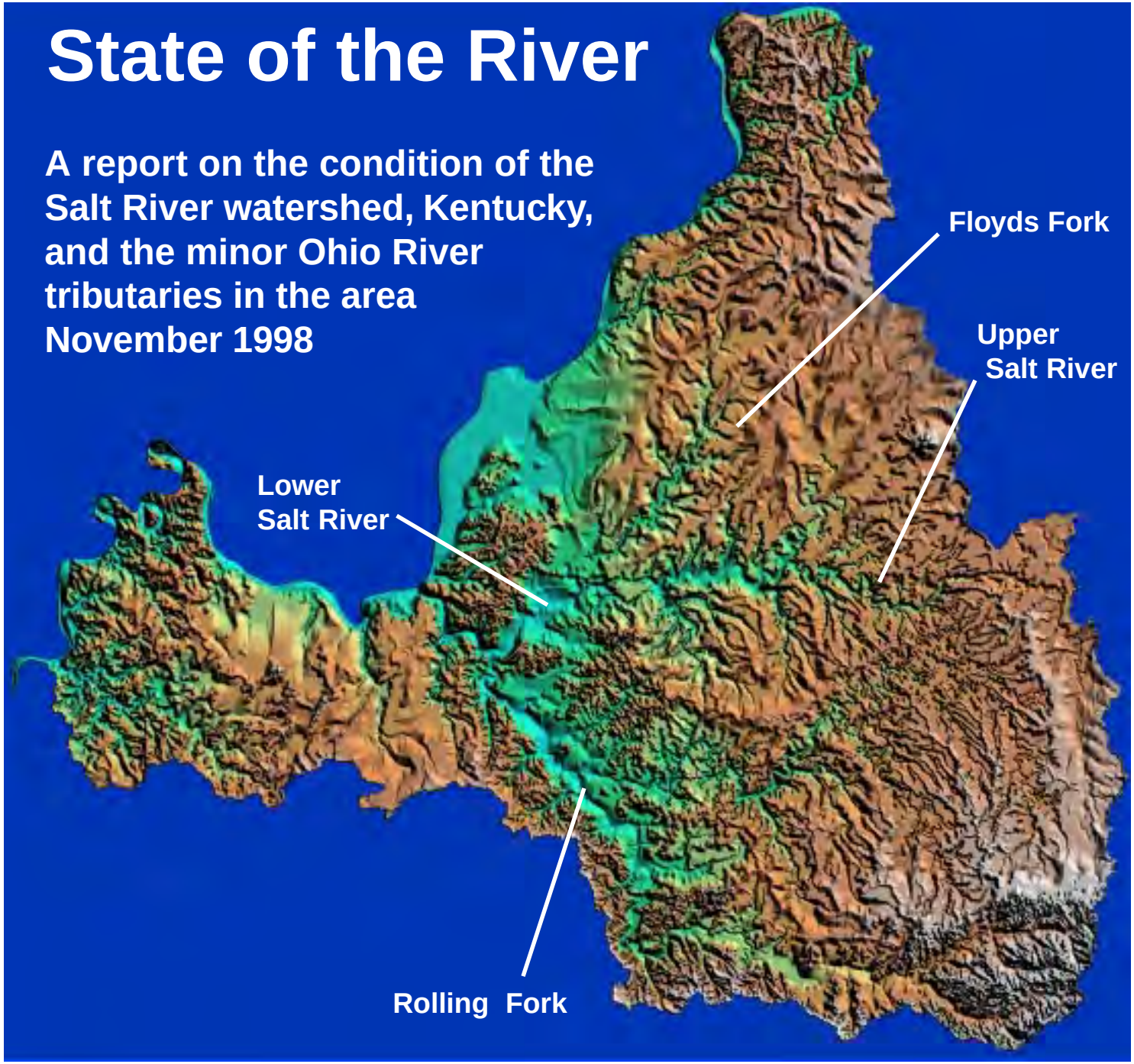
State of the River

A report on the condition of the Salt River watershed, Kentucky, and the minor Ohio River tributaries in the area
November 1998

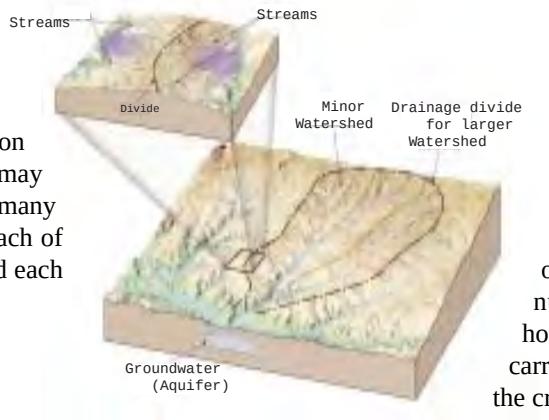


INSIDE

- The Salt River Watershed and minor Ohio River tributaries
- What is the water quality?
- What are the primary concerns?
- What can be done?

What is a watershed?

No matter where you live, work, or play, you are in a watershed. A watershed is a geographic area where all water running off the land drains to a specific location. This location may be a stream, river, lake, wetland, or ocean; or the water may drain underground into the groundwater. You may live on a creek, which is considered a small watershed. Your creek may join a river, which is a larger watershed. The river may have many smaller creeks, known as tributaries, that drain into it and each of these tributaries has a small watershed associated with it, and each is part of the larger watershed of the river.



How does land use affect the watershed?

Land use simply refers to the way humans use the land that they live on. All of the different types of land use affect the water quality in a watershed.

Agricultural land is used to grow crops or raise farm animals. Farmers may apply chemicals such as fertilizers, herbicides, or insecticides that could be carried off into the river by stormwater. Other impacts include soil erosion resulting in sediments entering the streams and animal wastes containing pathogens and nutrients entering the streams.

Forest land may be a natural area that is relatively undisturbed or an area where selective harvesting occurs. A forest area that is managed as a natural area may have relatively little impact on the waters within the watershed. However, a poorly managed forest that is harvested for lumber may impact the watershed through soil erosion from logging roads.

Residential land includes small communities and suburban areas of homes. Land disturbance during construction as well as land changes affect the hydrology of streams. Many homes depend on septic tanks which are sources of bacteria, pathogens, and nutrients. Chemicals applied to lawns, trees and shrubs by homeowners, such as fertilizers, insecticides, and herbicides, are carried off by stormwater and may harm the quality of the water in the creeks or harm the animals and plants in the creek.

One of the greatest impacts on water quality and aquatic life from **urbanization** is the change in water-flow regimes. The increase in impervious surfaces (roads, parking lots, roof tops, etc.) and modifications to "improve" drainage (ditches, storm sewers) result in flash flooding of urban streams. Flash floods can wash out aquatic insects that are the source of food for fish and result in bank erosion, adding to silt that smothers surviving organisms. These changes also reduce groundwater recharge, so stream flows in summer months are lower. Dissolved oxygen levels are reduced, and the concentration of toxic materials is increased. Riparian vegetation that normally provides shade and acts as a source of food for aquatic life is removed, threatening the biological integrity of streams.

Finally, **other** land uses include quarries, transportation corridors, recreational areas, and rural land currently not in productive use and land covered by streams and lakes.

Residential area of land use in the Floyds Fork Watershed

Contaminants and their Effects

Nutrients – nitrogen and phosphorus cause an increase in algal growth; when the algae die, their decomposition removes oxygen from the water; these result in low dissolved-oxygen concentrations. The breakdown of some nitrogen compounds by bacteria also lowers dissolved oxygen.

