

# 2022 Annual Report

## Kentucky Division of Water



# CONTENTS



CONTENTS.....	2
EXECUTIVE SUMMARY .....	4
EMERGENCIES ACROSS THE COMMONWEALTH .....	6
Nicholas County Flooding (July and August 2021).....	6
Western Kentucky Tornadoes.....	7
New Year’s Day 2022 and other flooding events.....	8
COMPLIANCE & INSPECTIONS.....	9
Dam Inspections and Incidents.....	9
Other Inspections.....	10
PERMITS, CERTIFICATIONS, & APPROVALS.....	11
Floodplain Development Permits .....	11
Laboratory Certification .....	11
Clean Water Act §401 Water Quality Certifications .....	11
Kentucky Pollution Discharge Elimination System (KPDES) Permits.....	13
INFRASTRUCTURE .....	15
Bipartisan Infrastructure Law and State Revolving Funds .....	15
Lead and Copper Rule Revisions: Lead Service Line Inventory Preparation .....	16
Regionalization of Small, Privately Owned, Wastewater Treatment Plants.....	17
Proactive PFAS Planning .....	17
DRINKING WATER .....	18
2021 Annual Safe Drinking Water Act Compliance Report.....	18
Area-Wide Optimization Program Awards .....	19
Voluntary Lead Testing in Schools and Child Care Facilities .....	21
Data Management and Reliability .....	21
FLOODING & DROUGHT .....	23
State-Owned Dam Repair Program.....	23
Bullock Pen Lake Dam .....	23

Scenic Lake Dam.....	24
GIS & MAPS.....	25
Nature-Based Watershed Solutions Story Map.....	25
MONITORING & ASSESSMENTS .....	26
Six Additional Appendices Added to the Statewide Bacteria Total Maximum Daily Load .....	26
Surface Water Monitoring Highlights .....	27
2021 National Wetlands Condition Assessment (NWCA).....	28
2022 National Lakes Assessment (NLA).....	29
Sampling For Per- and Polyfluoroalkyl Substances (PFAS) in Fish .....	29
2018/2020 Integrated Report and Web Resources for Clean Water Act §305(b) Assessment Results .	29
Development of Human Health Criteria for Surface Waters .....	31
PLANNING & PROTECTION.....	33
Water Supply Security in Bowling Green .....	33
Nonpoint Source Management Program.....	33
Pitman/Sinking Creek Dye Trace Project .....	34
Middle Fork Beargrass Creek .....	35
Agriculture Water Quality Planning.....	35
Ripple Effects Project .....	36

# *EXECUTIVE SUMMARY*



Dear Reader,

As we celebrate the 50th Anniversary of the Clean Water Act in 2022, the Kentucky Division of Water (the Division) is pleased to provide its Annual Report for State Fiscal Year 2022 (July 1, 2021 – June 30, 2022). The Annual Report summarizes the achievements of Division scientists, specialists, engineers, and administrative staff in meeting the goals of:

- Protecting, managing, and restoring water resources
- Compliance with the Safe Drinking Water Act and Clean Water Act
- Conducting effective water resources planning
- Promoting better data management and communication

During State Fiscal Year 2022 (SFY2022) the Commonwealth experienced widespread and destructive weather-related emergencies on record that resulted in profound loss for many of our friends, families, and coworkers. However, in the wake of the unprecedented chaos and damage, I have been both humbled by and proud of the compassion and responsiveness of our staff and partners in assisting recovery efforts and communities in crisis. Please accept my sincerest thanks and appreciation to all of you for stepping up where you have been most needed.

As we continue to meet the everyday challenges facing communities across the Commonwealth in water infrastructure and the extended COVID-19 pandemic, we are also pleased to report that all Kentucky public water systems completed Emergency Response Plans required by the Safe Drinking Water Act long before the federal 2024 deadline, and the Division earned the Safe Drinking Water Information System (SDWIS) Data Quality Award from the U.S. Environmental Protection Agency (EPA) for leading the country in data reporting.

I am also pleased to report the success of the Division during the recent EPA Permit Quality Review (PQR). The PQR is a cyclical review that examined 12 individual permits and one general permit. Dedication and hard work resulted in the EPA finding that "permits issued in the Commonwealth were of sufficient quality and consistency to support and uphold the intent and resources of the National Pollutant Discharge

Elimination System (NPDES) permit program." The EPA also noted the significant progress the Division has made in issuing compliant permits and the proactive measures it has taken, to address recommended EPA action items.

In November 2021, Congress passed the Bipartisan Infrastructure Law (BIL) which, over the next five years, will provide funding at unprecedented levels for investment in aging drinking water and wastewater infrastructure. The Division is actively engaged with its partner, the Kentucky Infrastructure Authority, in how best to distribute the funds the Commonwealth expects to receive.

With the growing concerns regarding per- and polyfluoroalkyl substances (PFAS), a group of manufactured chemicals that have been used in industry and consumer products for more than 70 years, the Division has engaged in additional studies and assisted with creative solutions to provide better data and protection for future decision-making.

The Division continues developing innovative nature-based solutions to watershed management, increasing accessibility to electronic stakeholder and public resources with its expanded website, and participating in educational opportunities to engage Kentucky citizens of all ages in the importance of maintaining and preserving our unique water resources.

I invite you to read more about the important accomplishments the Division achieved in the last year, and look forward to continuing to work with stakeholders and the public to manage, protect, and enhance the quality and quantity of the Commonwealth's water resources for present and future generations through voluntary, regulatory, and educational programs.

Sincerely,

A handwritten signature in black ink, appearing to read 'Carey Johnson', written in a cursive style.

Carey Johnson

Director



# ***EMERGENCIES ACROSS THE COMMONWEALTH***

Several rounds of severe storms during SFY2022 deposited excessive rainfall and spawned devastating tornadoes across the state. Consequently, two federal disasters were declared for these events.

## **Nicholas County Flooding (July and August 2021)**

On July 30, 2021, floodwaters that inundated Carlisle caused damage to homes and businesses, including its wastewater treatment plant. The chlorine storage and pump room, influent and effluent samplers, labs, and equipment were destroyed. Flooding in homes, including that of the treatment plant operators, further complicated the ability of personnel to address the resulting damage. Bypassing the compromised electric systems restored power to the plant, and coordination between the Division of Water (the Division), the Kentucky Rural Water Association (KRWA), and the Paris wastewater treatment plant produced a temporary disinfection system. A second flood event that occurred on August 16, 2021 disabled the temporary disinfection system, but plant operators were able to repair and restore the system. Division staff conducted an inspection of the intake and other structures with an aerial drone to assess flood damage.



Remains of chemical storage building in fence debris.

The Division also provided community assistance at the Multi Agency Recovery Center event in Carlisle in August 2021 by presenting technical assistance on debris removal from streams, sewage issues, permit applications, and floodplain mapping.

### **Western Kentucky Tornadoes**

On the evening of December 10, 2021, tornadoes swept across the Commonwealth and left a path of severe destruction in their wake, especially in western Kentucky and the cities of Mayfield and Dawson Springs. Division staff immediately initiated emergency reporting procedures and began surveying damage to drinking water and wastewater systems in the affected areas. Using the KYGIS portal and Emergency Operations Center (EOC) Water/Sewer dashboard, the Division assisted with tracking and resource coordination at the Boone Center. Staff helped collect and disseminate real-time information regarding water system damage assessments and resource needs, such as generators, personnel, and bottled water, so that its partners, including the KRWA and utilities across the state, could coordinate delivery of essential items to those areas.

Extra personnel were instrumental in assisting affected facilities by providing needed equipment, help in operating plants, and conducting leak detection activities on damaged drinking water pipelines. Finding and closing individual water meters is an essential step to help systems start building water storage tank volume and decreasing water losses. Efforts to bring systems quickly back online were complicated by the fact that many water meters were buried under debris and that landmarks, such as street signs and numbered mailboxes, had been destroyed by the tornadoes.



Shannon McLeary, DOW/ERT Incident Commander, standing in front of destroyed Mayfield 500,000 gallon water tank

Division staff conducted system checks on drinking water and wastewater systems twice daily, and maintained the EOC Water/Sewer Dashboard database with current status and needs for equipment, personnel, and water and power supplies. The emergency reporting system continued into the new year. While multiple drinking water systems were initially under Boil Water Advisories and water shortages, the contribution and coordination of necessary resources from multiple agencies and partnerships enabled a quick recovery of drinking water and wastewater systems. The last Boil Water Advisory was lifted on January 4, 2022.

