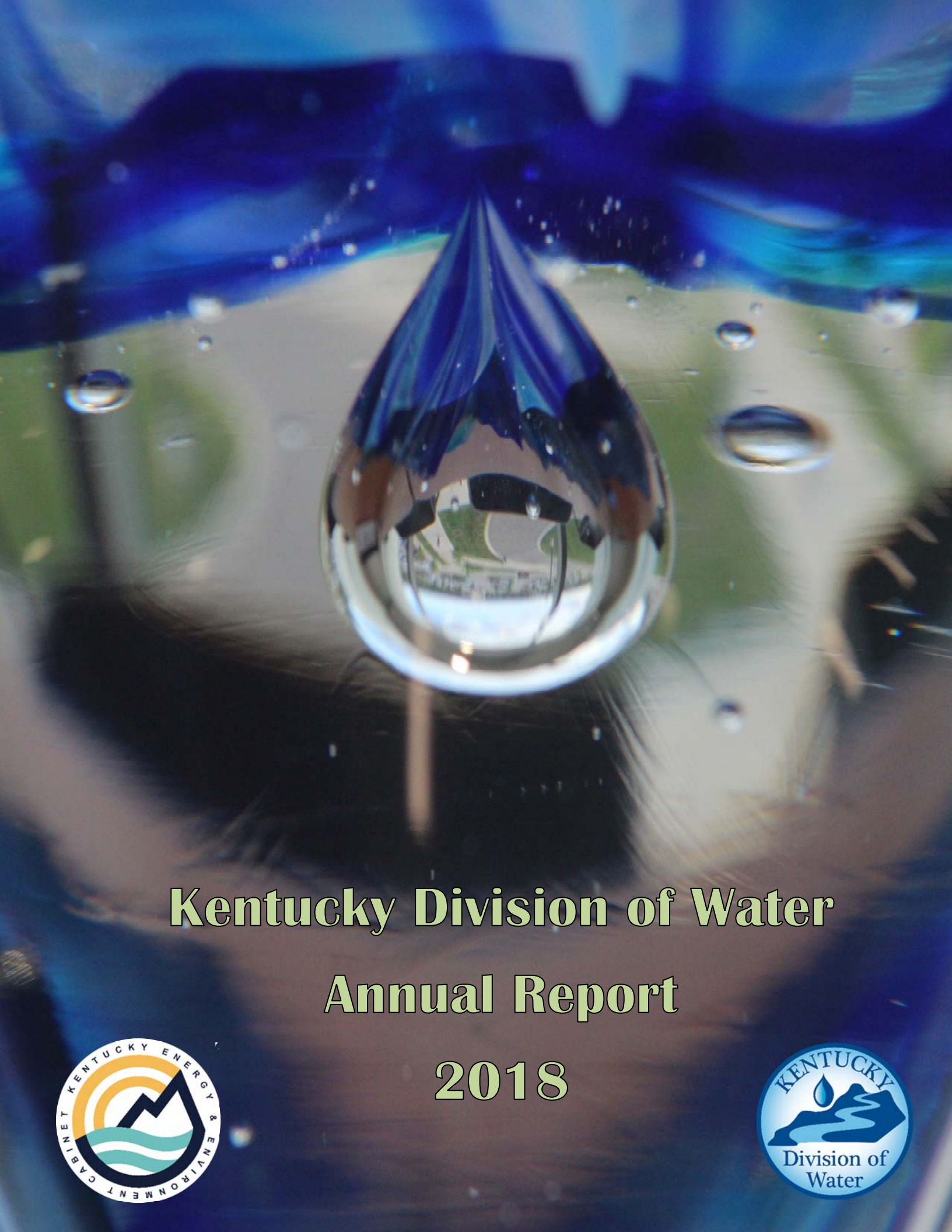

Kentucky Division of Water

Annual Report

2018

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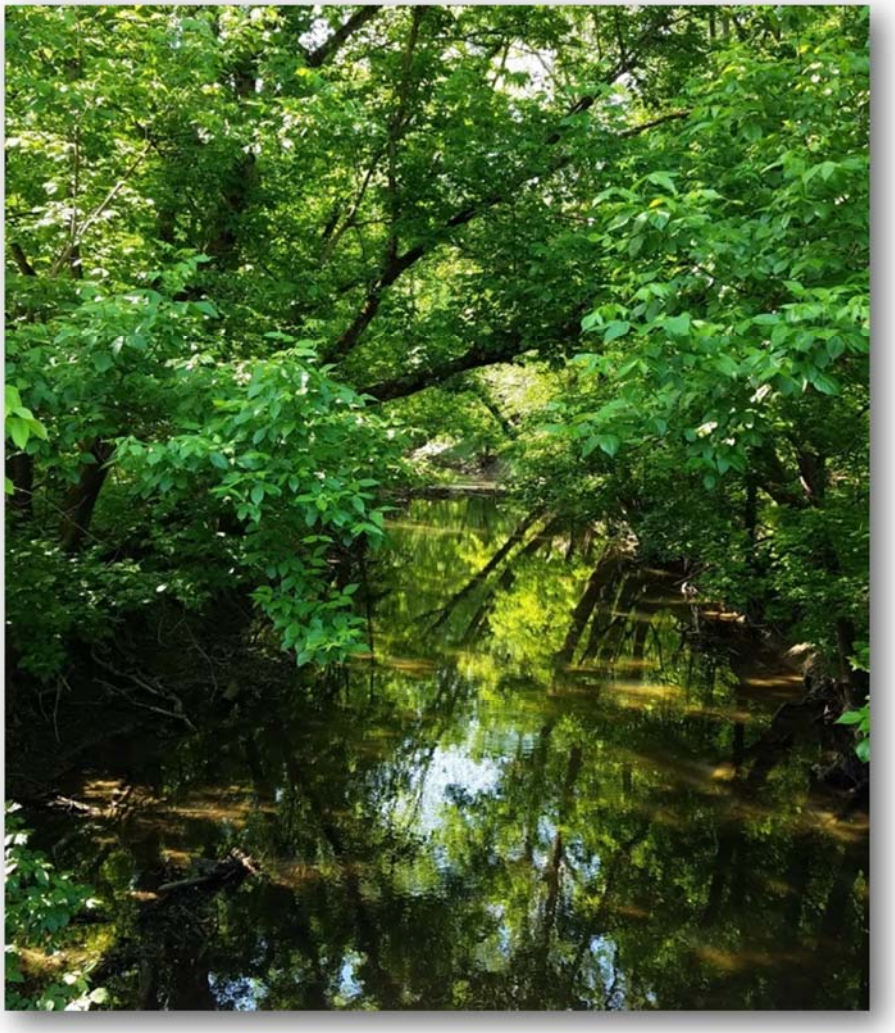


Beargrass Creek **DOW Staff Photo**

EXECUTIVE SUMMARY

Dear Reader,

The Kentucky Division of Water (the Division) is pleased to provide its Annual Report for Fiscal Year 2018 (FY18 – July 1, 2017 – June 30, 2018). The Annual Report summarizes the achievements of the Division's scientists, specialists, engineers, and administrative staff in meeting the Division's goals of:

- Protecting, managing, and restoring water resources
- Full compliance with the Safe Drinking Water Act and Clean Water Act
- Conducting effective water resources planning
- Promoting better data management and communication
- Addressing critical water infrastructure needs

The Division continued its commitment to Governor Bevin's Red Tape Reduction initiative by completing its review of all regulations in its authority and pursuing proposed amendments to regulations that are in need of revision or consolidation. In January 2018, 401 KAR 8:510 Disinfectant residuals, disinfection by-products, and disinfection by-product precursors was updated to include the new federal Stage 2 Disinfection By-Products rule.

On May 15, 2018, the Division filed proposed changes to 401 KAR Chapter 5 – Water Quality. Of the twenty-one regulations in the chapter, the Division proposed to amend fourteen, consolidate four, and certify (or continue without revision) three regulations. The regulations were published in the Kentucky Administrative Register on June 1, 2018. The Division held a public comment hearing on June 26, 2018 and accepted public comments through June 30, 2018. The Division will file its Statement of Consideration in August 2018 to respond to the comments it received and anticipates that the legislative Administrative Regulations Review Subcommittee and Natural Resources and Environment Committee will consider the regulations in Fall 2018. Proposed changes should become effective shortly thereafter.

In response to the difficulty in finding adequate resources to resolve customer and environmental issues when a privately owned small wastewater treatment plant fails, the 2018 Kentucky General Assembly passed House Bill 513 (now codified as KRS 224.73-130 through 73.150). The statutes now require owners of privately owned small wastewater treatment plants to have sufficient financial assurances to cover

plant operation and maintenance and gives both the Division and Public Service Commission more authority and flexibility in dealing with the fallout from plant failures. The Division expects to develop regulations pursuant to the new statutes in the next year.

The Division earned First Place in the 2nd Annual Federal Emergency Management Agency (FEMA) Cooperating Technical Partner (CTP) Recognition Program for outstanding achievement when it was selected by its peers for outstanding contributions in flood hazard identification, communication, and program management in the Risk MAP program. The Division was selected as the winner by its CTP peers from across the nation after a nominee quality review at FEMA Headquarters, FEMA Region IV, and a pre-selection vote from over 170 CTP stakeholders. David Maurstad, FEMA's Deputy Associate Administrator for Insurance and Mitigation and chief executive of the National Flood Insurance Program, presented the award at the annual Association of State Floodplain Managers (ASFM) conference in Phoenix, AZ on June 19, 2018. FEMA will create a follow-up Story Map on the Division's Risk MAP best practices.