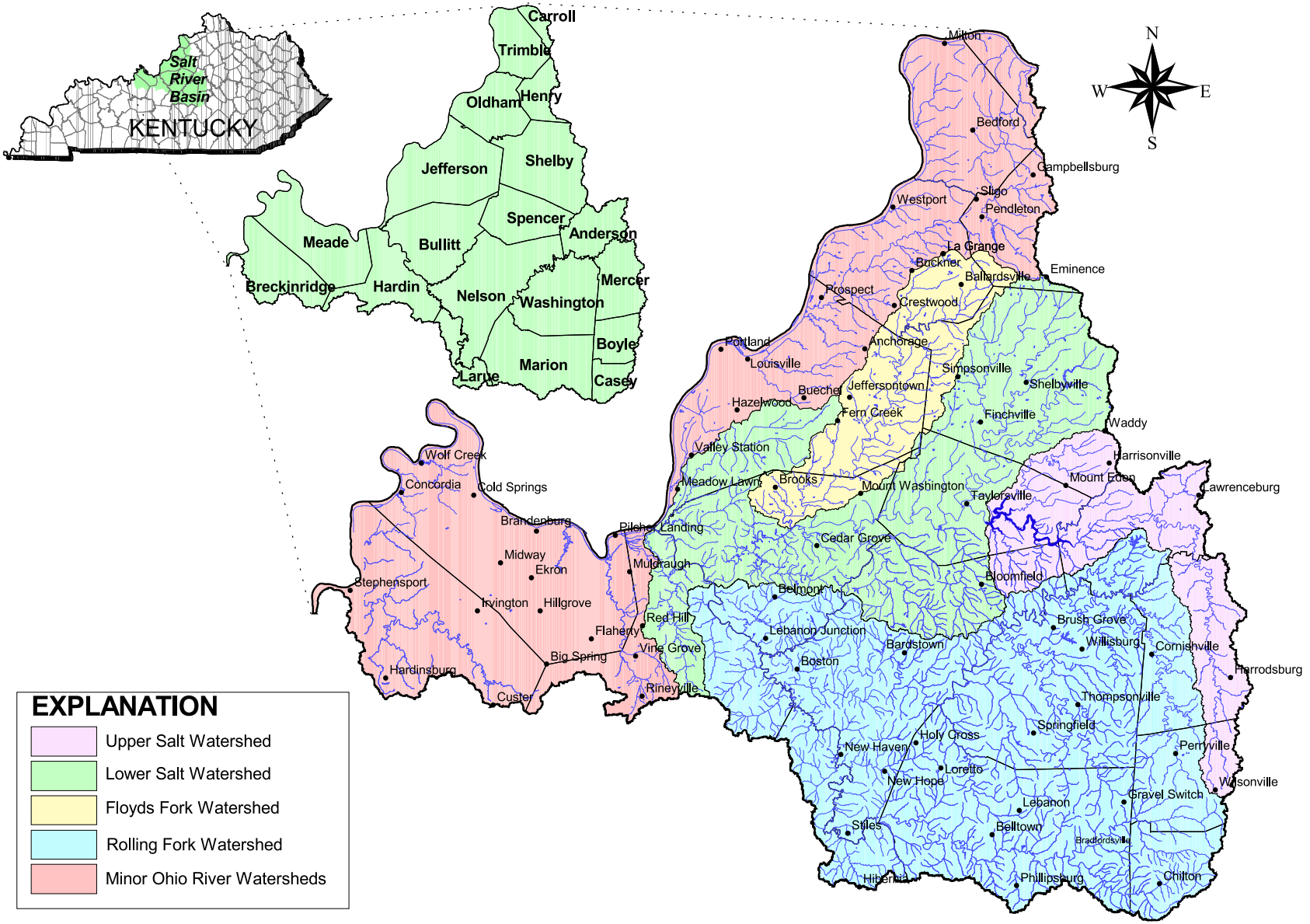
Pesticides – runoff of pesticides into streams results in harm and/or death to beneficial plants and animals that live in or use the water.

Pathogens – a high concentration of pathogens (bacteria, viruses, protozoans) may cause illness in fish, humans, and other animals and in some instances can cause death.

Sediments – the result of soil erosion, cause reservoirs to lose holding capacity as they settle out, reduce suitable habitat in streams, and transport attached contaminants (nutrients & metals).

Metals – are toxic to fish, humans, and other animals and can cause illness, deformities, and death.

SALT RIVER WATERSHED: Hydrologic Divisions



The Salt River and Minor Ohio River Tributary Watersheds

Description

The Salt River and the five minor Ohio River tributaries flow through portions of 19 Kentucky counties and drain some 5,200 square miles of land, representing 13% of the state. The main stem of the Salt River is approximately 150 miles long and flows through portions of 15 counties. The Salt River joins the Ohio River at West Point. The minor tributaries drain about 1,200 square miles of land and flow directly into the Ohio River. These areas run adjacent to the Ohio River between Carroll County and Breckinridge County. Louisville, Harrodsburg, Bardstown, Brandenburg, Shepherdsville, and the Fort Knox Military Reservation are all located within these watersheds. Some of the major lakes in these watersheds include Taylorsville Lake, Guist Creek Lake, and Doe Valley Lake.

Overall Quality

There is a total of approximately 3,770 miles of streams and rivers in the Salt River Watershed. Only 650 miles (17%) have been assessed to determine whether these streams meet the water quality standards for swimming and fishing. There are streams within the watershed that are relatively pristine; but in areas with large populations, water quality is poor due to urban runoff, municipal wastewaster treatment plants, septic tanks, and discharges from businesses and industry. These sources contribute bacteria and pathogens, silt, metals, chlorine, pesticides, and a wide range of organic chemicals. In Jefferson County, no stream meets the state standards for swimming. In many of the rural areas, stream quality is degraded from siltation, animal waste, nutrients, and pesticides.

There are roughly 200 stream miles found in the tributaries to the Ohio River covered in the Salt River Watershed basin management area. A number of these streams drain urban areas and are known to have water quality problems. The pollution sources are primarily wastewater treatment plants, combined sewer overflows, failing septic systems, and urban runoff, all typical sources of water quality problems in fast-growing urban areas across the country.

What are the Priority Concerns in the Watershed?

One of the priority concerns in the watershed is rapid population growth and urban sprawl. The watershed has a population of just over one million people, or about 27% of Kentucky's population. In comparison, the land area is about 13% of the state. Population pressures are particularly intense in the counties surrounding Jefferson County. The fastest growing counties in the state are located in the watershed. Since 1990, the state's population growth has been 6%. In comparison, the growth rate in Spencer County during the same time period was 35%; Oldham County grew 30%; Trimble, Anderson, and Bullitt increased from 20%-24%. In addition to the impacts of urbanization, water quality is adversely impacted because rural communities are often unprepared to accommodate rapid growth. Sewers and other needed environmental infrastructure are unavailable. In Spencer County, for example, fewer than 10% of the population has access to public wastewater treatment. In Oldham, Trimble, Henry, Shelby, Bullitt, Nelson, Washington, Marion, Mercer, and Meade counties, fewer than 50% of the households have access to public treatment facilities. These formerly rural counties also do not have the public capacity to assure that water quality is protected. Most of the counties do not have adequate zoning or local ordinances, sufficient local health and building permit staff, or resources to protect water quality adequately.

Other Special Areas and Concerns in the Watershed

Wetlands

Wetlands are essential to the overall health of the watershed. They store water during floods and droughts and filter pollutants from the water. They provide diverse habitats for a wide variety of mammals, reptiles, amphibians, and fish. The total area of wetlands within this watershed is diminishing.

Endangered and Threatened Species

Federally listed endangered (E) and threatened (T) animal species known to occur in the Salt River watershed include the Indiana bat (E), gray bat (E), fanshell mussel (E), and the bald eagle (T). The only federally listed endangered or threatened plant species known to occur in the watershed is running buffalo clover (E).

Freshwater Mussels

The Salt River historically supported a diverse native freshwater mussel fauna. More than 50 species once existed in the watershed, and current records indicate that approximately 20 species still exist, including the federally endangered fanshell. The decline in diversity of freshwater mussel species in the Salt River can be attributed to water-quality degradation, impoundments, channelization, and gravel mining in the watershed.

