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# Water

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**Sources of Water:** Surface and ground water are present throughout Kentucky's 40,598 square miles. Surface water occurs as rivers, streams, ponds, lakes, and wetlands. Ground water occurs in the pore spaces within rocks and alluvium, in fractures, and in solution openings or conduits in areas underlain by soluble carbonate rocks (e.g., limestone). Approximately 25 percent of Kentucky is underlain by limestone exhibiting karst features. Although we often speak of ground water and surface water as though they were two different things, ground water is the sustaining supply for surface water, and, in karst areas, surface water often enters or returns to the ground-water system through sinkholes and cave openings.

## Water Supply:

- About 46 inches of precipitation (32 trillion gallons) falls on Kentucky every year. About 18 inches (12 trillion gallons) runs off in streams, and 28 inches (20 trillion gallons) evaporates or is transpired by plants.
- Kentuckians use more than 4 billion gallons of water per day. This amount includes about 300 million gallons per day (MGD) for domestic and commercial uses, 430 MGD for industrial/mining uses, 60 MGD for agriculture, and 3,400 MGD for cooling at thermoelectric power plants.
- Almost 94 percent of water used is returned to streams.
- About 815 public systems provide water for 80 percent of the population.

**Water Contamination:** Surface- and ground-water supplies in Kentucky are susceptible to pollution from both natural and man-made sources. Naturally occurring substances such as iron, manganese, barium, fluoride, hydrogen sulfide, and salt may be present at undesirable levels. Bacteria from sewage, septic tanks, and animal wastes are a common problem. High nitrate-nitrogen levels contaminate water supplies in some areas. Some water supplies in Kentucky have been threatened by organic chemicals, including trihalomethanes (THM's).

## Rivers and Streams:

- Thirteen major river basins, containing over 89,400 miles of streams, drain the State.
- More than 400 miles of streams have been designated "Outstanding Resource Waters."
- One hundred fourteen miles of nine streams have been designated "Wild Rivers."

## Lakes and Reservoirs:

- Kentucky has more than 2,700 lakes and reservoirs, more than a third of which are larger than 10 acres.
- Reservoir storage in Kentucky totals 2.9 trillion gallons, or 9 million acre-feet.
- Of 104 assessed lakes, 72 percent supported all uses.

## Wetlands:

- Kentucky has an estimated 325,000 acres of marsh vegetated wetlands, 320,000 acres of lake wetlands, and 75,000 acres of river wetlands.
- Fifty-five percent of all rare and endangered species in Kentucky are either located in or dependent upon wetland areas.
- Three wetlands areas have been designated "Outstanding Resource Waters": Metropolis Lake in McCracken County, Murphys Pond in Hickman County, and Swan Lake in Ballard County.

## Surface-Water Use:

- Surface sources provide about 95 percent of the water used in Kentucky.
- About 2.6 million Kentuckians are served by surface-water sources.

### For More Information Contact:

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Electronic version also available on the KGS World Wide Web site at <<http://www.uky.edu/KGS/home.htm>>



- ◆ Surface water provides domestic water supplies for 92 percent of Kentucky's urban population and for about half of Kentucky's rural population.

#### **Surface-Water Quality:**

- ◆ The state of Kentucky maintains 44 stations that monitor stream-water quality.
- ◆ Fifty-six percent of Kentucky households are served by 2,700 waste-water treatment plants.
- ◆ Aquatic life was diminished because of pollution in almost 25 percent of evaluated streams.
- ◆ Eighty-two percent of evaluated streams did not pass standards to allow swimming and recreation.

#### **Sources of Surface-Water Pollution:**

- ◆ Nonpoint sources pollute about three and a half times as many miles of streams as point sources.
- ◆ Primary nonpoint sources of pollution are
  - ◆ Resource extraction, 31 percent
  - ◆ Agriculture, 29 percent
  - ◆ Urban runoff, 10 percent
  - ◆ Land disposal/septic systems, 20 percent
- ◆ Municipal sewage treatment plants account for 70 percent of the point sources of pollution.

#### **Water Wells:**

- ◆ Kentucky has more than 200,000 water wells.
- ◆ More than 39,000 new water wells have been registered in Kentucky since 1985.
- ◆ Median depths to ground water range from 20 feet in the Blue Grass Region to 64 feet in the Jackson Purchase Region.
- ◆ Guidelines for the installation of water and monitoring wells can be obtained from the Kentucky Division of Water.

#### **Ground-Water Use:**

- ◆ About 900,000 Kentuckians depend on ground water for domestic water supplies.
- ◆ Kentuckians use about 205 million gallons of ground water per day.
- ◆ Ground water, cisterns, and hauled water supply about half of Kentucky's rural population.

#### **Ground-Water Quality:**

- ◆ It has been estimated that at least half of the State's private drinking-water wells are contaminated by bacteria.
- ◆ Less than 1 percent of 1,735 surveyed rural domestic wells had pesticide concentrations in excess of Maximum Contaminant Levels (MCL's) recommended by the U.S. Environmental Protection Agency.
- ◆ Pesticides were detected in nearly 20 percent of 1,735 surveyed rural domestic wells.
- ◆ Nitrate-nitrogen concentrations exceeded the MCL in about 1 out of 20 of the 4,829 surveyed rural domestic wells.

#### **Potential Sources of Ground-Water Contamination:**

- ◆ 125,000 unplugged oil and gas wells
- ◆ 500,000 septic tanks
- ◆ 40,000 underground storage tanks
- ◆ More than 600 inactive landfills
- ◆ 5,000 open dumps
- ◆ Nearly 3,500 permitted hazardous waste-handling facilities
- ◆ More than 6,000 injection or disposal wells associated with the production of oil or natural gas (U.S. Environmental Protection Agency class II wells)

**Kentucky Ground-Water Data Repository:** This repository was established in 1990 to archive and distribute ground-water data collected by Federal and State agencies, independent researchers, universities, and other organizations. It provides the public with a central location to access information on water wells, well construction, water quality, springs, discharge, maps, and publications. The repository is managed by the Kentucky Geological Survey. In addition, the Survey maintains databases on surface water, coal, and oil and natural gas.

**Additional Water Information:** The Water Resources Section at the Kentucky Geological Survey conducts research on the hydrogeology of agricultural lands, coal fields, and karst terranes, and on basin hydrology. Most research programs focus on water quality. The Kentucky Geological Survey has facilities to perform a complete range of analyses to identify water chemistry.

**Sources:** Kentucky Geological Survey, U.S. Geological Survey, Kentucky Environmental Quality Commission, Kentucky Division of Water, U.S. Census Bureau.