Kentucky Division of Water

2013 Annual Report

Commonwealth of Kentucky
Energy and Environment Cabinet
Department for Environmental Protection
Division of Water
water.ky.gov

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INTRODUCTION

Dear Reader,

The Kentucky Division of Water (DOW) continues to make significant progress in its mission to manage, protect and enhance the quantity and quality of the Commonwealth's water resources for present and future generations through voluntary, regulatory and educational programs. This annual report summarizes the past year's work of DOW's scientists and specialists toward reaching these goals.

A new state wastewater laboratory certification program that became effective Sept. 5, 2013, will standardize the procedures used in obtaining and analyzing wastewater compliance samples and reporting results to help ensure the quality of analytical data used by DOW for regulatory purposes.

In January of 2013, DOW, in cooperation with the Department for Natural Resources (DNR), began Compliance Evaluation Inspections (CEIs) of coal facilities with regard to water quality of outfall effluent and receiving streams. The coal CEI process requires the participation of DNR field inspectors, support from DOW field personnel and coordination from DOW and DNR central offices.

During SFY 2013, field office inspectors investigated a total of 1,774 water-related citizen complaints. This marks the sixth consecutive year that the number of complaints statewide has decreased. Over that time, complaints have decreased by 30 percent.

DOW finalized its enhanced Dam Safety Hazard Mitigation Project. Begun in August of 2011, the focus of the project is to develop a dam safety industry Standard of Practice (SOP) for cost-effectively evaluating dam hazard classifications and identifying mitigation strategies for cases where a classification is no longer valid.

DOW is working to reduce the hazards of flooding in the short term by encouraging flood-prone communities to enroll in the National Flood Insurance Program, which is administered by the Federal Emergency Management Agency (FEMA).

Nutrient pollution remains a national issue with significant local impacts, and DOW is developing the Kentucky Nutrient Reduction Strategy to identify sources of nutrients in Kentucky, methods of addressing nutrients, and source-specific strategies for nutrient reduction in priority watersheds.

I invite you to read more about these activities and other accomplishments of DOW as we work to protect and manage the waters of the Commonwealth and serve its citizenry. I look forward to continued implementation of DOW's operational plan and to meeting the challenges of the coming year.

Peter T. Goodmann, Acting Director
Kentucky Division of Water

DIVISION OF WATER MISSION STATEMENT

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.

The **Division of Water (DOW) Operational Plan** is intended to serve as an annual road map toward accomplishing its mission, taking into consideration current environmental, regulatory and resource conditions. The division has identified four major objectives in this endeavor:

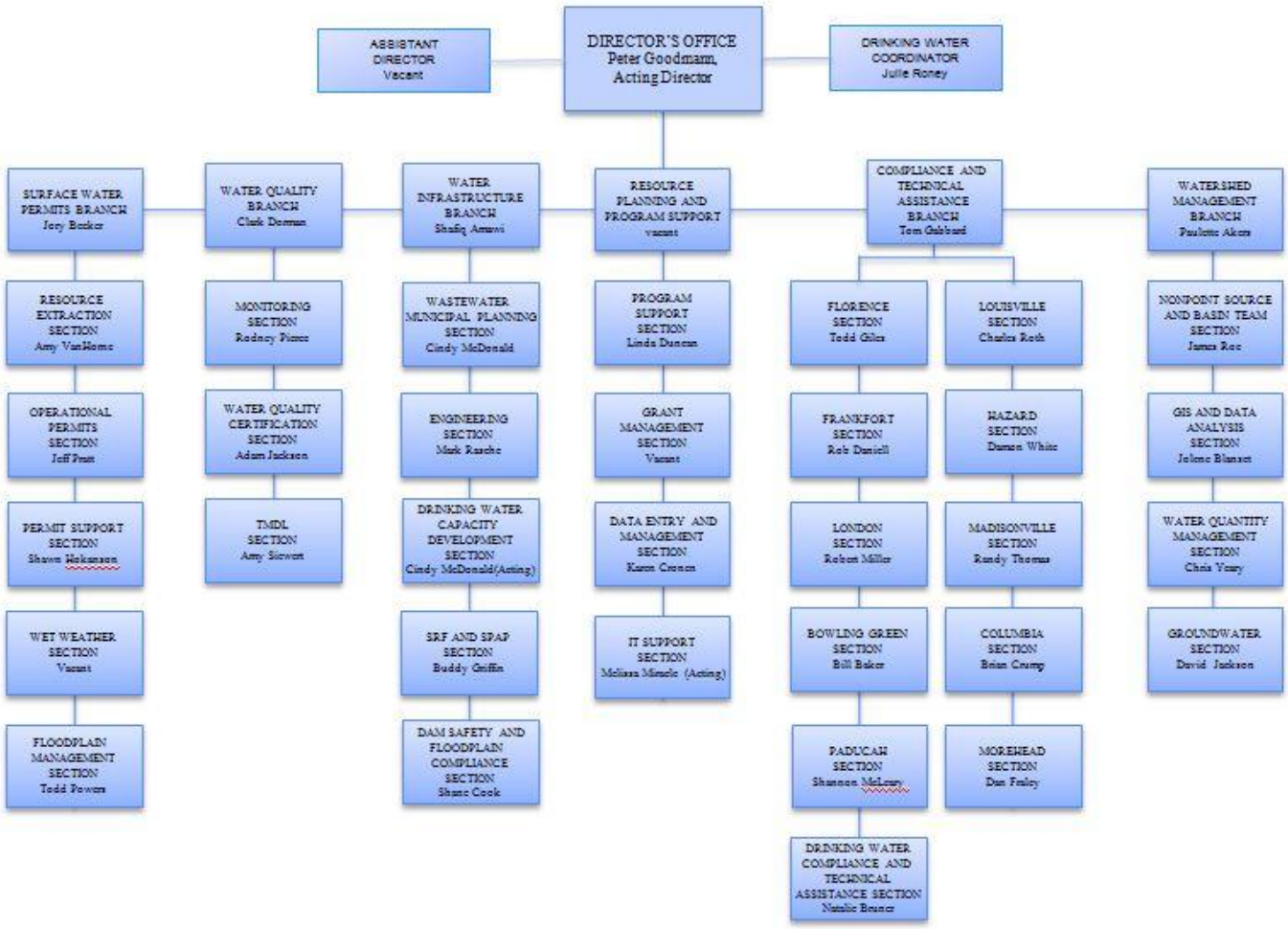
1. **Protect, manage and restore water resources.**
   a. Develop and implement Total Maximum Daily Loads (TMDLs).
   b. Implement a Nutrient Reduction Strategy.

2. **Conduct effective water resources planning.**
   a. Revise and update the guidance for Kentucky's Watershed Approach.
   b. Promote the U.S. EPA's Sustainable Infrastructure Initiative.
   c. Plan for sustainable infrastructure.
   d. Participate in U.S. EPA rulemaking.

3. **Meet federal and state program requirements.**
   a. Meet federal grant and work plan requirements.
   b. Meet state requirements and maintain progress toward achieving and maintaining zero permit backlogs.

4. **Promote better management and communication of data.**
   a. Implement an integrated data management system for water quality data.
   b. Implementation of SharePoint to educate the public and assist regulated entities with compliance with program requirements.
   c. Water Availability Tool for Environmental Resources Application (WATER) implementation on Geographical Information System (GIS) terminal server.
   d. Promote better decision making through GIS and data analysis.
   e. Transition from the Permit Compliance System (PCS) to the Integrated Compliance Information System (ICIS) to improve permit compliance, tracking and data analysis.

Commonwealth of Kentucky
Division of Water
October 2013



Resource Planning and Program Support

Resource Planning and Program Support Branch (RPPS) is responsible for planning, coordinating and facilitating the administrative, financial and infrastructure functions of DOW, including the development and management of the division's budget. The branch also facilitates the development and promulgation of DOW's regulations and legislation. This involves facilitating public hearings and distributing newly filed administrative regulations to public subscribers, tracking bills generated by the annual legislative sessions, and directing information to the appropriate DOW branches for comments and official response by the director.

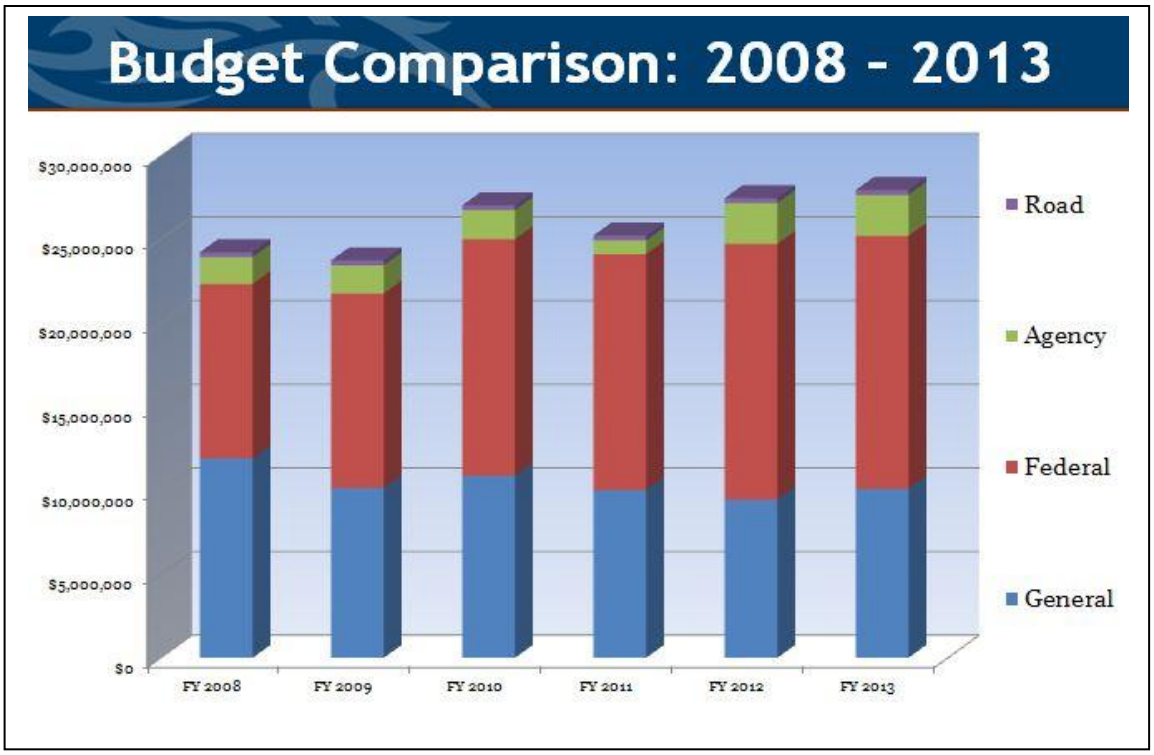
There are four sections within the RPPS branch. The Program Support Section facilitates DOW training needs, medical monitoring, processing receipts, issuing refunds, receipt and payment of invoices, tracking inventory and ordering equipment and supplies. The Program Support Section is also responsible for coordinating the safety needs of the division. The Grants Management Section manages the federal grant programs, which are used to support personnel costs, equipment, training, and travel.

Federal funds are also used to support projects that are developed in coordination with DOW and implemented by a variety of nonprofit groups, state universities, local governments, other state agencies and private sector companies. These projects all have a water-quality or water-infrastructure focus. The Information Technology (IT) Section performs IT functions and manages IT needs and infrastructure. This section also manages the Tools for Environmental Management and Protection Organizations (TEMPO) database, Safe Drinking Water Information Systems and the Kentucky Water Assessment Data Exchange (K-WADE), and works with program staff to implement electronic solutions that DOW develops. The Data Entry and Management Section performs data entry, manages the file room and processes open records requests.

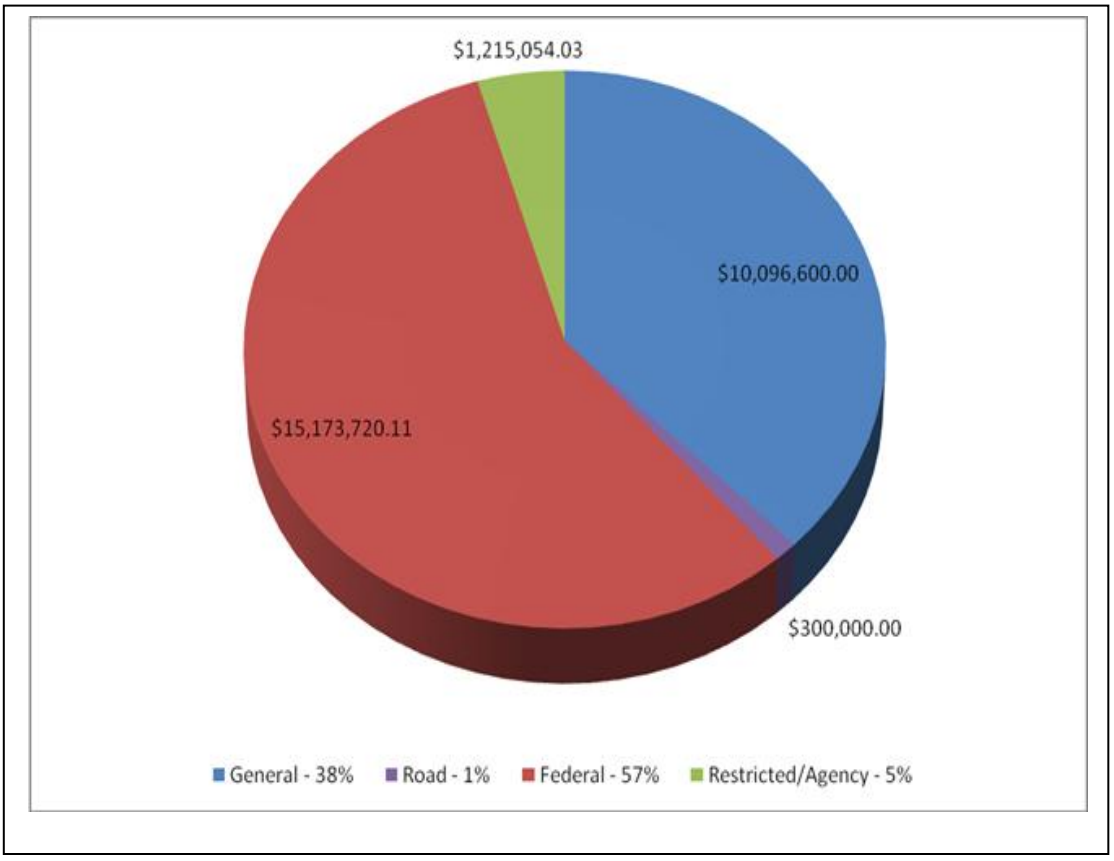
Budget Issues

DOW's activities are maintained by general fund appropriations, federal grants from the U.S. Environmental Protection Agency (EPA) and FEMA, fees collected for permitting and certification activities and an annual appropriation from the Road Fund. DOW's budget maintained 261 full-time, permanent employees in SFY 2013. An analysis of DOW funding for SFY 2013 indicates a decrease in federal funding – a new trend that reverses increases in federal funds over the previous four years. In 2013, federal funding made up 57 percent of the agency's budget, which is down from 58 percent in SFY 2012.

EPA has requested additional reporting on unliquidated obligations of old funds as well as outlay strategies on new grant funds received, especially for those grants that are expended over more than one year (e.g., 319[h], SRF set-aside funds). This focus on unobligated funds is the result of greater congressional scrutiny. DOW has realized an increase in receipts from permit fees collected from permits. This increase has come from a restructure of our permitting fees as more permits are being issued. The increase in permit fee receipts has not offset the decrease in federal funds, but it has lessened the impact.



Budget Breakdown SFY 2013



Regulation Development

A new state wastewater laboratory certification program that became effective Sept. 5, 2013, will standardize the procedures used in obtaining and analyzing wastewater compliance samples and reporting results to help ensure the quality of analytical data used by DOW for regulatory purposes.

Legislation passed by the General Assembly in 2011 and codified as KRS 224:10-670 requires certification of laboratories that conduct analysis of wastewater samples for purposes of compliance with the Kentucky Pollutant Discharge Elimination System. The Wastewater Laboratory Certification regulation (401 KAR 5:320) that went into effect Sept. 5, 2013, outlines the detailed requirements of the program authorized by KRS 224:10-670.

DOW is awaiting EPA's approval on the following regulations that were adopted as part of the triennial review of water quality standards required by the Clean Water Act Section 303(c) and 40 CFR Section 131.20:

- 401 KAR 10:001 Definitions for 401 KAR Chapter 10
- 401 KAR 10:026 Designation of uses of surface waters
- 401 KAR 10:031 Surface water standards

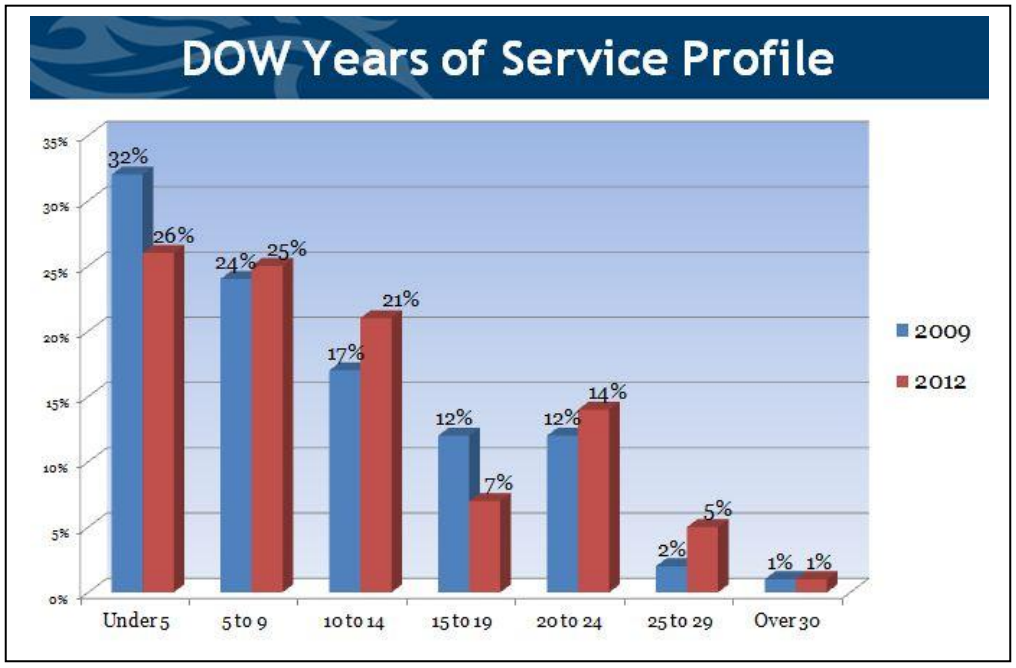
The proposed amendments to 401 KAR 10:001 and 401 KAR 10:026 were considered by the Administrative Regulation Review Subcommittee (ARRS) on Feb. 11, 2013. These regulations were referred by legislative leadership to the Senate Committee on Natural Resources and Environment and the House Committee on Natural Resources and Environment on March 6, 2013. Neither of these two committees met to consider these proposed regulations within 30 days of the referral. Therefore, 401 KAR 10:001 and 401 KAR 10:026 became effective April 5, 2013.

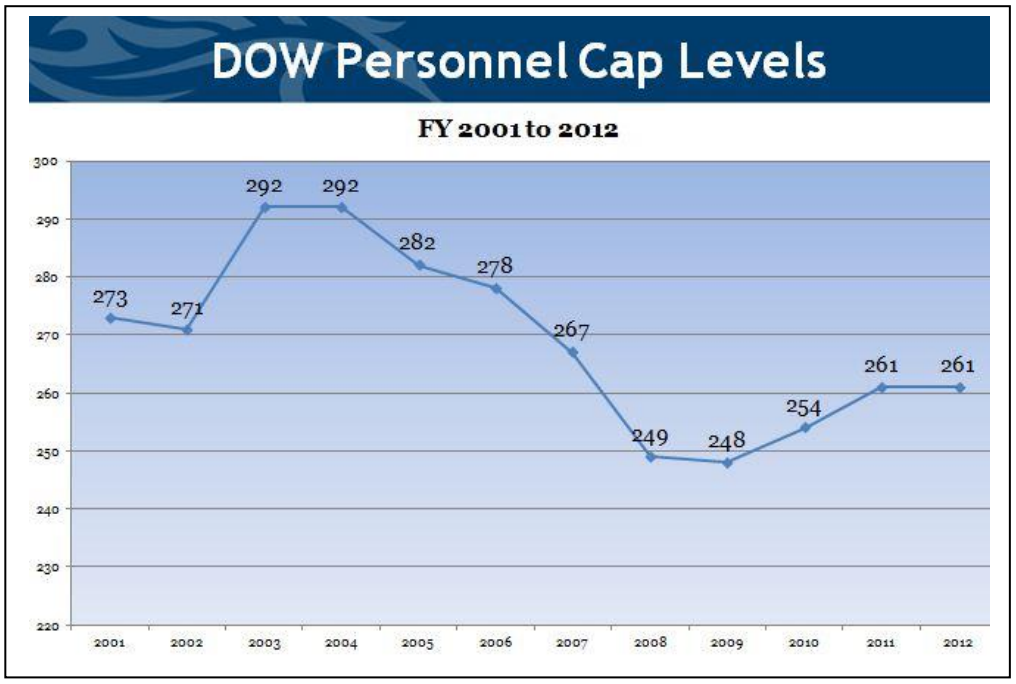
The proposed amendments to 401 KAR 10:031 were considered by the ARRS on April 9, 2013. The subcommittee voted to approve the agency amendments regarding selenium pursuant to KRS 13A.320. 401 KAR 10:031 (as amended) was referred by legislative leadership to the Interim Joint Committee on Natural Resources and Environment on May 1, 2013. The Interim Joint Committee on Natural Resources and Environment did not meet to consider these proposed regulations within 30 days of the referral. Therefore, 401 KAR 10:031 became effective May 31, 2013.

