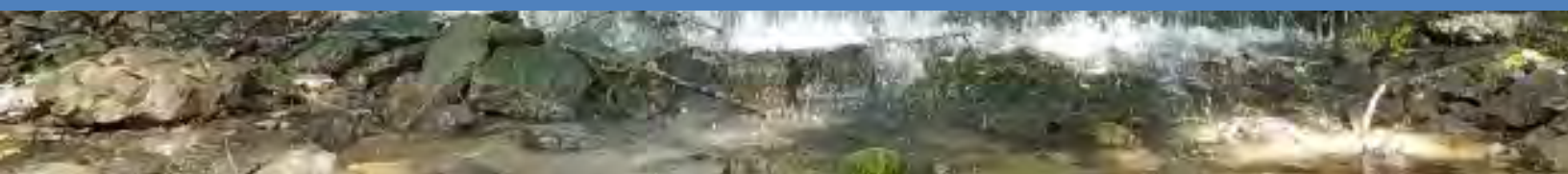




Kentucky Division of Water

2016 Annual Report



CONTENTS



EXECUTIVE SUMMARY	4
MISSION	7
WATER QUALITY	8
The Ohio River Harmful Algal Bloom (HAB)	8
Updated Fish Consumption Advisories	10
Water Quality Standards – 2015 Triennial Review	11
Agricultural Water Quality	12
401 Certification of the US Army Corps of Engineers’ Letter of Permission for the Kentucky Transportation Cabinet	12
Watershed Improvement Efforts	13
Watershed Coordinators	14
Recovery Potential Tool.....	15
Water Quality Monitoring.....	16
Surface Water	16
Groundwater	18
TMDLs	19
DRINKING WATER.....	21
Compliance.....	21
Source Water Protection Assistance Program (SWPAP).....	22
Advisory Groups	24
Drinking Water Advisory Council.....	24
Lead in Drinking Water Work Group	24
PERMITTING	26
Permit Issuance	26
New and Reissued General Permits	27

Coal Mining Operations General Permit	27
Stormwater Construction General Permit	28
Net Discharge Monitoring Reports (NetDMR)	28
DRINKING WATER AND WASTEWATER PLANNING	29
Wastewater Advisory Council	29
SRF Grants and Projects	29
Wastewater Treatment Facility Energy Optimization and Nutrient Removal	29
Small Package Wastewater Treatment Plants (WWTPs)	30
Combined and Separate Sewer Systems.....	31
Municipal Separate Storm Sewer Systems (MS4s)	32
COMPLIANCE AND TECHNICAL ASSISTANCE	34
Compliance and Inspections	34
Laboratory Certification Program	37
WATER RESOURCES MANAGEMENT	39
Risk MAP	39
Dam Safety Program	40
Floodplain Management	41
Process Development and Efficiencies	42
WATER MAPS PORTAL	44
Best of Kentucky Award	45
Risk MAP Portal	45
New Map Viewers	46
HABs Viewer	46
Special Use Waters Mobile App	47
New Story Maps	48

EXECUTIVE SUMMARY



Dear Reader,

The Kentucky Division of Water (DOW) is pleased to provide its Annual Report for Fiscal Year 2016 (FY2016). This report summarizes the achievements of DOW scientists, specialists, and administrative staff in meeting the DOW mission of managing, protecting, and enhancing the water resources of the Commonwealth. In order to meet its goals, DOW implements five strategic objectives: 1/ Protect, manage, and restore water resources; 2/ Full compliance with the Safe Drinking Water Act, 3/Conduct effective water resources planning; 4/ Meet federal and state program requirements; and 5/ Promote better management and communication of data. The Annual Report highlights the progress being made in meeting these target areas.

DOW successfully met many challenges in FY2016. In late summer 2015, the most expansive Harmful Algal Bloom (HAB) to affect waters of the Commonwealth in recent times occurred on the Ohio River, the largest water resource in the state. At its peak, this HAB spanned a 700-mile stretch of the river. By collaborating with other state, interstate, and federal agencies, as well as public and private utilities, DOW played a significant role to coordinate and monitor the river's status through quick and efficient sampling and testing, and communicating the resulting data to other agencies and the public in order to keep Kentuckians safe from exposure to HAB-contaminated water.

During the 2016 legislative session, the Kentucky General Assembly passed House Bill 529 (now KRS 115.113) which established the Water Resources Board. This Board is comprised of members from the Energy and Environment Cabinet, Department of Agriculture, and the University of Kentucky, as well as representatives from local governments, conservation districts, rural water, and the business sector. The Board will address water resource challenges affecting agriculture and rural industries. DOW looks forward to collaborating with the Water Resources Board and other partners to address some of those challenges. Continued collaborations with the Drinking Water Advisory Council, Waste Water Advisory Council, and the Lead In Drinking Water Work Group have generated valuable examination, discussion, and innovative approaches to issues surrounding the quality and quantity of water in the Commonwealth.

Kentucky continues to extend greater protections to more water bodies in the state. In FY2016, DOW completed its Triennial Review, a comprehensive review of each state's water quality standards which federal law requires every 3 years. After considering comments gathered through informal public listening sessions in May 2015, DOW filed proposed amendments to its water quality standard regulations with the Legislative Research Commission in August 2015, and continued through the administrative regulation promulgation process required by KRS 13A until its completion in January 2016. As a result of this process, 20 streams or stream segments were added to the list of Outstanding State Resource Waters, 12 streams or stream segments (approximately 41 miles) were added to the Exceptional Waters category, and primary contact recreation standards were updated to rely on a better metric. Additionally, DOW's draft 2014 Clean Water Act Section 303(d) list proposes to remove 60 water bodies and stream segments from the impaired waters list.

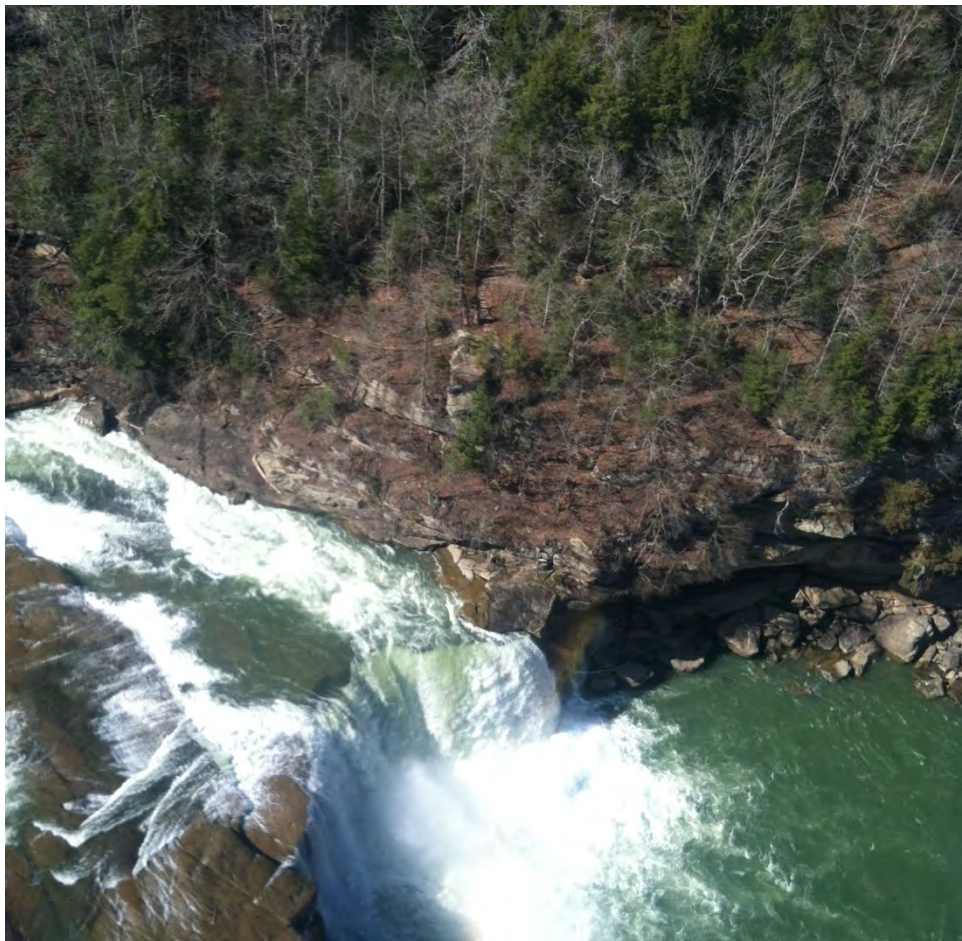
Public water systems in the Commonwealth continue to produce excellent quality water and maintain the downward trend in violations, with faster correction when violations occur, and inspections indicate that permitted facilities continue to improve compliance rates. Progressive actions, including regionalization of wastewater treatment, have enabled the deactivation of several aging, small wastewater treatment plants that cannot meet current technology and water quality standards. DOW continues to assist municipalities and public water systems in these efforts with technical assistance, Source Water Protection Assistance grant projects, and Clean Water State Revolving Funds.

DOW received a Best of Kentucky Award for its Water Health Portal at the 2016 Kentucky Digital Government Summit. Progress in DOW technology has enabled greater transparency and expansion of publicly available data and information. Kentucky still leads the number of electronic NetDMRs (Discharge Monitoring Reports) being filed online, and with the development of additional Map Viewers and Story Maps, and a Special Use Mobile App, the public can easily access more information on the health and status of the waters of the Commonwealth.

Over the course of the summer, DOW and the entire Energy and Environment Cabinet (EEC) moved to its new location at 300 Sower Boulevard. The new building, constructed by public-private partnerships and leased by the Finance Cabinet, offers a large, light, and energy-efficient space that is a much more professional environment and is conducive to better collaboration and communication among all EEC staff.

I invite you to read more about the activities of the Division of Water, its accomplishments in monitoring, improving, and reporting on Kentucky waters, and its ongoing efforts to manage and protect these important resources for the benefit and enjoyment of the citizens of Kentucky.

Peter T. Goodman, Director
Division of Water



Cumberland Falls

DOW Staff Photo

MISSION



The mission of the Kentucky Division of Water is 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.



Rockcastle River

DOW Staff Photo

WATER QUALITY

The Ohio River Harmful Algal Bloom (HAB)

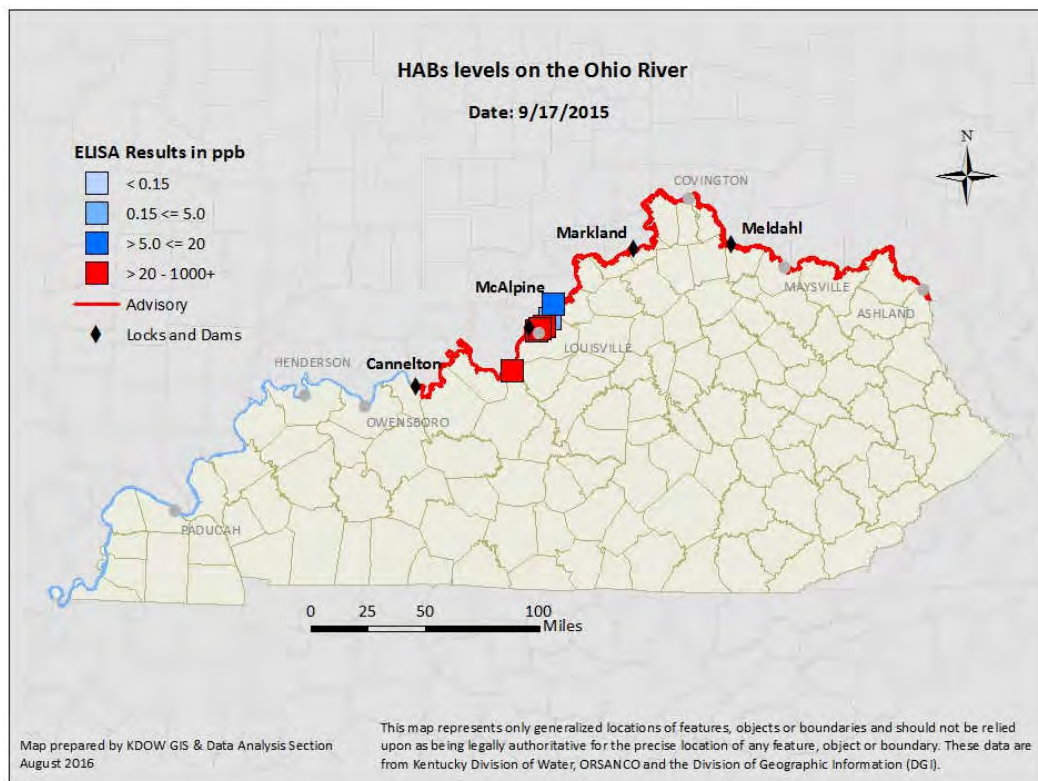
Cyanobacteria (blue-green algae) occur naturally and are a vital component of ecosystems. A variety of factors, such as excess phosphorus and nitrogen (also called “nutrients”), sunny conditions, warm temperatures, and low flows, can result in toxin-producing cyanobacteria multiplying excessively and creating a health hazard to humans and animals if they drink or have contact with contaminated water. The Ohio River, the largest and one of the most important water resources in Kentucky, experienced a very large HAB that began in late August 2015 and lasted well into October. This event required the coordinated work of several agencies and partners to monitor the HAB as it moved downstream, and advise the public of the safest ways to handle this troublesome issue.

The Ohio River Valley Water Sanitation Commission (ORSANCO), of which Kentucky is a member, first received notification of a green sheen on the Ohio River near Wheeling, West Virginia, at the Pike Island Locks and Dam on Wednesday, Aug. 19, 2015. Analysis of a river water sample confirmed the presence of blue-green algae. ORSANCO contacted all the states directly impacted, and those downstream, to inform them of the potentially toxin-producing algal bloom.

On Monday, Aug. 31, 2015, DOW received a report that a HAB was observed on the Ohio River at Mile 338 upstream to Mile 334 near Greenup, Kentucky. Additional HABs were observed on the Little Sandy River in the area of the Greenup Water Plant intake. On September 4, 2015, the DOW and Department for Public Health issued its first recreational advisory on the Ohio River which extended from the Meldahl Dam to the West Virginia state line, including the tributary confluences.

What followed the first advisory was a collaborative effort with DOW, the Kentucky Department for Public Health and the Division of Environmental Program Support, the states of Ohio, West Virginia, Pennsylvania, Indiana, and Illinois, ORSANCO, the EPA, and the U.S. Army Corps of Engineers (USACE) to monitor the river’s condition, collect samples from the river and drinking water facilities dependent upon the river, and analyze the samples for fast and accurate results. This effort resulted in the recreational contact advisory being extended from the West Virginia state line to the Cannelton Locks &

Dam on September 18, 2015. This was the first time Kentucky ever issued a HAB advisory for the Ohio River. Previous HAB protocols focused on lakes and reservoirs.



The most immediate concern involved drinking water facilities that withdraw their water from the Ohio River. DOW communicated directly with, and provided guidance to, the facilities at Ashland, Greenup, Russell, and Maysville. DOW staff rearranged schedules to visit and collect samples of raw and finished water at the facilities. The samples were transported by direct shipping or DOW staff to the Environmental Services Lab in the Department's Division of Environmental Program Support and were quickly analyzed to provide timely information. The affected public water systems did an excellent job monitoring and treating the algae, and as a result no HAB drinking water advisories were issued for the Ohio River or its tributaries.

