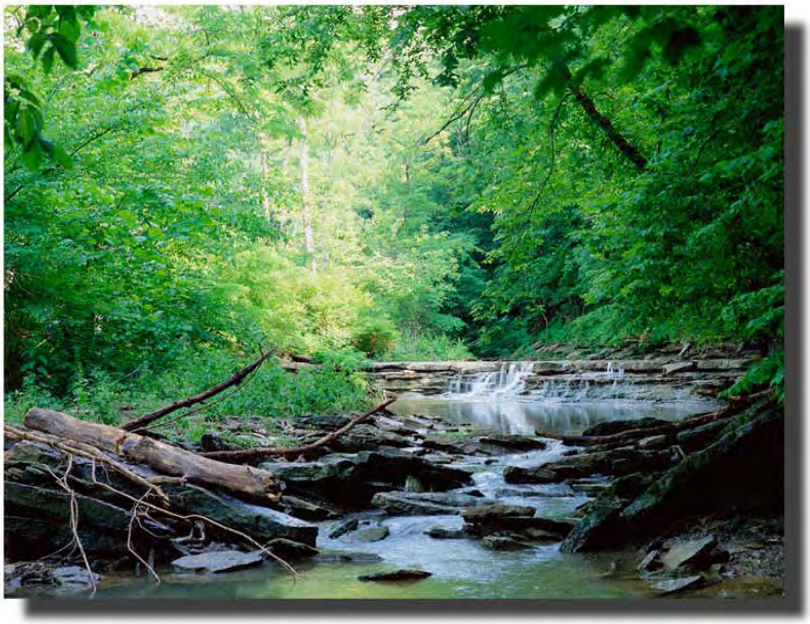
# The Banklick Watershed Action Plan

## Kenton and Boone Counties, Kentucky

### A Comprehensive Approach to Watershed Improvement



Banklick
WATERSHED
COUNCIL

## — IN APPRECIATION —

The Banklick Watershed Council (BWC) extends it thanks to the many organizations and individuals willing to share ideas, insights, and information in the development of this plan. Special thanks and recognition are given to those individuals directly involved in preparing this plan. They include:

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Maps included herein were provided by the Northern Kentucky Area Planning Commission and Limno-Tech, Inc.

Cover graphics include a photo by Marc Hult of Fowler Creek, a tributary to Banklick Creek, and the Small Stream Ecosystem poster created by Rick Hill, Kentucky Department of Fish & Wildlife.

The successful collaboration among many to develop this plan symbolizes the spirit of partnership that can reclaim Banklick Creek for the people in its watershed.

Comments and questions concerning this plan should be directed to the Banklick Watershed Council's web site at www.banklick.org. Email: info@banklick.org

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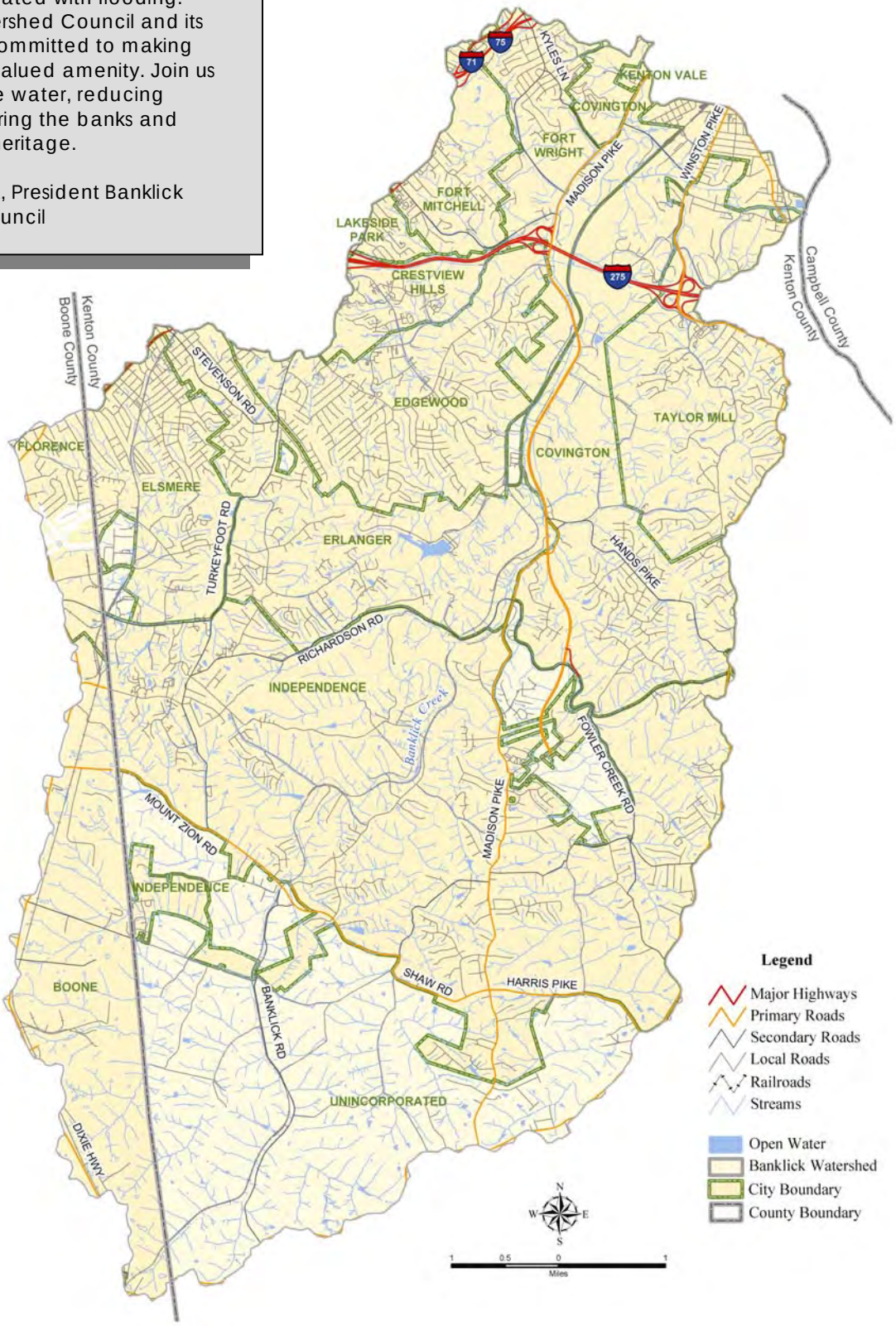
After decades of neglect, Banklick Creek and its watershed are receiving the attention they need to restore water quality and reduce the hazards associated with flooding. Banklick Watershed Council and its partners are committed to making the stream a valued amenity. Join us in cleaning the water, reducing flooding, restoring the banks and honoring the heritage.

----Marc F. Hult, President Banklick Watershed Council



**BANKLICK WATERSHED COUNCIL MISSION STATEMENT –**

**" protecting, promoting and restoring the biological, chemical and physical integrity of Banklick Creek, its tributaries and watershed."**

## EXECUTIVE SUMMARY

November 2005

The Banklick Watershed Action Plan provides a blueprint for improving the 58-sq. mi. drainage basin of Banklick Creek, which flows though portions of Kenton and Boone counties in Northern Kentucky. Included in the plan are sections on the watershed's natural resources, land use, and changing patterns of development. Water quality and quantity problems also are considered. The centerpiece, of the document, however, is an action plan that focuses on the four goals of the Banklick Watershed Council, presented in the box below.

The plan examines each goal with regard to progress made, future plans and key challenges in attaining the goal. Stakeholders integral to the formation of a strong local, state and federal partnership to improve Banklick watershed are presented in the plan's final table. In addition, the plan offers web links and a variety of text boxes and photos to acquaint the reader with watersheds in general and the Banklick in particular.

**FOUR GOALS OF BWC**

**CLEAN THE WATER**

**REDUCE FLOODING**

**RESTORE THE BANKS**

**HONOR THE HERITAGE**

This plan has been developed to guide the Banklick Watershed Council and all its partners in watershed improvement efforts, but it is further hoped that it will stimulate watershed residents, businesses and others to join in those efforts.

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Summary of results of Banklick Watershed Council survey

Areas of expertise/interest indicated by BWC meeting participants

## KEY TO ACRONYMS

| | |
|---|---|
| **BACE** | Banklick Creek Watershed Analysis and Issue Characterization for Education and Outreach |
| **BCC** | Boone County Conservancy |
| **BCCD** | Boone County Conservation District |
| **BMP** | best management practice |
| **BWC** | Banklick Watershed Council |
| **CSO** | Combined Sewer Overflow |
| **KCC** | Kenton County Conservancy |
| **KCCD** | Kenton County Conservation District |
| **KCFC** | Kenton County Fiscal Court |
| **KCHSEM** | Kenton County Homeland Security and Emergency Management |
| **KCPD** | Kenton County Parks Department |
| **KDOW** | Kentucky Division of Water |
| **LAND** | Local Alliance for Nature and Development |
| **LRRK** | Licking River Region in Kentucky (a document by the KDOW) |
| **LRWW** | Licking River Watershed Watch |
| **NKAPC** | Northern Kentucky Area Planning Commission |
| **NKIHD** | Northern Kentucky Independent Health District |
| **NKUCAE** | Northern Kentucky University Center for Applied Ecology |
| **NKUCFC** | Northern Kentucky Urban and Community Forestry Council |
| **NRCS** | Natural Resources Conservation Service of the USDA |
| **RM** | River Mile |
| **SD1** | Sanitation District No.1 of Northern Kentucky |
| **SSO** | Sanitary Sewer Overflow |
| **USACE** | U.S. Army Corps of Engineers |
| **USGS** | U.S. Geological Survey |

# The Banklick Watershed Action Plan – A Comprehensive Approach to Watershed Improvement

## INTRODUCTION

Brushy Fork: A tributary of Banklick Creek

Expanding populations and rapidly changing landscapes are affecting the way we think about our natural resources. There is a growing recognition that our waterways, soils, forests and other resources do not exist in isolation, but are part of a much larger system of natural functions and human activities. The watershed approach recognizes the intricacy of these connections and encourages comprehensive and coordinated ways to address environmental concerns. As in many other parts of our country, the watershed approach offers a blueprint for success in the approximately 58-square mile drainage basin of Northern Kentucky's Banklick Creek.

