

Kentucky's Environmental Trends: Progress and Problems

While environmental quality is improving in Kentucky, much remains to be done. For example, toxic spills have increased; more than half of the state's drinking water was in violation of one or more safe drinking water standards in 1995; and our forests and other natural resources remain at risk from unrestricted development, neglect, and pollution. On the bright side, 56 waste sites have been closed and 24 state-of-the-art facilities are operating in Kentucky today; statewide participation in garbage programs is at 80 percent compliance; and we are well within sight of reaching our recycling goal of 100 million tons per year. Moreover, air pollutants in Kentucky have been declining since monitoring began in 1980. Today, we are well below the national standards for public health safety. As Kentucky's economy grows, measuring environmental quality will become increasingly important to our efforts to ensure a viable and sustainable environmental future.

By Leslie Cole
Environmental Quality Commission

Kentuckians place a high value on a clean environment. Poll after poll reveals that the environment remains a top public concern. For example, a 1994 public opinion survey, conducted by the University of Kentucky found that more than half of the respondents supported a healthy environment at the expense of economic development.¹ A 1996 University of Kentucky poll also found that Kentuckians want the state to spend at least 50 times more on environmental programs.² The poll further revealed that the environment ranks behind only education and health care among the priorities Kentuckians would set for state spending. Currently, less than 1 percent of the state budget is allocated to environmental programs.

National opinion surveys echo similar sentiments. A 1995 poll, commissioned by the Coalition of American's Children, found that 93 percent of Americans support setting federal environmental standards at levels strong enough to protect children's health.³ Many of those polled valued children's health more than reducing government spending and would be willing to bear the regulatory costs of protecting children if they were passed down to consumers. A September 13, 1996, survey, conducted by Princeton Survey Research for Knight-Ridder Washington Bureau, also indicated that 45 percent of Americans considered the environment among the most important problems facing the country.⁴

Public opinion about the environment has long guided government response. Public concerns led to the enactment of numerous federal environmental laws in the 1970s, 1980s, and 1990s. And these laws have been responsible for the significant progress made in restoring the environment.

For example, the Clean Air Act of 1980 has resulted in concentrations of many air pollutants in Kentucky declining to their lowest levels since monitoring began more than two decades ago. Further, a 25 percent reduction in the amount of toxic chemicals reported released to the environment by Kentucky industries since 1988 has been attributed to the 1986 federal Right-To-Know Law. And federal and state solid waste rules passed in the 1990s have resulted

¹ University of Kentucky Survey Research Center. (1995, November) *Annual Kentucky survey*. Lexington, KY: Author.

² University of Kentucky Survey Research Center. (1996, November) *Kentucky budget choices and environmental values*. Lexington, KY: Author.

³ Poll: 93% say environmental standards should protect children. (1995, September 25) *Greenwire*. 5, 3.

⁴ Knight-Ridder Washington Bureau (1996, September). Poll by Princeton Survey Research of 1,002 registered voters.

in the closure of 56 substandard landfills in the state and the permitting of 24 state-of-the-art municipal solid waste landfills in the past four years.

But problems still remain. Drinking water quality, particularly for thousands of Kentuckians who depend on private wells and small drinking water systems for supplies, is marginal at best. Kentucky's drinking and wastewater infrastructure will require billions of dollars in investments to upgrade and improve operations. Contaminated runoff from cities, abandoned mine lands, and farms, along with discharges of improperly treated sewage, continues to make many waterways unfit for swimming, fishing, and other uses. Environmental degradation threatens the health and economic well-being of small rural communities as well as inner city neighborhoods located near contaminated waste sites and pollution sources. And our forests and other natural resources remain at risk from unrestricted development, neglect, and pollution. Little data are available to document how much timber is being removed from Kentucky's forests, but many suspect that logging has increased considerably in the past few years due to demand and rising stumpage prices.

But many of the federal laws and programs which brought about the benefits of cleaner air, water, and land are now under attack as too costly and inflexible—unable to address the current environmental needs and issues of the day. Regulatory reform is a common theme heard from the White House and the halls of the U.S. Congress to the offices of the Kentucky General Assembly. The President's Council of Economic Advisors in its *1996 Annual Economic Report to Congress* included, for the first time, a chapter on environmental regulations. The report details various options to reinvent environmental regulations based on the notion that changes in our economy, knowledge, technology, and society call for changes in regulatory policies.⁵ In the 1995 publication *Setting Priorities, Getting Results, A New Direction for the Environmental Protection Agency*, the National Academy of Public Administration calls for "A system that would rely more heavily, though not exclusively, on the ability of individuals, firms, communities, and states to meet national environmental standards in a way that makes the most sense to them."⁶

While meeting environmental standards set to protect public health and the environment will remain the heart of environmental programs, Kentucky and other states will be given more flexibility in designing their own approaches to achieving environmental quality. State efforts to reinvent environmental regulation are taking on a variety of forms ranging from targeting areas of greatest need, integrating risk-based decisionmaking, reengineering permits, developing incentive and customer-based initiatives, and shifting from prescribed methods of regulatory compliance to specifying desired outcomes.

But is Kentucky ready to take on the responsibility of designing its environmental future? There are arguments on both sides. Environmentalists argue that environmental policy will be driven by economic interests rather than need and public accountability will be lost. The regulated community counters that it is in their best interest to meet or exceed environmental standards, particularly if they can use their own cost-effective strategies.

