



2000

## 1998-1999 Monitoring Strategy, Kentucky River Basin Management Unit

L. Ormsbee

*Kentucky Water Resources Research Institute*

G. Epp

*Kentucky Water Resources Research Institute*

E. Caudill

*University of Kentucky*

Lee Colten

*Kentucky Division of Water*

Follow this and additional works at: [https://uknowledge.uky.edu/kwrri\\_reports](https://uknowledge.uky.edu/kwrri_reports)



Part of the [Water Resource Management Commons](#)

**Right click to open a feedback form in a new tab to let us know how this document benefits you.**

---

### Repository Citation

Ormsbee, L.; Epp, G.; Caudill, E.; and Colten, Lee, "1998-1999 Monitoring Strategy, Kentucky River Basin Management Unit" (2000). *KWRRI Research Reports*. 242.

[https://uknowledge.uky.edu/kwrri\\_reports/242](https://uknowledge.uky.edu/kwrri_reports/242)

This Report is brought to you for free and open access by the Kentucky Water Resources Research Institute at UKnowledge. It has been accepted for inclusion in KWRRI Research Reports by an authorized administrator of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).

# **1998-1999 Monitoring Strategy**

## **Kentucky River Basin Management Unit**

March 2000

Prepared by:

**Lindell Ormsbee**

Kentucky River Authority Watershed Management Coordinator  
Kentucky Water Research Institute

**Nel Ruffin and Greg Epp**

Kentucky River Basin Coordinators  
Kentucky Water Research Institute

**Erman Caudill**

Department of Civil Engineering  
University of Kentucky

**Lee Colten**

State Watershed Coordinator  
Kentucky Division of Water

This report was funded by the Kentucky River Authority as part of the Kentucky River Basin Watershed Management Program administered under the Kentucky Watershed Management Framework.

## TABLE OF CONTENTS

<b>Introduction .....</b>	<b>1</b>
<b>Overview .....</b>	<b>2</b>
Basin Management Approach.....	2
Participants.....	2
Kentucky River Management Unit Team .....	2
Objectives .....	2
Describe Current Conditions .....	3
Characterize the Impacts of Predominant Land Uses .....	3
Characterize Least-Impacted Streams.....	3
Meet Sampling Requirements for TMDL Determinations .....	3
Analyze Trends .....	3
Characterize Groundwater/Surface Water Interaction .....	3
Resources Available .....	3
<b>Biological Sampling.....</b>	<b>6</b>
Network Protocol Sampling .....	6
Biological Reference Reach Sites .....	6
Probabilistic Biological Sites.....	6
Fixed Biological Sites: Biological Monitoring Program Network.....	7
Rotating Biological Sites: Watershed Biological Monitoring Network .....	7
Additional Biological Sampling .....	8
Fish Tissue Collection .....	8
Toxicity Testing .....	9
<b>Water Quality Sampling .....</b>	<b>10</b>
Stream Sampling .....	10
Fixed Sites: Surface Water Quality Network.....	10
Rotating Sites: Targeted Basin Surface Water Network .....	11
Groundwater Sampling .....	14
Fixed Sites: Groundwater Monitoring Network .....	14
Rotating Sites: Targeted Basin Groundwater Network.....	14
Lake Sampling .....	15
Lake Surface Water Sites.....	15
<b>Appendix A: The Kentucky River Basin and Subbasins .....</b>	<b>17</b>
Figure A1. Kentucky River Basin with Counties .....	18
Figure A2. Kentucky River Basin with 11-Digit HUCs .....	19
Figure A3. Kentucky River Lower Basin with 11-Digit HUCs.....	20
Figure A4. Kentucky River Middle Basin with 11-Digit HUCs.....	21
Figure A5. Kentucky River Upper Basin with 11-Digit HUCs.....	22
Figure A6. Kentucky River Lower Basin with Fourth-Order Watersheds.....	23
Figure A7. Kentucky River Middle Basin with Fourth-Order Watersheds.....	24
Figure A8. Kentucky River Upper Basin with Fourth-Order Watersheds.....	25

<b>Appendix B: Other Monitoring During the 1998-2000 Study Period</b>	26
Lexington-Fayette Urban County Government	26
Kentucky River Watershed Watch	26
US Army Corps of Engineers	26
US Geological Survey	26
Figure B1. Planned LFUCG Monitoring Sites	28
Table B1. Planned LFUCG Monitoring Sites	29
Figure B2. Kentucky River Watershed Watch Monitoring Sites	30
Table B2. Kentucky River Watershed Watch Monitoring Sites	31
Figure B3. Planned US Army Corps of Engineers Monitoring Sites	35
Table B3. Planned US Army Corps of Engineers Monitoring Sites	36
<b>Appendix C: Sampling Parameters</b>	39
Kentucky River Watershed Watch Parameters	39
Groundwater Parameters (Fixed and Targeted Basin Sites)	40
<b>Appendix D: Biological Sampling Sites</b>	41
Figure D1. Reference Reach Biological Sites	42
Table D1. Reference Reach Biological Sites	43
Figure D2. Probabilistic Biological Sites	44
Table D2. Probabilistic Biological Sites	45
Figure D3. Fixed Biological Sites	47
Table D3. Fixed Biological Sites	48
Figure D4. Rotating Biological Sites	49
Table D4. Rotating Biological Sites	50
<b>Appendix E: Water Quality Sampling Sites</b>	56
Figure E1. Fixed Water Quality Sites	57
Table E1. Fixed Water Quality Sites	58
Figure E2. Rotating Water Quality Sites	59
Table E2. Rotating Water Quality Sites	60
<b>Appendix F: Contact Information</b>	62

## Introduction

During the fall of 1997 and spring of 1998 about 40 individuals and more than 30 organizations and agencies provided input into the development of a monitoring strategy for the Kentucky River basin under the Kentucky Watershed Management Framework. In addition to the agencies that were able to commit resources to the monitoring effort, citizen input was sought in the design of the strategy. Citizen monitoring efforts are also providing valuable information in many portions of the state.

The intent of the coordinated planning process was to carefully consider agency resources and capabilities, taking into account where and when each was conducting field work, in order to make the best use of available resources and collect the best information at the least cost. The result should be better information for watershed management and protection, decision making, and demonstration of progress in programmatic activities.

Another objective of the coordinated planning effort was to take a multimedia approach by considering surface water and groundwater, water quality and quantity, biology, toxicity, fish tissue, and sediment.

All media are not fully represented. A method for integrating atmospheric deposition with other data is not yet available. Groundwater sampling and data recording protocols are still being finalized. Nor does the final plan pretend to represent a fully comprehensive strategy for characterizing all resource conditions. However, the results of the planning effort do represent a significant stride toward the goal of a comprehensive multimedia watershed monitoring strategy.

The overall sampling effort includes data collected from 90 of the 97 11-digit hydrologic unit code (HUC) watersheds in the Kentucky River basin.

A standard set of sampling protocols was agreed to, and cross-training sessions were provided for biological collections and habitat assessments. This report provides a summary of sampling efforts along with a standard set of water quality parameters and sampling regimes that were designed around types of land use/land cover to allow maximum utilization of programmatic resources and best characterization of water quality resources. Where possible, sampling sites for the various media utilized the same sampling sites or were placed in close proximity to each other, providing multiple lines of evidence for site assessments. Information is also presented in a way that puts rotating basin monitoring (the monitoring resources progress from basin to basin under the Watershed Management five-year cycle) into context with other ongoing statewide efforts, including other locally based monitoring, prioritization, and planning.

# Overview

## ***Basin Management Approach***

The purpose of the watershed management approach is to use programs, people, information, and funds as efficiently as possible to protect, maintain, and restore water and land resources. This approach provides a spatial and temporal framework within which participating individuals can link and support one another's efforts in watershed management. The initiative includes a five-year cycle of activities that proceeds from information gathering and monitoring in Year 1 to assessment in Year 2, prioritization of watersheds in Year 3, plan development in Year 4, and implementation in Year 5. This schedule allows for better coordination and provides opportunities for leveraging of resources.

For geographic coordination, the state is divided into five basin management units. Activities within each unit follow the five-year schedule; however, the activities of each basin unit are staggered by one year, so that efforts in each phase of the cycle can be better focused in a basin.

The Kentucky River basin cycle began in July 1997. Public participation has been encouraged throughout the process, allowing citizens and organizations to stay informed and have an active role. This document provides a summary of the strategic monitoring plan and the results associated with the 1997-1998 sampling effort in the Kentucky River basin.

## ***Participants***

### KENTUCKY RIVER BASIN TEAM

Basin Coordinator: Nel Ruffin

Kentucky River Authority Watershed Management Coordinator: Dr. Lindell Ormsbee.....

Kentucky River Authority: Jeno Balassa

Lexington-Fayette Urban County Government: David Gabbard

Kentucky Rural Water Association: Barry Back

Kentucky Division of Water

    Watershed Management Program: Lee Colten (State Coordinator)

    Water Supply: Leon Smothers

Kentucky Department of Fish and Wildlife: Benjy Kinman

Kentucky River Watershed Watch: Hank Graddy, Carl Vogel

Eastern Kentucky University: Alice Jones

Bluegrass Area Development District: Don Hassall

Kentucky Geological Survey: R. Steven Fisher

Letcher County Water and Sewer District: Jim Tolliver

USDA Natural Resources Conservation Service: Will Lacy

Citizen representation: Dwight Hitch, E. J. Bunzendahl, Gene Blair,

    David Edwards, Don Spencer

### INTERAGENCY MONITORING WORKGROUP

Kentucky Division of Waste Management: Fazi Sherkat

Kentucky Department of Fish & Wildlife Resources: Benjy Kinman

Kentucky Division of Conservation: Demetrio Zourarakis

Kentucky Division of Forestry: Cary Perkins

Kentucky Division of Pesticides: Ernest Collins

Kentucky Division of Water - Ground Water Branch: Jim Webb

Kentucky Division of Water - Drinking Water Branch: Vicki Ray

Kentucky Division of Water - Water Quality Branch: Terry Anderson

Kentucky Division of Water - NPS Section: Margi Jones

Kentucky Division of Water - NPS Section: Steve McMurray

Kentucky Division of Water - Ecol. Supp. Sec: Mike Mills  
Kentucky Division of Water - Standards & Specs: Tom Van Arsdall  
Kentucky Division of Water - Watershed Coordinator: Lee Colten  
Kentucky Geological Survey: Steve Fisher  
Kentucky River Authority: Hugh Archer  
Kentucky River Watershed Watch: Hank Graddy  
Kentucky State Nature Preserves Commission: Ron Cicerello  
NRCS: Doug Hines  
ORSANCO: Jason Heath  
Tennessee Valley Authority: Billy Smith  
East Kentucky Power Company: Jeff Hohman  
US Army Corps of Engineers: Pat Neichter  
US Fish & Wildlife Service: Steve Alexander  
US Forest Service: Jon Walker  
Kentucky Water Research Institute, University of Kentucky: Lindell Ormsbee

## ***Objectives***

Objectives for establishing basin sites for the 1997-1998 monitoring period were developed through a series of meetings during the summer and fall of 1997. In August and December 1997, smaller groups convened to discuss the physicochemical monitoring protocol and objectives.

### DESCRIBE CURRENT CONDITIONS

This objective reflects the general lack of qualitative and quantitative data and knowledge in these basin management units. It encompasses many potential sub-objectives, such as identification of impaired or of least-impacted stream reaches.

### CHARACTERIZE THE IMPACTS OF PREDOMINANT LAND USES

The team selected activities that warranted impact characterization. These included agriculture, mining, silviculture, urban development, and least-impacted sites. Other land uses that impact water quality, but were not selected as criteria for site selection, include landfills, recreational overuse, transportation corridors, and wastewater treatment plants.

### CHARACTERIZE LEAST-IMPACTED STREAMS

Satisfying this objective provides baseline data for the management units as a benchmark for biological potential.

### MEET SAMPLING REQUIREMENTS FOR TMDL DETERMINATIONS

It was necessary to select certain sites in order for the Division of Water to determine Total Maximum Daily Loading (TMDL) on selected impaired streams.

### ANALYZE TRENDS

The Statewide Fixed (Ambient) Network provides trend information.

### CHARACTERIZE GROUNDWATER/SURFACE WATER INTERACTION

A few groundwater and surface water sites are located close enough to one another for analysis of

interaction to be possible. However, flow monitoring resources are limited, and more detailed flow-balance characterizations of groundwater and surface water interactions will most likely have to wait for the next basin management cycle.

## ***Resources Available***

The Watershed Management Framework (Appendix F of the Framework document) summarizes many of the principal monitoring stakeholders and resources. However, upon initiating the monitoring strategy development for the basin, a comprehensive survey of monitoring resources and capabilities was undertaken. This ensured that all the appropriate stakeholders were at the table and all resources could be taken into consideration as planning proceeded.

Under the Watershed Management Framework, monitoring (and other functions) are organized by basin and watershed. Sampling regimes for monitoring programs in the Kentucky River basin are arranged to cover the basin on two levels: the 11-digit HUC watersheds and the smaller watersheds of fourth-order streams. The entire basin is divided into 97 11-digit HUC watersheds and further divided into 312 fourth-order stream watersheds. Appendix A contains a set of maps showing the boundaries of the basin, its subbasins (8-digit HUCs), the fourth-order stream watersheds, and the 11-digit HUCs.

The data from the sampling efforts are still being compiled and analyzed; however, Table 1 summarizes committed monitoring resources for the Kentucky River basin by listing the number of sites by agency and general sampling regime. The total of 729 samplings represents 90 of the 97 11-digit HUCs in the Kentucky River basin.

Rotating sites, including the 49 probabilistic sites selected by USEPA for the Kentucky Division of Water, may or may not be in the same location during the next sampling cycle.

Kentucky River Watershed Watch (KRWW) sites are volunteer-based and some locations therefore change, although many sites are sampled repeatedly. The KRWW has collected water quality and biological samples and performed habitat assessments in the basin since 1997. KRWW typically collects each type of sample once per year, providing synoptic parameter coverage for the basin. Testing at all sites included habitat assessment, dissolved oxygen, conductivity, and pH.

For locations of sampling sites of the Lexington-Fayette Urban County Government (LFUCG), KRWW, US Army Corps of Engineers, and US Geological Survey (USGS), please see the maps and tables in Appendix B. Appendix C lists the parameters measured under the KRWW program.



**Table 1. Kentucky River Basin Management Unit Surface Water Sampling Summary.**

Sampling Regime	Surface Water									Groundwater		Total No. of Samplings***
Type of Sample	Biological					Physical		Chemical				
Sample Site Sampling Pattern	Rotating*		Fixed		Additional Biological Sampling**	Rotating*	Fixed	Rotating*	Fixed	Rotating*	Fixed	
Organization	Probabilistic Monitoring	Watershed Biological Monitoring	Biological Monitoring Program	Reference Reach Program								
Kentucky Division of Water	50	37	14	21	42	-	6	25	16	29	8	248
Kentucky Dept. of Fish & Wildlife	-	90	-	-	-	-	-	-	-			90
Kentucky Nature Preserves Commission - Planned	-	4	-	-	-	-	-	-	-			4
US Forest Service - Planned	-	15	-	-	-	-	-	-	-			15
US Army Corps of Engineers - Planned	-	-	-	-	48	-	-	-	-			48
Eastern Kentucky University	-	40	-	-	-	-	-	-	-			40
Lexington-Fayette Urban County Government - Planned	-	-	-	-	21	-	-	-	-			21
Kentucky River Watershed Watch	-	-	-	-	93	85	-	85	-			263
Total for All Organizations	50	186	14	21	204	85	6	110	16	29	8	729

Notes: \* Rotating Sites are sites that may not be in the same location during the next sampling cycle (see text for details).

\*\* Additional biological Sampling for DOW includes toxicity bioassay and fish tissue analysis sites.

\*\*\* Multiple sample types were taken at some sites, so number of samplings is greater than number of unique sites.  
Sampling represents 90 of 97 11-digit HUC watersheds in the Kentucky River Basin.

# Biological Sampling

Biological data were collected using four separate collection network protocols: The Biological Reference Reach Sites, Probabilistic Biological Sites, Fixed Biological Sites, and Rotating Biological Sites. These are each described below in separate sections. In addition, final sections describe supplementary sampling for fish tissue analysis and toxicity bioassays.

## NETWORK PROTOCOL SAMPLING

### ***Biological Reference Reach Sites***

#### Responsible parties

The Reference Reach Program is conducted by the Kentucky Division of Water.

#### Objectives

The Reference Reach Program is designed to characterize the biology of least-impacted stream conditions in each ecoregion.

#### Sites

*Criteria for site selection.* Reference Reach sites are recommended through a screening process that includes field reconnaissance, literature searches, anecdotal information, land use, and professional judgment.

If a site ranks high on the Index of Biological Integrity (IBI) twice in a two-year period, or if the algae or macroinvertebrate communities exhibit excellent structure, the site can be added to the Reference Reach list. An adequate number of sites and samples in each ecoregion is needed in order to statistically characterize the reference biological condition.

*Number and location of sites.* Twenty-one Reference Reach sites were sampled in the study area. For locations and descriptions of these sites, please see the map and table in Appendix D.

#### Parameters

Reference Reach sites are sampled for biology (fish, algae, macroinvertebrates), some physical and chemical parameters, and habitat.

#### Frequency

Reference Reach sites are sampled twice a year, in the spring and fall.

### ***Probabilistic Biological Sites***

#### Responsible parties

The Division of Water is responsible for sampling the probabilistic network.

#### Objectives

The probabilistic network supports the objectives of describing current conditions and characterizing the impacts of predominant land uses or site-specific impairments. Data collected from this network will allow a statistically-based characterization of the basin management unit for warm water aquatic life use.

## Sites

*Criteria for site selection.* The federal EPA office in Corvallis, Oregon, provided randomly selected sites within each basin on mostly first- to third-order streams. Order was determined by applying the Strahler method to streams at a scale of 1:100,000 in USEPA Reach File 3.

*Number and location of sites.* Fifty sites were sampled in the Kentucky River Basin during the 1997-1998 sampling year. For a map and table of sites selected for the probabilistic sampling network, please see Appendix D. Thirty-one sites were situated in the downstream reaches of fourth order or 11-digit watersheds. These sites had the dual function of random survey and watershed sites. Nineteen of the sites were the only biological sites in the lower watershed. Twelve of the sites were used in combination with other biological data from the lower reaches of fourth-order watersheds. Nineteen sites were on smaller tributary streams.

## Parameters

Biological assessment of these sites was based on macroinvertebrate sampling and habitat assessments. Other information collected included water temperature, dissolved oxygen, pH, and conductivity.

## Frequency

The sites were sampled once during late spring and summer of 1998.

## ***Fixed Biological Sites: Biological Monitoring Program Network***

### Responsible Parties

The Kentucky Division of Water is the only agency responsible for fixed biological sites, also called Ambient Biological Network sites, under the Biological Monitoring Program.

### Objectives

In conjunction with its surface water quality monitoring fixed-site network, the Division of Water has historically conducted biological monitoring at one-fifth of the statewide Ambient Biological Network, or about 12 sites, once every five years. Ambient Biological Network sites are also referred to as statewide Biological Monitoring Program (BMP) sites. The ambient network is being replaced by the Watershed Biological Monitoring (WBM) network, which consists of sites that are targeted within a basin for biological monitoring purposes. The resources for these sites are rotated from basin to basin according to the watershed management schedule.