The U.S. Environmental Protection Agency and Kentucky Division of Water are among the public agencies that recognize the value of the watershed approach in improving streams and the lands within watersheds. Like many other states, Kentucky has organized its water quality and assessment programs by major watersheds.

What is a Watershed?

A watershed, or basin, includes all the area that drains to a particular stream, river or lake. Each watershed is unique, with its characteristics dependent on its natural systems and the people who live there. Like other watersheds, the Banklick watershed and its resources mirror the natural events and economic activities within its boundaries.

Banklick Creek is a watershed within the larger Licking River Basin. Through an interagency prioritization process led by the Kentucky Division of Water, Banklick Creek has been designated as one of the three "highest priority" watersheds in the Licking River basin. Among the factors contributing to the watershed's priority designation are the severity of Banklick's flooding and water quality problems, its diversity of stakeholders, the high projected growth rate, and the large number of water quality violations. The following chapter presents additional information on issues related to land use, water quality and quantity (flooding), and public agency and community involvement.

Watershed monitoring, assessment and other collaborative activities conducted in the Licking River basin have helped support the formation of the Banklick Watershed Council (BWC), the primary citizens' group involved in the protection and improvement of Banklick Creek. The BWC recognizes the critical connections between the region's rolling topography, forest cover, agricultural lands and cityscapes though which the creek flows for 19 miles toward its confluence with the Licking River. Like all streams, Banklick Creek is a reflection of its watershed, mirroring the natural landscape, as well as decades of human activity and intense development. At the beginning of the 21st century, the creek reflects a highly developed, ecologically compromised watershed.

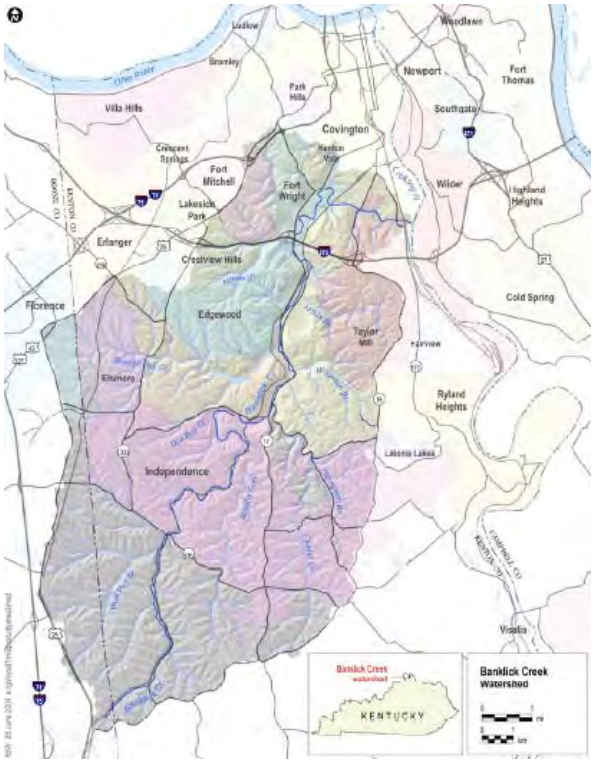



**Figure 1: Municipalities within Banklick Creek. Limno-Tech 2004**

Since 2002, the BWC has worked with many municipalities, agencies and individuals to develop a new vision for Banklick Creek that includes the improvement and reclamation of the stream and its riparian corridor. A strategy for the watershed's long-term management is emerging, but its transformation to reality will require adherence to the well-defined, comprehensive effort, as presented in this plan. Successful watershed projects elsewhere have illustrated the need for a clear plan of action to garner public support and to leverage the funding for implementation of plan components.

Several other key factors must be considered to create a blueprint for success in the Banklick watershed. The effort must encompass the entire watershed, transcending political boundaries for the collective good. The watershed as shown on Figure 1 is a jurisdictional patchwork of more than 10 municipalities, as well as unincorporated portions of Boone and Kenton counties. Although each of these cities and areas has its own identity, they are all part of the same watershed. From a watershed perspective, cities and counties working together have the advantages of combined resources and greater influence in dealing with state and federal agencies. Communities working together to improve Banklick Creek can realize economies of scale in implementing sound, cost-effective strategies. Moreover, better ideas and implementation strategies frequently emerge from group interaction than can be developed individually.

**The success of the Banklick effort also depends upon:**

- ✓ providing well-structured opportunities for meaningful participation by all the project stakeholders;
- ✓ identifying the most significant threats to water quality and targeting resources accordingly;
- ✓ establishing well-defined goals and objectives related to water quality, habitat improvement and biodiversity, and
- ✓ recognizing at the outset the long-term nature of watershed improvement and the diversity of financial and technical resources required to accomplish the goals.

Chapter 1 provides an overview of conditions in the Banklick Creek watershed today and information on water quality problems and flooding. Chapter 2 is the centerpiece of the plan because it presents a point-by-point action plan for improving Banklick Creek. Chapter 3 considers how progress towards the watershed goals will be measured.

A "Key to Acronyms" is presented after the table of contents to help the reader identify the project stakeholders and techniques that may be included in the overall watershed strategy. A "Glossary of Terms" is presented at the end of the document. ***Boldface italics*** are used to alert the reader to new terms the first time they are used. The references alluded to in the text are included in "Sources". Supplemental information at the end of the action plan includes a summary of results of BWC survey of watershed stakeholders and a list of areas of expertise/interest indicated by BWC meeting participants.

# CHAPTER 1: Overview of Banklick Watershed and Issues of Concern

The Banklick watershed has long-standing problems resulting from two centuries of human settlement and related activities, as well as a general lack of civic awareness of the values of stream and watershed resources. The cumulative impacts of urbanization and channelization have changed much of Banklick Creek and its network of tributaries into an unhealthy, ecologically impoverished stream system that has become notorious in Northern Kentucky.

Major concerns in the watershed include water quality, water quantity and flooding, land use and lack of community involvement.

This section provides information on the watershed's location, topography, land use, biotic resources, water quality and flooding. It also establishes the four key goals of the Banklick Watershed Council's overall improvement effort.

## Watershed Characterization

**Banklick Creek at confluence with Licking River**

Banklick Creek is one of the largest watersheds in Northern Kentucky. Of the watershed's more than 58 square miles, approximately 90 percent are in Kenton County and about 10 percent are in Boone County. The stream rises in rural areas near the Boone-Kenton County line and then flows northeasterly joining the Licking River in a highly urbanized area of Covington, about 4.7 miles from the Licking's confluence with the Ohio River. The topography of the watershed ranges from steep to gently sloping. Elevations above mean sea level range from 960 feet along the upper portion of the watershed divide to 450 at the Banklick's confluence with the Licking River (USDA 1973). Throughout most of its length, Banklick Creek is shallow and flows over a narrow, gravelly streambed. However, approximately ¾ mi. upstream from its mouth, it becomes wider and six to eight feet deep. The Banklick is hydraulically influenced by the Licking at its mouth, such that, at times, the Licking River flows upstream into the Banklick for 30-40 feet and has an influence on the Banklick's temperature, dissolved oxygen and other stream parameters (Limno-Tech, Inc. 1998).

Most soils in the watershed were formed from shale, limestone and sandstone. Principal upland soils, which are mostly well drained, include Eden, Cynthiana, Faywood and Nicholson. Major bottomland and terrace soils include Newark, Nolin, Captina and Licking. Soil layers in the watershed are relatively shallow (less than 10 feet deep). The combination of shallow soils underlain by karst limestone and shale results in limited groundwater storage.

Groundwater supplies baseflow to streams and is the primary contributor to stream flow during dry weather. Most small upstream tributaries of the Banklick are rock-bound while lower downstream tributaries have gravel bottoms. The Banklick's major tributaries from upstream to downstream are Wolf Pen Branch, Brushy Fork, Fowler Creek, Wayman Branch, Bullock Pen Creek, Holds Branch and Horse Branch. There also are several small, unnamed tributaries. Also located in the watershed is Doe Run Lake, a 51-acre flood control reservoir that was constructed on Bullock Pen Creek between 1978 and 1982 (USDA 1973, Limno-Tech 2004).

How does geography affect stream health?
The lay of the land, soil types, and vegetation in an area can directly affect water quality – especially when the land is tilled. Vegetation can reduce flooding by slowing down runoff from rainstorms and can even filter out silt and other contaminants before they reach streams.