### **New Year's Day 2022 and other flooding events**

Severe storms that occurred from December 31, 2021 through January 1, 2022 resulted in more than three (3) inches of rain in 24 hours over most of eastern Kentucky, with higher local amounts. The heavy rains caused flash flooding and destruction in Breathitt, Casey, Floyd, Johnson, Knott, Owsley, Perry, Pike, Pulaski, and Rockcastle counties which resulted in road and infrastructure damage, erosion, and broken and washed out water lines. Division staff maintained twice-daily contact with affected facilities to get status updates, report assistance requests, and track resource coordination through the KYGIS portal and EOC Water/Sewer Dashboard.

As more flooding occurred in Spring 2022, the Division assisted property owners with permitting for flood-damaged structures, issuing approvals to counties and municipalities for flood-damaged roads, bridges, and water lines. Staff worked with community officials and local floodplain managers during and after these events to provide guidance in applying for public assistance, and help through the expedited permit review process, local permitting procedures and ordinance requirements, and mitigation funding opportunities. The Division provided additional coaching to local floodplain managers through a series of Community Assistance Contacts and general technical assistance, which focused on specific flood response and recovery circumstances in each community.



# *COMPLIANCE & INSPECTIONS*



## **Dam Inspections and Incidents**

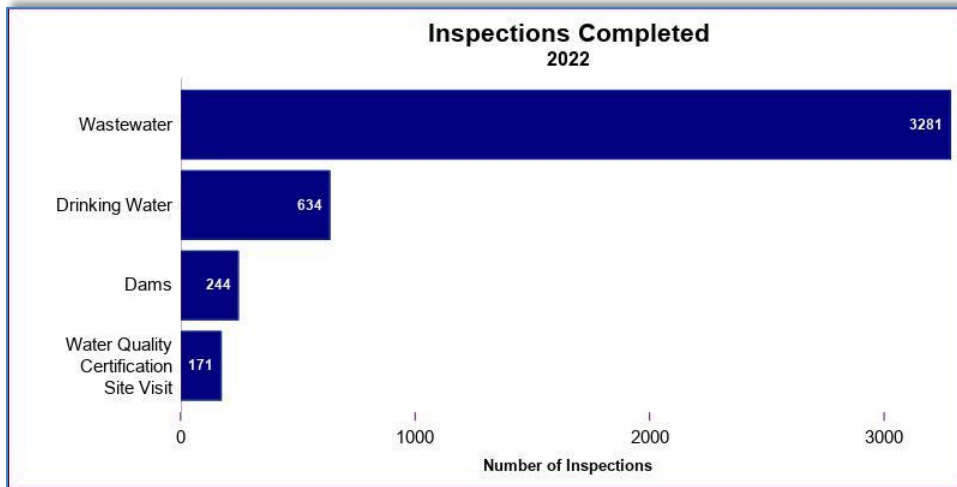
In calendar year 2021, the Division conducted 244 dam inspections, including all state-regulated high hazard dams. The Division also issued five dam construction permits, with construction completed on 14 dams that had been permitted in prior and/or current years.

In September and October 2021, the Division responded to a sinkhole that developed and recurred after initial repairs on the crest of Lake Sympson Dam in Nelson County. The Division provided technical assistance to the owner (KYTC) in developing and interpreting the results of a Geotechnical Investigation Plan, and has continued consulting with the owner on remedial measures to stabilize the dam. To date, the investigation and remedial measures on Lake Sympson dam have not impacted this water source for the City of Bardstown.

In April 2022, the Division responded to a report of significant seepage from the embankment of Marion City Lake dam in Crittenden County. As the event progressed, a sinkhole developed on the downstream slope of the dam, and the embankment showed increased saturation and instability. The Division recommended that the dam owner (City of Marion) lower the water level below the assumed source of the leak to alleviate hydraulic pressure and continued internal erosion of the embankment. The city temporarily breached the dam in May to prevent a catastrophic failure that could have inundated the area with water, and has worked in consultation with the Division to stabilize the temporary breach to protect the public in areas downstream of the dam. The Division continues working with Marion and surrounding communities to identify a sustainable, long-term water supply solution.

## Other Inspections

In addition to dams, the Division is responsible for all inspections related to water resources across the Commonwealth, including wastewater and drinking water. Inspections for compliance with permits issued by the Division occur on a routine basis, and other inspections may be prompted by citizen concerns.



# ***PERMITS, CERTIFICATIONS, & APPROVALS***



## **Floodplain Development Permits**

Development in, along, or across a stream requires a floodplain permit from the Division. Certain eligible activities that will not affect the Base Flood Elevation (BFE) in a community, and have minimal flood risk potential, may be covered under the Floodplain General Permit (FPGP). Development activities that do not meet FPGP eligibility requirements, such as construction or renovation of residential and commercial structures, stream crossings or alterations, fill, excavation, grading, and small stream impoundments require individual permits from the Division.

During FY2022, the Division issued nearly 950 final floodplain permit actions, which included notifying over 30 applicants of coverage under the FPGP rather than needing individual permits, saving time and considerable effort for both applicants and the Division. The Division also completed over 20 floodplain compliance investigations and assisted property owners in returning to compliance with state and federal floodplain regulations.

## **Laboratory Certification**

The Division certifies all laboratories performing analyses on drinking water and wastewater compliance samples in Kentucky. To facilitate these efforts, the Division recently added electronic applications and payment capabilities for these certifications. For the 2022 certification period, 22 drinking water laboratories and 55 wastewater laboratories submitted applications and payments electronically. The Division hopes that all laboratories will make further use of this new option for future submittals.

## **Clean Water Act §401 Water Quality Certifications**

Section 401 of the Clean Water Act (CWA) gives states the authority to grant, deny, or place conditions on proposed federal permits for activities that may discharge into "waters of the United States" depending on whether the activity complies with state water quality standards. A Water Quality Certification issued by the Division affirms that the discharge will not violate Kentucky water quality standards.

In late 2021, the US Army Corps of Engineers (the Corps) reissued 41 CWA Section 404 Nationwide Permits for activities that will not require an individual federal permit. After thorough review and assessment, the Division issued general 401 Water Quality Certifications for several activities that will not require further review in order to comply with Kentucky water quality standards, and those that will comply as long as certain other conditions are met. This information is available at [General Water Quality Certification - Kentucky Energy and Environment Cabinet](https://eec.ky.gov/EnvironmentalProtection/Water/PermitCert/WQ401Cert/Pages/General-WQ-Certification.aspx)

(<https://eec.ky.gov/EnvironmentalProtection/Water/PermitCert/WQ401Cert/Pages/General-WQ-Certification.aspx>)

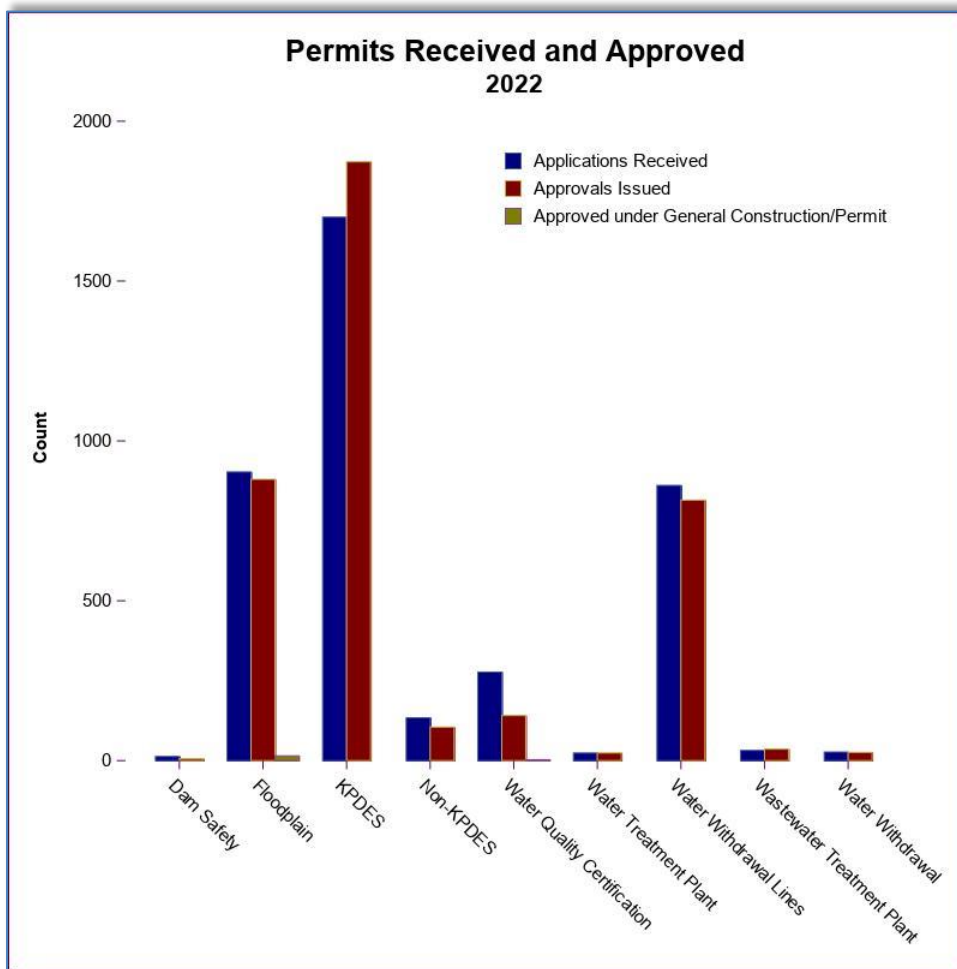
While a federal definition of "waters of the United States" and how the corresponding §401 Certification rule will apply in the future are still in flux, the Division continues working collaboratively with Corps Districts in Kentucky to develop processes and procedures for effective interagency communication. This cooperation assists with implementing changes to processing timelines, scope of review, condition requirements, and enforcement authority.