### Parameters

Macroinvertebrates, fish, and algae are collected and habitat assessments are performed at all Biological Monitoring Program sites. Typically, fish tissue and sediment are analyzed as well.

Please see Appendix D for a map and table of fixed sites in the Biological Monitoring Program network.

## ***Rotating Biological Sites: Watershed Biological Monitoring Network***

### Responsible parties

Partners contributing to biological sampling included the Kentucky Department of Fish and Wildlife Resources, Kentucky Division of Water, US Forest Service, Kentucky State Nature Preserves Commission, Lexington-Fayette Urban County Government, Eastern Kentucky University, and the US Fish and Wildlife Service.

### Objectives

Rotating sites (sometimes called “targeted basin” sites) are organized into the Watershed Biological

Monitoring (WBM) network, which was designed to provide an evenly distributed coverage of the basin. The primary objective in placing the WBM sites was to obtain a snapshot of the river basin using fourth-order watersheds. The collected data will be used to determine sites with high-quality waters, sites impacted by water quality problems or loss of habitat, or sites with problems of unknown origin occurring within their watersheds. This information will then serve as the basis for future prioritization of monitoring in targeted basins and will also assist in determining program effectiveness, identifying impairment sources, etc.

### Sites

### *Criteria for*

*site selection.* Watershed Biological Monitoring program sites were sampled at the downstream ends of fourth-order watersheds. All fourth-order watersheds were considered for inclusion and were removed from consideration if backwater was significant, if sampling or intensive studies had been recently conducted, if it was a short segment of the mainstem river, or if it was very small or impractical to sample.

### Locations and sampling agencies.

### Appendix

D presents a map of sites selected for the Watershed Biological Monitoring program in the Kentucky River basin. The accompanying table lists the locations and the agency doing the sampling.

### Parameters

Sampling was dependent on the agency conducting the sampling. Habitat was characterized at each site; other sampling variables include macroinvertebrates, fish, and algae. In addition to habitat assessment, participating agencies typically collected the following assemblages:

Lexington-Fayette Urban County Government	fish, macroinvertebrates
Eastern Kentucky University	fish, macroinvertebrates
Kentucky Division of Water	fish, macroinvertebrates, algae
Kentucky Fish and Wildlife Service	fish
Kentucky State Nature Preserves Commission	fish
US Fish and Wildlife Service	fish
US Forest Service	macroinvertebrates

### Frequency

Each site was sampled once during the sampling year. Sites were sampled during low-flow periods to allow accessibility to the biota and in order to characterize critical stress conditions.

## ADDITIONAL BIOLOGICAL SAMPLING

### ***Fish Tissue Collection***

### Responsible parties

The Division of Water and Department of Fish and Wildlife Resources conducted fish tissue collections. Processing and analyses of the samples were coordinated by the Division of Water.

### Objectives

Identification of fish tissue contamination was for the purposes of protecting human health from consumption of contaminated fish.

### Sites

*Criteria for site selection.* Sites for collection of fish for tissue analysis were selected based on evidence of sport fishing in the area or the possibility of toxicity problems.

*Locations.* Fish tissue samples were collected at a subset of the fixed and rotating sites at which surface water quality samples were also collected. Six additional sites on the main stem of the Kentucky River were selected for sampling as well.

*Number of sites.* In 1998, 45 samples were collected at 26 sites within the Kentucky River Basin.

#### Parameters

Metals, percent lipids, PCBs, chlordane, and pesticides were evaluated.

#### Frequency

Generally, two composite samples (each sample consisting of three to five fish of a single species and of similar size) are taken at each site for screening purposes. One bottom-feeding species and one top predator species are sampled whenever possible. At some sites, one species or three species are collected rather than two, as dictated by the size of the stream at the site and the diversity of the fish community there.

### ***Toxicity Testing***

#### Responsible parties

The Division of Water conducted all whole effluent and sediment toxicity bioassays.

#### Objectives covered

Whole effluent toxicity (WET) monitoring at KPDES-permitted outfalls is used to determine permit compliance.

#### Sites

#### *Criteria*

*for site selection.* Facilities for WET testing include those major and minor municipals with pretreatment as well as industries with WET as a permit condition. In 1998, 32 tests were conducted at 16 facilities.

*Number of sites.* The number of whole effluent toxicity bioassay sites varies with permit conditions. Three sites were selected for initial sampling for the sediment bioassays.

#### Parameters

Whole effluent toxicity and conventional water chemistry parameters (dissolved oxygen, pH, conductivity, hardness, alkalinity, etc.).

#### Frequency

Compliance testing is conducted on a monthly or quarterly basis by all KPDES-permitted facilities with a biomonitoring limit on a self-monitoring basis. State-conducted compliance monitoring is conducted at each permitted facility at least once during the five-year permit cycle.

# Water Quality Sampling

## STREAM SAMPLING

Two complementary approaches were employed in the selection of sites for stream surface water sampling. Together, the fixed sites of the Stream Surface Water Quality Network and the rotating sites of the Targeted Basin Stream Surface Water Network ensure sampling of surface water from areas with different predominant land uses and from streams of differing condition and provide long-term tracking capabilities. In all, 41 sites were monitored. Table 2 shows the breakdown between the fixed and rotating sites and among the land use categories. Note that some sites fall into more than one category or into no special category, so that category totals do not sum to the total number of sites. See Appendix E for a map and listing of individual sites.

**Table 2. Breakdown of Water Quality Sampling Sites.**

Category	No. of Fixed Sites	No. of Rotating Sites
Agricultural land use	13	5
Silvicultural land use	0	5
Mining land use	0	5
Urban land use	1	3
Least-impacted streams	0	6
All water quality sites	16	25

### ***Fixed Sites: Stream Surface Water Quality Network***

#### Responsible parties

The water quality sampling fixed network is a program of the Kentucky Division of Water.

#### Objectives

The surface water quality monitoring fixed network assists in describing current conditions and may assist in characterizing the impacts of predominant land uses or site-specific problems. This network also provides large-scale trend analysis capabilities.

#### Sites

*Criteria for site selection.* The surface water quality monitoring fixed network is designed to sample at the downstream reaches of most eight-digit HUCs, and at as many fourth-order watersheds as possible. Also several sites are mid-unit in the eight-digit HUCs or on reservoirs or major tributaries.

*Number and location of sites.* There are 16 fixed water quality sampling sites in the Kentucky River Basin. (There are 71 sites statewide.) Sampling at the Division of Water's fixed surface water quality sites has been active for between 1 and 20 years and will continue indefinitely. See map and tables in Appendix E for locations and details.

#### Parameters

Fixed network water quality sampling sites are sampled for field measurements (dissolved oxygen, conductivity, temperature, and pH), conventional parameters, metals (total recoverable and dissolved), nutrients, fecal coliform bacteria, pesticides, and stage. Most are also sampled for biology, sediment, and fish tissue. See section entitled *Targeted Basin Stream Surface Water Sites* for details.

#### Frequency

Fixed network water quality sites in the Kentucky River basin were sampled monthly during the 1997-1998 sampling year. However, they are sampled bimonthly during “off basin” years in the watershed management cycle.

### ***Rotating Sites: Targeted Basin Surface Water Network***

#### Responsible parties

Kentucky Division of Water is responsible for sampling the targeted basin sampling sites.

#### Objectives

The basin surface water sampling network supports the objectives of describing current conditions, characterizing least-impacted streams, characterizing the impacts of predominant land uses, and meeting TMDL needs.

#### Sites

The tables provided in Appendix E list the surface water sites to be sampled.

#### *Criteria for site selection.*

Basin surface water quality sites were selected in the Kentucky River basin by the Intragency Monitoring Workgroup and approved by the Kentucky River Basin Team. The monitoring teams provided input and suggestions for site locations based on land use and personal knowledge of the watersheds. Sites were generally selected at the lower ends of 11-digit HUCs. When possible, surface water and biological sites were located at the same sampling point to provide multiple lines of evidence. Site selection criteria for the different monitoring objectives are summarized separately below.

*Least-impacted sites:* Least-impacted sites were selected based on recommendations from the Reference Reach program (see section entitled *Biological Reference Reach Sites* for selection criteria) among available fourth-order streams.

*Predominant land use sites:* Predominant land use sites were chosen in watersheds with generally homogenous land uses for the purpose of developing a water quality database for these various land use types. Land uses that were targeted in this cycle included urban, agriculture, mining, and silviculture. Least-impacted sites were also selected. All land use sites were located by reviewing land use data and conferring with team members and other people with knowledge about land use activities in the basin units.

*USGS gages:* For purposes of hydrologic information and the ability to calculate loading, sites near USGS gage sites were selected when feasible.

*Number of sites.* In all, 25 water quality sampling sites were selected within the basin. See Table 2 above for a breakdown by land use category. For tables and maps of sites selected for water quality sampling in the Kentucky River Basin, please see Appendix E.

### Parameters and frequency

Water-quality parameters were selected based on two issues. First, a core set of parameters was collected at each site. These core parameters were used for comparisons between land use sites and statewide network sites. Additional parameters based on land use were then collected. For example, nutrients were collected only if they were expected to be a problem due to land use activities.

Samples were collected based on periodic sampling and the land use upstream from the site. Where no predominant land use was indicated for the site, samples were collected on a monthly basis. Where land use was an issue for the sampled watershed, the schedule for the sampling was directed to the time frame or season when problems were expected to occur. In agricultural areas, for example, pesticide samples were collected monthly during the growing season but only once during fall and winter.

Tables 3 and 4 provide an explanation of constituents, site types, and sampling regimes. Site types with more than one regime indicated were sampled by following each indicated regime. Sampling regimes for F are suggested; however, the actual number of samples may vary.

**Table 3. Key to Surface Water Sampling Regime Codes in Table 4.**

<b>Code</b>	<b>Explanation</b>
A	Annually, in the fall
A2	Semi-annually
F	Flow-related sampling periodically: two low-flow and two high-flow events
M	Monthly sampling on a set schedule
M1	Monthly with one high-flow sample each season, and one low-flow fall sample
M2	Bi-monthly
R	Monthly March through July and November, plus one low-flow fall sample
S	Sampled every 6 weeks rather than monthly
X	Wherever feasible, an elevation reference point will be established at each site in order to obtain a measure of relative flow at the time of each sampling event.



**Table 4. Surface Water Quality Parameters and Sampling Regimes.**

Constituent	Fixed Site	Least Impaired	Land Use: Mining	Land Use: Agriculture	Land Use: Urban	Land Use: Silviculture
Water Temperature	M	M1	M	M1	M1	M1
Specific Conductance	M	M1	M	M1	M1	M1
Dissolved Oxygen	M	M1	M	M1	M1	M1
Biological Oxygen Demand						M1
pH	M	M1	M	M1	M1	M1
Alkalinity	M	M1	M	M1	M1	M1
Chloride	M	M1	M	M1	M1	M1
Sulfates	M	M1	M	M1	M1	M1
Total Suspended Solids	M	M1	M	M1	M1	M1
Total Organic Carbon	M	M1	M	M1	M1	M1
Hardness	M	M1	M	M1	M1	M1
Total Metals	M	M1	M	M1	M1	M1
Total Ammonia	M	M1	M	M1	M1	
Total Nitrite and Nitrate	M	M1	M	M1	M1	
Kjeldhal Total Nitrogen	M	M1	M	M1	M1	
Total Phosphorus	M	M1	M	M1	M1	
Fecal Coliform	M	M1	M	M1	M1	
Sediment metals/pesticides	A	A				
Pesticide 507	R	R	R	R	M2	
Pesticide 508	R	R	R	R	M2	
Pesticide 515.1	R	R	R	R	M2	
Pesticide 531.1	R	R	R	R	M2	
Glyphosate	R	R	R	R	M2	
Semi-Volatiles	A2	A2	A2	A2	A2	A2
Flow	X	X	X	X	X	X

## GROUNDWATER SAMPLING

### ***Fixed Sites: Groundwater Monitoring Network***

#### Responsible parties

The Kentucky Division of Water is the primary responsible party. Attempts to expand the statewide ambient groundwater monitoring network will continue.

#### Objectives

The statewide groundwater monitoring fixed network assists with the objective of describing current groundwater conditions. It may also identify sites with groundwater contamination.

#### Sites

#### *Criteria*

*for site selection.* The statewide groundwater fixed network sites were selected to provide a geographically distributed set of sites that represent predominant land uses and differing geology and flow regimes within the basin units. Preference was given to sources of public water and to sites adjacent to surface water quality or biological monitoring sites. Base level springs or wells were given preference over perched springs or wells above base level. Site selection was also affected by ease of access and permission from owner.

*Number and location of sites.* There are about 165 sites in the network statewide. Approximately 70 of these are sampled each quarter, including about 45 core sites that are sampled regularly. Eight of the core sites are in the Kentucky River Basin. Results of sampling at these sites were being compiled and analyzed at the time of publication of this report.

#### Parameters

Water quality parameters include conventional parameters, metals, nutrients, and pesticides at all sites and volatile organic carbons at urban sites. See Appendix C for details.

#### Frequency

Well sites are sampled quarterly, and most springs are sampled six times a year. Frequency is determined by flow regime and residence time of water in the aquifer.

### ***Rotating Sites: Targeted Basin Groundwater Network***

Basin groundwater sampling sites were selected after staff surveyed each county for suitable sampling sites, including springs and wells. Sites were selected after Division of Water staff presented recommendations and options to interested monitoring partners and team members.

#### Responsible parties

#### *The*

Division of Water is responsible for sampling selected sites and analyzing the samples. Analytic results and explanation of the results are provided to the landowner.

#### Objectives

The basin groundwater network will support a description of current conditions and may characterize the impacts of predominant land uses or other site-specific information.

#### Sites

*Criteria for site selection.* Sites were selected so as to provide a geographic distribution of sites that represent predominant land uses and differing geology and flow regimes within the basin units. Preference was given to sources of public water systems, sites adjacent to surface water quality or biological monitoring sites, and base level springs or wells (over perched springs or wells above base level). Site selection was also affected by ease of access and permission from owner.

*Number of sites.* Twenty-nine groundwater sites were sampled as part of the monitoring process.

#### Parameters

Each site was sampled for conventional parameters, metals, nutrients, pesticides, and major inorganic ions.

#### Frequency

Basin groundwater sampling sites were sampled quarterly.

## LAKE SAMPLING

### ***Lake Surface Water Sites***

#### Responsible parties

The Kentucky Division of Water is responsible for all the lake sampling listed in this section.

#### Objectives

Objectives of the lake monitoring program vary from lake to lake; however, the monitoring objectives include: detection of trends in trophic status of the lake; information for permit decisions; characterization of ambient water quality; and determination of point and nonpoint source impacts.

#### Sites

#### *Criteria*

*for site selection.* Significant publicly owned lakes, as determined by the Water Quality Branch, Division of Water, were selected.

*Number of sites.* A total of 22 lakes in the Kentucky River Basin were sampled for the 1998 305(b) Report to Congress (Table 5). Lake data collected and sites utilized during the 1997-1998 sampling season were still being analyzed at the time of the publication of this report.

#### Parameters

Chemical parameters for the lake monitoring program include pH, conductivity, dissolved oxygen, temperature, nitrogen series, phosphorus series, and chlorophyll *a*. Additionally, other evidence, such as reports of fish kills, macrophyte infestations, and finished drinking water data from public water systems, is utilized to make lake assessments.

#### Frequency

Lakes are sampled three times per year in the targeted basin during the recreational season, i.e., late April through October.

**Table 5. Sites Sampled for Inclusion in 1998 305(b) Report.**

Name	Description	Latitude	Longitude
------	-------------	----------	-----------

Bert Combs Lake	Bert Combs Lake impounds Beech Creek	37.1667	83.7075
Boltz Lake	Boltz Lake impounds Arnolds Creek	38.7033	84.6125
Buckhorn Lake	Buckhorn Lake impounds the Middle Fork Kentucky River	37.3044	83.4483
Bullock Pen Lake	Bullock Pen Lake impounds Bullock Pen Creek	38.7933	84.6447
Campton Lake	Campton Lake impounds Hisam Branch	37.7450	83.5436
Carr Fork Lake	Carr Fork Lake impounds Carr Fork	37.2344	83.0008
Corinth Lake	Corinth Lake impounds Three Forks Creek	38.5000	84.5822
Elmer Davis Lake	Elmer Davis Lake impounds North Severn Creek	38.4975	84.8778
Fishpond Lake	Fishpond Lake impounds Fishpond Branch	37.1617	83.6772
General Butler State Park Lake	General Butler State Park Lake impounds an unnamed tributary of the Kentucky River	38.6678	85.1483
Herrington Lake	Herrington Lake impounds Dix River upstream to Boone Creek	37.7458	84.7039
Mill Creek Lake	Mill Creek Lake impounds Mill Creek	37.7686	83.6683
Pan Bowl Lake	Pan Bowl Lake impounds an old meander of the North Fork Kentucky River	37.5750	82.3753
Stanford Reservoir	Stanford Reservoir impounds Neals Creek	37.4867	84.6800
Wilgreen Lake	Wilgreen Lake impounds Taylor Fork	37.4111	84.3453

---

## APPENDIX A

### The Kentucky River Basin and Subbasins

Figure A1. Kentucky River Basin with Counties.

Figure A2. Kentucky River Basin with 11-Digit HUCs.

Figure A3. Kentucky River Lower Basin with 11-Digit HUCs.

Figure A4. Kentucky River Middle Basin with 11-Digit HUCs.

Figure A5. Kentucky River Upper Basin with 11-Digit HUCs.

Figure A6. Kentucky River Lower Basin with Fourth-Order Watersheds.

Figure A7. Kentucky River Middle Basin with Fourth-Order Watersheds.

Figure A8. Kentucky River Upper Basin with Fourth-Order Watersheds.

