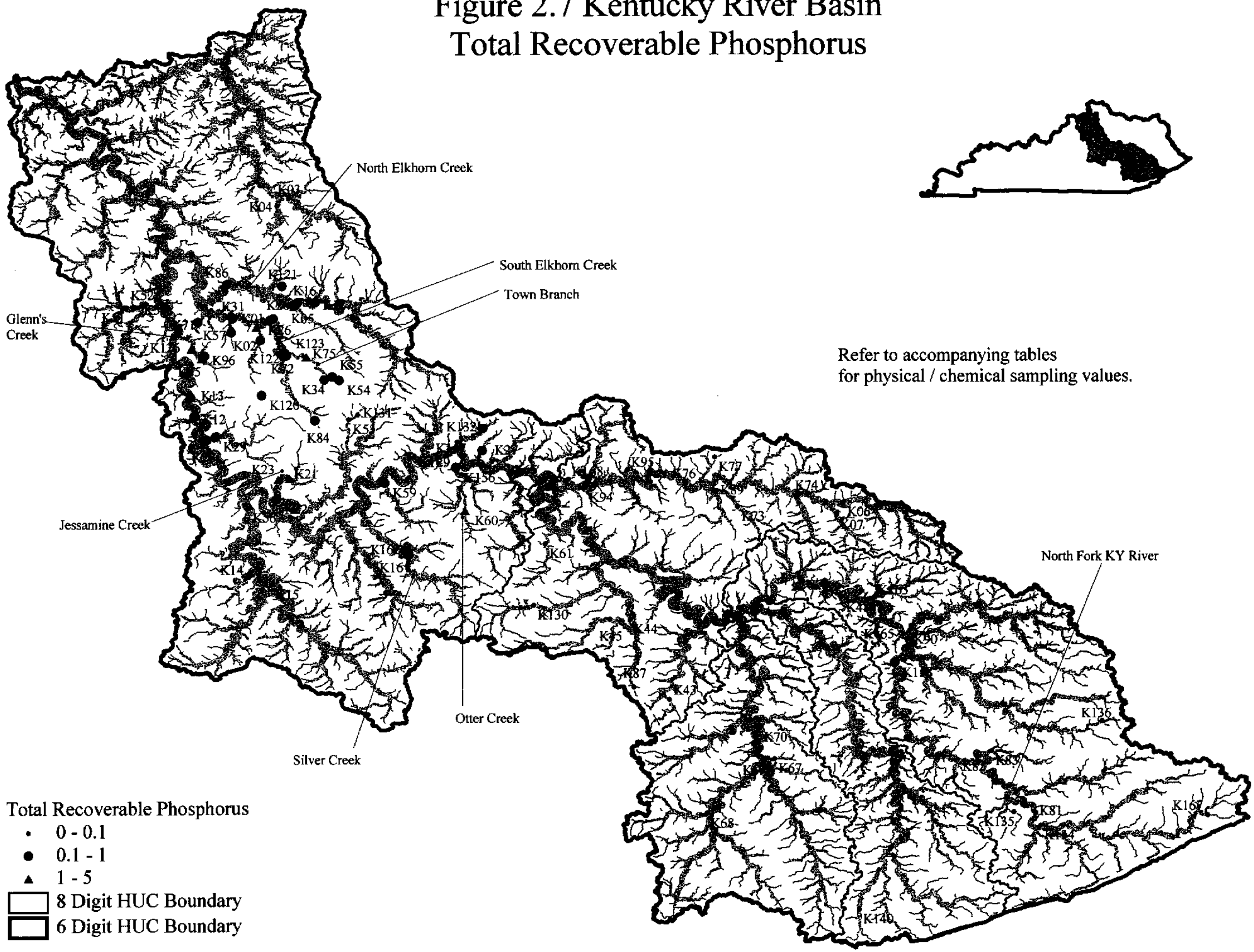


Table 2.7 Kentucky River Watershed Watch Nutrient Sampling Results - September 2000

Sample ID	Collection Date	Ammonia (NH_3)	Ammonia (NH_3-N)	Kjeldahl Nitrogen (NH_3)	Nitrate (NO_3)	Nitrate-N (NO_3-N)	Kjeldahl Nitrogen (-N)	Orthophosphate (PO_4)	Orthophosphate-P (PO_4-P)	Total Recoverable Phosphorus	Sulfate
K01	10-Sep-00	5.20	4.28	5.30	1.0	0.23	4.36	3.961	1.292	1.77	59.3
K02	10-Sep-00	0.02	0.02	Less Than MDL	5.7	1.29	Less Than MDL	0.740	0.241	0.27	21.6
K03	10-Sep-00	0.02	0.02	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.023	0.008	0.05	12.8
K04	10-Sep-00	0.07	0.06	Less Than MDL	0.3	0.07	Less Than MDL	0.131	0.043	0.07	21.9
K05	10-Sep-00	0.05	0.04	Less Than MDL	1.9	0.43	Less Than MDL	0.575	0.188	0.20	62.7
K06	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.9	0.20	Less Than MDL	0.009	0.003	Less Than MDL	49.5
K07	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.3	0.07	Less Than MDL	0.026	0.008	Less Than MDL	284
K12	12-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	8.8	1.99	Less Than MDL	0.960	0.313	0.30	42.6
K13	12-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	13.3	3.01	Less Than MDL	1.153	0.376	0.41	41.2
K14	09-Sep-00	0.06	0.05	Less Than MDL	60.0	13.6	Less Than MDL	4.639	1.513	1.57	61.0
K15	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.3	0.07	Less Than MDL	0.144	0.047	0.09	14.2
K16	10-Sep-00	0.17	0.14	0.18	5.3	1.20	0.15	1.820	0.594	0.58	98.8
K21	09-Sep-00	0.04	0.03	Less Than MDL	28.8	6.51	Less Than MDL	4.721	1.540	1.84	225
K22	09-Sep-00	0.16	0.13	0.17	5.3	1.20	0.14	0.775	0.253	0.29	59.3
K23	09-Sep-00	0.02	0.02	Less Than MDL	15.6	3.53	Less Than MDL	3.660	1.194	1.62	220
K26	10-Sep-00	0.04	0.03	Less Than MDL	11.9	2.69	Less Than MDL	1.810	0.590	0.62	30.0
K27	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.375	0.122	0.16	30.2
K28	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.6	0.14	Less Than MDL	0.667	0.218	0.23	16.0
K29	10-Sep-00	0.10	0.08	0.11	2.8	0.63	0.09	0.889	0.290	0.30	51.0
K31	10-Sep-00	0.02	0.02	Less Than MDL	50.6	11.4	Less Than MDL	2.220	0.724	0.80	115
K33	10-Sep-00	0.02	0.02	Less Than MDL	1.1	0.25	Less Than MDL	0.693	0.226	0.42	28.8
K34	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	4.0	0.90	Less Than MDL	0.635	0.207	0.23	41.4
K43	18-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.2	0.05	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	12.8
K44	17-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.2	0.05	Less Than MDL	0.013	0.004	Less Than MDL	17.0
K45	17-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.2	0.05	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	13.8
K48	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	2.7	0.61	Less Than MDL	0.023	0.008	Less Than MDL	508
K50	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.20	0.04	Less Than MDL	0.155	0.051	Less Than MDL	29.7
K51	10-Sep-00	0.07	0.06	Less Than MDL	0.2	0.04	Less Than MDL	0.075	0.024	Less Than MDL	25.9
K52	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.3	0.07	Less Than MDL	0.137	0.045	Less Than MDL	26.7
K53	09-Sep-00	0.15	0.12	0.13	2.8	0.63	0.11	0.410	0.134	0.10	38.7
K54	08-Sep-00	0.05	0.04	Less Than MDL	4.8	1.08	Less Than MDL	0.672	0.219	0.30	19.1
K55	08-Sep-00	0.12	0.10	0.18	8.0	1.81	0.15	0.632	0.206	0.26	30.9
K56	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	5.6	1.27	Less Than MDL	0.256	0.083	Less Than MDL	31.7
K57	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	21.1	4.77	Less Than MDL	1.036	0.338	0.29	21.6
K59	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	8.1	1.83	Less Than MDL	2.007	0.655	0.65	143
K60	10-Sep-00	0.11	0.09	Less Than MDL	49.6	11.2	Less Than MDL	4.193	1.368	1.72	252
K61	10-Sep-00	0.04	0.03	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.023	0.008	Less Than MDL	131
K65	09-Sep-00	0.02	0.02	Less Than MDL	0.6	0.14	Less Than MDL	0.058	0.019	Less Than MDL	20.5
K67	09-Sep-00	0.04	0.03	Less Than MDL	1.6	0.36	Less Than MDL	0.048	0.016	Less Than MDL	32.9
K68	09-Sep-00	0.02	0.02	Less Than MDL	2.5	0.56	Less Than MDL	0.039	0.013	Less Than MDL	103
K69	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	3.4	0.77	Less Than MDL	0.109	0.036	Less Than MDL	117
K70	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.8	0.18	Less Than MDL	0.019	0.006	Less Than MDL	78.2
K71	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	5.3	1.19	Less Than MDL	0.644	0.210	0.19	45.1
K72	10-Sep-00	0.12	0.10	0.10	7.1	1.60	0.08	1.108	0.361	0.39	35.7
K73	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.2	0.27	Less Than MDL	0.042	0.014	Less Than MDL	9.6
K74	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.3	0.07	Less Than MDL	0.021	0.007	Less Than MDL	11.0
K75	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	37.7	8.52	Less Than MDL	2.942	0.960	1.12	104
K76	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.3	0.07	Less Than MDL	0.032	0.010	Less Than MDL	25.3