Licking River Region in Kentucky (LRRK)

As mentioned in the introduction, a close link exists between land activities and water quality. For nearly 200 years, agriculture has been the traditional land use in Banklick's headwaters and upland areas. The region's approximately 186-day growing season and 40-inch annual precipitation have been favorable to the growth of tobacco, other row crops, fruits and vegetables. Livestock operations also are numerous in the watershed and have contributed water-borne sediments and manure to streams. Many of these traditional farmlands are in transition, however, and are rapidly being converted into residential subdivisions, adding to impervious surfaces in the watershed. As the Banklick flows downstream, its watershed becomes increasingly urbanized flowing through dense residential, commercial and light industrial development in the Latonia neighborhood of Covington.

**Figure 2: 1995 Land Use – Limno-Tech**

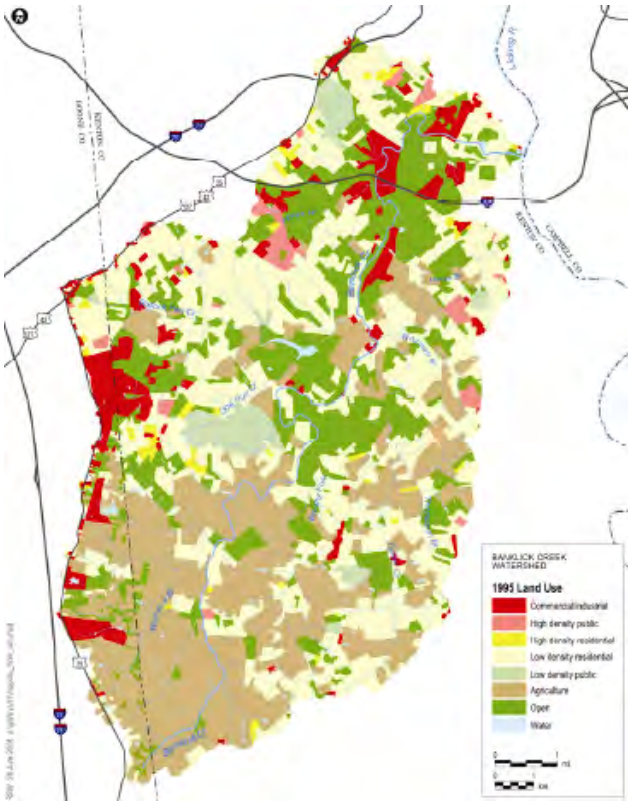
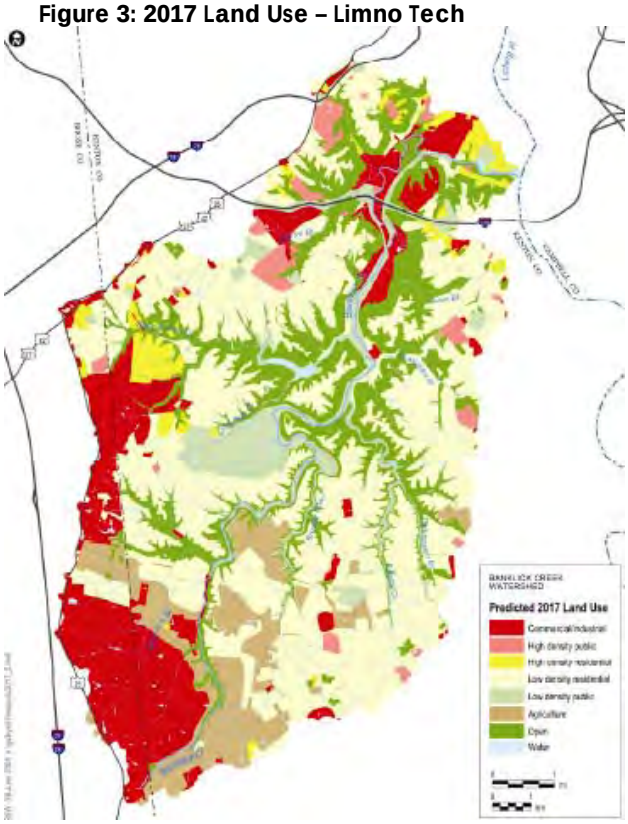



Figure 2 reflects current land use in the Banklick watershed and illustrates that a large portion of the watershed is highly developed. Long-standing patterns show that developed parts of the watershed are clustered near the northernmost parts of the watershed, while the southern part of the watershed is more agricultural and contains large amounts of open space.

Figure 3, however, projects growth through 2017 and illustrates marked changes in land use in the watershed, especially a decrease in the amount of agricultural land. Most of Fowler Creek is expected to change from agricultural to low density residential, while a large strip of land along the western edge of the watershed in proximity to Interstate 75 is expected to change from primarily agricultural to industrial uses (Limno-Tech, Inc. 2004).

Major shifts in land use and populations in watersheds create both challenges and opportunities. During such transitions, public agencies and watershed organizations may be able to gradually influence positive changes in policies, actions and attitudes toward watershed resources.

**Figure 3: 2017 Land Use – Limno Tech**




> Northern Kentucky's landscape changes on a daily basis, often in ways that can't be reversed. Our challenge then, as stewards of this landscape, is to consider the natural environment each time we draft a growth strategy or review a development proposal. It's to see that the benefits of growth are maximized, the negative impacts are minimized, and the fragile balance of nature is respected. Nowhere is this challenge more critical than in the Banklick Creek Watershed, an area that constitutes the heart of Northern Kentucky's urban life. More than any other, it will be this watershed's health that will illustrate for future generations how successful we were at meeting this challenge.
>
> Dennis Andrew Gordon, FAICP
> Executive Director, NKAPC

## Green Spaces and Biotic Resources

Although many small community parks occur in the watershed, a system of Kenton County parks was not developed until recent decades. In terms of both land availability and affordability, the relative lateness in park development has limited the county's options in acquiring larger tracts of land. Kenton County parks in the watershed include:

Doe Run Lake Park – 183 acres
Banklick Woods Park – 78 acres
Pioneer Park – 43 acres, and
Richardson Road Park – 21 acres

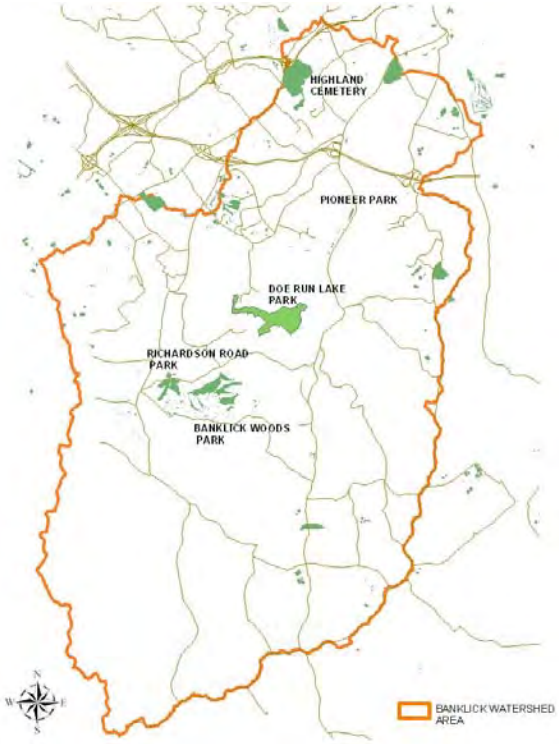



**Figure 4: Green Spaces in watershed**

Another notable green space available to the public is Highland Cemetery, which includes a 150-acre natural area with extensive trails. The cemetery trail system connects with the 13-acre Fort Wright Nature Center. Plant species found in the two tracts and typical vegetation in the Banklick watershed include dogwood and redbud trees, blue phlox, bloodroot, Solomon's seal, wild ginger, trout lily, May apple, sessile trillium, Queen Anne's lace, chicory, evening primrose, late summer aster, black-eyed Susan, butterfly weed, goldenrod, snakeroot, thistle and ironweed. Wildlife observed in the Highland-Fort Wright area and typical of the watershed includes at least 106 birds and 19 mammals (Gayle Pille, Personal Communication).

Biotic data concerning Banklick watershed are scattered, although the watershed's natural resources have received more attention in recent years. The 2004 BACE study (**B**anklick Creek Watershed **A**nalysis and Issue **C**haracterization for **E**ducation and Outreach) focused on forest resources and determined that nearly 30 percent of the Banklick watershed is comprised of natural areas needing protection while nearly 50 percent of the watershed is in need of restoration measures.

Aquatic resources of the watershed have not been extensively studied in the past, but included a 1969 fish survey of Banklick Creek near present-day Pioneer Park and a Bankllick tributary, Bullock Pen (Jones, 1970). A total of 16 fish species representing five families were collected -- among them, three darter species (see box on next page). Darters are small fish adapted for life in swift -flowing sections of clear rocky streams and are indicative of relatively high water quality. At the time of the survey, Jones noted a moderate amount of bank fishing along Banklick Creek and that fishing was considered good. Accompanying notes on fish food organisms (***macroinvertebrates***)

indicated the presence of Ephemeroptera (mayflies) and Coleoptera (aquatic beetles); both groups of organisms are considered to be pollution-sensitive. Although Jones' report includes little interpretation, data for Banklick indicates a relatively healthy small stream ecosystem for much of its length in 1969.