Figure A.1 Kentucky River Basin

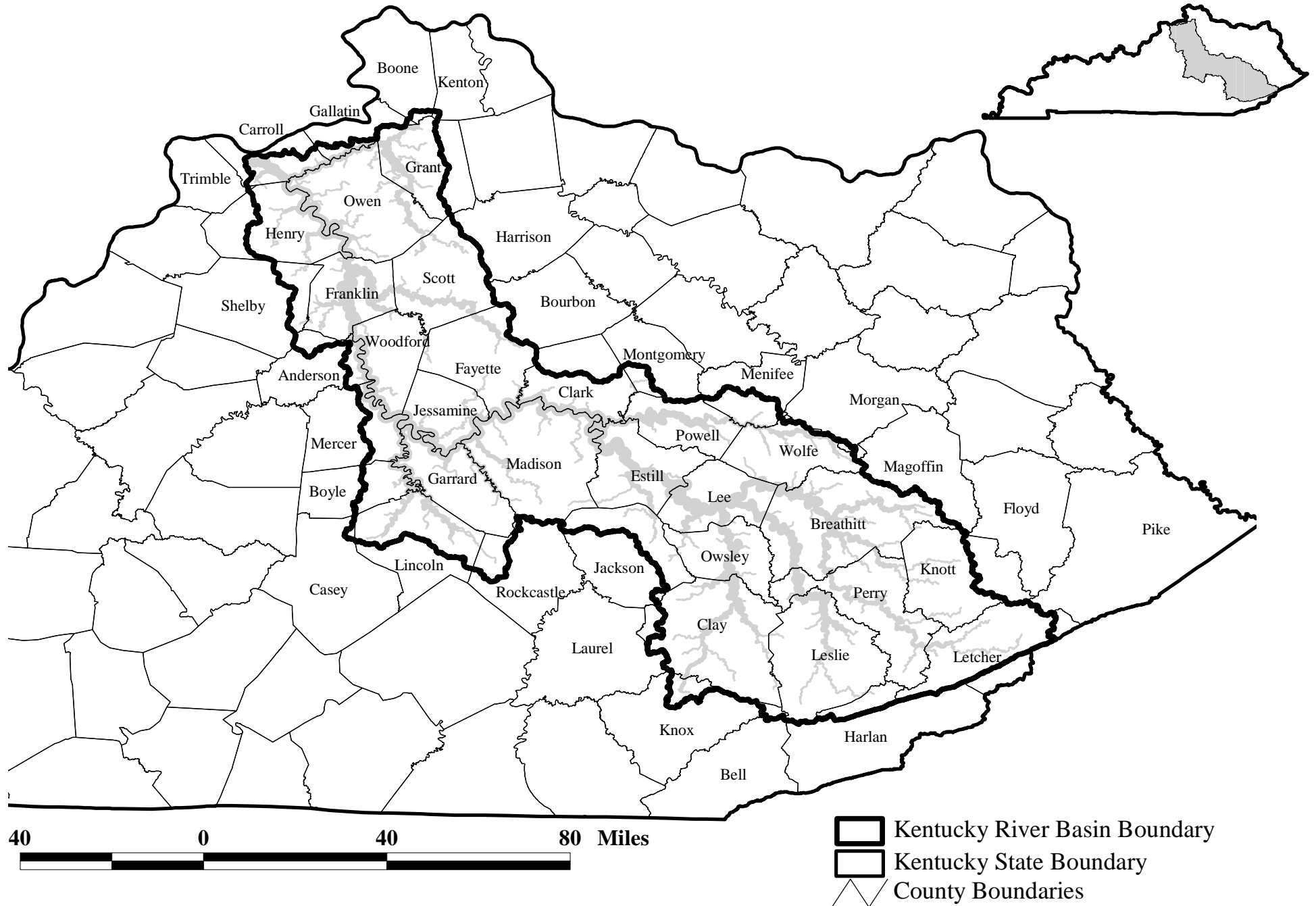


Figure A.2 Kentucky River Basin  
8-Digit HUC Identifications

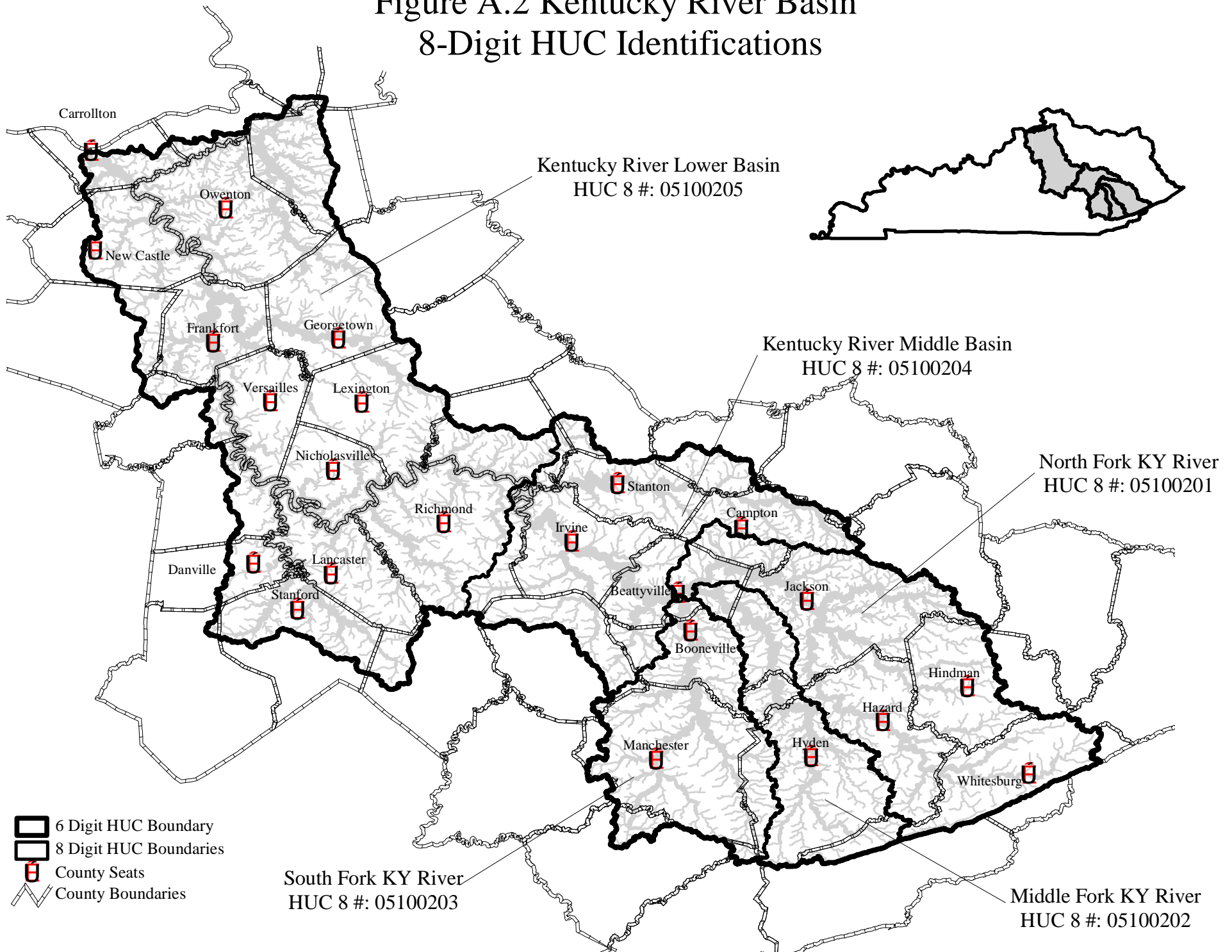
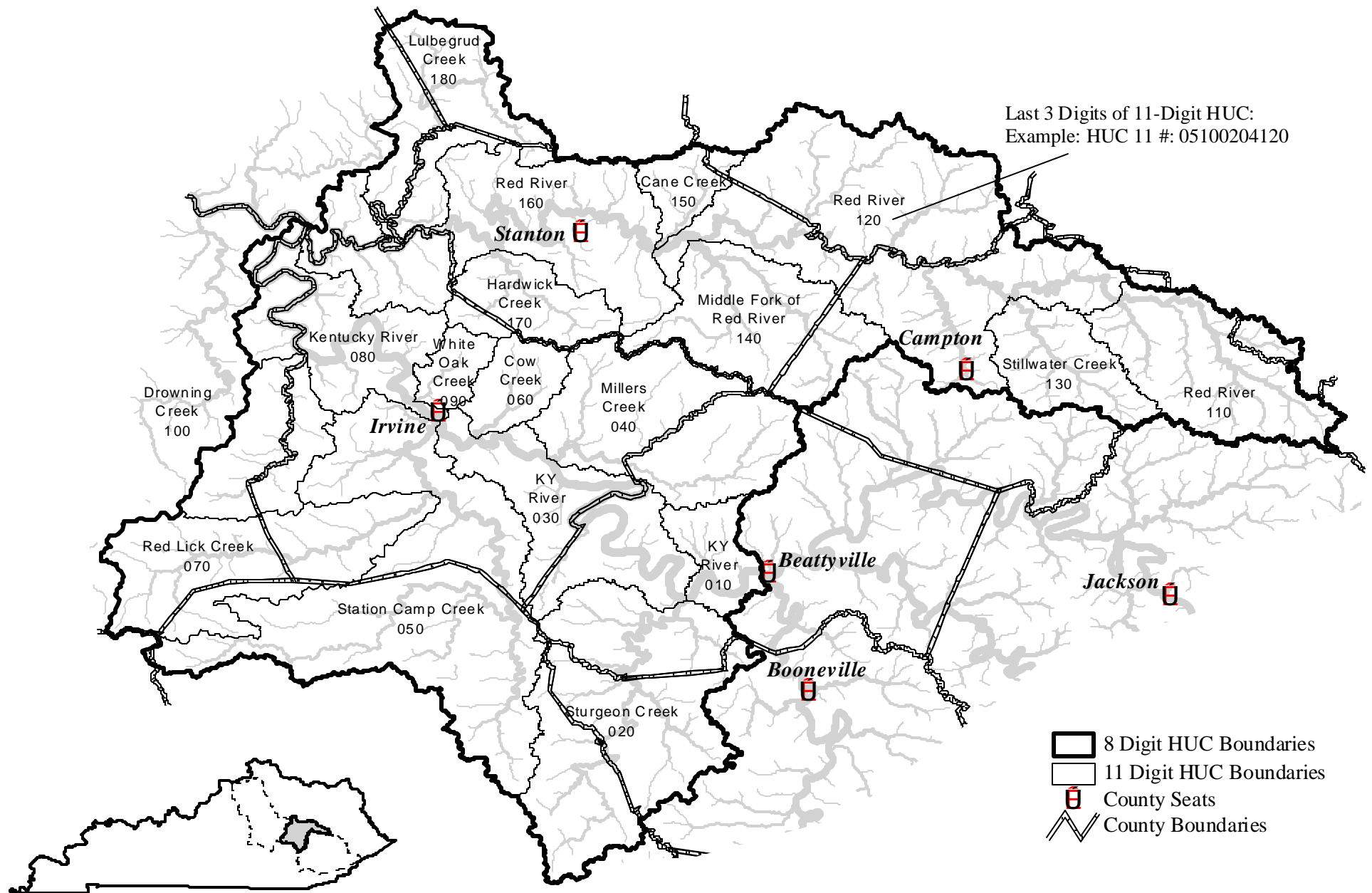