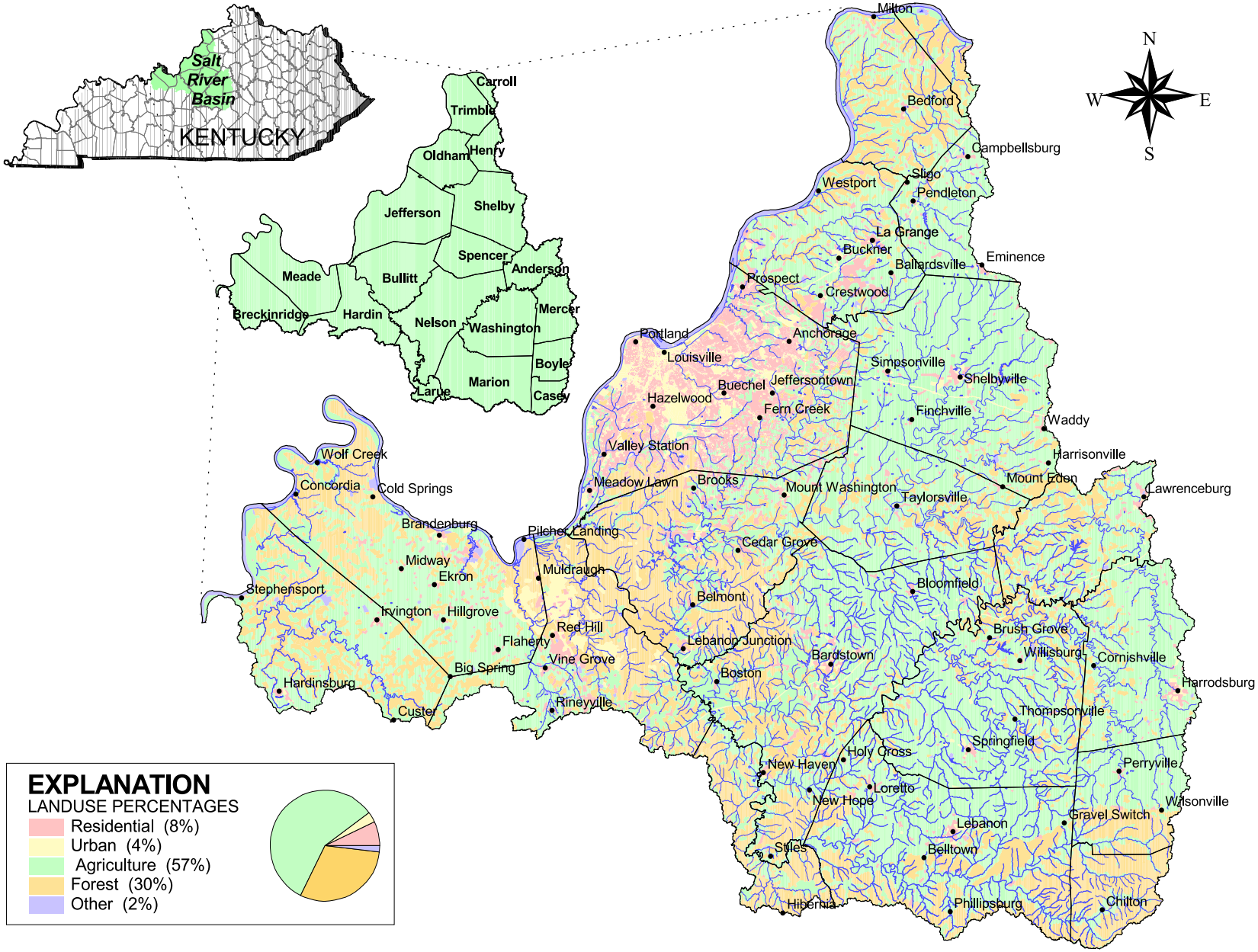
Drinking Water

There are 36 public water supply systems in the watershed. Five of these rely on surface water: Lebanon (Rolling Fork), Shelbyville (Guist Creek), Taylorsville (Salt River), Springfield (Willisburg Lake), and Louisville (Ohio River). Cities and counties are required to develop water supply plans and are encouraged to protect sources of water for these plants.

Wastewater

There are 314 wastewater discharge points in the watershed. These include 49 public wastewater treatment facilities, 60 industrial discharge points, and 205 other dischargers, including schools, subdivisions, nursing homes, malls, and trailer parks. Although the volume from these smaller plants is low, they typically have a high incidence of violations due to poor management, inadequate funds, and poor design. Since they are often located on smaller streams, they have a great potential for releasing contaminants that render the stream uninhabitable for aquatic life. Over the past decade, the state has implemented a policy to consolidate these small plants.

SALT RIVER WATERSHED



EXPLANATION

LANDUSE PERCENTAGES

- Residential (8%)
- Urban (4%)
- Agriculture (57%)
- Forest (30%)
- Other (2%)

What is the Water Quality in the Upper and Lower Salt River Watersheds?

The Upper and Lower Salt River Watersheds

Taylorsville Lake separates the Upper and Lower Salt River watersheds. The reservoir slows the flow of water allowing the sediments from soil erosion to sink to the bottom. Also, as the water remains in the reservoir for an extended period of time, many contaminants are broken down, processed or removed from the water. Because of this, the water flowing into the Lower Salt River is quite different from the water in the Upper Salt River. The Upper and Lower Salt River watersheds are in the Outer Bluegrass Region.

The Upper Salt River watershed begins in Boyle County west of Danville; the river flows north about 50 miles, then west about 98 miles to its confluence with the Ohio River. The Upper Salt River watershed ends at the Taylorsville Lake Dam. The drainage area measured upstream from the dam is 354 square miles. The lake extends about 18 miles upstream, covering 3,050 acres at summer water levels. The upper 50 miles of the Salt River flow through a fairly narrow drainage system bordered by the Kentucky River watershed to the east and Chaplin River to the west. The watershed widens as the river turns west, with a larger network of tributary streams. Major tributaries in the Upper Salt River watershed include Hammond Creek, Crooked Creek, Beech Creek and Ashes Creek. Portions of Boyle, Mercer, Anderson, Shelby, Spencer and Nelson counties are within the Upper Salt River drainage area. The principal land-use activity upstream of Taylorsville Lake watershed is agriculture; this is about 74% of the land use in the watershed with the remaining land use consisting of forest (22%), and urban and residential (4%). The area north of Taylorsville Lake is predominantly pasture and forest, with minimal row cropping and dairy operations. The area directly south of the lake is also predominantly pasture, though dairy operations are more numerous than beef cattle operations. Dairy operations and row cropping dominate land use along the mainstem of the Upper Salt River. The principal crops are tobacco, soybeans and corn.

The Lower Salt River watershed begins at Taylorsville Lake Dam and flows to the Ohio River at West Point. Floyds Fork, Rolling Fork, and Cox Creek are major tributaries to the Lower Salt River. Both Floyds Fork and the Rolling Fork are covered in later sections of this report. The principal land-use activity downstream of Taylorsville Lake in the Lower Salt River watershed is also agriculture (61%). Forest land is 24%, residential 9 %, and urban 5%. The Lower Salt River and its tributaries are located in an area that was historically a swamp. Due to the increased population and changes in land use, this area has flooding and drainage problems.

Water Quality and Ecological Health

A biological and water quality investigation of the Upper Salt River was conducted between June 1989 and August 1990. The purpose of the investigation was to determine the extent of nonpoint pollution through the collection of biological and water-quality data. Water-quality data showed that concentrations of nitrogen, phosphorus, zinc and arsenic were elevated throughout the watershed. Bacterial analyses indicated that fecal pollution from human and animal waste exceeded the Kentucky surface-water standards. Overall, the water quality conditions in the Upper Salt River watershed ranged from fair to poor. Areas with the most severe pollution were Hammond Creek near the mouth and the Upper Salt River below Harrodsburg.

The diversity and population of the fish community located in the same areas were poor. The stream segments in the middle portion of the watershed ranged from good to fair to poor. The stream segments in the area of the watershed around the Taylorsville Reservoir had a classification of good. Water quality impairment is attributed to both point source pollution in Hammond Creek and the Upper Salt River below Harrodsburg and nonpoint source pollution throughout the drainage.

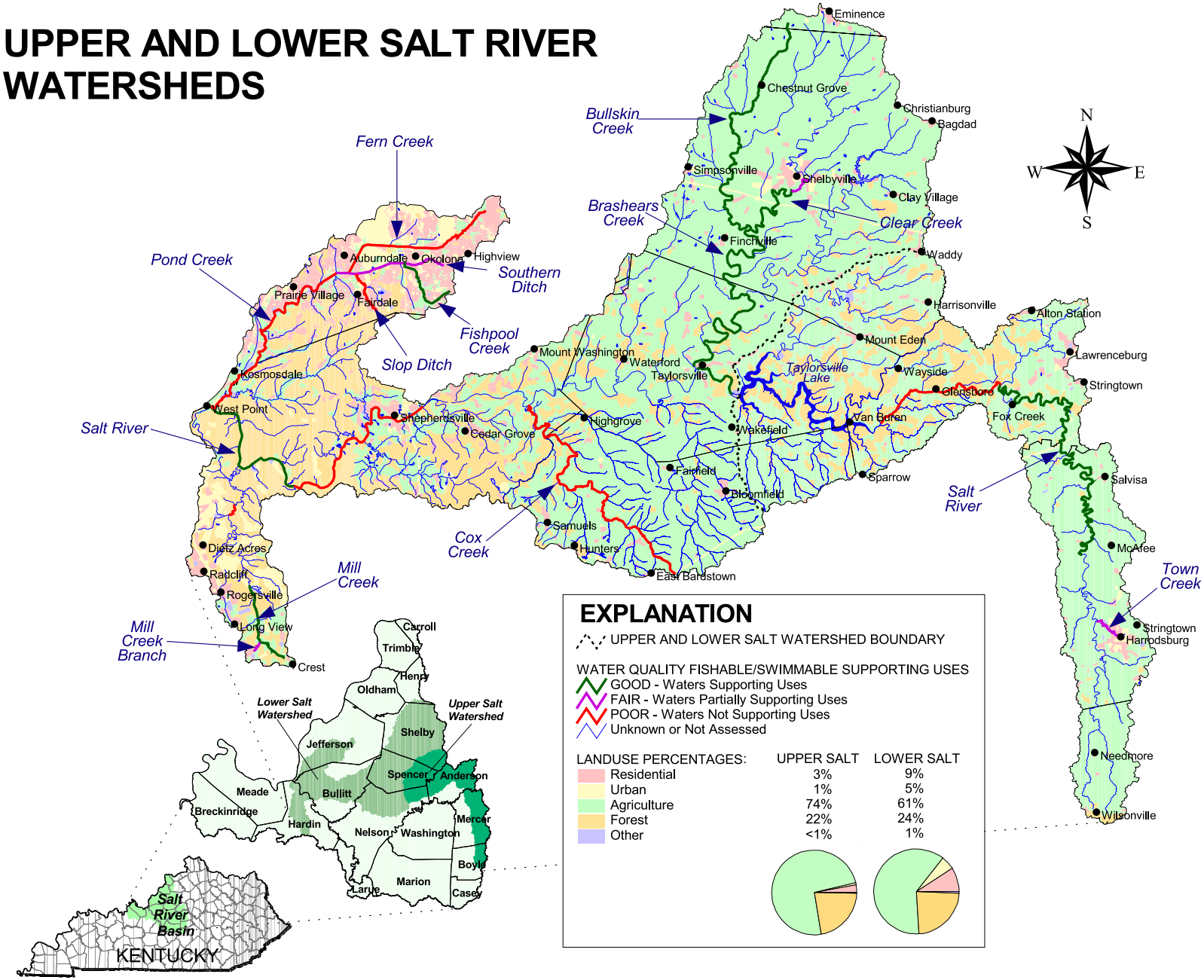
As the dividing line between the Upper and Lower Salt River watersheds, Taylorsville Lake has water quality problems.