As Kentucky moves into the 21st century, one thing is certain for the environment and that is change. Change in the way we view and understand environmental problems. Change in the policies and tools used to address them. And change in the government's role in achieving a desirable and sustainable environmental and economic future. What is crucial is that Kentuckians have an active part in designing that future.

⁵ Council of Economic Advisors. (1996, February). *Economic report of the president*. Washington, DC: Office of the President.

⁶ National Academy of Public Administration. (1995, April) *Setting priorities, getting results: A new direction for EPA*. Washington, DC: Author.

Environmental Trends: Progress and Problems

Kentucky's environment continues to show signs of recovery largely due to numerous regulatory requirements imposed on municipalities, businesses, and industries during the past two decades. These rules, along with billions of dollars in private and public sector investments, have led to cleaner air, water, and landscapes across the state while our economy has grown and prospered—a strong indicator of the complementary role a healthy environment plays in a strong economy. But much more remains to be done to ensure a safe and healthy environment for future generations of Kentuckians.

Air Quality

Data collected in 1995 from the state's 113 air quality monitors in 34 counties reveal that the average concentrations of many pollutants in the air were at their lowest levels recorded since monitoring began in Kentucky two decades ago. For example, concentrations of carbon monoxide (CO), an air pollutant formed when the carbon in fuels from cars and other sources is not burned completely, fell 42 percent in the state during the past two decades. Average CO levels during 1995 were well below the standards set to protect public health. The improvements are primarily due to pollution controls on automobiles.

Another success story is sulfur dioxide (SO₂). SO₂ is formed when fossil fuel containing sulfur, such as coal, is burned. Power plants are responsible for 90 percent of the sulfur dioxide emissions in the state. Between 1980 and 1995, the average concentrations of SO₂ in the air declined 29 percent. These improvements are attributed to the federal Clean Air Act Amendments of 1990 which required 10 of the state's 21 power plants to reduce SO₂ emissions 30 percent to 40 percent below 1980 levels by the year 2000 to address the threat of acid rain. The installation of pollution control equipment, such as scrubbers, at many power plants in Kentucky reduced SO₂ emissions 40 percent between 1980 and 1995. Measures to reduce sulfur dioxide emissions have also likely led to improvements in the pH of Kentucky's rainfall. Since 1985, rainfall at monitored sites in four Kentucky counties has become generally less acidic.

Nitrogen dioxide (NO₂) belongs to a family of highly reactive gases called nitrogen oxides (NO_x)—a brownish gas produced by fossil fuel combustion from sources such as cars and power plants. This pollutant can irritate the lungs and lead to respiratory infections. NO₂ is also associated with atmospheric reactions that produce ozone and acid rain. While all Kentucky regions currently meet the health-based standard for NO₂, Kentucky ranks 11th in the nation in NO_x emissions. Large sources of NO_x, such as power plants, will be required to reduce emissions by 30 percent to 40 percent by the year 2000. In Kentucky, NO_x emissions from power plants increased 14 percent between 1980 and 1995. The lack of emission reductions are attributed to the hesitancy of industry to invest in controls until federal regulatory uncertainties are resolved.

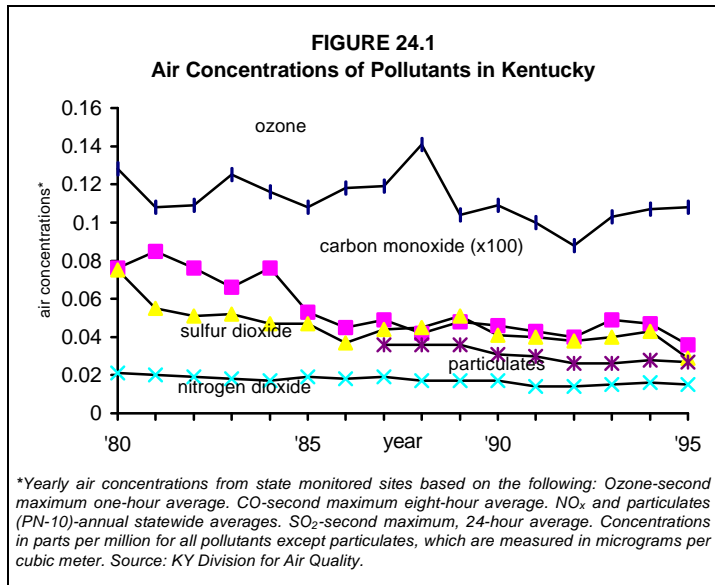
Levels of small particles in the air are declining in Kentucky. Particles of dust, dirt, and soot are emitted by many sources including cars, agriculture operations, and construction projects. These particles can be inhaled into the lungs and damage tissue and lead to premature death. All regions of the state currently meet the particulate standard of 10 micrometers or less, known as PM-10. However, the U.S. EPA is considering a new more stringent standard which would limit fine particles of 2.5 micrometers or less.

A more protective ozone standard is also under consideration by the U.S. EPA. Of the six principal air pollutants, ground-level ozone has been the most difficult to control. Kentucky was among 35 states that exceeded the ozone standard during 1995.⁷ Ozone is produced when

⁷ U.S. Environmental Protection Agency (USEPA). (1995, December) *Comparison of preliminary 1995 ozone concentrations to 1993 and 1994*. Washington, DC: Author.

emissions of volatile organic compounds (VOCs), such as solvents and automobile exhaust, and nitrogen oxides (a byproduct of combustion) react with sunlight and heat to form smog. According to a 1995 American Lung Association survey, 432,516 people in Kentucky, or 11 percent of the state's population, suffer from lung cancer or chronic respiratory diseases that can be complicated by exposure to ozone and other air pollutants.⁸ Ozone pollution not only affects people with impaired respiratory systems, but healthy adults and children as well.