Figure A.3 Kentucky River Lower Basin  
HUC 8 #: 05100205

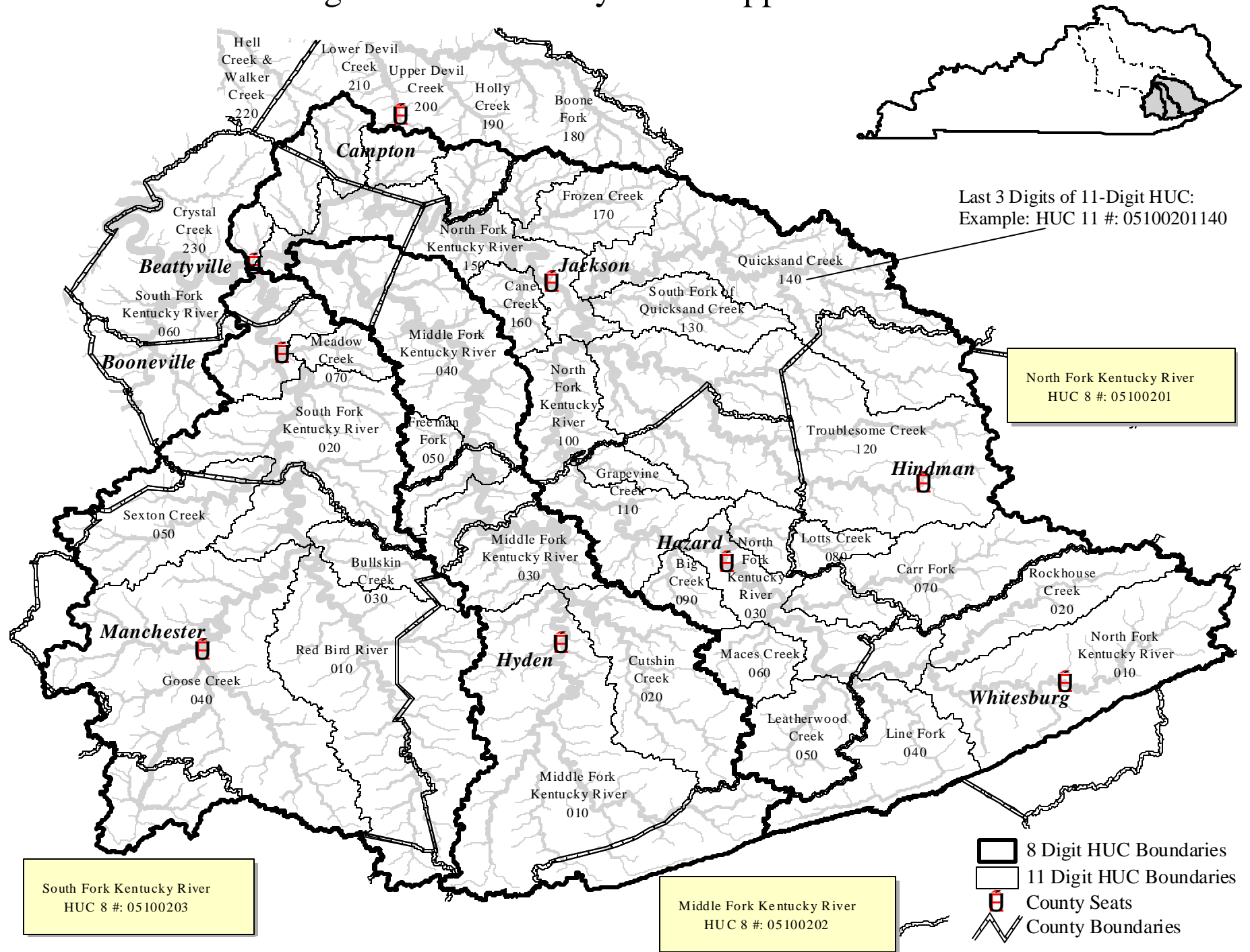




Figure A.4 Kentucky River Middle Basin  
HUC 8 #: 05100204



# Figure A.5 Kentucky River Upper Basin



# Figure A.6 Kentucky River Lower Basin 4th Order Watershed Boundaries

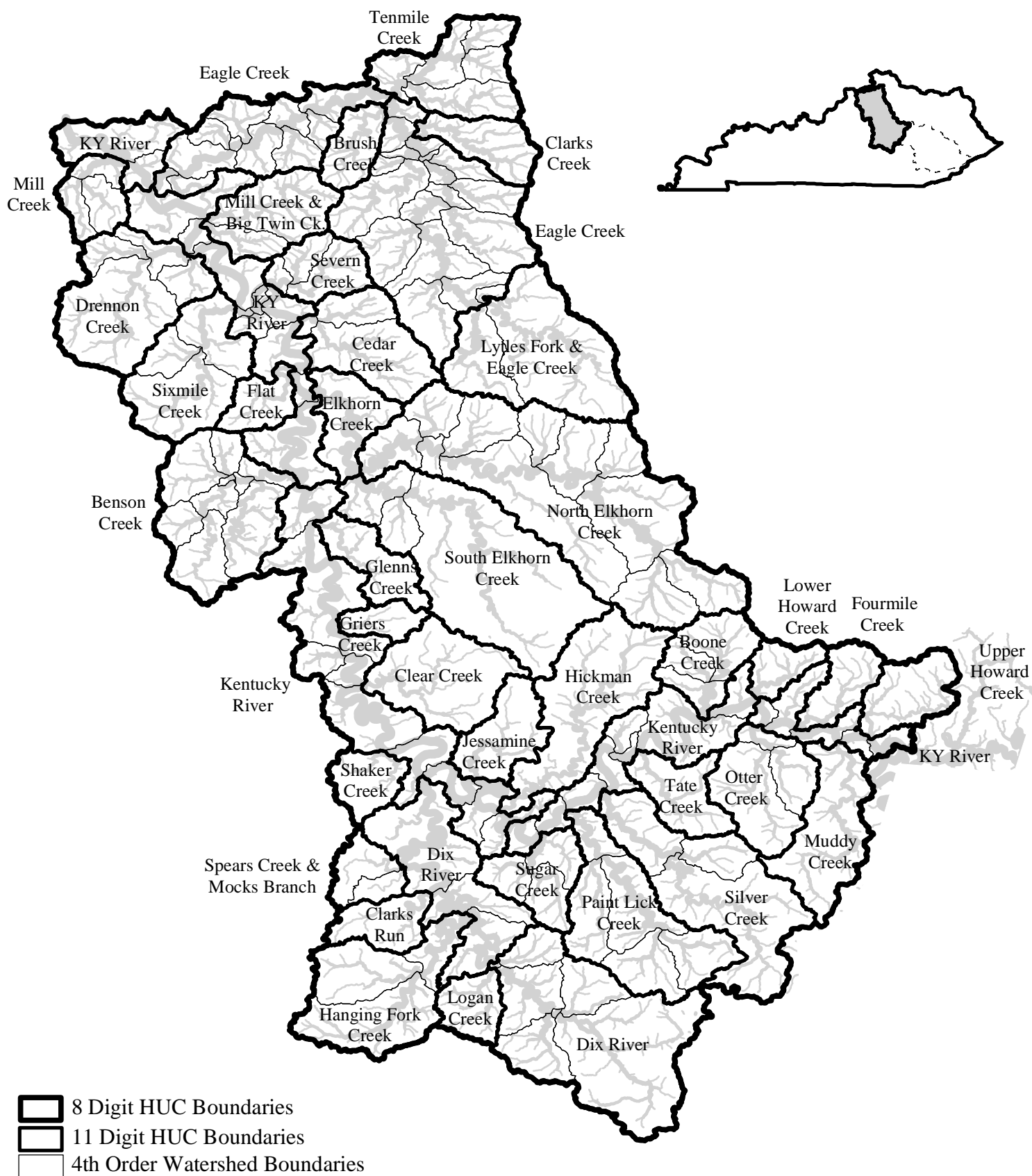


Figure A.7 Kentucky River Middle Basin  
4th Order Watershed Boundaries

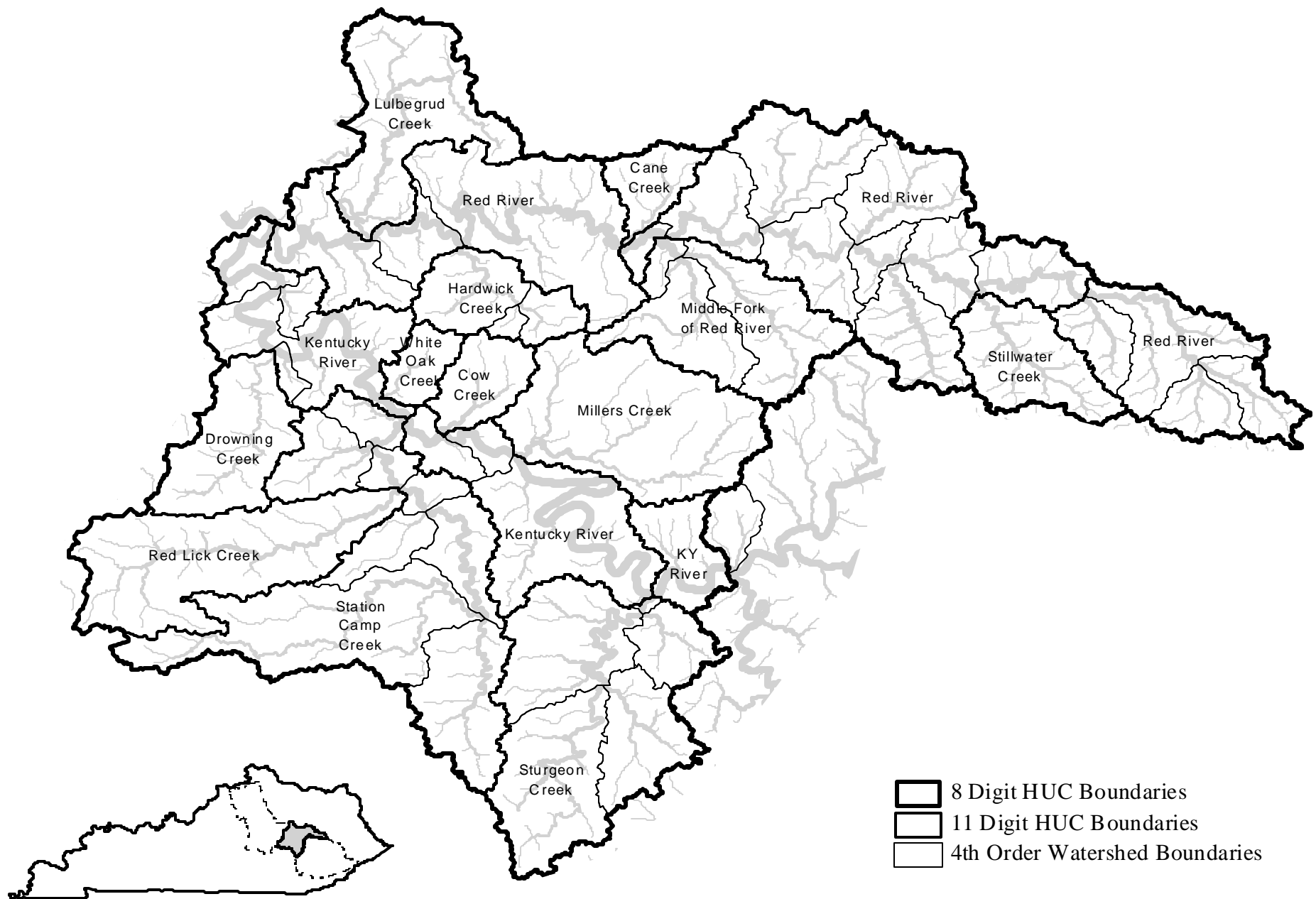
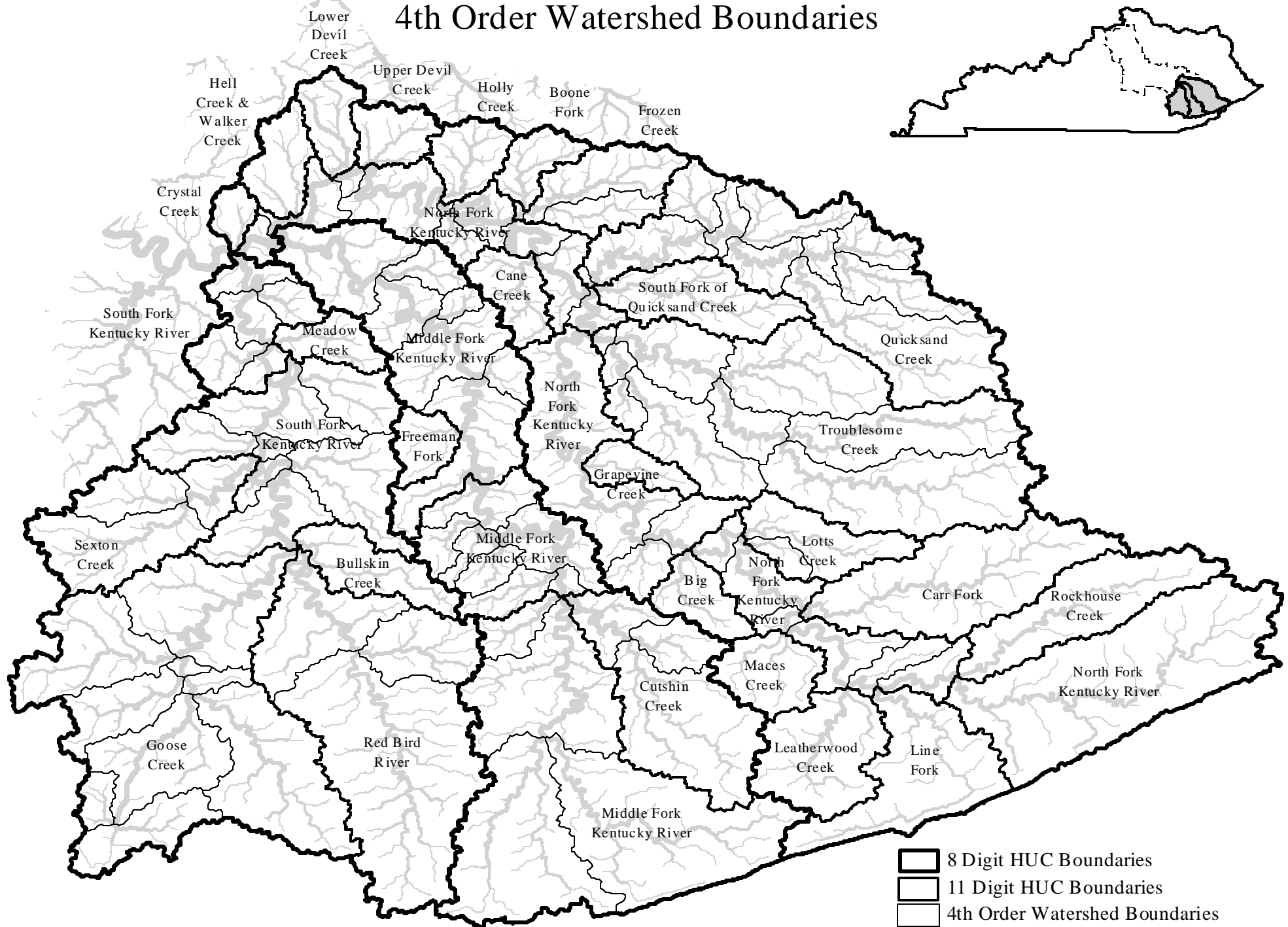


Figure A.8 Kentucky River Upper Basin  
4th Order Watershed Boundaries



## APPENDIX B

### Other Monitoring During the 1998-2000 Study Period

#### **LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT**

For more information, contact David Gabbard at 502-540-6990.

#### **KENTUCKY RIVER WATERSHED WATCH**

Watershed Watch is an organization of local volunteers working with the Kentucky Waterways Alliance, Cumberland Sierra Club, and the Kentucky Division of Water's Water Watch Program. Watershed Watch trains volunteer teams to conduct visual surveys and collect water samples for laboratory analysis from streams and rivers in the watershed.

Watershed Watch volunteers have been collecting data and information for biological, chemical, and habitat assessments in the basin since 1997. Sampling has included (1) *biological analysis* for benthic macroinvertebrates, algae, and total coliforms; (2) *habitat analysis* for bank stability, riparian zone width, sediment substrate assessments, and other conditions; (3) *water quality* sample analysis for conventional parameters, nutrients, pesticides, and selected metals (total). Pesticides are collected during the spring application season. Conventional parameters, nutrients, and metals are collected during summer and fall low-flow conditions. Most samples are collected on a once per year basis, providing a synoptic view of the basin.

The Watershed Watch website (<http://water.nr.state.ky.us/watch/ky.htm>) provides further information.

#### **US ARMY CORPS OF ENGINEERS**

The Corps of Engineers collects water quality, flow, rainfall, and other data at Buckhorn Lake and Carr Fork Lake. In association with this basin monitoring plan, inflow and tailwater stations were collected monthly from April 1998 to March 1999. In addition, several lake sites that are typically sampled four times annually between May and September were sampled with a few additional parameters. The Corps also collects temperature and dissolved oxygen profiles weekly at the dam during summer stratification. Parameters collected at most stations include nutrients, specific ions, total organic carbon, solids, alkalinity, algae, chlorophyll, turbidity, and metals. Macroinvertebrate data are collected at the inflow and tailwater stations annually. For additional information, contact Pat Neichter at 502-582-6739.

#### **US GEOLOGICAL SURVEY**

As the nation's largest water, earth, and biological science and civilian mapping agency, the USGS works in cooperation with more than 2,000 organizations across the country to provide reliable, impartial, scientific information to resource managers, planners, and other customers. This information is gathered in every state by USGS scientists to minimize the loss of life and property from natural disasters, contribute to sound economic and physical development of the nation's natural resources, and enhance the quality of life by monitoring water, biological, energy, and mineral resources.

Within the Kentucky River Basin Management Unit, the USGS Water Resources Division has 15 established stations. Other stations in the Kentucky River Management Unit are jointly funded with the Kentucky Division of Water, the US Army Corps of Engineers, and the Kentucky River Authority. Many of the stations are monitored continuously for stream flow; others are operated for stage only.

The following stations are located in the Kentucky River Basin Management Unit. Additional information on the activities of the USGS within the Commonwealth of Kentucky can be found at the District Home Page (<http://www.dky.usgs.gov>).

**STATION LOCATION**

03277300	North Fork Kentucky River at Whitesburg
03277450	Carr Fork near Sassafras
03277500	North Fork Kentucky River at Hazard
03280000	North Fork Kentucky River at Jackson
03280600	Middle Fork Kentucky River near Hyden
03280700	Cutshin Creek at Wooton
03281000	Middle Fork Kentucky River at Tallega
03281500	South Fork Kentucky River at Booneville
03282000	Kentucky River at Lock 14, Heidelberg
03283500	Red River at Clay City
03284000	Kentucky River at Lock 10, Winchester
03284230	Kentucky River at Lock 9
03285000	Dix River near Danville
03286500	Kentucky River at Lock 7, Highbridge
03287000	Kentucky River at Lock 6, Salvisa
03287250	Kentucky River at Lock 5 (lower)
03287500	Kentucky River at Lock 4, Frankfort
03288100	North Elkhorn Creek at Georgetown
03288110	Royal Spring at Georgetown
03290500	Kentucky River at Lock 2, Lockport

Figure B1. Planned LFUCG Monitoring Sites.

Table B1. Planned LFUCG Monitoring Sites.

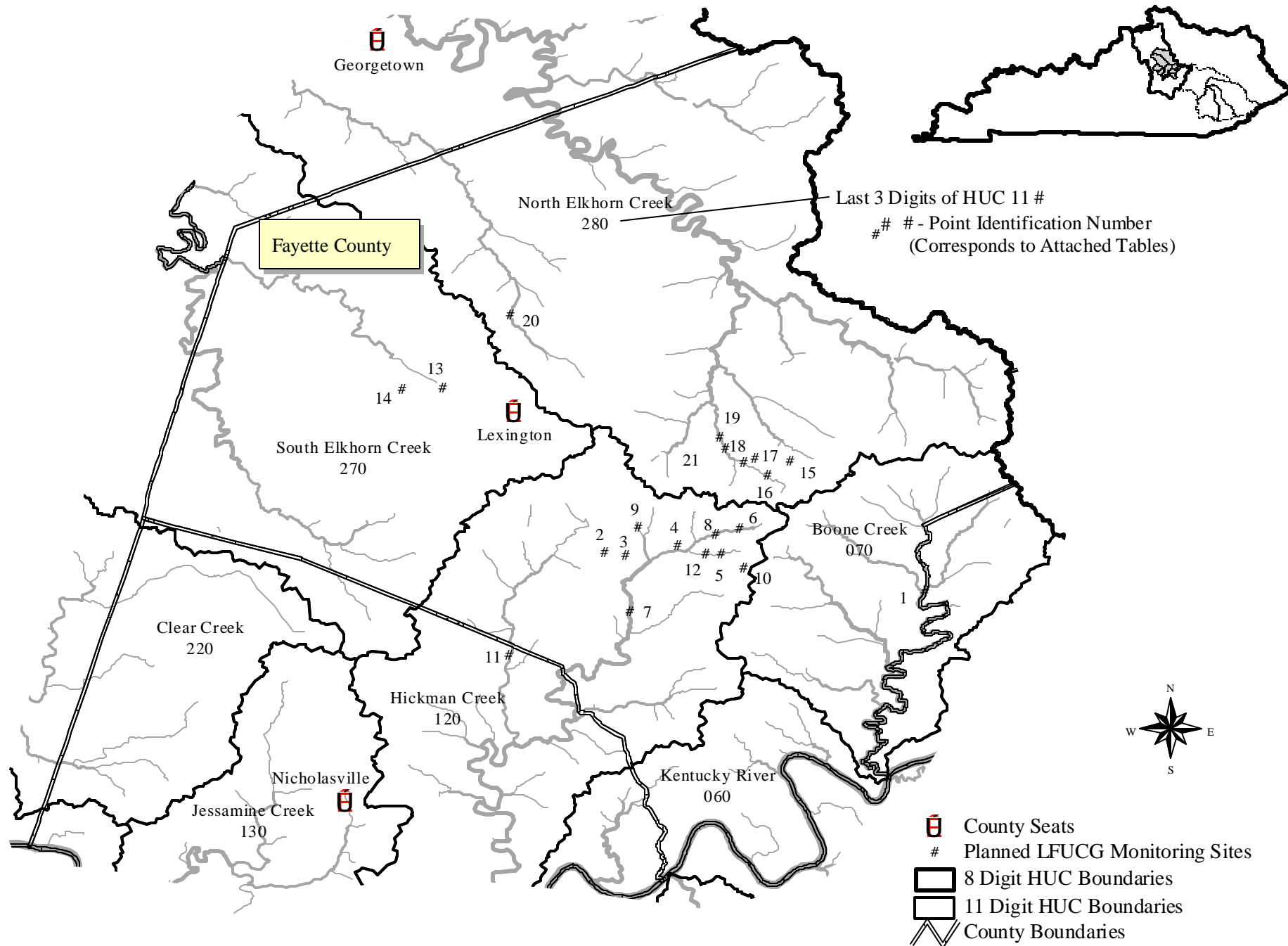
Figure B2. Kentucky River Watershed Watch Monitoring Sites.

Table B2. Kentucky River Watershed Watch Monitoring Sites.

Figure B3. Planned US Army Corps of Engineers Monitoring Sites.

Table B3. Planned US Army Corps of Engineers Monitoring Sites.

# Figure B.1 Lexington-Fayette Urban Co. Government Planned Monitoring Sites

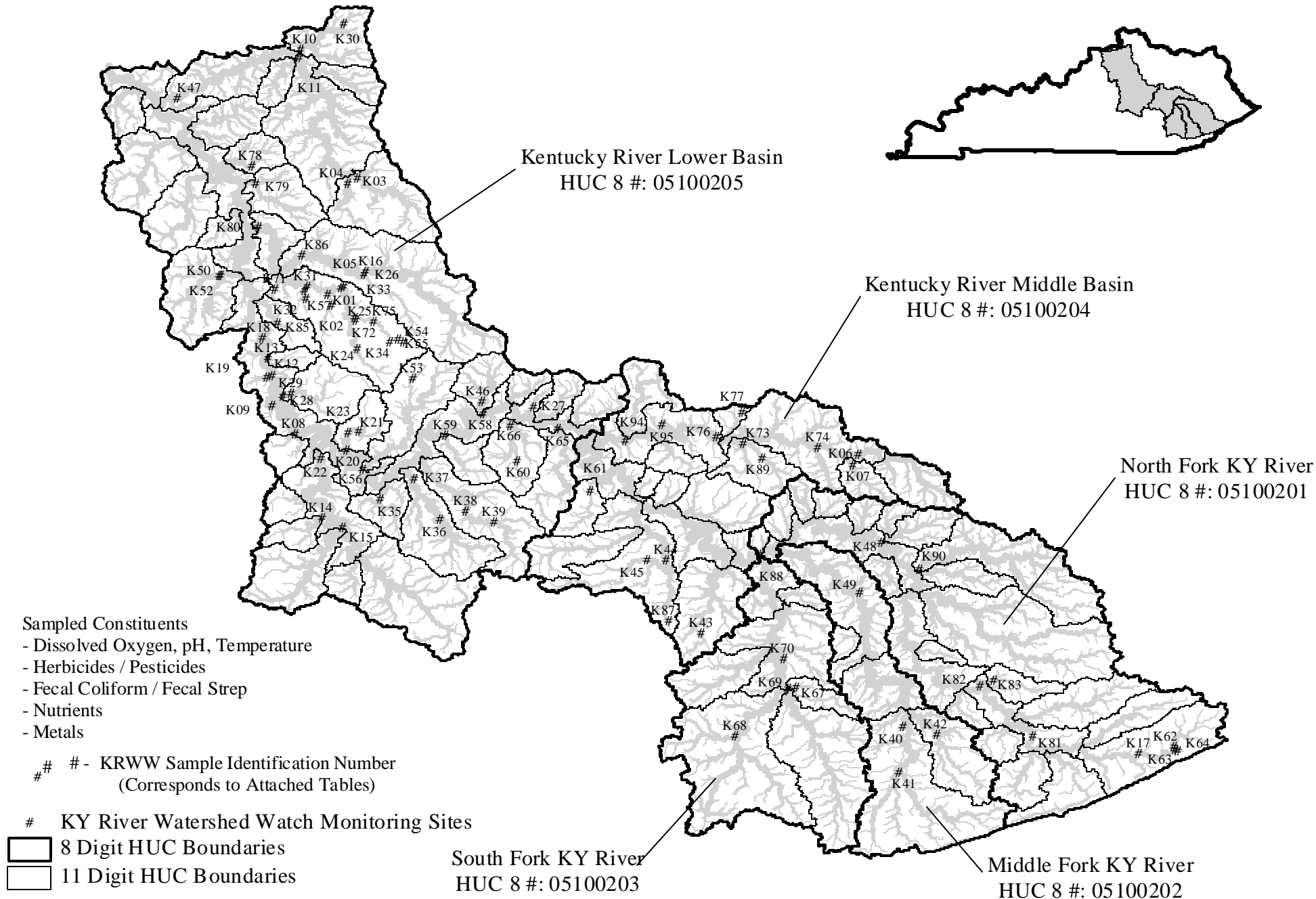




***Table B.1 Planned Lexington Fayette Urban Co. Gov. Sites***

<i>Map ID #</i>	<i>Stream</i>	<i>11 Digit HUC #</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>
01	Baughman Fork	5100205070	Boone Creek	Boone Ck-1	Clark
02	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
03	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
04	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
05	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
06	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
07	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
08	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
09	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
10	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
11	West Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Jessamine
12	East Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Fayette
13	Town Branch	5100205270	South Elkhorn Creek	South Elkhorn Ck-3	Fayette
14	Wolf Run	5100205270	South Elkhorn Creek	South Elkhorn Ck-3	Fayette
15	North Elkhorn Creek	5100205280	North Elkhorn Creek	North Elkhorn Ck-10 (David Fork)	Fayette
16	North Elkhorn Creek	5100205280	North Elkhorn Creek	North Elkhorn Ck-10 (David Fork)	Fayette
17	North Elkhorn Creek	5100205280	North Elkhorn Creek	North Elkhorn Ck-10 (David Fork)	Fayette
18	North Elkhorn Creek	5100205280	North Elkhorn Creek	North Elkhorn Ck-10 (David Fork)	Fayette
19	North Elkhorn Creek	5100205280	North Elkhorn Creek	North Elkhorn Ck-10 (David Fork)	Fayette
20	Cane Run	5100205280	North Elkhorn Creek	North Elkhorn Ck-7 (Cane Run)	Fayette
21	North Elkhorn Creek	5100205280	North Elkhorn Creek	North Elkhorn Ck-10 (David Fork)	Fayette