The U.S. Department for Homeland Security Science & Technology Directorate (DHS) awarded the Division a $200,000 grant to continue its work on a pilot project to develop dam instrumentation monitoring and flood warning systems for a second year. The project identified dam failure modes and instrumentation that can monitor and alert potential dam failures. DHS developed state-of-the-art sensors that will be tested at several dam locations. At certain thresholds, monitoring reports and warnings will be sent by various sensors to project monitors. Additionally, the project will utilize unmanned aerial instruments to detect and monitor changes at dams. At the conclusion of the project, a Kentucky-Specific implementation plan will be developed that may serve as a template for other states and communities.

I invite you to read more about the important work and accomplishments of the Division of Water throughout the last year.

Peter Goodmann, Director

L to R: Alex Van Pelt (Kentucky Division of Water), Laura Algeo (FEMA CTP Manager), Carey Johnson (Kentucky Division of Water), and David Maurstad (FEMA Deputy Associate Administrator for Insurance & Mitigation and CEO, National Flood Insurance Program).

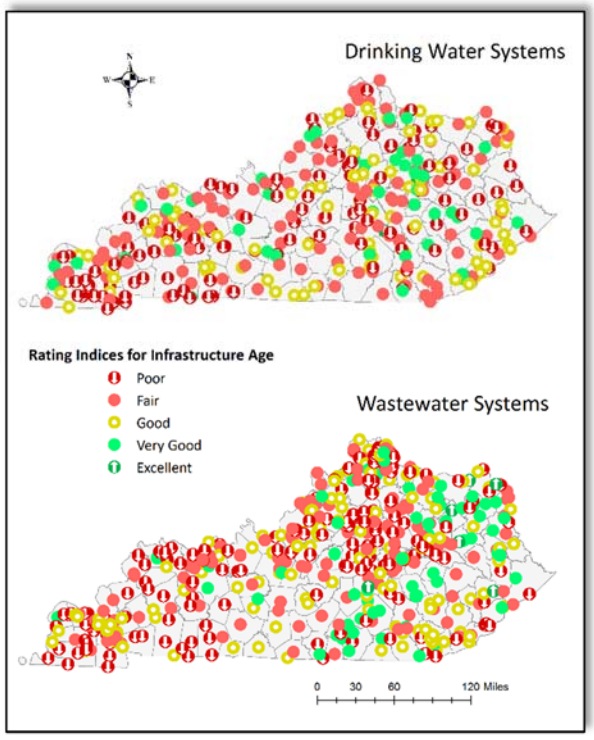
INFRASTRUCTURE PLANNING

Electronic Construction Application Submittals

On December 9, 2017, the Division began accepting electronic applications for water and wastewater infrastructure construction. The new form will reduce costs, processing time, and the amount of paper used for the submission, review, and approval of construction applications. The form can be found on Kentucky's Onestop web page at https://onestop.ky.gov.

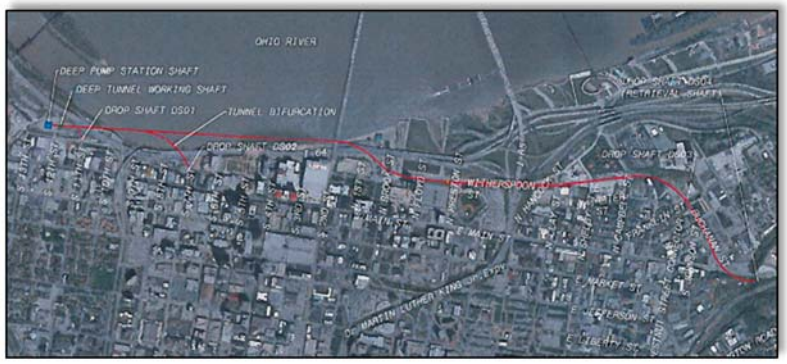
Drinking Water and Wastewater Rating Index

Based on data used to develop the Drinking Water and Wastewater Action Plans, the Division conducted an assessment of all regulated community water systems and permitted wastewater facilities in the Commonwealth to determine their resiliency and sustainability. Drinking water facilities were assessed on five categories: operation and maintenance activities, federal Safe Drinking Water Act compliance, water supply quality and reliability, future planning activities, and the average age of infrastructure. Wastewater facilities were assessed on operation and maintenance activities, federal Clean Water Act compliance, future planning activities, and the average age of infrastructure. Information from the triennial Drinking Water Sanitary Survey, inspection reports, permits, wastewater Discharge Monitoring Reports, facility planning, and infrastructure data, all obtained from the Water Resource Information System (WRIS), formed the basis for rating each facility Excellent, Very Good, Good, Fair, or Poor in each category. In August 2018, Cabinet officials presented this data to legislators on the interim joint committee for Natural Resources and Energy, and urged officials to meet the critical need for investment in future water and wastewater infrastructure projects. The data will also be used to identify future needs of water and wastewater facilities, strategic plan development, and future regulatory requirements.



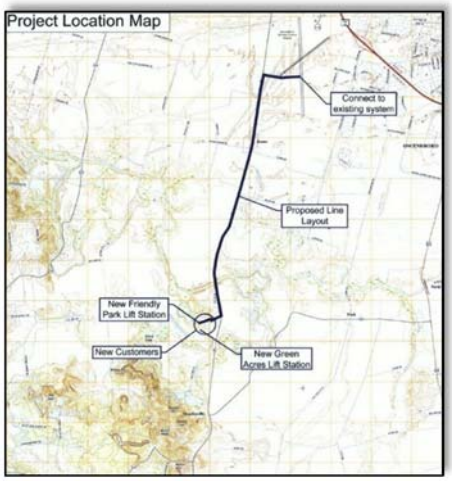
Large Construction Projects

Ohio River Tunnel



The Louisville and Jefferson County Metropolitan Sewer District (MSD) is currently under a Consent Decree with the U.S. EPA and the Energy and Environment Cabinet to reduce and/or eliminate unauthorized discharges from MSD separate sewer systems, combined sewer overflow systems, and water quality treatment centers. The Ohio River Tunnel project will involve construction of a 20-foot diameter tunnel, approximately 200 feet underground, that will stretch from the intersection of 12th and Rowan Streets eastward to East Main Street (about 13,400 feet). The tunnel will store approximately 37 million gallons of flow from twenty-two combined sewer overflow points that currently discharge about 351 million gallons of combined sewage into the South Fork of Beargrass Creek and the Ohio River. The tunnel will capture about 98% of those flows and allow them to be pumped back into MSD's sewer system to be treated before discharge. Construction began in January 2018 and should be completed by the end of 2020.

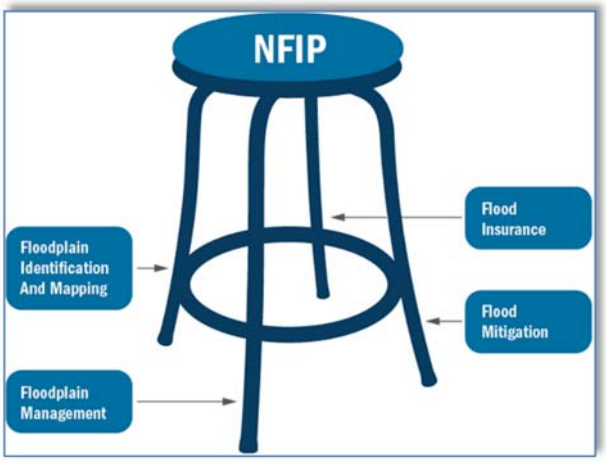
Friendly Park Village Sewer Extension



The Friendly Park Development wastewater treatment plant (WWTP) serves approximately ninety-two residents of Daviess County, Kentucky. This packaged steel, extended aeration WWTP has met the end of its useful life, is in poor condition, and has a history of non-compliance, which resulted in the Friendly Park Sanitation Disposal Corporation petitioning the Public Service Commission for its abandonment. With the help of a State Revolving Fund loan and Community Development Block Grant, the Regional Water Resource Agency intends to construct a wastewater pumping station that will move the sewage about four miles to a collection system near the Daviess County airport, and then be treated at the Max Rhoads WWTP. This project will allow the abandonment of the Friendly Park WWTP and improve water quality in the area. Construction began in July 2018 and is expected to take approximately six months.

National Flood Insurance Program, Floodplain Management, and Risk MAP

Flooding presents one of the most significant natural hazards that Kentuckians face each year. In 1968 the U.S. Congress created the National Flood Insurance Program (NFIP) to help offset the rising recovery costs of flooding to American citizens, and for the past fifty years, it has been the cornerstone program for mapping, managing, and mitigating the nation's flood risks.



In Kentucky, the NFIP balances state floodplain management requirements, which are established in KRS Chapter 151, with state regulations and local knowledge to manage flood hazard areas. A total of 353 Kentucky communities (out of approximately 425 total communities) participate in the NFIP. With the exception of the Louisville Metro region, the Kentucky Watermaps Portal (http://watermaps.ky.gov) contains extensive flood hazard data for all Kentucky counties.

The Division continues to increase its floodplain management outreach efforts. In FY18, the Division contacted each NFIP-participating community and provided local officials with monthly updates on available floodplain management-related training, funding opportunities, and mentoring. The Division also partnered with Kentucky Emergency Management to offer training webinars for stakeholders across the Commonwealth.

The Community Rating System (CRS) provides a major cost savings component to NFIP-related flood insurance. Through CRS, flood insurance discounts – generally about $75 per flood insurance policy – are provided to communities that manage flood risks above and beyond minimum federal requirements. In FY18 six new communities (Bath and Pendleton Counties, and the Cities of Butler, Falmouth, Newport, and Salt Lick) began participating in CRS. Statewide community participation in CRS has nearly doubled to over thirty communities since 2015.

The Division's Risk MAP program, recognized for outstanding contributions to FEMA's Cooperating Technical Partners program, actively identifies flood hazards, assesses the risks of major floods, plans

mitigation efforts to minimize community risks, and communicates flood risk to citizens and communities across the Commonwealth.