DOW has deferred 401 KAR 10:030, Antidegradation Policy Implementation Methodology, to the November ARRS meeting as DOW continues to work to address issues raised by stakeholders during the comment period with regards to this regulation.

Personnel Issues

DOW maintained a personnel cap of 261 full-time, permanent positions and for most of the year maintained at least that number of employees, which is a great success. An analysis of DOW personnel based on years of service shows that DOW is following the national trend of a younger workforce as the baby boomer generation continues to retire. Currently, 51 percent of DOW's workforce of 261 filled positions has less than 10 years of experience. Consequently, DOW is expending proportionally more resources for employee development.





Data Entry and Management Section

The Data Entry and Management Section scanned 232,106 documents in SFY 2013 in a continuing effort to retain all DOW documents electronically. The section also responded to 1,383 open records requests, certifying these records and complying with the Kentucky Open Records Act. Data entry staff entered 7,844 documents in 2013.

Information Technology Section

TEMPO Modernization

Tools for Environmental Management and Protection Organizations (TEMPO) is the software that the Kentucky Department of Environmental Protection (DEP) uses to maintain permit, inspection and investigation data and documentation. The DOW Information Technology (IT) Section is working with DEP staff on a TEMPO modernization project called TEMPO360. Modernization will convert the current TEMPO software to a web-based software application. DEP has financially committed to modernization. The TEMPO vendor is CGI. TEMPO360 user acceptance testing has been ongoing since February 2012. CGI and DEP have tentatively scheduled a phased deployment for late fall 2014. After deployment, the DOW IT Section will work with departmental IT staff to create training videos for the modernized version of TEMPO. These videos will be used to train department and division staff on use of this new version of TEMPO.

PCS to ICIS Conversion Project

In 2010, DOW began working on a data migration project to move all of Kentucky's data from EPA's Permit Compliance System (PCS) to EPA's Integrated Compliance Information System (ICIS). The data was migrated in February of 2011 but required a significant amount of data clean-up. The IT Section completed the data cleanup in June 2013.

K-WADE Migration

In Kentucky, water quality data is maintained through a variety of databases and other processes. The majority of the data is housed in the Ecological Data Application System (EDAS) access database. In September 2011, DOW began the process of implementing the Kentucky Water Assessment Data Exchange (K-WADE) system to replace EDAS. The final version of K-WADE includes functionality that enables other state agencies (e.g., the Department of Natural Resources and the Nature Preserves Commission) to store and share their water quality data in K-WADE. As of July 2013, the final release has been through user-acceptance testing, with minor revisions pending.

DOW program and technical staff are working on finalizing the reference table data so that the IT Section can begin migrating current EDAS data and other water quality data into the new K-WADE Oracle database. This work must be done before the K-WADE system can be put into production and used to replace EDAS. Once the data migration into K-WADE is completed, department IT personnel will create an automated process for moving the water quality data from K-WADE into EPA's system (WQX/STORET). In addition, IT personnel will be developing reporting tools to provide DOW personnel with the ability to analyze the data stored in the K-WADE database.

SDWIS

DOW manages drinking water data in the Safe Drinking Water Information System (SDWIS), which is a database system that is provided to the states from EPA. Each year, IT personnel, in conjunction with drinking water program staff, are responsible for upgrading the system. EPA released version 3.2.1 in July 2013. The system was immediately upgraded and is in use. EPA is developing a new version of SDWIS called SDWIS Next Generation. States will be required to move to SDWIS Next Generation in the fall of 2014.

Watershed Watch Volunteer Management System

In 2012, the IT section assumed management of the Watershed Watch Volunteer Management System. This system is used by the division to track the processes associated with training, equipping and registering volunteers to take water samples and make scientifically-based field observations about water in their neighborhoods. The IT Section facilitated a gap analysis session with program staff and developed a mock-up of a revised data management system. Simple modifications were made to fix and/or enhance the current application to work more effectively. Staff fixed the current reports and worked with division program staff to develop some new reporting capabilities. The IT Section has also developed a method to automatically share volunteer data with the Kentucky Geological Survey (KGS). The application is undergoing a complete redesign of both the web-based front-end and database back-end. The IT Section plans to complete development and testing by December 2013.

Dye Trace Application

In 2012, the IT Section assumed management of the Dye Trace Application. Since that time, the section has been managing the application and fixing problems that arise. However, there are plans to review the entire system and if necessary perform a gap analysis and redesign the application. This will be done once the Watershed Watch Data Application is completed.

Risk Map Portal

DOW contracted with an outside vendor to research, analyze and develop an Internet-based resource that supports the Risk MAP Cooperating Technical Partners workflow. The IT Section has played an advisory role on this project and will help DOW technical staff manage the system. IT Section personnel have also been working closely with the vendor and DOW technical staff to understand the process and complete any training that the vendor recommends to meet the requirements to maintain this system.

Wastewater Lab Certification Management System

In February 2013, the IT Section was notified that a new system needed to be in place to manage the new wastewater laboratory certification program. The section met with program staff to perform an initial analysis of the requirements and suggested the use of Minnesota's system. By July of 2013, the legal obligations for sharing the system utilized by the state government of Minnesota had been met. If coordination between the two states' databases proves unworkable, DOW's IT will develop a system with the goal of it being operational by November 2013 and implemented in 2014.

HB378 – An act relating to impaired waters

The IT section will work with DOW management to implement a public site that meets all the requirements mandated in House Bill (HB) 378. HB378 outlines steps DOW will take to better engage public participation in the process of improving impaired waters in the Commonwealth, to include targeted distribution lists and a new public website. The IT Section and DOW management are in the planning stages of this project and will work to implement the most efficient and effective site to meet these new requirements.

Management of DAQ applications

Due to the possible reorganization of IT Section personnel to DEP, DOW IT personnel have taken on some responsibilities for applications in the Division for Air Quality (DAQ). Two of these systems include AirVision and the Motor Vehicle Emission Simulator (MOVES). A new process for upgrading this system has been put into place, which includes DOW IT section staff work with DAQ technical staff to fill out the necessary forms to receive administrator access to the AirVision database prior to an upgrade. Once the access is granted, these staff will work together to perform the update. The change in process was initiated in May 2013 and there have been two AirVision upgrades since the change.

IT personnel have begun working with DAQ technical staff to manage the MOVES system. The main responsibility of the section will be to write the queries to enable DAQ staff to more effectively access data and use it for reporting purposes.

Compliance and Technical Assistance Branch

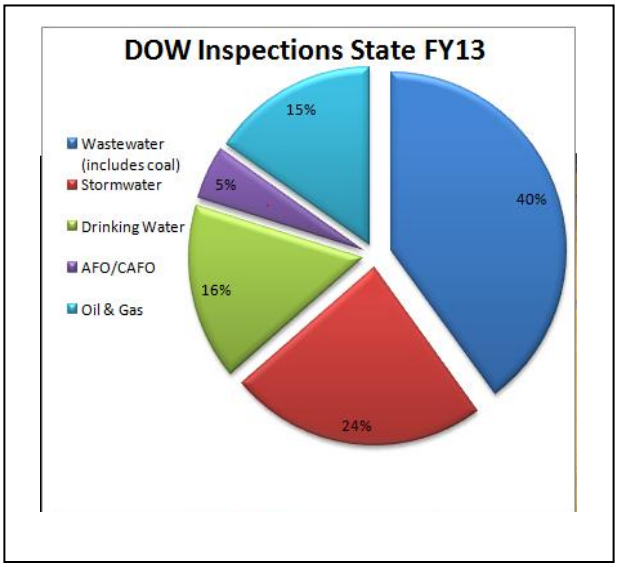
The Compliance and Technical Assistance Branch (CTAB) is currently staffed by 79 employees. The branch includes the Regional Field Offices, the Drinking Water Program, the Compliance and Technical Assistance Section and the Wastewater Laboratory Certification Program.

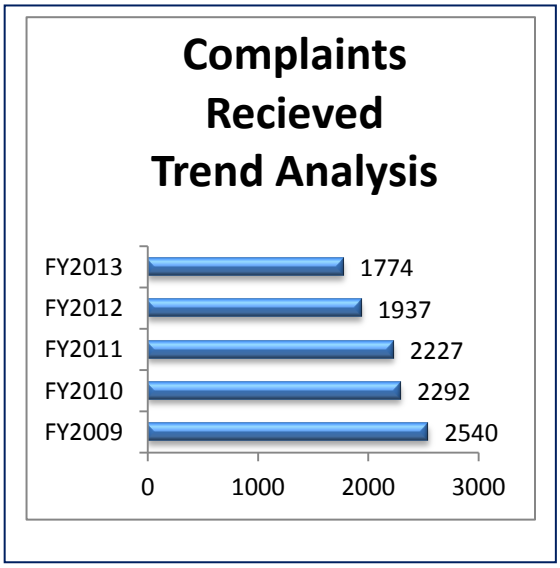
Regional Field Offices

The field staff in each of DOW's ten regional field offices perform a wide variety of inspections and directly address the concerns of the public with swift response to complaints and emergencies involving the waters of the Commonwealth of Kentucky. DOW inspectors are required to have broad programmatic knowledge (49 inspection types) and experience in addressing compliance issues. They must also be well trained and well-equipped in order to perform consistent inspections, technical assistance and enforcement.

During SFY 2012, 38 DOW inspectors performed 4,995 inspections in the areas of wastewater, storm water, drinking water, animal feeding operations, and oil and gas. This represents a 26 percent increase in the number of inspections performed as compared to SFY 2011, when 3,695 inspections were completed. Each inspection type is integral to the protection and improvement of Kentucky's water quality.

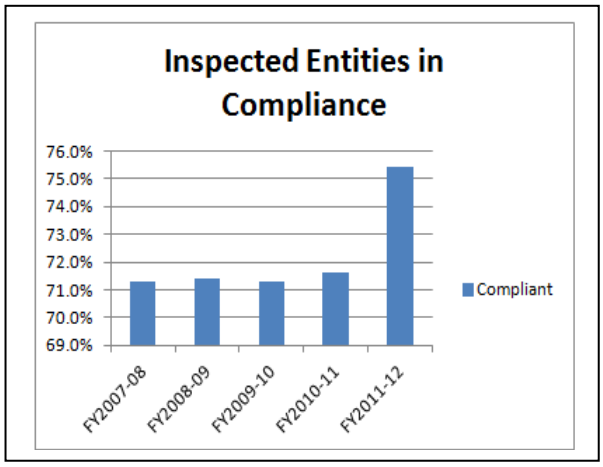
DOW is required to perform a number of inspections at preselected facilities based on an EPA 106 grant work-plan commitment. DOW committed to performing 1,290 inspections during the FFY 2012. As of June 30, 2012, 808 inspections were completed at pre-selected sites to satisfy the requirements of the work-plan. With 75 percent of the committed inspections completed, DOW's inspectors are on track to fulfill 100 percent of their EPA commitment by the end of the federal fiscal year.





Complaints are Down, Compliance is Up

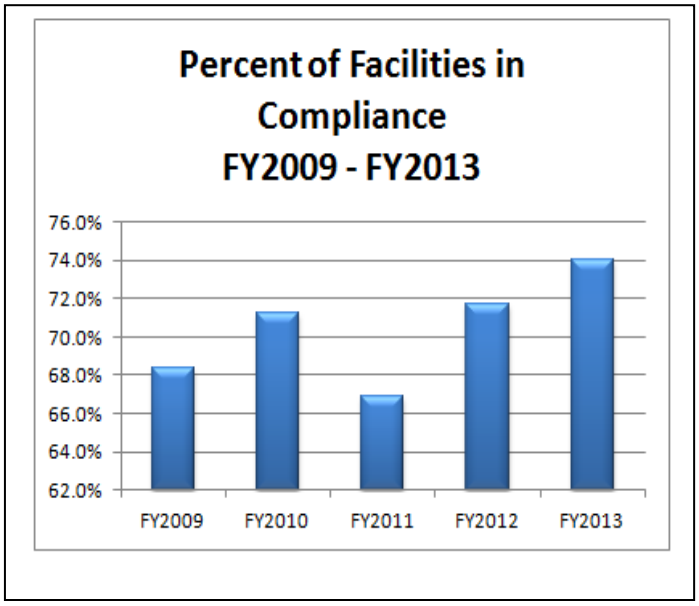
Compliance regulations require permitted facilities to notify DOW when certain disruptions occur. The most common notifications are wastewater bypasses/overflows and drinking water main breaks, low pressure or loss of pressure in a drinking water distribution system, loss of disinfection or other treatment disruption.



Previous years show that the number of complaints is steadily decreasing while the number of notifications is increasing. This suggests that the reporting requirement has elicited quick responses from permitted facilities to correct compliance issues. The division received 8,245 required notifications in SFY 2013 compared to 8,181 during SFY 2012. During SFY 2013, field office inspectors investigated a total of 1,774 water-related citizen complaints. This marks the sixth consecutive year that the number of complaints statewide has decreased. Over that time, complaints have decreased by 30 percent.

A large portion of the workload for DOW regional office staff is to respond to complaints and notifications. Responses can range from the routine to extensive commitment of resources, for example, following an ice storm or flooding event. DOW is challenged in planning for such events, especially due to their unexpected nature. DOW inspectors continue to respond to complaints, emergencies and other matters in a timely and professional manner.

Along with the decrease in the number of complaints received in SFY 2013, overall compliance has improved in the areas of wastewater, stormwater, drinking water, oil and gas, animal feeding operations and concentrated animal feeding operations. Inspection data from SFY 2013 shows that compliance is up over previous years to a rate of 74.4 percent. This represents a gain of 5.6 percent compliance over the last five years. While the compliance rate of permitted facilities is up, so is the number of sites receiving Notices of Violation (NOVs). NOVs increased from 373 in SFY 2012 to 431 in SFY 2013, or nine percent of facilities inspected. The number of Letters of Warning issued to facilities decreased two percent.



Coal Compliance Evaluation Inspections Begin

In January 2013, DOW, in cooperation with the Department for Natural Resources (DNR), began Compliance Evaluation Inspections (CEIs) of coal facilities with regard to water quality of outfall effluent and receiving streams. The coal CEI process requires the participation of DNR filed inspectors, support from DOW field personnel and coordination from the central office.

The field portion of the inspection includes examination of the permit holder's record keeping and best management practices as well as the inspection of water at outfall locations and receiving streams. The second part of the coal CEI involves the review of Discharge Monitoring Reports to determine compliance with the facility's KPDES permit. The results of the field inspection and the discharge data review are used to determine whether the facility is in overall compliance. The inspection results are compiled for a final assessment of practices that may result in issuance of a Notice of Violation or enforcement action.

In order to conduct these required inspections, DOW worked closely with the Department for Environmental Protection's Division of Enforcement a well as the DNR to develop and implement the new inspection process. Extensive classroom and field training was provided by DOW for DNR staff regarding water quality inspections and water sample collection.

DOW completed 100 CEIs in SFY 2013, as committed to EPA.

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DOW Environmental Scientist Frank Hall, center right, demonstrates water sampling techniques at an outfall on a surface mine near Prestonsburg during a training conducted for DNR inspectors.

Drinking Water Program

Approximately 95 percent of Kentuckians receive drinking water from public water systems that must meet the strict standards of the federal Safe Drinking Water Act (SDWA). DOW has the administrative and regulatory authority in Kentucky to implement SDWA, through which the EPA sets maximum contaminant levels for the amounts of metals and contaminants that may occur in finished drinking water. DOW is responsible for ensuring that the water produced at public drinking water treatment plants does not exceed those established levels.

DOW also works closely with drinking water treatment plants and distribution systems to ensure they make good source water choices, that they treat and distribute water properly, and that they test and monitor for contaminants. Public water systems (PWSs) must sample the finished water on a prescribed schedule to ensure that treatment is removing contamination from the source water before it is sent through the distribution system. DOW requires that all sample testing be performed in laboratories that have been certified by the DOW Drinking Water Program.

DOW's Drinking Water Program works closely with more than 450 water systems across Kentucky to ensure Kentuckians are provided safe drinking water. Drinking water is tested by individual systems with results submitted to DOW for review and approval. Specific chemicals are analyzed on a regular basis to ensure that drinking water meets established standards under the Safe Drinking Water Act.

Drinking Water Primacy

As of June 2013, there were 453 public water systems in Kentucky, compared to 460 as of June 2012. DOW provides primary enforcement authority ("primacy") oversight for implementing the Safe Drinking Water Act (SDWA) for these water systems. As a condition of primacy, the state must adopt and administer state rules that are at least as stringent as federal requirements. DOW is still waiting on final primacy decisions from EPA Region 4 for three drinking water regulations for which Kentucky has interim primacy. Primacy of regulations enforcement allows DOW to work directly with the public water systems in Kentucky to help them meet federal laws.

Kentucky released the 2012 Annual Compliance Report in June 2013, which summarizes the drinking water violations by violation category and by public water system.

EPA allowed for the first time the distribution of 2012 Consumer Confidence Reports by electronic means via a concise, web-based link. Thirty-six percent of the community water systems opted to use the approach this year to reach their customers.

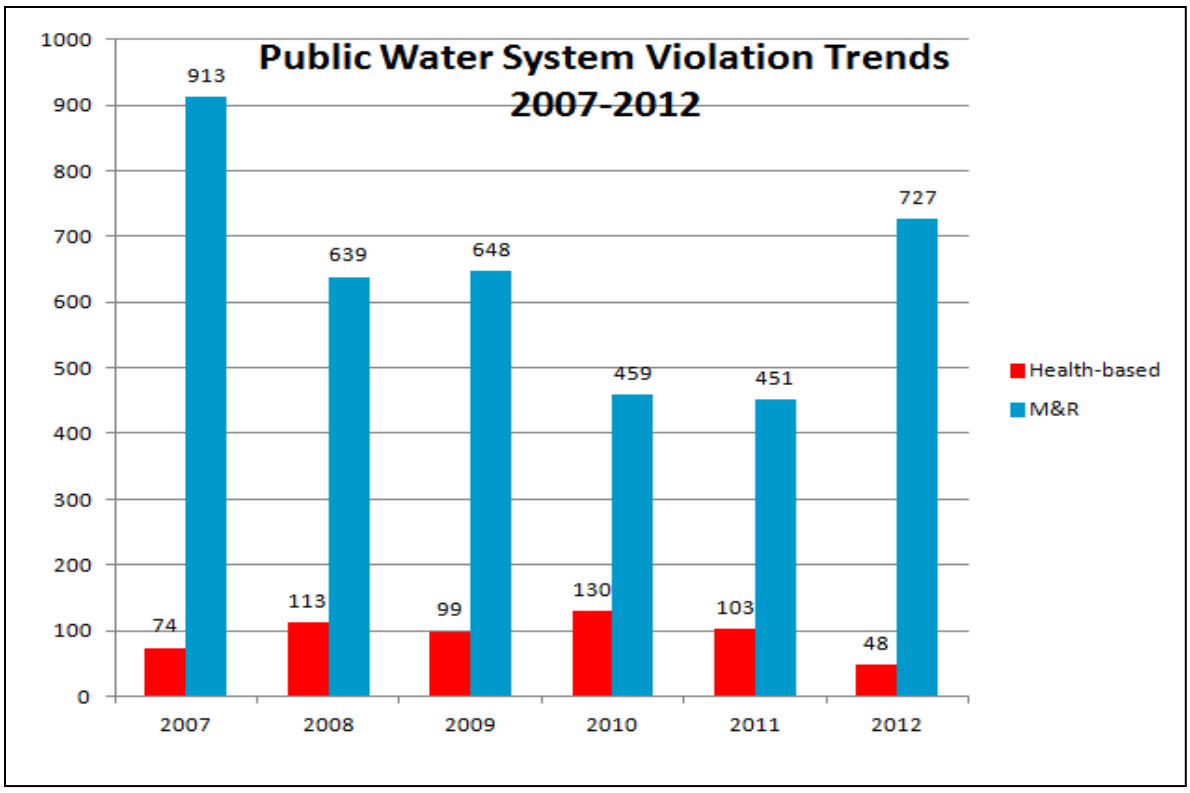
EPA finalized the Revised Total Coliform Rule in early 2012 with an effective date of April 2015 for water system compliance. DOW will begin revising existing state drinking water regulations pending the release of the State Implementation Guidance in late 2013.