Table 2.7 Kentucky River Watershed Watch Nutrient Sampling Results - September 2000

Sample ID	Collection Date	Ammonia (NH_3)	Ammonia (NH_3-N)	Kjeldahl Nitrogen (NH_3)	Nitrate (NO_3)	Nitrate-N (NO_3-N)	Kjeldahl Nitrogen (-N)	Orthophosphate (PO_4)	Orthophosphate-P (PO_4-P)	Total Recoverable Phosphorus	Sulfate
K77	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.21	0.05	Less Than MDL	0.053	0.017	Less Than MDL	9.6
K81	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.2	0.27	Less Than MDL	0.019	0.006	0.06	293
K82	19-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.1	0.25	Less Than MDL	0.038	0.012	Less Than MDL	226
K83	14-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.3	0.29	Less Than MDL	0.019	0.006	Less Than MDL	541
K84	10-Sep-00	2.53	2.08	2.54	0.8	0.18	2.09	0.724	0.236	0.28	15.1
K85	09-Sep-00	0.04	0.03	Less Than MDL	14.8	3.34	Less Than MDL	3.018	0.984	1.32	77.6
K86	10-Sep-00	0.04	0.03	Less Than MDL	2.4	0.54	Less Than MDL	0.788	0.257	0.25	73.8
K87	17-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.7	0.16	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	9.9
K89	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.5	0.11	Less Than MDL	0.037	0.012	Less Than MDL	7.4
K90	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.4	0.09	Less Than MDL	0.043	0.014	Less Than MDL	210
K94	11-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.0	0.23	Less Than MDL	0.033	0.011	Less Than MDL	30.0
K95	11-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.2	0.27	Less Than MDL	0.048	0.016	Less Than MDL	24.8
K96	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	27.2	6.15	Less Than MDL	1.215	0.396	0.38	34.6
K120	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	15.9	3.59	Less Than MDL	0.802	0.262	0.26	34.7
K121	10-Sep-00	0.02	0.02	Less Than MDL	3.9	0.88	Less Than MDL	0.984	0.321	0.31	36.2
K122	10-Sep-00	0.12	0.10	0.13	4.2	0.95	0.11	1.032	0.337	0.28	37.5
K123	10-Sep-00	0.09	0.07	Less Than MDL	27.0	6.10	Less Than MDL	2.620	0.854	0.76	76.0
K125	13-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.09	53.9
K126	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	11.2	2.53	Less Than MDL	2.889	0.942	1.18	78.9
K127	10-Sep-00	0.06	0.05	Less Than MDL	7.3	1.65	Less Than MDL	1.759	0.574	0.53	80.8
K129	08-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	15.0	3.39	Less Than MDL	1.762	0.575	0.51	165
K130	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.2	0.04	Less Than MDL	0.030	0.010	Less Than MDL	65.6
K131	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	3.0	0.68	Less Than MDL	0.205	0.067	Less Than MDL	181
K132	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.1	0.02	Less Than MDL	0.917	0.299	0.29	42.1
K134	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.7	0.38	Less Than MDL	0.039	0.013	Less Than MDL	135
K135	09-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.2	0.04	Less Than MDL	0.062	0.020	Less Than MDL	109
K136	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.2	0.04	Less Than MDL	0.079	0.026	Less Than MDL	104
K140	08-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.2	0.04	Less Than MDL	0.069	0.023	Less Than MDL	138
K156	08-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.0	0.23	Less Than MDL	0.043	0.014	Less Than MDL	120
K157	08-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.2	0.27	Less Than MDL	0.023	0.008	Less Than MDL	117
K158	08-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	2.3	0.52	Less Than MDL	0.830	0.271	0.26	46.2
K161	08-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.1	0.25	Less Than MDL	0.357	0.116	0.11	59.5
K162	08-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	2.94	0.66	Less Than MDL	0.487	0.159	0.15	41.2
K163	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	1.1	0.25	Less Than MDL	0.036	0.012	Less Than MDL	128
K165	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.3	0.07	Less Than MDL	0.035	0.011	Less Than MDL	33.4
K166	10-Sep-00	Less Than MDL	Less Than MDL	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Less Than MDL	Less Than MDL	Less Than MDL	Not Analyzed
K167	10-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	0.6	0.14	Less Than MDL	0.025	0.008	Less Than MDL	47.1
K168	08-Sep-00	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.071	0.023	Less Than MDL	75.0

Total phosphorus (TP) is commonly measured in surface waters. TP includes all of the various forms of phosphorus (organic, inorganic, dissolved, and particulate) present in a sample. Phosphorus is one of the key elements necessary for growth of plants and animals. Phosphates are made up of phosphorus and exist in three forms: orthophosphate, metaphosphate (or polyphosphate) and organically bound phosphate. Each compound contains phosphorous in a different chemical formula. Ortho forms are produced by natural processes and are found in sewage. Poly forms are used for treating boiler waters and in detergents. In water, they change into the ortho form. Organic phosphates are important in nature. Their occurrence may result from the breakdown of organic pesticides which contain phosphates. They may exist in solution, as particles, loose fragments or in the bodies of aquatic organisms.