The Division partnered with the Kentucky Division of Geographic Information, Kentucky Transportation Cabinet, Kentucky Department for Local Government, the Natural Resource Conservation Service, the U.S. Geologic Survey, and many other state and local agencies to create a seamless, statewide LiDAR (Light Detection and Ranging) dataset for the entire Commonwealth. The Division continues to coordinate with its partners to maintain, update, and develop new tools and products derived from the state's elevation datasets. The Division conducted the flood, dam-related, and drought risk assessment for the 2018 Commonwealth Hazard Mitigation Plan update. This comprehensive assessment of water-related natural hazards utilized the Division's expertise on programs, initiatives, and policies that impact citizens of in times of natural disaster and allows for resilient rebuilding after a disaster occurs. This effort illustrates the relationship between the Division and Kentucky Emergency Management in managing, reducing, and mitigating water-related hazards and risks.

All 120 Kentucky counties currently have digital flood hazard maps, and enhanced flood risk identification for approximately 65% of the Commonwealth's population has been initiated or completed through Risk MAP. Current Risk MAP initiatives include work in the Lower Green, Highland-Pigeon, Silver-Little Kentucky, Middle Ohio-Laughery, South Fork Licking River, Rolling Fork, North Fork Kentucky River, Lower Tennessee, and Tradewater watersheds. The Division revises its Risk MAP business plan every year to reflect new or updated flood hazard identification needs. In addition to "traditional" flood hazard identification, the Division has completed a structure-based flood risk assessment in partnership with the City of Hopkinsville. After being shared with FEMA headquarters and U.S. EPA Region IV, the assessment provided a basis to develop a unique flood risk score for each structure examined. The Division also actively participated on the Technical Mapping Advisory Council (TMAC) to advise FEMA on the development of the national flood hazard mapping program.

The Division continues to be the state lead for the U.S. Army Corps of Engineers' Silver Jackets initiative, which brings together multiple local, state, and federal agencies to reduce flood risks and strengthen response and recovery efforts when a natural disaster occurs. To date, the partnerships formed with other local, state, and federal agencies have led to flood risk reduction studies or actions in more than ten Commonwealth communities.

Dams and Levees

Critical infrastructure, such as dams and levees, is essential to the Commonwealth's economic and ecologic interests. Dams and levees benefit Kentucky by providing flood protection, recreation, water supplies, and power generation. However, many dams are approaching their usable lifespan and face significant needs. The Division supports dam owners and the general public by regulating and monitoring approximately 1000 dams across the Commonwealth, with the exception of those owned by the U.S. Army Corps of Engineers or regulated by the Kentucky Department of Natural Resources. Approximately 80% of dams in Kentucky are privately owned, so the Division prioritizes its inspections based on the risk a dam poses to life and property. Each year the Division visits about 300 dams and participates in activities to encourage dam owners, emergency management officials, local officials, and the general public to understand the risks and rewards associated with dams.

Through its various agencies, Kentucky owns approximately seventy dams. The State Owned Dam Repair (SODR) program ensures that Commonwealth-owned dams meet safety requirements. During FY18, the Division began rehabilitating Scenic Lake Dam at John James Audubon State Park in Henderson in a two-phased approach. The first phase stabilized the dam from seismic (earthquake) hazards, and the second phase will ensure that the dam can safely handle the Probably Maximum Precipitation (PMP) value for the area – approximately twenty-eight inches of rain in six hours!

The Division will commence work on Bullock Pen Lake Dam in 2018, which will require a cofferdam to preserve the reservoir water supply for Bullock Pen Water District and allow the Kentucky Division of Fish and Wildlife Resources (KDFWR) fishery to remain intact. Dam repairs will stabilize the dam's spillway, using FEMA Hazard Mitigation Grant Program funds, and a massive, labyrinth-like concrete spillway will enable the dam to safely pass the PMP.

WATER RESOURCES PLANNING

On-Farm Water Management Program

In March of 2018 the Kentucky Agricultural Development Board (ADB) committed up to $1 million to establish the On-Farm Water Management Program (OFWMP). This collaboration between ADB and the Energy and Environment Cabinet's Water Resources Board (WRB) will promote water resilience on farms by funding projects that develop and implement new water best management practices (BMPs).

The program seeks to showcase the value of water as the most important ingredient in life and agriculture by utilizing demonstration farms to reach out to producers and illustrate opportunities for economic development in agricultural industry. The program's mission is to promote innovation in on-farm water management, increase on-farm water availability and farm profitability, standardize practices into traditional funding programs and innovative practices, and seeks to coordinate efforts with individuals and entities interested in the long-term science and planning of water resources.

The OFWMP consists of the Research, Development, and Demonstration (RDD) category for water management practices on public regional farms, and the Practical Implementation Project (PIP) for private farms that wish to implement BMPs for water management. RDD farms will serve as educational hubs open for public educational to highlight practices for harvesting, storing, and redistributing water with a $250,000 project cap. PIP farm projects will carry a $50,000 cap.

Both programs are required to provide information about the costs and benefits of the BMPs and help generate educational materials to assist producers in implementing the practices on their farms. To date, the OFWMP staff have performed twenty-eight site visits across the Commonwealth to observe a variety of proposed projects which include managing water for livestock, runoff and stormwater management, and water harvesting to support irrigation of row crops, market gardens, greenhouses, nurseries, high-tunnels, and field-grown specialty crops.

WATER QUALITY

2018 Triennial Review

The federal Clean Water Act (CWA) gives states the responsibility of establishing objectives to manage, maintain, and enhance water quality, and requires states to develop and adopt Water Quality Standards (WQS) to preserve and protect water quality. As part of this responsibility, states must review its WQS and hold a public comment session every three years. This process is known as the "Triennial Review".

To begin its 2018 Triennial Review, the Division hosted four public listening sessions across the Commonwealth in May 2018 in London, Bowling Green, Frankfort, and Calvert City. During these sessions, the Division explained some of the WQS changes it is considering, including establishing aquatic life criteria for ammonia, cadmium, carbaryl, and selenium, recreational criteria for E. coli, adopting Combined Sewer Overflow wet weather provisions, and designating fifty-two new Outstanding State Resource Waters and twenty-nine new Exceptional Waters. Proposed amendments to WQS regulations will be further developed based on feedback received during the listening sessions and in writing. The Division anticipates beginning the Kentucky regulatory process (KRS 13A) in Fall 2018.

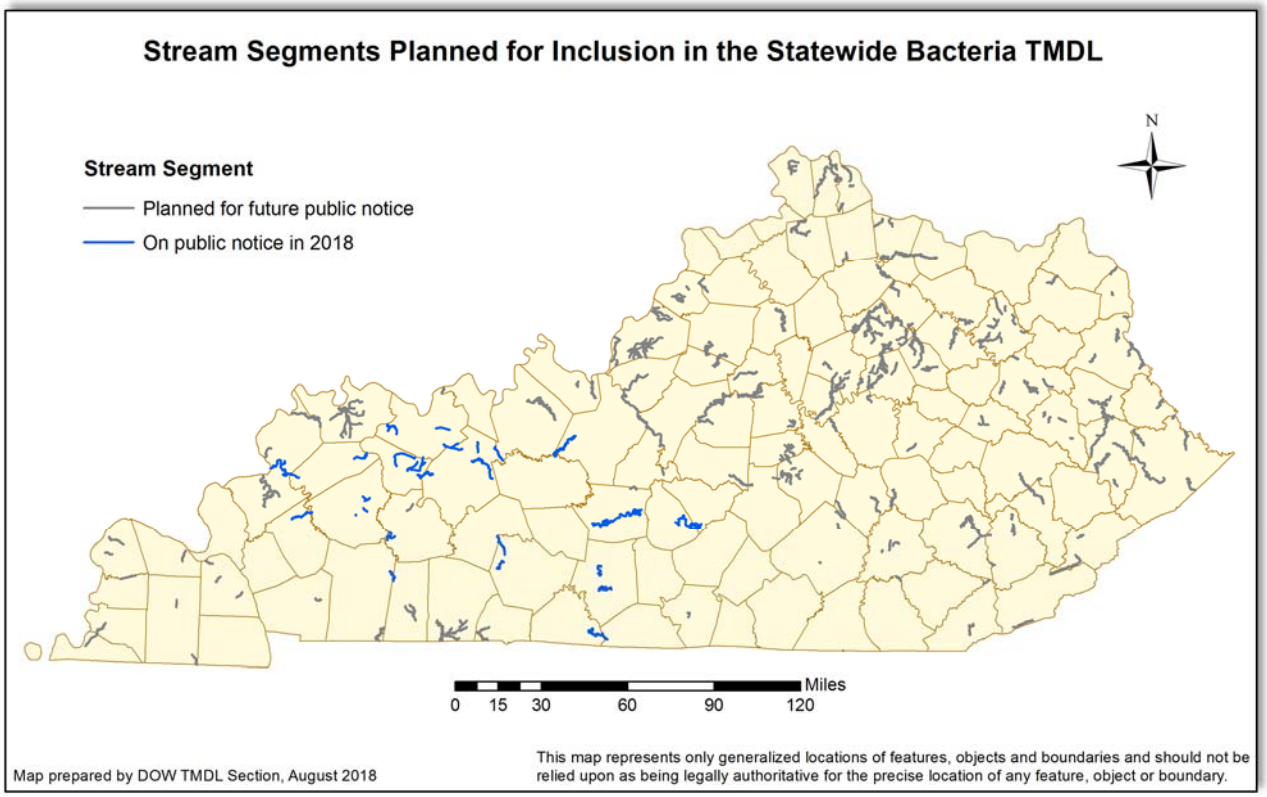
Statewide Bacteria Total Maximum Daily Load (TMDL)

"Total Maximum Daily Load" (TMDL) describes the amount of pollution a waterbody can receive and still meet WQS 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 CWA requires each state to identify waters in which designated uses are not being met and water quality impairments exist, and to prioritize the list of impaired waters, calculate a TMDL of pollutants for those waters, and devise plans to improve water quality.