**Fishes of the Banklick Watershed***

Carp and Minnow Family
- central stoneroller
- common carp
- silverjaw minnow
- rosefin shiner
- common shiner
- bluntnose minnow
- creek chub

Sucker Family
- white sucker

Catfish Family
- channel catfish

Sunfish Family
- green sunfish
- longear sunfish
- hybrid sunfish
- largemouth bass
- black crappie

Perch Family
- rainbow darter
- fantail darter
- johnny darter

Species reported by Jones, A.R. 1970. Inventory and Classification of Streams in the Licking River Drainage. KY Dept. of Fish and Wildlife Resources.

Since 1969, many changes have occurred near these sampling sites, including the impoundment of Bullock Pen and its tributary Doe Run, to form Doe Run Lake. The development of Doe Run Lake has been followed by major subdivision development in that subbasin. Also, near the Pioneer Park sampling site and throughout the watershed major highway development has occurred. A 2003 habitat and biological community assessment found high algal biomass in the Bullock pen/Doe Run subbasin, indicative of high nutrient loads from suburban lawns. Accordingly, Bullock Pen Creek has been identified as being impaired because of high nutrients (Strand Associates, Inc. 2003). The assessment also found lower numbers of common invertebrates in the more urbanized portions of the creek, typical of habitat changes, reduced ***riparian corridors*** and siltation impacts from runoff. Again, such findings are consistent with water use impairments, as discussed in the following section.

**Water Quality of Banklick Creek**

As early as the 1950s, residents along Banklick Creek described the stream as "smelly" and complained about debris left by receding waters (Ormsbee et al. 1994). A 1952 attempt to lessen the creek's odors by building up the bank and containing the creek failed to alleviate the problem. Banklick Creek's water quality concerns have continued to the present day, but unlike past efforts to treat the symptoms of pollution, today's public agencies and citizens are trying to understand the sources of problems and remediate them for the long-term benefit of the stream and those who live and work in the watershed.

In accordance with the federal Clean Water Act, states must designate one or more uses for each waterway. In Kentucky, almost every waterbody is classified as ***warmwater aquatic habitat*** and ***primary and secondary contact recreation***. Waterbodies that are not meeting their ***designated uses*** are described as "impaired". Since 1998, the entire 19-mile length of Banklick Creek has been on Kentucky's 303(d) list, in accordance with the section of the Clean Water Act requiring each state to list water body segments not expected to meet state water quality standards. The reasons Banklick Creek is listed as impaired are excessive nutrients, organic enrichment, low dissolved oxygen, hydromodifications and related habitat alterations,

and pathogens, including ***fecal coliforms***. The general sources of pollution, as listed by the state (Kentucky Division of Water 1998), include municipal point sources, combined sewer overflows (see box on page 12), urban runoff/storm sewers, and flow modification.

Remedial actions to address these water quality concerns include studies and projects related to combined sewer overflows (CSOs), sanitary sewer overflows, package plants and septic system failures, and sediment and erosion control related primarily to construction in upstream areas. Over the years, data documenting water quality in the Banklick Creek watershed have been collected by the Northern Kentucky Independent Health District (NKIHD), Sanitation District No.1 of Northern Kentucky (SD1), Kenton County Conservation District (KCCD) and Licking River Watershed Watch (LRWW).

The most recent and concerted effort to identify and understand water quality problems is documented in *Watershed Assessment Protocol – Application to Banklick Creek* (Limno -Tech, Inc. 2004). In 2001, SD1 was awarded a federal grant to develop and demonstrate a method for understanding water quality problems on a watershed basis. The objective of the study was to develop a standard protocol for determining the quality of a watershed that could be applied to any impaired watershed in SD1's jurisdictional region. The first phase of the project led to the development of the protocol which consisted of four steps:

1) Problem identification -- Compare current conditions to desired conditions to determine whether or not there is an existing problem.
2) Source Assessment -- Identify potential and actual sources contributing to the problems identified.
3) Modeling -- Select and apply a model to link the sources to the problems.
4) Source Ranking -- Rank sources based on contribution to impairments and other site-specific factors.

In the second phase of the project, the protocol was applied to the Banklick Creek watershed. Banklick Creek watershed was selected as an appropriate site to test the protocol because it is located entirely within the District's jurisdictional area. Additionally, the sources of impairments are diverse, and a comprehensive database describing flow and water quality in this creek was available.

To supplement existing data on Banklick Creek, Limno-Tech sampled water quality during three dry and three wet weather events from October 2002 through September 2003 at five stations along the Banklick mainstem (located at river miles 0.5, 3.9, 8.1, 11.6 and 15.6). Additional stations were established at RM 0.08 on Fowler Creek (near its confluence with the Banklick at RM 8.1) and at RM 0.08 on Bullock Pen Creek (downstream from Doe Run Lake and near its confluence with Banklick Creek at RM 6.7).

Data collected by Limno-Tech during 2002-2003 were added to data collected by other organizations during the previous five years and all data were analyzed and compared to water quality criteria. These analyses more specifically identified impairments on the state's 303(d) list for Banklick watershed, as presented below and shown in Figure 5 on center page.

- Fecal coliform bacteria (entire length of Banklick Creek, Bullock Pen Creek at mouth and Fowler Creek at mouth)
- Dissolved oxygen (lower 3.5 miles of Banklick Creek)
- Sediment (Fowler Creek at mouth; Banklick Creek RM 0 -12) – RM 0 through 8.2 were previously identified on the state's 303(d) list
- Phosphorus (entire length of Banklick Creek and Doe Run Lake)

Steps 2 through 4 of the watershed assessment protocol were used to identify significant sources for each pollutant based on their percent contribution to instream impairment, as presented in the following table:

**Table 1 Percent of Pollutant Contributed by Source in the Banklick Watershed**

| Pollutant Source | FC | TSS | TP | Am | CBOD | SOD |
|---|---|---|---|---|---|---|
| Commercial/Industrial | 1% | 20% | 19% | 8% | 8% | 19% |
| High Density Residential | 0% | 2% | 2% | 1% | 1% | 2% |
| Low Density Residential | 34% | 51% | 67% | 44% | 41% | 50% |
| Construction activity | 0% | 8% | 0% | 0% | 0% | 7% |
| Cropland | 2% | 2% | 6% | 6% | 3% | 2% |
| Forest | 0% | 13% | 4% | 5% | 9% | 13% |
| Pasture | 4% | 4% | 1% | 3% | 2% | 4% |
| Septic Systems | 29% | 0% | 1% | 27% | 2% | 0% |
| Point Sources | 0% | 0% | 0% | 0% | 0% | 1% |
| Sewer Overflows | 30% | 0% | 1% | 6% | 33% | 2% |

**Key to Table 1**

Shading is used to represent pollutant-specific sources identified as being significant.

FC = fecal coliforms
TSS = total suspended solids
TP = total phosphorus
Am = ammonia
CBOD and SOD are measures of organic materials, including sediment.

In addition to water quality parameters listed as impaired by the Kentucky DOW, the watershed protocol assessment application to Banklick Creek revealed high levels of lead and copper exceeding state standards, as follows:

- The standard for copper was exceeded at Banklick Creek in the vicinity of RM 0.5 and 8.0 and at Fowler Creek at the mouth.

- The standard for lead was exceeded at Banklick Creek RM 0.5 – 12, Bullock Pen Creek at the mouth, and Fowler Creek at the mouth.

Low density residential development and commercial/industrial development appeared to be the major sources contributing these heavy metal to the watershed (Limno-Tech 2004).

The application of the watershed assessment protocol to Banklick Creek illustrated the complexities of water quality issues in larger urbanizing watersheds where many potential sources of pollution occur. Recommendations from the watershed assessment protocol included:

- Further study of the location, rate and effluent concentrations of failing septic systems
- Identification of locations and sizes of construction areas for use in follow-up watershed modeling, and
- Additional stormwater monitoring to better characterize the runoff from low density residential development.

**Water Quantity and Resulting Flooding**

Flooding is of even longer standing concern among Banklick watershed residents than water quality. As mentioned previously, the watershed includes steep slopes and shallow soils prone to flooding when the water table is high. Human activities have added to the ***"flash flooding"*** of the Banklick and its tributaries: Land clearing as early as the 19th century contributed to erosion of streambanks and localized flooding. Clearing and straightening of stream channels (channelization) was commonly thought to reduce flooding, although it simply moves water downstream faster and contributes to streambank erosion and streambed sedimentation. This practice still continues at places in the watershed and further exacerbates flooding. Further, as land has been cleared, loss of trees, shrubs and grasses along stream corridors have contributed to more streambank instability, erosion, streambed sedimentation, and loss of stream habitat, including good pools for fishing. Compacting of soils during construction operations and increases in rooftops, roads and parking lots that accompany typical development all contribute to surges in stream levels due to rapid runoff during storms and snow melts.

What is Combined Sewer Overflow (CSO)?
In older sewer systems knows as Combined Sewers, the system is designed to collect stormwater from city streets, catch basins, yard drains, etc. If the volume of sewage and stormwater exceeds the capacity of the sewer pipes or the treatment plant, a portion of the sewage-stormwater mixture is allowed to bypass the treatment process and is sent either directly to streams or rivers or is partially treated before release. Bypass pipes from Combined Sewer Sytems are known as CSO's.

LRRK*

In addition to physical impacts to streams, flooding has serious human health and safety implications. The Kenton County 2001 *Areawide Comprehensive Plan* calls for special zoning and building restrictions in flood-prone areas. Residents within the Banklick's flood prone areas have had their homes and safety compromised as flooding has become more frequent because of extensive upland development. Further, rainfall events causing combined and sanitary sewers to overflow lead to a continuing problems with pathogens, including fecal coliforms, which endanger human health through body contact, including such simple activities as wading or fishing. One of the areas most prone to flooding is Kenton County's Pioneer Park, located about six miles upstream from Banklick's confluence with the Licking River.