During FY2022, the Division issued 160 water quality certification final actions, reviewed annual mitigation monitoring reports for 72 projects, and released four of these projects from future monitoring in accordance with the §401 certification approval. The Division also reviewed 16 proposed stream and wetland mitigation banking projects through the Interagency Review Team process, which includes the Division, the Kentucky Division of Fish and Wildlife Resources, the Corps, the U.S. Environmental Protection Agency (EPA), and the US Fish and Wildlife Service.

The Ford Motor Company's announcement to develop a 1,500-acre parcel for the new BlueOval SK electric vehicle battery manufacturing plant presented unique challenges. The project proposed impacts to more than 28,000 feet of streams and 16 acres of wetlands. The Division conducted a comprehensive review of the 1,000+ page application and issued the required water quality certification in just 48 days, demonstrating its commitment to protecting Kentucky waters while supporting state economic development.

The Division is also working with the Corps Districts to implement the Kentucky Wetland Rapid Assessment Method and the Vegetative Index of Biotic Integrity. These tools will provide a quantifiable means to assess wetlands integrity and the potential effects an activity may have on the surrounding area, and will assist with permitting decisions related to wetlands. The EPA awarded the Division a \$328,449, two-year

Wetland Program Development Grant to assist in the development a Stream Quantification Tool that will assess stream impacts and mitigation associated with water quality certifications.



### Kentucky Pollution Discharge Elimination System (KPDES) Permits

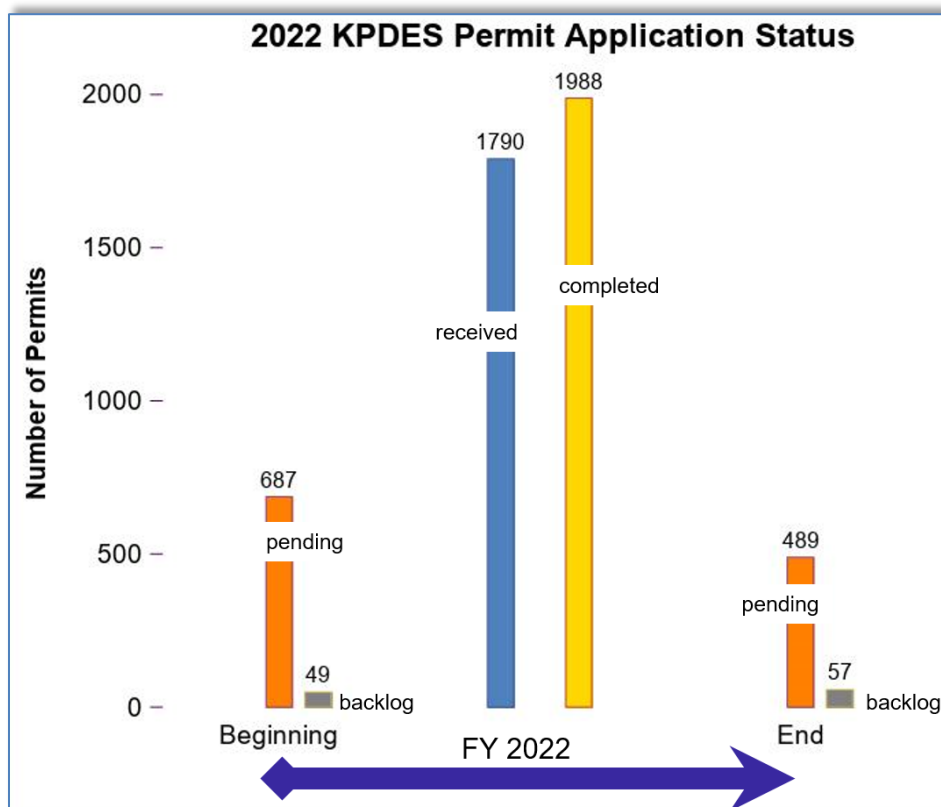
The federal CWA and state regulations require a KPDES permit to discharge wastewater into waters of the Commonwealth. To ensure that wastewater discharges from industrial facilities, publicly owned treatment works, and other sources are not harmful to human health or the environment, KPDES permits contain technical and water quality-based limits on what can be discharged, and requirements to monitor and report the quality and quantity of wastewater being discharged.

The Division authorizes and manages approximately 9,800 total permits consisting of individual, general, and state-authorized permits. Individual permits apply to single entities and reflect site-specific



requirements. General permits cover fifteen categories of dischargers with similar facilities, operations, and wastewater discharges, which a facility can obtain by filing a request for coverage with the Division. State-authorized permits include In-System Operational Permits (KISOP) for facilities that collect and transfer wastewater to a treatment system owned by another party, and No Discharge Operational Permits (KNDOP) for facilities that dispose of wastewater other than through point source discharges.

Most permits issued by the Division have a five-year validity period; this results in the Division receiving an average of 2,500 new and renewal permit applications each year. During the past year, the Division received 1,790 total permit applications, issued final decisions on 1,988 applications, and ended the state fiscal year with 489 pending applications and only 57 in backlog status.