In 2018 the Division sought public comment regarding a draft report addressing surface water bacteria impairments throughout the Commonwealth. The report discusses bacteria sources, how they enter surface water, what stakeholders can do to improve water quality, and describes a new, streamlined method for developing TMDLs for bacterial impairments. The report includes an appendix for the Green River basin with TMDLs for thirty-four bacteria-impaired stream segments and an appendix for the

Tradewater River basin with TMDLS for five bacteria-impaired stream segments. These thirty-nine impaired streams are located in twenty-one counties.

The Division will address the public comments it received and expects to submit its report to the U.S. EPA for approval in the coming year. More information can be found in the Statewide Bacteria TMDL Fact Sheet and at Kentucky's Clean Water 101 Story Map.

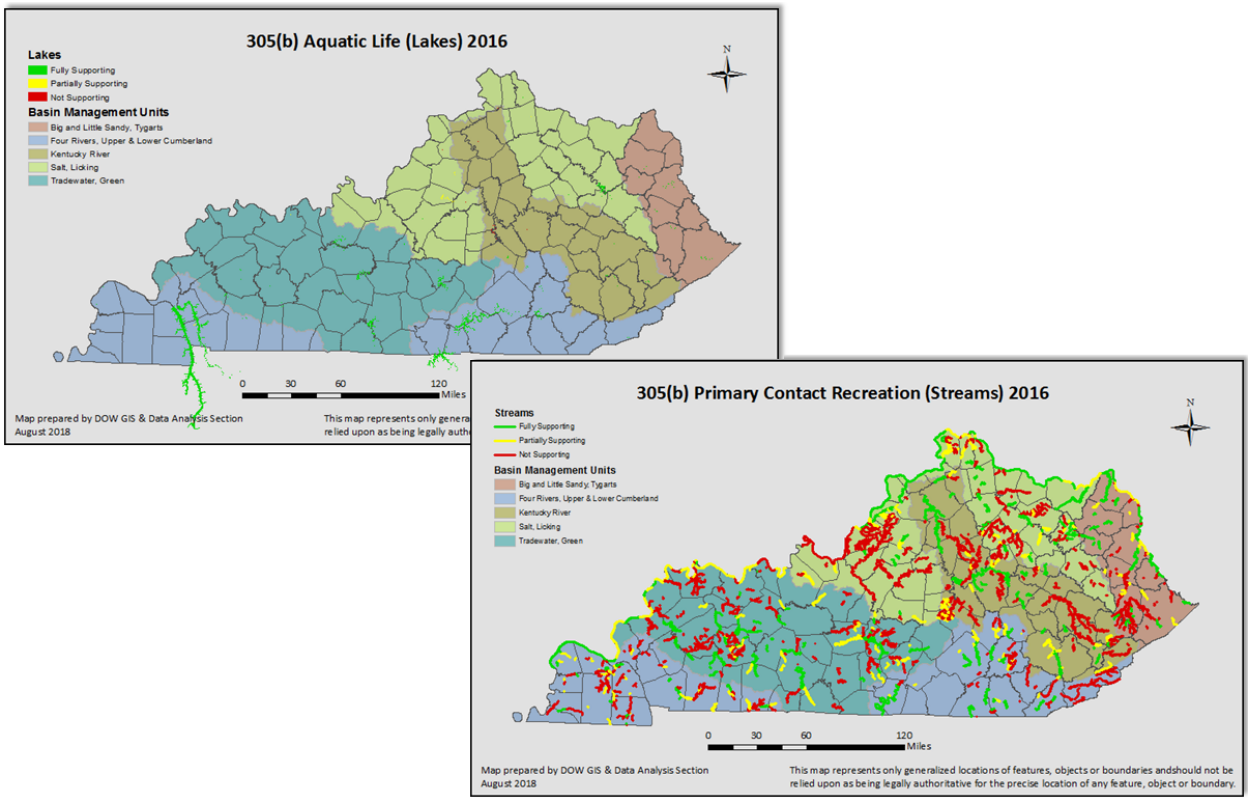


The Integrated Water Quality Report to the U.S. Congress

Section 305(b) of the CWA requires states to assess and report current water quality conditions to the U.S. EPA every two years. The Division submitted its 2016 Integrated Report (IR) to the U.S. EPA on March 1, 2018. The 303(d) list is a subset of the IR and includes only waterbodies determined to be impaired (i.e., could not meet its designated use) by a pollutant and that require a TMDL. The list contains 2,788 pollutant/waterbody combinations (PWC) which count the number of pollutants affecting a waterbody. The U.S. EPA approved Kentucky's 303(d) list on June 19, 2018.

The Division utilized data from approximately 530 collecting stations to complete assessments on waterbodies for which data had been collected. This equated to approximately 14% of Kentucky's stream miles. The 2016 IR assessed 2,751 waterbodies totaling 12,753 stream miles, 180,366 lake, reservoir, or pond acres, and 12.2 spring miles. Kentucky removed sixty-eight PWCs from the 303(d) list.

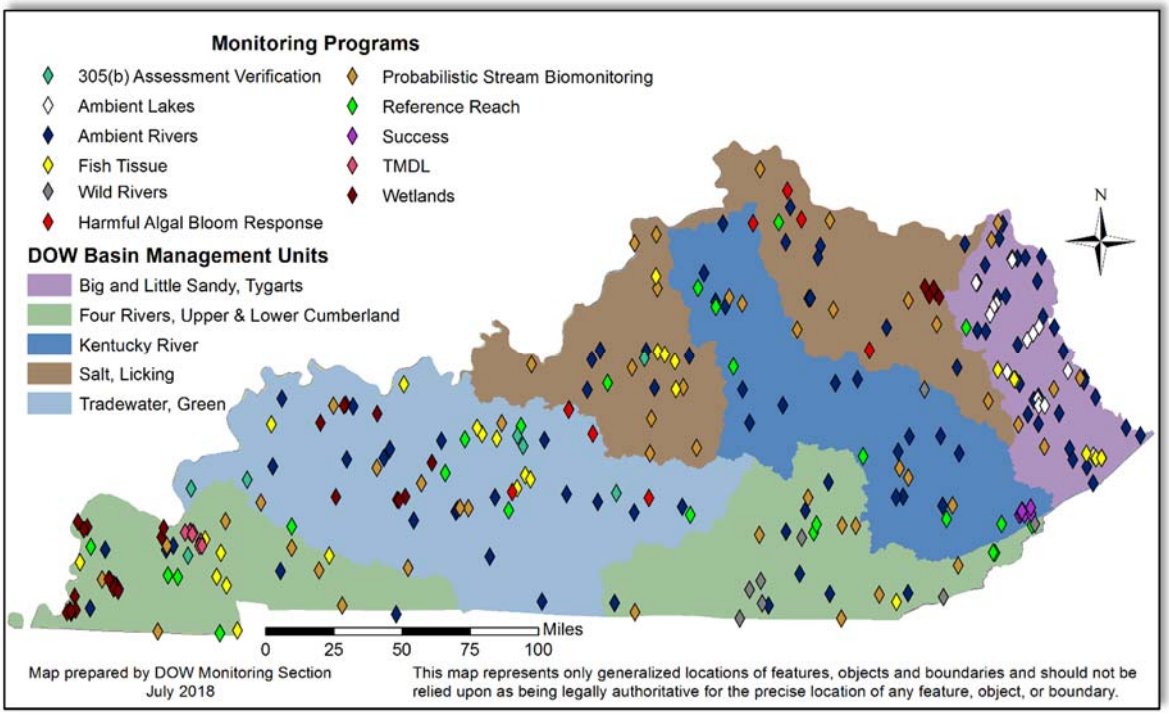
The 2016 305(b) report can be explored on the Division's website at http://water.ky.gov/waterquality/Integrated%20Reports/2016%20Integrated%20Report.pdf and includes assessment summaries for each waterbody that does not support one or more of its designated uses.



Surface Water Monitoring

During the 2017 calendar year sampling season, the Division completed approximately 1,500 monitoring site visits at over 300 locations, and collected samples from the Commonwealth's streams, rivers, springs, wetlands, lakes, and reservoirs to assess water quality. Sampling assists in a greater understanding of the condition of Kentucky's water resources through four broad strategies:

1) 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 to determine program effectiveness;
2) Probabilistic monitoring of streams and wetlands using randomly selected sites to project current aquatic conditions statewide or in a particular river basin;
3) Monitoring for potential fish consumption, drinking water, or recreational advisories through fish tissue collection and response to harmful algal bloom reports; and
4) Focused water quality monitoring in watersheds that require Total Maximum Daily Load (TMDL) development for pollutants



Monitoring highlights include:

- The Ambient Rivers and Ambient Lakes Programs rotated into the Big Sandy/Little Sandy/Tygarts Basin Management Unit for more intensive monitoring
- The Fish Tissue Monitoring Program continued its five-year rotation through approximately eighty lakes to provide data for fish consumption advisories, and completion of a study on Cumberland River trout in partnership with the Kentucky Department of Fish and Wildlife