The forms of nitrogen routinely analyzed at most Kentucky ambient sampling sites are ammonia and ammonium (NH_3/NH_4), total Kjeldahl nitrogen (TKN), and nitrite and nitrate (NO_2/NO_3). Ammonia and ammonium are readily used by plants. TKN is a measure of organic nitrogen and ammonia in a sample. Nitrate is the product of aerobic transformation of ammonia, and is the most common form used by aquatic plants. Nitrite is usually not present in significant amounts.

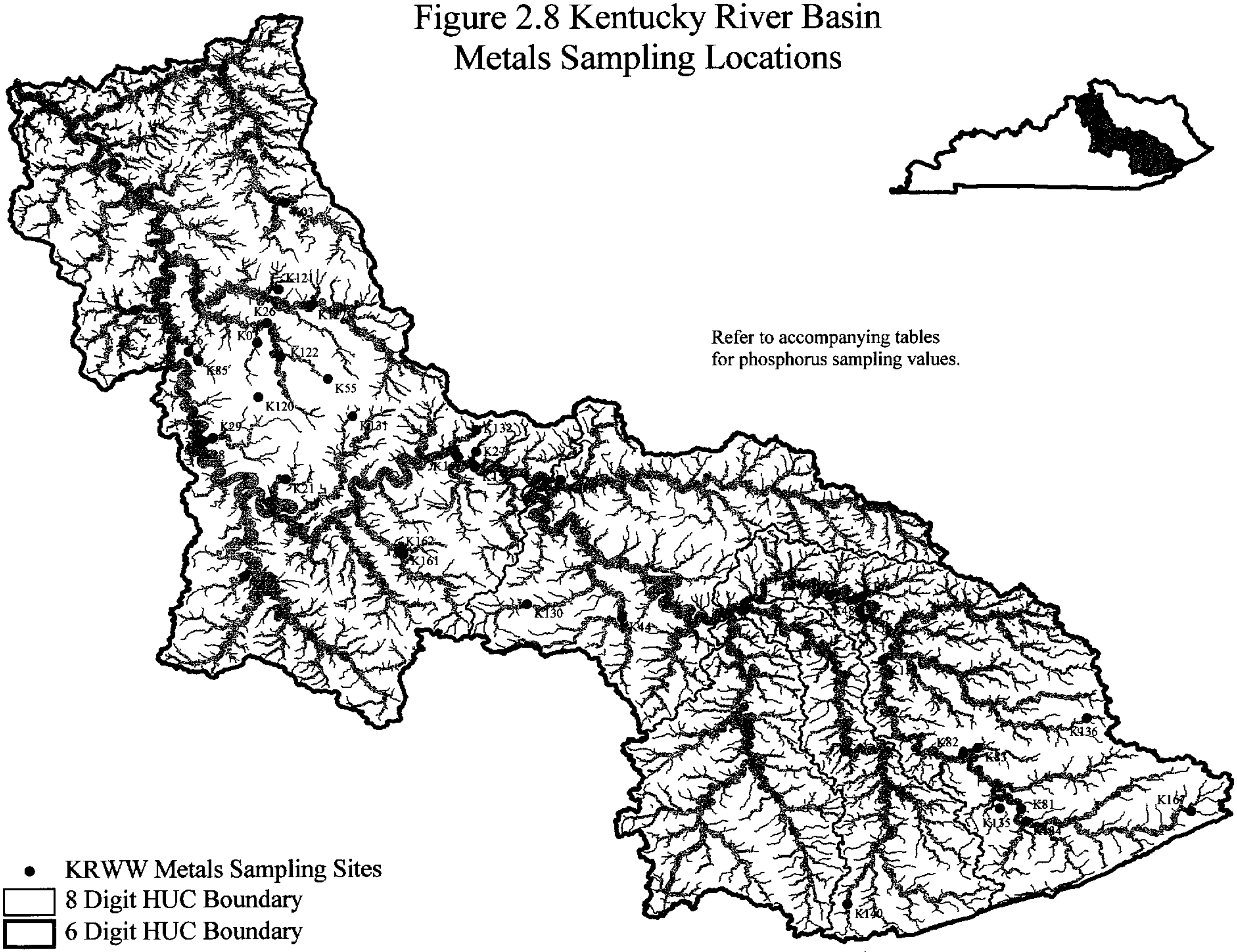
Kentucky currently has no official numerical standards or criteria for nutrients in water. However, the USEPA has issued recommendations for phosphorus concentrations to prevent over-enrichment. In general, any concentration of phosphorus in excess of 0.1 mg/l has the potential to cause possible eutrophication problems in a stream.

In addition to man-made sources, some phosphorus loadings may occur naturally from the watershed soils and underlying geology. In particular, background TP levels in the Bluegrass region have been observed from wells, springs, and pristine watersheds as high as 0.25 mg/l. In most cases these readings have been associated with high phosphorus concentrations associated with the Tanglewood member of the Lexington.

2.9 Metals Data

In addition to chemical and nutrient data, metals data were also collected at all new stations that were established as part of the 2000 sampling effort and also at those previous year stations at which high metals concentrations were identified. The final set of selected sampling locations are shown in Figure 2.8. The results of the sampling effort are provided in Table 2.8. A summary of those stations that had the highest concentration for a particular metal are shown in Table 2.9. A discussion of the significance of each of these metals is provided in Appendix A along with (where applicable) specific criteria limits

Figure 2.8 Kentucky River Basin Metals Sampling Locations



Refer to accompanying tables
for phosphorus sampling values.

Table 2.9 Stations with Maximum Metal Concentrations

Metal	Maximum Level (mg/l)	Sites
1. Aluminum	1.89	K81
2. Antimony	0.17	K48, K83
3. Arsenic	Less than MDL	
4. Barium	0.34	K02
5. Beryllium	Less than MDL	
6. Boron	0.32	K21
7. Cadmium	Less than MDL	
8. Calcium	84.7	K131
9. Chromium	Less than MDL	
10. Cobalt	0.004	K85, K121, K131, K162
11. Copper	0.0.14	K21
12. Gold	Less than MDL	
13. Iron	0.88	K81
14. Lead	Less than MDL	
15. Lithium	0.02	K03, K81, K48
16. Magnesium	65.66	K48
17. Manganese	0.25	K29
18. Nickel	0.02	K21
19. Potassium	11.68	K125
20. Selenium	Less than MDL	
21. Silicon	23.547	K135
22. Silver	Less than MDL	
23. Sodium	84.77	K21
24. Strontium	1.53	K83
25. Sulfur	626.4	K28
26. Thallium	Less than MDL	
27. Tin	Less than MDL	
28. Vanadium	Less than MDL	
29. Zinc	0.06	K21

Note: MDL = Minimum Detection Limit

Table 2.9 reveals that three sites accounted for most of the maximum metal concentrations. These included: K21, K48, and K81. Last year, the sites with the most maximum concentrations included K03, K48, and K50. Because in some cases the resulting concentrations may have violated designated use standards for the streams, it is recommended that additional sampling be performed to ascertain the source of the contamination. For a more comprehensive review of historic metals concentrations in the Kentucky River Basin consult Water-Quality Assessment of the Kentucky River Basin, Kentucky: Distribution of Metals and Other Trace Elements in Sediment and Water, 1987-1990 (USGS, 1995).