As the dividing line between the Upper and Lower Salt River watersheds, Taylorsville Lake also has water quality problems. The lake has a high level of nutrients, which has resulted in low dissolved oxygen, algal blooms, impaired fish reproduction and occasional fish kills. The source of these problems is primarily nonpoint source runoff that reaches the lake from the Upper Salt River and various other tributaries.

Cox Creek in Bullitt County, a tributary to the Lower Salt River, has been assessed as having water quality problems. The Lower Salt River below Shepherdsville is designated as poor also. As indicated by the map to the right, the Lower Salt River changes classification from poor to good where the Rolling Fork joins the river. The lower tributaries of the Lower Salt River located in Jefferson County are classified as fair or poor.

A thorough ecological assessment of the Lower Salt River watershed has not yet been done. However, poor ecological health is often connected with poor water quality.

UPPER AND LOWER SALT RIVER WATERSHEDS



What is the Water Quality in the Floyds Fork Watershed?

Floyds Fork Watershed

Floyds Fork is a major tributary of the Salt River and is the second largest waterway in Jefferson County. It drains an area approximately 284 square miles throughout portions of Henry, Oldham, Shelby, Jefferson, Bullitt, and Spencer counties. The topography of the Floyds Fork watershed is characterized by gently rolling hills in the headwaters to steeper slopes near the mouth in Bullitt County. It is located in the Outer Bluegrass Region.

As shown in the map explanation, the watershed is 22% residential, 57% agriculture, 2% urban, 16% forest, and less than 1% other. The major tributaries include Curry's Fork, Chenoweth Run, Long Run, Pope Lick, Cane Run, and Cedar Creek.

Streams are severely stressed from excessive nutrients, pathogens, and low levels of dissolved oxygen.

Water Quality and Ecological Health

Numerous water-quality sampling stations have been established throughout the Floyds Fork watershed. These sampling stations are monitored by local, state, and federal agencies, as well as by local citizen groups, for assessing water quality and aquatic habitation. Collection of water-quality data includes dissolved oxygen, pH, nutrients, metals, pesticides, sediment, and pathogens (bacteria).

An example of agricultural land use in the Floyds Fork Watershed

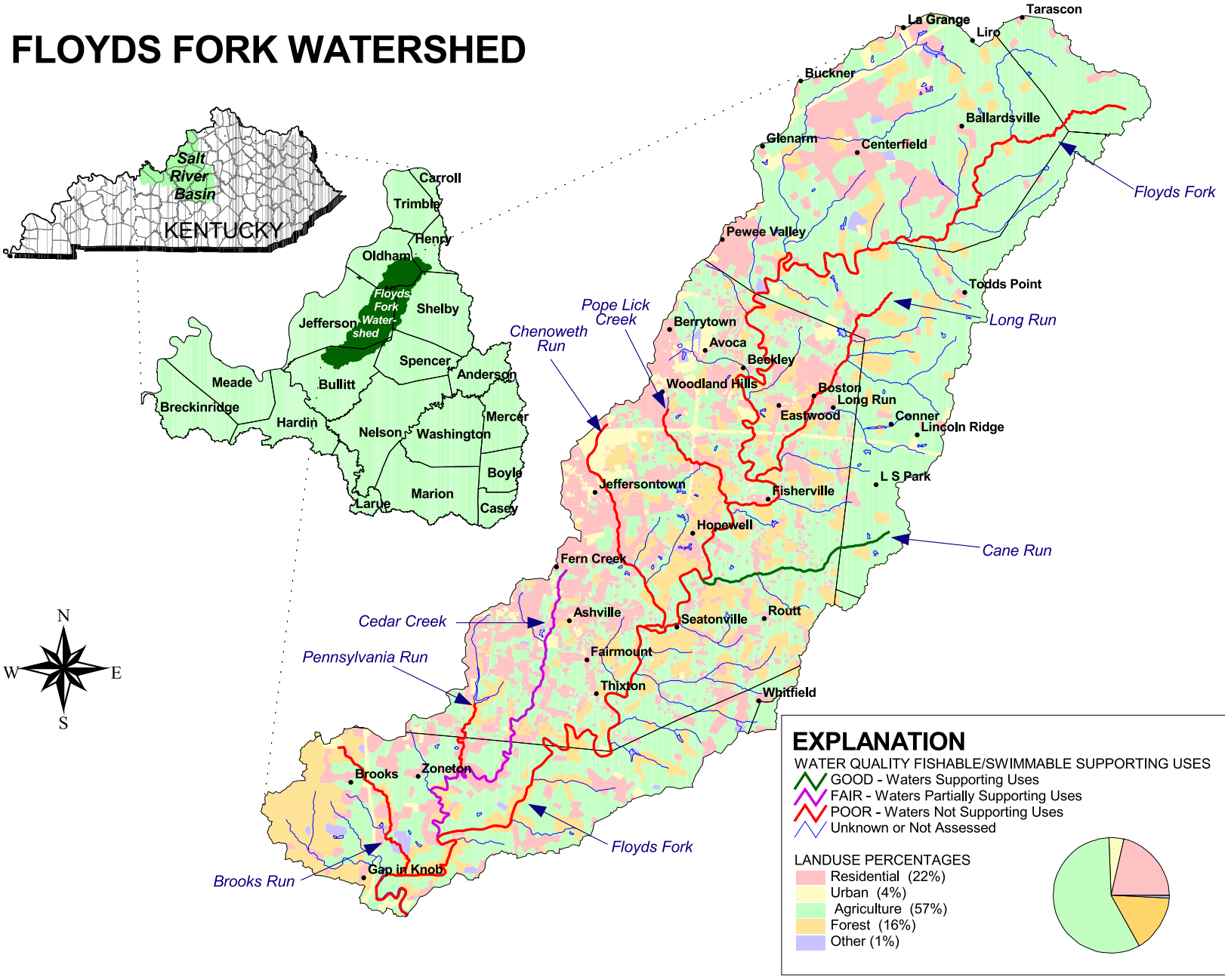
Within the past 20 years, the Floyds Fork watershed has experienced considerable growth in residential and urban development. These developments have led to an increase in point and nonpoint source pollution. Several investigations have been conducted describing the water quality conditions within the watershed. These investigations suggest that the streams are severely stressed from excessive nutrients, pathogens, and low levels of dissolved oxygen. Wastewater treatment plants (point sources) have the largest impact on the water quality within the Floyds Fork watershed. Nonpoint sources of pollution such as agriculture and urban runoff have secondary impacts on water quality. This differs from the rest of the Salt River watershed.

Floyds Fork has been identified as one of the 25 most polluted streams in the state. However, of the 117 miles assessed within the watershed, 17 miles meet the standards for swimming and aquatic life, including the entire length of Cane Run. Jefferson County has an aggressive land purchasing program to protect water quality in Floyds Fork. Areas purchased include Mary's Island, Myles farm, and property adjacent to Blackacre State Nature Preserves.

Dissolved oxygen is one of the major problems of water quality within the Floyds Fork watershed. The major causes of low dissolved oxygen levels in the streams are the result of wastewater treatment plants, and agricultural and urban runoff. These sources cause increased levels of nutrients such as phosphorus and nitrogen. This increase in nutrient levels has encouraged aquatic plant and algae growth within the streams. The excessive plant growth followed by decomposition has resulted in oxygen-depleted waters. Reductions in streamflow caused by water withdrawals and droughts also contribute to low dissolved-oxygen levels. The reduced streamflow inhibits the streams' ability to assimilate point and nonpoint source contaminants. This results in increased nutrient levels and pathogens, and lower oxygen levels.