# ***INFRASTRUCTURE***



## **Bipartisan Infrastructure Law and State Revolving Funds**

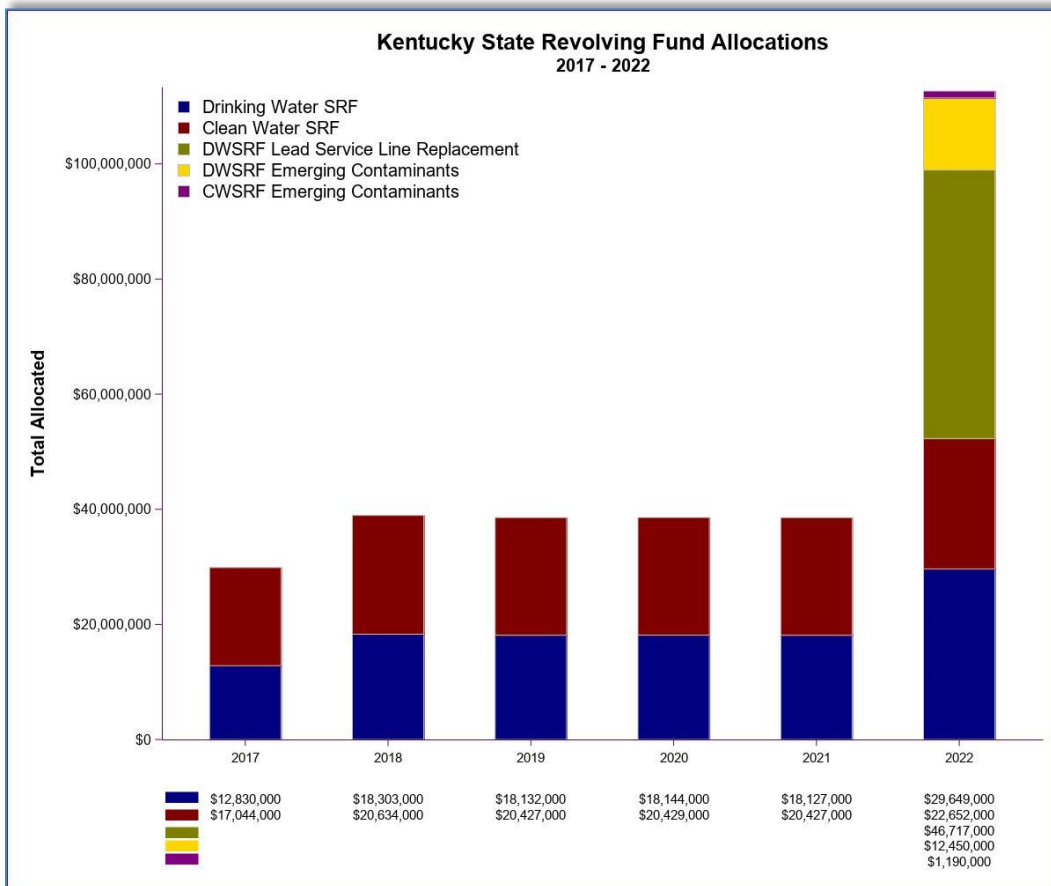
In early December 2021, EPA Administrator Michael S. Regan announced the first year allocation of over \$112 million to Kentucky in Bipartisan Infrastructure Law (BIL) funding. This historic investment in crucial drinking water and wastewater infrastructure prioritizes services to underserved communities and represents a once-in-a-generation opportunity to improve service across Commonwealth and the nation. Over the next five years, states and Tribes will receive \$43 billion in State Revolving Funds (SRF) dedicated to drinking water and wastewater infrastructure. In its partnership with the Kentucky Infrastructure Authority to implement SRFs, the Division looks forward to supporting needed infrastructure projects across Kentucky and is actively engaged in how to distribute the funds the Commonwealth expects to receive, taking into account that Kentucky has:

- 804 wastewater treatment plants and 20,000 miles of sewer lines, but fewer than 4,000 sewer lift stations. The average age of Kentucky sewer lines is 42 years and 10% are more than 70 years old.
- 213 drinking water plants and 64,000 miles of distribution lines (16% of which are more than 50 years old), but fewer than 1000 pump stations.
- 955 dams, 179 of which are considered High Hazard

And Kentucky needs more than \$114 billion by 2035 to maintain its infrastructure:

- \$8.2 billion for drinking water repairs
- \$6.2 billion for wastewater repairs
- \$100 million for dam repairs and upgrades

For more information regarding BIL funds in Kentucky, visit [Funding - Kentucky Energy and Environment Cabinet](https://eec.ky.gov/Environmental-Protection/Water/Funding/Pages/default.aspx) (<https://eec.ky.gov/Environmental-Protection/Water/Funding/Pages/default.aspx>).



### Lead and Copper Rule Revisions: Lead Service Line Inventory Preparation

In December 2021, the EPA released major revisions to the Lead and Copper Rule (LCRR). Some key changes for water systems included lead tap sampling procedures, increased requirements for replacing lead service pipes, and a new requirement for water systems to develop a lead service line (LSL) inventory. The LSL inventory, due on October 16, 2024, is an essential component to prepare for other LCRR requirements.

In response, the Division, the Lead in Drinking Water Workgroup, the Kentucky Rural Water Association, and other partners collaborated to provide assistance and guidance to public water systems by establishing guidance documents and templates for the LSL inventory, and developing geospatial methods for conducting the inventory.

In addition to developing guidance documents, the Division participated in and presented information at several events around the state throughout FY2022 in collaboration with the Rural Community Assistance

Partnership, the Kentucky Water and Wastewater Operators Association, and the Area Development Districts. The Division also began offering individualized guidance to water systems through site visits.

### **Regionalization of Small, Privately Owned, Wastewater Treatment Plants**

For several decades, small privately owned wastewater package treatment plants (WWTPs) treated domestic wastewater in areas that could not be served by larger, regional water treatment plants. In response to a catastrophic collapse and a number of failing systems being abandoned by previous owners, the 2017 General Assembly passed House Joint Resolution 56. HJR 56 directed the Division to study the problems presented by small, privately owned WWTPs, to develop measures to ensure the sustainability of small systems, and to identify actions to reduce issues resulting from system failure and/or abandonment. The final report identified 180 small systems with a potential to negatively impact wastewater services to citizens. An increased focus on compliance has resulted in the elimination of 48 of these systems to date. This positive trend is important to the regionalization efforts which should help ensure that the public will be served with effective, sustainable wastewater services for generations.

### **Proactive PFAS Planning**

Per- and polyfluoroalkyl substances (PFAS) are a group of manufactured chemicals that have been used in industry and consumer products since the 1940s. Also known as "forever chemicals" with some beneficial uses in products such as fire-fighting foam, non-stick cookware, stain-resistant carpets, food packaging, and water-resistant clothing, many PFAS break down very slowly and can accumulate in people, animals, and the environment over time. In 2016 the EPA issued its first PFAS health advisory limits for drinking water which prompted the Division to perform a statewide screening for PFAS.

The City of South Shore (Greenup County) was the first water supplier in the Commonwealth with PFAS detected at levels near the 2016 health advisory limits. Prior to this finding, the city had completed preliminary engineering studies and secured funding for a new water treatment plant to replace its aging facility, but ongoing concerns for long-term operation and maintenance costs to treat for PFAS remained. Working together, Energy and Environment Cabinet (EEC) and the city secured a temporary connection to the City of Portsmouth, Ohio to create an immediate, safe supply for citizens, while developing plans for a permanent connection beneath the Ohio River for the future. This unique collaboration is an example by which the Division encourages cost-effective solutions for long-range water supply planning.

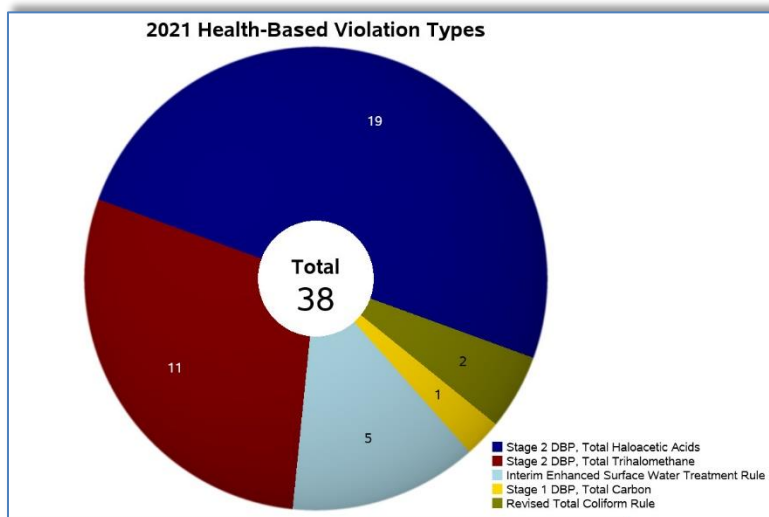
# DRINKING WATER

## 2021 Annual Safe Drinking Water Act Compliance Report

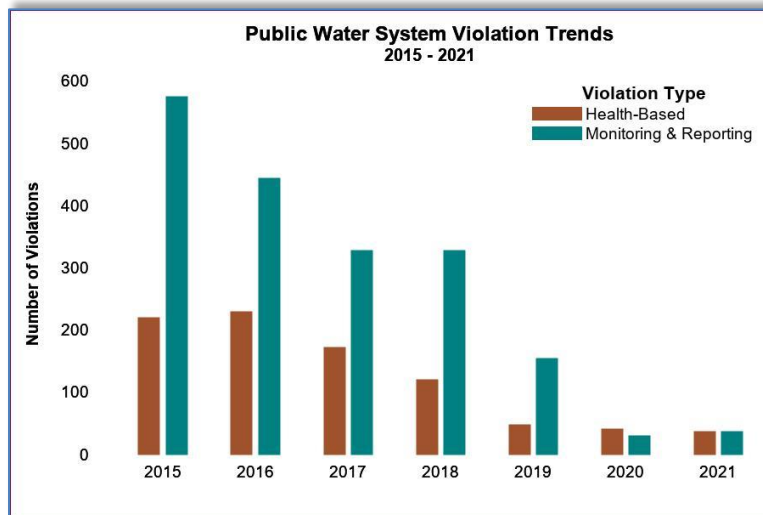
The Safe Drinking Water Act (SDWA) requires systems to test produced water regularly for more than 100 contaminants, and to take corrective action and notify customers when a contaminant exceeds drinking water standards. The annual SDWA compliance report summarizes health-based and monitoring and reporting violations for Kentucky water systems.