The Phase 1 and 2 stormwater permitting program, developed in response to the 1987 amendments to the federal Clean Water Act, recognizes important connections between water quantity (including ordinary runoff and floodwaters) and quality. The central emphasis of both stormwater management phases is the adoption of large and small-scale ***best management practices*** (BMPs) to control pollution characteristics of runoff from rainfall and snow melt. Banklick Creek is now part of a multi-county stormwater management district operated by Sanitation District No. 1 (SD1) in Northern Kentucky. SD1's stormwater management plan includes many challenges and will only be fully implemented over several years. Actions that have been implemented and others that are planned as part of this program will be discussed later in this document.

In 2001, the federal government allocated funding to the U.S. Army Corps of Engineers to perform an economic analysis of options for dealing with flooding of Banklick Creek, including the buyout of floodplain properties or building modifications. The results of this study are expected to be available in 2006.

**Floods and Droughts -- Unusual ?**

Floods and droughts are natural extremes caused by the variability of precipitation. Major flooding in 1997 and 1998 was followed by the drought of 1999. But human activity can make natural floods and drought much worse. Development in the watershed causes water to run rapidly off impervious surfaces such as roofs and streets so water levels rise more rapidly and higher that they would naturally. The water that runs off the land surface does not enter the ground and so does not sustain stream flow during periods of dry weather. This deepens the effect of natural droughts.

# BANKLICK CREEK WATERSHED AT A GLANCE

FIGURE 5

Banklick WATERSHED COUNCIL

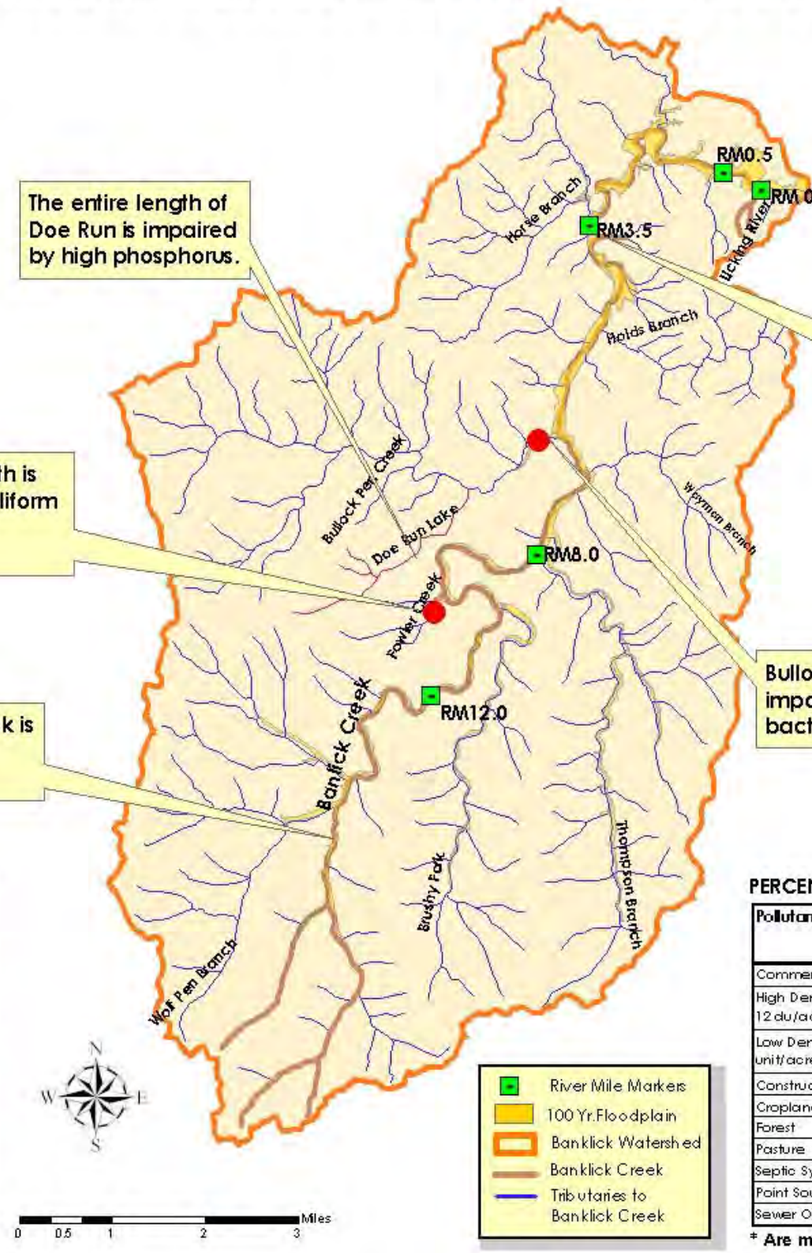
www.banklick.org
Email: info@banklick.org

## Designated uses for Banklick Creek

The state of Kentucky's designated uses for Banklick Creek include Warmwater Aquatic Life and Primary and Secondary Contact Recreation, which includes activities such as wading and fishing. These uses of Banklick Creek, however, currently are impaired by nutrients, siltation, habitat alterations, organic enrichment/low dissolved oxygen and pathogens.

## GOALS OF BANKLICK WATERSHED COUNCIL

- Clean the water
- Reduce flooding
- Restore the banks
- Honor the heritage




## IMPAIRMENTS ON BANKLICK CREEK

Fecal Coliform - Entire length
Phosphorus - Entire Length
Sediment - Between RM 0-12
Copper - In vicinity of RM 0.5 and 0.8
Lead - Between RM 0.5 and 12
Dissolved Oxygen - Lower 3.5 miles
Habitat alterations - Entire Length

A special place in the Banklick Watershed

## PERCENT OF POLLUTANT CONTRIBUTED

| Pollutant Source | Fecal Coliform | Total Suspended Solids | Total Phosphorus | Ammonia | CBOD* | SOD* |
|---|---|---|---|---|---|---|
| Commercial/Industrial | 1% | 20% | 19% | 8% | 8% | 19% |
| High Density Residential - 12 du/acre | 0% | 2% | 2% | 1% | 1% | 2% |
| Low Density Residential - 1 unit/acre | 34% | 51% | 67% | 44% | 41% | 50% |
| Construction activity | 0% | 8% | 0% | 0% | 0% | 7% |
| Cropland | 2% | 2% | 6% | 6% | 3% | 2% |
| Forest | 0% | 13% | 4% | 5% | 9% | 13% |
| Pasture | 4% | 4% | 1% | 3% | 2% | 4% |
| Septic Systems | 29% | 0% | 1% | 27% | 2% | 0% |
| Point Sources | 0% | 0% | 0% | 0% | 0% | 1% |
| Sewer Overflows | 30% | 0% | 1% | 6% | 33% | 2% |

* Are measures of organic materials, including sediment

Limno - Tech 2004

Mapping data provided by NKAPC

## Engaging Public Agencies and Communities

In contrast to the idea of unlimited natural resources that characterized much of the settlement of Northern Kentucky and other American frontiers is a growing recognition that natural resources need to be protected and sustained, not only for our enjoyment and use but for that of future generations. One of the most apparent signs of this changing mentality is the large number of watershed groups that have arisen throughout the country since the 1990s. Because each of us lives in a watershed, many people can relate well to the mission of such groups.

**BWC Council meeting – July 18th, 2002**

The Banklick watershed includes a spectrum of public agencies and groups that play important roles in protection, management and public education related to watershed activities and resources. The list is extensive, but of the many players in the Banklick watershed, the only group with a primary focus on the watershed is the Banklick Watershed Council (BWC). Since its formation in 2002, the BWC has worked in various ways to fulfill its mission of "protecting, promoting and restoring the biological, chemical and physical integrity of Banklick Creek, its tributaries and watershed." This watershed action plan has been developed to provide guidance in fulfilling that mission.

Like similar groups in other watershed, the BWC understands that success in attaining its mission depends on its ability to communicate to the larger watershed community. To that end, the BWC recently simplified its goals so communications are very clear.

**FOUR GOALS OF BWC**

**CLEAN THE WATER**

**REDUCE FLOODING**

**RESTORE THE BANKS**

**HONOR THE HERITAGE**

Collaborative projects, progress and plans toward achieving these goals is the focus of the next section of this document.

# Chapter 2: An Action Plan to Improve Banklick Creek

As the watershed overview in Chapter 1 has shown, previous attitudes towards watershed resources and a wide array of actions cumulatively detrimental to the Banklick over two centuries have resulted in a degraded stream system that is now the focus of attention by many stakeholders. Stakeholders interested in improving the watershed understand that reversing degradation trends will not occur in a matter of months or years, but that moving toward comprehensive watershed management and sustainability is a long-term effort. To that end, it is important to have a clear plan of action to focus public attention and leverage funding. The following action plan reiterates the BWC's goals presented at the end of the previous chapter and outlines strategies and commitments to help achieve the goals, yet it allows for flexibility and innovation.

## GOAL 1: CLEAN THE WATER

**No wading sign with playground equipment at Pioneer**

### *Improvement Problem*

Water quality issues in the Banklick watershed have become increasingly complex within the past 50 years. Concern about these issues has accelerated with upstream development and resulting increases in stormwater volumes. The creek is on Kentucky's 303(d) list of impaired waters. Therefore, its uses have been compromised, including its aquatic life use and primary and secondary recreational contact designations. Additional information on water quality is found in Chapter 1.