Table 2.8 Kentucky River Watershed Watch Metals Sampling Results - September 2000

Sample ID #	Collection Date	Aluminum Total by ICP	Antimony Total by ICP	Arsenic Total by ICP	Barium Total by ICP	Beryllium Total by ICP	Boron Total by ICP	Cadmium Total by ICP
K02	09/10/00	0.31	Less Than MDL	Less Than MDL	0.34	Less Than MDL	0.03	Less Than MDL
K03	09/10/00	0.27	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.13	Less Than MDL
K21	09/09/00	0.20	Less Than MDL	Less Than MDL	0.02	Less Than MDL	0.32	Less Than MDL
K26	09/10/00	0.87	Less Than MDL	Less Than MDL	0.01	Less Than MDL	0.10	Less Than MDL
K27	09/10/00	0.43	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.04	Less Than MDL
K28	09/10/00	0.16	0.09	Less Than MDL	0.03	Less Than MDL	0.01	Less Than MDL
K29	09/10/00	0.14	Less Than MDL	Less Than MDL	0.06	Less Than MDL	0.02	Less Than MDL
K44	09/17/00	0.29	Less Than MDL	Less Than MDL	0.02	Less Than MDL	0.03	Less Than MDL
K48	09/10/00	1.09	0.17	Less Than MDL	0.06	Less Than MDL	Less Than MDL	Less Than MDL
K50	09/10/00	0.18	Less Than MDL	Less Than MDL	0.02	Less Than MDL	0.03	Less Than MDL
K55	09/08/00	0.93	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.07	Less Than MDL
K81	09/09/00	1.89	0.08	Less Than MDL	0.06	Less Than MDL	0.04	Less Than MDL
K82	09/19/00	0.38	0.07	Less Than MDL	0.04	Less Than MDL	0.03	Less Than MDL
K83	09/14/00	0.13	0.17	Less Than MDL	0.04	Less Than MDL	0.05	Less Than MDL
K85	09/09/00	0.29	Less Than MDL	Less Than MDL	0.01	Less Than MDL	0.23	Less Than MDL
K120	09/10/00	0.10	Less Than MDL	Less Than MDL	0.02	Less Than MDL	0.04	Less Than MDL
K121	09/10/00	0.63	Less Than MDL	Less Than MDL	0.02	Less Than MDL	0.02	Less Than MDL
K122	09/10/00	0.75	Less Than MDL	Less Than MDL	0.02	Less Than MDL	0.02	Less Than MDL
K123	09/10/00	0.42	Less Than MDL	Less Than MDL	0.02	Less Than MDL	0.10	Less Than MDL
K125	09/13/00	0.13	Less Than MDL	Less Than MDL	0.05	Less Than MDL	0.04	Less Than MDL
K126	09/10/00	0.15	Less Than MDL	Less Than MDL	0.01	Less Than MDL	0.23	Less Than MDL
K127	09/10/00	0.16	Less Than MDL	Less Than MDL	0.02	Less Than MDL	0.13	Less Than MDL
K130	09/10/00	0.16	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.04	Less Than MDL
K131	09/09/00	0.17	0.07	Less Than MDL	0.04	Less Than MDL	0.07	Less Than MDL
K132	09/09/00	0.66	Less Than MDL	Less Than MDL	0.01	Less Than MDL	0.01	Less Than MDL
K134	09/09/00	0.12	Less Than MDL	Less Than MDL	0.07	Less Than MDL	0.05	Less Than MDL
K135	09/09/00	0.19	0.09	Less Than MDL	0.08	Less Than MDL	Less Than MDL	Less Than MDL
K136	09/10/00	0.20	Less Than MDL	Less Than MDL	0.05	Less Than MDL	0.06	Less Than MDL

Table 2.8 Kentucky River Watershed Watch Metals Sampling Results - September 2000

Sample ID #	Collection Date	Aluminum Total by ICP	Antimony Total by ICP	Arsenic Total by ICP	Barium Total by ICP	Beryllium Total by ICP	Boron Total by ICP	Cadmium Total by ICP
K140	09/08/00	0.13	Less Than MDL	Less Than MDL	0.04	Less Than MDL	0.02	Less Than MDL
K156	09/08/00	0.48	Less Than MDL	Less Than MDL	0.04	Less Than MDL	0.03	Less Than MDL
K157	09/08/00	0.77	Less Than MDL	Less Than MDL	0.04	Less Than MDL	0.03	Less Than MDL
K158	09/08/00	0.54	Less Than MDL	Less Than MDL	0.01	Less Than MDL	0.02	Less Than MDL
K161	09/08/00	0.38	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.06	Less Than MDL
K162	09/08/00	0.44	Less Than MDL	Less Than MDL	0.01	Less Than MDL	0.03	Less Than MDL
K163	09/10/00	0.25	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.02	Less Than MDL
K165	09/10/00	0.16	Less Than MDL	Less Than MDL	0.04	Less Than MDL	0.06	Less Than MDL
K166	09/10/00	0.06	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.04	Less Than MDL
K167	09/10/00	0.12	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.06	Less Than MDL
K168	09/08/00	0.33	Less Than MDL	Less Than MDL	0.03	Less Than MDL	0.05	Less Than MDL

Table 2.8 Kentucky River Watershed Watch Metals Sampling Results - September 2000

Sample ID #	Collection Date	Calcium Total by ICP	Chromium Total by ICP	Cobalt Total by ICP	Copper Total by ICP	Gold Total by ICP	Iron Total by ICP	Lead Total by ICP
K02	09/10/00	85.36	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.18	Less Than MDL
K03	09/10/00	38.53	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.43	Less Than MDL
K21	09/09/00	49.05	Less Than MDL	Less Than MDL	0.014	Less Than MDL	0.32	Less Than MDL
K26	09/10/00	32.16	Less Than MDL	0.03	Less Than MDL	Less Than MDL	0.49	Less Than MDL
K27	09/10/00	63.37	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.34	Less Than MDL
K28	09/10/00	69.43	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.05	Less Than MDL
K29	09/10/00	90.90	Less Than MDL	0.005	Less Than MDL	Less Than MDL	0.08	Less Than MDL
K44	09/17/00	47.90	Less Than MDL	0.01	Less Than MDL	Less Than MDL	0.12	Less Than MDL
K48	09/10/00	93.64	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.62	Less Than MDL
K50	09/10/00	47.45	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.13	Less Than MDL
K55	09/08/00	50.91	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.61	Less Than MDL
K81	09/09/00	57.06	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.88	Less Than MDL
K82	09/19/00	54.96	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.26	Less Than MDL
K83	09/14/00	96.34	Less Than MDL	0.003	Less Than MDL	Less Than MDL	0.21	Less Than MDL
K85	09/09/00	54.24	Less Than MDL	0.004	Less Than MDL	Less Than MDL	0.25	Less Than MDL
K120	09/10/00	84.70	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.08	Less Than MDL
K121	09/10/00	53.46	Less Than MDL	0.004	Less Than MDL	Less Than MDL	0.42	Less Than MDL
K122	09/10/00	55.14	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.51	Less Than MDL
K123	09/10/00	60.29	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.34	Less Than MDL
K125	09/13/00	53.78	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.17	Less Than MDL
K126	09/10/00	57.78	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.13	Less Than MDL
K127	09/10/00	64.83	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.10	Less Than MDL
K130	09/10/00	39.59	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.35	Less Than MDL
K131	09/09/00	142.1	Less Than MDL	0.004	Less Than MDL	Less Than MDL	0.04	Less Than MDL
K132	09/09/00	65.77	Less Than MDL	0.003	Less Than MDL	Less Than MDL	0.39	Less Than MDL
K134	09/09/00	40.72	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.08	Less Than MDL
K135	09/09/00	85.6	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.10	Less Than MDL
K136	09/10/00	40.26	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.18	Less Than MDL