DOW began evaluating the American Water Works Association's water audit manual and software. This is a holistic approach for non-revenue water (formerly referred to as water loss) that includes

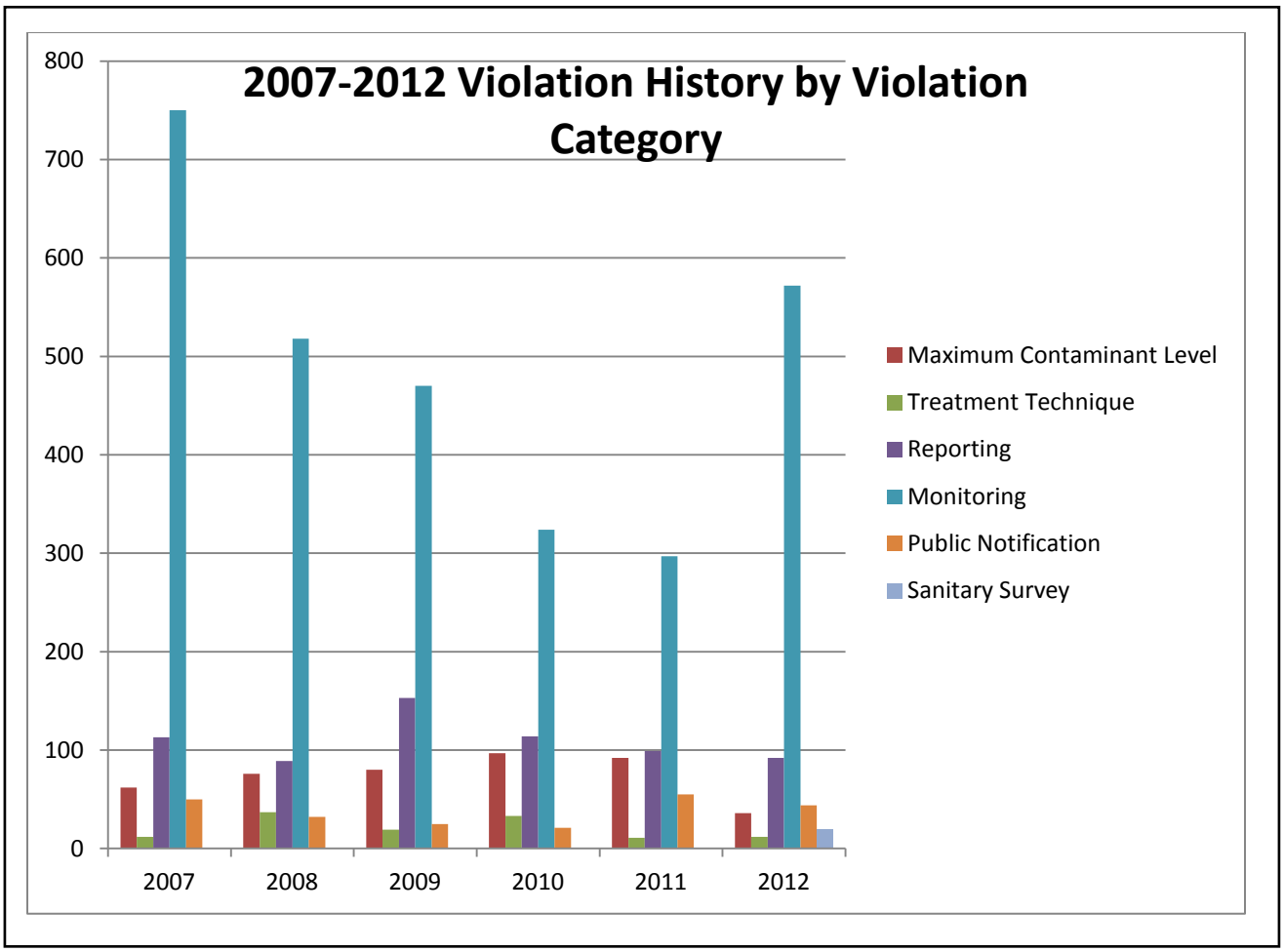
metering, billing, usage, data error resolution and leak detection. Water audits may be required of public water systems as a condition for increasing water withdrawal amounts.

Drinking Water Violations at Public Water Systems

Drinking water violations are issued on a calendar year cycle. There were 775 violations issued for calendar year 2012. The decline in health-based violations continued from past years, however, monitoring and reporting violations increased, with 93 percent of the violations issued in 2012 for monitoring and/or reporting ("paperwork") violations. The increase was primarily due to failure to monitor. DOW has responded by intensifying efforts to educate water systems on monitoring, recordkeeping and reporting requirements. For SFY 2013, DOW referred five water systems to the Division of Enforcement for formal action under the EPA's Enforcement Referral Policy; a total of nine enforcement cases were active by the end of the fiscal year.



Six-year trend of drinking water violations



Five-year trend of drinking water violations, by category

Drinking Water Technical Assistance Improves Performance

Technical assistance is provided to all public water systems in the form of site visits, training and sanitary surveys. A successful component of technical assistance continues to be the Area-Wide Optimization Program (AWOP). AWOP is a voluntary effort by those drinking water systems that treat surface water and focuses on turbidity (microbial) removal and disinfection by-product (DBP) reduction beyond that required by the SDWA. For 2012, the DOW recognized 54 surface water treatment plants for commitment to AWOP and for meeting more stringent turbidity goals. This translates into 2.2 million Kentuckians receiving drinking water made safer in 2012 compared to 1.5 million in 2010.

As the majority of Kentucky's drinking water health-based violations are related to DBP formation, technical assistance efforts were focused on resolving current violations and preventing future DBP violations. The successful national AWOP turbidity effort was used as a model to develop targeted DBP training for both treatment and distribution operators.

As Kentucky is considered a "small system" state (70 percent of the public water systems serve less than 10,000 in population), assistance efforts targeted those systems. Technical assistance contacts were made with more than 400 small systems and targeted AWOP activities occurred in five systems.

Georgetown drinking water plant using chloramine disinfection to reduce production of disinfection byproducts

An increasing number of surface water treatment plants are using chloramines, which is a combination chlorine and ammonia, as a disinfectant to comply with current and upcoming federal and state drinking water rules. In comparison to the more typical chlorine disinfection, chloramine disinfection provides a longer lasting disinfection residual and forms fewer regulated byproducts.

Georgetown Municipal Water and Sewer Services draws its raw water from Royal Spring, pictured right. The spring has been the area's water source since earliest settlement of the site in 1775, then known as McClelland's Station.

One public water system using chloramines as a disinfectant is Georgetown (Ky.) Municipal Water and Sewer Services (GMWSS). However, because chloramine disinfection introduces unique challenges that can complicate water distribution system operation, its use is being carefully monitored by a team of representatives from the DOW Drinking Water Compliance and Technical Assistance Branch and EPA. The team is conducting ongoing studies to support the development of a chloramines distribution system optimization approach to ensure the produced water exceeds regulatory levels.

The primary purpose of the studies is to develop a process for optimizing chloraminated distribution system water quality through enhanced monitoring and process control. The secondary purpose is to provide GMWSS with an in-depth assessment of its distribution system from an optimization perspective.

Initial results of the studies indicate no significant water quality concerns in the GMWSS distribution system. Knowledge and data obtained throughout the initial studies have been incorporated into the ongoing development of the chloraminated water system optimization approach. Current studies being conducted by the EPA and the DOW are investigating the accuracy of various water quality field tests in the distribution system of GMWSS.

Wastewater Laboratory Certification Program

A new state wastewater laboratory certification program that became effective Sept. 5, 2013, standardizes the procedures used in obtaining and analyzing wastewater compliance samples and reporting results to help ensure the quality of analytical data used by DOW for regulatory purposes.

Legislation passed by the General Assembly in 2011 and codified as KRS 224:10-670 requires certification of laboratories that conduct analysis of wastewater at permitted for purposes of compliance. The Wastewater Laboratory Certification regulation spells out the detailed requirements of the program authorized by KRS 224:10-670.

The Wastewater Laboratory Certification Program regulation provides procedures for laboratories applying to be certified, establishes annual fees, and provides the appropriate methods and references for evaluating and assuring laboratory competence and data reliability. The certification requirement will affect approximately 300 to 350 private and public laboratories that provide wastewater testing services associated with the Kentucky Pollutant Discharge Elimination System (KPDES) permit program.

DOW will monitor the permitted facilities to ensure permit compliance. Monitoring activities will include

- Reviewing discharge monitoring reports
- Interviewing facility personnel knowledgeable of the facility
- Inspecting the processes that generate and treat wastewater
- Sampling wastewater discharges to navigable waterways and other points in the generation or treatment process
- Reviewing how samples are collected and analyzed by the laboratory

The program includes specific standards for training, quality control, field analysis, equipment, supplies, analytical methodologies, data management, fees and auditing of the certified laboratories.

Surface Water Permits Branch

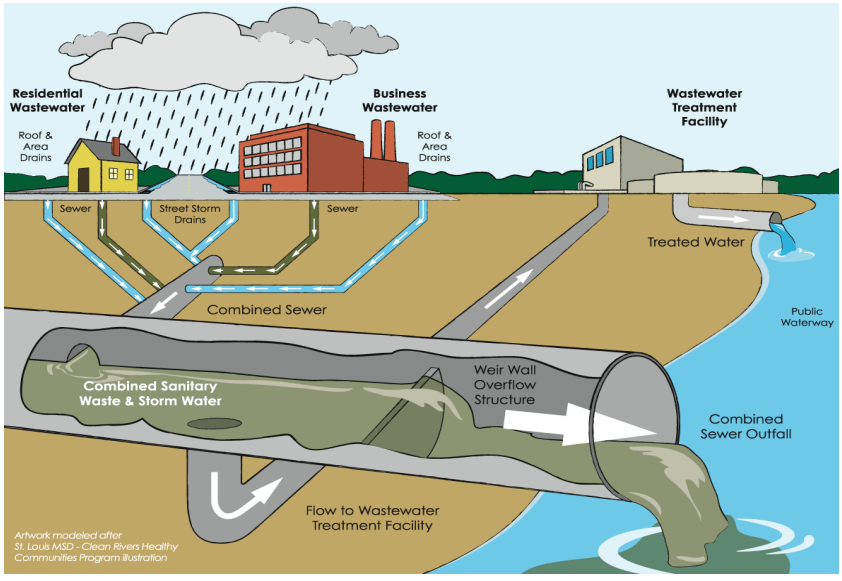
The 1972 Clean Water Act introduced a system of permitting and regulating point sources of pollution. It is illegal to discharge point source pollutants to surface waters without a permit from the National Pollutant Discharge Elimination System (NPDES). The Surface Water Permits Branch (SWPB) consolidates many of the activities associated with issuing permits that have a direct impact on surface water. The branch issues operational permits for wastewater and storm water discharges and permits for construction in a floodplain.

The SWBP implements programs to control surface water pollution caused by point source discharges of wastewater from public and private sewage collection and treatment systems, industrial wastewater treatment facilities, industrial stormwater runoff, and municipal and industrial landfills. The terms and conditions of individual KPDES permits require the installation, operation and maintenance of appropriate wastewater treatment technology to protect and enhance the quality of Kentucky waters.

The branch also implements the wet weather compliance program, the Combined Sewer Overflow/Sanitary Sewer Overflow (CSO/SSO) program, the municipal separate storm sewer (MS4) program, the pretreatment program, and the whole effluent toxicity (WET) program. SWPB consists of five sections: Resource Extraction, Operational Permits, Permit Support, Floodplain Construction and Wet Weather.

Combined and Separate Sewer Systems

Combined sewer systems are an old design practice once used in civil engineering that involves the conveyance of both storm water and sanitary wastewater in the same pipe. When wet weather events occur, these systems often become inundated with storm water flow, causing the combined sanitary and storm waters to overflow. Even when sanitary sewage pipes are separate from storm water pipes, sanitary sewer overflows can result from inflow or infiltration due to precipitation or leaky infrastructure, equipment malfunctions, power outages and blockages.



Combined sewer overflows (CSOs) are permitted discharges under the NPDES program that are required to comply with the 1994 EPA Combined Sewer Overflows Policy. Sanitary sewer overflows are illegal discharges and must be eliminated.

Since the 1994 CSO Policy was issued, communities in Kentucky have been making progress updating their aging systems and minimizing these discharges of untreated wastewater.

However, overflows are complex and costly problems to solve. When progress lagged behind federal timetables, some communities in Kentucky were placed under federal and state consent orders to facilitate their progress addressing the CSO and SSO issues. Currently, 17 Kentucky CSO communities are under such orders and are working toward meeting their requirements. In addition, two Kentucky communities with SSOs in separate sewer systems are under joint state/federal consent orders to eliminate SSOs and other unpermitted discharges.

Communities placed under consent orders must comply with remedial measures including developing early action plans, long-term control plans (LTCP) for CSOs and sanitary sewer overflow plans (SSOP) for SSOs. DOW reviews and approves the plans in conjunction with the Kentucky Division of Enforcement and U.S. EPA Region 4. In the chart below, SUO refers to Sewer Use Ordinance; SORP to Sewer Overflow Response Protocol; and CMOM to Capacity, Management, Operations and Maintenance.

Summary Table of CSO Remedial Measure Status

	Map	SUO	SORP	CMOM	SSOP	NMC Report	Interim LTCP	LTCP [1]	Annual or Quarterly Reports [2]	Annual Review (SORP)	Other remedial measures [3]	Final Compliance Date [4]
Ashland	●	●	●	◎	▪	●	●	◎	◎	○	▪	2017
Catlettsburg	●	●	●	◎	▪	●	▪	◎	◎	▪	▪	▪
Frankfort	●	●	●	◎	●	●	●	◎	◎	○	▪	2018
Harlan	●	●	●	◎	▪	●	▪	◎	◎	○	▪	▪
Henderson	●	●	●	◎	●	●	▪	●	◎	○	▪	2017
Louisville	▪	▪	●	●	●	●	●	●	◎	◎	▪	2020
Loyall	●	●	●	◎	▪	●	▪	◎	◎	○	◈	▪
Maysville	●	●	●	◎	◎	●	●	●	◎	○	▪	2017
Morganfield	●	●	●	◎	▪	●	▪	●	◎	○	▪	2017
Northern KY SD #1	▪	▪	●	●	◎	●	●	◎	◎	◎	▪	2025
Owensboro (RWRA)	●	●	●	▪	▪	●	◎	○	◎	◎	▪	2017
Paducah	●	●	●	◎	◎	●	●	◎	◎	◎	▪	2017
Pikeville	●	●	●	◎	▪	●	▪	▪	◎	▪	●	2014[1]
Pineville	●	●	●	◎	▪	◎	▪	◎	◎	○	◈	▪
Prestonsburg	●	●	◎	◎	▪	◎	▪	▪	◎	▪	▪	2015[1]
Vanceburg	●	◎	◎	◎	◎	◎	▪	◎	◎	▪	◈	▪
Worthington	●	●	◎	◎	▪	●	▪	◎	◎	▪	▪	▪

Review Status
▪ Not requested
● Approved
◎ Review In Progress
○ Not due yet
◈ To Be Determined

[1] *Pikeville and Prestonsburg have deadlines for separation in lieu of an LTCP*

[2] *Overall status of all annual and quarterly reports*

[3] *Requirements that may not produce a document to be reviewed by the Wet Weather Section*

[4] *A final compliance date is an enforceable date by which full compliance with the 1994 CSO Policy must be achieved. Pikeville and Prestonsburg must achieve full sewer separation by this date or submit an LTCP. These dates are included in a consent order, an Administrative Order issued by U.S EPA Region 4, or in an approved LTCP.*

Consent decrees spur improvements at Clark County Wastewater Treatment Plant

Construction of the Lower Howard's Creek Wastewater Treatment Plant in Clark County was completed on schedule in January 2013, meeting the requirements of the consent decree negotiated by EPA and the Energy and Environment Cabinet with the City of Winchester and Winchester Municipal Utilities for violations of the Clean Water Act – specifically, to eliminate existing and recurring sanitary sewer overflows (SSOs) and reduce the potential for future SSOs caused by inadequate and aging infrastructure.

The consent decree required the City of Winchester and WMU to develop, submit, finalize and implement plans for the continued improvement of the wastewater collection and transmission system and the WWTP, and the elimination of SSOs and unpermitted bypasses.

Left *-- Construction of the new wastewater treatment plant at Lower Howard's Creek proceeded through the winter months of 2012 to reach completion by the target date of January 2013.*

Below *-- Staff training takes place, overlooking the oxidation ditches at the new wastewater treatment plant at Lower Howard's Creek.*

The Kentucky Division of Water reviewed and approved the plans. The $30-plus million project included construction of a new wastewater treatment plant and pump station, installation of a 24-inch force main, installation of a sanitary sewer interceptor and installation of two new outfall sewers. The project is expected to eliminate 13 recurring SSOs in the Lower Howard's Creek Watershed and 13 of the documented 27 system-wide SSOs.

Municipal Separate Storm Sewer Systems (MS4s)

The MS4 program is an important program DOW manages to help manage nonpoint source pollution from municipal storm water runoff from entering Kentucky's streams, rivers, lakes and groundwater.

Contaminated storm water runoff is commonly transported through MS4s that discharge the runoff directly into local waterbodies. To prevent harmful pollutants from being washed or dumped into an MS4, operators must obtain an NPDES permit and develop a storm water quality management program. "Operators" include local communities, state departments of transportation, universities, local sewer districts, hospitals, military bases and prisons.

MS4 categories

- Large -- 250,000+ population
    - Louisville/ Jefferson Co. and co-permittees
    - Lexington/Fayette Co.
- Medium -- 100,000+ population
- Small -- fewer than 10,000 or a density of 1,000 per square mile (103 Phase II under 47 permits)

MS4 permit program activities

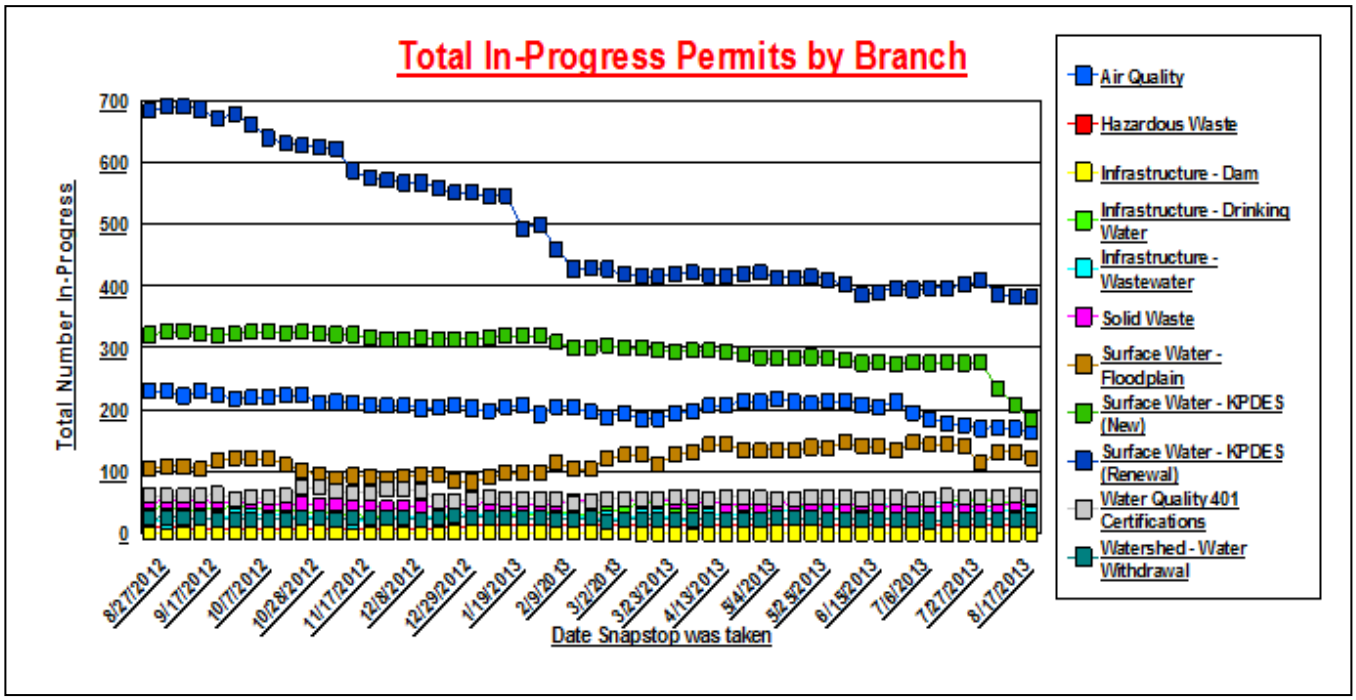
- Illicit discharge detection and elimination
- Construction site runoff controls
- Post-construction site runoff controls
- Public involvement and outreach programs
- Facility good housekeeping and pollution prevention
- Monitoring

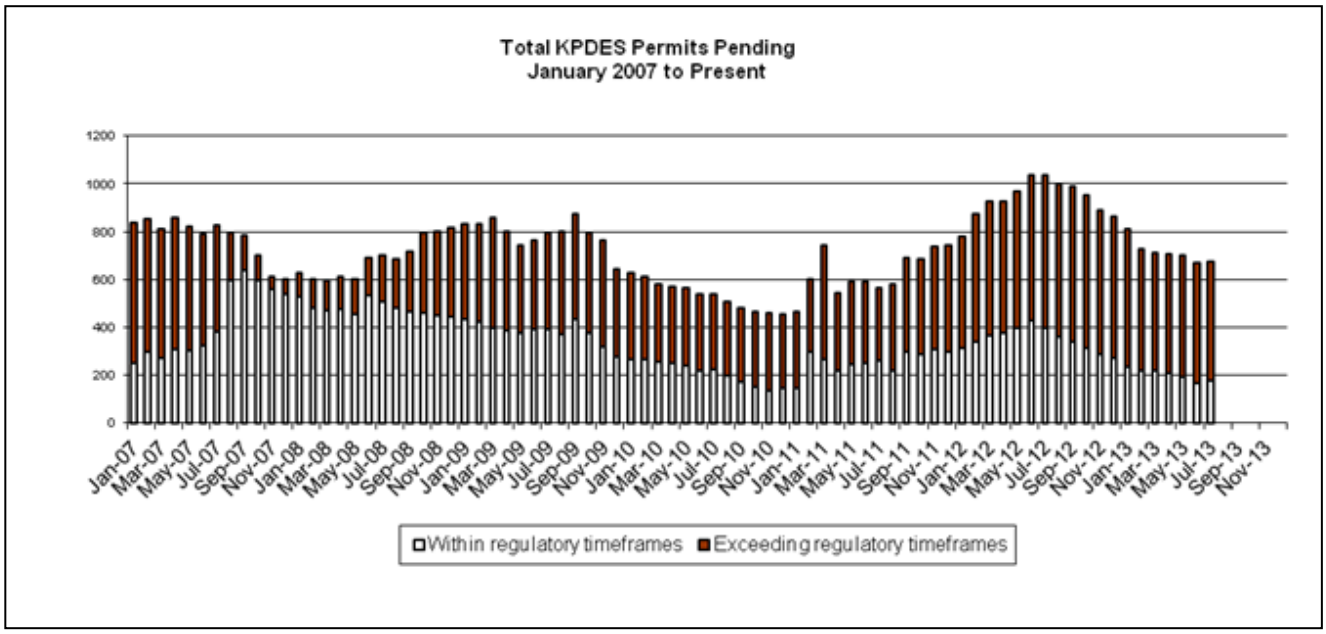
The current Phase II General MS4 permit was drafted with language to include the newly-designated MS4s. The permit provides timeframes for the required Stormwater Quality Management Plan to be drafted. The permit also gives a structured timetable for the adoption of the MS4 Program's required ordinances for illicit discharge detection and elimination, erosion prevention and sediment control, and lastly, post-construction for new development and redevelopment.