# Figure B.2 1999 KY River Watershed Watch Monitoring Sites



***Table B.2 KY River Watershed Watch,  
1998-1999 Monitoring Sites***

<i>11 Digit HUC #</i>	<i>Stream</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>	<i>KRWW Sample ID#</i>
510020101C	North Fork KY River	North Fork Kentucky River	North Fork Ky River	Letcher	K17
510020101C	Creekam Creek	North Fork Kentucky River	North Fork Ky River	Letcher	K64
510020101C	Pine Creek	North Fork Kentucky River	North Fork Ky River	Letcher	K63
510020101C	North Fork KY River	North Fork Kentucky River	North Fork Ky River	Letcher	K62
510020108C	Lotts Creek	Lotts Creek	Lotts Creek	Perry	K83
510020114C	Quicksand Creek	Quicksand Creek	Quicksand Ck-1	Breathitt	K90
510020115C	North Fork KY River	North Fork Kentucky River	North Fork Ky River	Breathitt	K48
510020115C	North Fork KY River	North Fork Kentucky River	North Fork Ky River	Perry	K82
510020115C	North Fork KY River	North Fork Kentucky River	North Fork Ky River	Perry	K81
510020201C	Middle Fork	Middle Fork Kentucky River	Middle Fork Ky River-3	Leslie	K41
510020201C	Middle Fork	Middle Fork Kentucky River	Middle Fork Ky River-3	Leslie	K40
510020202C	Cutshin Creek	Cutshin Creek	Cutshin Ck-3	Leslie	K42
510020204C	Middle Fork KY River	Middle Fork Kentucky River	Middle Fork Ky River	Breathitt	K49
510020302C	Bishops Branch	South Fork Kentucky River	South Fork Ky River	Clay	K70
510020303C	Bullskin Creek	Bullskin Creek	Bullskin Creek	Clay	K67
510020304C	Goose Creek	Goose Creek	Goose Ck-1	Clay	K68
510020304C	Goose Creek	Goose Creek	Goose Ck-1	Clay	K69
510020401C	Crystal Creek	Kentucky River	Crystal Creek	Lee	K88
510020402C	Sturgeon Creek	Sturgeon Creek	Sturgeon Ck-5	Jackson	K43
510020405C	Station Camp Creek	Station Camp Creek	Station Camp Ck-6	Estill	K44
510020405C	Station Camp Creek	Station Camp Creek	Station Camp Ck-7 (South Fk Station Camp Ck)	Jackson	K45
510020405C	War Fork Creek	Station Camp Creek	Station Camp Ck-8 (War Fork)	Jackson	K87
510020410C	Drowning Creek	Drowning Creek	Drowning Creek	Estill	K61
510020412C	Swift Camp Creek	Red River	Swift Camp Creek	Wolfe	K74
510020412C	Red River	Red River	Red River-8	Wolfe	K06
510020413C	Stillwater Creek	Stillwater Creek	Stillwater Ck	Wolfe	K07
510020414C	Mdl Fork	Middle Fork of Red River	Middle Fork Red River-2	Powell	K73
510020414C	South Fork of Red River	Middle Fork of Red River	Middle Fork Red River-2	Powell	K89
510020416C	Cane Creek	Red River	Red River-3	Menifee	K77

***Table B.2 KY River Watershed Watch,  
1998-1999 Monitoring Sites***

<i>11 Digit HUC #</i>	<i>Stream</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>	<i>KRWW Sample ID#</i>
510020416C	Red River - Lower	Red River	Red River-1	Clark	K94
510020416C	Red River	Red River	Red River-3	Powell	K76
510020416C	Red River	Red River	Red River-3	Powell	K95
510020502C	Muddy Creek	Muddy Creek	Muddy Creek	Madison	K65
510020504C	Otter Creek	Otter Creek	Otter Ck-1	Madison	K66
510020504C	Dreaming Creek	Otter Creek	Otter Ck-3 (West Fork Otter Creek)	Madison	K60
510020507C	Boone Creek	Boone Creek	Boone Ck-3	Clark	K58
510020507C	Boone Creek	Boone Creek	Boone Ck-3	Fayette	K46
510020508C	Tates Creek	Tate Creek	Tate Creek	Madison	K59
510020509C	Silver Creek	Silver Creek	Silver Ck-3	Madison	K38
510020509C	Silver Creek	Silver Creek	Silver Ck-3	Madison	K39
510020510C	Paint Lick Creek	Paint Lick Creek	Paint Lick-3	Madison	K36
510020510C	Paint Lick Creek	Paint Lick Creek	Paint Lick-1	Garrard	K37
510020511C	Sugar Creek	Sugar Creek	Sugar Ck-1	Garrard	K35
510020512C	Hickman Creek	Hickman Creek	Hickman Creek	Jessamine	K20
510020512C	W Hickman Creek	Hickman Creek	Hickman Creek	Fayette	K53
510020513C	Town Branch	Jessamine Creek	Jessamine Creek	Jessamine	K21
510020513C	Wilmore Tn Branch	Jessamine Creek	Jessamine Creek	Jessamine	K23
510020514C	Gilbert's Creek	Kentucky River	Ky River (Gilbert Creek)	Anderson	K19
510020517C	Dix River	Dix River	Dix River-1	Mercer	K56
510020518C	Hanging Fork Creek	Hanging Fork Creek	Hanging Fk-2	Lincoln	K15
510020519C	Clarks Run	Clarks Run	Clarks Run	Boyle	K14
510020521C	Shawnee Run	Shaker Creek	Shaker Creek	Mercer	K08
510020522C	Clear Creek	Clear Creek	Clear Creek	Woodford	K29
510020522C	Clear Creek	Clear Creek	Clear Creek	Woodford	K28
510020523C	Grier's Creek	Griers Creek	Griers Creek	Woodford	K13
510020524C	Glen Creek	Glenns Creek	Glenns Creek	Woodford	K85
510020526C	Benson Creek	Benson Creek	Benson Ck-8 (South Benson Creek)	Franklin	K50
510020526C	South Fork Benson Creek	Benson Creek	Benson Ck-3	Franklin	K52

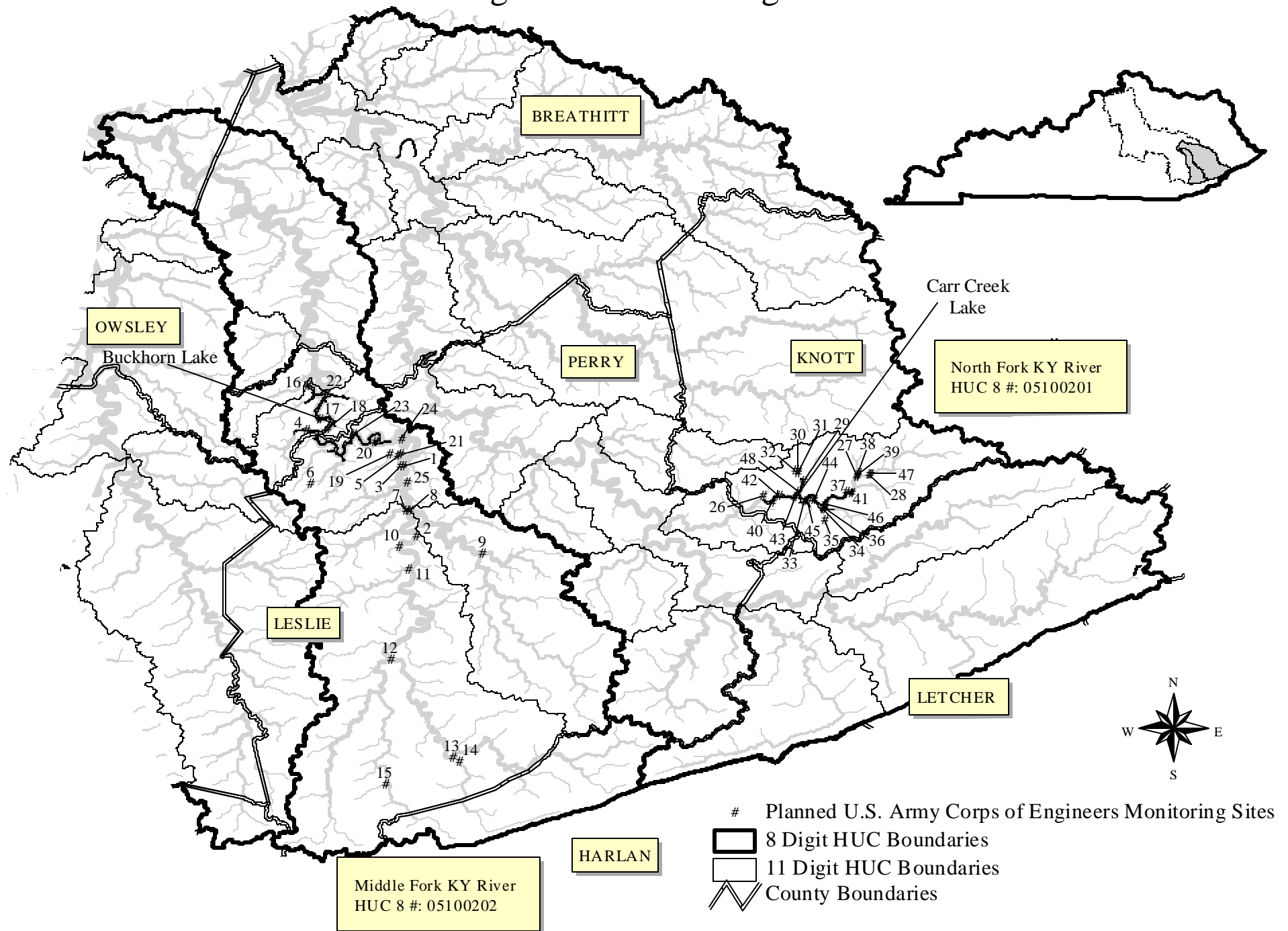
***Table B.2 KY River Watershed Watch,  
1998-1999 Monitoring Sites***

<i>11 Digit HUC #</i>	<i>Stream</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>	<i>KRWW Sample ID#</i>
510020527C	South Elkhorn	South Elkhorn Creek	South Elkhorn Ck-3	Fayette	K24
510020527C	Lee's Branch	South Elkhorn Creek	South Elkhorn Ck-3	Woodford	K02
510020527C	South Elkhorn	South Elkhorn Creek	South Elkhorn Ck-3	Scott	K25
510020527C	South Elkhorn	South Elkhorn Creek	South Elkhorn Ck-3	Woodford	K26
510020527C	Lee's Branch	South Elkhorn Creek	South Elkhorn Ck-3	Woodford	K01
510020527C	Steele's Branch	South Elkhorn Creek	South Elkhorn Ck-3	Woodford	K72
510020527C	South Elkhorn Creek	South Elkhorn Creek	South Elkhorn Ck-3	Woodford	K31
510020527C	Beals Run	South Elkhorn Creek	South Elkhorn Ck-2 (Beals Run)	Woodford	K32
510020527C	Wolfe Run	South Elkhorn Creek	South Elkhorn Ck-3	Fayette	K34
510020527C	South Fork Elkhorn	South Elkhorn Creek	South Elkhorn Ck-1	Franklin	K71
510020527C	Town Branch	South Elkhorn Creek	South Elkhorn Ck-3	Fayette	K55
510020527C	McConnell Springs	South Elkhorn Creek	South Elkhorn Ck-3	Fayette	K54
510020527C	Spring Stn	South Elkhorn Creek	South Elkhorn Ck-2 (Beals Run)	Woodford	K57
510020527C	South Elkhorn	South Elkhorn Creek	South Elkhorn Ck-3	Scott	K33
510020527C	Town Branch	South Elkhorn Creek	South Elkhorn Ck-3	Fayette	K75
510020528C	North Fork Elkhorn	North Elkhorn Creek	North Elkhorn Ck-7 (Cane Run)	Scott	K16
510020528C	North Fork Elkhorn Creek	North Elkhorn Creek	North Elkhorn Ck-2	Franklin	K86
510020528C	Cane Run Creek	North Elkhorn Creek	North Elkhorn Ck-7 (Cane Run)	Scott	K05
510020529C	Elkhorn Creek	Elkhorn Creek	Elkhorn Creek	Franklin	K80
510020531C	Cedar Creek	Cedar Creek	Cedar Ck-2	Owen	K79
510020532C	Severn Creek	Severn Creek	Severn Ck-3	Owen	K78
510020536C	Eagle Creek W Fork	Lytles Fork & Eagle Creek	Eagle Ck-20 (Lytles Fork)	Scott	K04
510020536C	Eagle Creek E Fork	Lytles Fork & Eagle Creek	Eagle Ck-19 (East Fork)	Owen	K03
510020537C	Eagle Creek	Eagle Creek	Eagle Ck-22	Grant	K11
510020539C	Ten Mile Creek	Tenmile Creek	Tenmile Ck-1	Grant	K10
510020539C	Ten Mile Creek	Tenmile Creek	Tenmile Ck-3 (Bullock Pen Creek)	Grant	K30
510020541C	Eagle Creek	Eagle Creek	Eagle Ck-4	Carroll	K47

***Table B.2 KY River Watershed Watch,  
1998-1999 Monitoring Sites***

<i>11 Digit HUC #</i>	<i>Stream</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>	<i>KRWW Sample ID#</i>
510020542C	Craig Creek	Kentucky River	Kentucky River	Woodford	K12
510020542C	Landing Run	Kentucky River	Kentucky River	Mercer	K09
510020542C	Sharps Branch	Kentucky River	Kentucky River	Anderson	K18
510020542C	Jessamine Creek	Kentucky River	Kentucky River	Jessamine	K22
510020542C	Two Mile Creek	Kentucky River	Kentucky River	Clark	K27

Figure B.3 Planned U.S. Army Corps  
of Engineers Monitoring Sites



***Table B.3 Planned U.S. Army Corps of Engineers Sites***

<i>Map ID #</i>	<i>Stream</i>	<i>11 Digit HUC #</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>
1	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie
2	Kentucky River, Middle Fork	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-3	Leslie
3	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie
4	Un-named Trib. Middle Fork KY	5100202030	Middle Fork Kentucky River	Leatherwood Creek	Perry
5	Un-named Trib. Middle Fork KY	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie
6	Elkhorn Creek	5100202030	Middle Fork Kentucky River	Elkhorn Creek	Leslie
7	Bull Creek	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-2 (Bull Creek)	Leslie
8	Cutshin Creek	5100202020	Cutshin Creek	Cutshin Ck-1	Leslie
9	Wooton Creek	5100202020	Cutshin Creek	Cutshin Ck-2 (Wooton Creek)	Leslie
10	Asher Branch	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-3	Leslie
11	Rockhouse Creek	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-3	Leslie
12	Greasy Creek	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-5 (Greasy Creek)	Leslie
13	Greasy Creek	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-5 (Greasy Creek)	Leslie
14	Laurel Fork	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-5 (Greasy Creek)	Leslie
15	Big Branch	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-4	Leslie
16	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Perry
17	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Perry
18	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Perry
19	Un-named Trib. Middle Fork KY	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie
20	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie



***Table B.3 Planned U.S. Army Corps of Engineers Sites***

<b><i>Map ID #</i></b>	<b><i>Stream</i></b>	<b><i>11 Digit HUC #</i></b>	<b><i>HUC 11 Name</i></b>	<b><i>4th Order Watershed</i></b>	<b><i>County</i></b>
21	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie
22	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Perry
23	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie
24	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie
25	Kentucky River, Middle Fork	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Leslie
26	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
27	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
28	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
29	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
30	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
31	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
32	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
33	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
34	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
35	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
36	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
37	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
38	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
39	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
40	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott

***Table B.3 Planned U.S. Army Corps of Engineers Sites***

<i>Map ID #</i>	<i>Stream</i>	<i>11 Digit HUC #</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>
41	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
42	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
43	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
44	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
45	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
46	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
47	Kentucky River, Carr Fork	5100201070	Carr Fork	Carr Fork	Knott
48	Un-named Trib. KY River - Carr Fork	5100201070	Carr Fork	Carr Fork	Knott

## APPENDIX C

### Sampling Parameters

#### 1. KENTUCKY RIVER WATERSHED WATCH PARAMETERS

##### *Conventional Parameters*

Alkalinity  
Conductivity  
Total suspended solids  
Total dissolved solids  
Hardness

##### *Nutrients*

Nitrate  
Nitrite  
Ammonia nitrogen  
Total Kjeldahl nitrogen  
Phosphorus, ortho  
Phosphorus, total  
Organic carbon

##### *Inorganics*

Fluoride  
Chloride  
Bromide  
Sulfate  
Calcium  
Magnesium  
Sodium  
Potassium  
Aluminum  
Arsenic  
Barium  
Cadmium  
Chromium  
Copper  
Iron  
Lead  
Manganese  
Mercury  
Zinc  
Silica

##### *Field Parameters*

Dissolved oxygen (before 6:00 am)  
pH  
Temperature

##### *Pesticides*

2,4-D(amine)  
(used on pastures and lawns)  
Chlorpyrifos  
(Dursban, replacing Diazinon)  
Metolachlor  
(used on soybeans)  
Pendimethalin  
(found in urban streams or areas of  
concentrated tobacco cultivation)  
Triazine  
(used as pre-emergent for corn)

## **2. GROUNDWATER PARAMETERS (FIXED AND TARGETED BASIN SITES)**

### *Pesticides*

Method 507, 508, 515

### *Nutrients*

Ammonia

Total Kjeldahl nitrogen

Phosphorus

Nitrates and nitrites

### *Metals*

Total and dissolved

### *Organics*

Volatile organic carbons at some selected sites, especially for MTBE data

## APPENDIX D

### Biological Sampling Sites

Figure D1. Reference Reach Biological Sites.

Table D1. Reference Reach Biological Sites.

Figure D2. Probabilistic Biological Sites.

Table D2. Probabilistic Biological Sites.