### *Progress Towards the Goal*

- ✓ The Kentucky Division of Water has designed a planning document titled *Basin Monitoring Plan 2004-2005 – Strategic Monitoring Salt and Licking Rivers* to guide water quality monitoring and assessment in relation to land-use/cover types to attain the best characterization of water quality resources.

- ✓ The 2004 *Watershed Assessment Protocol – Application to Banklick*, prepared for SD1, outlines a standardized approach for assessing water quality, identifying water quality impairments and sources of impairment, linking sources to the impairments, and ranking those sources. Another document prepared for SD1, *Habitat and Biological Community Assessment of Banklick Creek*, presents data and analyses of present stream conditions.

- ✓ The Northern Kentucky Independent Health District has designated surface water quality as a priority health concern in its *2005 Master Health Plan*. The Health District took the lead in collaborating with other organizations to prepare a Section 319 grant application to U. S. EPA to address pathogens and other pollutants in Banklick Creek and other Northern Kentucky watersheds. Although the project was not funded, the grant application may be revised and resubmitted in the future.

**New stream signs make people aware of Banklick Creek.**

- ✓ SD1 has developed and is implementing a long-term program for stormwater management, in accordance with requirements of the federal Stormwater Phases I and II requirements of the Clean Water Act. The plan encompasses CSO and SSO control, management of stormwater to mitigate flooding, erosion and sedimentation from all land uses, and extensive public outreach programs.

- ✓ The Kenton County Conservation District (KCCD) continues to oversee implementation of the Kentucky Agricultural Water Quality Act which requires agricultural operations10 acres or greater to file Agriculture Water Quality Plans for their property. Working with the KCCD, the USDA Natural Resources Conservation Service provides technical and financial assistance for remediation of agricultural pollution.

- ✓ Water quality monitoring of Banklick Creek is periodically conducted by volunteers for the Licking River Watershed Watch. Doe Run Lake also has been monitored for many years by staff and supervisors of the KCCD.

***Future Plans***

- ✓ Under a Clean Water Act ***consent decree*** (negotiated among SD1, U.S. EPA and the Kentucky Environmental and Public Protection Cabinet), SD1 is required to develop a 20-year plan to address raw sewage from CSOs and SSOs in its service area, including the Banklick watershed. In addition to long-term CSO and SSO control plans, SD1 is required to remove improper stormwater connections, extend sewer lines to areas with failing septic systems, and perform system-wide upgrades. The decree calls for four watershed plans to assess and tackle cumulative effects of water pollution. (One such plan will include Banklick Creek and perhaps parts of adjacent watersheds.) The decree also calls for SD1 to provide funding to several other projects and organizations to help raise awareness and foster environmental stewardship in the region served by SD1.

- ✓ Development of a ***total maximum daily load allocation (TMDL)*** has been discussed by SD1, but the direction this would take is presently somewhat uncertain in light of the above consent decree and subsequent watershed plans to be developed.

- ✓ Education efforts will be ongoing and targeted to diverse constituents, including public officials, developers, representatives of business and industry and residents of agricultural, suburban and urban areas.

- ✓ The Kentucky DOW will comprehensively assess the Licking River watershed, including Banklick Creek, for waterbody impairments. However, that assessment is conducted on a rotating basis among principal watersheds in Kentucky; the Licking Basin assessment is not scheduled until 2009.

***Key Challenges***

The recent consent decree is complicated in many respects and will require additional interpretation by SD1. A good balance of interested stakeholders in the Banklick and other watersheds will be critical to the long-term success of planning and implementation resulting from the consent decree.

- ✓ It will be essential to seek collaboration among a diverse group of stakeholders to seek funding to comprehensively address water quality problems in the watershed. A combination of federal, state and private sector funding will be needed.

- ✓ Attaining the long-term goal of "cleaning the water" will require maintaining a strong focus and momentum through education and public awareness.

- ✓ Negative perceptions of Banklick Creek will be difficult to overcome, but will decrease as the public becomes more aware of how water quality issues are being addressed and if citizens avail themselves of recreational opportunities along Banklick Creek and its tributaries.

## GOAL 2: REDUCE FLOODING

**Banklick Creek along Madison Pike**

A combination of natural factors, including topography and soil types, makes the Banklick watershed very responsive to precipitation and prone to flooding. Clearing of woodland and agricultural activities in the upper watershed have contributed to erosion and flooding, while parts of the lower watershed have long been characterized by urban development and impervious surfaces. Channelization at many locations in the watershed has only served to hasten the movement of water downstream, rather than prevent flooding. Within the past couple decades, development of the watershed's upland areas has accelerated and exacerbated flooding, endangering safety and private property. As with water quality problems, flooding in the Banklick watershed is a complex problem for which there is no "quick fix". Additional information on flooding is found in Chapter 2.

***Progress Towards the Goal***

- ✓ The Corps of Engineers – Louisville District is nearing completion of a flood damage reduction feasibility study advocating measures to control flooding. Possible measures may include purchase of properties in the floodway and restoration of wetlands and other natural habitats in the floodplain.

- ✓ Measures outlined in SD1's Stormwater Management Plan are being implemented to mitigate stormwater impacts. An interactive stormwater model developed by SD1 helps to assess the effectiveness of various BMPs.

- ✓ In the city of Fort Wright, a stormwater disconnect program is underway to direct rooftop drainage into local soils and away from the sewer system. Such disconnections decrease water volumes entering sewers and, ultimately, streams.

- ✓ The Kenton County *2001 Areawide Comprehensive Plan* calls for special zoning and building restrictions in flood-prone areas. Both Kenton and Boone counties consider watersheds and watershed issues in planning for growth.

- ✓ The U.S. Geological Survey installed a stream flow gage at Banklick mile 8.0 near Richardson Road in 1999 that provides data to understand and manage flooding. Data collected by the gage also is helping discern long-term flow patterns.

- ✓ The KCCD has distributed publications and sponsored numerous workshops and other educational events on erosion and sediment control aimed at public official and developers. Effective controls help with stormwater issues.

- ✓ Kenton County's Homeland Security & Emergency Management Agency (HSEM) coordinates government emergency services to ensure that needs of the public are met during disasters, including floods. HSEM coordinates Project Impact, a federal program to encourage building disaster-resistant communities. Further, the HSEM works with communities to develop pre-disaster action plans to minimize loss of life and property when emergencies occur.

- ✓ SD1 has opened an award-winning regional stormwater park designed to demonstrate BMP's and educate all age groups about issues related to water quantity and quality.

**SD#1 Public Service Park. Photo courtesy of SD#1**

- ✓ A group of developers, planners and public officials and environmental leaders has created the Local Alliance for Nature and Development. LAND is planning to implement a development project that would showcase and promote BMPs aimed at minimizing stormwater runoff during project development and maintenance. Aspects of LAND's efforts are also related to Goal 3 of restoring the banks.

***Future Plans***

Because many activities listed above are ongoing and long-term, their effectiveness will only become apparent over time. Two of the most significant projects are listed below.

- ✓ The completion of the Corps of Engineers flood damage reduction study is expected to provide important data and recommendations for addressing flooding issues in the watershed. Plans are for the Kenton County Fiscal Court to work with the Corps in reviewing and implementing recommendations.

- ✓ Implementation of SD1's stormwater management plan and CSO control program are in the early stages and will be carried out over decades. (See information under Goal 1 about the Clean Water Act consent decree.)

***Keys Challenges***

- ✓ Both items listed under "Future Plans" are extremely costly and will require state and federal support. Future public sector funding for such projects remains very uncertain.

- ✓ Dealing with individual communities and property owners if a property "buy-out" occurs may be complicated and involve extensive legalities.

- ✓ Success in implementing such long-term projects not only will require cooperation and consensus among current community leaders and stakeholders but also of future leaders and stakeholders. Therefore, education on these issues must be a continuing process.

## GOAL 3: RESTORE THE BANKS

Two centuries of land clearing for agricultural use coupled with ever increasing urban and suburban land uses have profoundly affected forested areas that used to buffer Banklick Creek from pollutants in runoff and also helped reduce effects of flooding. Public appreciation for the natural and aesthetic benefits of riparian areas, however, is increasing and projects have been undertaken to assess, protect and restore forest resources in the watershed.

**Banklick Creek re-channelized for railroad.**

***Progress Towards the Goal***

- ✓ Several project partners and cooperating agencies worked together on the **B**anklick **C**reek Watershed **A**nalysis and Issue **C**haracterization for **E**ducation and Outreach (BACE), which focused on forest resources. The resulting ***Geographical Information Systems*** (GIS) analysis has been used to identify critical areas for protection and restoration. Data generated by the study has increased understanding of the watershed's resources and also will help establish watershed priorities.

- ✓ Groups in the watershed are in various stages of developing and planning greenways that optimally will promote reforestation and recreational use, as well as raise community awareness of the importance of green corridors to protect streams and link wildlife habitat. Among the watershed entities involved in greenway development are the cities of Erlanger and Fort Wright, the Doe Run Lake advisory group and the Northern Kentucky Area Planning Commission.

- ✓ The KCCD, Boone County Conservation District and USDA Natural Resources Conservation Service continue to promote riparian buffers as a first line of defense to prevent erosion of streambanks and sedimentation of streambeds. Federal cost share programs are available for the implementation of related BMPs.