Since 2014 drinking water systems have reduced violations by more than 80%, a trend that continued into 2021. The ability to submit information electronically and improvements in disinfection by-product reductions are largely responsible for the decreasing number of violations. Compliance assistance provided by the Division and its partners, combined with improvements in data management, continue to help reduce monitoring and reporting violations.

The complete report is available on the Division website at: [Annual Compliance Reports - Kentucky Energy and Environment Cabinet](https://eec.ky.gov/Environmental-Protection/Water/Drinking/Pages/Annual-Compliance-Reports.aspx) (<https://eec.ky.gov/Environmental-Protection/Water/Drinking/Pages/Annual-Compliance-Reports.aspx>).







### Area-Wide Optimization Program Awards

The Energy and Environment Cabinet recognized Kentucky drinking water treatment facilities that voluntarily achieved optimization goals even more stringent than those required by the EPA, thereby meeting the goals of the Area-Wide Optimization Program (AWOP) in 2021.

Drinking water systems utilize AWOP tools and methods to increase protection for consumers by emphasizing the reduction of turbidity and disinfection by-products (DBPs). Turbidity, or cloudiness, is a measurement of particles in water including soil, algae, bacteria, viruses, organic material, and other substances. DBPs are compounds that form when chlorine (used for disinfection) reacts with organic material in water.

Two drinking water treatment plants received the AWOP Champion Award, which recognizes water systems that achieved AWOP standards for three years in a row:

- Lawrenceburg Water and Sewer Department received the 2021 Champion Award for large systems (designed to treat 3 million or more gallons of water per day)



Alicia Jacobs (Kentucky Division of Water) and Kyle Thacker (Assistant Superintendent)

- Monroe County Water District received the 2021 Champion Award for small systems (designed to treat less than 3 million gallons of water per day)



L to R: Nick Joinville (Treatment Operator), CJ Bailey (Kentucky Division of Water), Jimmy Simmons (General Manager), and David Flowers (Lead Treatment Operator)

Additionally, 16 drinking water plants earned special recognition for achieving AWOP turbidity goals 100 percent of the time in 2021, 44 received a certificate for meeting AWOP turbidity goals and criteria in 2021, and 10 received a certificate for meeting AWOP DBP goals and criteria in 2021.

For additional information about AWOP visit [Area Wide Optimization Program \(arcgis.com\)](https://arcgis.com) (<https://tinyurl.com/KYAWOP>).

## **Voluntary Lead Testing in Schools and Child Care Facilities**

In 2016 the federal Water Infrastructure Improvements for the Nation (WIIN) Act established the Lead Testing in School and Childcare Program which offers grants to assist voluntary testing for lead in drinking water at schools and childcare facilities. As of June 30th,2022 the Division had been granted a total of \$1,265,000 to develop and implement this voluntary program in Kentucky, which is based on guidance from the EPA "3Ts" program – Training, Testing, and Taking Action.

Work during FY2022 focused primarily on program development, with sampling expected to begin in schools in the fall of 2022. The Division developed a webpage dedicated to this program and will eventually include a data management tool to provide results to the public:

[Voluntary Lead Testing in Schools - Kentucky Energy and Environment Cabinet](https://eec.ky.gov/Environmental-Protection/Water/Drinking/Pages/school-lead-testing.aspx)

(<https://eec.ky.gov/Environmental-Protection/Water/Drinking/Pages/school-lead-testing.aspx>).

In April 2022, the Division contracted with the Kentucky Rural Water Association (KRWA) to perform all field work necessary for the program. Under the contract, KRWA will perform all site visits to schools, including inventorying facilities and collecting samples, and can assist with remediation guidance.

The EPA College/Underserved Community Partnership Program enabled a collaboration with Kentucky State University to develop educational materials, including a questionnaire that will be available on the Division website, to help educate school and day care facility staff on potential lead sources in their buildings and determine whether participation in the program may be useful to them.

## **Data Management and Reliability**

The Division developed new forms, workflows, and standard operating procedures for updating inventory information in the databases it uses, and water systems are using the eForms application to submit data. The Division also improved assistance to water systems in developing Consumer Confidence Reports (CCR), which are the reports water systems use to notify the public about drinking water quality in communities they serve. This assistance included a new template that makes the CCR more readable to the public, and a more efficient method of providing individualized guidance that water systems can use before publishing the CCR. The Division hopes to repeat this approach when helping water systems develop the LSL inventory.

The Division made significant progress on two data management improvements: development of a new software application that will replace the 20-year-old data entry system, and initiating development of new monthly operating report electronic submittal software. The new data entry software application is expected to be in use before the end of the 2022 calendar year.

The Division also completed a "business requirements" document that will guide development of software to enable electronic upload of monthly operating data (required by the state and SDWA) directly to the DOW, thereby eliminating the need for manual data entry and improving data quality. The document outlines every requirement that water systems must follow for monthly reporting and identifies compliance and error checks. The Division expects to begin building the new software in the fall of 2022.

# ***FLOODING & DROUGHT***

## **State-Owned Dam Repair Program**

The Division oversees the State Owned Dam Repair (SODR) program to rehabilitate state-owned dams that do not meet Kentucky regulatory requirements.

### **Bullock Pen Lake Dam**

The Division completed upgrades to Bullock Pen Lake Dam in Grant and Boone Counties in October 2021. This \$16 million dollar project began in 2019 and included installation of a concrete labyrinth spillway to meet regulatory hydraulic capacity requirements, energy dissipation steps in the spillway and a concrete stilling basin below the spillway, and decommissioning and stabilization of the original eroded spillway channel by constructing an earthen embankment, to decrease maintenance requirements for the dam owner (KY Dept. of Fish and Wildlife Resources). Construction was completed without lowering Bullock Pen Lake, which is the main water supply source for the Bullock Pen Water District.



Bullock Pen Dam: right embankment and spillway view from lake (L) and from downstream (R)



## Scenic Lake Dam

In May 2022, the Division completed the final phase of upgrading Scenic Lake Dam at John J. Audubon State Park in Henderson County. This \$6 million dollar project began in 2018 and included stabilization of the dam foundation and embankment, construction of a new drawdown system, a new spillway with energy dissipation baffles, a riprap stilling basin, and a walking bridge over the spillway to allow improved access to park trails. The project brought the dam into full compliance with dam safety regulation for its owner (KY Dept. of Parks).



Scenic Lake Dam: new spillway and riprap stilling basin (L) and drawdown system tower (R)

# GIS & MAPS



## **Nature-Based Watershed Solutions Story Map**

Nature-based solutions are locally appropriate, cost-effective practices that mimic or support natural processes, such as restoring floodplains to help store excess flood waters, while simultaneously providing economic, social, and environmental benefits. With the increase in frequency and duration of severe weather events, Kentucky communities face growing pressure to develop strategies that protect vulnerable populations and infrastructure from flooding and other water quantity issues. Extreme rain events can also exacerbate runoff of water quality-degrading pollutants, such as sediments and nutrients.

Nature-based solutions that provide filtration of pollutants from stormwater runoff may also slow quick flowing water and improve water infiltrating soil, thereby reducing erosion and flooding while protecting water quality and controlling water quantity. By supporting the natural, sponge-like function of soils, these actions can also help combat drought conditions by maintaining moisture in the ground. Nature-based solutions provide a unique opportunity to strengthen natural resource management efforts and create a better, more resilient future for all Kentuckians.