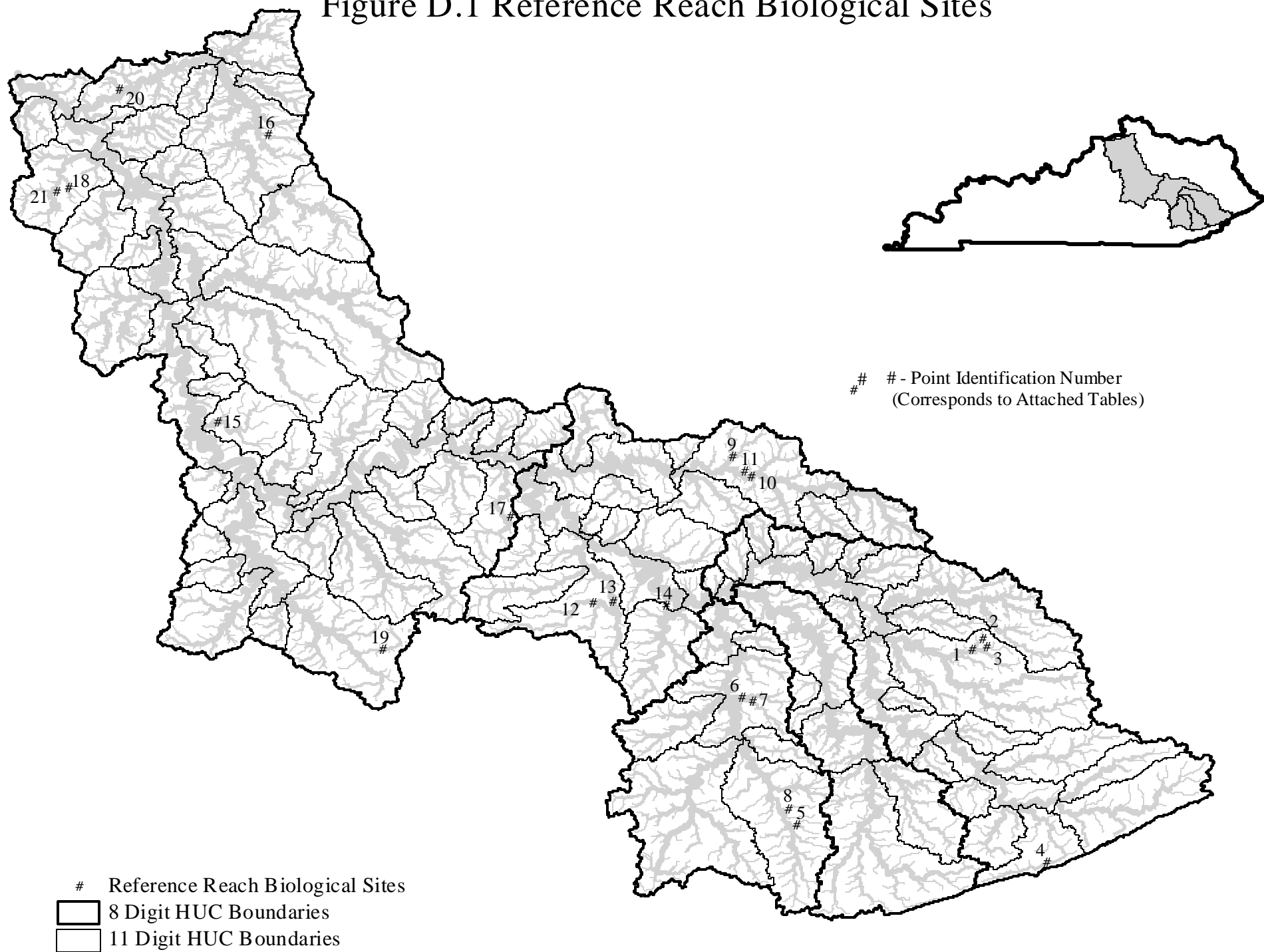
Figure D3. Fixed Biological Sites.

Table D3. Fixed Biological Sites.

Table D4. Rotating Biological Sites.

Figure D4. Rotating Biological Sites.

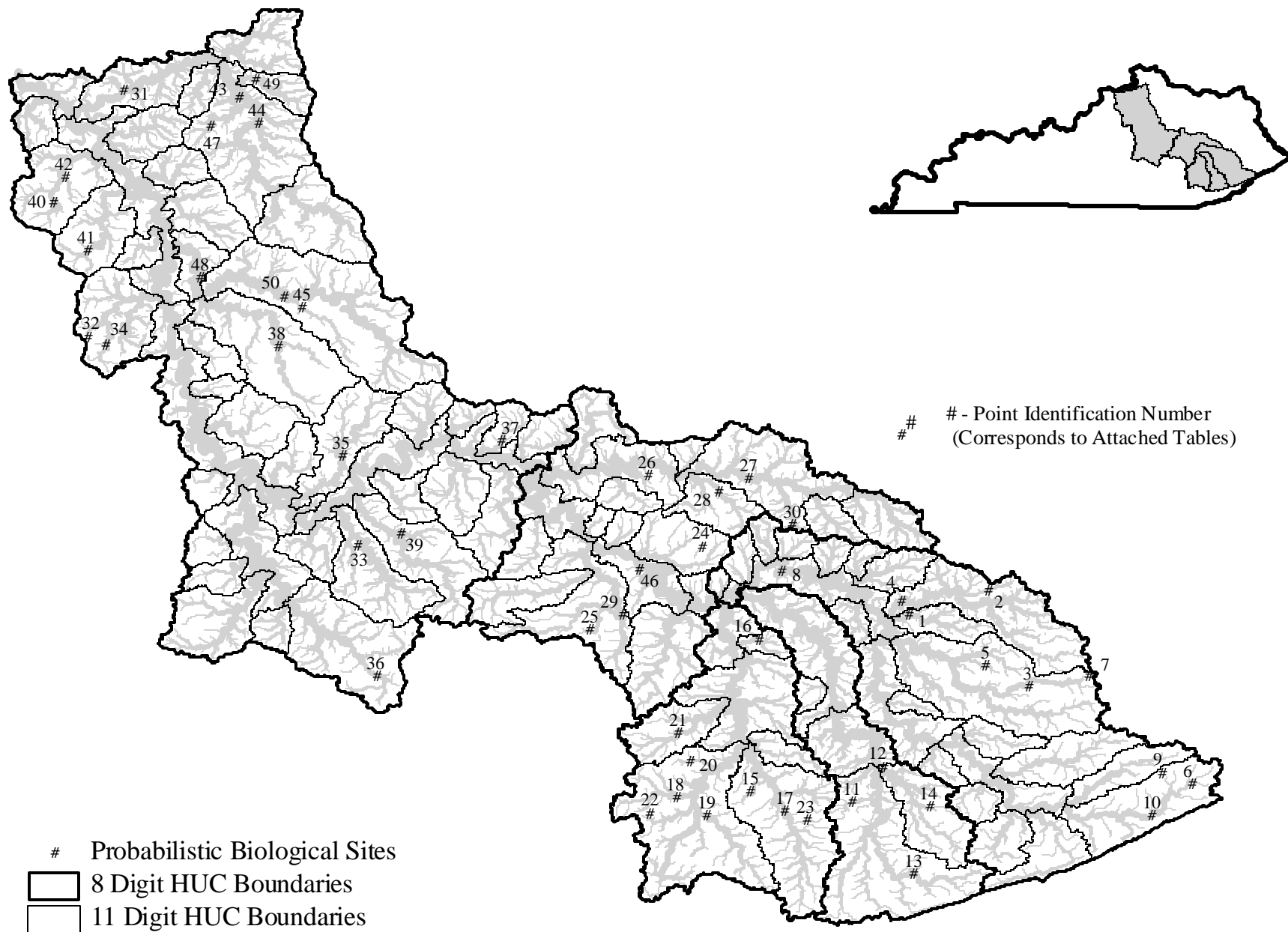
Figure D.1 Reference Reach Biological Sites



***Table D.1 Reference Reach Biological Sites,  
Kentucky Division of Water***

<i>Map ID #</i>	<i>Stream</i>	<i>11 Digit HUC #</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>
1	Clemons Fork	5100201120	Troublesome Creek	Troublesome Ck-5 (Buckhorn Creek)	Breathitt
2	Clemons Fork	5100201120	Troublesome Creek	Troublesome Ck-5 (Buckhorn Creek)	Breathitt
3	Coles Fork	5100201120	Troublesome Creek	Troublesome Ck-5 (Buckhorn Creek)	Breathitt
4	Line Fork Creek	5100201040	Line Fork	Line Fork	Letcher
5	Elisha Creek	5100203010	Red Bird River	Red Bird River-3	Leslie
6	Buffalo Creek	5100203020	South Fork Kentucky River	South Fork Ky River-5 (Buffalo Creek)	Owsley
7	Right Fork Buffalo Creek	5100203020	South Fork Kentucky River	South Fork Ky River-5 (Buffalo Creek)	Owsley
8	Sugar Creek	5100203010	Red Bird River	Red Bird River-3	Leslie
9	East Fork Indian Creek	5100204120	Red River	Indian Creek	Menifee
10	Wolfpen Creek	5100204120	Red River	Red River-6	Menifee
11	Gladie Creek	5100204120	Red River	Red River-6	Menifee
12	South Fork Station Camp Creek	5100204050	Station Camp Creek	Station Camp Ck-7 (South Fk Station Camp Ck)	Jackson
13	Station Camp Creek	5100204050	Station Camp Creek	Station Camp Ck-6	Estill/Jackson
14	Sturgeon Creek	5100204020	Sturgeon Creek	Sturgeon Ck-3	Lee
15	Clear Creek	5100205220	Clear Creek	Clear Creek	Woodford
16	Musselman Creek	5100205370	Eagle Creek	Eagle Ck-17 (Three Fork Creek)	Grant
17	Muddy Creek	5100205020	Muddy Creek	Muddy Creek	Madison
18	Fivemile Creek	5100205340	Drennon Creek	Drennon Ck-4	Henry
19	Copper Creek	5100205150	Dix River	Dix River-8	Rockcastle
20	Indian Creek	5100205410	Eagle Creek	Eagle Ck-5 (Indian Creek)	Carroll
21	Drennon Creek	5100205340	Drennon Creek	Drennon Ck-4	Henry

Figure D.2 Probabilistic Biological Sites





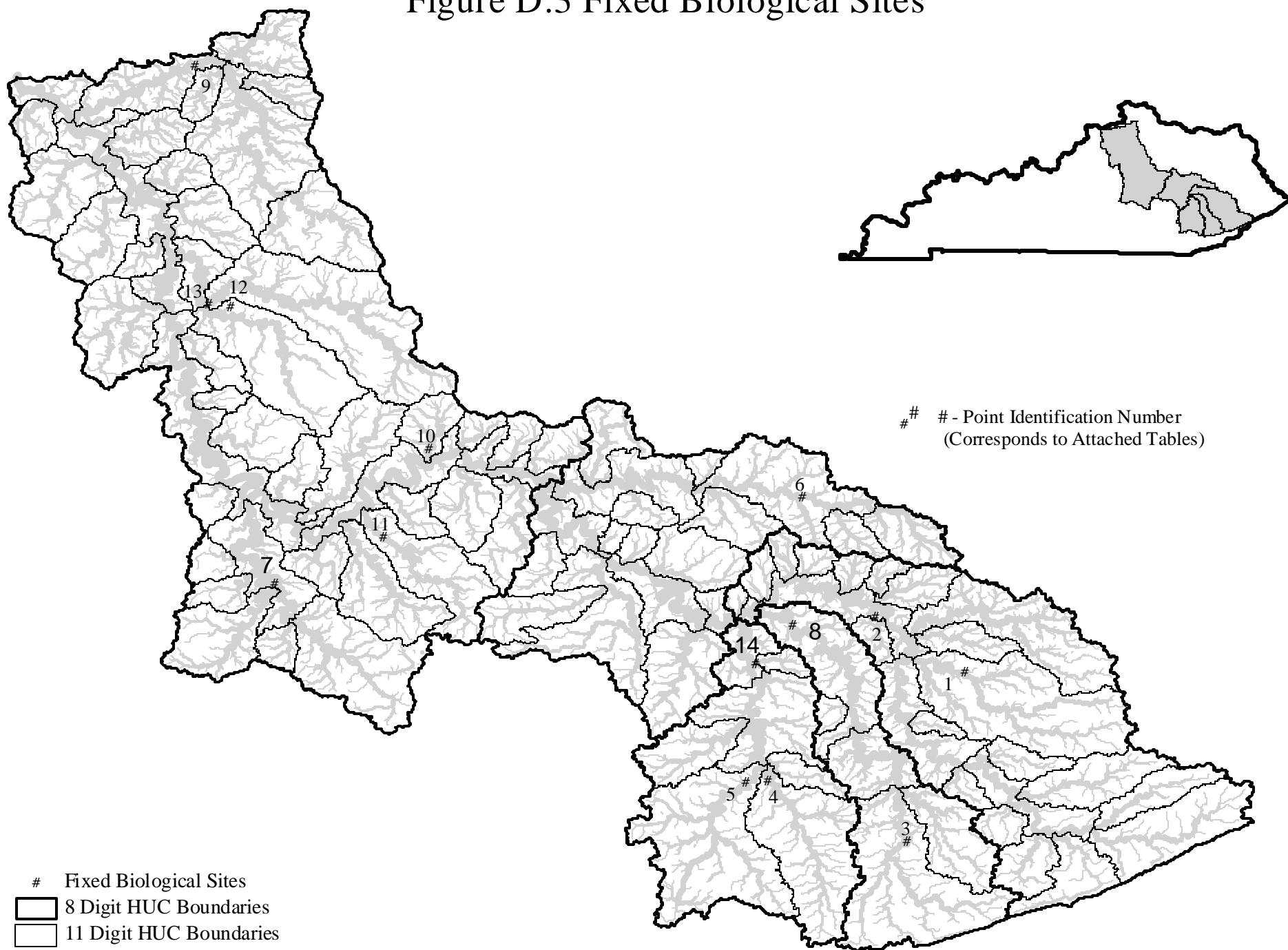
***Table D.2 Probabilistic Biological Sites,  
Kentucky Division of Water***

<i>Map ID #</i>	<i>Stream</i>	<i>11 Digit HUC #</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>
1	South Fork Quicksand Creek	5100201130	South Fork of Quicksand Creek	South Fork Quicksand Creek	Breathitt
2	Big Caney Creek	5100201140	Quicksand Creek	Quicksand Ck-7 (Big Caney)	Breathitt
3	Balls Fork	5100201120	Troublesome Creek	Troublesome Ck-8 (Balls Fork)	Knott
4	Quicksand Creek	5100201140	Quicksand Creek	Quicksand Ck-2	Breathitt
5	Long Fork	5100201120	Troublesome Creek	Troublesome Ck-5 (Buckhorn Creek)	Breathitt
6	Potter Fork	5100201010	North Fork Kentucky River	North Fork Ky River	Letcher
7	Bolen Branch	5100201120	Troublesome Creek	Troublesome Ck-8 (Balls Fork)	Knott
8	Walker Creek	5100201150	North Fork Kentucky River	North Fork Ky River	Lee
9	Left Fork Millstone Creek	5100201010	North Fork Kentucky River	North Fork Ky River	Letcher
10	North Fork Kentucky River	5100201010	North Fork Kentucky River	North Fork Ky River	Letcher
11	Rockhouse Creek	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-3	Leslie
12	Cutshin Creek	5100202020	Cutshin Creek	Cutshin Ck-1	Leslie
13	Greasy Creek	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-5 (Greasy Creek)	Leslie
14	Polls Creek	5100202020	Cutshin Creek	Cutshin Ck-3	Leslie
15	Long Fork	5100203010	Red Bird River	Red Bird River-1	Clay
16	Meadow Creek	5100203070	Meadow Creek	Meadow Creek	Owsley
17	Red Bird River	5100203010	Red Bird River	Red Bird River-3	Clay
18	Little Goose Creek	5100203040	Goose Creek	Goose Ck-2 (Little Goose Creek)	Clay
19	Goose Creek	5100203040	Goose Creek	Goose Ck-9	Clay
20	Laurel Creek	5100203040	Goose Creek	Goose Ck-1	Clay
21	Sexton Creek	5100203050	Sexton Creek	Sexton Ck-3	Clay
22	North Fork Kentucky River	5100203040	Goose Creek	Goose Ck-5 (Horse Creek)	Letcher
23	Gilberts Big Creek	5100203010	Red Bird River	Red Bird River-3	Leslie
24	Little Sinking Creek	5100204040	Millers Creek	Millers Creek	Lee

***Table D.2 Probabilistic Biological Sites,  
Kentucky Division of Water***

<i>Map ID #</i>	<i>Stream</i>	<i>11 Digit HUC #</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>
25	Cavanaugh Creek	5100204050	Station Camp Creek	Station Camp Ck-7 (South Fk Station Camp Ck)	Jackson
26	Judy Creek	5100204160	Red River	Red River-3	Powell
27	Red River	5100204120	Red River	Red River-6	Menifee
28	Middle Fork Red River	5100204140	Middle Fork of Red River	Middle Fork Red River-2	Powell
29	South Fork Station Camp Creek	5100204050	Station Camp Creek	Station Camp Ck-6	Jackson
30	Ut To Swift Camp Creek	5100204120	Red River	Swift Camp Creek	Wolfe
31	Eagle Creek	5100205410	Eagle Creek	Eagle Ck-3	Owen
32	Goose Creek	5100205260	Benson Creek	Benson Ck-7 (Mink Run)	Shelby
33	Back Creek	5100205100	Paint Lick Creek	Paint Lick-3	Garrard
34	Benson Creek	5100205260	Benson Creek	Benson Ck-9	Anderson
35	Hickman Creek	5100205120	Hickman Creek	Hickman Creek	Jessamine
36	Dix River	5100205150	Dix River	Dix River-8	Rockcastle
37	Four Mile Creek	5100205030	Fourmile Creek	Four Mile Creek	Clark
38	South Elkhorn Creek	5100205270	South Elkhorn Creek	South Elkhorn Ck-3	Woodford
39	Silver Creek	5100205090	Silver Creek	Silver Ck-3	Madison
40	Drennon Creek	5100205340	Drennon Creek	Drennon Ck-4	Henry
41	Six Mile Creek	5100205330	Sixmile Creek	Sixmile Ck-3	Shelby
42	Five Mile Creek	5100205340	Drennon Creek	Drennon Ck-4	Henry
43	Stevens Creek	5100205370	Eagle Creek	Eagle Ck-12 (Stevens Creek)	Grant
44	Eagle Creek	5100205370	Eagle Creek	Eagle Ck-27	Grant
45	Cane Run	5100205280	North Elkhorn Creek	North Elkhorn Ck-7 (Cane Run)	Scott
46	Buck Creek	5100205420	Kentucky River	Kentucky River	Estill
47	Stevens Creek	5100205370	Eagle Creek	Eagle Ck-14 (Stevens Creek)	Owen
48	Elkhorn Creek	5100205290	Elkhorn Creek	Elkhorn Creek	Franklin
49	Clarks Creek	5100205380	Clarks Creek	Clarks Creek	Grant
50	North Elkhorn Creek	5100205280	North Elkhorn Creek	North Elkhorn Ck-7 (Cane Run)	Scott