There are numerous small and large sources contributing to ozone pollution including automobiles, manufacturing plants, coal-fired power plants, and gas stations. While most regions of the state currently meet the national ozone standard, it is still considered a problem in the urban airsheds of northern Kentucky/ Cincinnati (which includes Boone, Campbell, and Kenton counties) and the Jefferson County/Southern Indiana region (which includes Jefferson and portions of Bullitt and Oldham counties). Efforts to address ozone pollution in these areas are ongoing, however, both the Louisville and northern Kentucky regions exceeded the standard during 1995.



Other air pollutants receiving increased attention are toxic chemicals known or suspected of causing cancer or other serious health effects, such as birth defects or reproductive problems. During 1994, the most recent year for which data are available, 424 industries in Kentucky reported releasing 36.2 million pounds of toxic chemicals to the environment, 97 percent of which was to the air.⁹ But data also reveal that releases of 17 toxic chemicals to the air prioritized by the U.S. EPA for reduction because they are considered highly toxic, carcinogenic, or released in large volumes, have declined 35 percent in Kentucky since 1988, representing important progress in reducing human exposure to toxic air pollution. The 1990 Clean Air Act Amendments will focus additional attention on reducing toxic air emissions and require technology-based standards on major emitters of 189 toxic air pollutants by the year 2000.

The release of certain chemicals such as carbon dioxide and chlorofluorocarbons are also believed to be affecting global temperatures. A 1996 Kentucky study found that an estimated 205 million pounds of these greenhouse gases were released to the state's atmosphere during 1990, primarily by power plants and from the use of chemical refrigerants.¹⁰ Although scientific uncertainties remain concerning the potential effects of greenhouse gases on global climates, policymakers at the international level enacted a treaty in 1992 to stabilize greenhouse gas emissions at 1990 levels by the year 2000.

The loss of the protective ozone layer is also believed to be contributing to global warming by allowing more of the sun's rays to pass through the earth's atmosphere. The ozone layer,

⁸ American Lung Association. (1996). *National health interview survey*. Washington, DC: Author.

⁹ Kentucky Department for Environmental Protection. (1996). *Toxic release inventory report*. Frankfort, KY: Author.

¹⁰ Spencer, H. (1996). *Kentucky greenhouse gas inventory*. Louisville, KY: Kentucky Institute for Environment and Sustainable Development, Center of Environmental Engineering, University of Louisville.

which surrounds the earth and shields out ultraviolet radiation, is being destroyed twice as fast as thought. Excessive exposure to UV-B radiation can cause skin cancer and damage crops and livestock. In 1994, Kentucky industries reported releasing 5.6 million pounds of ozone depleting chemicals, ranking the state second in the nation in emissions of chemicals associated with ozone depletion.¹¹ But trends also reveal that industries are making progress in reducing these chemical emissions. Reported releases of 11 ozone depleting chemicals emitted by Kentucky industries fell 52 percent between 1991 and 1994.

Many of the air quality improvements are due to various federal, state, and local regulatory measures to control air pollution from both large and small sources. The Kentucky Division for Air Quality currently regulates 2,082 air pollution sources and the Jefferson County Air Pollution Control District regulates 1,587 sources. About 10 percent of these sources were in violation of air quality rules in 1995, 217 of which were fined.

Many large air pollution sources will be required to apply for new air quality Title V permits in 1996. The Title V program, required under the Clean Air Act Amendments of 1990, is designed to improve the permitting process. The permit applications, due December 1996, are expected to take three to five years for the state to process and will be funded by fees charged to air pollution sources. In fiscal year 1995, \$5.5 million in fees were collected by the Division for Air Quality from 963 sources. This amounted to a fee of about \$34.35 per ton of pollutant emitted. The fees accounted for 64 percent of the division's budget in 1995.

Waste Management

Managing Kentucky's waste has long been a challenge. But during the past decade the state has met this challenge head on and passed numerous laws and regulations to further promote the proper disposal of waste. Yet despite these efforts, improper disposal of solid and hazardous waste still threatens our environment.

Kentuckians are producing more waste than ever before, about 4.4 pounds per person.¹² But more Kentuckians are now disposing of their waste properly. About 161,000 more Kentucky households participated in a garbage collection program in 1995 than was the case in 1994. It is now estimated that 1.17 million or 80 percent of the state's households are disposing of their garbage properly. However, participation rates vary across Kentucky. For example, 17 counties report less than a 50 percent household participation rate in garbage collection services.¹³

Most of the municipal solid waste generated in Kentucky is disposed of in 24 state-of-the-art municipal solid waste (MSW) landfills. Nearly 3.6 million tons of municipal waste and 72,000 tons of industrial solid waste were disposed at these landfills in fiscal year 1995-96. This represented a 14 percent decline from the previous year. The decrease may be due to the diversion of waste to other facilities such as the 132 construction and demolition debris landfills now operating in the state and the recovery of materials for recycling. County solid waste reports reveal that about 1 million tons of waste, about 24 percent of the waste stream in Kentucky, was diverted from landfills in 1995 for recycling and composting. But plunging prices for paper, cardboard, and other recyclable commodities in 1995 and 1996 threaten many recycling programs in Kentucky.