To provide more information regarding nature-based projects in watersheds across the Commonwealth, the Division developed a story map that is easy to navigate and explains the conservation and environmental benefits that each project provides for residents and businesses alike:

[Nature-Based Watershed Solutions in Kentucky \(arcgis.com\)](https://www.arcgis.com/apps/Shortlist/index.html?appid=bd78c93f73964c5298ff0dc9af28e008)

(<https://www.arcgis.com/apps/Shortlist/index.html?appid=bd78c93f73964c5298ff0dc9af28e008>)

# MONITORING & ASSESSMENTS

## Six Additional Appendices Added to the Statewide Bacteria Total Maximum Daily Load

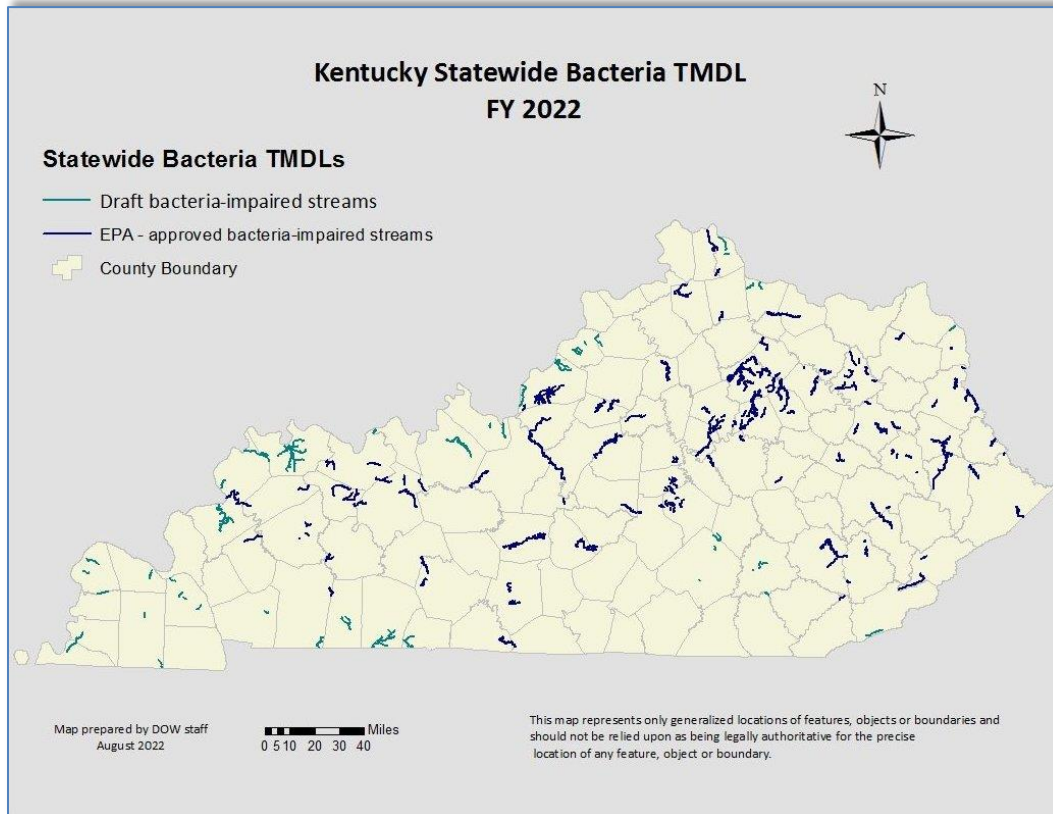
"Total Maximum Daily Load" (TMDL) refers to the amount of pollutant a waterbody can receive and still meet water quality standards which protect beneficial water uses or "designated uses." Standards for E. coli and fecal coliform bacteria are intended to protect the health of those swimming, wading, boating, and using a waterbody for other recreation. The Clean Water Act (CWA) requires each state to identify waters in which water quality impairments exist, prioritize the list of impaired waters, calculate a TMDL of pollutants for those waters, and devise plans to improve water quality. TMDLs are an important first step in planning how to restore water quality in impaired streams.



In 2019, the EPA approved the Kentucky Statewide Bacteria TMDL which outlined a framework and methodology for developing TMDLs for Kentucky streams and rivers that do not meet the standards for E. coli and/or fecal coliform bacteria. This report formed the basis for long term TMDL development priorities in Kentucky from 2016-2022. This ambitious plan sought to complete TMDLs for more than 300 streams impaired by bacteria which were identified in the 2016 Integrated Report on Water Quality. The Division organized the TMDLs by major river basins in several appendices which were shared with the public for review and comment prior to being finalized and submitted for EPA approval.

The first two appendices were approved by EPA in 2019 and contain TMDLs for 39 stream segments in the Green River and Tradewater River basins. During SFY2022, the EPA approved six additional appendices containing TMDLs for 188 stream segments in the Big Sandy River, Little Sandy River, Tygarts Creek, Kentucky River, Salt River, and Licking River basins.

At the close of SFY2022, the Division had drafted five additional appendices covering Upper and Lower Cumberland River basins, Tennessee River basin, minor Mississippi River tributaries and minor Ohio River tributaries, covering 84 stream segments. The Division expects these TMDLs to be submitted and approved by EPA in fall 2022, completing the 2016-2022 priority TMDL commitments.

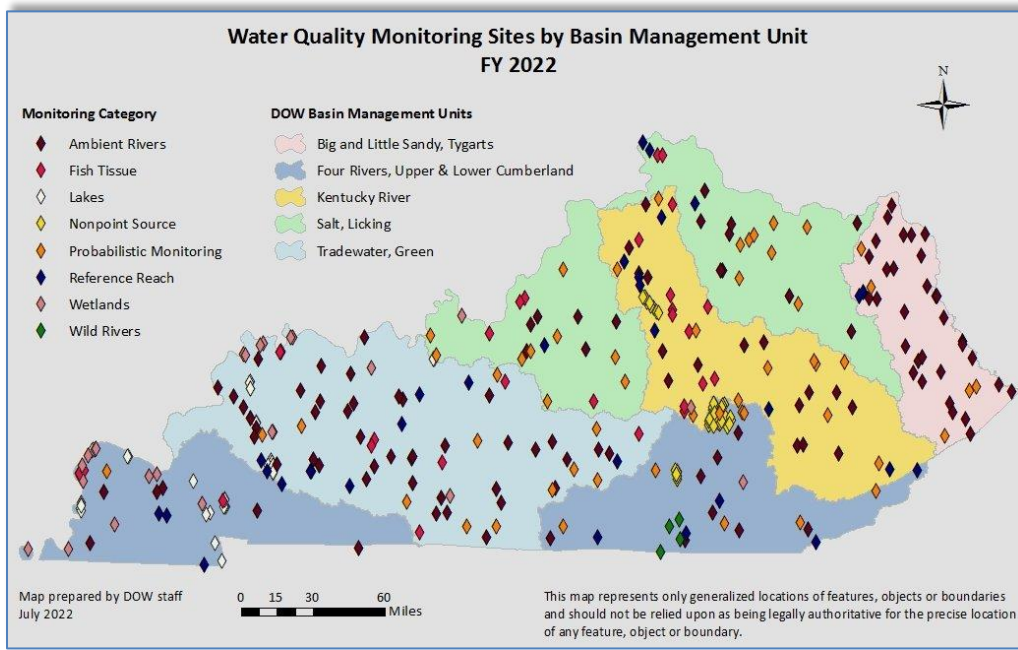


## Surface Water Monitoring Highlights

From July 2021 through June 2022, the Division completed approximately 1,400 surface water monitoring site visits at 357 locations, and collected samples from streams, rivers, springs, wetlands, lakes, and reservoirs to assess water quality. This work provides a greater understanding of the condition of Kentucky water resources through:

- Targeted monitoring of streams with high quality aquatic habitats, watersheds with emerging water quality concerns or issues, and watersheds with projects designed to improve water quality and evaluate program effectiveness;
- Probabilistic monitoring of streams and wetlands using randomly selected sites to project current aquatic conditions statewide or in a particular river basin;
- Monitoring for potential fish consumption, drinking water, or recreational advisories through fish tissue collection and response to harmful algal bloom reports; and
- Intensive water quality monitoring in watersheds to support the development of nonpoint source watershed plans.