Table 2.8 Kentucky River Watershed Watch Metals Sampling Results - September 2000

Sample ID #	Collection Date	Calcium Total by ICP	Chromium Total by ICP	Cobalt Total by ICP	Copper Total by ICP	Gold Total by ICP	Iron Total by ICP	Lead Total by ICP
K140	09/08/00	23.63	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.10	Less Than MDL
K156	09/08/00	35.33	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.25	Less Than MDL
K157	09/08/00	34.45	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.43	Less Than MDL
K158	09/08/00	51.65	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.04	Less Than MDL
K161	09/08/00	46.11	Less Than MDL	0.003	Less Than MDL	Less Than MDL	0.22	Less Than MDL
K162	09/08/00	59.40	Less Than MDL	0.004	Less Than MDL	Less Than MDL	0.25	Less Than MDL
K163	09/10/00	37.81	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.43	Less Than MDL
K165	09/10/00	38.58	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.39	Less Than MDL
K166	09/10/00	30.87	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.19	Less Than MDL
K167	09/10/00	30.68	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.18	Less Than MDL
K168	09/08/00	45.86	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL	0.19	Less Than MDL

Table 2.8 Kentucky River Watershed Watch Metals Sampling Results - September 2000

Sample ID #	Collection Date	Lithium Total by ICP	Magnesium Total by ICP	Manganese Total by ICP	Mercury Total	Nickel Total by ICP	Potassium Total by ICP	Selenium Total by ICP	Silicon Total by ICP
K02	09/10/00	Less Than MDL	5.95	0.05		Less Than MDL	3.21	Less Than MDL	4.98
K03	09/10/00	0.02	8.30	0.20		Less Than MDL	8.34	Less Than MDL	1.63
K21	09/09/00	0.006	11.03	0.02		0.02	9.78	Less Than MDL	2.49
K26	09/10/00	Less Than MDL	5.56	0.05		Less Than MDL	6.72	Less Than MDL	2.975
K27	09/10/00	Less Than MDL	8.05	0.17		Less Than MDL	2.98	Less Than MDL	2.85
K28	09/10/00	Less Than MDL	5.25	0.02		Less Than MDL	2.94	Less Than MDL	2.33
K29	09/10/00	Less Than MDL	7.43	0.25		0.01	5.67	Less Than MDL	3.18
K44	09/17/00	Less Than MDL	6.41	0.01		Less Than MDL	2.67	Less Than MDL	3.03
K48	09/10/00	0.02	65.66	0.09		Less Than MDL	9.37	Less Than MDL	2.69
K50	09/10/00	Less Than MDL	9.53	0.05		Less Than MDL	4.39	Less Than MDL	1.29
K55	09/08/00	Less Than MDL	5.77	0.07		Less Than MDL	5.07	Less Than MDL	3.27
K81	09/09/00	0.02	29.42	0.03		Less Than MDL	7.27	Less Than MDL	4.26
K82	09/19/00	0.01	29.87	0.06		0.007	6.46	Less Than MDL	1.63
K83	09/14/00	0.05	56.19	0.05		0.008	10.25	Less Than MDL	2.723
K85	09/09/00	0.01	9.81	0.04		Less Than MDL	9.03	Less Than MDL	3.66
K120	09/10/00	Less Than MDL	5.89	0.02		Less Than MDL	2.45	Less Than MDL	3.55
K121	09/10/00	Less Than MDL	5.31	0.08		Less Than MDL	4.67	Less Than MDL	2.99
K122	09/10/00	Less Than MDL	5.74	0.09		Less Than MDL	4.91	Less Than MDL	3.29
K123	09/10/00	0.007	9.99	0.07		Less Than MDL	9.48	Less Than MDL	3.16
K125	09/13/00	Less Than MDL	18.15	0.10		Less Than MDL	11.68	Less Than MDL	1.68
K126	09/10/00	0.01	9.68	0.02		Less Than MDL	9.07	Less Than MDL	3.62
K127	09/10/00	0.008	9.01	0.06		Less Than MDL	9.19	Less Than MDL	2.02
K130	09/10/00	Less Than MDL	9.71	0.08		Less Than MDL	5.46	Less Than MDL	2.47
K131	09/09/00	0.006	25.01	0.20		0.009	5.04	Less Than MDL	2.75
K132	09/09/00	Less Than MDL	7.28	0.03		Less Than MDL	4.97	Less Than MDL	3.36
K134	09/09/00	0.01	16.01	0.01		Less Than MDL	6.53	Less Than MDL	1.06
K135	09/09/00	0.004	44.56	0.07		Less Than MDL	6.12	Less Than MDL	23.547
K136	09/10/00	0.008	21.86	0.01		Less Than MDL	5.70	Less Than MDL	1.94

Table 2.8 Kentucky River Watershed Watch Metals Sampling Results - September 2000

Sample ID #	Collection Date	Lithium Total by ICP	Magnesium Total by ICP	Manganese Total by ICP	Mercury Total	Nickel Total by ICP	Potassium Total by ICP	Selenium Total by ICP	Silicon Total by ICP
K140	09/08/00	0.01	11.6	0.01		Less Than MDL	4.17	Less Than MDL	0.79
K156	09/08/00	0.005	18.41	0.05		Less Than MDL	4.11	Less Than MDL	2.56
K157	09/08/00	0.009	16.85	0.05		Less Than MDL	4.01	Less Than MDL	3.12
K158	09/08/00	Less Than MDL	8.27	0.01		Less Than MDL	3.39	Less Than MDL	1.22
K161	09/08/00	0.004	10.34	0.06		0.006	7.45	Less Than MDL	2.35
K162	09/08/00	Less Than MDL	10.23	0.05		Less Than MDL	5.91	Less Than MDL	2.465
K163	09/10/00	Less Than MDL	22.03	0.06		Less Than MDL	4.74	Less Than MDL	2.50
K165	09/10/00	Less Than MDL	9.08	0.05		Less Than MDL	4.19	Less Than MDL	1.92
K166	09/10/00	Less Than MDL	7.75	0.06		Less Than MDL	4.48	Less Than MDL	2.76
K167	09/10/00	Less Than MDL	9.93	0.05		Less Than MDL	4.54	Less Than MDL	2.44
K168	09/08/00	Less Than MDL	14.68	0.05		Less Than MDL	6.40	Less Than MDL	2.69

Table 2.8 Kentucky River Watershed Watch Metals Sampling Results - September 2000