The recreational advisory issued on September 4, and extended on September 18, became a major issue for northern Kentucky and Louisville. The biggest recreational event impacted by the advisory was the Louisville Ironman competition scheduled for October 10, 2015. DOW collected multiple water samples in the vicinity of the Louisville Ironman race to ensure the safety of the 2500 athletes competing. The bloom began to dissipate and move away from the competition route, and the monitoring and analysis

efforts by DOW and the Environmental Service Lab allowed sufficient information to lift the advisory in the Ironman location. DOW also sampled water prior to the race to help the Ironman organizers make the best decision for their athletes. Over 200 samples were collected from Ashland to Henderson over a 2 ½ month period until the final recreational advisory was lifted on the Ohio River on November 4, 2015.

DOW had previously established the HAB Work Group as a proactive collaboration to develop effective responses and tools to deal with HABs that affect Kentucky waters. The group is a panel of state agency members that includes the departments of Public Health, Fish & Wildlife, Natural Resources, Parks, and the U.S. Army Corps of Engineers. This group developed several new mechanisms in order to coordinate HABs responses and provide consistent information to the public and water users. To assist with public communication, the



HAB Work Group developed a new sign to post at entrances to recreational waters that have experienced HABs in the past. The signs explain what HABs are, what they look like, what to be aware of, and how to get the most current status of the water. The signs provide the website address and a Quick Response (QR) bar code that link users to the new HAB Map Viewer, which in turn shows active HAB watches and warnings anywhere in Kentucky.

Updated Fish Consumption Advisories

DOW, in conjunction with the departments for Public Health, Natural Resources, and Fish & Wildlife, updated Kentucky fish consumption advisories in January 2016. The advisories are guidelines to assist the public in making responsible decisions when consuming fish caught in Kentucky waters, and are established on USEPA risk-based limits. The majority of mercury occurring in aquatic ecosystems is anthropogenic; coal-fired power plants are thought to be the major source of mercury from air deposition and non-point source runoff. Mercury has been found at high levels in fish tissue, largely as methylmercury, in every state. Mercury is converted to methylmercury by bacterial activity in sediment where it is absorbed by bacteria, plankton, and other small organisms and bioaccumulates up the food chain as it is ingested by larger organisms. Mercury poses risks to sensitive populations, such as women of childbearing age and children up to six years old, who are now advised not to consume more than six meals per year of predatory fish, and no more than one monthly meal of panfish and bottom feeder fish. The general population is advised not to consume more than one monthly meal of predatory fish, nor more than one weekly meal of panfish or bottom feeder fish.

Statewide Guidance

Species	General Population	Sensitive Population	Contaminant
Predatory fish	1 meal per month	6 meals per year	Mercury
Bottom feeder fish and Panfish	1 meal per week	1 meal per month	Mercury
All other fish	No Advisory	1 meal per week	Mercury
Note: one meal is considered to be an 8 oz serving for a 150 pound person.			
Sensitive Populations: Women of childbearing age and children 6 years and younger.			
Predatory fish include: Largemouth Bass, Smallmouth Bass, Spotted Bass, White Bass and Striped Bass and their hybrids, Yellow Bass, Flathead Catfish, Blue Catfish, Musky, Sauger and Walleye and their hybrids, Bowfin, Chain Pickerel and all Gars.			
Panfish include: Bluegill, Green Sunfish, Longear Sunfish, Redear Sunfish, Rock Bass, and Crappie species.			
Bottom feeder fish include: Channel Catfish, Drum, Carp Sucker, White Sucker, Common Carp, Bullhead species, Northern Hog Sucker, Buffalo species, Spotted Sucker, Redhorse species, Sturgeon and Creek Chub.			

Water Quality Standards – 2015 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) as a means to preserve and protect water quality. The CWA requires the states to review and hold a public comment session regarding state WQS every three years. This process is known as the “Triennial Review”.

To begin its Triennial Review, DOW hosted public listening sessions in May 2015. Based on feedback received during these sessions and in writing, DOW began the Kentucky regulatory process, in compliance with KRS 13A, by filing proposed amendments to its WQS regulations in August 2015 with the Legislative Research Commission. A public hearing was held on September 24, 2015, and public comments were accepted through, September 30, 2015. In October 2015, DOW filed a Statement of Consideration in response to the comments received. The legislative Administrative Regulation Review Subcommittee addressed the proposed regulatory changes at its December 2015 meeting. The Natural Resources and Environment Committee declined to consider the regulations at its January meeting, so the changes became effective on February 6, 2016.

As a result of the Triennial Review, 20 streams or stream segments were added to the list of Outstanding State Resource Waters, 12 streams and stream segments (approximately 41 miles) were added to the

Exceptional Waters category, and primary contact recreation standards were updated to use a more appropriate metric. DOW filed its completed Triennial Review package with the USEPA in March 2016 and is awaiting approval of its water quality standards.

Agricultural Water Quality

DOW continues to maintain an active working role with the Kentucky Agricultural Water Quality Authority (AWQA). This is accomplished by participating in quarterly AWQA meetings, providing technical assistance for sub-committees, and working directly with agricultural stakeholders and support partners to improve implementation and effectiveness of the Kentucky Agriculture Water Quality Act.

In FY2016, DOW staff updated the four minimum Best Management Practice (BMP) Standards for Agriculture Water Quality Act Streams and Other Waters; Stream Crossings for Farm Equipment, Sand, and Gravel Removal; Streambank and Shoreline Protection; and Stream Drainage Maintenance. The BMPs were amended to include current regulatory standards and citations, and updated technical and financial resource information for producers to utilize in developing and implementing their Agriculture Water Quality Plans. The amended BMPs were presented to the AWQA at its June 2016 meeting for review by members, with a pending nomination to adopt the updated BMPs.

DOW also continues to work closely with the University of Kentucky Cooperative Extension Service (UKCES) Agriculture Water Quality Liaison, the Nutrient Management Specialist, and the Division of Conservation State Cost Share Coordinator, to provide technical and financial assistance to agricultural producers who are developing and implementing their state-mandated Agriculture Water Quality Plans.

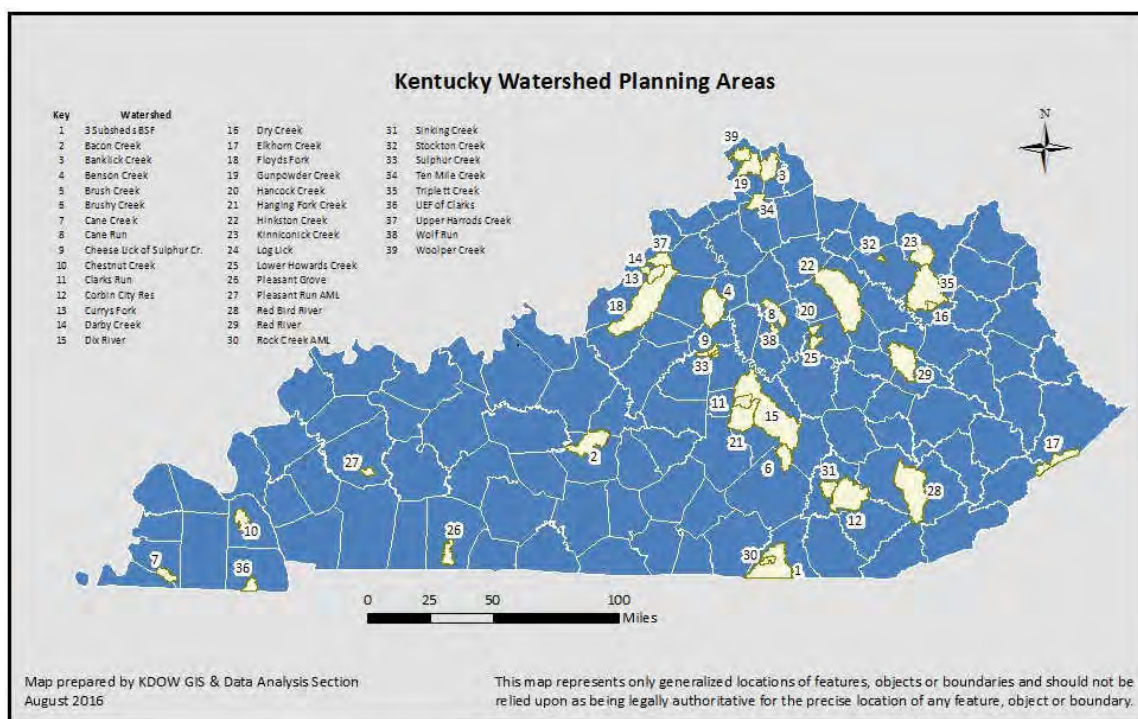
401 Certification of the US Army Corps of Engineers' Letter of Permission for the Kentucky Transportation Cabinet

Section 401 of the Clean Water Act (CWA) requires applicants for federal permits to provide certification that any discharges will comply with state water quality standards. This usually requires that each project receive an individual water quality certification from DOW. During FY2016, however, DOW worked to streamline Kentucky Transportation Cabinet (KYTC) projects that require this certification. In February 2016, DOW published notice of its proposed water quality certification of the U.S. Army Corps of Engineers Letter of Permission (LOP) for the KYTC as required by 401 KAR 9:010. Notice of this single water quality certification applies to all projects that meet the LOP requirements, and will allow DOW to certify many KYTC projects without the need for further public notice. Only those projects that do not

meet the LOP requirements will need individual water quality certification, and require 30-day public notice. This strategy will reduce the time and resources needed to approve and begin eligible KYTC projects that are essential to Kentucky's economic vitality, while protecting any water resources that may be impacted by construction.

Watershed Improvement Efforts

Pollution resulting from nonpoint source runoff is the primary source of pollution affecting water quality in Kentucky. DOW is annually awarded Clean Water Act Section 319(h) grant funds from the USEPA for the purpose of addressing problems associated with nonpoint source pollution. DOW works at both a watershed level and on a statewide scale to protect surface water and groundwater from nonpoint source pollution, to abate pollution threats, and to restore degraded waters so water quality standards are met and designated uses are supported. The program works with federal, state, local, and private partners to promote complementary, regulatory, and nonpoint source pollution control initiatives.



Work continues on 27 watershed plans across the Commonwealth which are either under development or being implemented. These watershed plans describe conditions in the watershed, identify causes and sources of impairment, and explain how BMPs can be used to improve water quality conditions and

ultimately meet water quality standards. Implementation of watershed plans typically involves local watershed coordinators.

Watershed Coordinators

Across the state, DOW supports positions for 12 Watershed Coordinators who work with watershed plans in targeted areas to bring about quantitative, positive water quality improvements through implementation of voluntary BMPs. Watershed Coordinators work to unify the efforts of other agencies

A Case Study:

The Curry's Fork (Oldham County) Watershed Coordinator

Through FY2016, the Curry's Fork Watershed Coordinator worked on the early stages of implementing the Curry's Fork Watershed Plan which is a strategy to assess and manage information for the watershed, and includes analyses, actions, participants, and resources for its successful application. The Curry's Fork plan requires on-the-ground BMPs to reduce pollution coming from urban stormwater, failing on-site wastewater systems, agriculture, and the loss of riparian zones around water bodies. This combination of issues can create a diverse group of stakeholders, often with different goals, and the Watershed Coordinator helps find commonalities and issues upon which everyone can work.

To successfully carry out the strategies of the plan, the Watershed Coordinator developed a targeted campaign to engage stakeholders within the community and build support for the project. These activities included presenting watershed education and outreach programs at community events such as "Oldham County Day", the "Putting Nature to Work in Your Landscape" workshop, and organizing community meetings such as the "Curry's Fork Fest", where citizens learned about the issues in their watershed and how the Watershed Plan is attempting to address them. The Watershed Coordinator also worked to reach out to the community through multiple media outlets, including radio and television ads, mailers, and social media, building awareness and recruiting volunteers. The coordinator recently formed a technical advisory committee involving local government, state agencies (DOW, and the Kentucky Department of Fish and Wildlife Resources), University of Kentucky Cooperative Extension Service, the Natural Resource Conservation Service, local health departments, agricultural producers, and other experts to help inform the planning process.

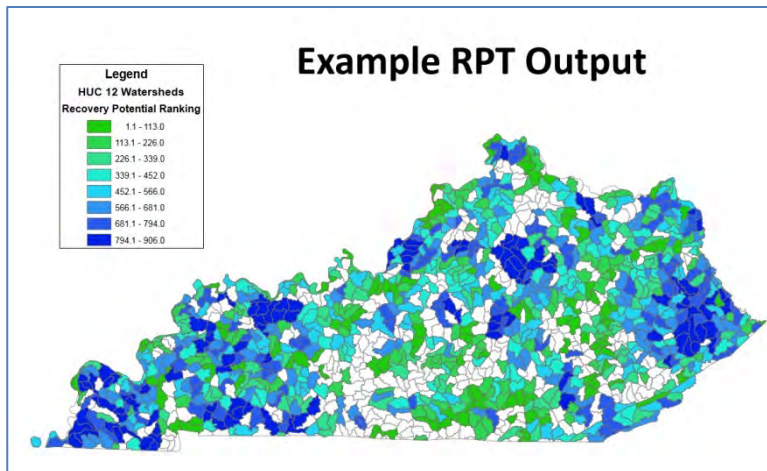
A targeted restoration project on South Curry's Fork seeks to address issues of streambank stability and flood control. Areas along the stream are experiencing high levels of erosion, flooding, and riparian habitat degradation, resulting in poor water quality and property loss and damage. The Watershed Coordinator is assisting the property owners in making streambank modifications to decrease erosion rates and halt the loss of land to the creek, and has been engaging with local homeowners associations bordering the stream to encourage "No Mow" and "Pollinator Habitat" areas along the waterway to build a robust riparian zone that will help prevent erosion and filter stormwater runoff. In addition, the Watershed Coordinator has initiated the groundwork for an Onsite Wastewater Incentive Grant Program. This cost-sharing program will aid residents with septic repair and replacement in an effort to reduce bacteria inputs to the watershed. In preparation for this effort, the Watershed Coordinator has advertised the program, researched appropriate target areas, and established partnerships with the health department to develop workshops that will teach the public about proper septic care and maintenance.

in the watershed to manage implementation, document water quality status and improvements, acquire additional funding, and educate and inform the general public. It is imperative that Watershed Coordinators collaborate with diverse stakeholders, from federal and state agencies, to local officials, nonprofit groups, and local businesses. The more relationships they are able to build, and more partners they are able to involve, the more successful the implementation of their water quality improvement projects can be.

DOW considers education a key element to raising awareness, changing attitudes, and affecting action, by empowering and encouraging individuals to take interest and responsibility in their community watersheds. As part of education and outreach, Watershed Coordinators develop education materials, get local city and county officials involved, engage local schools, and apply for additional funding through the DOW's §319(h) grant and other sources. In FY2016, Watershed Coordinators taught a variety of stakeholders about the importance of water resources, watersheds, nonpoint source pollution, and sustainable water management at community events, organizational conferences, school programs, governor's initiatives, and continuing education courses.

Recovery Potential Tool

Several years ago, Kentucky became a pilot state to work with the USEPA in developing the Recovery Potential Screening Tool (RPT) that compares multiple watersheds for the potential for restoring impaired waters which can guide Total Maximum Daily Load (TMDL) development and other efforts. DOW modified the RPT with



detailed, state-specific information that broadened the application beyond its original intended use. In addition to determining TMDL development priorities, the RPT can now be used to assist with watershed planning decisions, wetlands program prioritization, and determination of priority healthy watersheds. Users can select inputs relating to stream ecology, ecological stressors, and social context to compare watersheds within the Commonwealth, and how easy or difficult they may be to protect or restore. The RPT allows DOW to more easily and efficiently decide how to manage waters across the state.