## 2021 National Wetlands Condition Assessment (NWCA)

Division staff participated in the EPA 2021 National Wetlands Condition Assessment survey by collecting data to provide information on the ecological health of wetlands across the nation. Staff collected an array of vegetation, soil, hydrology, water chemistry, algae, and buffer characteristics data from 10 wetlands from July - September 2021. For additional information, visit the EPA NWCA website:

[National Wetland Condition Assessment | US EPA](https://www.epa.gov/national-aquatic-resource-surveys/nwca)

(<https://www.epa.gov/national-aquatic-resource-surveys/nwca>)



Environmental Biologists, Michelle Cook and Jacob Eldridge, dig a soil pit (left) to characterize and measure different soil horizons within the wetland (right)

## **2022 National Lakes Assessment (NLA)**

For the first time, the Division participated in the EPA National Lakes Assessment, a survey of lakes and reservoirs designed to provide information on the extent of waters that support healthy aquatic life and recreation, while providing insight into whether conditions are improving over time. The Division sampled 8 lakes during SFY22 for a wide variety of biological, chemical, and physical parameters, including zooplankton, nutrients, algal toxins, and fish tissue contaminants. For additional information, visit the EPA NWCA website: [National Lakes Assessment | US EPA](https://www.epa.gov/national-aquatic-resource-surveys/nla) (https://www.epa.gov/national-aquatic-resource-surveys/nla)

## **Sampling For Per- and Polyfluoroalkyl Substances (PFAS) in Fish**

As part of the ongoing evaluation of the presence of per- and polyfluoroalkyl substances (PFAS) in Kentucky waters, the Division began collecting and analyzing fish for PFAS across the state. Results from testing fish for these contaminants will help guide future monitoring priorities, as well as inform considerations for future fish consumption advisory updates.

## **2018/2020 Integrated Report and Web Resources for Clean Water Act §305(b) Assessment Results**

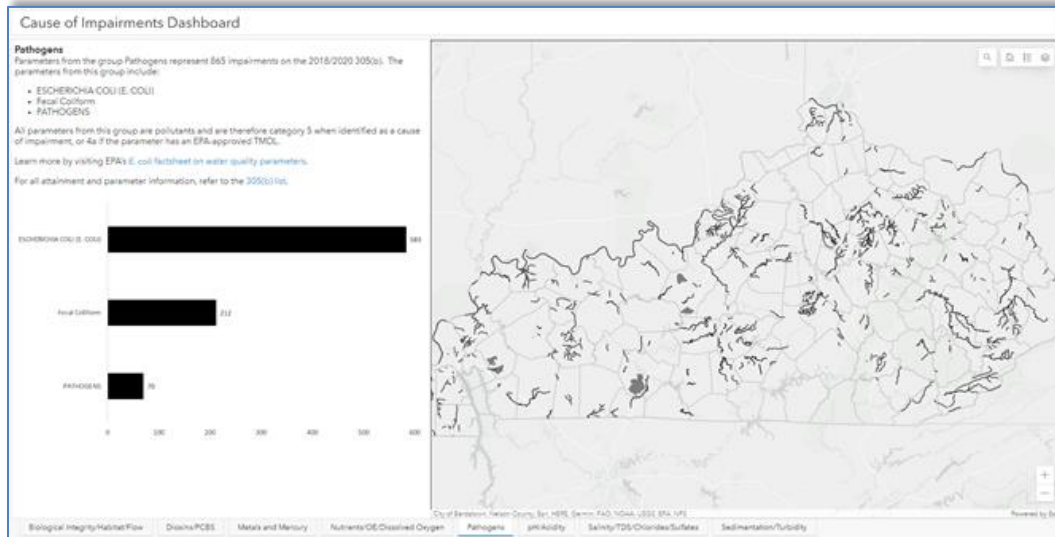
Section 305(b) of the CWA requires states to report the health of the waters of the Commonwealth to Congress every two years. Section 303(d) of the CWA requires states to identify impaired waters, the pollutant(s) causing the impairment, and to develop a total maximum daily load (TMDL) for each pollutant. The resulting "Integrated Report" addresses both sections 305(b) and 303(d) of the Clean Water Act.

The Division submitted [Kentucky's 2018/2020 Integrated Report](https://eec.ky.gov/Environmental-Protection/Water/Monitor/IR_Dashboard/2018-2020_Integrated_Report.pdf) (https://eec.ky.gov/Environmental-Protection/Water/Monitor/IR\_Dashboard/2018-2020\_Integrated\_Report.pdf) to the EPA on January 28, 2022. The EPA approved Kentucky's 2018/2020 303(d) list of impaired waters requiring a TMDL on February 24, 2022, which is available in the [2018-2020 305\(b\) workbook](https://eec.ky.gov/Environmental-Protection/Water/Monitor/IR_Dashboard/2018-2020_305(b)_List.xlsx) (https://eec.ky.gov/Environmental-Protection/Water/Monitor/IR\_Dashboard/2018-2020\_305(b)\_List.xlsx).

New to this reporting cycle, the Division created an [ArcGIS Hub Site for the Integrated Report](https://2018-2020-integrated-report-site-kygis.hub.arcgis.com/) (https://2018-2020-integrated-report-site-kygis.hub.arcgis.com/). By presenting the Integrated Report as

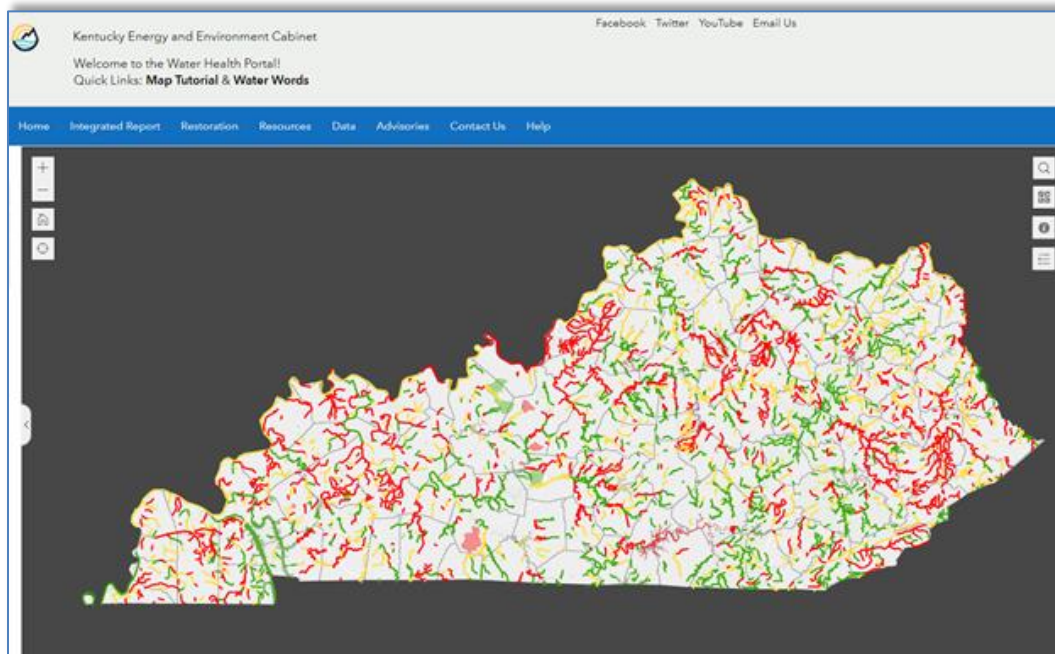
a Hub Site, interactive maps, dashboards, and story maps allow a user-driven experience of information and data. The Integrated Report document and 305(b)/303(d) spreadsheet are still available, but interested parties now have an online tool that is tailored to specific interests of the 305(b) program, such as fishing and recreation, causes of impairment, or new 303(d) listings.

Soon after receiving EPA approval of the 2018/2020 303(d) list, the Division updated the [Water Health Portal](https://water-health-portal-kygis.hub.arcgis.com/) (https://water-health-portal-kygis.hub.arcgis.com/) with the 2018/2020 305(b) assessment results. The Water Health Portal also displays waterbodies with Total Maximum Daily Loads (TMDLs) and waterbodies designated as Outstanding State Resource Waters (OSRW). With this release, Division staff updated the entire Water Health Portal website to a more modern platform that is easier to maintain and update as work on assessment, TMDLs, and waterbody use designation are completed.



A tab from the Causes of Impairment dashboard displays pathogen listings throughout the Commonwealth





The Water Health Portal was updated with the 2018/2020 305(b) assessment results in addition to an overall update of the website to a more modern platform

### **Development of Human Health Criteria for Surface Waters**

Section 304(a) of the Clean Water Act requires the EPA to periodically review and revise criteria that accurately reflect the latest science to protect water quality and human health. During 2015, the EPA finalized revisions to criteria for 94 chemicals to protect human health from drinking contaminated water and eating contaminated fish.