- ✓ The Kenton and Boone County Conservancies have been formed in the last few years as local land trusts. Both seek to protect green space though a variety of mechanisms, including conservation easements. Presently, Conservancy members, developers and landowners are working together to gain protection of approximately 40 acres along Banklick Creek. Representatives of Northern Kentucky University's Center for Applied Ecology and the Corps of Engineers – Louisville District have met to discuss possible stream restoration measures on the site.

***Future Plans***

As progress is made on these initiatives, priorities will be established for protection and restoration. Work on restoring the banks is expected to continue for many years.

Riparian area

Stream banks and the land along them are called riparian areas. With appropriate vegetation, these areas provide natural protection from pollutants that drain off the land. Good riparian management can prevent erosion and flooding. It also provides important habitat for wildlife because it offers food, water, shelter and a travel corridor.

LRRK

***Key Challenges***

- ✓ As with other Banklick goals, funding to restore the banks will be challenging to obtain. Labor expenses for trail development and plantings may be defrayed by community volunteers.

- ✓ Many partners have collaborated on the BACE and other riparian projects. The continued active involvement of those partners in implementing bank restoration will be critical to its success.

- ✓ Reversing the negative perception of the Banklick and its tributaries after decades of deforestation and water quality impairment will be important in gaining public support and encouraging the use of riparian trails and other open space in the watershed.

- ✓ As in other parts of the country, dealing with exotic plant species such as bush honeysuckle and multiflora rose will be difficult and will threaten the biological integrity of riparian areas.

- ✓ Educating individual landowners on the benefits of riparian areas and engaging them in actions to preserve and protect such areas will be challenging.

## GOAL 4: HONOR THE HERITAGE

**Engraving of a painting by G.N. Frankenstein**

The Banklick watershed not only has rich and varied natural resources but also rich and varied cultural resources. Small cemeteries still carry the names of pioneer farmers who settled the area two centuries ago, while artifacts collected near industrial sites along KY 17 have revealed a Native American encampment. Small bands of both Union and Confederate soldiers came though the area during the Civil War. And the site of the present day Latonia Shopping Plaza, from 1883 to 1939, was the location of Latonia Racetrack, one of the foremost racetracks in the world at that time. Many aspects of the cultural history of the watershed have been documented by the Behringer-Crawford Museum in Covington and in *Northern Kentucky Heritage* magazine.

### *Progress Towards the Goal*

- ✓ Signage placed at several locations in the watershed within recent years has made citizens aware of the location of Banklick Creek.

- ✓ Critical natural areas for protection and restoration have been identified through the BACE study.

- ✓ Neighborhood organizations such as garden clubs and groups such as the East Ritte's Corner group in Latonia form a base for other possible activities that could honor or preserve aspects of the natural and cultural heritage of the watershed.

### *Future Plans*

The blending of natural and cultural heritage to heighten watershed appreciation is not typical of all watershed organizations, but offers many opportunities for future public involvement in the Banklick watershed. A few ideas concerning how to "Honor the Heritage" are presented below:

- ✓ Work with the Northern Kentucky Heritage League and the history departments of NKU and Thomas More College to identify and highlight additional locations in the watershed that reflect important events or past life styles, including farming.

- ✓ Work with county and community parks to determine additional ways to interpret both the natural and cultural history of Banklick watershed through signage and programming.
- ✓ Work with the Behringer-Crawford Museum and explore the possibilities of using their country road tour guide to develop a driving tour brochure for the Banklick watershed.

- ✓ Use findings from the BACE study and documents from the Northern Kentucky Area Planning Commission to prepare an article for *Northern Kentucky Heritage* magazine on land use in the Banklick watershed past, present and future.

**Key Challenges**

- ✓ Development and suburbanizing of formerly rural parts of the watershed are causing rapid changes that are affecting both natural landscapes and cultural resources. As an example, an ante-bellum mansion (1845) in Taylor Mill that could have been preserved was recently razed. Loss of such resources is irreversible.

- ✓ The watershed is experiencing an influx of new residents who may be unaware of the rich natural and cultural heritage of the watershed and Northern Kentucky region. Such changing demographics present educational challenges regarding our heritage.

- ✓ As with other watershed goals, funding will be a challenge to honoring the heritage before it is too late.

# CHAPTER 3: Evaluating Progress

This action plan to improve the Banklick watershed is both comprehensive and long-term, making it essential to frequently measure progress in attaining goals and specific objectives. Further, incorporating regular evaluations into the initiative will help to maintain direction and momentum. Because the Banklick effort is so multi-faceted, many different activities may be occurring simultaneously. Regardless of whether these activities are long- or near-term or have qualitative or quantitative results, methods of measuring progress ideally should be planned before an activity or program is implemented.

Table 2 summarizes the goals of the action plan to improve the Banklick watershed and the government entities, agencies, and other organizations that have been involved or probably will be involved. Checkmarks indicate where commitments have been made and progress is occurring; although progress on some goals is further along than on others. The Banklick Watershed Council will play important roles in securing funding for certain initiatives and in coordinating and collaborating with the spectrum of stakeholders.

Watershed protection, restoration and management are dynamic processes, requiring definition, revision and prioritization of tasks, as needed. The development and adoption of an annual work plan by the BWC will be an integral step in moving ahead. The Council plans to review work plans from successful watershed efforts in our region and elsewhere. Such work plans may have application to Banklick Creek and may provide insights into collaborating with diverse project partners and stakeholders.

Although the BWC has held a few workshops to gather public comments, listening to resident of the Banklick watershed will continue to be important in establishing priorities and measuring progress. Broader participation in the BWC by municipalities and neighborhood groups within the watershed will help provide feedback and strengthen the Council's image and the importance of its mission.

The University of Kentucky Extension Service – Kenton County Office and the Kenton and Boone County Conservation Districts are potential resources for developing tools for evaluating watershed projects. Various online watershed resources also will be helpful in matching objectives with evaluation methods and audiences and in constructing reliable evaluation instruments.

**TABLE 2 A STRONG LOCAL, STATE AND FEDERAL PARTNERSHIP TO IMPROVE THE BANKLICK CREEK WATERSHED**

| ACTION PLAN GOALS | Banklick Watershed Council | Conservancies | Conservation Districts | Kenton County Fiscal Court | Kenton County Homeland Security Emergency Management | Kenton County Parks Department | Kentucky Division Of Water | Local Alliance for Nature Development | Licking River Watershed Watch | Northern Kentucky Area Planning Commission | Northern Kentucky Independent Health District | Northern Kentucky University Center for Applied Ecology | Northern Kentucky Urban and Community Forestry Council | Natural Resources Conservation Service | Sanitation District1 | U.S Army Corps of Engineers | U.S Geological Survey | Various municipalities |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | |
| **1 - CLEAN THE WATER** | | | | | | | | | | | | | | | | | | |
| Overall water quality monitoring | X | | X | | | | X | | X | | X | | | | X | | | |
| Addressing pathogens harmful to human health | | | | | | | X | | | | X | | | | X | | | |
| CSO and SSO planning and implementation | | | | | | | X | | | | | | | | X | | | |
| Overall public education on water quality issues | X | | X | | | | X | | X | | X | | X | | X | | | |
| Sediment and erosion control education and BMPs | X | | X | | | | X | X | | X | | | X | | X | | | |
| Implementation of Kentucky Agriculture Water Quality Act | X | | X | | | | X | | | | | | | X | | | | |
| | | | | | | | | | | | | | | | | | | |
| **2 - REDUCE FLOODING** | | | | | | | | | | | | | | | | | | |
| Preparation of flood damage reduction plan | | | | | | | | | | | | | | | | X | | |
| Evaluation of USACE plan and potential implementation of recommendations | | | | X | | | | | | | | | | | | | | |
| Continued work on long-term stormwater mgmt. program | X | | | | | | X | | | | | | | | X | | | |
| Implementation of zoning and building restrictions in flood prone area | | | | | X | | | | | X | | | | | | | | |
| Restoration of wetlands near Pioneer Park | X | | X | | X | X | | | | | | | X | X | | X | | |

| ACTION PLAN GOALS | Banklick Watershed Council | Conservancies | Conservation Districts | Kenton County Fiscal Court | Kenton County Homeland Security Emergency Management | Kenton County Parks Department | Kentucky Division Of Water | Local Alliance for Nature Development | Licking River Watershed Watch | Northern Kentucky Area Planning Commission | Northern Kentucky Independent Health District | Northern Kentucky University Center for Applied Ecology | Northern Kentucky Urban and Community Forestry Council | Natural Resources Conservation Service | Sanitation District1 | U.S Army Corps of Engineers | U.S Geological Survey | Various municipalities |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2 - REDUCE FLOODING (continued)** | | | | | | | | | | | | | | | | | | |
| Removal of improper stormwater connections | | | | | | | | | | | | | | | X | | | X |
| Implementation of develop. project to demonstrate stormwater BMPs | | | X | | | | | X | | X | | | X | X | | | | |
| Continued operation/maintenance of Richardson Rd. stream flow gage | | | | | | | | | | | | | | | | | X | |
| | | | | | | | | | | | | | | | | | | |
| **3 - RESTORE THE BANKS** | | | | | | | | | | | | | | | | | | |
| Planning/development of greenways | X | | | | | X | | | | X | | | X | | | | | X |
| Restoration and protection of critical natural areas | X | X | X | | | X | | | | X | | X | X | X | | | | |
| Promotion of sediment/erosion control BMPs and stream buffers | X | | X | | | X | X | X | | X | | X | X | | | | | |
| | | | | | | | | | | | | | | | | | | |
| **4 - HONOR THE HERITAGE** | | | | | | | | | | | | | | | | | | |
| Installation of Banklick watershed signage | X | | | | | | | | | | | | | | | | | |
| Additional interpretation of natural and cultural heritage in parks, other areas | X | X | X | | | X | | | | X | | | X | | X | | | |
| Interactions with Behringer-Crawford Museum and historical societies | X | | | | | X | | | | | | | | | | | | |

The Banklick watershed improvement effort represents a unique cooperative partnership among many agencies, governments, and organizations. This table illustrates the diverse support for the implementation of the Watershed Action Plan. An "X" in a box denotes that an organization provides either funding, coordination, technical expertise, or land ownership for the effort. See the "Key of Acronyms" for interpretation of participating stakeholders.