DOW continues to monitor and inspect the MS4 programs by requiring annual reports from each MS4 and by inspecting a percentage of the MS4s per year.

Permitting Progress

Permit writing and review are often lengthy and complicated processes, requiring adequate staff with expertise and experience. While staff employee turnover has been an issue when processing permit applications and renewals, the KPDES branch is making headway on the permit queue by hiring additional staff and intensifying training. In fact, with an improving economy, the permit workload is expected to continue to increase.


Total In-Progress Permits by Branch
Total Number In-Progress
700
600
500
400
300
200
100
0
8/27/2012
9/17/2012
10/7/2012
10/28/2012
11/17/2012
12/8/2012
12/29/2012
1/19/2013
2/9/2013
3/2/2013
3/23/2013
4/13/2013
5/4/2013
5/25/2013
6/15/2013
7/6/2013
7/27/2013
8/17/2013
Date Snapstop was taken
Air Quality
Hazardous Waste
Infrastructure - Dam
Infrastructure - Drinking Water
Infrastructure - Wastewater
Solid Waste
Surface Water - Floodplain
Surface Water - KPDES (New)
Surface Water - KPDES (Renewal)
Water Quality 401 Certifications
Watershed - Water Withdrawal


Total KPDES Permits Pending
January 2007 to Present
1200
1000
800
600
400
200
0
Jan-07
Mar-07
May-07
Jul-07
Sep-07
Nov-07
Jan-08
Mar-08
May-08
Jul-08
Sep-08
Nov-08
Jan-09
Mar-09
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Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
May-13
Jul-13
Sep-13
Nov-13
Within regulatory timeframes
Exceeding regulatory timeframes

Net-DMR Kentucky moves into the Future

Kentucky has been proactive in complying with EPA's proposed eReporting Rule, which requires permittees and regulators to use existing available technology to electronically report information and data related to the NPDES permit program in lieu of paper reports. In advance of the requirement, Kentucky began the mandatory phase-in of electronic DMR reporting for non-coal mining DMRs using EPA's NetDMR website in May of 2013, with complete migration of all non-coal mining DMRs by March 2014.

As of August 2013, more than 900 of the nearly 2,200 permits with assigned requirement dates have completed migration to NetDMR. Kentucky currently has the most permittees submitting DMRs through NetDMR for all states using NetDMR. After March 2014, Kentucky will begin the mandatory phase of coal-mining permittees submitting DMRs electronically. Kentucky has also initiated migration of all general permit Notices of Intent and Notices of Termination to electronic methods and will complete this migration during the current permit renewal cycle.

DMR Statistics 1/1/2013-7/31/2013 (NetDMR Submittal Counts Provided by US EPA)

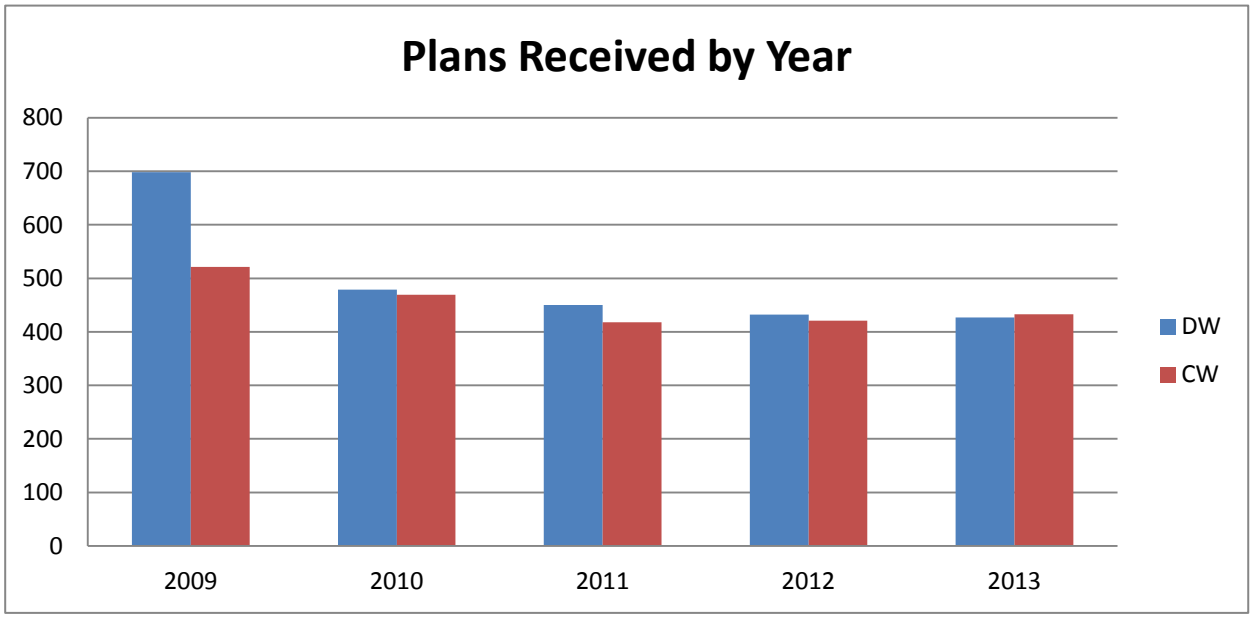
Instance Name	DMRs Received-Majors	Nat'l Rank	DMRs Received-Minor	Nat'l Rank	Total DMRs Received/Year	Nat'l Rank	New Facilities Submitting via NetDMR Since 3/31/13	Nat'l Rank	Total Facilities Submitting via NetDMR	Nat'l Rank
EPA Region 04	0	21	0	22	0	22	0	18	0	22
EPA Region 06 - AR-GM-LA-NM-TX	459	7	2335	4	2794	4	1	11.5	107	5
Arkansas DEQ	454	8	219	14	673	13	0	18	62	10
Colorado DPHE WQCD	553	6	1664	5	2217	6	37	2	137	4
Connecticut DEP	634	5	1056	8	1690	7	5	8.5	103	7
Indiana DEM	333	10	374	11	707	12	7	5	78	9
Kentucky	**2142**	**1**	**3173**	**2**	**5315**	**2**	**188**	**1**	**649**	**1**
Louisiana DEQ	1708	2	5656	1	7364	1	36	3	375	2
Montana	1357	4	184	16	1541	9	6	6.5	17	14
Tennessee	51	15	2	21	53	20	1	11.5	3	21
Totals	10502		22650		33152		310		2155	

Water Infrastructure Branch

The Water Infrastructure Branch (WIB) consolidates the activities associated with water infrastructure planning, construction, management and funding. The branch is responsible for drinking water and wastewater planning; construction permitting of water line extensions; sewer line extensions and dams; evaluation of management of public water systems, publicly owned wastewater treatment works and dams; and implementation of the technical components of the federal special appropriations grant program of the clean water and drinking water state revolving funds (CWSRF and DWSRF). The branch also manages dam safety and compliance with floodplain permitting and treatment rules. The branch places increasing emphasis on projects that incorporate sustainability and green infrastructure.

Engineering

The Engineering Section of the Water Infrastructure Branch conducts the technical and engineering reviews and approves various infrastructure facilities to include sewer collection projects, drinking water treatment and distribution projects and semi-public water system projects. Since SFY 2009, the Engineering Section has finished the year with no permit backlog. Again this year, all projects were reviewed and processed within the 45-day regulatory timeframe.



The total number of projects reviewed for the SFY 2013 is comparable to the two previous years and have held relatively steady for the third consecutive year. The six review engineers and two administrative assistants continue to develop their knowledge base for reviewing drinking water and wastewater treatment, distribution and collection projects. The staff also continue to review both the technical components and the specifications for projects funded by state revolving funds. Funded projects require field inspections by the review engineers as well.

Wastewater Planning

The Wastewater Planning Section (WPS) reviews and approves regional facility plans for municipal wastewater collection, conveyance and treatment systems in the state of Kentucky. The plans are reviewed for compliance with regulations, efficiency through regionalization, application of the best

available and most appropriate technology and project implementability. During SFY 2013, the section reviewed and approved three facility plans and prepared environmental assessments for 26 projects receiving financial assistance from the clean water state revolving fund. Four facility plans are currently under review. The WPS also reviewed ten asset inventory reports and are in the process of drafting the asset inventory assessment report. Section staff is providing assistance to small utilities in completing the asset inventory form accurately.

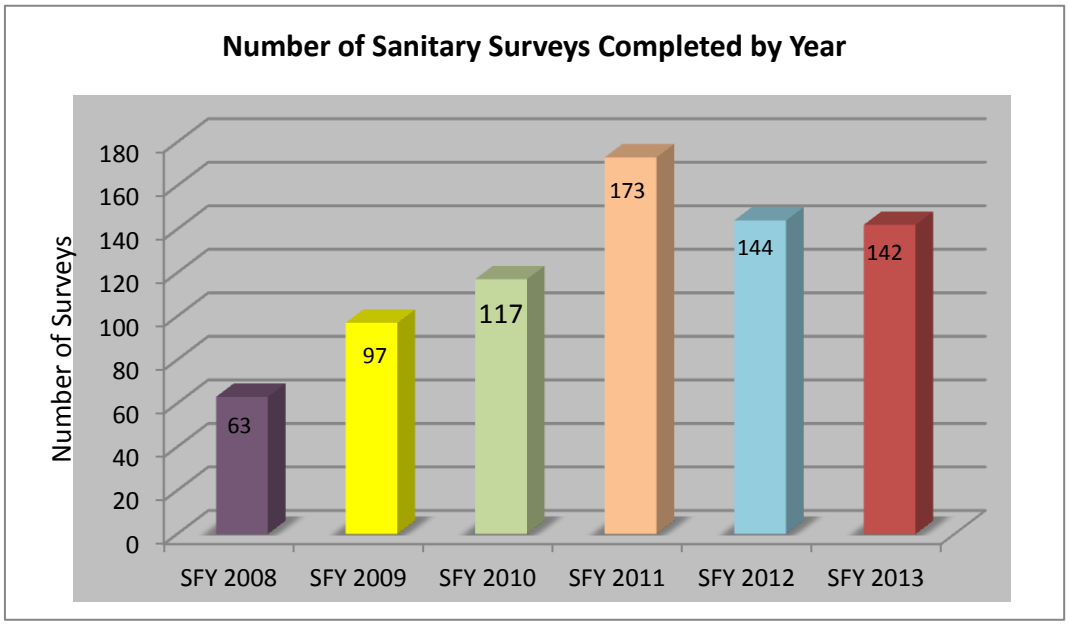
The WPS staff conducted the Clean Watershed Needs Survey (CWNS). The CWNS is conducted in response to Sections 205(a) and 516 of the Clean Water Act. The EPA, in partnership with states, conducts the CWNS every four years when states must document the wastewater and stormwater needs to address water quality or water quality related public health problems. Kentucky documented needs amounting to $6.5 billion.

The section has actively promoted sustainable infrastructure and updates on the revised facility planning regulations through attendance at Area Development District Water Management Council meetings.

Capacity Development

Every community water system is required to meet the same water quality standards using approved treatment processes and chemicals regardless of size or age of the plant or the number of customers served. The Capacity Development Section uses a proactive approach to assist water systems develop technical, financial and managerial capacities while complying with state and federal requirements.

The CDS performed 142 sanitary surveys at public drinking water plants in SFY 2013. A sanitary survey is an on-site review of a public water system's water source, facilities, equipment, operation and maintenance. Surveys point out sanitary deficiencies and assess a system's capability to supply safe drinking water to lower the risk of waterborne disease and identify systems that require technical or capacity development.



State Revolving Funds (SRF) and Special Appropriation Projects (SPAP)

The SRF and SPAP Section is primarily responsible for the administrative functions of the Clean Water and Drinking Water State Revolving Funds (SRF Program) and the EPA Special Appropriation (SPAP) Grants. This entails working with the planning and technical sections of the WIB to commit grant and loan funds for drinking water and wastewater facilities.

The SRF and SPAP Section this year assisted the Kentucky Infrastructure Authority program administrators in committing approximately $123.3 million in SRF funds to drinking water and clean water projects. Demand for the SRF funds remains healthy as communities throughout the state continue to seek low-interest loans from the state revolving funds to rehab the old and build new infrastructure. The section manages 167 active SRF and SPAP projects.

City of Livermore improves wastewater infrastructure

A low-cost $1 million loan from the Clean Water State Revolving Fund has allowed the City of Livermore in McLean County to improve its sewer system to reduce wastewater overlows, improve collection lines and enhance the quality of life for its citizens and improve water quality. The loan, which is adminstered through the Kentucky Infrastructure Authority and DOW, allows the municipality to address problems with the collection system and to reduce infiltration and inflow. An additional $1 million Community Development Block Grant helped pay for the $2 million project.

The city had been experiencing infiltration and inflow issues that caused overflows at manholes in the system and at the wastewater treatment plant. The project was developed to improve sewer service to Livermore's 511 customers (approximately 1,450 people) by mitigating the inflow of storm water into the system during wet weather and relieving the extraneous burden of infiltration and inflow at the Livermore wastewater treatment plant.

After careful consideration, the city decided the most effective solution was to rehab or replace deteriorated sewer lines and manholes. The sewage pumping lift stations were replaced due to the extent of deterioration. The Green River station was replaced at a cost of $150,000 and included variable frequency drives to allow for more consistent flows into the wastewater treatment plant. The Lawrence Street pump station was replaced at a cost of $100,000.

Green Lift Station Valve Vault

Lawrence Street Lift Station

New Program Provides Funding for Small Water Utilities

Twenty-five small drinking water treatment systems in Kentucky are receiving financial assistance through the Capacity Development Assistance Program designed to improve their technical, managerial and financial capabilities to ensure production of safe drinking water in a consistent, cost-effective manner. Small systems are those that serve fewer than 10,000 customers.

The funding program, which is in its second year, is a cooperative venture of DOW and the nonprofit Community Action of Kentucky (through the Rural Community Assistance Program). DOW identified small drinking water systems in need of capacity development assistance based on factors that are not regulated, such as equipment, training and office management.

Many small treatment plants are at a disadvantage because of their budget and personnel limitations, yet they face the same challenges as larger plants that have more money and staff.

Funding was made possible through funds set aside by the Commonwealth of Kentucky from the Drinking Water State Revolving Fund capitalization grant.

Fordsville Water District – $20,000 for mapping
Brodhead Water Works – $15,000 to develop O&M manual
Centertown Water System Phase I – $19,500 for mapping, phase I
Centertown Water System Phase II – $18,000 for mapping, phase II
Morgantown Utilities – $9,745 for mapping
Fleming-Neon Water Company -- $19,500 to conduct leak detection/water loss study
Trenton Water and Sewer – $8,000 for mapping
Dexter-Almo Heights Water District – $3,200 for mapping Area 1
Dexter-Almo Heights Water District – $5,200 for mapping Area 2
Nortonville Water Works – $17,500 for mapping
Western Lewis Rectorville WD – $6,000 for mapping
Pineville Water, Fonde – $3,500 for mapping
Bonnieville Water District – $10,000 to conduct leak detection/water loss study
Mt. Olivet Water Department – $5,000 to develop asset management plan
Wingo Water – $7,000 to conduct tank inspection
Adairville Water Works – $ 5,000 to conduct leak detection/water loss study
Brownsville Municipal Water System – $ 15,000 for mapping
Brodhead Water Works – $15,900 for rate study
Augusta Regional Water Treatment Plant – $3,000 to develop asset management plan
Elkhorn Water District – $15,000 to conduct leak detection/water loss study
Munfordville Water Department – $20,000 to conduct leak detection/water loss study
Livermore Water Works – $ 5,043 for mapping
Burkesville Water Works – $10,500 to conduct tank inspection
Cawood Water District – $19,500 to conduct leak detection/water loss study

The Green Project Reserve

The Green Project Reserve (GPR) is a provision that originated in the American Recovery and Reinvestment Act (ARRA) of 2009, and has been included in SRF capitalization grants since that time. The GPR has generally stated that between 10 and 20 percent of the clean water and drinking water SRF capitalization grants be used to fund projects that address green infrastructure, water or energy efficiency improvements, or other environmentally innovative activities. These four categories of projects make up the components of the GPR that define "green" projects.

Because the SRF programs provide below-market interest rates, these loans are competitive. To be selected for a SRF loan, projects must rank high on an annual priority list that is developed by DOW and is based on a set of ranking criteria. As a result of the national interest in green infrastructure, Kentucky responded by adding green infrastructure incentive points to the ranking criteria for Drinking Water and Clean Water SRF programs.

DOW adopted the federal GPR guidance to use in its evaluation of green infrastructure projects. Those water and wastewater systems that claimed "green" points were asked to submit a short business case to demonstrate eligibility under one of the four green categories.