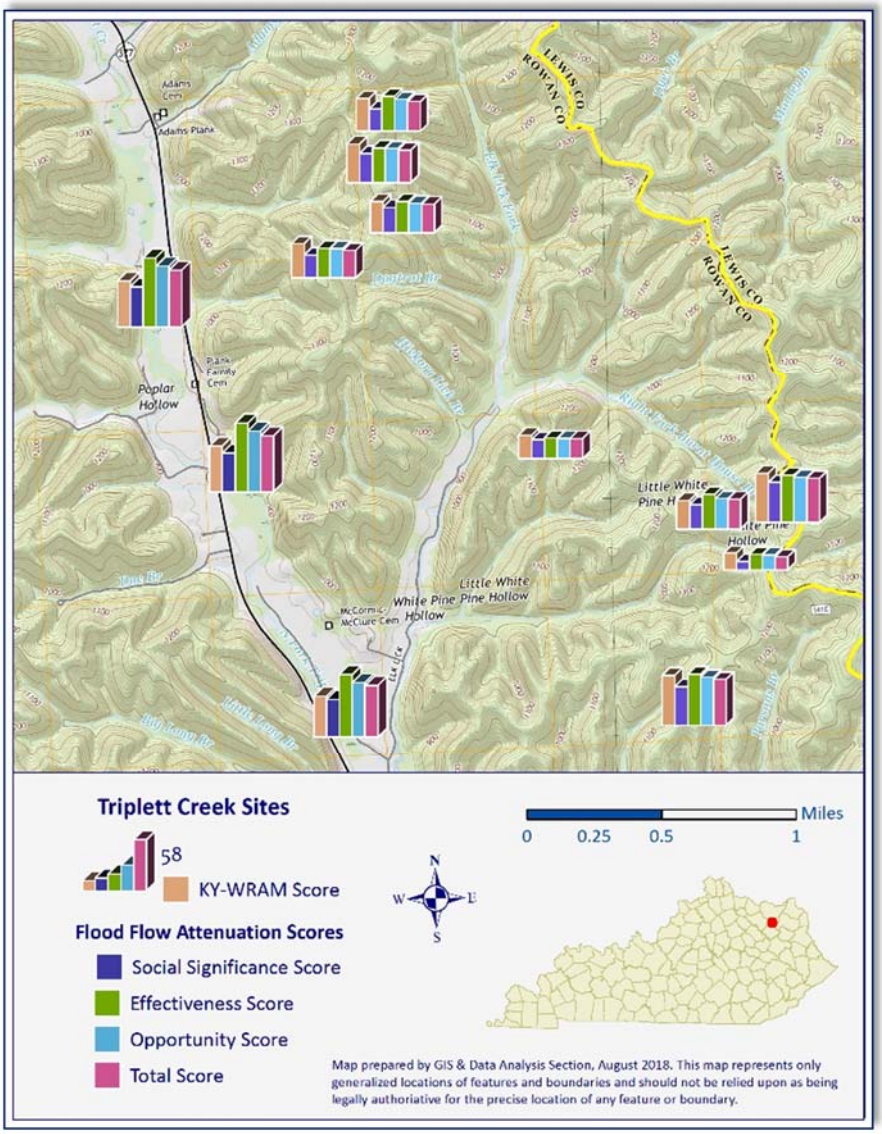
- The Probabilistic Biomonitoring Program began the first year of its statewide design which was developed in collaboration with the U.S. EPA and will assist in providing a representative assessment of stream health across the Commonwealth
- Reports of potential harmful algal blooms (HABs) resulted in eleven response visits which revealed cyanotoxin concentrations below the threshold for issuing an advisory; consequently, no new advisories were issued in 2017
- Intensive monitoring began in the Dry Fork, Sandlick Creek, and Crafts Colly watersheds of the North Fork Kentucky River to provide baseline data for a watershed plan and future efforts to improve area water quality

Wetlands Program Summary

Wetlands are habitats that range in wetness from permanently ponded to seasonally soggy and provide numerous benefits to citizens of the Commonwealth. A global study that estimated the monetary value for services each habitat type provides revealed that the dollar per area of bottomland forests and swamps outranked all other ecosystems. Wetlands need protection from degradation and loss because they are enormously and naturally efficient at regulating and treating water and waste from natural and human sources.

The Division began establishing its Wetlands Monitoring and Assessment Program in the last decade to develop assessment tools necessary to examine different aspects of wetland health, with the ultimate goal of the program to help protect and restore wetlands across the Commonwealth. The Kentucky Wetland Rapid Assessment Method (KY-WRAM) takes a "snapshot" of the hydrology, soil, and habitat health in a particular area. The Division is currently developing and testing other tools, such as indices of biotic integrity (IBIs), which will provide more intensive assessments of wetland health.

The new Wetlands Prioritization Tool (WPT) will allow the Division to incorporate data gathered by the KY-WRAM into decision-making processes by adjusting the KY-WRAM scores to reflect the ability of a wetland to perform specific ecosystem services, such as sediment retention, flood flow attenuation, nutrient removal, and wildlife habitat. The WPT objectively considers the quality of a wetland and its ability to provide these ecosystem services when choosing a preservation or mitigation project. For example, the map on the next page illustrates that riverine wetlands have higher flood flow attenuation scores than ridgetop wetlands.



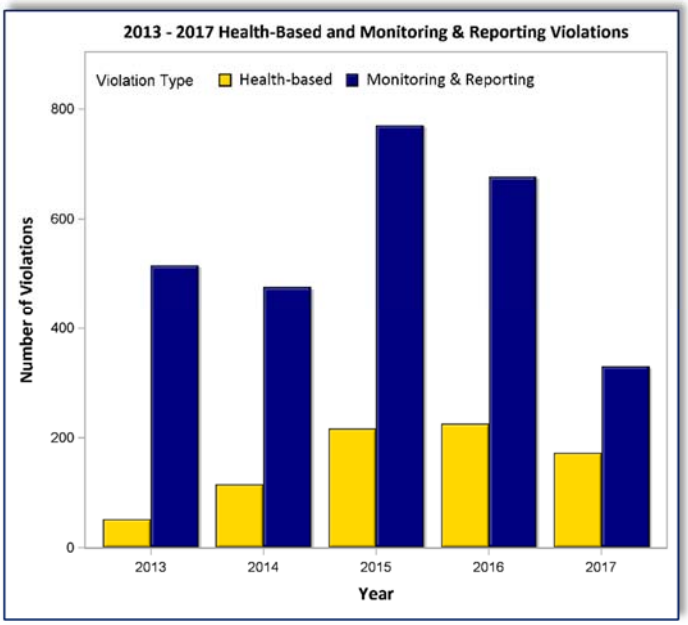
The implementation of the WPT will increase the quality and quantity of wetlands by providing a way to determine which wetland projects will have the best return of ecosystem services for the investment provided.

In 2017 the Division conducted KY-WRAM assessments at thirty-six sites and amphibian surveys at sixteen sites. The amphibian survey data will be used to develop an Amphibian Index of Biotic Integrity (IBI) for Kentucky. KY-WRAM data collected at the same sites will be validated by the Amphibian IBI when it is completed, and KY-WRAM data from eastern and western Kentucky will help evaluate the WPT.

COMPLIANCE AND INSPECTIONS

2017 Annual Drinking Water Report

The federal Safe Drinking Water Act (SDWA) requires an Annual Drinking Water Report that describes notices of violations issued to public water systems in the previous calendar year. Most violations are administrative in nature which show issues with monitoring and reporting, whereas health-based violations occur when water exceeds established limits for a regulated contaminant. An anticipated spike in violations occurred between 2014 and 2016 due to new federal requirements for disinfection byproducts (DBPs) which result from the interaction of disinfection chemicals with other chemicals in the water. However, with increased industry experience, training, and targeted technical assistance, Kentucky public water systems have shown substantial improvements in both types of violations in the past year.

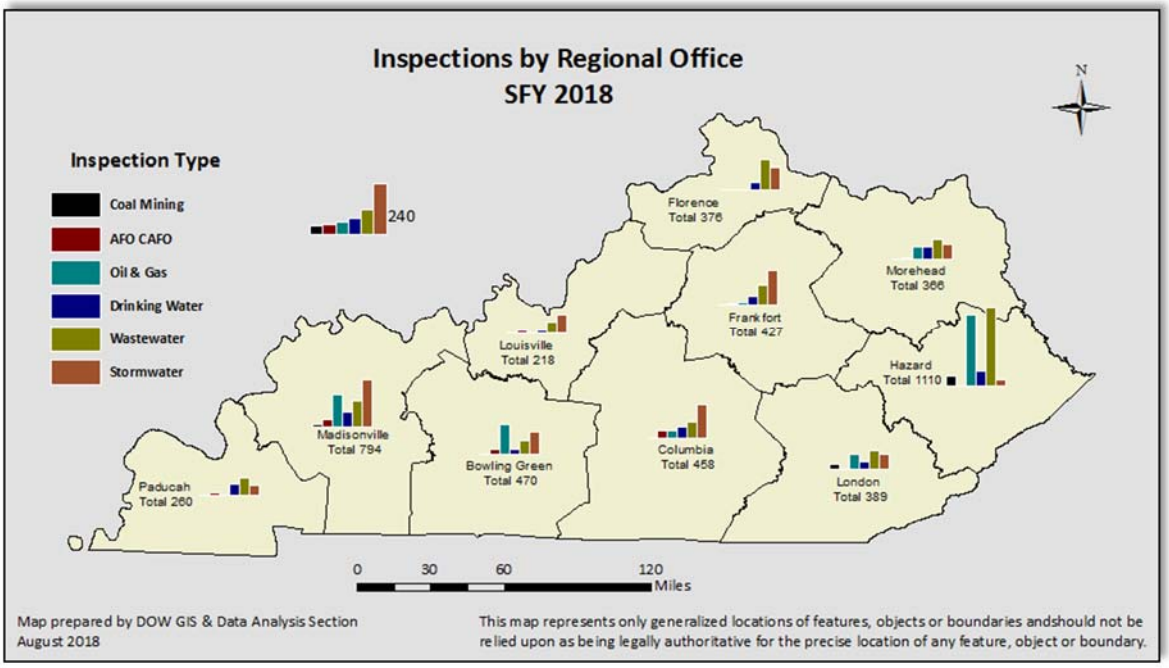


The current report shows that health-based violations decreased by 25% and that monitoring and reporting violations decreased by 51% in 2017. The 173 health-based violations comprised only 0.21 percent of the more than 82,000 test results evaluated by the Division. More than 99.7% of the results were compliant with state and federal regulations. Additionally, none of Kentucky's 435 public drinking water systems exceeded federal limits for metals, including lead, or cancer-causing volatile organic compounds. Kentucky's public water systems continue producing drinking water of excellent quality for citizens of the Commonwealth.