Water Quality Monitoring

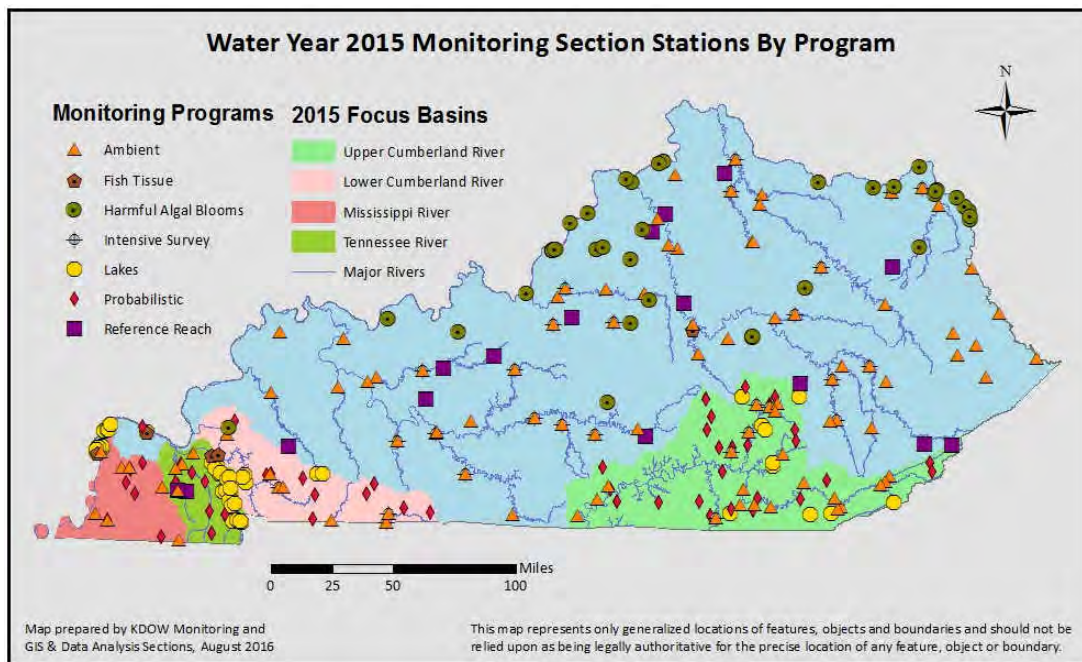
Surface Water

In FY2016, DOW expended significant resources to monitor streams, rivers, and lakes to assess water quality, habitat, and whether these waters are meeting water quality standards. All of the monitoring and assessment efforts by DOW lead to greater understanding of the condition of Kentucky's water resources. DOW manages numerous monitoring programs to determine the water quality conditions of the Commonwealth's streams, rivers, springs, lakes and reservoirs.

These monitoring programs generally align with three broad strategies:

1. Monitor streams, rivers, reservoirs and lakes to assess water quality. This includes monitoring water bodies with high quality aquatic habitats; monitoring Reference Reach water bodies to determine water quality and habitat in Kentucky's best streams; targeting watersheds to investigate emerging water quality concerns or issues; monitoring fish tissue and drinking water supplies for human health consumption; and monitoring to determine the effectiveness of watershed projects implemented to improve water quality.
2. Monitor stream health through random (probabilistic) aquatic biological surveys. The probabilistic program results provide statistical data to enable the agency to extrapolate current aquatic conditions across a given river basin or region.
3. Conduct focused water quality monitoring in watersheds that require a Total Maximum Daily Load (TMDL) to be developed for pollutants. TMDL monitoring identifies specific sources of the pollutants causing the stream to be impaired (not meeting one or more designated uses). These studies generate data to enable DOW to determine how much pollutant load a waterbody can receive and meet its designated uses and identify pollutant loading reductions necessary to restore a waterbody such that it meets its designated uses.

Kentucky uses a five-year Basin Management Unit (BMU) rotation cycle for water quality monitoring. The majority of FY2016 monitoring took place during the sampling season of May 2015 through October 2015.



Data generated by these various monitoring programs are used to make assessments as to whether the waterbodies monitored are meeting their designated uses. The assessment results are compiled into an Integrated Report on water quality. This biennial report is required of states by the Clean Water Act as a means to communicate the conditions of each state’s water resources. The assessment results reflect, to some degree, the effectiveness of the implementation of water quality standards adopted by the Commonwealth to maintain healthy water bodies for fishing, swimming, boating, fish consumption, and to provide safe drinking water. Waterbodies that fail to meet one or more designated uses are compiled on the impaired waters (303(d)) list.

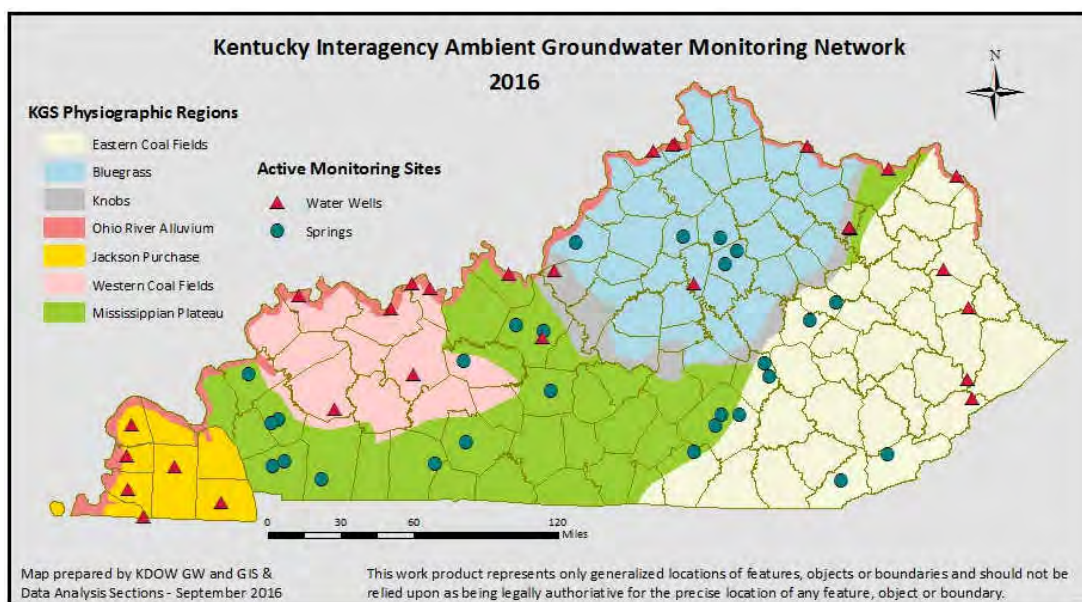
DOW submitted its Draft 2014 Clean Water Act Section 303(d) list to the USEPA to remove from the impaired waters list 60 water bodies and stream segments that are now meeting water quality standards. Of those, 26 stream segments that now meet the methylmercury fish tissue standard are from the Ohio River. Since 2008, DOW has determined that 284 water bodies and stream segments previously listed as “impaired” are subsequently meeting water quality standards. DOW began the assessment process for the 2016 Clean Water Act 303(d) list in January 2016.

For a more detailed description of DOW’s monitoring programs, please visit our website at: <http://water.ky.gov/waterquality/Pages/WQMonitoring.aspx>.

Groundwater

Groundwater is found beneath the earth's surface and is widely used to supply water for public and private consumption, industrial processes, agricultural irrigation, and provides the majority of non-stormwater baseflow recharge for streams. Groundwater is also an important resource for industrial and domestic heating and cooling. DOW conducts groundwater monitoring to characterize the ambient water quality conditions of this important resource throughout the state. The ambient groundwater monitoring network is the principal program used to gather this information, and is augmented with complaint-driven groundwater sampling and groundwater assessment projects.

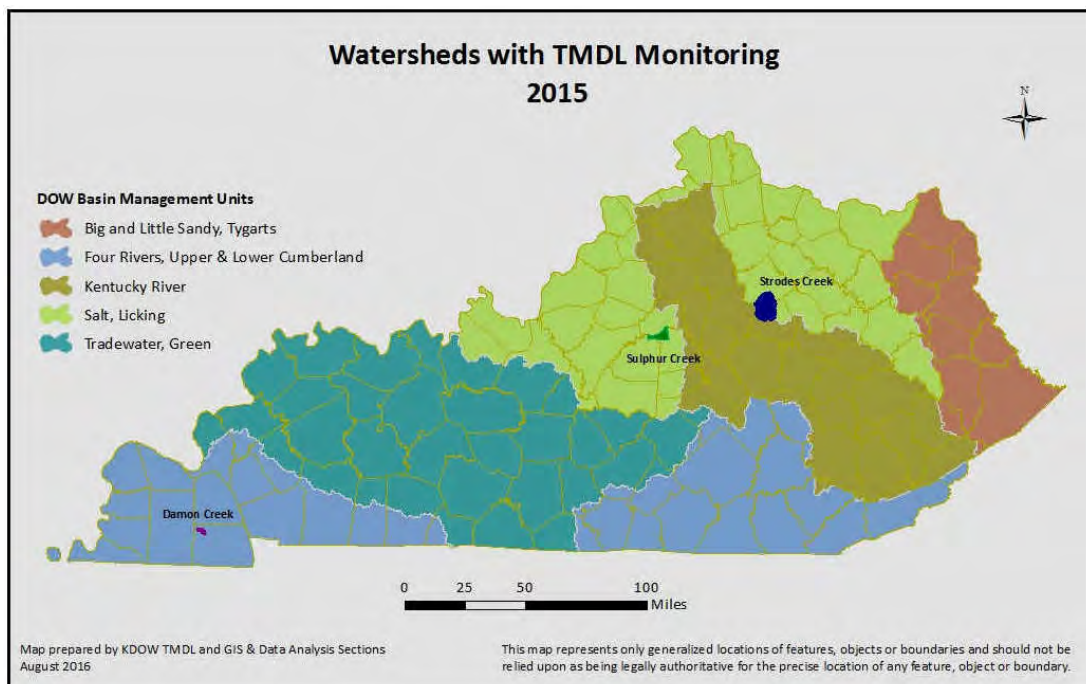
Monitoring sites are chosen to represent all of the physiographic provinces, major watersheds, and aquifer types in Kentucky. Priority is given to groundwater sources that provide public or domestic water supplies. Samples are analyzed for basic water chemistry, major inorganic ions, metals, nutrients, pesticides, and volatile organic compounds. Active ambient groundwater monitoring sites are shown in the figure below. Since the inception of the groundwater monitoring program in 1995, approximately 16,000 samples have been collected from over 10,000 groundwater sources across Kentucky. In FY2016, 161 samples were collected from 76 sites (70 wells and 91 springs) and data were included in statistical analyses for regional and watershed-based groundwater assessments. Groundwater quality data are provided to individuals through information requests and through the Kentucky Groundwater Data Repository via the Kentucky Geological Survey website (<http://www.uky.edu/KGS/>).



TMDLs

The required Total Maximum Daily Load (TMDL) is a calculation of the maximum amount of a pollutant that a waterbody can naturally assimilate and still maintain its designated use(s) based on data collected for each pollutant/waterbody combination. A TMDL must be calculated for each pollutant impairing a lake, reservoir, or specific reach of stream. The TMDL reports undergo internal preliminary review, a 30-day public comment period, and approval by the USEPA. The TMDL reports contain load allocations for both point and nonpoint sources for the pollutant identified as causing the impairment so that a waterbody can be brought back to full support of its designated uses.

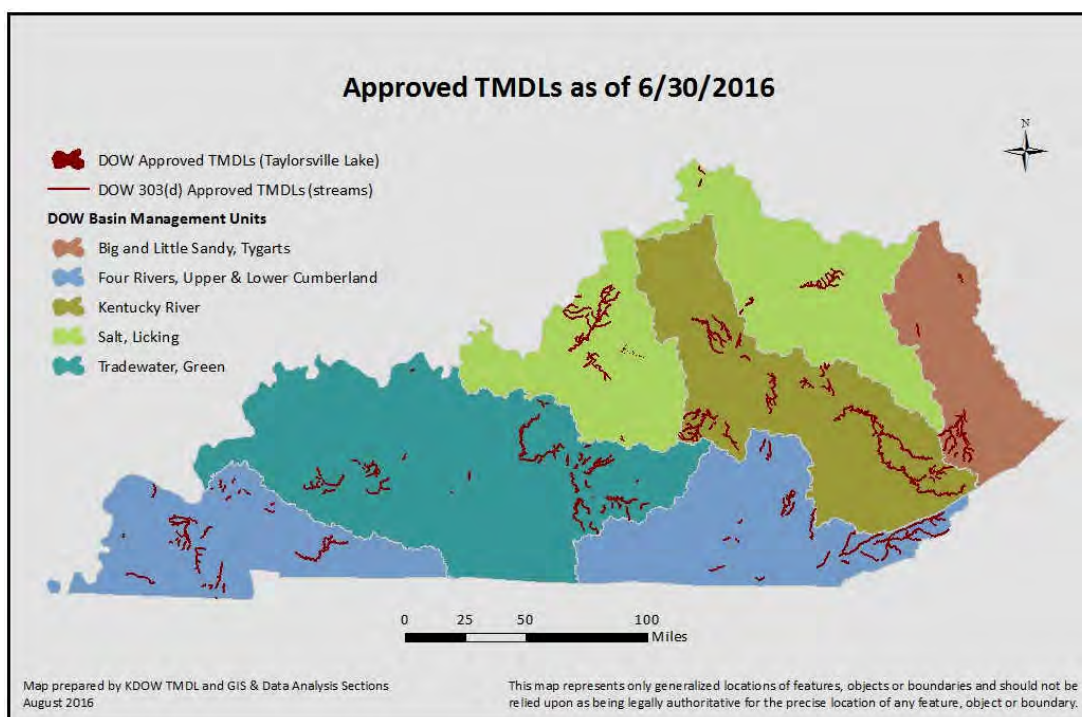
The development of a TMDL begins with monitoring stream segments in areas that have identified impairments. Most TMDL water chemistry monitoring sites are visited monthly over the course of 1 - 3 years, and TMDL bacteriological monitoring sites are visited at least 10 times during the primary contact recreation season from May through October.



In 2015, DOW personnel monitored the Strodes Creek watershed for TMDL development, and the Sulfur Creek and Damon Creek watersheds for the development of watershed plans. The USEPA approved TMDLs for 16 pollutant-waterbody combinations on stream segments in the Hurricane Creek, Copper Creek, and Caney Creek watersheds in Hopkins County which were impaired by pH and metals. Other TMDLs under development during FY2016 include the Ohio River bacteria and the Pond Creek

Watershed metals, pH, and bacteria TMDLs. A Statewide Bacteria TMDL methodology is under development to address all of the state's *E. coli* and fecal coliform listings.

DOW submitted its Draft 2014 Clean Water Act Section 303(d) list for USEPA approval in December 2015. The Clean Water Act Section 303(d) obligates DOW to develop a TMDL for each waterbody and each pollutant for which the waterbody is not meeting its designated use. There are currently 2,597 pollutant/waterbody combinations for which DOW must develop TMDLs or use alternative methods to restore the water quality in that waterbody.