Capitalization Grant Year	Drinking Water SRF	Clean Water SRF
2009 ARRA Grant	$4,090,000 ($20,450,000 grant)	$9,975,620 ($49,878,100 grant)
2011 Cap. Grant	$2,675,800 ($13,379,000 grant)	$3,758,000 ($18,794,000 grant)
2012 Cap. Grant	$0	$1,798,700 ($17,987,000 grant)
2013 Cap. Grant	The Grant has not been awarded	The Grant has not been awarded

Kentucky GPR Requirements

Capitalization Grant Year	Drinking Water SRF	Clean Water SRF
2009 ARRA Grant	$4,090,000 ($20,450,000 grant)	$9,975,620 ($49,878,100 grant)
2011 Cap. Grant	$2,675,800 ($13,379,000 grant)	$3,758,000 ($18,794,000 grant)
2012 Cap. Grant	**$0**	**$1,798,700 ($17,987,000 grant)**

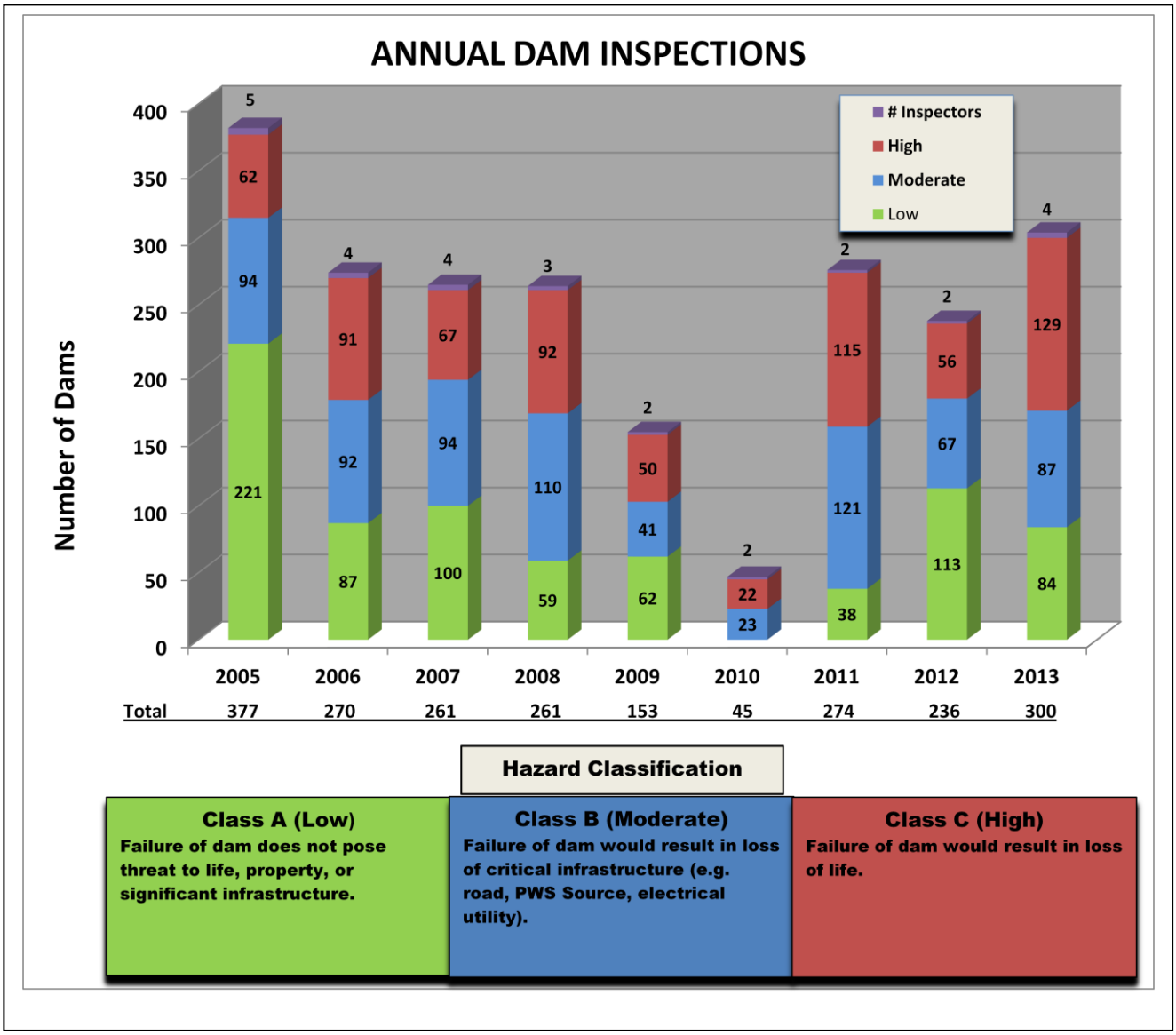
As the table above shows, there was no GPR minimum requirement in the 2012 capitalization grant for the Drinking Water SRF. Regardless of the federal GPR provisions in the future, Kentucky plans to continue to provide incentive points for green projects, as well as for sustainable infrastructure and asset management practices.

Dam Safety and Floodplain Compliance

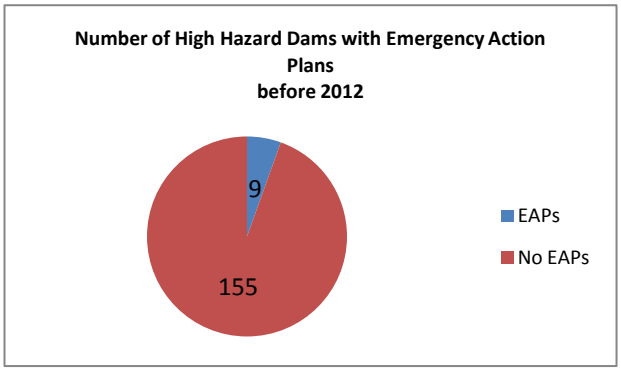
The Dam Safety and Floodplain Compliance Section is primarily responsible for inspecting and permitting of dams and providing oversight in identifying and resolving floodplain compliance issues. DOW engineers inspect between 200 and 300 dams a year. They also investigate and handle remedial actions on cases of construction in floodplains without the appropriate permits or violation of floodplain permit limitations.

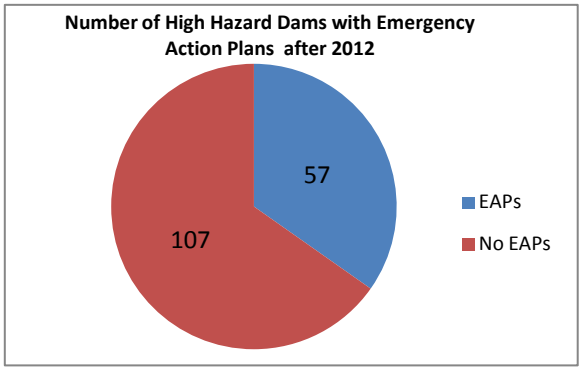
The U.S. Department of Homeland Security has developed for states an integrated software package for two-dimensional dam and levee break flood simulation, inundation mapping and consequence analysis named DSS-WISE. Developing EAPs with DSS-WISE is a cost-effective approach Kentucky will apply to address emergency preparedness for high- and moderate-hazard dams.

Of the more than 1,000 dams in Kentucky that are inspected on a regular basis, none are currently declared unsafe. There is a continual need to find additional sources of funding for development of inundation studies for EAPs and to train dam owners to implement and exercise EAPs.



The National Dam Safety Review Board has recommended that all states have Emergency Action Plans (EAPs) for all high-hazard dams. Of the 164 high hazard dams in Kentucky, the total number of dams with EAPs has risen from 9 to 57, as shown in the chart below. Of the 196 moderate-hazard dams in Kentucky, the total number of dams with EAPs increased from 4 to 22 in 2012. More than 107 high-hazard dams and 174 moderate hazard dams are lacking EAPs.





Dam Safety Mitigation Plan

While Kentucky has been involved in Dam Safety since the 1970s, many of the state's dams are approaching or exceeding their design life, and diagnosing and fixing the deteriorating dams is essential.

Since 2010, DOW, through their State-Owned Dam Repair Program (SODR), has been actively upgrading and repairing 74 dams throughout the state. The Dam Safety Section is tasked with assuring that all 74 dams owned by the Commonwealth comply with dam safety regulations. Remarkable progress has already been made, with seven dams funded for various projects to reduce or mitigate risk.

DOW obtained a $1.6 million Hazard Mitigation Grant through the Federal Emergency Management Agency to characterize and assess risks and develop mitigation strategies for approximately 200 state and local community-owned dams classified as low hazard, moderate hazard and high hazard...

To accomplish this goal, DOW contracted in 2011 with Stantec Consulting Services Inc. to review, test and develop best practices to help quantify, communicate and mitigate current risks associated with the dams. The goals were to (1) develop a standard of practice within the dam safety industry for cost-effectively validating dam hazard classifications and (2) identify mitigation strategies for cases where a classification is no longer valid. The project also included significant public education and outreach to legislators and downstream residents, to inform them of flood hazards associated with dams.

The project team has worked to enhance dam safety programs for close to 200 state and municipally owned dams across the state. DOW has also developed EAPs for 78 dams and Dam Failure Recovery Plans for another 10 dams.

Watershed Management Branch

The Watershed Management Branch (WMB) coordinates the implementation of the watershed framework and watershed basin planning. It also implements groundwater management programs, administers the water withdrawal permitting program and coordinates the development of Geographic Information Systems (GIS) and quality assurance tools and products for the division and the public.

Groundwater Section

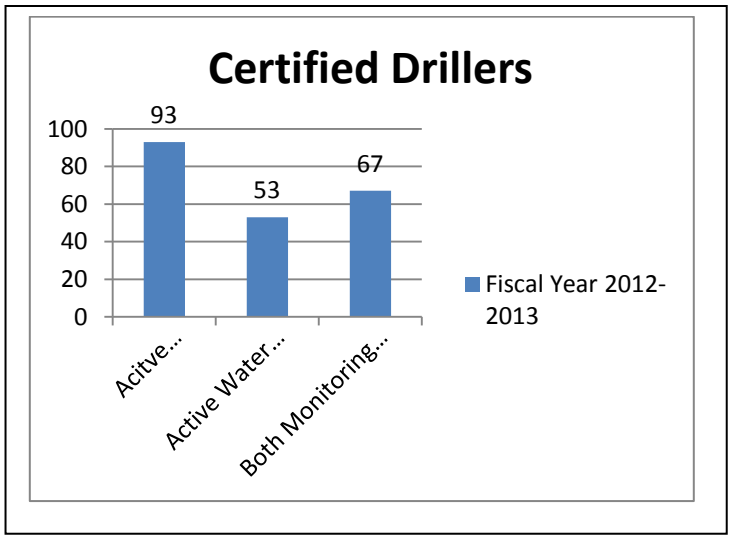
The five staff members and supervisor of the Groundwater Section works to manage and protect the groundwater of the Commonwealth through implementation of the Certified Well Drillers' Program, the Ambient Groundwater Quality Monitoring Network and Groundwater Protection Plans program. Section personnel also regularly provides technical assistance to citizens and industry as well as to local, state and federal agencies.

Certified Well Drillers' Program

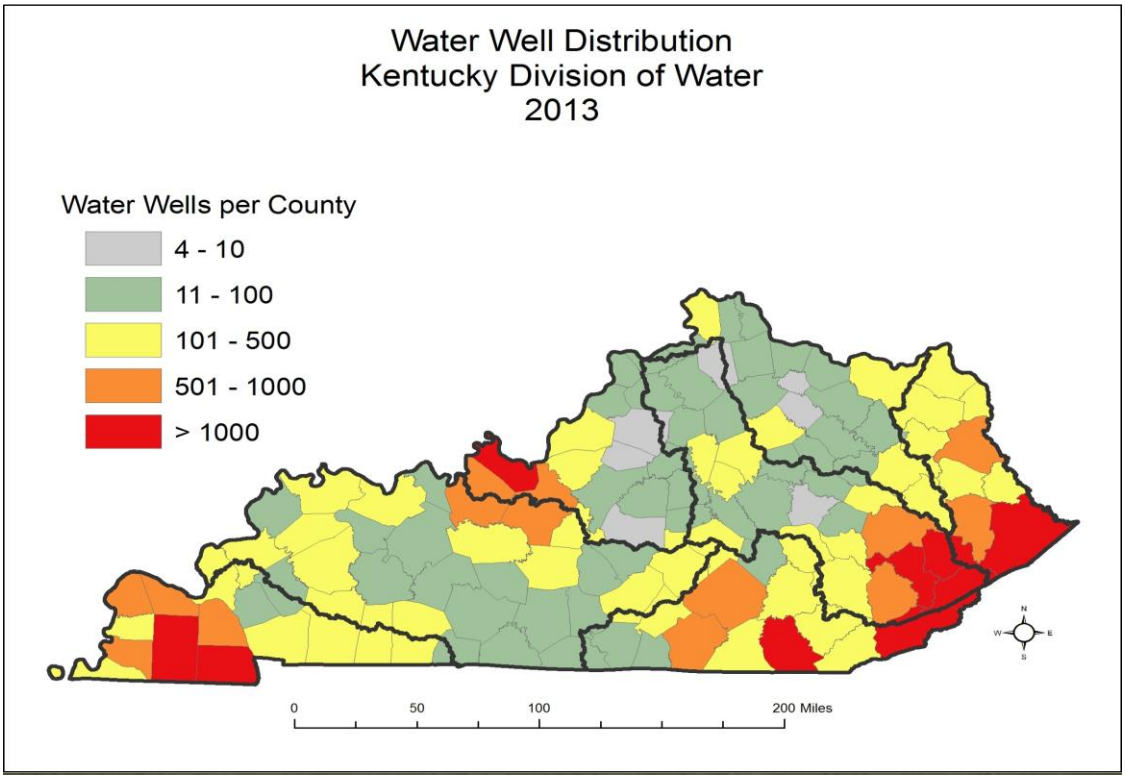
DOW certifies well drillers, provides technical assistance to certified drillers, consultants and the public to ensure groundwater is protected and well construction standards are met. During SFY 2013, DOW issued 213 certifications to water well drillers, including 53 for water wells, 97 for monitoring wells and 67 as dual licenses.

The total of 1,300 wells drilled and officially reported in SFY 2013 can be broadly classified into five categories:

Agriculture	135 wells
Domestic	113 wells
Monitoring and Remediation	580 wells
Public	8 wells
Other	166 wells for misc. uses



Plugging records submitted to the cabinet for the general abandonment of wells during the same time period totaled 1,597. Well abandonments generally mirrored well installations in that the greatest number of wells abandoned were classified as monitoring and remediation wells, accounting for 1,552 of the 1,597 wells abandoned.

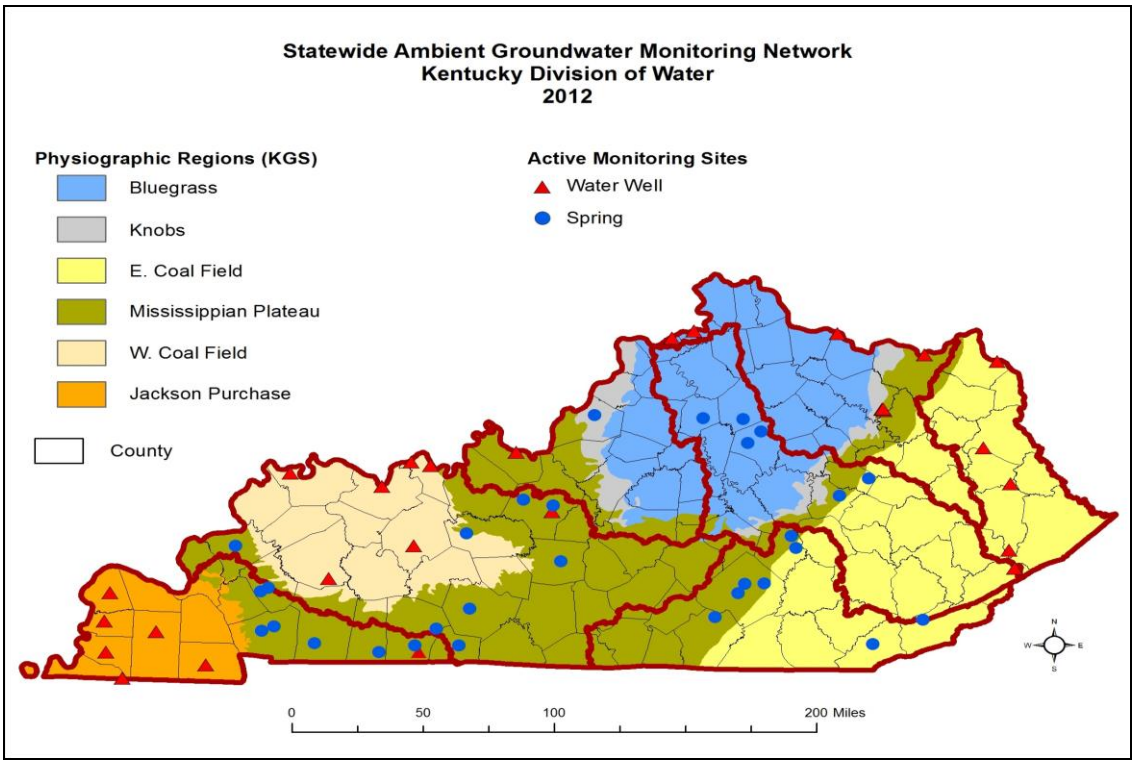


Ambient Groundwater Monitoring Network

The statewide Ambient Groundwater Monitoring Program provides groundwater data for aquifer characterization, ambient groundwater quality assessment and nonpoint source pollution assessment. Groundwater from public water wells and private-sector wells, as well as springs, is sampled quarterly and analyzed for hundreds of parameters, including metals, nutrients, pesticides and volatile organic compounds.

In SFY 2013, DOW staff collected 127 samples from 55 sites (28 wells and 27 springs) across the state. Groundwater quality data were provided to numerous individuals through information requests. Data were also included in statistical analyses for regional and watershed-based groundwater assessments.

Program	Wells	Springs
Ambient Monitoring Network	49	73
Statewide Pathogen Study	203	8
Western Kentucky Karst Study	0	84
Pesticide MOA	4	12
Complaints	46	6
TOTAL	302	182



Statewide Ambient Groundwater Monitoring Network

Region	# Sites	Basin Management Unit	# Sites
Bluegrass*	5	1 – Kentucky	6
Ohio River Alluvium	10	2 – Salt & Licking	7
E. Coalfield	8	3 – Green & Tradewater	15
Mississippian Plateau	24	4 – Four Rivers, Upper & Lower Cumberland	22
W. Coalfield	2	5 – Big and Little Sandy, & Tygarts	5
Jackson Purchase	6		

Table 2 *Bluegrass Region includes Inner and Outer Bluegrass and Knobs

The spatial distribution of permanent groundwater sampling locations based on physiographic region and basin management unit (BMU).

Groundwater Protection Plan Program

Activities that have the potential to pollute groundwater may require the development of a Groundwater Protection Plan (GPP). Some of the activities that require GPPs involve the storage, handling or application of pesticides, fertilizers, hazardous and solid wastes; transmission through pipelines of raw materials (e.g., petroleum), installation and operation of on-site sewage disposal systems; mining and associated activities; installation and abandonment of wells; and commercial and industrial transfer of raw materials in bulk.

DOW staff help develop and review the GPPs and perform on-site inspections to ensure GPPs include employee training and record-keeping. In SFY 2013, DOW staff reviewed 149 GPPs. A guidance document is also being prepared to assist geothermal drillers in developing a GPP in association with the installation of closed-loop vertical boreholes.

Public Assistance

Groundwater Section personnel respond to groundwater complaints and conduct investigations as requested by the general public. In SFY 2013, DOW collected 38 samples from 41 sites relating to complaint investigations (35 wells and 6 springs). Many water well and spring inspections and requests for technical assistance are completed in response to citizen requests for a comprehensive inspection of domestic drinking water systems, professional advice and onsite technical assistance.

Dye Trace Special Projects

The Groundwater Section conducted 31 tracer tests for karst mapping projects and groundwater technical assistance. The section also assisted 11 county health departments, DOW Dam Safety, U.S. Army Corps of Engineers, the Division of Mine Reclamation and Enforcement, Division of Waste Management, Princeton Sewer Department, the Lexington-Fayette Urban County Government and the Somerset Sewer Department with dye traces relative to localized contamination and subsurface connection investigations.

Support of Certified Drillers Program

DOW staff working with Geographic Information Systems and Data Analysis Section (GDA) manage the receipt, review and processing of all monitoring and water well records, well inspection forms and spring inventory forms. Of the 1,056 well installation records received, 269 (25 percent) were submitted to DOW from drillers via eForm during SFY 2013 while 15 of the 247 water well installation records (six percent) were submitted electronically.

Well and Spring Record Processing					
	Monitoring Wells (Install / Plug)		Water Wells (Install / Plug)		Springs
Received	1,056	743	247	14	9
Processed	4,142	1,055	252	43	57
Prepared for Scan	5,099		674		6
Archived	2,971		524		18

GDA staff provide regular technical support to drillers, the public, private industry, and other state government employees on monitoring and water well issues. These issues include casing requirements based on lithology, drilling methods, setback requirements, maintenance and plugging requirements per the applicable regulations. Assistance is also provided to the public on such topics as safe drinking water levels in public consumption wells, treatment options and alternative drinking water sources.

Wellhead Protection Program

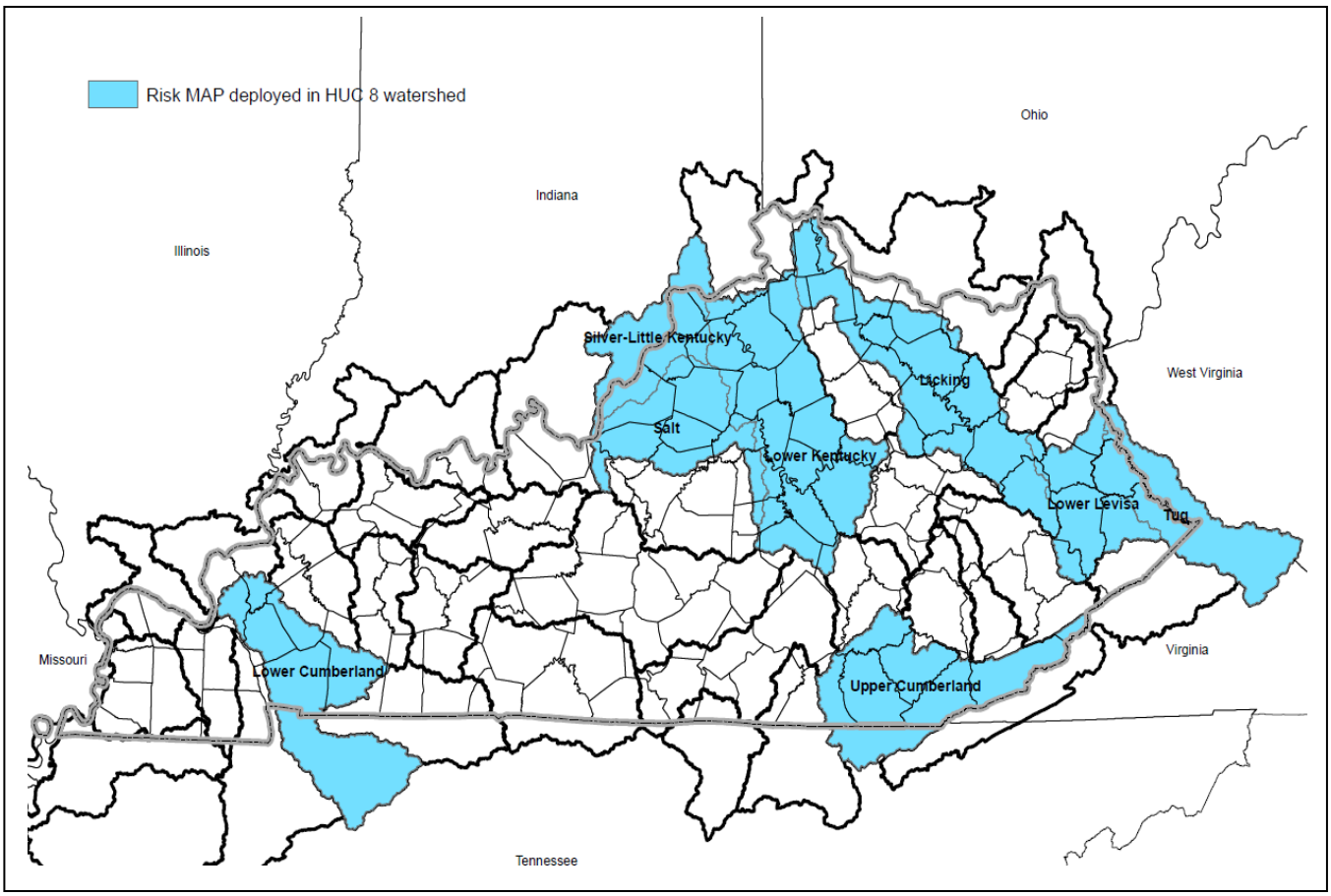
During SFY 2013, the Watershed Management Branch, Wellhead Protection Program (WHPP), and the Kentucky Transportation Cabinet's Division of Traffic Operations designed and fabricated new Water Supply Protection Area signs. The new signs feature the standard DOW logo and the Water Supply Protection Area-Report Spills motto. They are designed to be easily read and recognized. To date, many of the transportation districts have completed the installation of new signs and replaced any old signs. All of the existing signs will be replaced with the new sign design for continuity.