The full report is available online at:
http://water.ky.gov/DrinkingWater/Pages/AnnualComplianceReports.aspx

Inspections and Technical Assistance

The Division conducts inspections of wastewater, drinking water, stormwater, oil and gas, agriculture, and coal mining activities. During FY18, the Division completed 4,781 inspections and found approximately 80% of inspected facilities in compliance with state and federal regulations. This compliance rate has remained consistent for the previous four years.



The number of complaints from the public received by the Division continued its 10-year decline, with 1,234 complaints logged during FY18. The decline is likely attributable to increased regulatory compliance and permittee self-reporting, which enables early identification and resolution of issues prior to the public needing to make a complaint.

The Division also offers technical assistance to public water systems, and in FY18 conducted over 180 site visits. During the visits Division staff perform targeted technical assistance such as file assessments, tank studies, and plant and distribution system water testing. Additionally, the Division conducted several distribution system and plant optimization training sessions which assist drinking water professionals in gaining skills they need to consistently improve water quality.

As previously noted, an anticipated spike in violations occurred between 2014 and 2016 due to new federal requirements for disinfection byproducts (DBPs) which result from the interaction of disinfection

chemicals with other chemicals in the water. The partnership between the Division and the Kentucky Rural Water Association, combined with the cooperation of public water systems, resulted in a 25% increase in compliance with the DBP rule, and a 51% decrease in monitoring and reporting.

Kentucky is one of twenty-six states participating in the U.S. EPA Area-Wide Optimization Program (AWOP), which provides tools and approaches for drinking water systems to meet water quality optimization goals that exceed regulatory requirements, and provide an increased, and sustainable, level of public health protection to their consumers. Sixty-six systems met the microbial optimization goals, while forty-two of those systems, which collectively serve more than 1.1 million Kentuckians, received additional recognition for outstanding performance in their respective categories.

January 2018 Freeze and Flooding

Frozen conditions throughout the Commonwealth in January 2018 led to a significant number of line breaks that resulted in water outages, primarily in the eastern and southeastern areas of the state. Residents of Clay, Floyd, Martin, Perry, and Pike Counties in particular experienced extended water outages. The number of customers without water, with low water pressure, or under Boil Water Advisories led to the activation of the Kentucky Emergency Management (KYEM) Emergency Operations Center (EOC). At the peak of the month-long emergency, approximately 7,500 customers were without water, and 11,000 customers had low water pressure and/or were under Boil Water Advisories.

A coordinated effort to successfully address the emergency drinking water issues involved the Division, KYEM, Kentucky National Guard, Kentucky Department for Public Health, the Kentucky Rural Water Association, and elected officials. The Division supported emergency operations while repairs were made to restore service to customers by contacting water systems twice daily to collect accurate data regarding the number of affected customers and progress towards the completion of repairs. The Division participated in daily conference calls, furnished updates that enabled KYEM to buy and ship bottled water to affected areas, and provided technical assistance as needed. The efforts of all the agencies involved resulted in this event concluding without any significant public health-related issues.

WATERSHED ASSESSMENTS

Volunteer Lake Monitoring Program (VLMP)

Kentucky has approximately 440,000 acres of lakes within its borders, which amounts to more than 100 billion gallons of water. The Volunteer Lake Monitoring Program (VLMP) engages citizen scientists to expand water resource monitoring in the Commonwealth. This program provides a means to address some data gaps and improve upon characterization of water quality in Kentucky lakes. Collection, observation, and reporting procedures used by volunteers are designed to be low cost, quickly and easily performed, and provide practical experience for volunteers.

The Division partnered with Watershed Watch in Kentucky, a nonprofit group focused on water quality monitoring, to initiate a VLMP to support harmful algal bloom (HAB) monitoring with an emphasis on drinking water sources. In 2017, the pilot program focused on three lakes in the Kentucky River, Cumberland River, and Tennessee River basins. Roughly one dozen volunteers monitored twenty-four sites on Lake Herrington, Lake Barkley, and Kentucky Lake. The goal for 2018 is to expand the program into the Salt River and Big Sandy River basins.

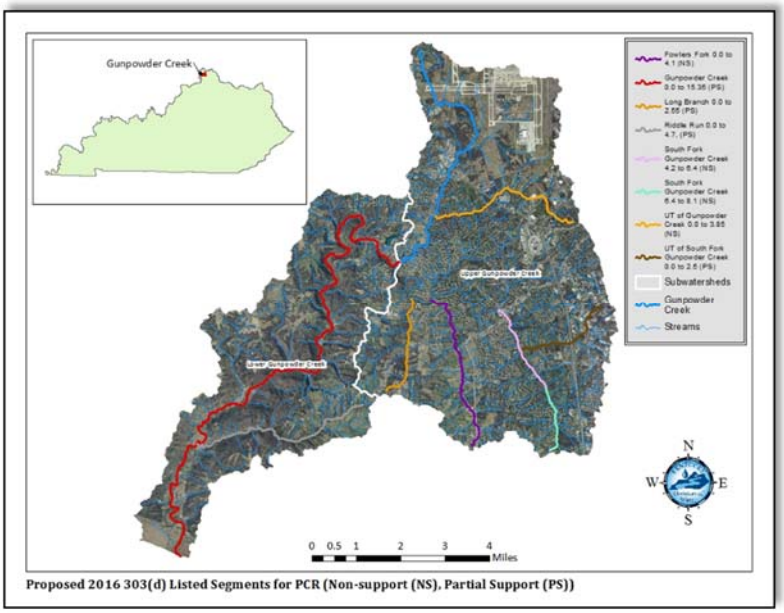
The procedures used by volunteers are not intended to identify subtle changes or fully assess a waterbody for all potential uses. The data and observations will show the general lake condition, track conditions over time, and provide regular observations for potential HABs. Volunteers collect Secchi Depth measurements every two weeks and record lake condition observations, such as general appearance and recent and current weather conditions. This information, combined with other data, helps evaluate the need for increased monitoring and serves as field verification of remote sensing models which utilize Landsat images to evaluate basic water quality indicators. Volunteers can use a standard, hard copy form to complete and submit for data entry, or a mobile application specifically designed for Kentucky's VLMP that quickly uploads information to the database.

The Kentucky Water Watch *Volunteer Lake Sampling Results* web-based map viewer, which can be accessed on the Kentucky Geological Survey website at https://kgs.uky.edu/wwky/lake, manages and reports collected data.

EPA Accepts Kentucky's First Total Maximum Daily Load (TMDL) Alternative

In February 2018, U.S. EPA Region IV accepted the Gunpowder Creek Watershed Plan and Supplement as the first TMDL Alternative plan for the Commonwealth. A TMDL Alternative is a restoration approach that establishes a planned set of actions designed to attain water quality standards. The TMDL Alternative does not remove Gunpowder Creek from the list of impaired waters that require a TMDL, but it allows additional time for water quality improvement while restoration approaches are pursued to achieve water quality standards. You can learn more about TMDLs by visiting the Division's Clean Water 101 Story Map.

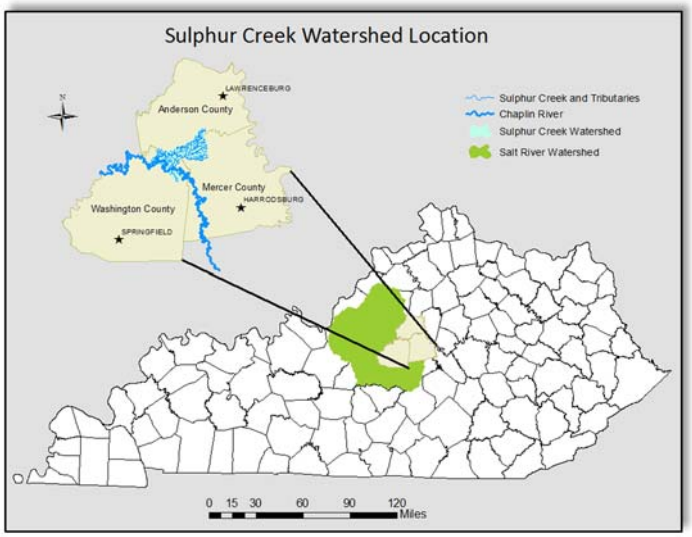
The Gunpowder Creek Watershed Initiative developed a watershed plan for Gunpowder Creek in 2014, which the U.S. EPA approved in July 2015. The plan identified pollution sources and targeted activities to reduce pollutant loads from those sources. The Division collaborated with the Boone County Conservation District and Northern Kentucky Sanitation District 1 to develop a plan supplement that included additional data needed for TMDL Alternative status. The supplement focused on bacteria levels that make water unsafe for swimming or fishing, identified potential sources of bacteria and actions to address them, and included an implementation table regarding land use, specific actions to take, key partners, funding sources, and timeframes for improvement. The tables are used to track the progress of the alternative and report achievements. Citizens can follow the work in progress by visiting the Boone County Conservation District's website and can learn more about water quality in the Commonwealth by visiting Kentucky's Water Health Portal.