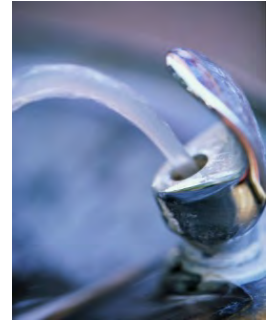


Water bodies that do not support one or more designated uses may be monitored at a later date to determine if land-use changes, facility upgrades, or projects implemented to abate sources of pollutants have effectively restored water quality. If one or more pollutants that previously failed to meet water quality standards now meet the standards, DOW provides the data and technical rationale that supports removing the pollutant or designated use of a waterbody segment from the 303(d) list. Water bodies removed from the 303(d) list may be an indicator of water quality improvement, especially if facility upgrades, land-use changes, or pollution abatement projects have occurred in the watershed.

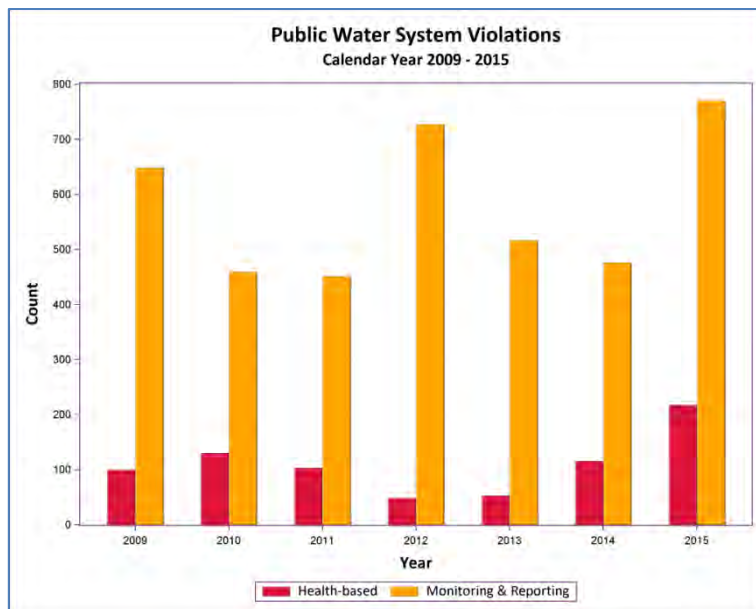
DRINKING WATER

Compliance

Kentucky is served by 441 public water systems that draw from the abundant water resources of the Commonwealth. Most are small public water systems serving less than 3,300 customers each that face significant challenges in making water affordable, while operating effectively and maintaining an extensive, aging infrastructure. Despite these challenges, Kentucky's public water systems continue to provide safe, reliable drinking water.



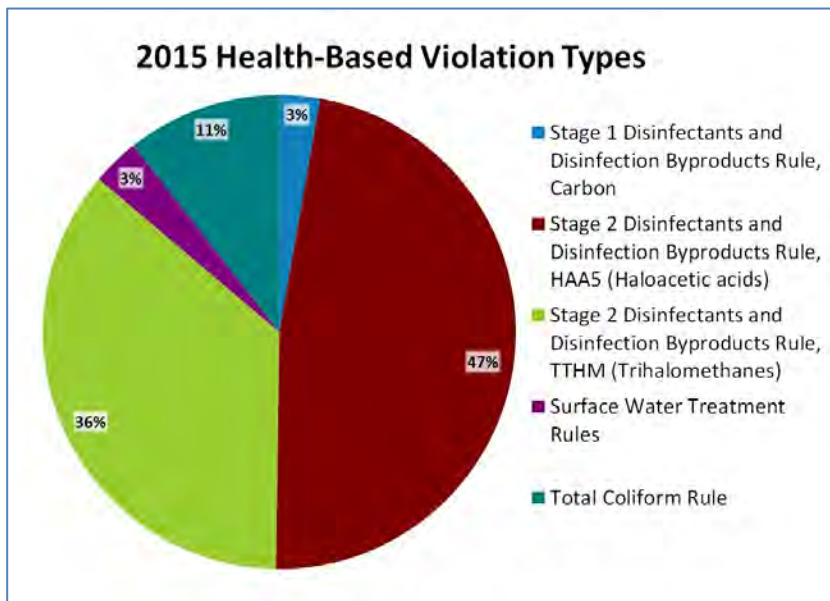
The federal Safe Drinking Water Act (SDWA) requires Kentucky's public water systems to regularly test produced water for more than 100 contaminants such as bacteria, nitrates, and other chemicals. A water system must take corrective action and notify its customers when water samples exceed contaminant limits. DOW reviews the results and issues an annual report that summarizes public water system monitoring and compliance data.



Data from Kentucky's 441 public water systems in FY2016 demonstrates consistent production of excellent quality water, declining numbers of health-based violations, and very high rates of compliance with SDWA requirements. These data show that most violations were administrative in nature, and most involved monitoring and reporting issues.

The USEPA periodically reviews and revises the SDWA to ensure appropriate protection of public health. Disinfection By-Products (DBPs) are a class of contaminants that result from the interaction of disinfection chemicals with other chemicals in treated drinking water. DBPs are classified as chronic contaminants, meaning that health risks could occur from exposure to these chemicals over many years.

In response to these issues, the USEPA established the DBP Rule. With the implementation of Stage 2 of the DBP Rule, public water systems that purchase water from other public water systems (called “consecutive systems”) are now required to monitor and treat water for DBPs. These “consecutive” systems are more susceptible to the development of disinfection by-products.



With the expansion of the Stage 2 DBP Rule to consecutive systems, which were previously exempt, the number of health-based violations increased, as expected, from 52 violations in 2013, to 115 violations in 2014, and 217 violations in 2015. These 217 violations constitute only a small portion, 0.26 percent, of more than 82,000 test results evaluated each year, and DBPs constituted 86% of all health-based violations in 2015. This increase in violations is not reflective of a change in water quality, but the expanded application of the Stage 2 DBP Rule.

Source Water Protection Assistance Program (SWPAP)

The protection of source water, including the streams, lakes, reservoirs and underground aquifers that provide drinking water, is critical to the economic resilience and the environmental and public health of Kentucky and its citizens. Source water protection safeguards human health and ensures adequate water supply now and in the future. Protecting the quality of our source waters is also important because conventional water treatment methods cannot remove all contaminants, and treatment for

some pollutants is very costly to make water safe for consumption. More than 95% of Kentuckians rely on public water systems to provide safe water for drinking, food production, and manufacturing. By protecting water at the source we ensure our citizens have safe and healthy sources of drinking water.

Many activities occurring within source water protection areas have the potential to negatively impact drinking water quality or quantity. When managed correctly, using BMPs and other source water protection strategies, most of these activities will not affect drinking water. However, it can be commonly difficult for a water system or local government to ensure that these potential contaminant sources are being properly managed, as water systems and local governments often do not have jurisdictional authority over those sources and may require financial assistance to implement various management strategies.

DOW's Wellhead Protection Program developed a Source Water Protection Assistance Program (SWPAP) which provides funding to public water systems that work on projects with local landowners, local media, watershed groups, and many others to achieve their source water protection goals. The SWPAP makes SDWA State Revolving set-aside funds available to public water systems and municipalities that use either surface or groundwater sources for drinking water supplies to employ protection strategies.

For the second year (calendar year 2015) of the program, the SWPAP awarded funding to five projects totaling approximately \$145,000. All projects are on pace for successful completion of their proposed objectives.

- Mt. Sterling Water & Sewer System (MSWSS): \$50,000 to collect and analyze water samples in Greenbrier Reservoir to determine nutrient and blue-green algae levels in coordination with Morehead State University (MSU). MSWSS will also coordinate with Tetra Tech, Montgomery County Conservation District, and MSU to assess and prioritize suspected nutrient sources. BMPs will be installed to reduce excess nutrients entering the reservoir.
- American Cave Conservation and City of Horse Cave: \$47,000 to provide community education and outreach events, develop a hazard map of the industrial corridor over the Hidden River Cave recharge basin, and conduct soil sampling and water analysis.
- Louisville Water Company: \$34,320 to partner with the U.S. Geological Survey to identify and properly plug unused drinking water wells, inventory unused septic systems, and develop a

public education program regarding the importance of properly servicing and closing these systems.

- Trimble County Water District #1: \$5,318 to provide education assistance to its customers by creating educational brochures, handouts, and maps.
- Western Lewis - Rectorville Water & Gas District: \$9,050 to contract with a certified well driller for proper plugging of two unused drinking water wells.

SWPAP announced total project funding for FY2016 at \$150,000, with a single project cap of \$60,000 (same as FY2014 and FY2015). Four projects were selected to receive funding for FY2016. The projects cover a range of strategies similar to those of FY2014 and FY2015, and additionally will include constructing a bioretention/rain garden system with interpretive signage, and a real-time water quality monitoring station.

SWPAP details are available at <http://water.ky.gov/groundwater/Pages/SWPAssistanceProgram.aspx>.

Advisory Groups

Drinking Water Advisory Council

The Drinking Water Advisory Council (DWAC) is a stakeholder panel comprised of representatives of public and rural utilities that provide drinking water to Kentucky's citizens. DWAC was formed several years ago to address issues that may affect consumers and the regulated community. In the past year, DWAC was instrumental in assisting with the monitoring of, and response to, the Harmful Algal Bloom on the Ohio River, and discussed the most effective ways to locally address pharmaceutical disposal, disinfection by-products, the shortage of drinking water and waste water operators, lead in drinking water, and policies and regulations pertaining to these issues.

Lead in Drinking Water Work Group

While Kentucky does not have drinking water utilities or urban areas nearly as large as those found in Flint, Michigan, the national discourse and issues regarding lead in drinking water prompted DOW to invite representatives of public drinking water utilities to form a work group to examine this issue in Kentucky. DOW wanted a proactive, coordinated effort by a diverse panel to examine where the Commonwealth currently stands, where future action might need to be taken, and eventually develop recommendations, if appropriate. Members of the group include representatives from the Department

of Public Health, Kentucky Rural Water Association, the University of Louisville, and several public utilities across the state. Recognizing the complexity of water chemistry and the variety of topics involved with lead in drinking water, the Work Group began examining the health effects of lead, issues related to corrosion control, infrastructure, regulations, and financing. The Work Group is expected to continue examining these topics into late 2016 and make recommendations regarding protocols, policies, and regulatory needs in response to appropriately manage lead in drinking water.



Quadrule Falls, Martins Fork Wild River

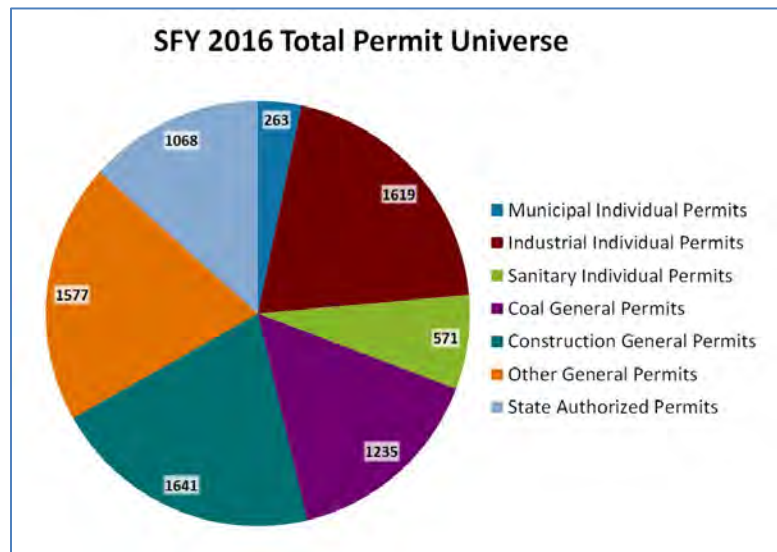
DOW Staff Photo

PERMITTING

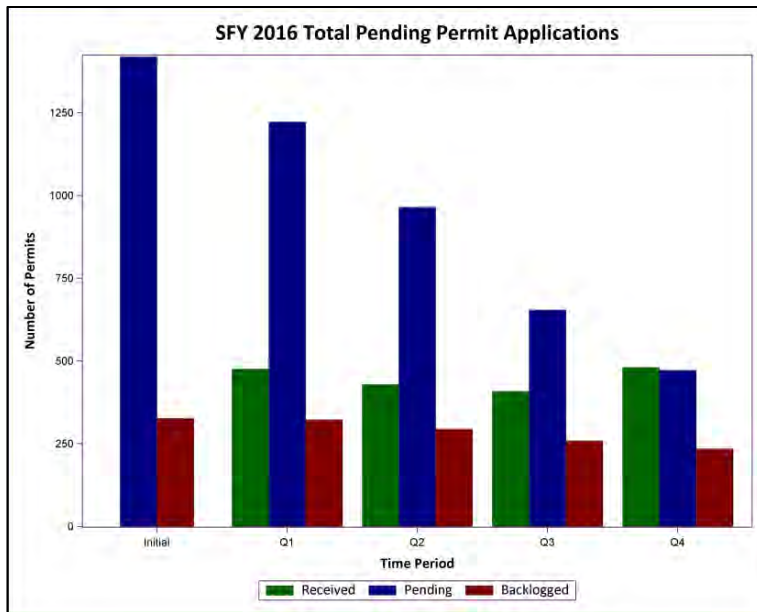
The Clean Water Act requires a Kentucky Pollutant Discharge Elimination System (KPDES) permit for wastewater discharges into waters of the Commonwealth. The KPDES permit contains provisions to ensure that wastewater discharged from industrial facilities, publicly owned treatment works, and other sources are not harmful to human health and the environment.

Permit Issuance

The permitting universe is comprised of individual permits and general permits. An individual permit is issued to a single discharger and is written to reflect site-specific information submitted by the discharger. General permits address a group of dischargers with similar operations and types of wastewater; Kentucky has general permits for fifteen categories of dischargers. There are approximately 3,500 individual permitted dischargers in Kentucky, and more than 4,400 facilities covered by general permits.



The permit renewal cycle for most permits is five years and DOW receives an average of 1,500 new and renewal permit applications each year. DOW began FY2016 with 1,420 pending permit applications, 327 backlogged applications (exceeding regulatory timeframes), and received an additional 1,795 applications during the year. Of the total 3,215 applications, DOW issued final decisions on 251 individual permits and 2,492 general permits.



In addition, DOW committed to USEPA's Office of Wastewater Management to issue 20% of the applications from a federal list of priority permits. The Priority Permits Initiative is important because it ensures Kentucky is addressing the most environmentally or programmatically significant permits. DOW met its commitment to USEPA and finalized 24 priority permits from the federal list.

New and Reissued General Permits

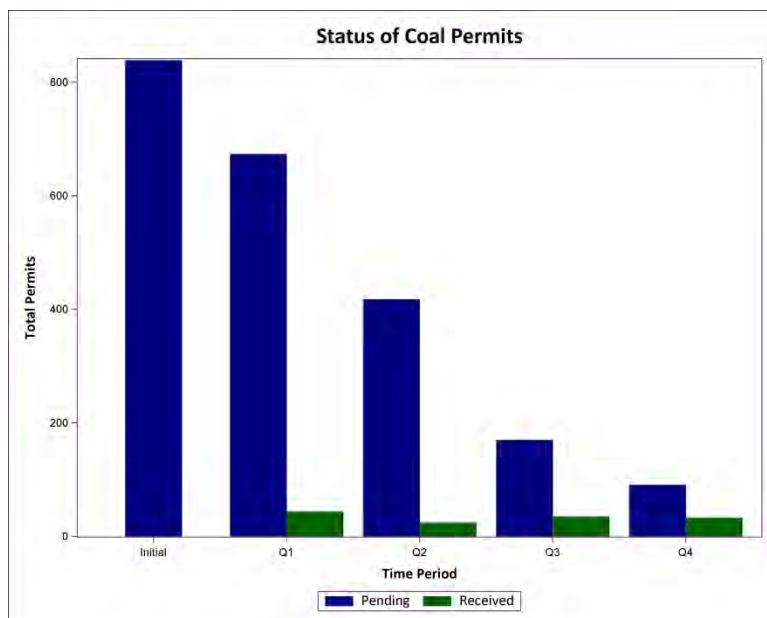
Coal Mining Operations General Permit

The *Coal Mining, Processing, and Associated Activities General Permits* authorize discharge of wastewater from surface mining operations in eastern and western Kentucky coal fields. When the permit was renewed in 2014, DOW amended the general permit and included requirements for permittees to submit renewal applications in an electronic format.