The signs are a part of the public education efforts to develop awareness of the presence of wellhead and source water protection areas around the state. Public awareness of drinking water sources and the impact of their actions on these sources is invaluable to source water protection efforts.

Many people are simply unaware of the source of their drinking water. Groundwater is especially susceptible to the "out of sight, out of mind" mentality. By pointing out the locations of these areas and urging residents to report spills, DOW can promote not only the protection of drinking water sources, but also encourage environmental protection in general.

Kentucky Risk MAP is a collaborative effort between DOW and FEMA intended to better communicate flood risk across a variety of disciplines. The major tenets of Risk MAP include accurate flood hazard identification, identification of areas where major watershed changes have altered flooding characteristics resulting in the need for updated flood studies, integrating the products created through Risk MAP into regional and community hazard mitigation planning, and identifying and advancing mitigation actions that reduce flood risk in communities throughout the Commonwealth. To date, Risk MAP has been deployed in eight HUC 8 watersheds, encompassing approximately 55 percent of the state's population (see map below).

DOW has initiated integrating Dam Safety into Risk MAP activities since dam failures may pose a significant risk to public safety and offer opportunities to mitigate flood risk. Several of the watersheds where ongoing Risk MAP studies are occurring are shared with other states and FEMA Regions. With these considerations in mind, DOW Risk MAP efforts also include collaboration with stakeholders outside of Kentucky.



This map depicts the areas of Risk MAP deployment.

Risk MAP programmatic goals achieved during SFY 2013 include

1) Development of a DOW Dam Safety Mitigation Plan.
2) Development of an interactive flood risk web portal.

3) LiDAR collection in a large area of the Jackson region of Kentucky.
4) Updated Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FISs) in eight counties
5) Identification of mitigation actions in Risk MAP watersheds that will be incorporated into community Hazard Mitigation Plans with the intent to advance two to three actions per community in each watershed.
6) Integration of FEMA's revised Levee Analysis and Mapping Procedures (LAMP) into applicable flood studies.
7) Collaboration with the USACE Silver Jackets initiative with regards to three pilot projects.
8) Participation in the State Hazard Mitigation Council.
9) Development of a Risk Communication Toolbox that includes video tutorials published on social media channels, fact sheets and web resources.

Nonpoint Source Pollution Program

The mission of the Nonpoint Source and Basin Team Section is to protect Kentucky's surface and groundwater from nonpoint source pollution, to abate pollution threats and to restore degraded waters to the extent that water quality standards are met and beneficial uses are supported. The section works with federal, state, local and private partners to promote complementary, regulatory and nonregulatory pollution control initiatives at both statewide and watershed levels.

The section administers and implements the DOW's 319(h) federal grant program. Each year, EPA awards DOW with grant funds for the purpose of addressing problems associated with nonpoint source pollution. All projects that receive funding are required to provide a 40-percent nonfederal match to support the project. Priority is given to projects involving watershed-based plan development and implementation in impaired waters, as well as protection of Special Use Waters with identified threats.

This year, communities and organizations shared $2.64 million in federal grants to develop watershed plans and implement nonpoint source pollution controls. DOW awarded $1.54 million to four sub-grantee project contractors to implement statewide and regional water agricultural nonpoint source education, as well as implement three watershed plans and one Total Maximum Daily Load (TMDL).

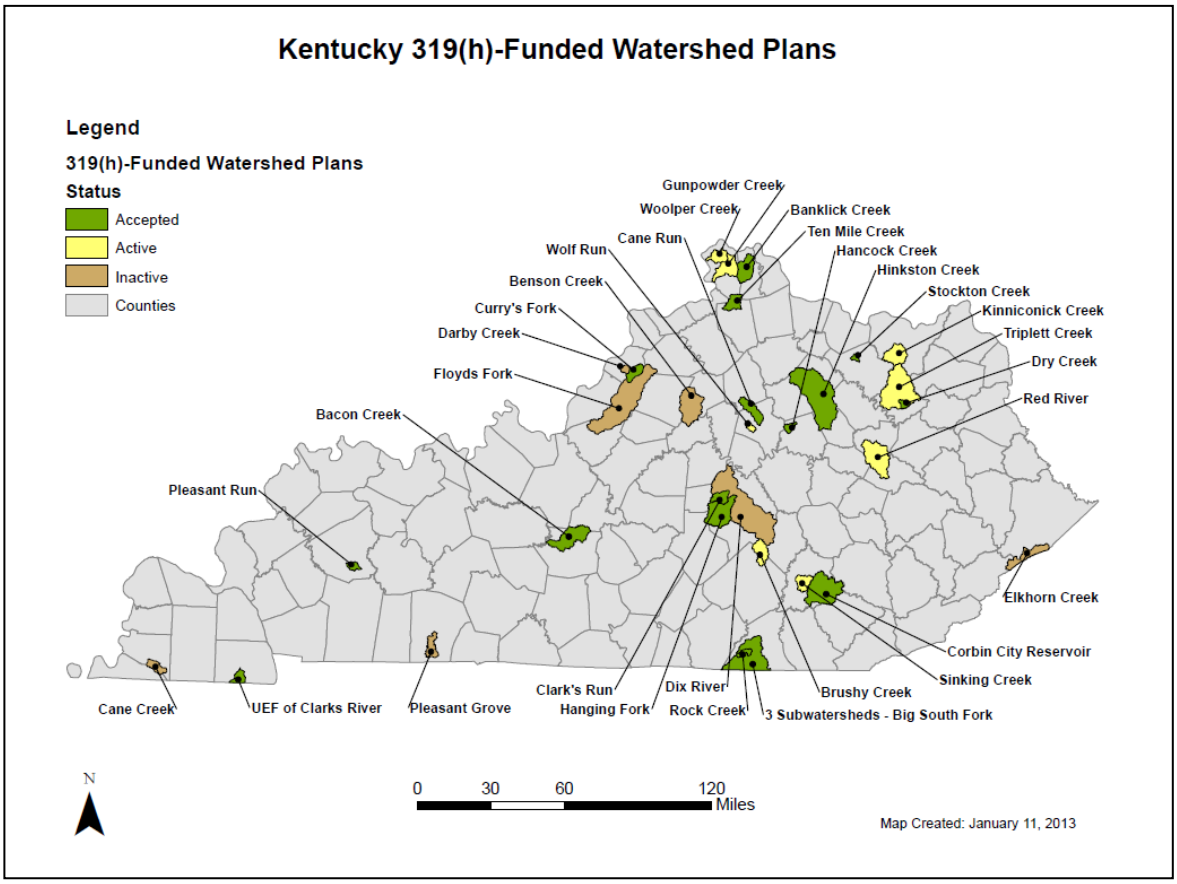
An additional ten projects were funded through the re-obligation of funding from a combination of the 2008, 2009 and 2010 grant years. All 14 projects have executed contracts and have begun work. The Kentucky Division of Conservation received $54,000 to provide technical assistance and oversight on sub-grantee projects with a focus on agricultural issues.

Watershed Planning and Implementation

DOW staff provided technical assistance to watershed groups for the development of watershed plans by conducting reviews of 12 draft watershed plans during SFY 2013. Two of the watershed plans – Wolf Run in Fayette County and Three Tributaries of the Big South Fork River in McCreary County – were accepted for implementation.

Watershed plan reviews continue to be coordinated through the Kentucky Inter-branch Watershed Implementation Workgroup, which provides the opportunity for all DOW branches to comment on or offer constructive feedback on watershed plans prior to acceptance. Currently, 17 watershed plans have been accepted for full or partial implementation with Clean Water Act Section 319(h) funding. An additional 11 watershed plans are currently under development.

There are 14 watershed plans currently being implemented through one or more non-point source pollution (319h) grant contracts per plan. Implementation is primarily centered on the employment of watershed coordinators to conduct education and outreach in the watersheds. The watershed coordinators also manage the implementation of on-the-ground best management practices to reduce of nonpoint source pollution coming from urban stormwater, failing on-site wastewater systems, agriculture, and the loss of riparian zones around water bodies.



Environmental Education and Outreach

DOW provides nonpoint source pollution education and outreach activities across the Commonwealth in addition to what is offered by 319(h) sub-grantees. DOW considers education the key to raising awareness, changing attitudes and affecting action by empowering and encouraging individuals to take an interest and responsibility in their community watersheds. Without a solid foundation in environmental literacy, much of the watershed improvements completed by DOW and 319(h) sub-grantees may be misunderstood or even undone by misinformation.

During SFY 2013, DOW 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. DOW also supported more than 30 educational outreach events in the past year, reaching more than 5,000 people.

DOW mascot Ollie Otter greets visitors to the Earth Day celebration sponsored by Gov. and Mrs. Steven Beshear.

Ollie Otter meets and greets attendees at the 36th Annual Kentucky Association of Environmental Education Conference.

Project WET™
Water Education for Teachers
KENTUCKY
Divison of Water

In 2012, DOW sought and received designation as the host institution for Project WET in Kentucky. This has allowed DOW to be a leader throughout the state in a nationally and internationally recognized water education program. DOW is conducting trainer workshops for those interested in teaching Project WET as well as providing coordination and support for those who will conduct the educational workshops. This will maximize the number of people reached with this valuable and effective educational teaching tool.

Project WET's goal is to provide scientifically accurate and educationally sound water resources education materials, training courses and networking services to citizens, organizations, governments and corporations. The Kentucky Project WET coordinator has multiple roles, including training facilitators and educators across the Commonwealth, ensuring certified facilitators have all required forms to support their workshops, managing activity guide orders, and developing and maintaining a database of certified facilitators and educators in Kentucky. DOW has signed an MOU with the Kentucky Association for Environmental Education to coordinate project trainings and further promote water education in Kentucky.

Watershed Watch training in Kentucky

DOW has been working closely with the Watershed Watch in Kentucky (WWKY) nonprofit organization to promote volunteer water monitoring. The WWKY program recently updated sampling protocols and the materials used to train volunteers. Since the new materials were introduced in January 2012, a total of 56 Watershed Watch trainers and 548 volunteer samplers have been trained at 92 training events. The remaining 1,100 citizen volunteers will be trained over the next few years.

Volunteers are trained in two phases. Phase I training teaches watershed basics and how to take grab samples and collect in-stream field chemistry. Phase II training teaches how to conduct habitat assessments and biological monitoring.

As a part of their training, volunteers are loaned equipment to use in the field, including dissolved oxygen and pH kits, conductivity meters, thermometers, D-frame nets and white bins. Volunteers are also provided with a color flip booklet with laminated pages that explain step-by-step procedures as well as illustrations of benthic macroinvertebrates.

The new materials have been very well received by volunteers. The revised protocols and renewed emphasis on training citizen volunteers has resulted in improved participation in the organization and greater numbers of water quality samples being collected for analysis.

River Basin Team Coordination (RBTC) Program

The goal of the RBTC program is to engage citizens and local governments, along with other interested agencies and entities, to participate in education activities and projects that have a positive impact on water quality in their watershed. The basin coordinators provide a unique interface between DOW and the public that enhances communication, understanding and cooperation in addressing watershed issues and meeting the goals of the Clean Water Act.

The basin coordinators continue to implement DOW's watershed management initiatives with cooperating agencies, local governments and citizens across the state. This involvement takes place through participation in basin team meetings, watershed groups' organizational and planning meetings, various citizen groups' activities and efforts, as well as other watershed-related events.

Additionally, the Licking, Kentucky, Green/Tradewater, and Four Rivers basin coordinators all received the updated Watershed Watch "Train-the-Trainer" instruction utilizing the new sampling protocols. The basin coordinators continue to conduct regular Watershed Watch Volunteer Sampler training events.

The basin coordinators continue to provide education on watershed-related topics to a variety of audiences. During SFY 2013, basin coordinators have conducted and participated in rain barrel and rain garden workshops and school environmental field days, and given presentations to conservation district annual meetings, local government and planning meetings, school groups and community groups.

The DOW makes available to the public a large supply of environmental educational equipment that allows teachers and other professionals to use a variety of resources for educational events that precludes the need to purchase and maintain their own individual equipment. This equipment can be viewed and reserved through DOW's Water Watch Program website, and picked up at DOW's Frankfort Central Office.

Hinkston Creek Watershed Project engages community

Hinkston Creek originates in the southern and western portions of Montgomery County and flows through the city of Mt. Sterling. It then proceeds northward through Bourbon County, where it joins with Stoner Creek to form the South Fork of the Licking River. The river is used as a drinking water source and a recreational resource by communities in Harrison County and other counties, making good water quality a public health concern.

The watershed, which is predominantly agricultural, drains 260 square miles of rolling pastureland in the Outer Bluegrass region northeast of Lexington. Over the years, DOW had identified several reaches of the mainstem of the creek and major tributaries as impaired due to the effects of agricultural activities and aging septic systems.

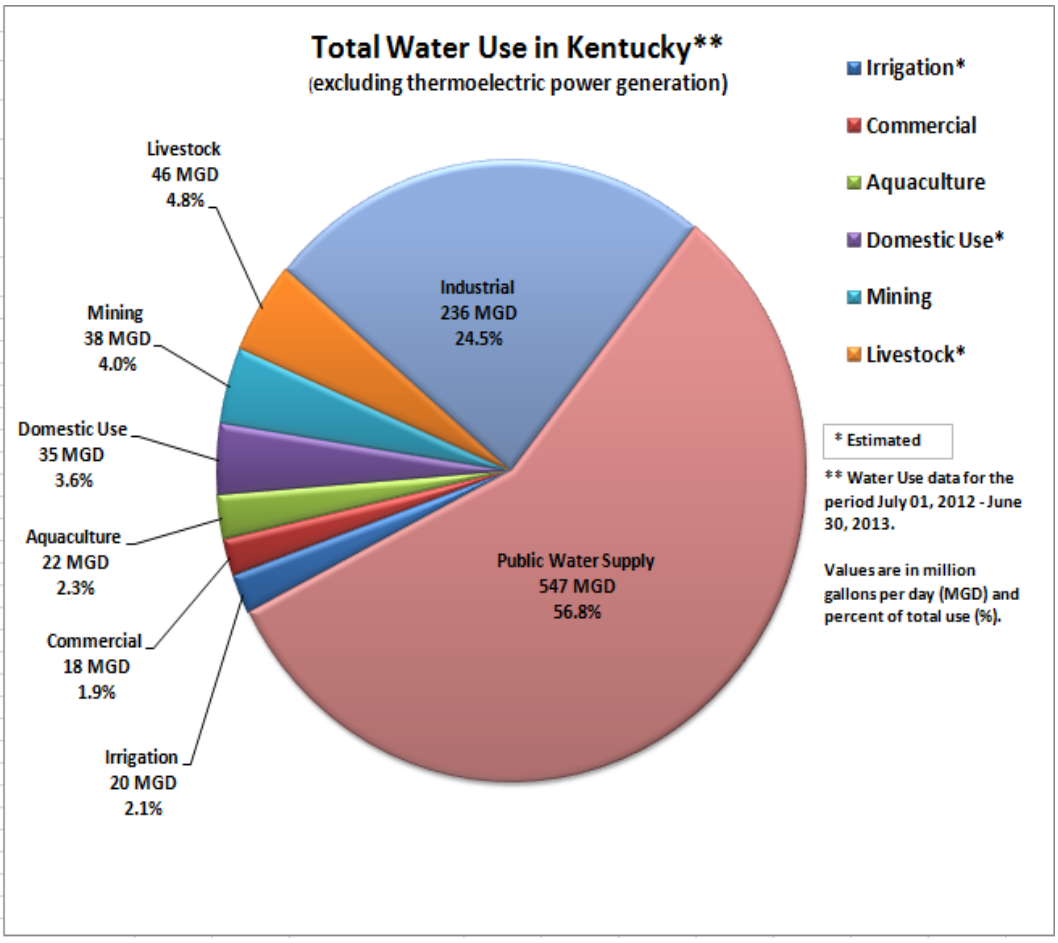
In 2010, a coalition of county conservation districts, local and state government entities, private land owners and businesses and other interested people decided to do something about the problems. Armed with a $484,000 Clean Water Act nonpoint source pollution control (319(h) grant issued by DOW and coordinated through the Kentucky Division of Conservation, the team went to work. In an effort to proactively address impairments and improve water quality, county conservation districts, local governments officials and other interested parties worked with Tetra Tech environmental consulting firm to review existing data, assess water quality and watershed conditions and develop a plan to address the impairments.

Agriculture producer partners installed 14,128 feet of fencing to prevent livestock access to waterways plus 5,480 feet of waterline to supply 12 stock watering tanks. Seven heavy-use feeding areas were stabilized with the use of geotextile and stone. Signs along roads announcing the name of the watershed as well as signs on bridges that identify the creek as Hinkston help raise awareness of the watershed and the need to protect it. In addition, two stream crossings allow livestock to cross with minimum stream disturbance through the use of protective ramps, culverts and fencing.

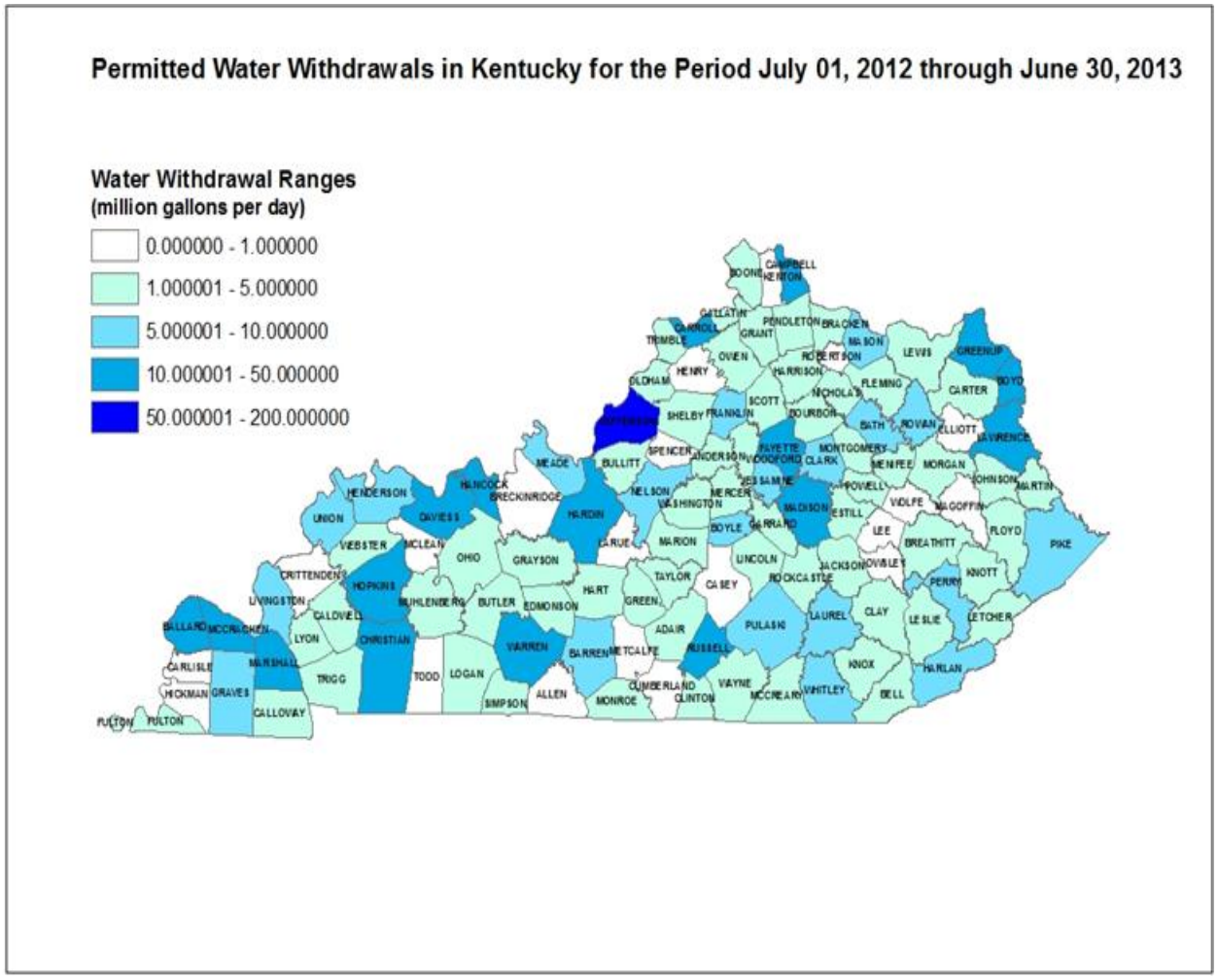
Water Use in Kentucky

For SFY 2013, a total of 862 million gallons per day, excluding cooling water withdrawals for thermoelectric power generation, were reported withdrawn from the major water use sectors in Kentucky. This is just two percent less than the reported water withdrawn during SFY 2012. Withdrawals from surface water (rivers, streams, lakes and ponds) accounted for nearly 77 percent of the total water withdrawn in Kentucky.