Sample ID #	Collection Date	Silver Total by ICP	Sodium Total by ICP	Strontium Total by ICP	Sulfur Total by ICP	Thallium Total by ICP	Tin Total by ICP	Vanadium Total by ICP	Zinc Total by ICP
K02	09/10/00	Less Than MDL	5.19	0.10	6.75	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K03	09/10/00	Less Than MDL	35.46	0.21	4.08	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K21	09/09/00	Less Than MDL	84.77	0.19	44.49	Less Than MDL	Less Than MDL	Less Than MDL	0.06
K26	09/10/00	Less Than MDL	21.28	0.10	9.14	Less Than MDL	Less Than MDL	Less Than MDL	0.01
K27	09/10/00	Less Than MDL	7.12	0.15	9.28	Less Than MDL	Less Than MDL	Less Than MDL	0.003
K28	09/10/00	Less Than MDL	4.42	0.12	626.4	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K29	09/10/00	Less Than MDL	12.27	0.19	15.71	Less Than MDL	Less Than MDL	Less Than MDL	0.008
K44	09/17/00	Less Than MDL	2.97	0.12	5.65	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K48	09/10/00	Less Than MDL	30.04	0.97	113.7	Less Than MDL	Less Than MDL	Less Than MDL	0.009
K50	09/10/00	Less Than MDL	9.56	0.17	9.57	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K55	09/08/00	Less Than MDL	22.40	0.14	9.69	Less Than MDL	Less Than MDL	Less Than MDL	0.03
K81	09/09/00	Less Than MDL	50.12	1.06	62.3	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K82	09/19/00	Less Than MDL	53.87	0.87	66.19	Less Than MDL	Less Than MDL	Less Than MDL	0.006
K83	09/14/00	Less Than MDL	151.2	1.53	148.2	Less Than MDL	Less Than MDL	Less Than MDL	0.005
K85	09/09/00	Less Than MDL	37.20	0.14	19.26	Less Than MDL	Less Than MDL	Less Than MDL	0.01
K120	09/10/00	Less Than MDL	13.14	0.10	9.35	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K121	09/10/00	Less Than MDL	10.47	0.10	8.86	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K122	09/10/00	Less Than MDL	10.91	0.10	9.25	Less Than MDL	Less Than MDL	Less Than MDL	0.01
K123	09/10/00	Less Than MDL	38.00	0.17	18.47	Less Than MDL	Less Than MDL	Less Than MDL	0.05
K125	09/13/00	Less Than MDL	16.05	0.31	15.88	Less Than MDL	Less Than MDL	Less Than MDL	0.004
K126	09/10/00	Less Than MDL	37.36	0.14	19.24	Less Than MDL	Less Than MDL	Less Than MDL	0.005
K127	09/10/00	Less Than MDL	35.87	0.17	21.66	Less Than MDL	Less Than MDL	Less Than MDL	0.005
K130	09/10/00	Less Than MDL	11.26	0.11	16.42	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K131	09/09/00	Less Than MDL	18.61	0.54	43.33	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K132	09/09/00	Less Than MDL	10.56	0.10	11.65	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K134	09/09/00	Less Than MDL	58.28	0.53	35.75	Less Than MDL	Less Than MDL	Less Than MDL	Less Than MDL
K135	09/09/00	Less Than MDL	27.27	0.33	86.50	Less Than MDL	Less Than MDL	Less Than MDL	0.01
K136	09/10/00	Less Than MDL	75.44	0.36	33.75	Less Than MDL	Less Than MDL	Less Than MDL	0.005

2.10 Letcher County Focused Sampling

In addition to the basin wide sampling effort, separate focused sampling was conducted in Letcher County during March 2000. A detailed metals analysis was conducted for three separate samples at sites K97, K98, and K99 while three rounds of fecal coliform samples at sites K100-K115. Three additional rounds of fecal coliform samples were then collected in September 2000 at sites KP18 and KP19. Finally, 11 additional sites (KL1- KL11) were sampled in an attempt to identify potential impacts associated with abandoned mine drainage (AMD). The locations of each of the sites is shown in Figure 2.9 The results from metals sampling and the fecal coliform sampling are shown in Tables 2.10 and 2.11 respectively. As can be seen from the fecal sample results, several sites continued to have extremely high fecal coliform counts. In addition, the fecal coliform/fecal strep rations were consistently greater than 1 and in many cases consistently greater than 4 for multiple samples at the same sites. This would strongly suggest that the source of the fecal contamination is from human sources.

The results of the AMD sampling is shown in Table 2.12. In general, all sites indicated very high levels of conductivity (> 800 umhos/cm) , total dissolved solids (> 750 mg/l) , sulfate (> 250 mg/l), iron (> 1 mg/l) and manganese (> 0.05 mg/l), thus indicating significant AMD impacts. Of particular impact were those sites located in the Crafts Colly Watershed (i.e. KL4, KL5, KL6, KL8, and KL9).

Table 2.10 Letcher County Metals Sampling Results

Sample ID #	Collection Date	Aluminum Total by ICP	Arsenic Total by ICP	Barium Total by ICP	Cadmium Total by ICP	Chromium Total by ICP	Copper Total by ICP	Iron Total by ICP	Lead Total by ICP	Magnesium Total by ICP	Manganese Total by ICP	Mercury Total	Potassium Total by ICP	Selenium Total by ICP	Sodium Total by ICP	Zinc Total by ICP
K97	03/07/00	BDL	BDL	0.05	BDL	BDL	BDL	0.37	BDL	32	0.09	BDL	3.6	BDL	38	BDL
K97	03/11/00	0.3	BDL	0.05	BDL	BDL	BDL	0.54	BDL	29	0.1	BDL	3.9	BDL	37	BDL
K97	03/18/00	0.08	BDL	0.04	BDL	BDL	0.014	0.37	BDL	21	0.08	BDL	2.8	BDL	21	BDL
K98	03/07/00	BDL	BDL	0.04	BDL	BDL	BDL	0.66	BDL	79	0.11	BDL	5.9	BDL	54	BDL
K98	03/11/00	5.8	BDL	0.09	BDL	BDL	0.012	12	BDL	63	0.39	BDL	6.4	BDL	39	0.06
K98	03/18/00	0.07	BDL	0.04	BDL	BDL	BDL	0.24	BDL	68	0.26	BDL	5.3	BDL	38	BDL
K99	03/17/00	0.31	BDL	0.05	BDL	BDL	BDL	0.92	BDL	42	0.7	BDL	4.5	BDL	56	BDL
K99	03/11/00	24	BDL	0.26	BDL	0.4	0.45	38	BDL	55	0.95	BDL	8.8	BDL	23	0.22
K99	03/18/00	0.67	BDL	0.05	BDL	BDL	BDL	1.1	. BDL	28	0.28	BDL	3.2	BDL	26	BDL