Proposed 2016 303(d) Listed Segments for PCR (Non-support (NS), Partial Support (PS))

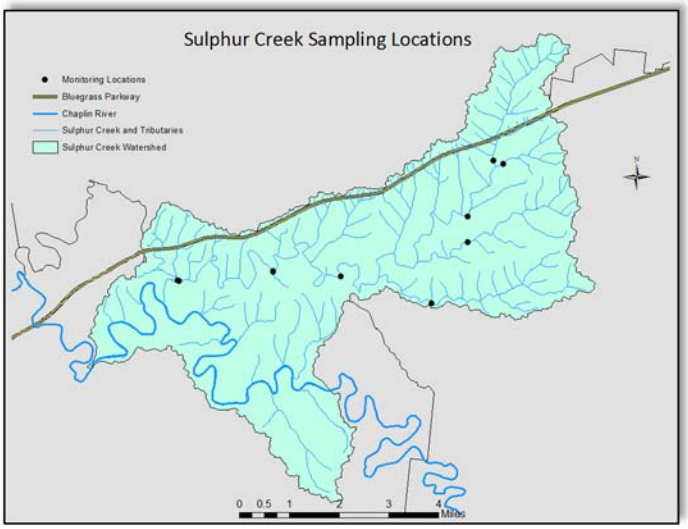
Sulphur Creek Watershed Plan Implementation

Nonpoint source runoff is the primary source of pollution affecting water quality in Kentucky. The Division receives Clean Water Act Section 319(h) funds from the U.S. EPA to address problems associated with nonpoint source pollution. The Division works at both statewide and watershed levels to protect surface water and groundwater from nonpoint source pollution, abate pollution threats, and restore degraded waters. Watershed plans describe watershed conditions, identify causes and sources of impairment, and explain best management practices (BMPs) that can improve water quality conditions and ultimately meet water quality standards and designated uses.



Located in central Kentucky's Bluegrass Region, the Sulphur Creek watershed drains approximately 23.14 square miles of rural land. About ten miles of Sulphur Creek is designated as an Exceptional Water (reference reach) and an Outstanding State Resource Water (OSRW). However, about 19.5 stream miles are designated as Non-Supporting for Primary Contact Recreation due to high levels of E. coli bacteria, and 2.8 miles of that are also Partially Supporting for Warm-Water Aquatic Habitat due to high levels of sediment and nutrients (nitrogen and phosphorus).

The Watershed Planning process, including sampling data from 2010 through 2013, revealed that the Sulphur Creek watershed lacks any sewer lines, every home uses either a septic system or no system (in the latter case, homes "straight piped" waste directly onto the land or into the creek), an estimated 50% of the 207 septic systems are failing, and that approximately 4,500 head of cattle live in the watershed.



When the Sulphur Creek Watershed Implementation Plan received final approval in 2015, the Division entered contracts with the Mercer County Health Department (MCHD) and the Mercer County Conservation District (MCCD) to address E. coli impairments in the watershed.

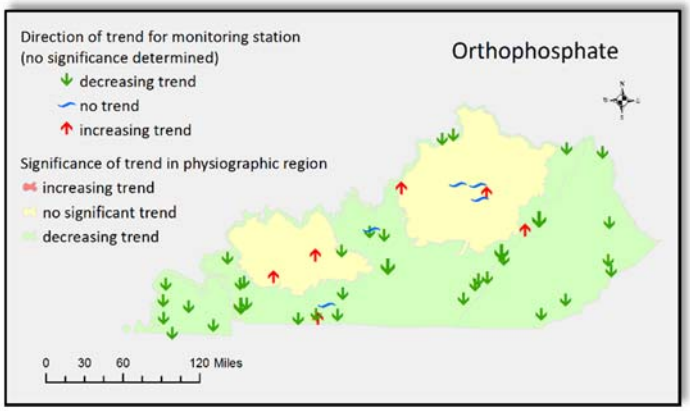
The contract with MCHD provides septic system education, inspections, and pump outs to any homeowner located in a priority area. Depending on the condition of inspected properties, homeowners became eligible for system maintenance, upgrade, replacement, or installation if no system was present. The MCHD held two education workshops regarding septic systems, published newspaper articles and radio advertisements, and provided inspections for ten households. Of the ten, two required pump out and eight required new lagoon septic systems. Work under the contract also identified two failing systems and eliminated eight straight pipes.

The contract with MCCD provides education about farm practices that reduce pollutant loads through Farm Field Days, including agriculture BMP demonstrations, and financial assistance to implement BMPs on eligible farms in priority areas of the watershed. The MCCD held two educational Farm Field Days and installed twenty-one agricultural BMPs on farms in two prioritized sub-watersheds. BMPs included renovation of 178 acres of pasture, creation of five winter feeding areas, animal trails, and walkways, establishing alternate water, and installing 14,000 linear feet of fencing. These BMPs reduced the pollutant load from over 340 cattle and 10 hogs from reaching the stream, and new fencing prevented 110 cattle from access to the streams.

20 year Groundwater Trends Report

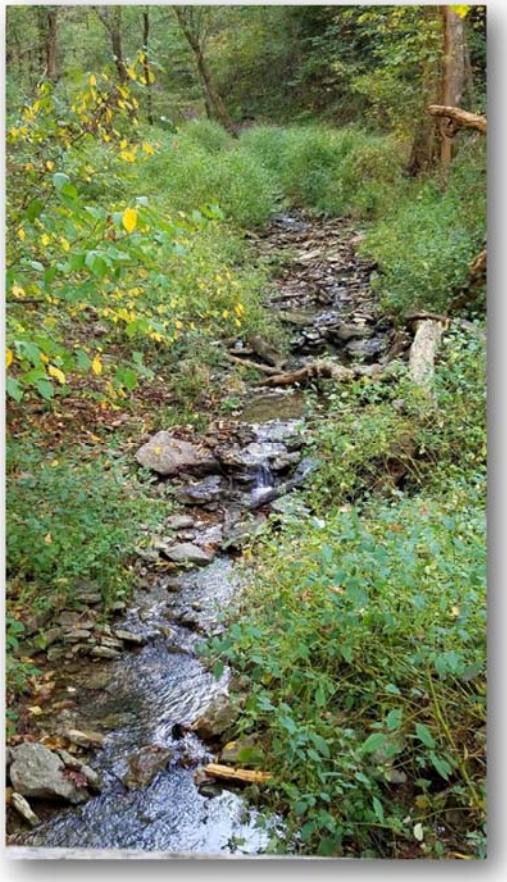
The Division released its first Groundwater Trends Report which analyzed data generated from twenty years of ambient groundwater sampling covering a range of land-use types and collected at forty-nine monitoring stations across the Commonwealth that were chosen to reflect general groundwater conditions.

The Kentucky Interagency Groundwater Monitoring Network (Network) was established to characterize groundwater that has not been contaminated. Network data collected from 1995 through 2015 were examined on a statewide basis and categorized by physiographic region and groundwater source (well or spring), covering detections of forty-three parameters. The Mississippian Plateau had the most monitoring stations (twenty-four out of forty-nine total) and allowed a larger sampling size to enable better detection of long-range trends.



The data reflect decreases of some nutrients (generally nitrogen and phosphorus) and sulfate concentrations, with increased concentrations of some metals, conductivity, and pH. The report identifies the locations where statewide trends originate and characterizes differences by region and source. Continued monitoring over time will ensure early detection of potential problems and the ability to address them before they become entrenched.

The report can be accessed on the division's website at:
http://water.ky.gov/groundwater/Documents/GW%20Exploration%20ArticleFinal.pdf.



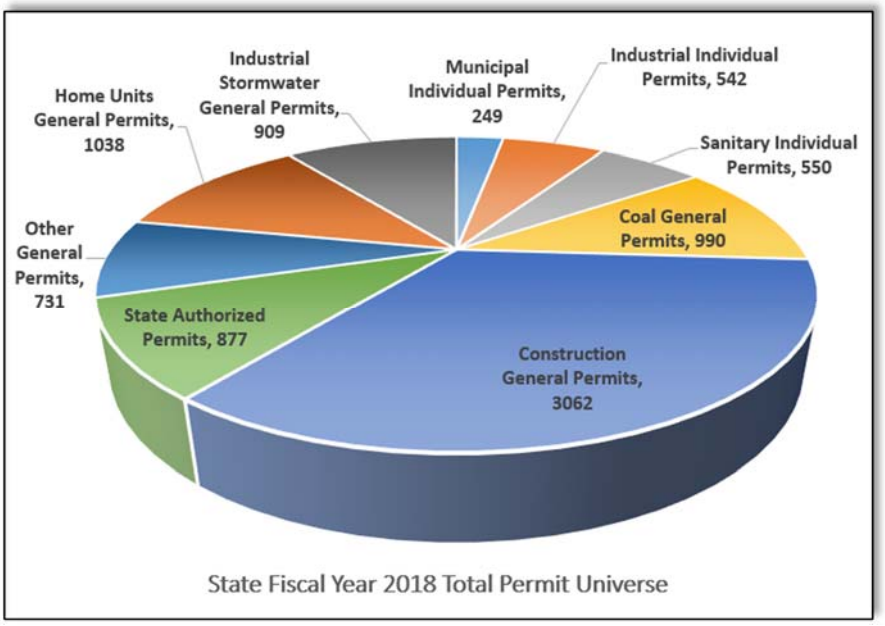
Cove Spring Park DOW Staff Photo

PERMITTING

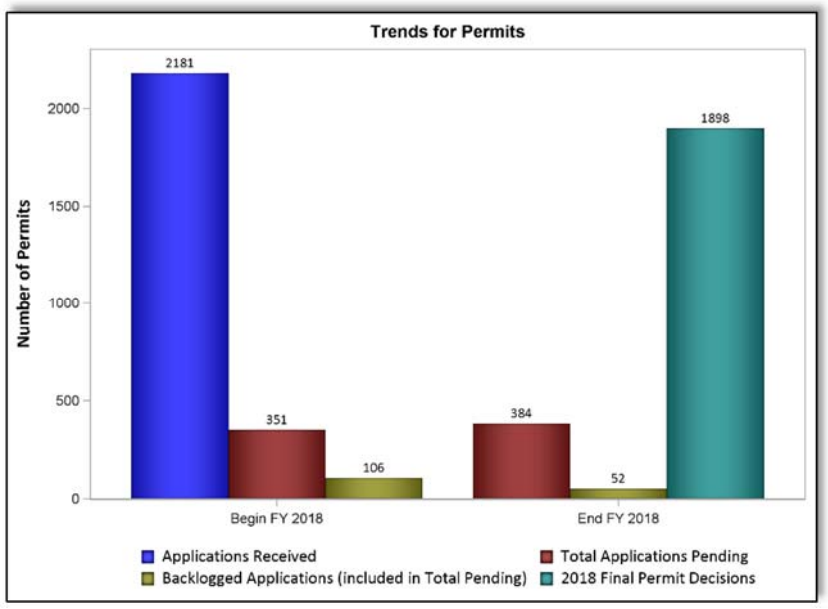
The Clean Water Act (CWA) requires dischargers of wastewater into waters of the Commonwealth to obtain a Kentucky Pollutant Discharge Elimination System (KPDES) permit. To ensure that discharges of wastewater from industrial facilities, publicly owned treatment works, and other sources are not harmful to human health or the environment, KPDES permits contain technical and water quality-based limits on what can be discharged and contain requirements to monitor and report the quality and quantity of wastewater being discharged.