Kentucky has 25 years of statewide capacity permitted at the 24 MSW landfills, compared to less than five years of capacity just four years ago. As anticipated, tipping fees have increased due to the more stringent state and federal landfill construction and operating standards. Nationwide, municipal solid waste landfill tipping fees have increased 400 percent since 1985.¹⁴ The average landfill tipping fee in Kentucky has increased 27 percent since 1993

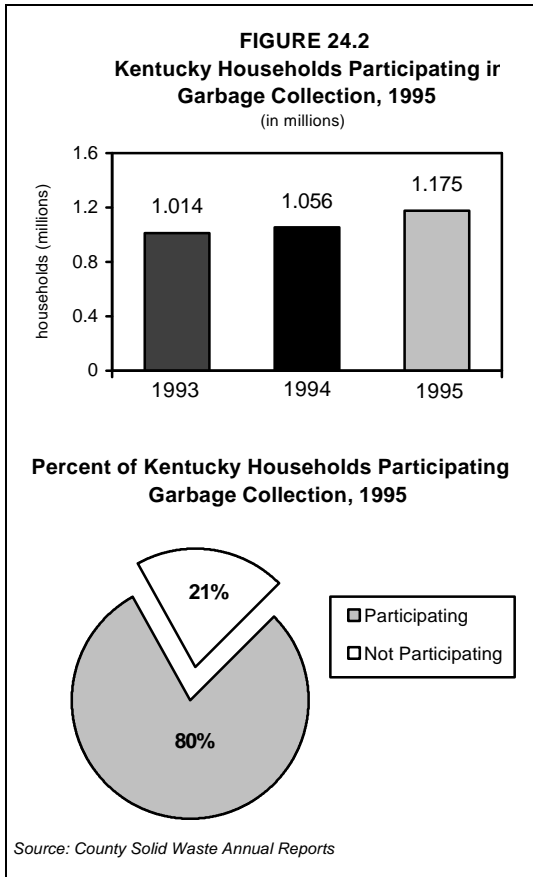
¹¹ Kentucky Department for Environmental Protection. (1996) *Toxic release inventory report*. Frankfort, KY: Author.

¹² USEPA. (1996). *Characterization of municipal solid waste in the US: 1995 update*. Washington, DC: Author.

¹³ *Annual County Solid Waste Reports*. (1995). Commonwealth of Kentucky.

¹⁴ Repa, E.W., Blakey, A. (1996). Municipal solid waste disposal trends: 1996 update *Waste Age*, 43.

and now average \$27.49 per ton.¹⁵ Average household garbage collection rates have almost doubled, increasing from \$5 a month in 1992 to \$9.70 per month in 1995.



While the state has made great progress in permitting new state-of-the-art landfills, 56 substandard landfills that closed in 1992 remain a significant challenge. These landfills were issued closure permits in the spring of 1996 and are required to monitor groundwater for the next two years. Already, 13 old landfills have detected groundwater contamination. One landfill, Roe Creek in Lawrence County, was classified as a state Superfund site in 1995 after bags of asbestos were found washing into a nearby creek. The state has spent \$117,000 to contain the Roe Creek site and recently fined the company \$4.6 million.

The state has placed increased priority on the clean up of solid waste dumps in the past few years. During 1995, a record 1,761 open garbage dumps, were cleaned up by local governments at an average cost of \$2,135 per dump. And more is being done to enforce open dumping laws. More violations of local open dump ordinances were cited in 1995 than in any previous year. Most of the 4,739 violations cited were resolved out of court; only 29 percent resulted in court action.

Tire piles have received increased attention as well. In 1996, six of the largest sites, containing 1.8 million tires, were or are in the process of being cleaned up at a cost to the state of \$1.6 million. But 187 tire piles, along with hundreds of open garbage dumps, remain scattered across the state and resources are limited to address many of these sites.