In preparation of the influx of new applications, DOW collaborated with the Kentucky Coal Association and the Kentucky Department for Natural Resources (DNR) to prepare permittees for the transition to electronic filing. In addition, DOW spent several months assessing the new electronic application process, conducting workshops for industry representatives, streamlining the internal review process, and reallocating and training personnel.

DOW made other amendments to the new Coal Mining General Permit and allowed owners to consolidate KPDES permits of contiguous mining properties. DOW worked closely with DNR to ensure permitted mining activities corresponded with KPDES applications for sediment control structures, and validated mine transfer and bonding information prior to issuing KPDES permits.

As a result of changes made to the permit and permitting process, DOW reduced the number of permittees that were required to submit renewal applications from 1,900 to 1,200. At the beginning of FY2016, 839 applications remained pending. DOW finalized all but 91 of those applications by the end of FY2016.



Stormwater Construction General Permit

The *Stormwater Construction General Permit* authorizes discharge of stormwater from construction activities that disturb more than one acre of land. Permit coverage is granted for two years, and the average number of active permits exceeds 1,600. In FY2016, DOW received more than 1,000 applications and made final decisions to issue or deny the permits within five days.

Net Discharge Monitoring Reports (NetDMR)

All permitted dischargers collect samples from their facility's wastewater outfall and submit the analytical results to DOW via electronic Discharge Monitoring Reports (DMRs). In Kentucky, 97% of facilities with individual and general permits provide discharge monitoring reports through an electronic reporting system known as NetDMR. NetDMR is a secure internet application that allows participants to discontinue mailing hard copies of DMRs, transmit data electronically, and receive instant confirmation of transmission. Kentucky began implementing NetDMR in 2012, and continues to transition permittees from paper-based to electronic reporting.

Kentucky is ranked first in the nation for number of facilities using NetDMR and receives more than 100,000 reports each year via NetDMR. Since DOW changed from paper to electronic submittal with NetDMR, DOW saves more than 1,700 man-hours per year of manual data entry.

DRINKING WATER AND WASTEWATER PLANNING

Wastewater Advisory Council

The Wastewater Advisory Council (WWAC) is a collaborative stakeholder group comprised of representatives of public utilities that provide wastewater treatment services to Kentucky's citizens. The WWAC was formed in 2014 to address issues that may affect consumers and the regulated community. In the past year, the WWAC discussed Next Generation Compliance which is a program designed to increase transparency and decrease CWA violations through innovative monitoring and enforcement; issues regarding municipal separate storm sewer systems (MS4s); Reasonable Potential Analysis (RPA) for narrative nutrient standards in permits; effective ways to locally address harmful algal blooms; and addressing the shortage of wastewater operators.

SRF Grants and Projects

The Division of Water and the Kentucky Infrastructure Authority (KIA) jointly administer Kentucky's State Revolving Fund program for drinking water (DWSRF) and wastewater (CWSRF). The SRF programs provide low interest loans to communities for drinking water and clean water infrastructure projects.

Basic infrastructure is a necessity for a community's economic growth and health. The funding assists communities in complying with the requirements of the Safe Drinking Water Act and the Clean Water Act. During FY2016, 17 drinking water facilities received a total allocation of \$30,103,488.00, and 26 wastewater facilities received \$45,271,528.00. Some of the projects that received funding represent investments in reservoir repair, new water treatment plants, sewer projects, water meter replacement, and district water tank operations and maintenance systems. Some of these projects are described in more detail in the following sections.

Wastewater Treatment Facility Energy Optimization and Nutrient Removal

Several Kentucky streams are identified as being impaired by excess nutrients, such as nitrogen and phosphorous, which contribute to Harmful Algal Blooms. Treatment of nutrient pollutants can be costly when meeting the requirements of the more restrictive KPDES permit limits.

Beginning in 2015, DOW, the Kentucky Division of Compliance Assistance (DCA), and the Kentucky Department for Energy Development and Independence (DEDI) began a collaborative effort to help wastewater treatment facilities reduce their energy use and costs, and by association, reduce nutrients in their effluent. The Tennessee Department of Environment and Conservation (TDEC) and USEPA Region 4 shared their expertise, methods of addressing these concerns, and provided Kentucky staff with Wastewater Energy Efficiency Training for targeted facilities in Kentucky in order to establish a program in the Commonwealth. DOW and USEPA Region 4 staff worked together to prioritize and identify facilities most likely to benefit from Kentucky's new program.

Subsequently, the DCA facilitated the creation of a Wastewater Energy Optimization Committee with representatives from the DOW, Kentucky Rural Water Association, Kentucky Infrastructure Authority, Metropolitan Sewer District (Louisville), and external stakeholders. The committee developed a pilot project with three participating communities: Danville, Glasgow, and Russellville.

Measurements of energy usage were taken within the selected communities' wastewater treatment plants, and an analysis of the data is currently being conducted to determine the potential for both saving energy and reducing the amount of nutrients being discharged from these facilities. Within the next year, results of this pilot project will be analyzed, and the energy savings realized reported. These wastewater treatment facilities are also monitoring nutrients in their effluent.

Small Package Wastewater Treatment Plants (WWTPs)

Aging wastewater infrastructure presents many challenges for the Commonwealth. Many WWTPs have a design lifespan of approximately 30 years, after which they begin to fail and pose risks to human health and the environment. These older, small package plants cannot meet current requirements of the Clean Water Act and abandonment of these failed, privately-owned plants creates extra burden on regional utilities and their customers.

Kentucky continues making progress in deactivating and closing some small WWTPs, and connecting customers to regionalized facilities that are better able to meet current technological standards in wastewater treatment. Since 1996, approximately 165 WWTPs have been successfully regionalized, most within Louisville's Metropolitan Sewer District. There are still several hundred package plants across the state that are being abandoned at an increasing rate, by choice or circumstances. Finding creative solutions to regionalize or operate these WWTPs present both fiscal and physical challenges. To

help address the problem, in FY2016, KDOW and KIA set aside \$500,000 of State Revolving Funds (Capital Construction Account) to provide Owensboro Regional Water Resource Agency and Farmdale Sanitation District financial assistance to begin eliminating five abandoned small WWTPs and connecting those customers to regional wastewater services.

Combined and Separate Sewer Systems

Several older cities in Kentucky have sewer systems designed to transport both sanitary wastewater and stormwater. During high rainfall events, when the flow of combined wastewater and stormwater exceeds the design flow, the excess water discharges from a designated outfall. This is referred to as a Combined Sewer Overflow (CSO).

Most communities have sanitary sewer systems designed to collect and transport only domestic, commercial, and industrial wastewater, while stormwater is transported through separate pipe systems. Periodically, the sewer systems overflow due to blockages, disrepair, and excessive inflow and infiltration from precipitation discharging from manholes, pump stations, or backing up into homes. These discharges of sanitary wastewater from a sewer collection system are known as a Sanitary Sewer Overflows (SSO).

DOW collaborates with federal, state, and local governments to bring communities into compliance with the Clean Water Act and eliminate sewer overflows in Kentucky. Eighteen Kentucky communities are under enforcement orders to eliminate SSOs and to mitigate CSOs to the extent economically feasible. To comply with the enforcement orders, communities implement projects to reduce overflows, manage capacity, and develop long-term control plans. The projects often include repairing and replacing sewer lines and increasing the storage capacity of sewage in the sewer system, which allows additional processing time for wastewater treatment. Final completion dates of these projects vary depending on the scope of work and financial considerations.

The city of Lexington has several ongoing projects to address SSOs pursuant to a federal consent decree. In FY2016, the city completed two sewer trunk-line projects to eliminate overflow from six SSOs, and constructed several large tanks to store excess wastewater during high precipitation events. One tank constructed at the Town Branch wastewater treatment plant stands 78 feet high and measures 260 feet in diameter, with a capacity of 22 million gallons. After high precipitation events, wastewater stored in

the tank is slowly released to the treatment plant. Funding for this project included a Clean Water State Revolving Fund (CWSRF) loan of approximately \$32 M.

The city of Owensboro received a CWSRF loan of \$3.975 M in FY2016 to fund the fourth phase of an ongoing sewer separation project. A portion of the combined sewer system was replaced with storm and sanitary sewer lines to separate the flow, and several roadway structures were replaced with box culverts and curb boxes. This long-term project will improve the capacity of the city's sewer systems and reduce occurrences of CSOs.

Also in FY2016, Vanceburg joined Pikeville and Prestonsburg in completing sewer separation and eliminating all CSOs. The city of Henderson also completed construction of its Long Term Control Plan projects, and will begin monitoring to measure the success of its mitigation efforts.

There are 277 Kentucky communities that are not under federal consent decrees but have varying degrees of aging infrastructure that cause bypasses and overflows at wastewater treatment plants. DOW personnel inspect these systems, focusing on systems with frequent and recurring incidents and complaints. During inspections DOW staff educates communities on identifying causes of overflows, prioritizing corrective actions, funding resources, and returning collection systems to compliance with the Clean Water Act. When these issues recur frequently, DOW works with the Division of Enforcement through the enforcement process to bring these communities into compliance.

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, homes, yards and streams. Kentucky communities continue to make progress minimizing discharges of untreated wastewater with long-term planning and assistance from DOW.

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 Kentucky's streams, rivers, lakes, and groundwater. The MS4 program requires communities with significant population density to develop stormwater management programs using the six Minimum Control Measures shown in the graphic below. Parties responsible for implementing MS4 programs

include local communities, state departments of transportation, universities, local sewer districts, hospitals, military bases, and prisons. To participate in the MS4 program, MS4 operators must obtain a permit and develop a stormwater quality management program. The MS4 categories and permit types are shown below.

The type of MS4 permit issued to an operator depends on the population and population density that the permit will serve. There are three MS4 categories: large, medium, and small. Phase 1 permits are issued to large MS4 areas and are written with specific requirements for the individual permittee. There are only two Phase 1 permits in Kentucky. Phase II are general permits issued for medium and small MS4s in those categories. Currently, there are 48 permits for small MS4s, but no permits for medium MS4s. DOW personnel provide technical assistance to MS4 communities and monitor compliance by reviewing annual reports and inspecting MS4s each year.

After working for several months with stakeholders, DOW issued the Phase II general permit to public notice in April 2016. This new permit is under revision based on comments received.

MS4 Categories

- Large -- 250,000+ population (2 Phase I permits)
- Medium -- 100,000 – 249,999 population (none in KY)
- Small -- 10,000 + population with a density of 1,000 per square mile, or smaller population within an urbanized area, or contiguous to another MS4 (103 Phase II MS4s covered under 48 permits)

MS4 Minimum Control Measures

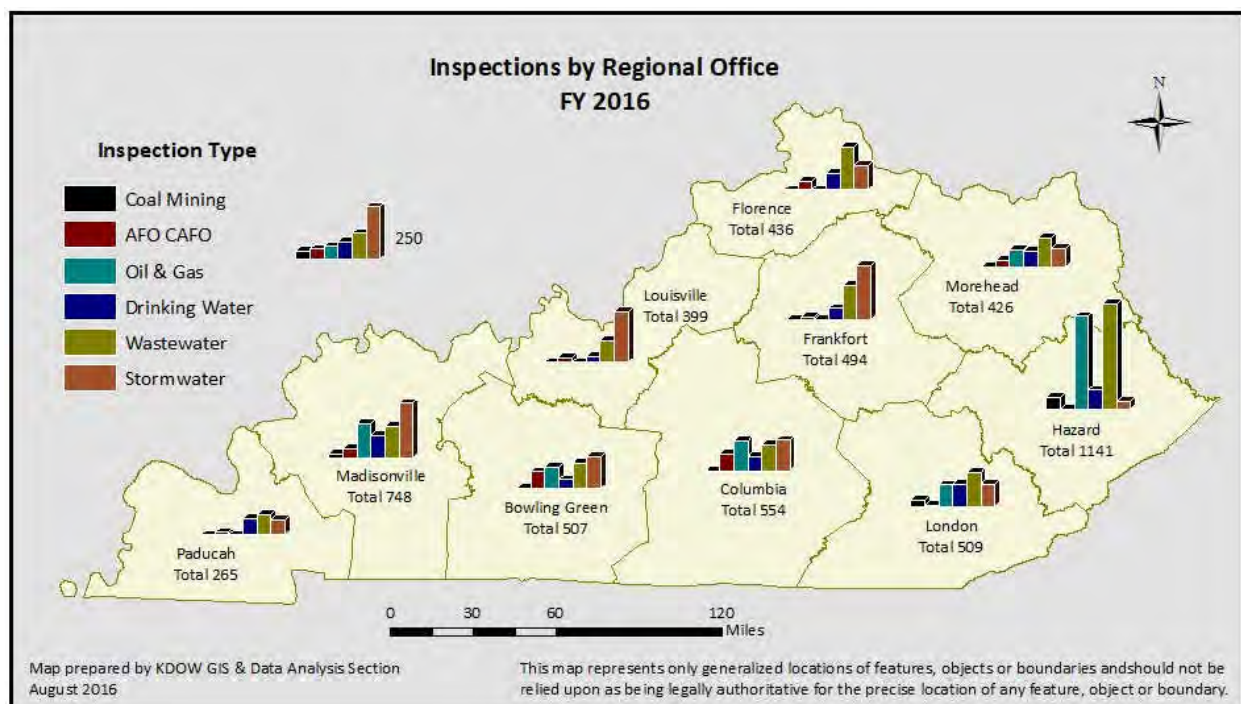
- Public education and outreach
- Public participation and involvement
- Illicit discharge detection and elimination
- Construction site runoff controls
- Post-construction site runoff controls
- Facility good housekeeping and pollution prevention

COMPLIANCE AND TECHNICAL ASSISTANCE

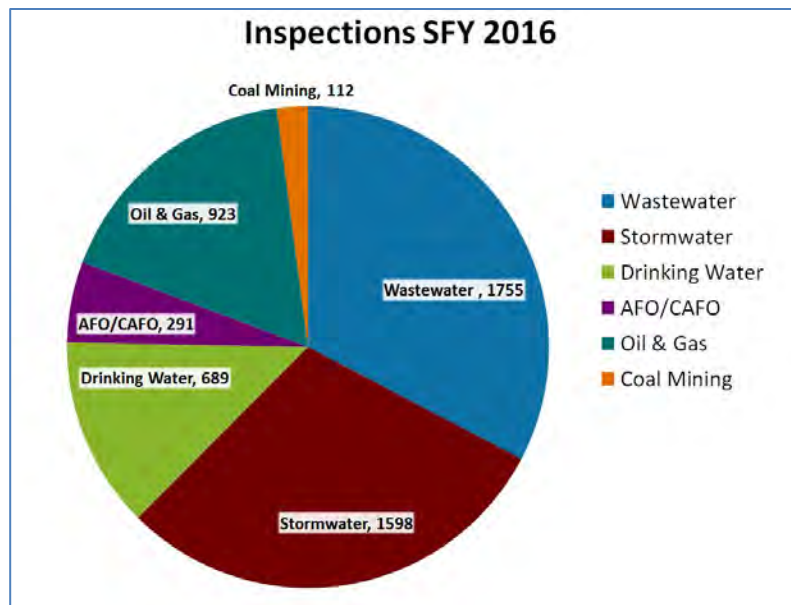
Compliance and Inspections

Compliance inspections ensure that wastewater, stormwater, and drinking water facilities are meeting regulatory and permit requirements, and are also a primary mechanism by which KDOW provides technical assistance to facility operators. Not surprisingly, the number of inspections corresponds well with the compliance rates of permitted facilities.