Water quality in the entire Floyds Fork watershed is very poor. Continuous monitoring of nutrients, oxygen levels, and the health of the fish community throughout the Floyds Fork watershed can result in better decision making and ecological management and lead to improved ecological health of the watershed.

FLOYDS FORK WATERSHED



What is the Water Quality in the Rolling Fork Watershed?

Rolling Fork Watershed

The Rolling Fork River begins in the Outer Bluegrass Region and flows into the Knobs Region and joins the Salt River. The major tributary of the Rolling Fork River is the Beech Fork, which also flows primarily from the Outer Bluegrass Region. The Rolling Fork River watershed is located in parts of Nelson, Washington, Mercer, Boyle, Marion, LaRue, Hardin, Casey, and Anderson counties. The landscape is characterized as gently rolling hills in the headwaters to very steep slopes and broad, nearly level bottomlands near the mouth.

The major land use is agriculture, primarily pasture and hay land with some row crops; this use represents 59%. Forest covers 38% of the watershed with residential and urban covering 3%.

Water quality in a large number of streams in the Rolling Fork watershed is unknown or has not been assessed.

Water Quality and Ecological Health

Water quality is monitored at 14 sites throughout the Rolling Fork River watershed. The primary water quality problem identified by these sites is high fecal coliform (bacteria) during summer low-flow periods. The potential sources for the high fecal coliform are septic systems and livestock farming operations.

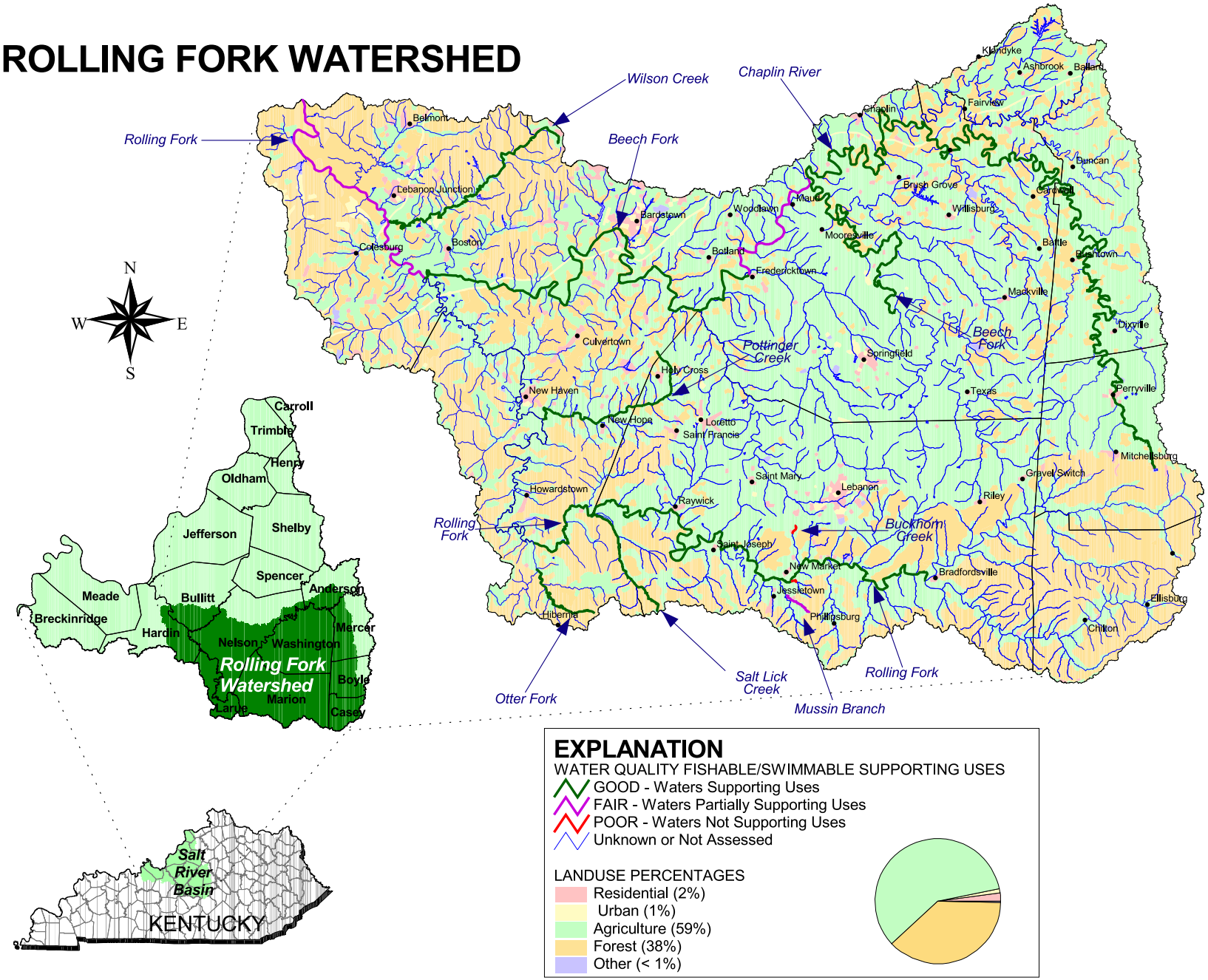
The Chaplin River which flows into Beech Fork above Maud is classified as good, as is Beech Fork. The water quality in Beech Fork between Maud and Fredericktown is classified as fair. The remainder of Beech Fork to its confluence with the Rolling Fork is good. Three small tributaries in the upper watershed of the Rolling Fork have segments classified as fair to poor as indicated on the map to the right. The Rolling Fork below the confluence of Beech Fork is classified as only fair. It is important to note the large number of streams in the entire Rolling Fork watershed for which the water quality is unknown or has not been assessed.

Department of Fish and Wildlife fisheries biologists have reported the fish population and diversity as very good. Waterfowl and mammals in and along the river are quite common. However, the ecological health of the watershed has not been fully assessed according to the criteria established for determining fishable and swimmable waters.

Streambank stabilization efforts on the Rolling Fork

The Salt River (Anderson County)

ROLLING FORK WATERSHED



EXPLANATION

WATER QUALITY FISHABLE/SWIMMABLE SUPPORTING USES

- GOOD - Waters Supporting Uses
- FAIR - Waters Partially Supporting Uses
- POOR - Waters Not Supporting Uses
- Unknown or Not Assessed

LANDUSE PERCENTAGES

- Residential (2%)
- Urban (1%)
- Agriculture (59%)
- Forest (38%)
- Other (< 1%)

What is the Water Quality in the Harrods Creek, Beargrass Creek, Sinking Creek, Doe Run, and other Minor Ohio River Tributary Watersheds?

The Minor Ohio River Tributary watersheds are unique because they flow directly into the Ohio River. They are typically short streams on the flat Ohio River floodplain and are influenced by backwater from the Ohio. Four of the larger direct tributaries are discussed below. The lower portions of Harrods Creek and the majority of Beargrass Creek are influenced by urban and residential land use. Sinking Creek and Doe Run are located in the lower portion of the area indicated on the map to the right. They are both influenced by agricultural impacts. The land use category percents reflect the entire area represented by small watersheds that flow directly to the Ohio River.

Harrods Creek

Harrods Creek drains 108 square miles and flows 31 miles to join the Ohio River above Louisville. The major tributaries are Ash Run, Brush Creek, Cedar Creek, Darby Creek, and South Fork Harrods Creek. The lower 4.2 miles of Harrods Creek have very low slopes, and the creek is subject to backwater from the Ohio River. The predominant land use in the Harrods Creek Basin is agriculture, with residential having a large effect on the lower portion of the basin.

Water Quality and Ecological Health

The Kentucky Division of Water (KDOW), U.S. Geological Survey (USGS), and Metropolitan Sewer District (MSD) have collected water quality data on Harrods Creek, mostly in the lower half of the watershed because this is the area of greatest concern. Much of the watershed is not served by a centralized wastewater treatment system. There are 33 active wastewater facilities in the watershed, which include schools, small industrial plants, residential subdivisions and MSD's Hite Creek regional facility. Another part of the problem is that areas of extensive backwater, such as in Harrods Creek, do not assimilate wastewater, as does a flowing stream. Selected portions of Harrods Creek meet water quality standards; other portions do not.

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Beargrass Creek

Beargrass Creek is located along the Ohio River in Jefferson County. The Beargrass Creek system drains 98.2 square miles of Eastern Jefferson County. This stream originally ran through downtown Louisville but was channelized and directed to the Ohio River east of downtown. The watershed is comprised of three tributary sub-watersheds: the South Fork, the Middle Fork, and the Muddy Fork. The South Fork drains 43.5 square miles, the Middle Fork drains 40.4 square miles, and the Muddy Fork 14.3 square miles. The principal land use in the Beargrass Creek watershed is residential and urban.