Section 303 of the Clean Water Act delegates the responsibility of establishing surface water quality standards to the states and, when the EPA develops recommended criteria, requires States to establish criteria by one of three processes: (1) adopt EPA’s recommended criteria; (2) modify EPA’s recommended criteria for site-specific conditions; or (3) use another scientifically defensible method to develop state-specific criteria.

Based in part on public and stakeholder feedback, the Division chose to explore option 3, using another scientifically defensible method to develop criteria for the 94 chemicals to protect human health. The Division determined that state-specific data were available, and a probabilistic approach to criteria calculation was an appropriate approach.

The probabilistic method recognizes that variability plays some part in predicting a future event. The Division used Monte Carlo analysis of multiple, randomly generated, representative populations which results in outputs that better account for differences in the adult population of Kentucky.

The inputs, methodology, and resulting criteria are subject to public notice and EPA review, prior to finalization and any action by the Division. This process ensures that current and rigorous data are used to determine the levels of specific chemicals in waters that may pose a risk to human health.

# ***PLANNING & PROTECTION***



## **Water Supply Security in Bowling Green**

The Barren River is the primary water supply for more than 117,000 customers served by Bowling Green Municipal Utilities (BGMU), directly and indirectly through the sale of water to the Warren County Water District (WCWD). Prompted by the projected population growth in Warren County and Bowling Green, and the potential for limited water supplies, in 2021-22 the Division, BGMU, and the Army Corps of Engineers (the Corps) developed a strategy to provide a reliable water supply that accommodates growth, while balancing competing uses and water quality standards. The resulting agreement allows the Corps to release water stored in Barren River Lake into the Barren River during low flow periods so that BGMU can withdraw additional water from the river. Expanding the releases assures that flow in the Barren River is sufficient to meet the projected needs of BGMU and state regulatory requirements. Bowling Green will pay for the reallocated water storage with interest, and a percentage of joint use costs under this agreement. This achievement will create a more sustainable water supply for one of fastest growing regions in Kentucky.

## **Nonpoint Source Management Program**

"Nonpoint source pollution" (NPS) refers to pollution that does not originate from a single, discrete source. Rather, rainfall and runoff carry natural and man-made pollutants across the ground and deposit them into surface waters and groundwater.

The mission of the Kentucky NPS Management Program is to protect surface and groundwater from NPS, abate pollution threats, and restore degraded waters in order to meet water quality standards and support their beneficial uses. The NPS Management Program administers and implements funds Kentucky receives from the Clean Water Act § 319(h) federal grant program for the purpose of addressing problems associated with NPS.

In Federal Fiscal Year (FFY) 2021, which overlaps with SFY2022, the Division awarded communities and organizations \$1.4 million to implement projects that control NPS pollution, including best management practices implemented in 14 watershed planning areas, development of three watershed plans,

coordination of statewide Agriculture Water Quality Authority efforts, and technical assistance and training to agricultural producers on water quality issues such as nutrient management.

### **Pitman/Sinking Creek Dye Trace Project**

Tied into the Pitman Creek Watershed Management Plan, which the City of Somerset and the Division are currently developing, is the Pitman/Sinking Creek Dye Trace Project. This ongoing, 319(h)-funded project involves mapping groundwater flow paths with the use of dye to better understand the Sinking Creek Watershed. Since the project began in late 2020, over 115 new springs have been identified and 18 successful dye traces have been performed in the Somerset/Pulaski County area.



Geologist Adam Nolte pours red Sulforhodamine B dye into a stream

Dye traces were conducted throughout Somerset and the surrounding areas in order to better understand the hydrology of springs and their respective basins. Injection sites ranged from sinkholes, to streams that sink underground, to stormwater disposal wells. The results of these new dye traces will allow the city and the Division to address issues such as flooding, groundwater pollution, and stormwater management. This information allows the city to better understand how and where to focus future best management practices.

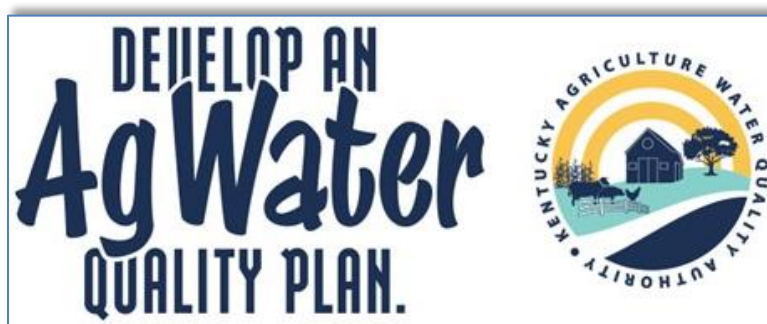
## **Middle Fork Beargrass Creek**

Middle Fork Beargrass Creek (MFBC) is a unique urban watershed located in eastern Jefferson County, and is home to residences, businesses, schools, parks, nature trails, malls, and even a historic farm. Unfortunately, MFBC falls short of meeting standards for healthy waterways. Along with citizen groups, many residents, business owners and other stakeholders are working together to improve MFBC water quality beginning with a watershed-based plan utilizing Section 319(h) funding, in partnership with Louisville/Jefferson County Metropolitan Sewer District (MSD).

Two key components distinguish this watershed plan from others in Kentucky. First, the plan addresses a fully urbanized watershed with diverse land use and population. Second, the types of partnerships that were fostered and leveraged to better characterize the watershed were unique. Since this is the first urban watershed plan for Louisville Metro, MSD compiled a group of consultants, local nonprofits and the University of Louisville to write specific portions of the watershed plan. This watershed-based plan provides a road map that can be utilized to improve water quality in MFBC, which will allow for more uses of its waterways such as wading, fishing and swimming, and strengthens the connection of those who live, work and play in the watershed.

## **Agriculture Water Quality Planning**

In the summer of 2021, the Division of Water and Division of Conservation developed and released the Kentucky Agriculture Water Quality Act (AWQA) Planning Tool to partners and agricultural producers. This new tool provides convenient access to conservation planning resources that empower producers to protect water quality. Training was provided to 336 conservation district staff, 56 University of Kentucky Cooperative Extension staff, and 32 commodity organization staff in the fall of 2021 and spring of 2022. Following development of the tool and staff training, the Division developed a marketing campaign to promote adoption of the AWQA Planning Tool.



## **Ripple Effects Project**

During winter 2021 and early spring 2022, collaborators from across Louisville Metro and beyond came together to support a water-focused photo contest to celebrate Earth Day 2022 and the 50th Anniversary of the Clean Water Act, promote volunteer monitoring of local waterways, and organize a popular exhibit for the Kentucky State Fair. Core partners included the Kentucky Center for African American Heritage, Louisville Free Public Library, Louisville Photo Biennial, Louisville Photographic Society, Louisville Water Company, the University of Louisville, and Waterfront Park.

The Project drew inspiration from the Louisville Free Public Library Bernheim Gallery exhibit entitled "River of Life: Cities and Towns Along the Mighty Ohio" which features historical and contemporary photographs of the Ohio River. A team of professional photographers volunteered as judges, and five winners were selected in each of four age categories (K-2, 3-5, Middle school, and High school). Award-winning entries from the contest were featured in a popular exhibit at the Kentucky State Fair titled "Ripple Effects: Exploring the Confluence of Art, Culture, and the Environment Along our Waterways."

For more information regarding the project and for a list of winners, visit [Ripple Effects: Community Forum | Louisville Free Public Library \(lfpl.org\)](https://www.lfpl.org/RippleEffects/slide.html) (<https://www.lfpl.org/RippleEffects/slide.html>).

## **Commonwealth of Kentucky**

**Andy Beshear, Governor**

## **Energy and Environment Cabinet**

**Rebecca Goodman, Secretary**

## **Kentucky Department for Environmental Protection**

**Anthony R. Hatton, P.G., Commissioner**

## **Kentucky Division of Water**

**Carey Johnson, CFM, Director**

### **Managers**

**Drinking Water Branch**

**Alicia Jacobs**

**Field Operations Branch**

**Connie Coy**

**Planning and Program Support Branch**

**Heather Baker**

**Surface Water Permits Branch**

**Jason Hurt**

**Water Infrastructure Branch**

**Jory Becker**

**Water Quality Branch**

**Melanie Arnold**

**Water Resources Branch**

**Shawn Hokanson**

**Watershed Management Branch**

**Joanna Ashford**

**Environmental Scientist Consultant Senior**

**Sarah Gaddis**