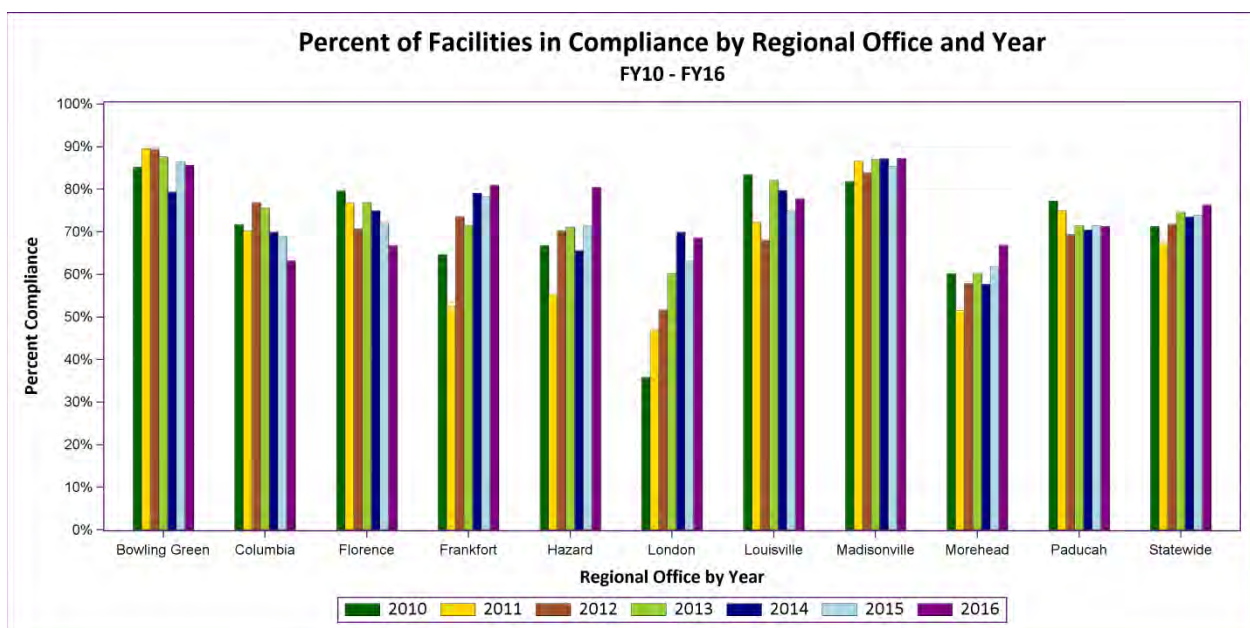
DOW's Compliance and Technical Assistance Branch (CTAB) oversees the majority of DOW's compliance monitoring. DOW has ten regional offices located throughout the state and personnel within the central office who provide technical assistance and compliance monitoring. The ten regional offices conduct inspections and investigations in order to monitor permit compliance and other circumstances which could result in violations of the Clean Water Act, as well as conducting inspections at all public drinking water systems to ensure compliance with the SDWA.



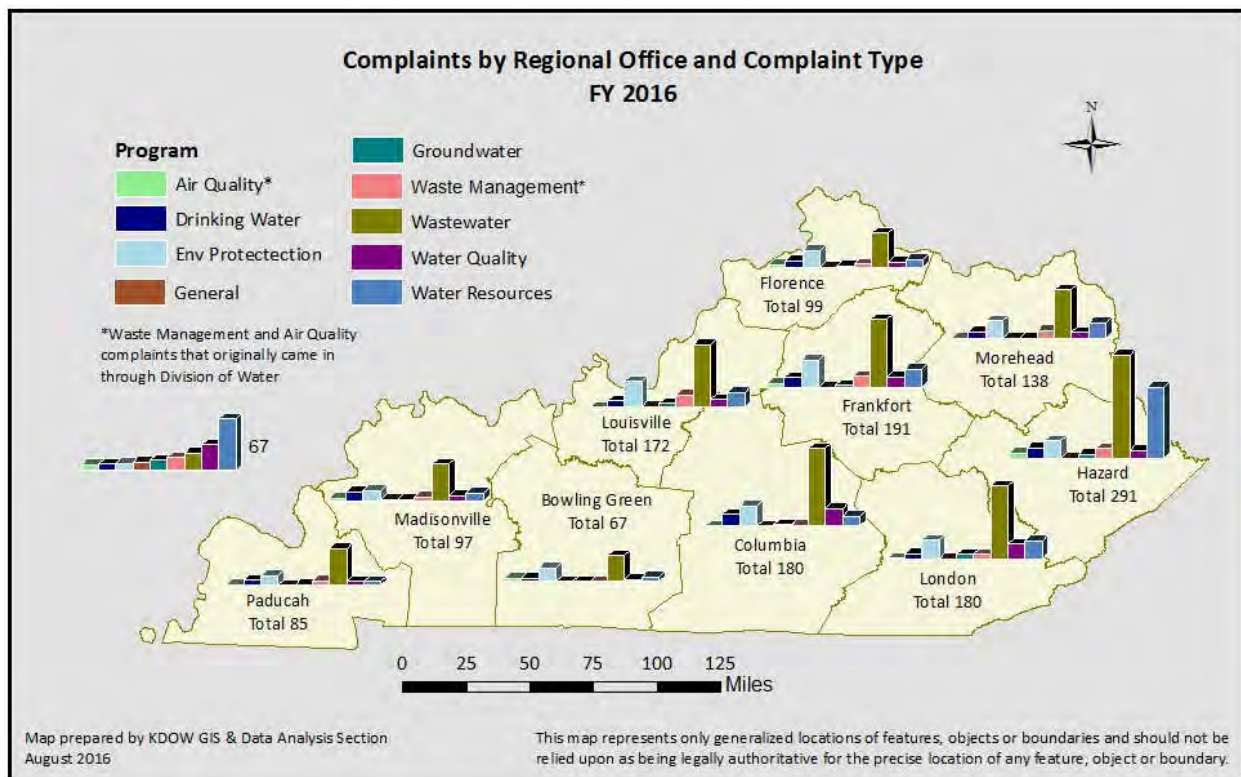
Forty-five DOW inspectors are responsible for compliance monitoring for KPDES-permitted facilities and public water systems. In FY2016 personnel conducted 5,368 inspections, an increase of more than 6% from 2015 and the highest number of inspections conducted in a single year over the previous eight years. Approximately 60% of all inspections were conducted for wastewater and stormwater permits, with drinking water, oil and gas, agriculture, and coal mining sectors comprising the remaining 40% of the inspections conducted.



Inspection results show that permitted facilities, excluding coal, had an overall compliance rate of 80%, which is a 2% increase over the previous year. This marks the fifth consecutive year that overall permit compliance has increased, and the highest compliance rate recorded. Overall, compliance across all historically inspected programs has increased 13% since 2011.

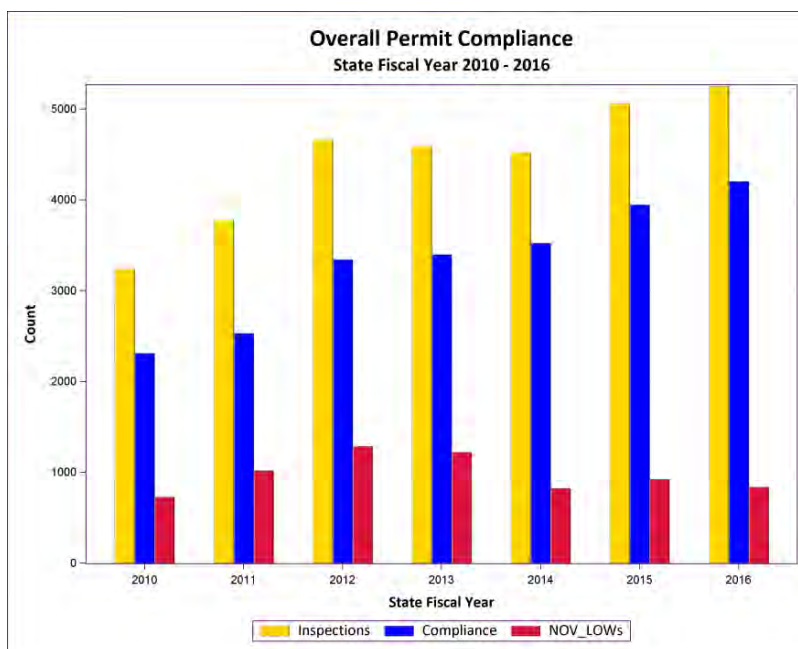


In addition to compliance inspections, DOW regional office personnel are responsible for recording and responding to complaints received by DOW. During FY2016, DOW received 1,502 complaints, most of which were investigated. Data show that the number of complaints decreased this year which continues a seven-year decline. In total, DOW staff conducted inspections or investigations of 6,870 facilities or incidents in FY2016, at a rate of approximately 152 per inspector.



The increased number of inspections and compliance rates, combined with declining numbers of citizen complaints, give a strong indication of DOW's effectiveness in assuring and facilitating compliance. While enforcement action is sometimes necessary, DOW inspectors and other personnel, and their valuable relationships with the regulated community, facilitate providing necessary technical assistance and support to prevent violations, resolve existing violations, and optimize the performance of wastewater and drinking water facilities. The direct relationship between the number of inspections conducted and the rate of compliance can be attributed to the accountability inspections require, but also reflects the significant technical and compliance assistance provided to those facilities by DOW inspectors and other personnel. Ultimately, there is a direct relationship between compliance rates and water quality, which is a primary objective of DOW.

In addition to field inspectors, DOW also has a specialized group of technical assistance providers who work exclusively with Kentucky's 441 public drinking water systems. These five individuals work closely with systems requiring assistance to improve performance and technical capacity so that safe drinking water is consistently provided to customers. The technical assistance providers also



oversee the Kentucky Area Wide Optimization Program (AWOP) that challenges drinking water systems to produce drinking water that is of greater quality than regulations require. AWOP has historically focused largely on improving water quality by reducing turbidities in drinking water. AWOP is shifting its focus significantly toward optimizing treatment and distribution system management to reduce disinfection byproducts. In addition, the AWOP personnel are providing more technical assistance to those systems that are dealing with HABs in their source water.

Laboratory Certification Program

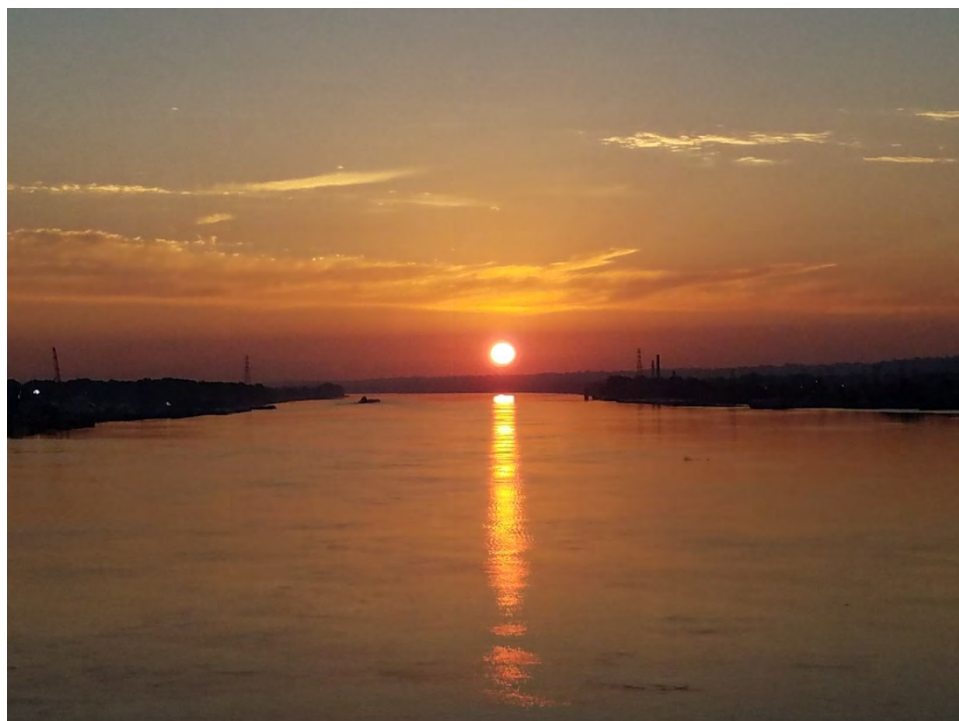
The Drinking Water and Wastewater Laboratory Certification programs ensure that Kentucky's drinking water and wastewater laboratories produce data of a known and useable quality. Required quality assurance and quality control criteria must be achievable by all facilities. The Laboratory Certification Program addresses DOW's strategic objective of maintaining and improving data quality.

Drinking water laboratory certification requirements have been in effect for several years. General wastewater laboratories requirements became effective in 2015, and field-only laboratory requirements became effective in 2016. The regulations prompted the creation of uniform, high quality data for use within the KPDES program. DOW staff provided laboratories and facilities with the necessary guidance and technical assistance to ensure compliance with the laboratory certification regulations.

During FY2016, DOW personnel conducted numerous trainings, including events sponsored by partners such as the Kentucky Rural Water Association and the Kentucky Water and Wastewater Operator Association. Trainings ensure laboratory facilities comply with the new certification program requirements as well as maintain existing quality.

The Laboratory Certification Program received a waiver from the USEPA Discharge Monitoring Report – Quality Assurance (DMR-QA) program beginning in calendar year 2016. The Kentucky program was deemed an acceptable alternative to the federal program. The waiver allows Kentucky certified laboratories more flexibility when choosing proficiency test providers, as well as the time of the year that samples must be analyzed. This waiver removes the requirement for Kentucky certified laboratories to analyze multiple samples of the same DMR-QA Study for multiple permitted facilities.

USEPA Region 4, based in Atlanta, GA, performs an on-site evaluation of the DOW drinking water certification program every three years as required by the SDWA. In 2016, USEPA Region 4 performed its triennial evaluation, which included assessments of both drinking water and wastewater laboratory certification programs, and determined the programs are effectively administering drinking water and wastewater certification requirements and oversight to Kentucky certified laboratories.