Water Quality and Ecological Health

The USGS and MSD have collected water quality data in the Beargrass Creek watershed since 1988. According to the data collected, the South Fork and Middle Fork of Beargrass Creek do not meet water quality standards. The Muddy Fork of the Beargrass Creek is listed as being in fair condition. The primary pollutants of concern are metals, organic enrichment and low dissolved oxygen. One of the major causes of Beargrass Creek impairment is combined and sanitary sewer overflows from wastewater collections systems.

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Sinking Creek

Sinking Creek begins in Breckinridge County and flows into the Ohio River near Stephensport. The creek is 40 miles long and drains approximately 434 square miles. The watershed is located in karst topography in the Pennyroyal Region. The karst topography allows the creek to "sink" into the groundwater system, eventually resurfacing in another location. The major tributary of Sinking Creek is Hardins Creek. The principal land use within the Sinking Creek basin is agriculture.

Water Quality and Ecological Health

The unique feature of Sinking Creek, disappearing underground and eventually resurfacing, suggests that groundwater can influence the water quality of Sinking Creek and vice versa. Although water quality data is sparse for Sinking Creek, portions are known to meet state water quality standards.

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Doe Run

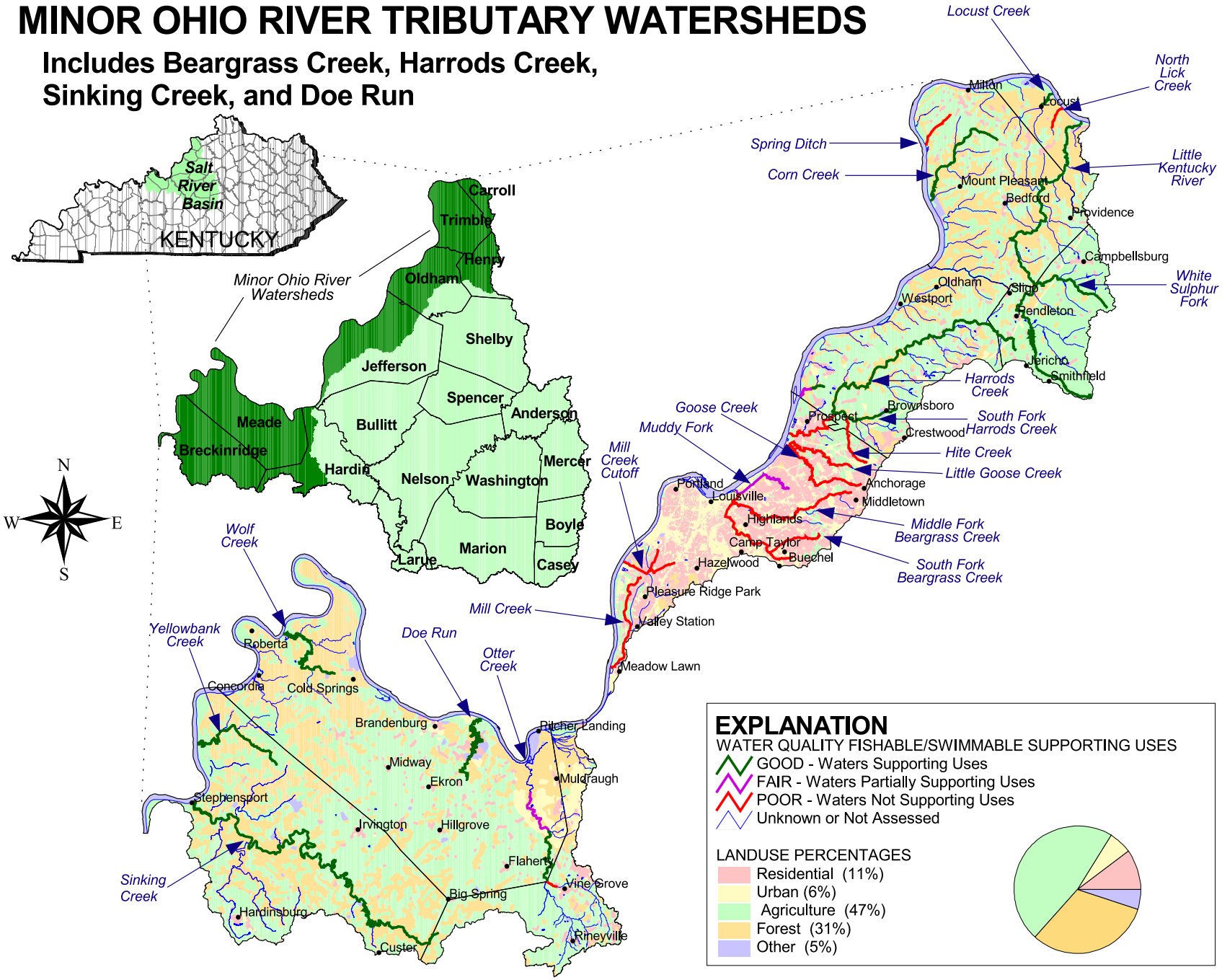
Doe Run begins in Meade County and flows 8 miles to join the Ohio River near Brandenburg. Doe Run has a drainage area of 52.7 square miles with much of the watershed undeveloped. The watershed is located in karst topography in the Pennyroyal Region. This undeveloped watershed provides quality habitat for fish, wildlife, and plants.

Water Quality and Ecological Health

Few water quality investigations have been performed on Doe Run; however, those investigations indicate that the river is currently meeting state water-quality standards for swimming and fishing. In a 1992 report assessing Kentucky rivers, Doe Run (lower 3 miles) was ranked as one of the best streams for the presence of diverse fish species and high water quality.

MINOR OHIO RIVER TRIBUTARY WATERSHEDS

Includes Beargrass Creek, Harrods Creek, Sinking Creek, and Doe Run



EXPLANATION

WATER QUALITY FISHABLE/SWIMMABLE SUPPORTING USES

- GOOD - Waters Supporting Uses
- FAIR - Waters Partially Supporting Uses
- POOR - Waters Not Supporting Uses
- Unknown or Not Assessed

LANDUSE PERCENTAGES

- Residential (11%)
- Urban (6%)
- Agriculture (47%)
- Forest (31%)
- Other (5%)

Why and how is the health of the watershed determined?

Water Quality Standards

The nation's Clean Water Act requires each state to develop water quality standards. They are used as a tool to accomplish the goal of restoring and maintaining the chemical, physical, and biological characteristics of waters - to make the nation's waters "fishable and swimmable." States must adopt water quality standards as laws or regulations to protect and manage their waters; they may use the U.S. Environmental Protection Agency's (EPA) standards as guidelines. At least once every three years, states must review their water quality standards and submit them to EPA for review and approval. Water quality standards in Kentucky are incorporated into the state's regulations. In developing the state's water quality standards, the Kentucky Division of Water designates uses for each body of water in the state. In Kentucky, these uses are domestic water supply, aquatic habitat, and recreation (i.e. direct contact with water such as swimming). Streams may be assessed as good, fair, or poor, depending upon the degree of impairment found in a particular reach of stream.

Report to Congress on Water Quality

The Clean Water Act (Section 305[b]) requires states to submit a report to Congress every two years on the quality of the state's waters. The report assesses water quality in the state for a two-year period, including degree of use support of rivers, streams, and lakes The "degree" of support follows EPA guidelines that define "fully supporting" as fully supporting all uses for which data are available. The "uses" are those defined in the water quality regulations. From the assessments in the 305(b) report, each state is also required, through Section 303(d) of the Clean Water Act, to prepare a list of impaired streams. The 303(d) List of Streams prioritizes the waters for establishing an allowable amount of pollutants for those waters (the total maximum daily load, or TMDL). It also discusses ongoing projects and initiatives that remedy stream impairments.

Pollution problems may lead to restricted uses of the state's waters, such as fish consumption advisories, swimming advisories, or threats of harm to aquatic life. The TMDL process involves identifying the specific pollutants and their sources that are the causes of water quality impairment and provides for a reduction in loading to the sources. It also involves determining the amount of the pollutant the waterbody can receive and still maintain proper water quality uses.

The schedule for completing TMDLs for all 1998-listed waters is provided in the 1998 303(d) List of Waters for Kentucky. The TMDL schedule is closely connected with the state's Watershed Management Framework. TMDLs for a number of watersheds have been completed, and others are in progress.

What can be done?

What can communities and citizens do?

So what can communities and citizens do to affect the watershed in which they live? Plenty! The key is being aware and getting involved. Citizens can serve on or attend local water supply planning councils, influence planning and zoning commission meetings, county fiscal courts, local ordinances, etc. Each involves day-to-day decisions that affect the watershed. There are several grassroots programs within the Salt River and area watersheds. The Kentucky Water Watch program is one avenue for involvement for schools, community leaders, and individual citizens. It offers water-quality monitoring and community education programs. There are also groups like the Friends of Floyds Fork and Friends of Beargrass Creek that focus on the issues of a sub-watershed. Cleansweeps, where groups of people "sweep" an area by picking up trash along a creek or river, are one activity sponsored by these organizations.