Water used for purposes of generating thermoelectric power accounted for 75 percent of the total water withdrawn in Kentucky for the fiscal period ending June 30, 2013. A majority of the water used for power generation is not consumed and is used primarily for cooling purposes and then returned to the source. When thermoelectric power generation is excluded, public water supply and industrial water use accounted for 81 percent of the total water withdrawn in Kentucky.



A majority of counties in Kentucky reported average daily withdrawals less than 5 million gallons per day for SFY 2013. Counties with average daily withdrawals above 10 million gallons per day are generally associated with larger population centers or large industrial water demands. The sources for these large withdrawals are primarily located in the Ohio River and its alluvium or from direct or indirect use of water that is stored and released from U.S. Army Corps of Engineers (USACE) reservoirs.



Climate Summary and Drought Development

Kentucky weather history in SFY 2012 exhibited extremes in both drought and excessive rainfall. The fiscal year began in July 2012 in the midst of a severe drought and record-high temperatures. While mid-July and August brought relief from the drought in eastern and central Kentucky, western portions remained entrenched in extreme to exceptional drought until the fall. Despite the relief, 2012 was the driest year on record for Paducah. The first half of 2013 was the opposite, during which the entire state experienced wet, cool conditions.

		FY 2011-2012 (Jan-June, 2012)	FY 2012-2013 (Jul-Dec, 2012)	FY 2012-2013 (Jan-June, 2013)
Region	Location (County)	Precipitation Departure from Normal (inches)		
Western Climatic Division 	Caldwell	(14.51)	(3.04)	4.20
	Fulton	(12.63)	(4.88)	9.26
	Henderson	(12.02)	(3.76)	2.40
	Marshall	(10.01)	(6.51)	9.02
Central Climatic Division 	Adair	(7.27)	0.42	1.63
	Breckinridge	(6.17)	(1.64)	0.56
	Grayson	(5.80)	(3.96)	3.02
	Warren	(10.77)	(3.45)	1.43
Bluegrass Climatic Division 	Boone	(4.98)	2.43	2.05
	Fayette	(6.92)	0.99	4.93
	Madison	(7.46)	(0.63)	2.19
	Nicholas	(6.92)	6.18	3.92
Eastern Climatic Division 	Knott	(5.01)	1.52	3.27
	Knox	(3.48)	3.91	4.39
	McCreary	(1.98)	0.07	3.08
	Rowan	(2.17)	1.91	0.43

Precipitation departures from normal for the second half of SFY 2011 and 2012 indicate the extreme drought conditions leading up to SFY 2013 and the shift to above-normal rainfall.

The peak of the drought combined with 100-plus degree temperatures took place concurrent with corn pollination resulting in stressed plants that did not produce full ears of corn. In the western parts of the state, many non-irrigated corn crops completely failed and some were even cut and baled to feed cattle. There were heavy losses to both livestock and crop production. Of the $460 million dollars paid out in crop insurance indemnities, 96 percent was drought and heat related.

On July 5, 2012, DOW issued a Water Shortage Watch for 27 counties. A number of counties were included due to high demand coupled with decreasing flows on the Kentucky River. No public drinking water systems experienced any drinking water shortages due to drought conditions.

GIS & Data Analysis

The GIS & Data Analysis Section (GDA) consists of eight employees with backgrounds in hydrogeology, biology, statistics, geospatial technology, computer programming and technical data management. The section provides support and programmatic direction to DOW in the areas discussed below.

Geographic Information Systems (GIS)

GIS is a computer system for integrating, displaying and manipulating data related to positions on the Earth's surface. DOW is using computerized GIS to better understand how to manage Kentucky's water resources. GIS can be a powerful tool for assessing water quality, determining water availability, predicting and mitigating flooding, understanding the natural environment and managing water resources. GIS staff continue to facilitate the DOW GIS workgroup and the informational series *It's GIS Lunch* in an effort to share strategies and techniques using GIS tools. GIS staff are responsible for the receipt, review and processing of all monitoring and water well records, well inspection forms, spring inventory forms and well plugging records.

Well and Spring Record Processing					
	Monitoring Wells (Install / Plug)		Water Wells (Install / Plug)		Springs
Received	663	1563	358	34	47
Processed	1,232	2,195	489	57	50
Prepared for Scan	3,197		706		171
Archived	1,323		557		69

Database Management

One of the projects involving GIS staff was the development of a temporary database to house incoming coal monitoring data. Assistance was also given toward in-house data management by streamlining functional areas, restructuring work activity logs, processing assessments for certified driller fees, creating electronic files for all certified drillers and each reported water well and spring location in the state. GIS staff assisted with development of K-WADE, the new water quality database.

Working with the Kentucky Geological Survey, the staff merged 13,731 water quality results and 8,836 field measurements from 1,626 KGS site visits into the Kentucky Consolidated Groundwater Database.

Data Analysis

Data Analysis projects included

- Detection of trends in nitrogen and phosphorus in effluent and groundwater.
- Comparison of total metals and dissolved metals in groundwater
- Selenium study
- Analysis of groundwater in Letcher County and Eastern Coal Field
- Annual pesticide data analysis
- Statistical analyses for the Floyds Fork model calibration and the selenium in fish tissue and water column.

Teamwork Leads to Success

With help from other DOW staff members, the GIS and Data Analysis Section and their partners have brought both the water well and well inspection records current as of June 2013, with a 24-hour turn-around time from receipt to being processed in TEMPO.

They attained this same benchmark in 2011 for monitoring well, well plugging and spring records, and have maintained this benchmark along with their other job duties.

Additionally, this has allowed GDA to address numerous "problem records" (those requiring extensive research through historic documents in TEMPO) and update 438 historic records into TEMPO.

Making sure both well construction details and accurate locations for these wells are available in TEMPO is of great importance to several permitting programs within DEP. The Water Withdrawal program in DOW and the Solid Waste and Hazardous Waste programs in DWM must include active wells (as subject items) within a permit before it can be issued. The Underground Storage Tank program in DWM requires documentation of plugged wells on site before they can issue No Further Action notifications.

Since SFY 2009, GDA has processed a total of 16,539 well records into TEMPO. This represents the first time since the early 1990s that all received well and spring records have been current.

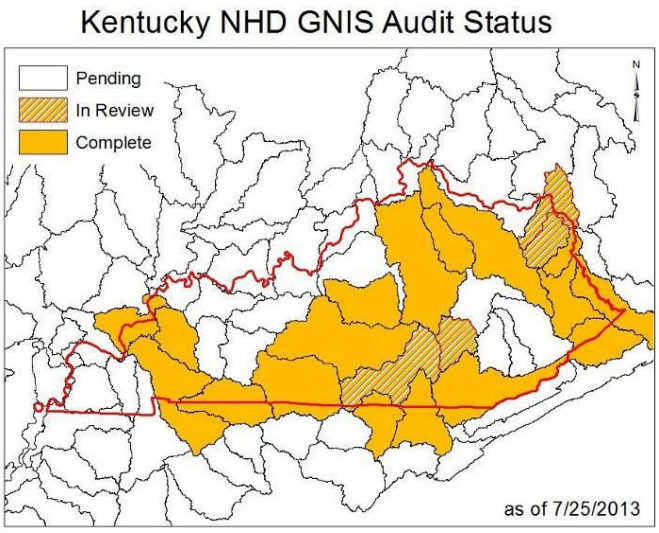
Type of Record	Number of Records Processed by Year				
	FY2009	FY2010	FY2011	FY2012	FY2013
Water Well Records & Insp Forms	471	306	263	293	489
Monitoring Well Records	445	617	1,367	4,165	1,232
Spring Records	29	4	6	76	50
Plugging Records	1,227	1,303	846	1,098	2,252
Total Records Processed:	**2,172**	**2,230**	**2,482**	**5,632**	**4,023**

National Hydrography Dataset (NHD) Stewardship

The NHD Stormwater Data Integration Project is an ongoing effort to incorporate stormwater data provided by local and regional sanitation districts into the NHD. Requests for digital stormwater pipeline and drainage ditch data were made to various cities and sanitation districts through the MS4 program. The following data sets have been incorporated:

- Louisville Metropolitan Sewer District, surface water features
- Lexington-Fayette County, surface and sub-surface features
- Northern Kentucky Sewer District 1, surface and subsurface features
- Paducah-McCracken County
- Owensboro-Daviess County
- Richmond

As part of the NHD Named Features GNIS (Geographic Names Information System) audit project, the state data steward continued to work on the systematic process to audit GNIS features sub-basin by sub-basin and corrected errors. Discrepancies due to an error with the GNIS record were reported to the federal Board of Geographic Names. To date, audits of the GNIS features of 17 sub-basins have been completed and corrections submitted. Two are awaiting approval and 15 have been accepted.



Water Quality Branch

The Water Quality Branch is responsible for collecting, analyzing and making scientific determinations (assessments) of the health of Kentucky's waterways. Water quality standards are the tools used to assess whether the quality of Kentucky's rivers and lakes are adequate for public consumption, recreation, agriculture, industry, and aquatic life. Programs in the branch consist of Water Quality Standards, Monitoring and Assessments, Total Maximum Daily Load (TMDL), Water Quality Certification, and the Wild Rivers Program. Designation and classification of Exceptional Waters, Outstanding States Resource Water, and Outstanding National Resource Waters enable the protection of Kentucky's highest quality waters. Impaired waters are restored through the Total Maximum Daily Load Program. Water resources are protected through the Water Quality Certification and Wild Rivers programs.

Science and technical staff in the branch serve as advisors for issues related to water quality standards, KPDES permitting, spill response, sampling/training protocols, watershed-based planning and all issues related to aquatic sciences. Branch personnel also participate on a host of technical and planning committees to further DOW's mission. The branch is involved in public education and outreach initiatives related to highly complex programs, such as Water Quality Standards, TMDLs and 401 Water Quality Certifications, to make protection of the water quality, aquatic life, and recreational use relevant to all Kentuckians.

Nutrient pollution remains a national issue with significant local impacts, and the division is developing the Kentucky Nutrient Reduction Strategy to identify sources of nutrients in Kentucky, methods of addressing nutrients, and source-specific strategies for nutrient reduction in priority watersheds.

Significant endeavors for the WQB included: 2012 Triennial Review and Update of Water Quality Standards, 2012 Integrated Report (assessed and impaired waters) to Congress, Floyds Fork pathogen and nutrient TMDLs, harmful algal blooms, DOW lab certification, field sampling training, Water Quality Standards Academy, Wild Rivers documentary, and riparian buffers promotion.

Triennial Review of Water Quality Standards

Section 303(c) of the Federal Pollution Control Act of 1972 requires states to review, adopt or develop and revise their water quality standards every three years. The Triennial Review was formalized in 2011 with topics ranging from water quality standards updates to reflect current National Recommended Water Quality Criteria, update to narrative criteria, commensurate definitions and implementation procedures for Outstanding State Resource Waters (OSRW). As the Triennial Review process proceeded through stakeholder participation, suggestions made by those participants were noted and incorporated for address per the proceedings under the Clean Water Act. The more visible and substantial revisions to water quality standards are outlined below.

- Revisions to the narrative nutrient standard to clarify DOW's interpretation and application of the standard, including a clarification of the definition of "eutrophication" to specify that nutrients shall not be elevated in a surface water to a level that results in adverse impacts to the aquatic community due to excessive eutrophication.

- Clarification of the dissolved oxygen standard that applies to the main stem of the Ohio River to specify that the dissolved oxygen standard is an in-stream standard that is achieved after mixing with the receiving water.
- As part of the triennial review of Kentucky's water quality standards, DOW made notice of the agency's proposal to update Kentucky's water quality criteria for selenium to reflect the best available science.
- Addition of 13 stream segments as Exceptional Waters.
- Addition of 27 stream segments as Outstanding State Resource Waters.

Wild Rivers Program

Portions of nine rivers and streams of exceptional quality and aesthetic character have been designated as Kentucky Wild Rivers in accordance with KRS 146:200-360. The protected segments include portions of the Cumberland River, Red River, Rockcastle River, Green River, Big South Fork of the Cumberland River, Little South Fork of the Cumberland River, Martin's Fork of the Cumberland River, Rock Creek and Bad Branch of Poor Fork of the Cumberland River.

Each Wild River is actually a linear corridor encompassing all visible land on each side of the river up to a distance of 2,000 feet. Management activities also include quarterly water quality monitoring in each Wild River corridor, periodic monitoring of high traffic areas and an annual aerial land use survey.

DOW management of the nearly 4,000-acre Wild Rivers inventory includes eradication of invasive species, monitoring of illegal activities and maintenance of property boundaries. The purchase of an additional two tracts totaling 1,100 acres is expected to close by the end of 2013.

Kentucky's Wild Rivers gained notoriety when crews with the Public Broadcasting Service (PBS) station at Western Kentucky University completed filming visits to Wild Rivers properties throughout the state and aired the one-hour documentary in celebration of Earth Day 2013.

Latest acquisition pushes Wild Rivers inventory past 4,000 acres

The acquisition of 458 acres of mature, high-quality forest in Pulaski County will help protect the exceptional quality and aesthetic character of the Rockcastle River, a portion of which is designated a Kentucky Wild River.

“We’ve had our eye on this particular property for about ten years in hopes that it would become available,” said Zach Couch, coordinator of the DOW Wild Rivers Program. “The landscape is a woodland of mature trees, mainly red oak and hemlock. Most importantly, however, is the inclusion of 90 acres of frontage on the Rockcastle River.”

The Rockcastle River contains a diverse assemblage of fish and mussels including several state and federally listed endangered species. In addition, the Dr. William H. Martin Watershed and Wildlife Conservation Area contains a vast summer roosting habitat for the Indiana bat and foraging habitat for the gray bat and other bat species.

The Kentucky Wild Rivers Act of 1972 designated segments of nine rivers, including a portion of Rockcastle River, as Wild Rivers. This designation allows the stream segments to retain many of their natural attributes and it protects them from unwise use and development. Each Wild River is actually a linear corridor encompassing up to 2,000 feet of all land on either side of the river.

Aptly nicknamed “Jack O’Lantern mushrooms,” *Omphalotus olearius* found on the Wild Rivers property grow clustered on or around deciduous stumps or buried wood, often in spectacularly large quantities.

Integrated Report to Congress on the Condition of Water Resources in Kentucky

For more than 20 years, DOW has monitored the quality of Kentucky's rivers, streams, lakes and reservoirs. For many years, rivers and streams monitoring consisted of a statewide network of only 45 stations. However, since the implementation of the five-year rotating basin management unit (BMU) approach in 1998, more intensive monitoring has been achieved.

There are now 70 fixed, long-term, water quality monitoring stations throughout the Commonwealth, and an additional 20 to 25 rotating watershed monitoring sites that provide more intensive scrutiny of water quality conditions per BMU. Monitoring of lakes has remained fairly consistent since it began in 1981. The emphasis in this program is to determine the long-term water quality conditions in these reservoirs/lakes.

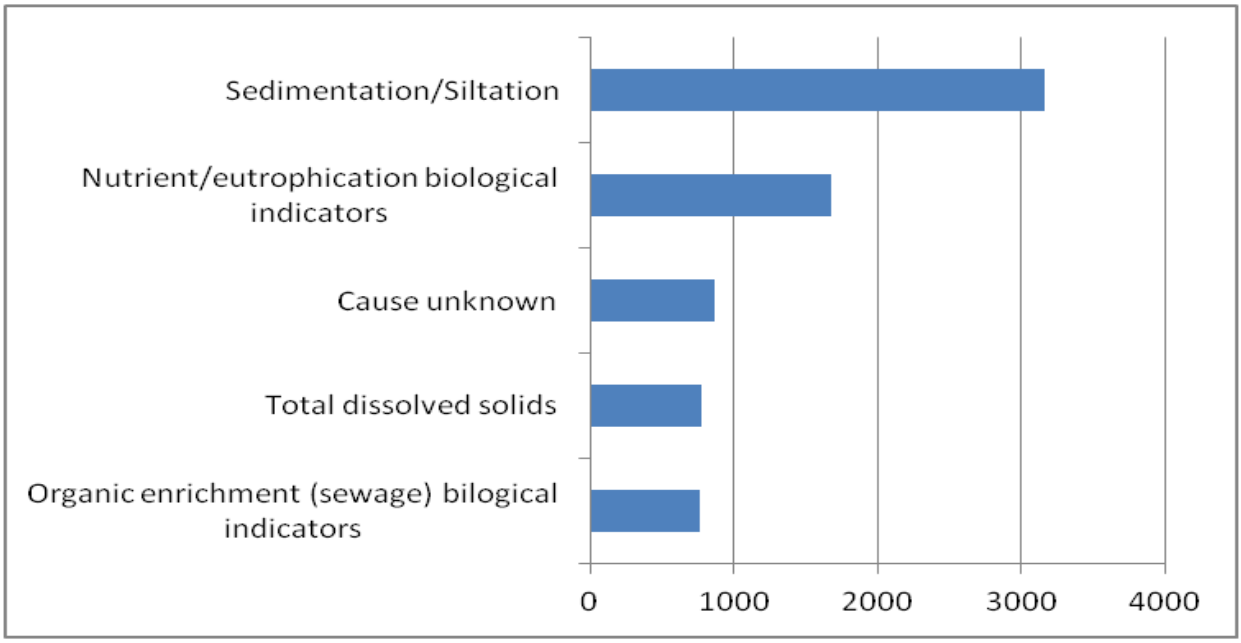
Every two years, DOW prepares a report on the quality of the state's water resources for EPA, which in turn shares the information with the U.S. Congress. The information provided in the "Integrated Report to Congress on the Condition of Water Resources in Kentucky" may be considered as a tool for rule making, budget appropriations and program evaluation by federal legislators. The report is "integrated" because it combines the requirements of Clean Water Act Sections 305(b) and 303(d), which mandate states to report on the general condition of waters and those not meeting water quality standards, resulting in a list known as the Impaired Waters List.

In Kentucky, there are five primary designated uses and one state-defined designated use applied to water bodies. These include aquatic habitat (coldwater and warmwater aquatic habitat), primary contact recreation, secondary contact recreation, domestic water supply (potable water), and outstanding state resource water. Fish consumption is often referred to as a designated use, but it is not specifically defined in Kentucky regulations. It is, however, considered a beneficial use that is strongly implied in water quality regulations.

The 2012 Integrated Report focused on the Salt River/Licking River basin management unit (BMU) and the Upper Cumberland River BMU. Some highlights from this report are discussed below, including:

Major Pollutants Statewide
Warmwater and Coldwater Aquatic Habitat Use Support
Primary Contact Recreation
Domestic Drinking Water Supply
Fish Consumption
Monitoring
Ambient Water Quality

Major Pollutants Statewide Quantified in Miles



Sediments

Sediments provide habitat and important structure for benthic organisms (organisms that are bottom-dwellers). Excessive and suspended sediment, however, can be harmful to fish and fish habitat. DOW monitors the quality of stream sediments to gain an overall understanding of the background conditions of sediments in wadeable streams and identify areas where concentrations of pollutants in sediments are elevated from background or historic records. Monitoring of sediments in Kentucky is conducted at the fixed stations within the watershed network framework. Sampling follows the guidelines of the U.S. Geological Survey's National Water Quality Assessment Program. Variables monitored include metals, nutrients and pesticides. Sediment monitoring is usually conducted in the fall when stream levels are lowest. Sediment monitoring results are accessible through STORET at http://www.epa.gov/storet/.