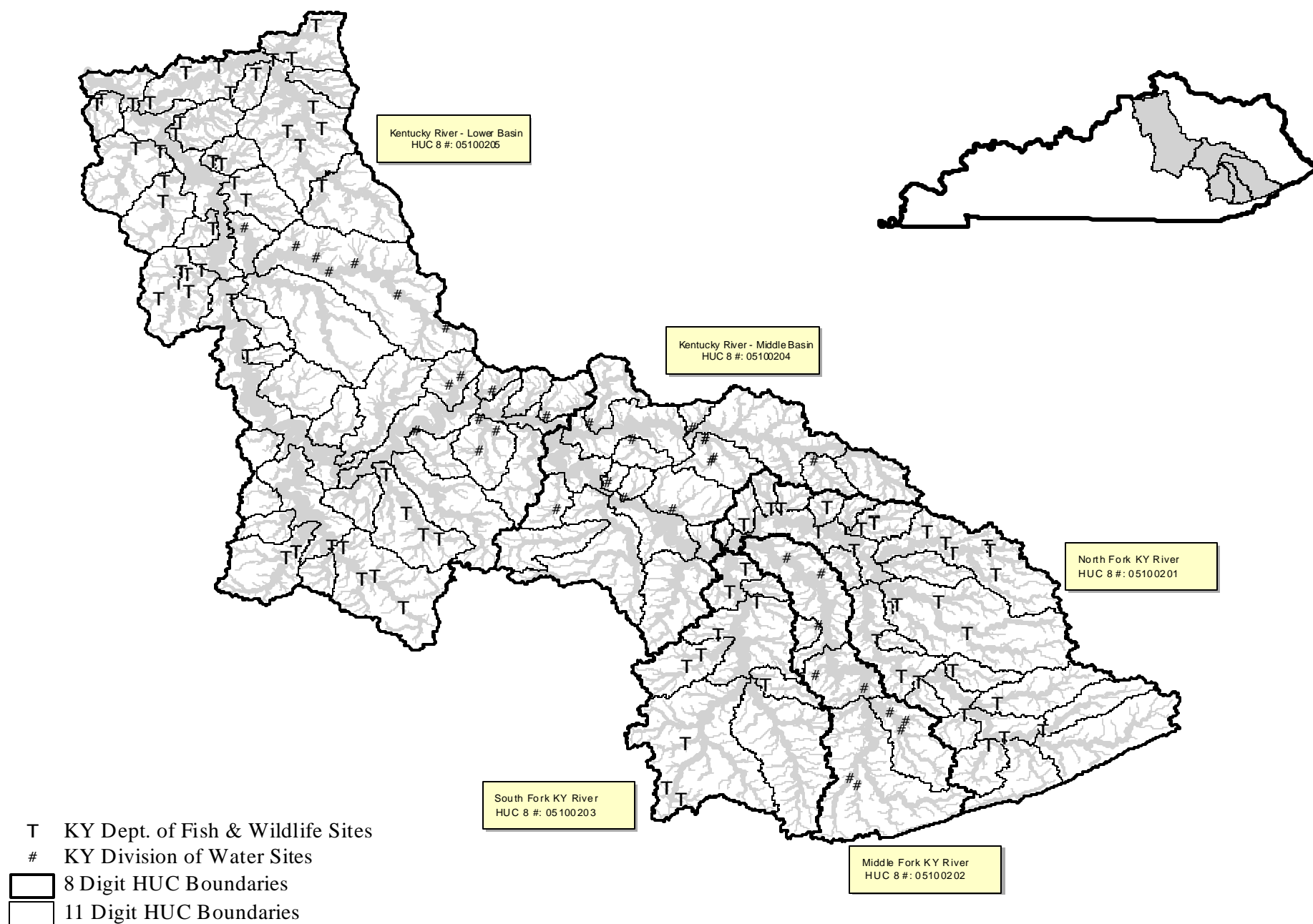
Figure D.3 Fixed Biological Sites



***Table D.3 Fixed Biological Sites,  
Kentucky Division of Water***

<i>Map ID #</i>	<i>Stream</i>	<i>11 Digit HUC #</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>
1	Troublesome Creek	5100201120	Troublesome Creek	Troublesome Ck-3	Breathitt
2	North Fork Ky River	5100201150	North Fork Kentucky River	North Fork Ky River	Breathitt
3	Middle Fork Ky River	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-3	Leslie
4	Red Bird River	5100203010	Red Bird River	Red Bird River-1	Clay
5	Goose Creek	5100203040	Goose Creek	Goose Ck-1	Leslie
6	Red River	5100204120	Red River	Swift Camp Creek	Menifee
7	Dix River	5100205170	Dix River	Dix River-9	Garrard
8	Middle Fork Kentucky River	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Lee
9	Eagle Creek	5100205410	Eagle Creek	Eagle Ck-11	Owen/Gallatin
10	Boone Creek	5100205070	Boone Creek	Boone Ck-3	Fayette/Clark Line
11	Silver Creek	5100205090	Silver Creek	Silver Ck-1	Madison
12	South Elkhorn Creek	5100205270	South Elkhorn Creek	South Elkhorn Ck-1	Franklin
13	North Elkhorn Creek	5100205280	North Elkhorn Creek	North Elkhorn Ck-2	Franklin
14	South Fork Kentucky River	5100203060	South Fork Kentucky River	South Fork Ky River	Owsley

Figure D.4 Rotating Biological Sites



## ***Table D.4 Rotating Biological Sites***

<i><b>11 Digit HUC #</b></i>	<i><b>Stream</b></i>	<i><b>HUC 11 Name</b></i>	<i><b>4th Order Watershed</b></i>	<i><b>County</b></i>	<i><b>Monitoring Organization</b></i>
5100201020	Rockhouse Creek	Rockhouse Creek	Rockhouse Creek	Letcher	KY Dept. of Fish & Wildlife
5100201040	Line Fork	Line Fork	Line Fork	Letcher	KY Dept. of Fish & Wildlife
5100201050	Leatherwood Creek	Middle Fork Kentucky River	Leatherwood Creek	Perry	KY Dept. of Fish & Wildlife
5100201060	Maces Creek	Maces Creek	Maces Creek	Perry	KY Dept. of Fish & Wildlife
5100201070	Carr Fork	Carr Fork	Carr Fork	Perry	KY Dept. of Fish & Wildlife
5100201080	Lotts Creek	Lotts Creek	Lotts Creek	Perry	KY Dept. of Fish & Wildlife
5100201090	Big Creek	Big Creek	Big Creek	Perry	KY Dept. of Fish & Wildlife
5100201100	North Fork KY River - Big Willard Creek	North Fork Kentucky River	North Fork Ky River-2 (Willard Creek)	Perry	KY Dept. of Fish & Wildlife
5100201110	Grapevine Creek	Grapevine Creek	Grapevine Creek	Perry	KY Dept. of Fish & Wildlife
5100201120	Troublesome Creek 5 - Buckhorn Creek	Troublesome Creek	Troublesome Ck-5 (Buckhorn Creek)	Breathitt	KY Dept. of Fish & Wildlife
5100201120	Troublesome Creek 6 - Lost Creek	Troublesome Creek	Troublesome Ck-6 (Lost Creek)	Breathitt	KY Dept. of Fish & Wildlife
5100201120	Troublesome Creek 9	Troublesome Creek	Troublesome Ck-9	Perry	KY Dept. of Fish & Wildlife
5100201120	Troublesome Creek 4 - Leatherwood Creek	Troublesome Creek	Troublesome Ck-4 (Leatherwood Creek)	Breathitt	KY Dept. of Fish & Wildlife
5100201140	Quicksand Creek 3 - Hunting Creek	Quicksand Creek	Quicksand Ck-3 (Hunting Creek)	Breathitt	KY Dept. of Fish & Wildlife
5100201140	Quicksand Creek 9 - Spring Fork	Quicksand Creek	Quicksand Ck-9 (Spring Fork)	Breathitt	KY Dept. of Fish & Wildlife
5100201140	Quicksand Creek 8 - Hawes Fork	Quicksand Creek	Quicksand Ck-8 (Hawes Fork)	Breathitt	KY Dept. of Fish & Wildlife
5100201140	Quicksand Creek 5	Quicksand Creek	Quicksand Ck-5	Breathitt	KY Dept. of Fish & Wildlife
5100201140	Quicksand Creek 10 - Middle Fork Quicksand	Quicksand Creek	Quicksand Ck-10 (Middle Fk Quicksand Creek)	Knott	KY Dept. of Fish & Wildlife
5100201140	Quicksand Creek 7 - Big Caney	Quicksand Creek	Quicksand Ck-7 (Big Caney)	Breathitt	KY Dept. of Fish & Wildlife
5100201150	North Fork KY River - War Creek	North Fork Kentucky River	North Fork Ky River-1 (War Creek)	Breathitt	KY Dept. of Fish & Wildlife
5100201160	Cane Creek	Cane Creek	Cane Creek	Breathitt	KY Dept. of Fish & Wildlife

## Table D.4 Rotating Biological Sites

<i>11 Digit HUC #</i>	<i>Stream</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>	<i>Monitoring Organization</i>
5100201170	Boone Fork	Frozen Creek	Frozen Ck-2	Breathitt	KY Dept. of Fish & Wildlife
5100201170	Frozen Creek	Frozen Creek	Frozen Ck-2	Breathitt	KY Dept. of Fish & Wildlife
5100201170	Cope Fork	Frozen Creek	Frozen Ck-3 (Cope Fork)	Breathitt	KY Dept. of Fish & Wildlife
5100201190	Holly Creek	Holly Creek	Holly Creek	Wolfe	KY Dept. of Fish & Wildlife
5100201200	Upper Devil Creek	Upper Devil Creek	Upper Devil Creek	Wolfe	KY Dept. of Fish & Wildlife
5100201210	Lower Devil Creek	Lower Devil Creek	Lower Devil Creek	Lee	KY Dept. of Fish & Wildlife
5100201220	Hell Creek	Hell Creek & Walker Creek	Hell Creek/Walker Creek	Lee	KY Dept. of Fish & Wildlife
5100202010	Beech Fork	Middle Fork Kentucky River	Middle Fork Ky River-4	Leslie	KY Division of Water
5100202010	Middle Fork Ky River	Middle Fork Kentucky River	Middle Fork Ky River-4	Leslie	KY Division of Water
5100202020	Cutshin Creek	Cutshin Creek	Cutshin Ck-1	Leslie	KY Division of Water
5100202020	Cutshin Creek	Cutshin Creek	Cutshin Ck-3	Leslie	KY Division of Water
5100202020	Wooten Creek	Cutshin Creek	Cutshin Ck-2 (Wooton Creek)	Leslie	KY Division of Water
5100202030	Leatherwood Creek	Middle Fork Kentucky River	Leatherwood Creek	Perry	KY Division of Water
5100202030	Hell For Certain	Middle Fork Kentucky River	Middle Fork Ky River-1 (Hell For Certain)	Leslie	KY Division of Water
5100202040	Freeman Fork	Freeman Fork	Freeman Fork	Breathitt	KY Division of Water
5100202040	Upper Twin Creek	Middle Fork Kentucky River	Middle Fork Ky River	Breathitt	KY Division of Water
5100202040	Puncheon Camp Creek	Middle Fork Kentucky River	Puncheon Camp Creek	Breathitt	KY Division of Water
5100203020	Cow Creek	South Fork Kentucky River	South Fork Ky River-3 (Cow Creek)	Owsley	KY Dept. of Fish & Wildlife
5100203020	Island Creek (Left Fork)	South Fork Kentucky River	South Fork Ky River-4 (Island Creek)	Owsley	KY Dept. of Fish & Wildlife
5100203030	Bullskin Creek	Bullskin Creek	Bullskin Creek	Clay	KY Dept. of Fish & Wildlife
5100203040	Goose Creek 5 (Horse Creek)	Goose Creek	Goose Ck-5 (Horse Creek)	Clay	KY Dept. of Fish & Wildlife

## ***Table D.4 Rotating Biological Sites***

<i><b>11 Digit HUC #</b></i>	<i><b>Stream</b></i>	<i><b>HUC 11 Name</b></i>	<i><b>4th Order Watershed</b></i>	<i><b>County</b></i>	<i><b>Monitoring Organization</b></i>
5100203040	Goose Creek 7 (Bull Creek)	Goose Creek	Goose Ck-7 (Bull Creek)	Knox	KY Dept. of Fish & Wildlife
5100203040	Goose Creek 8 (Hammon's Fork)	Goose Creek	Goose Ck-8 (Hammons Fork)	Knox	KY Dept. of Fish & Wildlife
5100203050	Sexton Creek 2 (Little Sexton Creek)	Sexton Creek	Sexton Ck-2 (Little Sexton Creek)	Clay	KY Dept. of Fish & Wildlife
5100203050	Sexton Creek 1 (Sexton Creek)	Sexton Creek	Sexton Ck-3	Clay	KY Dept. of Fish & Wildlife
5100203060	Lower Buffalo Creek	South Fork Kentucky River	South Fork Ky River-1 (Lower Buffalo Creek)	Owsley	KY Dept. of Fish & Wildlife
5100203060	Buck Creek	South Fork Kentucky River	South Fork Ky River-2 (Buck Creek)	Owsley	KY Dept. of Fish & Wildlife
5100204040	Millers Creek	Millers Creek	Millers Creek	Estill	KY Division of Water
5100204060	Cow Creek	Cow Creek	Cow Creek	Estill	KY Division of Water
5100204090	White Oak Creek	White Oak Creek	White Oak Creek	Estill	KY Division of Water
5100204100	Drowning Creek	Drowning Creek	Drowning Creek	Madison	KY Division of Water
5100204130	Stillwater Creek	Stillwater Creek	Stillwater Ck	Wolfe	KY Division of Water
5100204140	Sand Lick	Middle Fork of Red River	South Fork Red River	Powell	KY Division of Water
5100204140	South Fork Red River	Middle Fork of Red River	South Fork Red River	Powell	KY Division of Water
5100204140	Middle Fork Red River	Middle Fork of Red River	South Fork Red River	Powell	KY Division of Water
5100204150	Cane Creek	Cane Creek	Cane Creek	Powell	KY Division of Water
5100204170	Hardwick Creek	Hardwick Creek	Hardwick Ck-1	Powell	KY Division of Water
5100204180	Lulbegrud Creek	Lulbegrud Creek	Lulbegrud Creek	Clark	KY Division of Water
5100205010	Upper Howard'S Creek	Upper Howard Creek	Upper Howard Creek	Clark	KY Division of Water
5100205040	East Fork Otter Creek	Otter Creek	Otter Ck-2 (East Fork Otter Creek)	Madison	KY Division of Water
5100205040	Otter Creek	Otter Creek	Otter Ck-1	Madison	KY Division of Water
5100205040	West Fork Otter Creek	Otter Creek	Otter Ck-3 (West Fork Otter Creek)	Madison	KY Division of Water
5100205050	Lower Howard'S Creek	Lower Howard Creek	Lower Howard Creek	Clark	KY Division of Water



## Table D.4 Rotating Biological Sites

<i>11 Digit HUC #</i>	<i>Stream</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>	<i>Monitoring Organization</i>
5100205070	Boone Creek	Boone Creek	Boone Ck-1	Fayette/Clark Line	KY Division of Water
5100205070	Baughman Fork	Boone Creek	Boone Ck-2 (Baughman Fork)	Fayette	KY Division of Water
5100205080	Tate Creek	Tate Creek	Tate Creek	Madison	KY Division of Water
5100205100	Paint Lick Creek	Paint Lick Creek	Paint Lick-1	Garrard	KY Dept. of Fish & Wildlife
5100205100	Paint Lick Creek	Paint Lick Creek	Paint Lick-3	Garrard	KY Dept. of Fish & Wildlife
5100205100	White Lick Creek	Paint Lick Creek	Paint Lick-4 (Walker Br)	Garrard	KY Dept. of Fish & Wildlife
5100205100	Walnut Meadow Branch	Paint Lick Creek	Paint Lick-5 (Walnut Meadow Br)	Madison	KY Dept. of Fish & Wildlife
5100205150	Dix River 3 (Gilberts Creek)	Dix River	Dix River-3 (Gilberts Creek)	Lincoln	KY Dept. of Fish & Wildlife
5100205150	Dix River 5 (Drakes Creek)	Dix River	Dix River-5 (Drakes Creek)	Lincoln	KY Dept. of Fish & Wildlife
5100205150	Dix River 7 (Cedar Creek)	Dix River	Dix River-7 (Cedar Creek)	Lincoln	KY Dept. of Fish & Wildlife
5100205150	Dix River 8	Dix River	Dix River-8	Rockcastle	KY Dept. of Fish & Wildlife
5100205170	Dix River 2	Dix River	Dix River-2	Lincoln	KY Dept. of Fish & Wildlife
5100205180	Hanging Fork 2	Hanging Fork Creek	Hanging Fk-2	Lincoln	KY Dept. of Fish & Wildlife
5100205180	Hanging Fork 3	Hanging Fork Creek	Hanging Fk-3	Lincoln	KY Dept. of Fish & Wildlife
5100205180	Hanging Fork 1 (White Oak Creek)	Hanging Fork Creek	Hanging Fk-2	Lincoln	KY Dept. of Fish & Wildlife
5100205230	Griers Creek	Griers Creek	Griers Creek	Woodford	KY Dept. of Fish & Wildlife
5100205240	Glenns Creek	Glenns Creek	Glenns Creek	Franklin	KY Dept. of Fish & Wildlife
5100205260	Benson Creek	Benson Creek	Benson Ck-6	Franklin	KY Dept. of Fish & Wildlife
5100205260	Goose Creek	Benson Creek	Benson Ck-7 (Mink Run)	Shelby	KY Dept. of Fish & Wildlife
5100205260	Benson Creek	Benson Creek	Benson Ck-5	Franklin	KY Dept. of Fish & Wildlife
5100205260	Benson Creek	Benson Creek	Benson Ck-3	Franklin	KY Dept. of Fish & Wildlife
5100205260	North Benson Creek	Benson Creek	Benson Ck-2 (North Benson)	Franklin	KY Dept. of Fish & Wildlife

***Table D.4 Rotating Biological Sites***

<i>11 Digit HUC #</i>	<i>Stream</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>	<i>Monitoring Organization</i>
5100205260	North Fork North Benson Creek	Benson Creek	Benson Ck-1 (North Fork North Benson)	Franklin	KY Dept. of Fish & Wildlife
5100205260	South Benson Creek	Benson Creek	Benson Ck-8 (South Benson Creek)	Franklin	KY Dept. of Fish & Wildlife
5100205280	Avon Fork	North Elkhorn Creek	North Elkhorn Ck-9 (Avon Fork)	Fayette	KY Division of Water
5100205280	Lecomptes Run	North Elkhorn Creek	North Elkhorn Ck-1 (Lecomptes Run)	Scott	KY Division of Water
5100205280	Mcconnell'S Run	North Elkhorn Creek	North Elkhorn Ck-3 (McConnell Run)	Scott	KY Division of Water
5100205280	Dry Run	North Elkhorn Creek	North Elkhorn Ck-4 (Dry Run)	Scott	KY Division of Water
5100205280	North Elkhorn Creek	North Elkhorn Creek	North Elkhorn Ck-7	Scott	KY Division of Water
5100205280	North Fork Elkhorn Creek	North Elkhorn Creek	North Elkhorn Ck-8	Fayette	KY Division of Water
5100205290	Elkhorn Creek	Elkhorn Creek	Elkhorn Creek	Franklin	KY Division of Water
5100205300	Flat Creek	Flat Creek	Flat Creek	Franklin	KY Dept. of Fish & Wildlife
5100205310	Sawdridge Creek	Cedar Creek	Cedar Ck-1 (ElkLick)	Owen	KY Dept. of Fish & Wildlife
5100205310	Cedar Creek	Cedar Creek	Cedar Ck-3	Owen	KY Dept. of Fish & Wildlife
5100205320	North Severn Creek	Severn Creek	Severn Ck-1 (North Severn Creek)	Owen	KY Dept. of Fish & Wildlife
5100205320	Severn Creek	Severn Creek	Severn Ck-2	Owen	KY Dept. of Fish & Wildlife
5100205320	Severn Creek	Severn Creek	Severn Ck-3	Owen	KY Dept. of Fish & Wildlife
5100205330	Banta's Fork	Sixmile Creek	Sixmile Ck-1 (Bantas Fork)	Henry	KY Dept. of Fish & Wildlife
5100205330	Sixmile Creek	Sixmile Creek	Sixmile Ck-2	Henry	KY Dept. of Fish & Wildlife
5100205340	Sulphur Creek	Drennon Creek	Drennon Ck-3 (Sulphur Creek)	Henry	KY Dept. of Fish & Wildlife
5100205340	Drennon Creek	Drennon Creek	Drennon Ck-2	Henry	KY Dept. of Fish & Wildlife
5100205350	Big Twin Creek	Mill Creek & Big Twin Creek	Big Twin Creek	Owen	KY Dept. of Fish & Wildlife