Figure 2.9 Letcher County Focus Sampling Locations

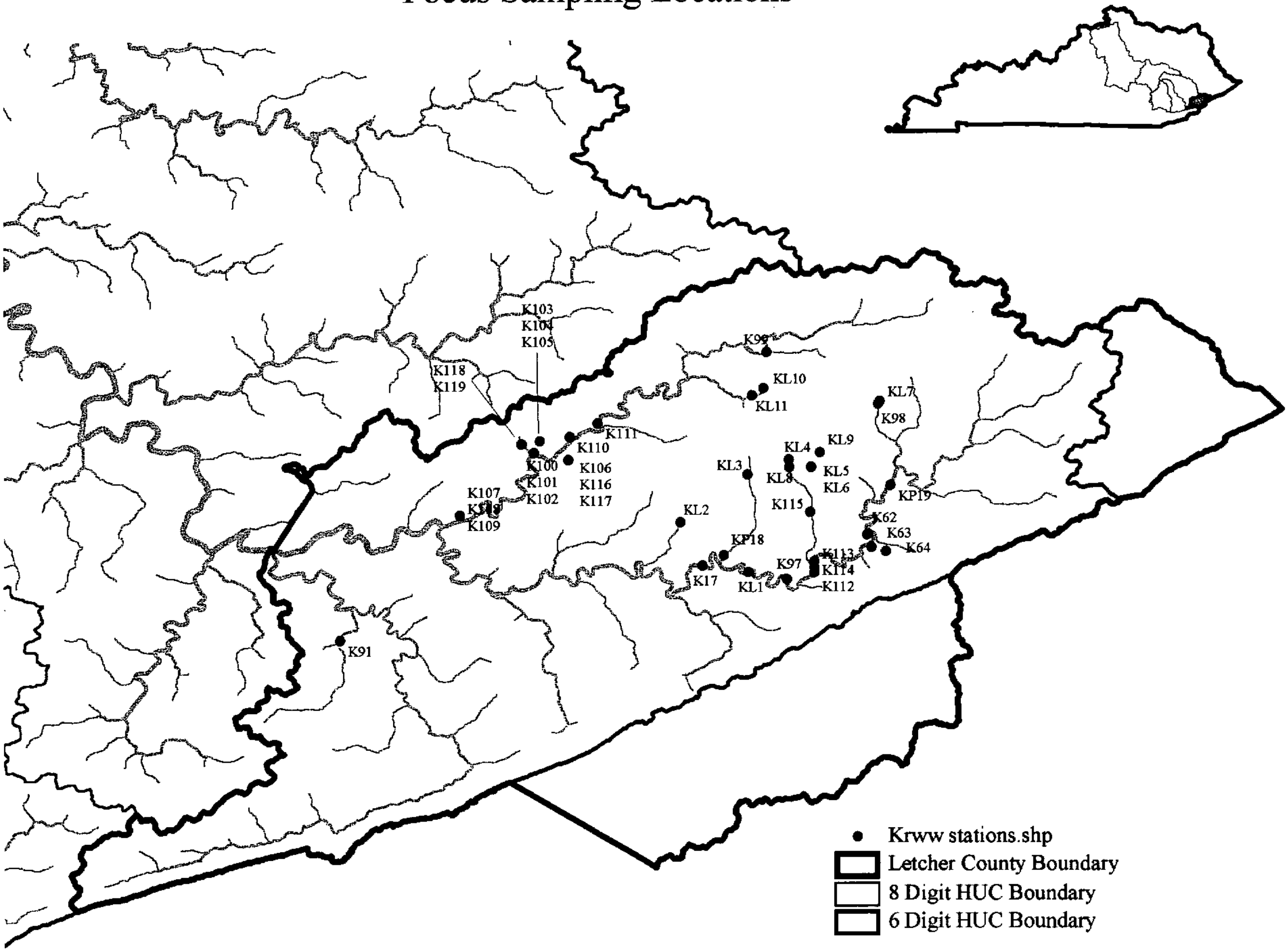


Table 2.11 Letcher County Fecal Coliform / Fecal Strep Sampling Results

Sample ID #	Collection Date	Fecal Coliform Count	Fecal Strep Count*	Fecal / Strep Ratio*
K100	3/26/00	460	260	1.769
K100	3/29/00	1000	40	25.000
K100	3/31/00	1100	190	5.789
K101	3/26/00	400	280	1.429
K101	3/29/00	400	70	5.714
K101	3/31/00	1200	150	8.000
K102	3/26/00	500	180	2.778
K102	3/29/00	2700	30	90.000
K102	3/31/00	2700	80	33.750
K103	3/26/00	16000	370	43.243
K103	3/29/00	130	230	0.565
K103	3/31/00	42000	320	131.250
K104	3/26/00	350	300	1.167
K104	3/29/00	800	60	13.333
K104	3/31/00	700	150	4.667
K105	3/26/00	17000	110	154.545
K105	3/29/00	22000	600	36.667
K105	3/31/00	54000	1000	54.000
K106	3/26/00	>60000	120	>500
K106	3/29/00	2500	1000	2.500
K106	3/31/00	1200	210	5.714
K107	3/26/00	360	110	3.273
K107	3/29/00	800	90	8.889
K107	3/31/00	190	90	2.111
K108	3/26/00	500	210	2.381
K108	3/29/00	450	60	7.500
K108	3/31/00	260	60	4.333
K109	3/26/00	300	80	3.750
K109	3/29/00	400	40	10.000
K109	3/31/00	100	1500	0.067
K110	3/29/00	500	90	5.556
K110	3/31/00	300	130	2.308
K111	3/29/00	900	20	45.000
K111	3/31/00	140	20	7.000
K112	3/29/00	1800	210	8.571
K112	3/31/00	440	150	2.933
K113	3/29/00	1700	230	7.391
K113	3/31/00	290	210	1.381
K114	3/29/00	1000	70	14.286
K114	3/31/00	450	130	3.462
K115	3/29/00	300	330	0.909
K115	3/31/00	BDL	200	-
KP18	9/5/00	60000		
KP18	9/6/00	60000	-	-
KP18	9/7/00	15000		
KP19	9/5/00	60000		
KP19	9/6/00	60000	-	-
KP19	9/7/00	7000	-	-