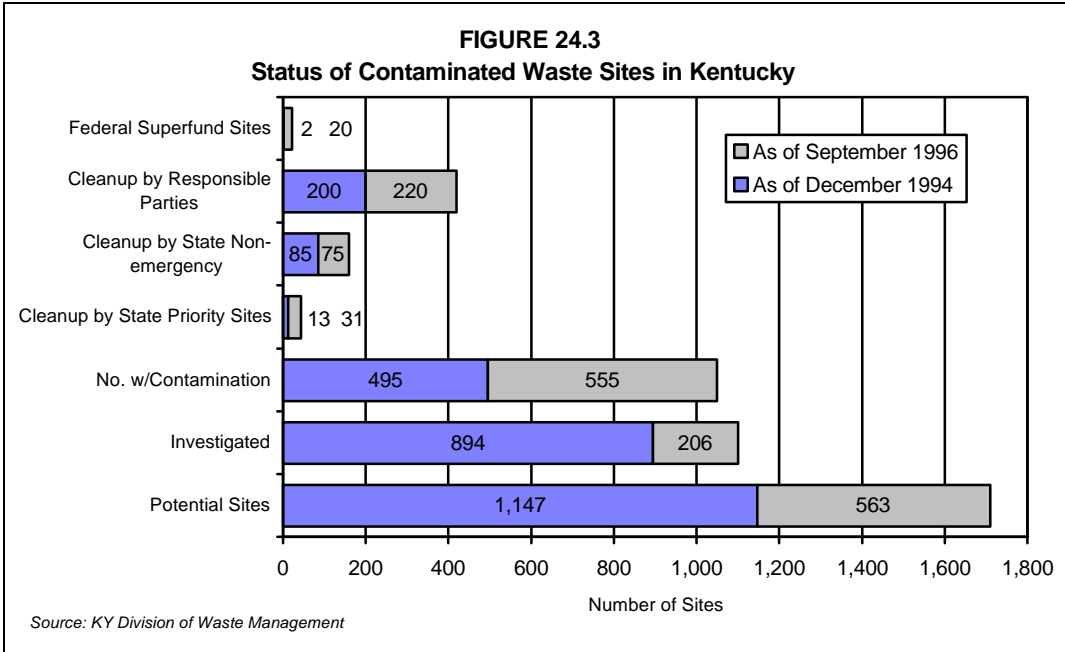
The state has also made headway on cleaning up contaminated hazardous waste sites. During the past two years, 500 contaminated waste sites were identified and 326 were remediated. The cleanup of Kentucky's 20 federal Superfund sites, while oftentimes slow, continues. Close to 300,000 Kentuckians, 42,000 of which are children, live within four miles of a federal Superfund site.¹⁶ Cleanup activities at five of Kentucky's federal Superfund sites have been completed and now are in long-term monitoring and maintenance.

For most federal Superfund sites, monitoring and maintenance will last for many years. For example, Maxey Flats, a federal Superfund radioactive waste site located in Fleming County, will be monitored for hundreds of years. Four hundred responsible parties recently agreed to pay \$60 million to contain the 4.75 million cubic feet of mostly low-level radioactive waste dumped at the site.

¹⁵ National Solid Waste Management Association. (1996, August 8). Fax transmission from Edward W. Repa on tipping fees in Kentucky.

¹⁶ Landview II. (1995, April). Mapping of selected EPA-regulated sites.

Addressing urban commercial or industrial contaminated sites, known as brownfields, has also received increased national and state attention. It is estimated that nationwide there are 130,000 to 450,000 contaminated commercial and industrial urban sites. These sites are disproportionately located in communities of color or in poor neighborhoods. Louisville was selected in 1995 as one of the U.S. EPA's 50 brownfield pilot projects to assess, safely clean up, and sustainably reuse brownfields. Brownfields cost the city about \$8.7 million in lost property tax revenues and have significantly affected the revitalization of inner-city neighborhoods.¹⁷



About 530 leaking underground petroleum storage tanks are in long-term cleanup since the state began to regulate these tanks in 1986. Another 18,000 have been closed or removed. But half of the 20,368 active underground storage tanks in Kentucky still require closure, removal, or upgrading to meet the 1998 federal spill and corrosion protection requirements.

Safe Drinking Water

More Kentuckians now have access to drinking water treated and supplied by a public water system. About 80 percent of the state's households are served by public drinking water.¹⁸ But how safe is the drinking water piped to our homes and businesses? In 1995, 51 percent of the 767 public drinking water systems operating in the state had one or more violations of drinking water rules. Most of the violations were monitoring and reporting infractions, although 39 systems did exceed drinking water standards. The most common violations of the drinking water standards were coliform bacteria and turbidity which are indicators of microbiological contamination. Fifteen plants also violated the standard for trihalomethanes, a suspected cancer-causing organic chemical created as a byproduct during the disinfection of drinking water.

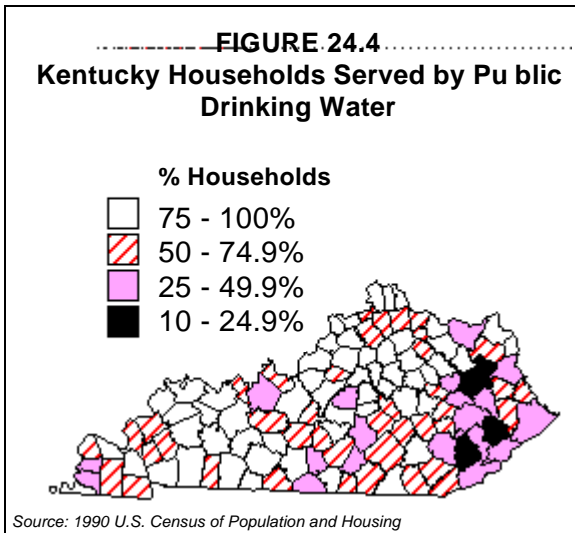
A majority of the drinking water violations continue to be committed by small systems serving 3,300 or fewer people. In 1995, 338 of these small systems accounted for 93 percent

¹⁷ USEPA. (1996, February). *EPA brownfields pilot—Louisville, Kentucky*. (Publication EPA/500/F-95/012). Washington, DC: Author.

¹⁸ Bureau of the Census. (1990). *Census of population and housing, Kentucky, 1990*. Washington, DC: U.S. Dept. of Commerce.

of the violations cited. Many small systems do not have the expertise, equipment, or resources to meet drinking water standards.

While treated public drinking water is generally considered safe for consumption, the vulnerability of water supplies to contamination do not permit us to take its quality for granted. Evidence of this risk to drinking water can be seen in the waterborne disease outbreaks reported in 17 states during 1993 and 1994.¹⁹ While the last waterborne disease outbreak in Kentucky was more than 10 years ago, the threat still remains.