Beargrass Creek Clean Sweep 1998

What can the state do?

The legislature passed the Agriculture Water Quality Act of 1994 and the Forest Conservation Act of 1998. Both of these acts direct loggers and farmers to carry out best management practices to decrease water quality impact.

The state also has permitting and enforcement authority as well as grant and loan programs. Some of these include the State Revolving Funds that administer low-cost loans to municipalities for wastewater and drinking water projects and the Nonpoint Source program that administers grants, as provided by Section 319 of the Clean Water Act, for a variety of demonstration projects for improving water quality. Numerous agricultural cost-share and incentive programs also exist.

What can the federal government do?

One of the roles of the federal government is to insure the quality and ecological health of all waters within the United States. These include waters within a state or that cross state boundaries. The Ohio River, for instance, drains all or parts of 14 states into the Mississippi, and that water then ends up in the Gulf of Mexico. The federal government also provides assistance to help states through grant programs and private landowners through cost-share programs to address watershed issues and management practices. The federal government also collects water quality and quantity information and provides it to the states through a variety of programs.

The Kentucky Watershed Management Framework

In Kentucky, various agencies and organizations that have an interest in watershed protection and management have joined together to create a forum – called the Watershed Management Framework – to better coordinate and integrate existing programs, tools, and resources The Watershed Management Framework sets up a Statewide Steering Committee and a series of Basin Teams in each of the major basin units of the state (Fig. 1); the Salt River Basin Team is responsible for the publication of this document. Through this watershed management process, the ecological structure and function of the watershed can be restored, maintained, and protected, and sustainable uses of the watershed can be supported.

1 Kentucky
2 Licking, Salt
3 Cumberland, Tenn., Miss.
4 Green, Tradewater
5 Big & Little Sandy, Tygarts

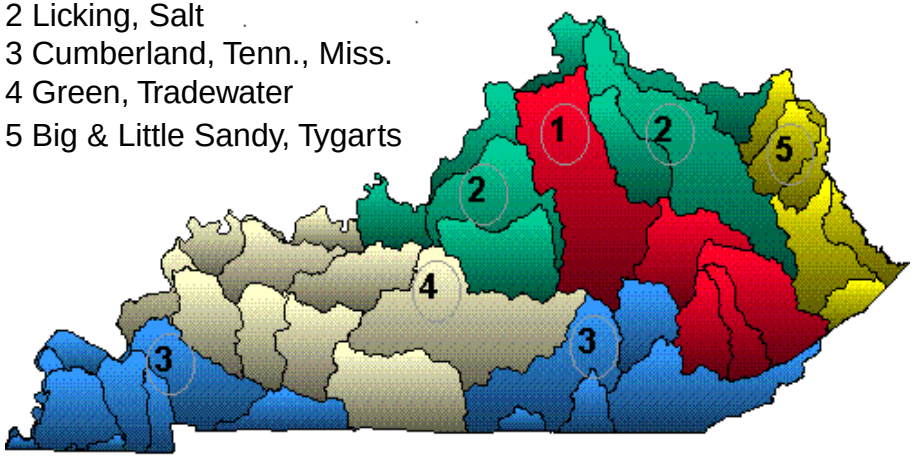


Figure 1

For additional information on the Salt River Watershed or the Kentucky Watershed Management Framework contact:

Allison Shipp
Watershed Coordinator
Salt River Watershed
U.S. Geological Survey
9818 Bluegrass Parkway
Louisville, KY 40299
(502) 493-1942

Lee Colten
Watershed Framework Coordinator
Kentucky Division of Water
14 Reilly Road
Frankfort, KY 40601
(502) 564-3410

The watershed process also sets up a repeating schedule, or basin management cycle, for coordination of activities within the Salt River basin. The first Phase (Scoping and Data Gathering) of the basin management cycle (Fig. 2) includes production of the Basin Status Report, the development of a monitoring plan, and education and outreach activities. This Phase began in July 1998 for the Salt River basin. Phase II will involve review and assessment of the data that have been collected. Phase III of the cycle is intended to identify those subwatersheds within the Salt River Basin that are in most urgent need of attention. Phase IV will entail development of a plan of action to address the problems in the priority watersheds. Phase V will lead to implementation of the management plans.

Following this schedule of phases allows interested individuals and groups to better work together. By coordinating activities, there may be better opportunities for partnerships to be formed and improved chances of finding agency resources and funds to achieve the project's goals.

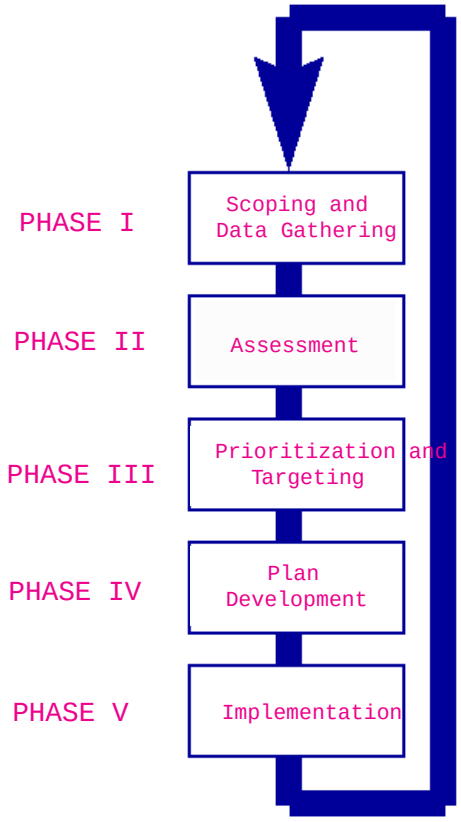


Figure 2

TABLE of Minor Ohio River Tributaries and other streams in the Salt River Watershed assessed for the *1998 Report to Congress on Water Quality*. There are more than 89,000 miles of streams in Kentucky, but only those on the U.S.G.S. 1:100,000 scale topographic maps were assessed for this report. These maps contain 49,100 miles of streams statewide. For the 1998 report, 9,860.6 miles, or 20 percent of the state's streams, were assessed. For the Salt River Watershed, 647.9 miles of the approximately 3,770 miles of streams, or a little more than 17 percent, were assessed. Information included for this watershed comes from streams monitored by the Kentucky Division of Water as well as from the Kentucky Department of Fish and Wildlife Resources, a joint project of the U.S. Geological Survey and Metropolitan Sewer District, and others.

County	Stream	Meets Standards*	Impaired for		Pollutants of Concern
			Swimming	Aquatic Life	
Anderson	Salt River		Swimming		Pathogens
Breckinridge	Sinking Creek	Meets			
	Yellowbank Creek	Meets			
Bullitt	Brooks Run		Swimming	Aquatic Life	Organic enrichment/Low DO Pathogens
	Cedar Creek		Swimming		Pathogens
	Cox Creek			Aquatic Life	Nutrients Siltation
	Floyds Fork		Swimming	Aquatic Life	Organic enrichment/Low DO Nutrients Pathogens
	Pennsylvania Run		Swimming	Aquatic Life	Organic enrichment/Low DO Pathogens
	Rolling Fork		Swimming		Pathogens
	Salt River		Swimming		Pathogens
	Wilson Creek	Meets			
Carroll	Little Kentucky River	Meets			
	Locust Creek	Meets			
	McCools Creek	Meets			
	Notch Lick Creek			Aquatic Life	Habitat alteration
Hardin	Brushy Fork		Swimming		Pathogens
	Mill Creek			Aquatic Life	Metals Organic enrichment/Low DO Ammonia (unionized)
	Salt River	Meets			
Henry	Harrods Creek	Meets			
	Little Kentucky River	Meets			
	White Sulphur Fork	Meets			
Jefferson	Beargrass Creek			Aquatic Life	Metals Organic enrichment/Low DO

*There are three designated uses for waters in Kentucky: recreation, aquatic life, and domestic water supply. Two of these uses (swimming and aquatic life) were assessed and found to be impaired for portions of the Salt River Watershed.