Notes

1. (*) - Dashed values indicates no data available

Table 2.12 Letcher County AMD Sampling Results

Station ID	Date	pH	Acidity (mg/L)	Alkalinity (mg/L)	Conductivity (mg/L)	TDS (mg/L)	Sulfates (mg/L)	Total Iron (mg/L)	Dissolved Iron (mg/L)	Total Manganese (mg/L)	Dissolved Manganese (mg/L)
KL1	6/28/00	7.6	BDL	96	670	18	180	0.61	-	0.42	-
KL2	8/28/00	7.4	0	366	1599	800	575	0.3	<.01	0.35	0.33
KL2	8/31/00	6.9	0	369	1736	868	430	0.38	0.12	0.37	0.34
KL2	9/6/00	7.2	0	361	1738	870	610	0.78	<.01	0.34	0.34
KL3	8/28/00	7.4	0	298	1262	632	200	4.77	<.01	0.62	0.54
KL3	8/31/00	6.9	0	306	1243	622	180	4.92	<.01	0.62	0.61
KL3	9/6/00	7.4	0	294	1252	628	290	2.19	<.01	0.69	0.44
KL4	8/28/00	4.9	50	0	671	337	250	8.09	<.01	0.84	0.73
KL4	8/31/00	4.5	45	0	657	329	280	9.26	6.85	0.77	0.74
KL4	9/6/00	3.7	55	0	674	337	230	8.69	2.72	0.81	0.77
KL5	8/28/00	6.6	0	127	1000	502	575	4.08	<.01	0.93	0.1
KL5	8/31/00	5.9	0	119	1054	527	450	4.12	0.07	0.83	0.26
KL5	9/6/00	6.4	0	116	1025	514	480	1.44	<.01	0.75	0.4
KL6	8/28/00	6.9	0	120	1062	532	600	0.38	0.07	0.36	0.27
KL6	8/31/00	6.3	0	123	1055	528	470	0.59	<.01	0.41	0.38
KL6	9/6/00	7.2	0	111	1017	510	440	0.48	<.01	0.61	0.54
KL7	8/28/00	6.9	0	354	1342	672	425	10.4	0.03	1.24	1.11
KL7	8/31/00	6.4	0	374	1421	711	320	2.67	0.01	1.45	1.41
KL7	9/6/00	7	0	353	1373	688	290	4.35	0.01	1.38	1.36
KL8	8/28/00	3.6	405	0	1101	552	800	2.51	1.21	3.06	2.99
KL8	8/31/00	3.4	135	0	1274	637	840	2.42	2.18	3.33	3.18
KL8	9/6/00	3.3	135	0	1236	619	680	2.7	1.46	3.2	3.14
KL9	8/28/00	6	0	35	996	498	675	0.61	0.02	1.21	1.21
KL9	8/31/00	5.5	5	33	1074	537	580	0.67	0.06	1.29	1.26
KL9	9/6/00	6.1	0.5	30	1051	527	530	0.61	0.08	1.4	1.32
KL10	8/28/00	6.7	0	343	1525	760	375	26.83	<.01	0.93	0.82
KL10	8/31/00	6.2	0	285	1804	902	270	40.48	1.88	1.23	1.19
KL10	9/6/00	7.2	0	294	1786	895	490	6.01	<.01	0.89	0.84
KL11	8/28/00	6.8	0	179	1082	544	425	1.77	0.02	0.16	0.13
KL11	8/31/00	6.4	0	178	988	494	360	1.41	<.01	0.12	0.12
KL11	9/6/00	7.3	0	165	982	492	440	0.56	<.01	0.13	0.12

Table 2.12 Letcher County AMD Sampling Results

Station ID	Date	Dissolved Calcium (mg/L)	Dissolved Magnesium (mg/L)	Dissolved Sodium (mg/L)	Dissolved Potassium (mg/L)	Chlorine (mg/L)	Aluminum (mg/L)	Hardness (mg/L)
KL1	6/28/00	59	33	-	-	-	0.09	290
KL2	8/28/00	51.12	32.88	288.57	7.9	18.4	0.019	-
KL2	8/31/00	44.33	23.88	304.4	8.25	14.8	0.005	-
KL2	9/6/00	32.7	29.15	327.75	9.15	14	0.004	-
KL3	8/28/00	53.94	35.28	178.16	6.4	7.6	<.001	-
KL3	8/31/00	55.62	26.15	233.43	6.83	6.8	0.01	-
KL3	9/6/00	65.5	33.3	243.85	10.9	4	0.007	-
KL4	8/28/00	30.4	30.22	29.55	4.24	5.6	2.74	-
KL4	8/31/00	36.69	23.09	-	5.63	6.8	4.21	-
KL4	9/6/00	27.35	22.6	49.65	7.3	4	4.29	-
KL5	8/28/00	86.24	59.76	60.66	7.47	5.2	0.401	-
KL5	8/31/00	83.78	45.65	64.62	8.55	4.8	1.65	-
KL5	9/6/00	79.35	47.75	95.55	12.05	2.4	0.061	-
KL6	8/28/00	84.05	60.38	61.67	7.58	4.4	<.001	-
KL6	8/31/00	85.91	43.47	60.27	8.1	3.6	0.028	-
KL6	9/6/00	87.75	50.1	83.4	10.3	2.8	0.044	-
KL7	8/28/00	131.4	76.98	110	9.57	68	0.035	-
KL7	8/31/00	122.06	59.9	76.44	9	35.6	0.004	-
KL7	9/6/00	128.3	60.65	105.05	10.8	40	0.017	-
KL8	8/28/00	48.44	67.48	44.48	4.22	17.2	25.1	-
KL8	8/31/00	61.22	57.83	36.11	5.43	3.6	31.5	-
KL8	9/6/00	50.6	47.05	51.25	6.4	2.8	27	-
KL9	8/28/00	77.82	58.62	59.76	6.65	9.2	14.5	-
KL9	8/31/00	81.83	51.12	53.69	7.4	3.6	14	-
KL9	9/6/00	70.2	54.95	92.2	11.7	3.6	11.4	-
KL10	8/28/00	40.46	19.04	303.82	8.48	22.8	0.72	-
KL10	8/31/00	57.96	17.87	291.66	9.33	20.8	0.233	-
KL10	9/6/00	36.9	12.1	374.1	12.9	16.4	0.222	-
KL11	8/28/00	90.98	52.3	45.86	8.56	4.4	0.029	-
KL11	8/31/00	89.78	39.96	45.08	7.94	6	0.003	-
KL11	9/6/00	74.5	38.9	39.71	11.5	3.2	<.001	-

CHAPTER 3: CONCLUSIONS AND RECOMMENDATIONS

This report summarizes the results of the 2000 Kentucky Watershed Watch Sampling effort for the Kentucky River Basin. As part of this sampling effort, approximately 150 separate sites were sampled at five different times for four main groups of parameters: herbicides/pesticides, pathogens, chemical/nutrients/metals, and AMD parameters. In addition, basic field parameters (temperature, pH, and dissolved oxygen) were also sampled. In general, the observed impacts associated with the measured herbicides and pesticides were minimal. In addition, dissolved oxygen readings were above a minimum threshold of 5 mg/l for nearly all cases. High fecal counts were observed in the North Fork of the Kentucky River and in both the North and South Forks of Elkhorn Creek as well as Clear Creek, Hickman Branch, and Jessamine Creek. This is consistent with sample results from previous years. Focused fecal sampling in Letcher county revealed continued significant impacts from straight pipes.

An evaluation of the nutrient results, revealed that the main nutrient of concern was phosphorus, which appeared in significant concentrations in both the North and South Forks of Elkhorn Creek and in Jessamine Creek. This is consistent with observations in previous years. However, it is noted that background levels in this region can be as high as 0.25 mg/l. Nevertheless, there remain several sites with phosphorus levels in excess of 1.0 mg/l which is ten times the unofficial maximum level of 0.1 mg/l and clearly reflects impacts from either point or non-point sources.

Significant metals concentrations were observed at several sites. Two of the sites had the maximum metals concentrations in multiple categories. These included:

K21: Hickman Creek, south of Nicholasville.
K83: Lotts Creek

Based on the fact that these sites contained the maximum concentrations for a number of constituents, it is recommended that additional investigations be performed at these sites to identify the source of the higher metals concentrations.

Focused AMD sampling in Letcher county revealed significant water quality impacts. Measured concentrations for conductivity, TDS, sulfates, manganese, and iron were all above maximum limits. Of particular concern were the measured values on Colly Creek.

Over the last four years, the Kentucky River Watershed Watch sampling program has helped to identify water quality problems in specific streams throughout the basin, and in particular in the lower basin. As in years past, it is recommended that additional synoptic sites be established in the headwater basins, while more frequent sampling be conducted at a fewer set of focused sites in the lower basins. However, beyond the need for continued monitoring, there is now sufficient data to indicate those streams which are significantly impacted. As a result, it is recommended that local action teams be formed to work with state officials in the development and implementation of effective TMDLs for these impaired waters.