Ohio River Sunrise

DOW Staff Photo

WATER RESOURCES MANAGEMENT

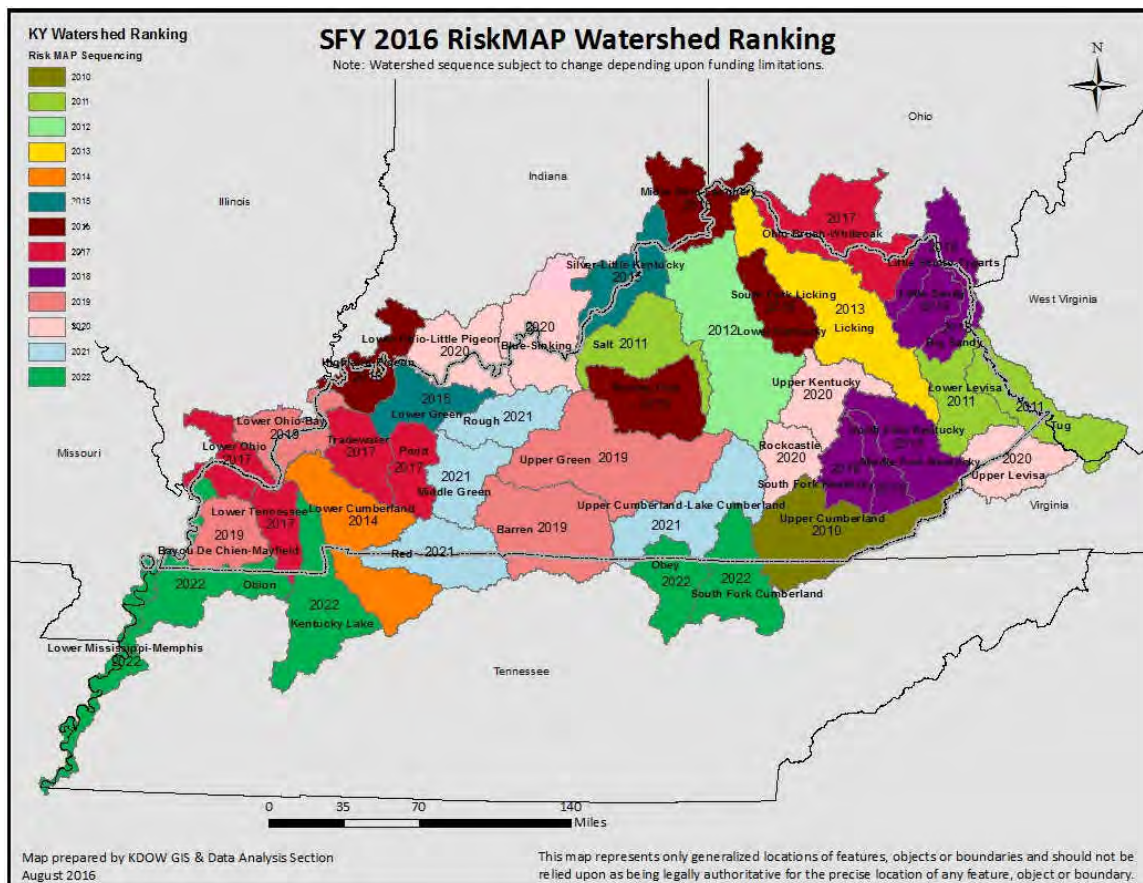


Since 2010, Kentucky has endured ten federally declared disasters, all of which dealt with recovery from flood events. Flooding poses the most significant natural hazard risk to Kentucky from an economic standpoint. Recent studies have indicated that rainfall and flooding events are occurring more frequently and becoming more intense. Flood prone areas and areas impacted by major infrastructure, such as dams, are dynamic and highlight the need for flood risk management and communication at all levels of government, the private sector, and individually. DOW continues its strategic alignment of water resources-related programs to streamline efficiency between DOW programs and to promote better customer service. By using risk-based methodologies, DOW took significant strides to continue managing current and future risks and communicate those impacts to those responsible for critical infrastructure.

Risk MAP

The overarching goals of Risk MAP include credible flood hazard identification, flood risk assessment, and planning initiatives to mitigate flood risks in communities across the Commonwealth. Building on best practices and lessons learned, DOW utilizes Risk MAP-related resources across several programmatic initiatives including acquiring high resolution Light Detection and Ranging (LiDAR) topographic data, leveraging funding from local communities and state and federal partners to mitigate flood hazards, and developing web-based tools for risk communication. Through Risk MAP, enhanced flood risk identification and communication of those hazards for approximately 60% of the Commonwealth's population has either been initiated or completed. This benefits local officials, emergency managers, businesses, and individual citizens by providing accurate depictions of flood hazards and ease in locating flood risk-related data to make informed decisions.

DOW expanded its Risk MAP initiatives to include the Licking River, lower Kentucky, lower Cumberland, lower Green, Highland-Pigeon, Silver-Little Kentucky and Salt River watersheds. These join the Upper Cumberland, lower Levisa, and Tug Fork watersheds in eastern Kentucky which already have Risk MAP products. Each year, DOW revises its Risk MAP business plan to reflect new or updated needs in watersheds with high populations and resulting flood risks.



DOW provided direct technical assistance and identification of collaborative flood risk reduction activities to the cities of Middlesboro, Taylorsville, and Owensboro, as well as to Louisville Metro, and Henderson County/City of Henderson. This assistance enabled flood risk reduction activities to be supplemented with limited resources available from agencies such as FEMA and the US Army Corps of Engineers. Regardless of past successes, Kentucky still faces significant challenges from extreme weather patterns and at-risk infrastructure.

Dam Safety Program

The DOW Dam Safety program supports water resources and flood risk management through the approval of new dam design and construction, and the enforcement of proper dam management. DOW staff monitors active dams in the Commonwealth except for those owned and operated by the U.S. Army Corps of Engineers and those permitted by the Division of Mine Reclamation and Enforcement. DOW's current inventory includes 964 dams of which 182 are classified as high hazard and may pose significant risk to life, property, and infrastructure; 148 are moderate hazard and may pose significant risk to property or infrastructure; and 634 are low hazard which pose minor risk to property or

infrastructure, should a dam failure occur. State and local government agencies own approximately 200 dams, of which approximately 80 supply water to public entities. The majority of Kentucky's dams are privately owned. In light of these hazards, DOW actively engages dam and property owners to manage the risks of dam failures through regulatory processes, inspections, stakeholder engagement, dam liability tutorials, and various mitigation measures.

Dams support communities and individuals by providing:

- Flood control, which protects lives and properties downstream of dams and reduces flooding of agricultural lands;
- Reservoirs for crop irrigation and livestock watering;
- Electrical power; and
- Recreational opportunities, including fishing, boating, swimming, and hunting.

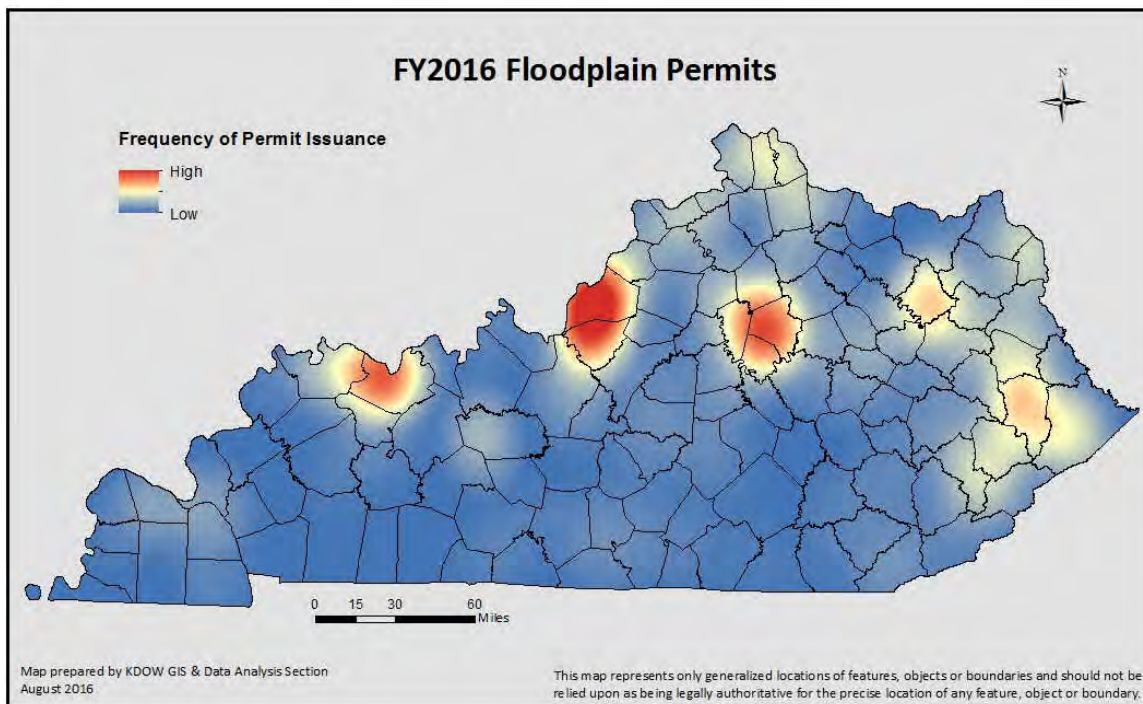
The Dam Safety program requires that dam owners maintain the structures which may include making improvements or repairs, dam redesign, or construction to ensure dams are reasonably safe and risks are minimized to the maximum extent possible. Regular dam inspections by DOW staff ensure that these dams are properly maintained and operated. The outcome of the inspection process results in a report to the dam owner designed to improve communication about the risks and needs of the structure. DOW personnel advise owners of low-hazard structures about maintenance practices for ensuring dam integrity, and advise owners of high-hazard structures regarding risks in the event of a dam failure.

DOW also manages the State Owned Dam Repair (SODR) program which has invested capital construction for improvements on state-owned dams. Through SODR, DOW acquires at-risk properties and works with local communities to restrict downstream development to avoid "hazard creep", which is the introduction of residences or infrastructure that may be impacted by a dam failure.

Floodplain Management

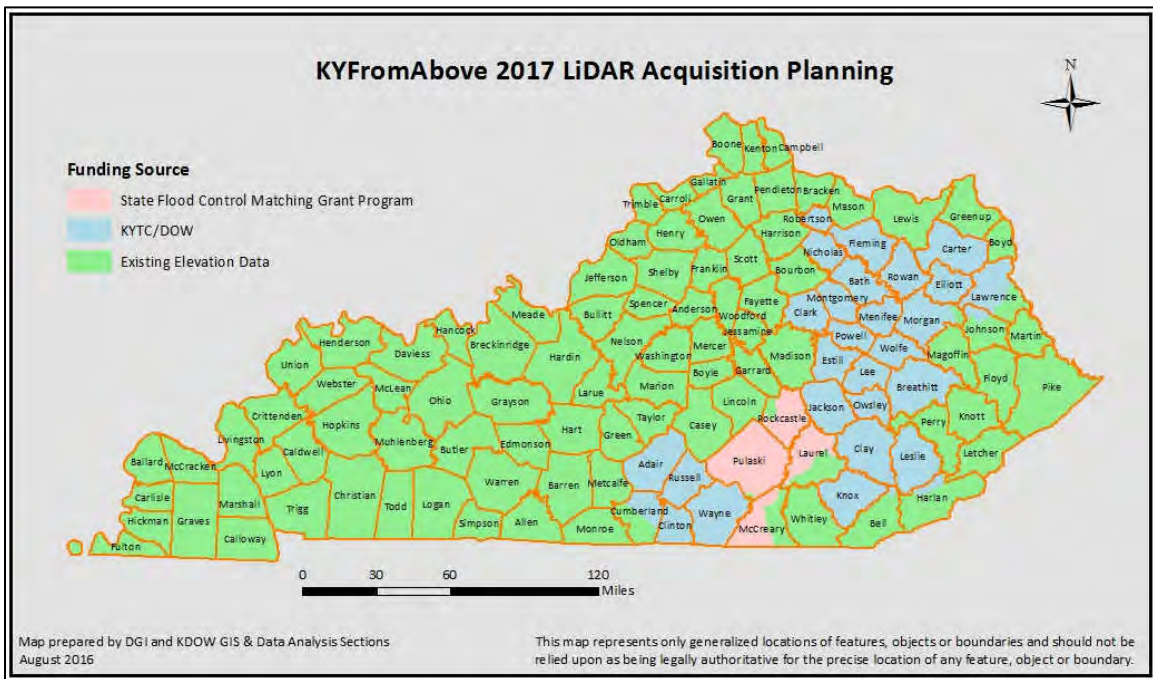
DOW's Floodplain Management Program promotes community well-being related to flood risks via regulatory processes, technical assistance, and regular communication with local officials and individuals. Through this program, DOW regularly provides technical assistance to private citizens and communities regarding flood hazards. Typical development activities regulated by DOW include dams, bridges, culverts, structures, water treatment plants, placement of fill, and stream alterations.

Floodplain construction permits are reviewed and issued to state agencies, businesses, industry, and property owners to mitigate the effects of development within sensitive areas. In 2016, the Floodplain Management Program processed and issued approximately 10% more floodplain construction permits than in 2015. These 804 permits were consistently issued within the 20-day regulatory time frame. DOW also administers and oversees the National Flood Insurance Program (NFIP) for over 361 communities across the Commonwealth, providing community officials technical expertise and support for local floodplain management programs.



Process Development and Efficiencies

DOW continues to strategically seek partnerships and resources to better identify and mitigate flood-related risks. In collaboration with the Commonwealth Office of Technology/Division of Geographic Information, Department of Local Government, Kentucky Transportation Cabinet, and FEMA, DOW will complete Light Detection and Ranging (LiDAR) terrain data collection for the entire Commonwealth by the end of 2017. These terrain data are valuable across many disciplines, including transportation planning and design, forestry, archaeology, and economic development. The data is used by DOW to model and map processes to accurately identify flood prone areas, create precise dam inundation maps, and to determine the potential and long-term impacts of permitted activities.



DOW has fully digitized all historic records pertaining to dams across the Commonwealth. Additionally, a spatially enabled dam inspection tool has been developed to use on mobile devices. This application will streamline field inspections by digitally collecting pertinent information and synchronizing the data to DOW’s TEMPO database. Also, the tool will allow automated report generation to communicate inspection information with dam owners.

DOW has been actively involved in the US Army Corps of Engineers’ Silver Jackets Program, which brings together teams of multiple state, federal, and local agencies to learn from one another in reducing flood risk and other natural disasters. State participants commonly include agencies with mission areas of hazard mitigation, emergency management, floodplain management, and natural resources management or conservation. Federal participation typically includes the U.S. Army Corps of Engineers, FEMA, and often others such as the National Weather Service and the U.S. Geological Survey. Over the past year, the Kentucky Silver Jackets team, led by DOW personnel, actively worked to create an integrated federal and state flood risk management guidebook, identify unmapped levees using LiDAR data, and developed alternatives analyses for communities to better understand contributing factors to flooding issues and steps that may be taken to reduce flood risks.

WATER MAPS PORTAL

In response to requests from the public for improved transparency and greater availability of data that DOW collects and information it generates, DOW worked with the Division of Environmental Program Support (DEPS) to create a number of water-related electronic map products that are available to the public and are located in a repository called the Water Maps Portal. In FY2016, DOW continued working with DEPS to expand and improve the Portal with new products, and received a major award for some of its content. New map products provide information on the advisory status for Harmful Algal Blooms (HABs), the status of streams related to Special Uses that confer special protections, the health of streams across the Commonwealth, detailed information on floodplains, information at the watershed-scale, and maps that tell stories through a series of photos. The Water Maps Portal can be accessed here: <http://watermaps.ky.gov/>.



A wide variety of water-specific web maps, applications, and services are being showcased from this Portal. KDOW has compiled these maps as a service to our customers using information from various sources. KDOW cannot ensure that the information is accurate, current or complete. Neither the information presented nor the maps themselves are official documents.