## ***Table D.4 Rotating Biological Sites***

<i><b>11 Digit HUC #</b></i>	<i><b>Stream</b></i>	<i><b>HUC 11 Name</b></i>	<i><b>4th Order Watershed</b></i>	<i><b>County</b></i>	<i><b>Monitoring Organization</b></i>
5100205350	Mill Creek	Mill Creek & Big Twin Creek	Mill Creek	Owen	KY Dept. of Fish & Wildlife
5100205360	Eagle Creek 20 (Lyttles Fork)	Lyttles Fork & Eagle Creek	Eagle Ck-20 (Lyttles Fork)	Scott	KY Dept. of Fish & Wildlife
5100205370	Eagle Creek 21 (Richland Creek)	Eagle Creek	Eagle Ck-16	Owen	KY Dept. of Fish & Wildlife
5100205370	Eagle Creek 22	Eagle Creek	Eagle Ck-22	Grant	KY Dept. of Fish & Wildlife
5100205370	Eagle Creek 31 (Grassy Run)	Eagle Creek	Eagle Ck-31 (Grassy Run)	Grant	KY Dept. of Fish & Wildlife
5100205370	Eagle Creek 30 (Rattlesnake Creek)	Eagle Creek	Eagle Ck-16	Owen	KY Dept. of Fish & Wildlife
5100205370	Elk Creek	Eagle Creek	Eagle Ck-15 (Elk Creek)	Owen	KY Dept. of Fish & Wildlife
5100205370	Eagle Creek 17 (Three Forks Creek)	Eagle Creek	Eagle Ck-17 (Three Fork Creek)	Grant	KY Dept. of Fish & Wildlife
5100205390	Ten Mile Creek 3 (Bullock Pen Creek)	Tenmile Creek	Tenmile Ck-3 (Bullock Pen Creek)	Grant	KY Dept. of Fish & Wildlife
5100205390	Ten Mile Creek 5 (Arnold's Creek)	Tenmile Creek	Tenmile Ck-5 (Arnold's Creek)	Grant	KY Dept. of Fish & Wildlife
5100205400	Brush Creek	Brush Creek	Brush Creek	Owen	KY Dept. of Fish & Wildlife
5100205410	Eagle Creek 2 (Twin Creek)	Eagle Creek	Eagle Ck-2 (Twin Creek)	Owen	KY Dept. of Fish & Wildlife
5100205410	Buck Run	Eagle Creek	Eagle Ck-6 (Lick Creek)	Carroll	KY Dept. of Fish & Wildlife
5100205410	Lick Creek	Eagle Creek	Eagle Ck-6 (Lick Creek)	Carroll	KY Dept. of Fish & Wildlife
5100205410	Two Mile Creek	Eagle Creek	Eagle Ck-8	Gallatin	KY Dept. of Fish & Wildlife
5100205410	Moseby Branch	Eagle Creek	Eagle Ck-9 (Moseby Br)	Owen	KY Dept. of Fish & Wildlife
5100205420	Emily Run	Kentucky River	Kentucky River	Carroll	KY Dept. of Fish & Wildlife
5100205430	East Fork Mill Creek	Mill Creek	Mill Ck-3 (East Fork Mill Creek)	Carroll	KY Dept. of Fish & Wildlife
5100205430	Mill Creek	Mill Creek	Mill Ck-1	Carroll	KY Dept. of Fish & Wildlife
5100205430	West Fork Mill Creek	Mill Creek	Mill Ck-2 (West Fork Mill Creek)	Carroll	KY Dept. of Fish & Wildlife

## APPENDIX E

### Water Quality Sampling Sites

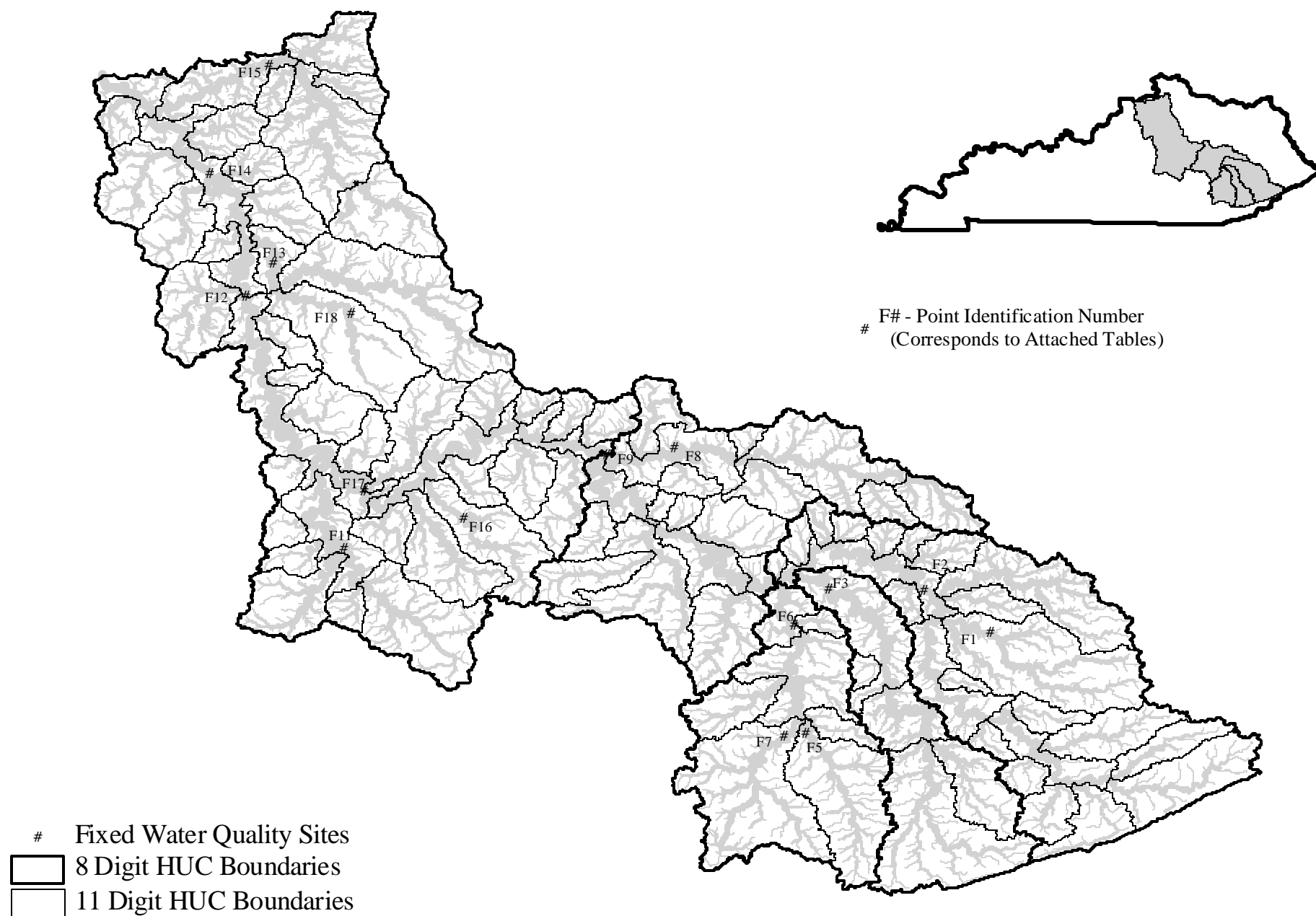
Figure E1. Fixed Water Quality Sites.

Table E1. Fixed Water Quality Sites.

Figure E2. Rotating Water Quality Sites.

Table E2. Rotating Water Quality Sites.

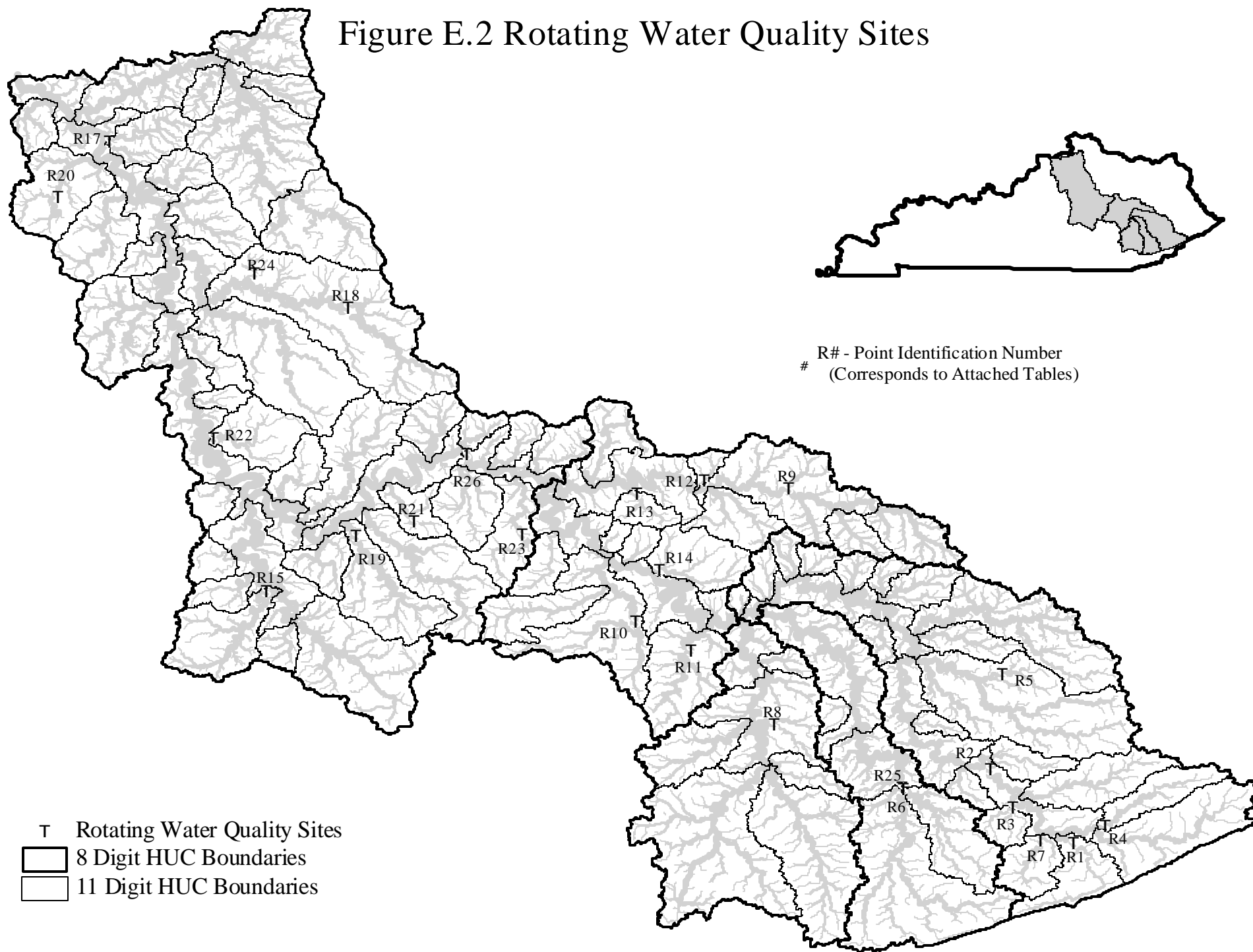
Figure E.1 Fixed Water Quality Sites



## ***Table E.1 Water Quality - Fixed Sites, Kentucky Division of Water***

<i><b>Map ID #</b></i>	<i><b>Stream/Location</b></i>	<i><b>11 Digit HUC #</b></i>	<i><b>HUC 11 Name</b></i>	<i><b>4th Order Watershed</b></i>	<i><b>County</b></i>	<i><b>Site Type</b></i>
F01	Troublesome Creek - Clayhole	5100201120	Troublesome Creek	Troublesome Ck-3	Breathitt	
F02	North Fork Kentucky River - Jackson	5100201150	North Fork Kentucky River	North Fork Ky River	Breathitt	Agriculture
F03	Middle Fork Kentucky River - Tallega	5100202040	Middle Fork Kentucky River	Middle Fork Ky River	Lee	Agriculture
F05	Red Bird River - Barcreek	5100203010	Red Bird River	Red Bird River-1	Clay	
F06	South Fork Kentucky River - Booneville	5100203060	South Fork Kentucky River	South Fork Ky River	Owsley	Agriculture
F07	Goose Creek - Hensley	5100203040	Goose Creek	Goose Ck-1	Clay	
F08	Red River - Clay City	5100204160	Red River	Red River-3	Powell	Agriculture
F09	Kentucky River - Trapp	5100205420	Kentucky River	Kentucky River	Madison	Agriculture
F11	Dix River - Danville	5100205170	Dix River	Dix River-9	Garrard	Agriculture
F12	Kentucky River - Frankfort	5100205420	Kentucky River	Kentucky River	Franklin	Agriculture
F13	Elkhorn Creek - Peaks Mill	5100205290	Elkhorn Creek	Elkhorn Creek	Franklin	Agriculture
F14	Kentucky River - Lockport	5100205420	Kentucky River	Kentucky River	Henry	Agriculture
F15	Eagle Creek - Glencoe	5100205410	Eagle Creek	Eagle Ck-11	Owen	Agriculture
F16	Silver Creek - Richmond	5100205090	Silver Creek	Silver Ck-1	Madison	Agriculture
F17	Kentucky River - High Bridge	5100205420	Kentucky River	Kentucky River	Garrard	Agriculture
F18	South Elkhorn Creek - Midway	5100205270	South Elkhorn Creek	South Elkhorn Ck-3	Scott	Agriculture & Urban

Figure E.2 Rotating Water Quality Sites



## ***Table E.2 Water Quality - Rotating Sites, Kentucky Division of Water***

<i><b>Map ID #</b></i>	<i><b>Stream/Location</b></i>	<i><b>11 Digit HUC #</b></i>	<i><b>HUC 11 Name</b></i>	<i><b>4th Order Watershed</b></i>	<i><b>County</b></i>	<i><b>Site Type</b></i>
R01	Line Fork	5100201040	Line Fork	Line Fork	Letcher	Least-impacted
R02	North Fork Kentucky River - Hazard	5100201150	North Fork Kentucky River	North Fork Ky River	Perry	Urban
R03	Maces Creek - Viper	5100201060	Maces Creek	Maces Creek	Perry	Silviculture
R04	Rockhouse Creek - Letcher	5100201020	Rockhouse Creek	Rockhouse Creek	Letcher	Mining
R05	Buckhorn Creek - Noble	5100201120	Troublesome Creek	Troublesome Ck-5 (Buckhorn Creek)	Breathitt	Mining
R06	Cutshin Creek - Dryhill	5100202020	Cutshin Creek	Cutshin Ck-1	Leslie	Silviculture
R07	Leatherwood Creek	5100202030	Middle Fork Kentucky River	Leatherwood Creek	Perry	Mining
R08	Buffalo Creek - Trixie	5100203020	South Fork Kentucky River	South Fork Ky River-5 (Buffalo Creek)	Owsley	Least-impacted
R09	Gladie Creek - Nada	5100204120	Red River	Gladie Creek	Menifee	Least-impacted
R10	Station Camp Creek - Alumbaugh	5100204050	Station Camp Creek	Station Camp Ck-6	Estill	Least-impacted
R11	Sturgeon Creek - Cressmont	5100204020	Sturgeon Creek	Sturgeon Ck-3	Lee	Silviculture
R12	Cane Creek - Bowen	5100204160	Red River	Red River-3	Powell	Silviculture
R13	Hardwick Creek - Clay City	5100204170	Hardwick Creek	Hardwick Ck-1	Powell	Agriculture
R14	Millers Creek	5100204040	Millers Creek	Millers Creek	Estill	Mining
R15	Hanging Fork - Hedgeville	5100205180	Hanging Fork Creek	Hanging Fk-2	Boyle	Agriculture
R17	Mill Creek - Perry Park	5100205350	Mill Creek & Big Twin Creek	Mill Creek	Owen	Silviculture
R18	North Elkhorn Creek - above Georgetown	5100205280	North Elkhorn Creek	North Elkhorn Ck-5	Scott	Agriculture
R19	Paint Lick Creek - Buckeye	5100205100	Paint Lick Creek	Paint Lick-1	Garrard	Agriculture
R20	Drennon Creek	5100205340	Drennon Creek	Drennon Ck-4	Henry	Agriculture
R21	Tate Creek - Richmond	5100205080	Tate Creek	Tate Creek	Madison	Urban
R22	Clear Creek - Versailles	5100205220	Clear Creek	Clear Creek	Woodford	Least-impacted
R23	Muddy Creek - Waco	5100205020	Muddy Creek	Muddy Creek	Madison	Least-impacted



*Table E.2 Water Quality - Rotating Sites,  
Kentucky Division of Water*

<i>Map ID #</i>	<i>Stream/Location</i>	<i>11 Digit HUC #</i>	<i>HUC 11 Name</i>	<i>4th Order Watershed</i>	<i>County</i>	<i>Site Type</i>
R24	North Elkhorn Creek - below Georgetown	5100205280	North Elkhorn Creek	North Elkhorn Ck-1 (Locust Fk/Lecomptes Run)	Scott	Urban
R25	Middle Fork Kentucky River - Dryhill	5100202010	Middle Fork Kentucky River	Middle Fork Ky River-3	Leslie	Mining
R26	Kentucky River - Winchester	5100205420	Kentucky River	Kentucky River	Madison	Model Input

## APPENDIX F

### Contact Information

Greg Epp  
Kentucky River Basin Coordinator  
  
Kentucky Water Research Institute  
233 Mining and Mineral Resources Building  
University of Kentucky  
Lexington, KY 40506-0107  
  
Phone: 859-257-5387  
Fax: 859-323-1049  
E-mail: gregepp@engr.uky.edu

Lindell Ormsbee  
Kentucky River Authority Watershed Management Coordinator  
  
Kentucky Water Research Institute  
233 Mining and Mineral Resources Building  
University of Kentucky  
Lexington, KY 40506-0107  
  
Phone: 859-257-1302  
Fax: 859-323-1049  
E-mail: lormsbee@engr.uky.edu

Lee Colten  
State Watershed Coordinator  
  
Kentucky Division of Water  
14 Reilly Road  
Frankfort, KY 40601  
  
Phone: 502-564-3410  
Fax: 502-564-0111  
E-mail: lee.colten@mail.state.ky.us

Watershed Management Web Site: <http://water.nr.state.ky.us/dow/watrshd.htm>