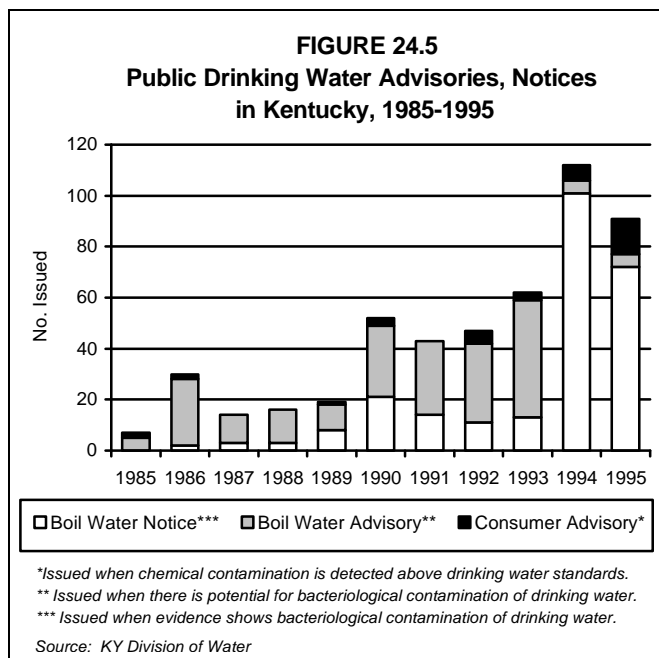


Turbidity contamination is a particular concern. Inadequate water treatment for turbidity was associated with the deadly waterborne disease outbreak in Milwaukee in 1993 which hospitalized 4,000 people, 100 of whom died. The outbreak was caused by *Cryptosporidium*, a pathogenic organism transmitted through the feces of infected animals. Consumption of the parasitic cyst causes gastrointestinal problems. While most people recover within a few weeks, children, the elderly, cancer patients, and people with AIDS are at risk from prolonged illness and possible death. More than 15,000 people were served by water systems

with persistent violations of bacteria and turbidity rules during 1995. It is not known how extensive “crypto” is in Kentucky since monitoring for the parasite in drinking water is currently not required. The U.S. EPA will require large drinking water systems to begin monitoring for the parasite in 1997.

Chemicals pose another threat to Kentucky’s drinking water. The Division of Water recently completed a round of tests for 68 chemicals at drinking water plants. The tests, conducted from 1993 through 1995, detected unsafe levels of chemicals in the drinking water of 47 systems. These systems serve an estimated 187,000 people. Some of the chemicals found occur in nature but can also be a byproduct of industrial use. Based on these and other tests, 20 advisories were issued by the Division of Water in 1994 and 1995, warning consumers not to drink the water due to chemical contamination.

Even if the water at the treatment plant is safe, there is still a possibility that by the time it reaches a home or business



¹⁹ Centers for Disease Control. (1995). *Surveillance for waterborne disease outbreaks—United States, 1993-1994*. (Vol. 45). Washington, DC: U.S. Department of Health and Human Services.

it could be contaminated. A Centers for Disease Control study found that during the past decade, 24 percent of the waterborne disease outbreaks were attributed to contamination of drinking water in the distribution system. In many areas of the state, distribution systems have not been maintained, resulting in deterioration, leakage, and failure. Water systems in Kentucky lose, on average, 41 million gallons of water each year.²⁰ Deteriorating pipes not only can cause water loss, they can also allow infiltration of contaminants during pressure losses. During 1994 and 1995, 173 boil water notices were issued in Kentucky primarily due to line breaks. This is a significant increase from past years which is attributed to greater efforts by water systems to report line breaks and educate the public about possible contamination problems.

The increase in boil water notices also reinforces the need to upgrade Kentucky's drinking water infrastructure. Most water systems are more than 30 years old and require improvements. Each year millions of dollars are spent on upgrading systems. But more is needed. A drinking water revolving loan fund was recently established at the national level to provide states with up to \$1 billion to fund infrastructure improvements and other activities to meet the 1996 amendments to the Safe Drinking Water Act. While water system investments can be costly, the Environmental Quality Commission finds that the average monthly household in the state still only pays about 64 cents per day for treated drinking water.²¹

Many communities have recognized the need to do a better job in planning for future water supplies. In Kentucky, 115 counties are in the process of developing long-range water supply plans. Some communities are also working to protect their water supplies. Of the 382 communities that depend on groundwater for public water supplies, 79 are developing plans to prevent contamination of the resource. However, most Kentucky communities do not have specific plans or programs to protect drinking water supplies.

Half a million Kentuckians currently rely on 207,000 private water wells for their drinking water supplies. Unfortunately, not much data on groundwater quality exist in Kentucky. Private wells are not required to be tested for contamination. However, local health departments will test water wells for bacteria upon request. These tests provide some insight into the quality of private water wells. During 1995, 54 percent of the 3,000 private water wells sampled by the health officials tested positive for coliform bacteria. According to state health officials, many private wells are not routinely tested or properly maintained.

For a majority of Kentuckians drinking water is safe. But more must be done to protect supplies and provide all Kentuckians with safe drinking water. Recognizing this need, Governor Patton recently established a Water Resource Development Commission to gather information and prepare a statewide plan for providing potable water to all Kentuckians by the year 2020. In addition, efforts must be made to strengthen training and technical assistance for drinking water system operators; enforce safe drinking water regulations while also streamlining monitoring requirements; develop new, more holistic approaches to protecting drinking water supplies; and establish an aggressive state education program to inform private water well owners about proper water well testing and maintenance.