Portals, Viewers and Story Maps



Risk Map Portal ▾



Water Health Portal ▾



KY Watershed Viewer ▾



Story Map Gallery ▾



HAB Viewer ▾



Special Use Waters ▾

Best of Kentucky Award

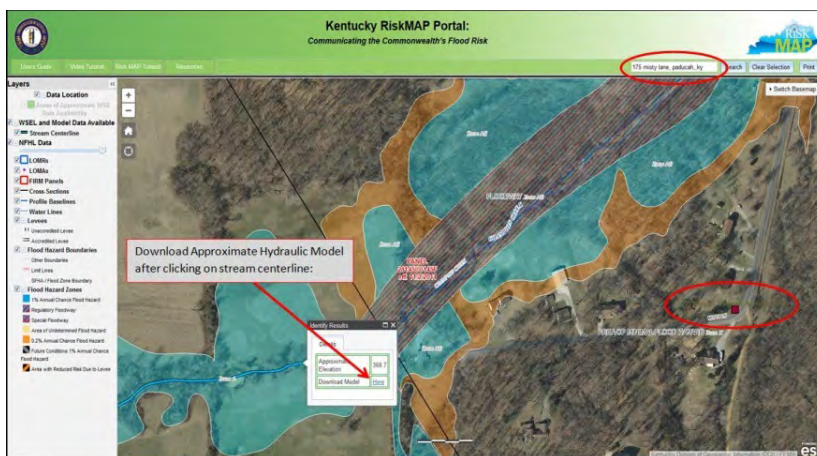
The Kentucky Water Health Portal was developed to make it easier for Kentuckians to determine the quality of the water at their favorite locations. The interactive map application provides information about the health of the streams across the Commonwealth, based on scientific examination of water bodies, fish and wildlife habitat, and water sample results.



In FY2016, DOW and DEPS were honored with a “Best of Kentucky” Award for the Water Health Portal at the 2016 Kentucky Digital Government Summit. This award recognizes the valuable service provided to citizens of the Commonwealth, and validates the hard work that DOW and DEPS personnel invested in creating a very useful tool for the public.

Risk MAP Portal

When new Preliminary Floodplain Maps are developed DOW solicits community input prior to the maps being finalized and placed into regulatory use. To facilitate better review of new maps, data are published to ArcGIS (a software program that utilizes geospatial data) online and a web application is created for each area of interest. These resources allow communities that may not have GIS software

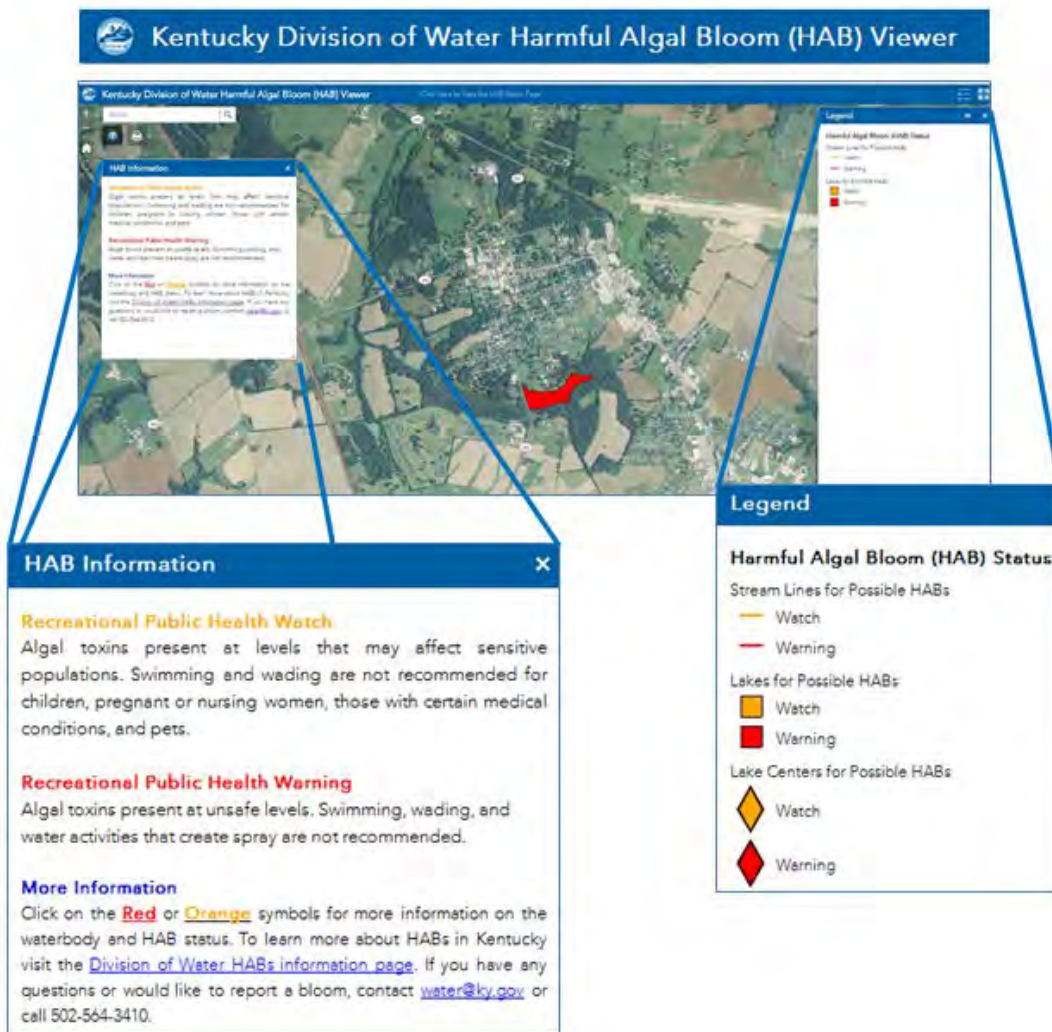


access a means to pan and zoom around the digital data that is not possible with Adobe or paper maps. These digital mapping applications will potentially enable more user-friendly and thorough review of preliminary mapping data.

New Map Viewers

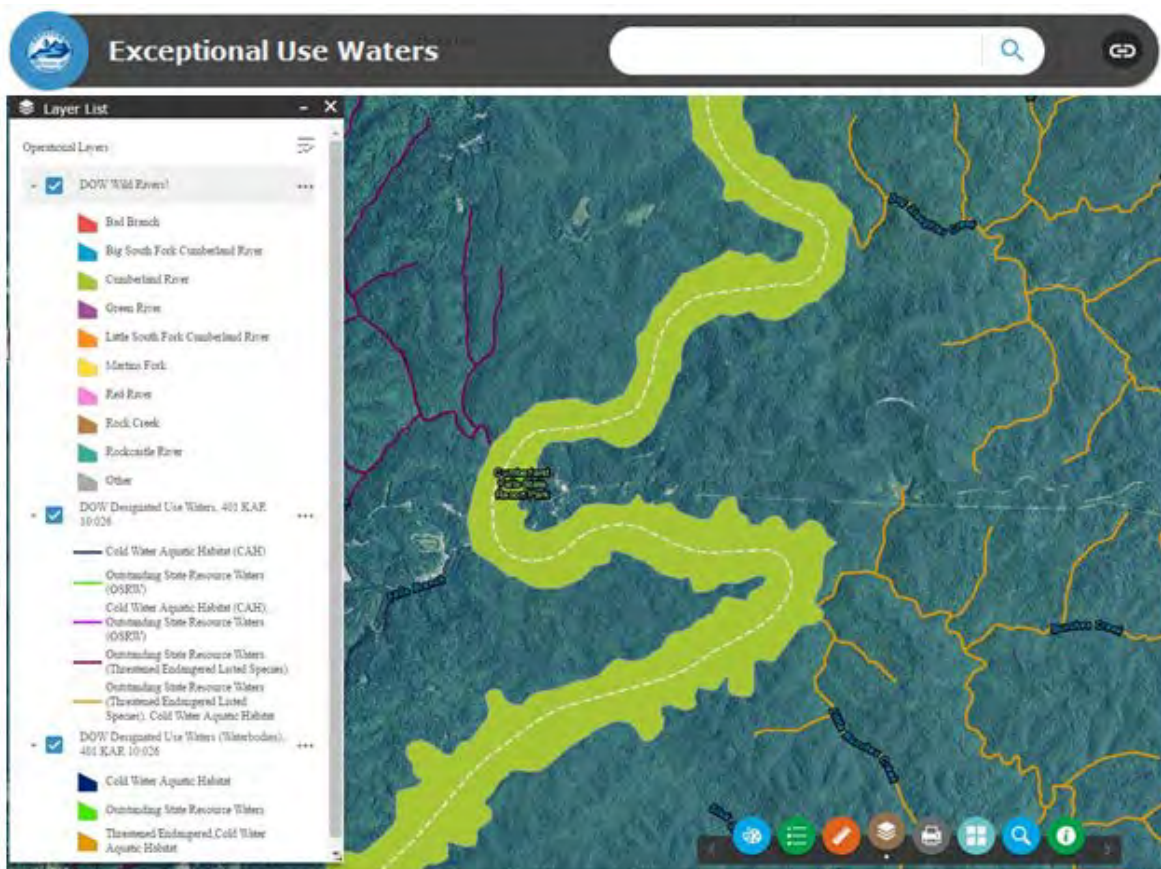
HABs Viewer

Harmful Algal Blooms (HABs) continue to be an important issue for Kentucky. To more easily and quickly communicate up-to-date information to the public regarding HABs, DOW worked with DEPS to create a mobile application called the HAB Viewer (accessible through the Water Maps Portal). This map viewer shows at a glance the status of any HAB Advisories for public recreation across the state. The HAB Viewer uses orange symbols to indicate a public health watch or that algal toxins are present at levels that may impact sensitive populations. When symbols appear red on the map, this indicates a public health warning, or that algal toxins exist at unsafe levels so that swimming, wading, and activities that create spray are not recommended. Users can click on map symbols to get more detailed information about specific advisories in Kentucky.



Special Use Waters Mobile App

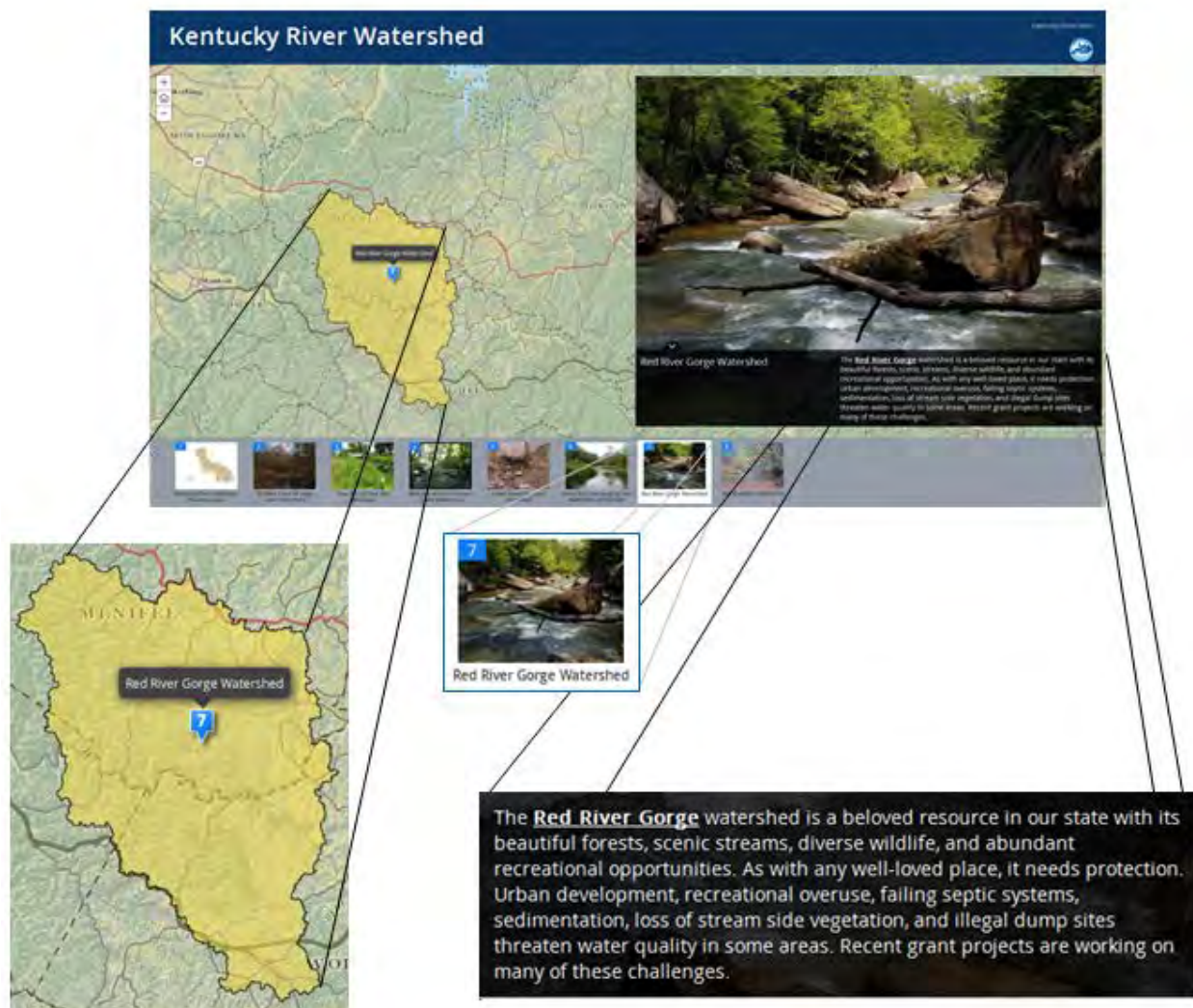
DOW works with the Forest Conservation Act BMP Board to provide input when forestry activities have the potential to impact waters of the Commonwealth. The Board was looking for an easy way to determine areas of the state in which forestry activities may impact designated Special Use waters (which, in some cases, could result in fines or penalties if degraded by accidental or negligent forestry practices), and would require additional considerations for the forestry community. In response, DOW collaborated with DEPS to create a mobile application that allows users to view a parcel of land they are or are planning to log. This application is available on mobile devices so it is convenient for use on-site in real time, and helps users determine what practices they need to adopt to maintain compliance with regulations. Users can identify their location on the map, identify the streams that border or are downstream from the logging site, any Special Uses for which those streams may be designated, and allows users to delineate the property being worked on for planning purposes. This application assists both the forestry industry and the Commonwealth by preventing accidental or negligent degradation of streams in Kentucky.



New Story Maps

Integrated with narratives and images, “Story Maps” give users a multi-dimensional visual perspective of entire river basins. Each watershed Story Map highlights project areas and gives an overview of projects taking place, or that have been completed, to manage, improve and protect Kentucky’s watersheds. Various DOW and DEP programs continue collaboration to further educate the public about the maps located in the Story Map Gallery (<http://watermaps.ky.gov>).

DOW added Story Maps for both the Licking River and Kentucky River Watersheds to the growing list of maps that utilize GIS tools. These new maps show some of the ways in which DOW is working with partners across the state to improve and protect the water we fish, swim in, and consume.



Commonwealth of Kentucky

Matthew G. Bevin, Governor

Energy and Environment Cabinet

Charles G. Snavely, Secretary

Kentucky Department for Environmental Protection

Aaron B. Keatley, Commissioner

Kentucky KDOW

Peter Goodman, Director

Thomas Gabbard, Assistant Director

Branch Managers

Compliance and Technical Assistance Branch

Sarah Gaddis

Resource Planning and Program Support Branch

Kristie Graham

Surface Water Permits Branch

Sara Beard

Water Infrastructure Branch

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