County	Stream	Meets Use	Impaired Use		Pollutants of Concern
			Swimming	Aquatic Life	
	Cane Run	Meets			
	Cedar Creek		Swimming		Pathogens
	Chenoweth Run		Swimming	Aquatic Life	Nutrients Noxious aquatic plants Pathogens
	Fern Creek		Swimming	Aquatic Life	Ammonia (unionized) Pathogens Organic enrichment/Low DONutrients
	Fishpool Creek	Meets			
	Floyds Fork		Swimming	Aquatic Life	Organic enricihment/Low DO Nutrients Pathogens
	Goose Creek		Swimming	Aquatic Life	Organic enrichment/Low DO Pathogens
	Harrods Creek		Swimming	Aquatic Life	Nutrients Organic enrichment/Low DO Pathogens
	Hite Creek			Aquatic Life	Unknown Toxicity
	Little Goose Creek		Swimming	Aquatic Life	Organic enrichment/Low DO Pathogens
	Long Run		Swimming		Pathogens
	Middle Fork Beargrass Creek		Swimming		Metals Organic enrichment/Low DO
	Mill Creek		Swimming		Pathogens Organic enricihment/Low DO Habitat alteration Siltation
	Mill Creek Cutoff		Swimming		Pathogens
	Muddy Fork		Swimming		Pathogens
	Pennsylvania Run		Swimming	Aquatic Life	Organic enrichment/Low DO Pathogens
	Pond Creek		Swimming	Aquatic Life	Nutrients Chlorine Organic enrichment/Low DO Pathogens
	Pope Lick Creek		Swimming	Aquatic Life	MetalsPathogens
	South Fork Beargrass Creek		Swimming	Aquatic Life	Organic enrichment/Low DO Pathogens
	Spring Ditch		Swimming		Pathogens
	Slop Ditch		Swimming	Aquatic Life	Metals Flow alterations Pathogens
	Southern Ditch		Swimming	Aquatic Life	Organic enrichment/Low DO Pathogens
Larue	Otter Fork	Meets			

County	Stream	Meets Use	Impaired Use		Pollutants of Concern
			Swimming	Aquatic Life	
	Rolling Fork	Meets			
	Salt Lick Creek	Meets			
Marion	Mussin Branch		Swimming	Aquatic Life	pH
	Pottinger Creek	Meets			
	Rolling Fork	Meets			
	UT of Rolling Fork		Swimming	Aquatic Life	pH
Meade	Buckhorn Creek		Swimming	Aquatic Life	pH
	Doe Run	Meets			
	Otter Creek		Swimming		Pathogens
					Suspended solids
Mercer	Salt River	Meets			
	Town Creek		Swimming	Aquatic Life	
Nelson	Beech Fork		Swimming		Pathogens
	Pottinger Creek	Meets			
	Rowan Creek	Threatened			Organic enrichment/Low DO Nutrients Siltation
	Rolling Fork	Meets			
	Town Creek	Threatened			Nutrients Siltation
Oldham	Darby Creek	Meets			
	Floyds Fork		Swimming	Aquatic Life	Organic enrichment/Low DO Nutrients Pathogens
	Harrods Creek	Meets			
	South Fork Harrods Creek	Meets			
	UT of Pond Creek			Aquatic Life	Nutrients Organic enrichment/Low DO Chlorine Siltation
	Wolf Creek	Meets			
Shelby	Clear Creek			Aquatic Life	Organic enrichment/Low DO
	Bullskin Creek	Meets			
Spencer	Brashears Creek	Meets			
	Salt River	Meets			
Trimble	Corn Creek	Meets			
	Little Kentucky River	Meets			
Washington	Beech Fork	Meets			

Where can you get additional information?

http://water.nr.state.ky.us/dow/dwhome.htm - Kentucky Division of Water
http://water.nr.state.ky.us/dow/watrshd.htm - Kentucky Watershed Management
http://water.nr.state.ky.us/watch/salt.htm - Salt River Watershed Watch
http://water.nr.state.ky.us/303D/ - 1998 303(d) List of Waters for Kentucky
http://www.epa.gov/region4/reg4.html – EPA Region 4, includes Kentucky
http://www.crh.noaa.gov/lmk/welcome.htm – National Weather Service
http://www.nws.noaa.gov/er/iln/ohrfc.htm – NWS, Ohio River Forecast Center
http://www.ord-wc.usace.army.mil/ - USCOE, Ohio River Regional Division
http://www.nws.noaa.gov/ - National Oceanic and Atmospheric Administration
http://www.usgs.gov – USGS
http://wwwdkylsv.er.usgs.gov/ - USGS, Kentucky District
http://www.epa.gov/ - EPA
http://www.uky.edu/KGS/home.htm – Kentucky Geological Survey
http://www.ncg.nrcs.usda.gov - USDA/NRCS
http://www.orl-wc.usace.army.mil/ - USCOE, Louisville District
http://www.usace.army.mil/ - US Army Corps of Engineers
http://www.state.ky.us/agencies/fw/kdfwr.htm - Ky. Dept. of Fish and Wildlife Resources
http://www.state.ky.us/agencies/nrepc/dnr/forestry/dnrdof.html - Ky. Division of Forestry
http://www.state.ky.us/agencies/nrepc/dnr/Conserve/doc2.htm - Kentucky Division of Conservation

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- Kentucky Department of Agriculture, Division of Pesticides
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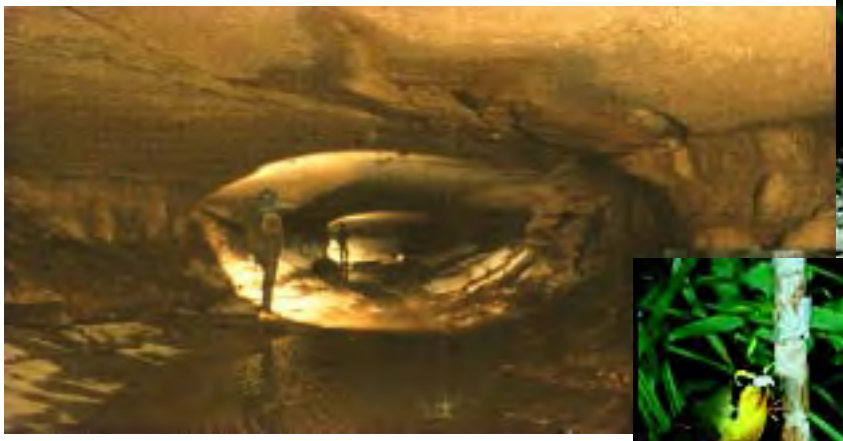
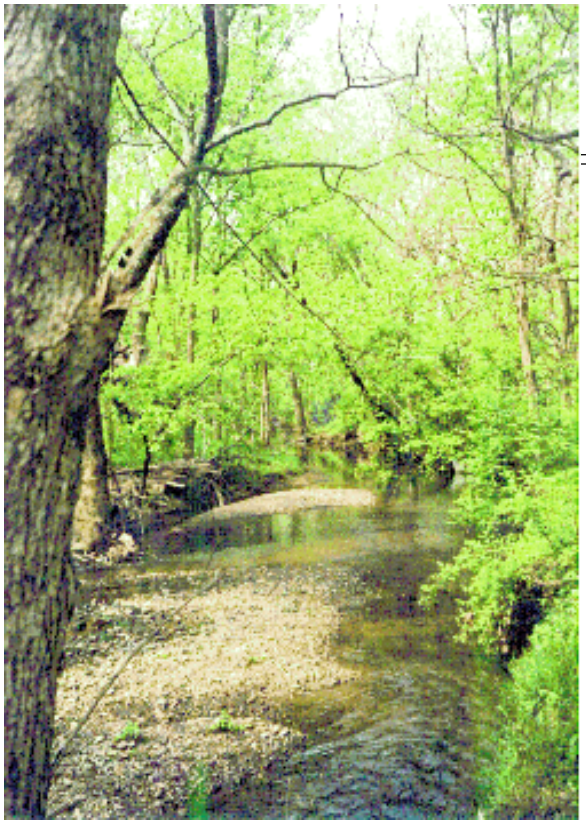
- Kentucky Department of Natural Resources (DNR)
- Kentucky Department of Fish and Wildlife Resources
- Louisville and Jefferson County MSD
- Sierra Club
- Kentucky Waterways Alliance
- Salt River Watershed Watch
- Center for GIS and Ky. Institute for the Environment and Sustainable Development, University of Louisville
- U.S. Army Corps of Engineers, Louisville District
- Natural Resources Conservation Service of U.S. Department of Agriculture
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Geological Survey

Maps provided by University of Louisville Center for GIS.
The illustration on the cover is a computer-generated color relief map of the Salt River Basin. This ilustration was created using ArcInfo GIS software and ErMapper Image Processing software. The base data was obtained from U.S. Geological Survey 1:250,000 scale Digital Elevation Model (DEM) data. (University of Louisville, Center for GIS, 1998)
Photos provided by Kathy Wynne (pages 1 and 7), Aimee Downs (page 13), John Overing (page 9, bank scene), Dan Gray (page 20, cave), Ralph Reiss (page 20, Beargrass Creek and rafting scene), Angie Crain (page 9, Salt River), and Ken Cooke (page 20, volunteers).

Graphic on page 1 from Tarbuck and Lutgens, *Earth: Introduction to Physical Geology Sixth Ed.* 1999. Reproduced by permission of Prentice-Hall, Inc., Upper Saddle River, NJ.

Kentucky Watershed Framework
Status Report of the Salt River Watershed





Kentucky Division of Water
14 Reilly Road
Frankfort, KY 40601