Permit Issuance

The Division issues individual, general, and state-authorized permits, and has a total universe of approximately 8,000 permits. Individual permits cover single entities and reflect site-specific requirements. Kentucky's general permits cover fifteen categories of dischargers, are issued for facilities with similar operations and wastewater discharges and can be obtained by filing a request for coverage. 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 by means other than through point source discharges. There are approximately 1,300 individual permitted dischargers, more than 6,700 facilities covered by general permits, 55 KISOPs, and 815 KNDOPs in Kentucky.



Most permits have a five-year period of validity, and the Division receives an average of 2,500 new and renewal permit applications each year. The Division began FY18 with 351 pending applications, including 106 backlogged applications (those that are beyond the regulatory timeframe), and received 2,181 total permit applications. The Division issued final decisions on 1,898 individual and general permits and ended the fiscal year with only fifty-two backlogged applications.



In the past year, the Division decreased its backlogged applications by 51%. The Division also achieved its commitment to the US E.P.A. Office of Wastewater Management to resolve 20% of applications on a federal list of prioritized permits. The Priority Permits Initiative ensures that Kentucky addresses the most environmentally or programmatically significant permits in a timely fashion.

Amendments to the Federal Clean Water Act (CWA)

Amendments to Section 316(b) of the federal Clean Water Act (CWA) require facilities with cooling water intake structures to use the best technology available to minimize entrainment and impingement. Entrainment occurs when a cooling water intake structure pulls small fish and shellfish into a power plant's cooling system. Impingement happens when larger organisms become trapped against screens at the front of an intake structure. Kentucky facilities had until July 14, 2018 to identify control systems to minimize entrainment and impingement, and to modify their KPDES permits.

Additionally, the U.S. EPA amended the effluent limitations guidelines for steam electric power generating plants and imposed a compliance deadline of November 1, 2018. The new guideline requires facilities to comply with the best available technology for flue gas desulfurization wastewater, gasification wastewater, fly ash transport water, flue gas mercury control wastewater, and bottom ash transport

water. Power plants met this challenge by installing physical, chemical, and biological treatment systems, and modifying power generating processes.

The new rules require Kentucky's seventeen power generating plants to upgrade water intake structures, meet more stringent environmental standards for discharging scrubber wastewater, and eliminate wet handling of fly ash and bottom ash. The Division worked with the steam-electric power plants and the Utilities Information Exchange of Kentucky to ensure compliance with the imposed deadlines. The Division provided the groups with a timeline of interim milestones for issuing KPDES permits, and then finalized permits for eleven facilities that submitted applications within the specified time frames. Three power plants were not subject to the new federal rules.

Combined and Separate Sewer Systems

Many older cities in Kentucky have portions of their sewer systems designed to collect and transport sanitary wastewater, industrial wastewater, and stormwater in the same pipe. During high rainfall events, the combined wastewater and stormwater may result in too much flow for a wastewater treatment system to manage. The excess water discharging from an outfall is referred to as a Combined Sewer Overflow (CSO).

Other cities have sewer systems designed to collect and transport sanitary wastewater separately from industrial wastewater and stormwater. Periodically, these systems overflow due to blockages, disrepair, or excessive flow. The discharge of wastewater from this type of sewer system is known as Sanitary Sewer Overflow (SSO). SSOs occasionally occur in almost every sewer system, even though systems are intended to collect and contain all the sewage the flows into them.

Varying degrees of aging infrastructure that cause bypasses and overflows at wastewater treatment plants can be found in 230 Kentucky communities. The Division typically inspects about 20% of these systems annually, focusing on those with frequent and recurring incidents and complaints. In FY18, the Division conducted a total of thirty-two CSO/SSO inspections during which Division staff educated communities on identifying causes of overflows, prioritizing corrective actions, finding funding sources, and returning collection systems to compliance with the Clean Water Act (CWA).

The City of Henderson completed implementation of its Long-Term Control Plan which required projects for controlling its CSOs. In 2018 the Franklin County Circuit Court terminated the Agreed Order that

mandated solutions to the Henderson CSO issue. Henderson will continue monitoring flows entering and leaving its system in order to demonstrate effective controls and CWA compliance. Final completion dates of other CSO/SSO projects vary depending on the scope of work and financial considerations.

Community/Entity	Expected Completion Date	Community/Entity	Expected Completion Date
Ashland	12/31/2025	Northern KY SD1	12/31/2025
Catlettsburg	1/31/2019	Owensboro RWRA	12/31/2026
Frankfort	12/31/2023	Paducah JSA	12/31/2038
Harlan	12/31/2020	Pikeville	Completed 07/01/2014
Henderson	Completed 07/20/2018	Pineville *	09/05/2017
Lexington LFUCG	12/31/2026	Prestonsburg	Completed 10/01/2015
Louisville MSD	12/31/2024	Vanceburg	Completed 12/31/2012
Loyall	12/31/2020	Winchester	12/31/2025
Maysville *	12/28/2015	Worthington *	12/31/2015
Morganfield	12/28/2018		
* The Division of Water and Division of Enforcement are working with the community to bring it into compliance with the Consent Order.			

Greater awareness of the seriousness of CSOs and SSOs, and completion of remedial projects, results in fewer overflows of raw sewage into public streets, parks, yards, and streams. Kentucky communities continue making progress to minimize discharges of untreated wastewater resulting in reducted risk to human health and reduced impacts on waterways.

Municipal Separate Storm Sewer Systems (MS4s)

Stormwater runoff from developed urban and suburban areas contributes significant pollution to Kentucky waters and increases downstream flooding. The purpose of the Municipal Separate Storm Sewer System (MS4) program is to minimize urban stormwater pollution runoff from entering the waters of the Commonwealth. The MS4 program requires communities with certain population thresholds or significant population density to obtain a permit and develop a stormwater management program. The three MS4 categories (large, medium, and small) are based the population of the community.

MS4 CATEGORIES AND PERMITS

CATEGORY	CRITERIA	PERMIT TYPE	# PERMITS IN KY
Large	250,000+ population	Phase I Individual Permit	2
Medium	100,000 - 249,999 population	Phase II General Permit	0
Small	10,000 - 99,999 population, or 1,000 population/square mile, or contiguous to another MS4	Phase II General Permit	60

Lexington-Fayette Urban County Government and Louisville MSD have the only Phase I individual permits in Kentucky. The Phase II general permit, which the Division reissued effective May 1, 2018, contains general conditions that smaller communities must meet. The Division issued permit coverage to 60 applicants for 105 communities. Many of these communities co-permit (jointly hold a permit between multiple adjacent communities) which allows cost-sharing to implement the MS4 Six Minimum Control Measures. Among co-permittees are the Northern Kentucky Sanitation District #I, which co-permitted with Boone, Kenton, and Campbell counties and an additional thirty cities, and Oldham County which is co-permitted with the Cities of Crestwood, Goshen, Orchard Grass Hills, Riverbluff, and LaGrange. Shelby County, and the Cities of Walton and Scott, are among the newly added entities covered by the MS4 general permit.

MS4 MINIMUM CONTROL MEASURES

1. Public education and outreach
2. Public participation and involvement
3. Illicit discharge detection and elimination
4. Construction site runoff controls
5. Post-construction site runoff controls
6. Facility good housekeeping and pollution prevention

The Division provides technical assistance to MS4 communities and monitors compliance by reviewing the communities' annual reports and inspecting approximately 20% of MS4 programs each year. The Division exceeded this threshold by conducting fifteen MS4 inspections during FY18 and evaluating programs to verify that they meet the MS4 Six Minimum Control Measures. These efforts assist in ensuring healthy waters for Kentucky citizens, natural habitats, and the environment.

Commonwealth of Kentucky

Matthew G. Bevin, Governor

Energy and Environment Cabinet

Charles G. Snavely, Secretary

Kentucky Department for Environmental Protection

Anthony R. Hatton, Commissioner

Kentucky Division of Water

Peter Goodmann, Director

Managers

Compliance and Technical Assistance Branch	**Sarah Gaddis**
Resource Planning and Program Support Branch	**Kristie Graham**
Surface Water Permits Branch	**Sara Anderson**
Water Infrastructure Branch	**Jory Becker**
Watershed Management Branch	**John Webb**
Water Quality Branch	**John Webb (acting)**
Consultants to Director's Office	**Tammi Hudson**
	Carey Johnson