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## GLOSSARY OF TERMS

| | |
|---|---|
| **Aquatic habitat, warmwater** | A water use designation that means the waterbody provides suitable warmwater habitat for the survival and reproduction of desirable fish, shellfish and other aquatic organisms. |
| **Best management practices (BMPs)** | Methods or techniques designed to prevent pollution. Often used in combination, BMPs include but are not limited to structural and nonstructural measures and operation and maintenance procedures. |
| **Consent decree** | A legally binding document with environmental regulators outlining an accelerated program of actions to further improve water quality and ensure compliance with the Clean Water Act. |
| **Designated uses** | Specified goals for surface waterbodies that include uses for public water supply, protection and propagation of fish and wildlife, recreation in and on the water, and agricultural, industrial and other uses as established by Kentucky state law, in accordance with the federal Clean Water Act. |
| **Fecal coliforms** | Bacteria that indicate the presence of sewage contamination waterway and the possible presence of other pathogenic organisms. |
| **Geographical Information System (GIS)** | A computerized data management method that allows for collection, retrieval, analysis and spatial display of geographically-based information. GIS combines maps of an area with database tables related to map features. |
| **Macroinvertebrates** | Animals without backbones (invertebrates) that are visible to the naked eye. |
| **Nonpoint source** | Any source of pollution which is diffuse and does not have a single point of origin (e.g. fertilizers on residential lawns). Such pollutants are generally carried off the land by stormwater runoff. |
| **Point Source** | Any discernible, confined or discrete conveyance from which a pollutant is or may be discharged into a waterbody (e.g. industrial discharge pipe). |
| **Primary Contact Recreation designation** | Refers to a water quality use designation indicating that people can swim in a waterbody without risk of adverse human health effects (such as catching waterborne diseases from raw sewage contamination). |
| **Riparian corridor** | A vegetated stream-side corridor that provides an important transition from the terrestrial to the aquatic environment. |
| **Secondary Contact Recreation designation** | Refers to a water quality use designation indicating that people can perform activities on the water (such as boating or fishing) without risk of adverse human health effects from ingestion or contact with the water. |
| **Total maximum daily load (TMDL)** | A calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. |

# SUPPLEMENTAL INFORMATION

## SUMMARY OF RESULTS OF BWC SURVEY OF AGENCIES PARTICIPATING IN THE WATERSHED IMPROVEMENT

During Summer 2005, the Banklick Watershed Council (BWC) surveyed several agencies involved in the Banklick watershed improvement effort to learn more about their activities, plans and interests related to the watershed. This comprehensive information will enhance the effectiveness of the BCW as it endeavors to coordinate ongoing watershed improvement efforts.

The survey consisted of four questions, as follows:

1) What is the current condition of the Banklick Watershed as compared to the desired future condition of "fishable, swimmable, and ecologically healthy"?

2) What actions has your organization taken that have had an impact on the Banklick watershed?

3) What future plans and timetables does your organization have that will have an impact on the watershed?

4) What obstacles and constraints do you see that will have an impact on our mutual efforts to improve the vitality of the Banklick Watershed?

Responses were received from the Boone County Planning Commission, Kenton County Conservation District, Licking Basin Coordinator of the Kentucky Division of Water, Northern Kentucky Area Planning Commission, Northern Kentucky Community and Urban Forestry Council, Sanitation District No.1 and the U.S. Army Corps of Engineers.

The responses to Question 1 indicated that BWC and other stakeholders share an understanding of the problems in the Banklick watershed, as reflected in the watershed overview in Chapter 2. Similarly, each organization seemed to be able to articulate its role in the watershed improvement effort. Their responses were consistent with the information presented in Chapter 3 – An Action Plan to Improve Banklick Creek – as well as actions summarized in the table at the end of Chapter 4.

In general, the tone of the responses was open and helpful, indicating a willingness to keep the lines of communication open in working with the BWC and other interested entities. As with other complex environmental problems, the survey respondents indicated several obstacles and constraints to achieving the long-term goals presented in this watershed action plan. Important obstacles and constraints mentioned included:

- Funding limitations
- The challenge of fostering collaboration among diverse communities and interested stakeholders
- The very rapid rate of land development, especially in the upper watershed
- The difficulty of sustaining public awareness and support over time
- Legal challenges related to SD1's stormwater management program, and
- The difficulties of enforcing state and federal environmental laws.

## AREAS OF EXPERTISE/INTEREST INDICATED BY BWC MEETING PARTICIPANTS*

Aquatic life habitat:
- Sanitation District No.1
- KY Dept. of Fish & Wildlife
- KY Watershed Watch
- KY Transportation Cabinet
- KY Division of Water

Bacteriological conditions: human & other animal waste:
- Sanitation District No.1
- Northern KY Independent Health District
- KY Division of Water
- USDA Natural Resources Conservation Service
- KY Watershed Watch
- Conservation Districts

Biological diversity:
- Sanitation District No.1
- KY Dept. of Fish & Wildlife
- NKU Center for Applied Ecology
- Northern KY Urban & Community Forestry Council

Botanical resources:
- Northern KY Urban & Community Forestry Council
- KY Dept. of Fish & Wildlife
- NKU Center for Applied Ecology

Chemical conditions:
- Sanitation District No.1
- Northern KY Water District
- KY Division of Water
- Kenton County Homeland Security & Emergency Mgmt
- U.S. EPA

Recreational resources:
- Kenton County Parks
- Watershed municipalities
- Forward Quest
- OKI Regional Council of Govt.

Riparian Corridors:
- NKU Center for Applied Ecology
- USDA Natural Resources Conservation Service
- KY Dept. of Fish & Wildlife
- Northern KY Urban & Community Forestry Council

Brownfields:
- City of Covington
- NKU Center for Applied Ecology

Community growth & planning:
- Northern Kentucky Area Planning Commission
- Home Builders Association
- Watershed municipalities
- Conservation Districts
- KY Transportation Cabinet
- Smart Growth Coalition

Cultural attitudes towards natural resources:
- Sierra Club
- OKI Regional Council of Govt.
- Conservation Districts

Flooding:
- Kenton County Fiscal Court
- Kenton County Homeland Security & Emergency Mgmt
- Northern Kentucky Area Planning Commission
- Northern KY Urban & Community Forestry Council
- Northern KY Area Dev. District
- Army Corp of Engineers
- KY Division of Water

Hydrologic balance (flow regimes):
- Sanitation District No.1
- Army Corps of Engineers
- Northern KY Urban & Community Forestry Council
- Northern Kentucky Area Planning Commission

Impermeable surfaces/soils:
- Conservation Districts
- USDA Natural Resources Conservation Service
- Northern Kentucky Area Planning Commission
- NKU Center for Applied Ecology

Management of toxins:
- Kenton County Homeland Security & Emer. Mgmt
- KY Division of Water
- Northern KY Independent Health District
- Northern Kentucky Water District

Public awareness:
- Residents
- Conservation Districts
- Home Builders Association
- Northern KY Independent Health District

Stormwater concerns:
- Sanitation District No.1
- Sierra Club
- Home Builders Association
- Northern Kentucky Area Planning Commission
- KY Division of Water

Trash, litter:
- Northern KY Area Dev. Dist
- Kenton County Parks
- Conservation Districts
- Sierra Club
- Creek Restoration in KY
- Watershed municipalities

Dams:
- Army Corps of Engineers
- KY Division of Water
- Conservation Districts
- USDA Natural Resources Conservation Service

Combined sewer overflows:
- Sanitation District No.1
- KY Division of Water
- U.S. EPA

*List of meeting participants at the Banklick Watershed Council meeting – July 18th, 2002

## CONTACTS

| | |
|---|---|
| Banklick Watershed Council | www.banklick.org |
| Boone County Conservation District | www.boonecountyky.org/bccd |
| Boone County Planning Commission | www.boonecountyky.org/pc |
| Boone County Conservancy | www.theblooneconservancy.org |
| Kenton County Conservation District | www.kentoncounty.org/conservation.html |
| Kenton County Conservancy | www.kentonconservancy.org/ |
| Kentucky Environmental and Natural Resources Protection Cabinet, Division of Water | www.water.ky.gov |
| Licking River Watershed Watch | www.lickingriver.org |
| Kentucky Waterways Alliance | www.KWAlliance.org |
| Northern Kentucky Area Planning Commission | www.NKAPC.org |
| Northern Kentucky Urban and Community Forestry Council | www.nkyurbanforestry.org |
| Sanitation District #1 | www.sd1.org |

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