Water Quality

According to a 1994 University of Kentucky poll, Kentuckians consider water pollution one of the biggest environmental problems facing the state. Kentucky's waterways continue to be affected by pollution, but there are signs of improvement. Data collected from the 44 monitoring stations show that in 1995, 31 percent of the 5,858 miles of waterways monitored in Kentucky were affected by pollution, compared to 42 percent in 1993.²² While this is good

²⁰ Kentucky Public Service Commission records. (1996).

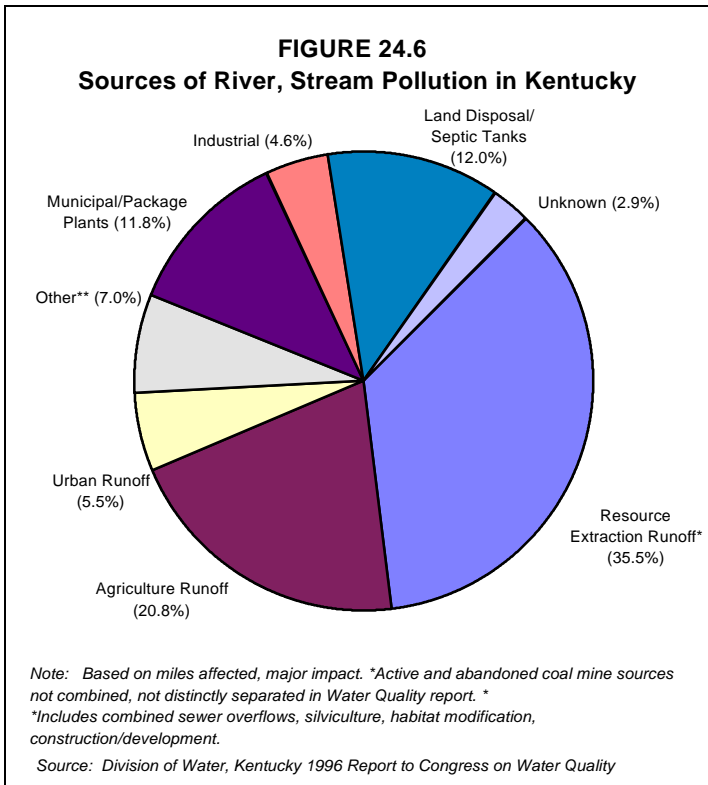
²¹ Kentucky Public Service Commission records. (1996).

²² Kentucky Division of Water. (1996, September) *1996 Kentucky report to Congress on water quality* (draft). Frankfort, KY: Author.

news for all Kentuckians, many waterways still remain unfit for swimming, fishing, or for use as a drinking water source.

Bacteria remains the top water pollution problem in the state. Just this summer, swimming advisories were issued along three of the state's 13 major rivers—the Kentucky, Upper Cumberland, and Licking rivers—due to high levels of fecal coliform bacteria. The public was also advised not to swim or have any body contact with rivers in and directly below urban areas, particularly after a significant rainfall, because of the increased potential for exposure to pollution from sewage.

Improperly operated sewage treatment plants were among the greatest sources of water pollution in the Commonwealth, responsible for 65 percent of the bacteria problems in our waterways. About 56 percent of the state's households are connected to sewers and have their



sewage treated at a wastewater plant. During 1995, 245 major and minor municipal sewage treatment plants, 1,706 minor sewage treatment or small package plants, and 1,276 industrial wastewater plants held permits to operate in Kentucky. But many wastewater treatment plants continue to violate water quality rules. In 1995, more than 50,000 violations were cited at wastewater treatment plants. Most of these violations occurred at small package plants (38 percent) and industrial wastewater plants (51 percent).

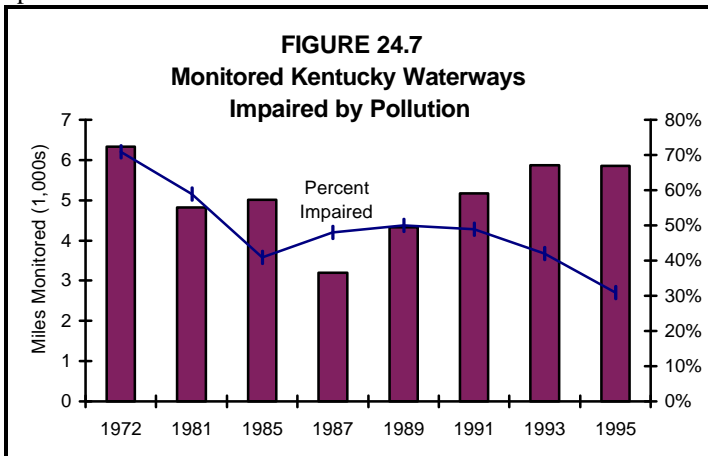
Efforts to address water pollution from wastewater treatment plants and consolidate small package plants have proceeded. Since 1986,

733 small package treatment plants have been deactivated. However, small package plants often remain the only sewage treatment option for small or rural communities. In the past 10 years, 979 new package plants were issued permits to operate in the state. Continued upgrading and regionalization of wastewater treatment plants, targeted enforcement at problem plants, financial resources to upgrade facilities, along with a strong program of technical assistance and training to wastewater treatment operators, will be necessary if problem plants are to be brought in compliance with clean water rules.

While most of the focus of the federal Clean Water Act has been on controlling pollution from large municipal and industrial sources, poorly maintained septic tanks and illegal straight pipe discharges from homes and businesses are contributing significantly to pollution problems in many waterways. A survey conducted along the north fork of the Kentucky River in Letcher County, found that more than 1,000 straight pipes were discharging untreated sewage directly into the water. In Harlan County, 660 residences are known to be dumping raw sewage into creeks. More than 3,000 homes in Floyd County are discharging sewage to community sewers that in turn discharge directly to the river. A county-by-county survey would likely reveal that this is a problem statewide. Many of the problems associated with straight pipes are

localized in nature and will require both state and local solutions.

Runoff pollution from coal mines and farmlands remains a problem as well. Data from monitoring stations in Kentucky reveal that coal mining was responsible for 36 percent of the pollution problems found in monitoring waterways.²³ Coal mines, both active and inactive, are impairing 1,021 miles of monitored waterways by contributing sediment, acid mine drainage, and other pollutants. And runoff from farmlands is causing 21 percent of the water pollution problems. Agricultural operations are polluting 598 miles of streams monitored in the state with sediment, organic chemicals such as pesticides, and bacteria.²⁴ The Division of Water is now moving towards a watershed-based approach to better target contaminated runoff and other pollution problems. The Division plans to select a waterway for its pilot watershed initiative in 1996 and create local/state partnerships and strategies to address water pollution problems. Another effort underway to combat runoff pollution from farmlands is the Agriculture Water Quality Authority. The authority was established by the 1994 General Assembly to develop plans and work with landowners to address runoff pollution from farms and logging operations.



Toxic chemicals also pose problems in a number of waterways. However, reported toxic chemical releases by industries to Kentucky's waterways have declined from 1.4 million pounds in 1988, to 40,292 pounds in 1994.²⁵ More municipal and industrial wastewater treatment plants are also meeting effluent toxicity requirements. But the number of toxic spills reported to state officials

continues to rise and remains a threat to clean water. During 1995, 3,749 spills were reported to state officials, up from 2,097 in 1990. In 1995, 172,000 fish were killed due to spills and other pollution incidents, the highest number reported since 1989.

Fish consumption advisories remain in effect along the Ohio River, the Green River Lake, five ponds in the West Kentucky Wildlife Management Area, Little Bayou Creek in McCracken County, West Four Drakes Creek in Simpson and Warren counties, and Town Branch in Logan, Butler, and Muhlenburg counties due to unsafe levels of toxic chemicals (PCBs, chlordane, or mercury) found in fish tissue.

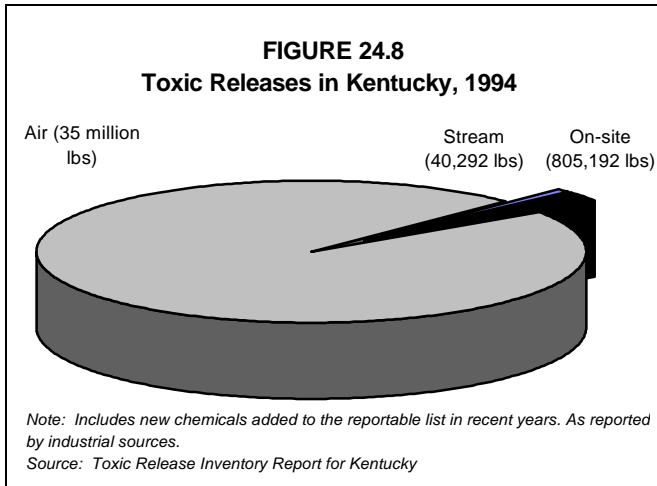
Water quality in some of Kentucky's lakes appears to be improving. Of the 104 public lakes assessed in Kentucky during 1995, 34 were affected by pollution, compared to 36 in 1993.²⁶ The principal sources of pollution to our public lakes include runoff from farmlands and abandoned coal mines and poorly operated wastewater treatment plants.

²³ Kentucky Division of Water. (1996).*1996 Kentucky report to Congress on water quality* (draft).

²⁴ Kentucky Division of Water. (1996).*1996 Kentucky report to Congress on water quality* (draft).

²⁵ Kentucky Department for Environmental Protection. (1996)*Toxic release inventory report*. Frankfort, KY: Author.

²⁶ Kentucky Division of Water.*1996 Kentucky report to Congress on water quality* (draft).



Kentucky's groundwater program is making advances to strengthen protection strategies. Many rural Kentuckians rely on groundwater as their only source of drinking water. New state groundwater regulations, enacted in 1994, will require agricultural, industrial, and other operations that have the potential to pollute groundwater, to develop and implement groundwater protection plans in 1995. While the effectiveness of this program will be difficult to measure, a new state groundwater

monitoring network will provide, for the first time, information on groundwater quality in the Commonwealth. The state began monitoring groundwater at 70 well and spring locations across the state in 1995.

Kentucky's waterways face increasing threats as state and federal program budgets erode, resulting in loss of staff and resources. The challenge to reverse the negative trends of water pollution will require new and innovative approaches such as watershed-based management, an infusion of financial resources, and collective partnerships among federal/state/and local governments, businesses, and communities alike.