Nutrients

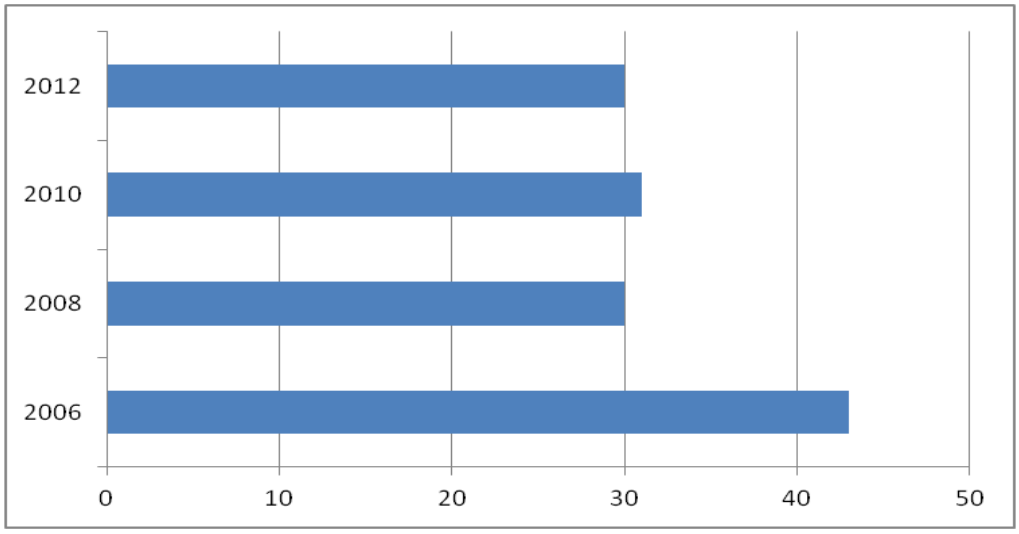
Pollution from excessive nutrients, such as phosphorus and nitrogen, is one of the most prevalent causes of water quality impairment in the United States and in the Commonwealth. Decaying organic matter, human and animal waste, chemicals and fertilizers are often deposited in Kentucky's waterbodies through stormwater runoff. DOW is developing the first Kentucky Nutrient Reduction Strategy based on criteria targets for watershed-based plans and TMDLs as well as possible statewide nutrient numeric criteria.

Warmwater and Coldwater Aquatic Habitat Use Support -- Streams

Kentucky possesses nearly 91,000 miles of streams, approximately 850 miles of which are small first- and second-order intermittent or perennial streams to the great rivers of the Ohio and the Mississippi. Of the 91,000 miles of streams, 10,256 miles (11.3 percent) were assessed for coldwater and warmwater aquatic habitat designated uses (collectively referred to as aquatic life use). Of assessed miles with in-stream data, 5,138 miles of streams, or 50 percent, fully support these designated uses, with the remaining 5,118 assessed miles not supporting these designated uses.

Primary Contact Recreation Use -- Streams

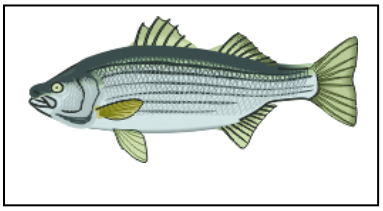
The goal of the criteria applied to primary contact recreation use, or swimming, is to protect people from pathogens that may cause gastric illness if water is ingested while swimming. There are nearly 5,070 stream miles assessed for this designated use with 70 percent of those stream miles not supporting the use and 30 percent fully supporting. This compares with 4,762 stream miles assessed for the 2010 Integrated Report (IR) with 3,268 stream miles, or 69 percent not supporting the use. Compared with data in the 2008 IR, the percentage of stream miles not supporting is the same, at 70 percent.



Percentages of assessed stream miles statewide supporting primary contact recreation between 2006 and 2012.

Domestic Drinking Water Supply

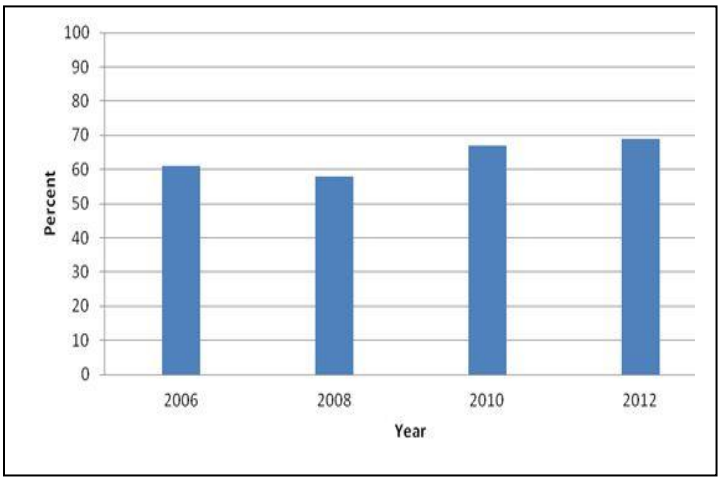
All stream miles fully support domestic drinking water supply use. Where this designated use has been implemented, an associated 689.5 stream miles have been assessed.



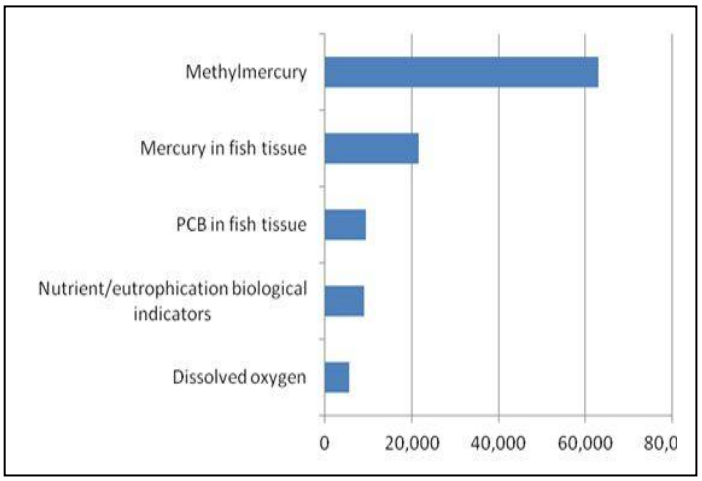
Fish Consumption

This use is not a designated use in Kentucky but it is implied as one in water quality standards (401 KAR 10:031 Section 2). Like contact recreation uses, this use is based on criteria to protect human health. Fish tissue is analyzed for possible residue of contaminants; the two of primary concern are methylmercury and polychlorinated biphenyl (PCB) chemicals. There have been 1,140 stream miles assessed for fish consumption with 695 stream miles (61 percent) fully supporting and 447 miles not supporting (39 percent). Since preparation of the 2010 IR, this represents a decrease of one percent and four percent, respectively. However, current support has increased by 10 percent as compared to the 2006 IR.

A fish consumption advisory issued in April 2011 remains in effect for the entire state due to low levels of mercury found in fish statewide. The advisory is a precautionary alert for those sensitive populations (children six years and younger and women of childbearing age) to consider limiting their consumption of fish to no more than one meal (a meal is considered eight ounces) per week.



Percentages of monitored and assessed lakes statewide that fully support all assessed use, 2006 through 2012.

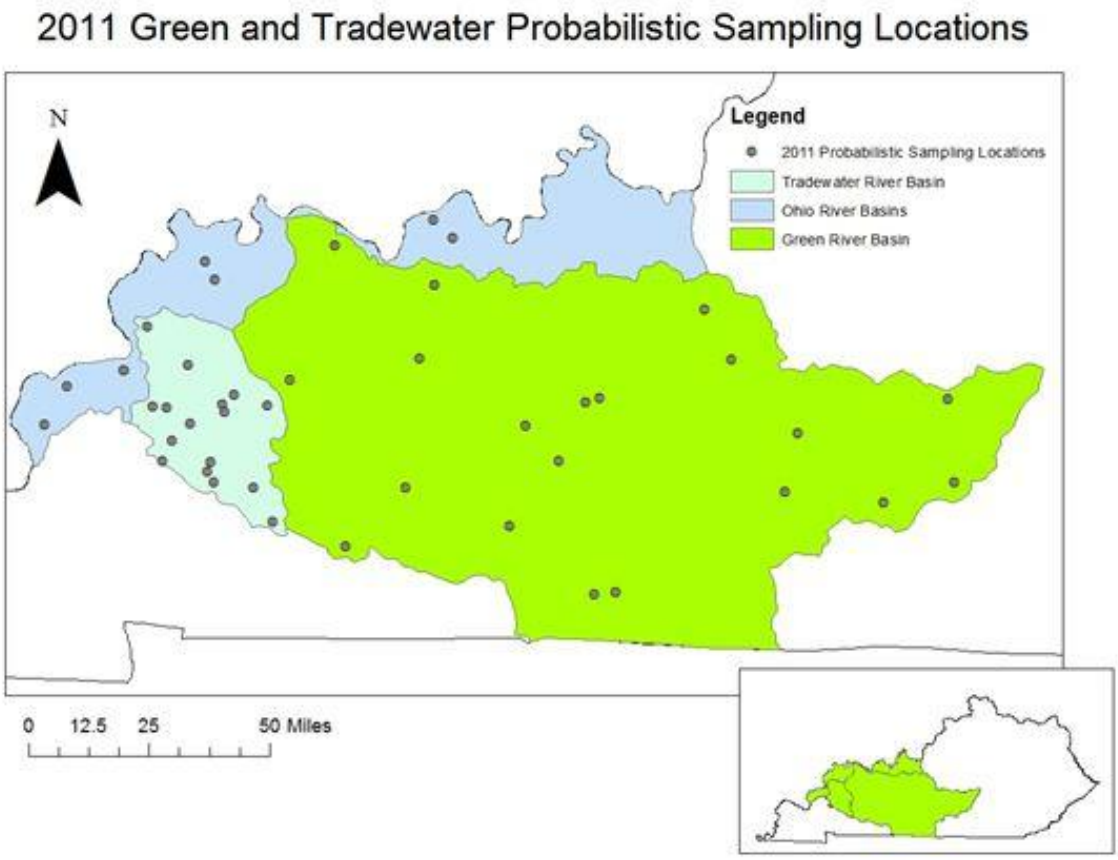


Five leading pollutants identified as affecting lakes, ponds and reservoirs statewide in

Monitoring

The assessment of water resources under Section 305(b) has broad-reaching implications, as it sets the course on how DOW implements many of its programs and provides a foundation to report on water quality trends under appropriate monitoring programs. An annual monitoring strategy is developed and implemented throughout the year. During calendar year 2011, DOW staff focused on the Green River Basin Management Unit (BMU). Monitoring activities included probabilistic stream monitoring, reference reach monitoring, fish tissue collection, lake and large river monitoring, sampling for Chlorophyll a in rivers and testing for ambient water quality. The data will be included in the 2014 IR.

Probabilistic monitoring is the use of random biosurveys of streams to project the level of aquatic life use support in a basin or region. The program uses insects and other invertebrates as the indicator community to determine the overall health of streams in the Commonwealth. The probabilistic approach is useful because it provides data that can be statistically applied to all waters in a basin of similar type, it provides comparable and unbiased data and it is the only means by which thousands of stream miles can be assessed. Sampling in 2011 for the probabilistic monitoring program was conducted in the Green River BMU. Of the 50 randomly selected targeted sites, 44 were sampled.



Reference Reach waters are representatives of the least-impacted streams within a bioregion that serve as chemical, physical and biological models from with to determine impairments to similar streams in other regions. Of 25 Reference Reach streams in the Green River BMU planned for biology sampling, 16 stations were sampled.

Fish tissue sampling in the Green River BMU included 41 specimens from 15 water bodies for analysis, to include testing for methylmercury. Fish tissue samples are collected from many sites across the Commonwealth to help determine if the fish are safe for human consumption. Fish are analyzed for metals, including mercury, PCBs, chlordane, and pesticides and herbicides. Results are used to determine if there are potential problems with contaminants in fish tissue that require further sampling. The data from this analysis is then provided to state and local officials so consumption advisories may be issued when warranted. If results are not elevated, no further fish tissue sampling is conducted in that stream reach.

Lake and reservoir sampling in the Green River BMU included testing for water chemistry and Chlorophyll a data in 23 lakes. Chlorophyll a is being monitored on Kentucky's boatable rivers by testing for nutrients and physio-chemical parameters. These tests will be used to (1) establish baseline data for Chlorophyll a, (2) determine whether correlations exist between nutrient levels and Chlorophyll a in rivers, (3) examine the variability of primary producers in differing river systems and (4) provide data from which to design future, more focused, studies of nutrients and primary production in rivers. During the 2011 sample season, 129 Chlorophyll a samples were collected at 29 sites.

Large River Monitoring protocols developed by EPA were used to sample ten sites in the Green/Tradewater BMU.

The Kentucky Ambient/Watershed Monitoring Assessment program assesses the status and trends in the quality of Kentucky's surface water resources and to develop an understanding of the major factors that affect water-quality conditions and use attainment. During this reporting cycle, a total of 815 water quality samples were collected in the Green River BMU as part of the ambient water quality program. These included 197 samples from 18 primary sites; 311 samples from 28 rotating sites and 307 samples from 133 non-basin primary sites. All samples are taken on a monthly basis.

DOW biologist Aric Payne poses with a muskie shocked for the purpose of monitoring the fish in large rivers.

DOW biologist Mark Vogel studies aquatic insect samples under a microscope at the DOW laboratory in Frankfort.

DOW biologists collect fish samples at Highland Creek.

Total Maximum Daily Loads

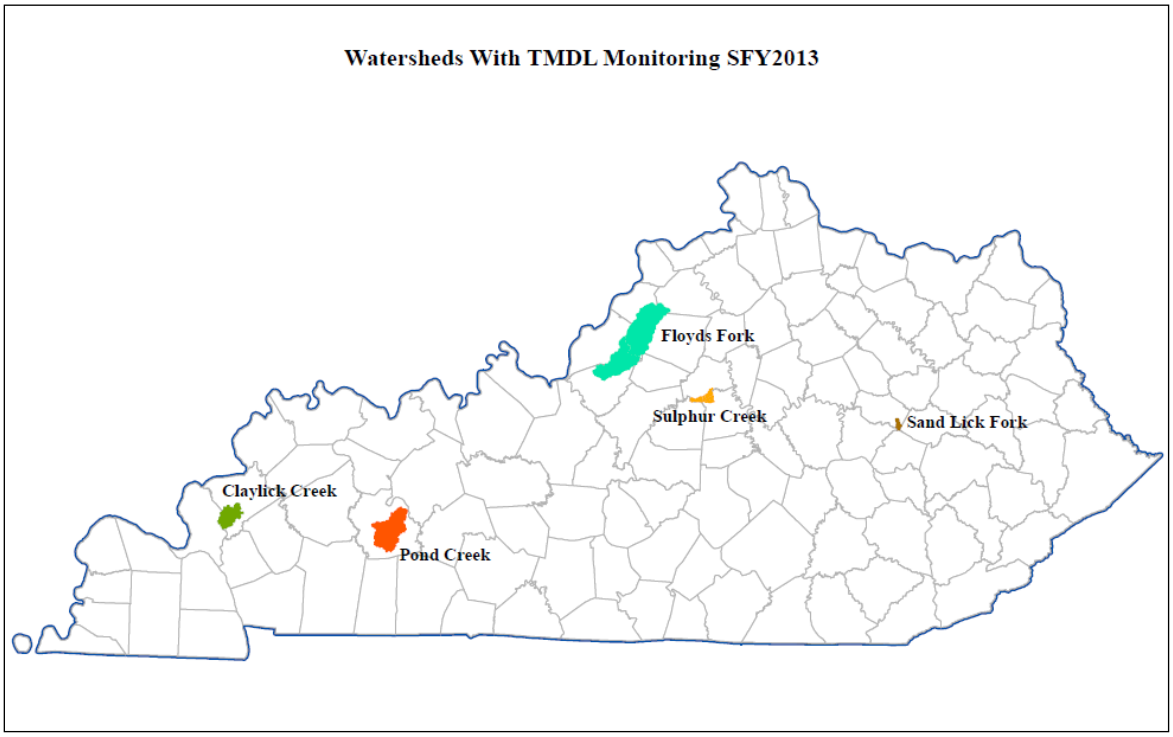
Section 303(d) of the Clean Water Act (CWA) requires states to identify water bodies within their boundaries that have been assessed and are not meeting their designated uses. The CWA also requires the development of a Total Maximum Daily Load (TMDL) for these water bodies.

A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can naturally assimilate and still maintain its designated use(s). The TMDL calculation, usually expressed in units of mass/unit time, is also termed the" loading capacity." A TMDL must be calculated for each pollutant impairing a lake, spring, pond or specific reach of stream. States then establish a priority ranking for such waters, taking into account their intended uses and the severity of the pollutant. Section 303(d) also requires that states provide a list of this information called the 303(d) list of impaired waters.

The TMDL Section and other DOW programs continue to assess water bodies as a result of the ongoing collection of monitoring data. As a result, the number of 303(d) listed streams has increased dramatically over the years. Volume 2 of the draft 2012 Integrated Report contains 2,457 pollutant/waterbody combinations (PWCs).

Monitoring and Document Writing for TMDL Development

During SFY 2013, TMDL monitoring staff collected samples from 41 chemical, 57 biological, 26 outfall and 38 bacteriological sites located within five watersheds. Most chemical sites are visited on a monthly basis for one year. Bacteriological sites are visited in the spring and summer. Outfall sites were visited during wet and dry periods to supplement actual numbers for assumptions made in the modeling effort for Floyds Fork. For SFY 2013, the monitoring staff collected 252 chemical, 20 biological, 133 outfall and 195 bacteriological samples.



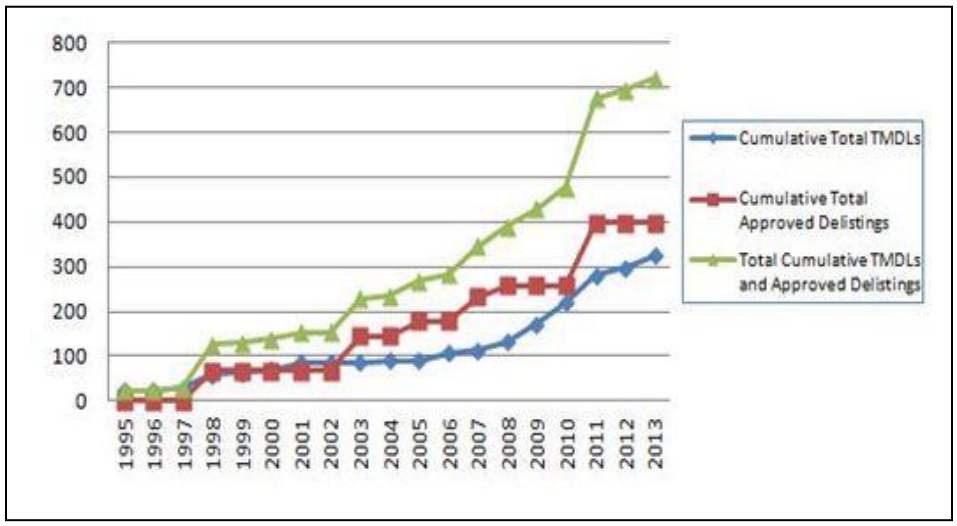
TMDL writers utilize the data collected by the monitoring staff to calculate the TMDL for each pollutant/waterbody combination. Once the data are analyzed, a report is written. The TMDL reports must undergo internal DOW review (preliminary review), a 30-day public comment period (proposed review) and must be approved by EPA (final review). The TMDL reports contain limits for both point and nonpoint sources of the pollutant such that a waterbody can be brought back to full support of its designated uses.

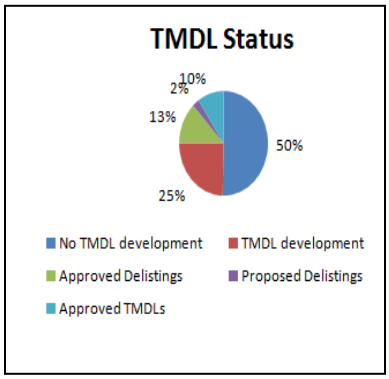
The TMDL Section has written and received formal EPA approval for 31 bacteria TMDLs in the Carr Fork, Hardwick Creek, Muddy Creek and Cox Creek watersheds. Sixteen bacteria TMDLs in the South Elkhorn and Cane Run watersheds were submitted to EPA for approval. Twenty-one bacteria TMDLs are at public notice for the North Elkhorn and Floyds Fork watersheds.

The TMDL Section is improving the defensibility of TMDLs and their supporting data by writing, implementing and revising standard operating procedures and quality assurance project plans.

Delisting of streams from the 303(d) list

Streams may be delisted from the impaired waters list when they have an approved TMDL or some other pollution control, or when the state determines that water quality has sufficiently improved. For Kentucky in 2013, EPA has formally approved TMDLs for a total of 313 PWCs and has approved delisting requests for 397 PWCs. DOW has also requested delistings for an additional 78 PWCs based on the 2012 Integrated Report. Approved TMDLs can be found on the DOW website at http://water.ky.gov/waterquality/Pages/ApprovedTMDLs.aspx.





Education and Outreach

On March 22, 2013, Gov. Steve Beshear signed into law House Bill 378 that requires DOW to be more transparent and to encourage more public participation in the processes of assessing waters, listing these waters as impaired, and in the development of TMDLs. In response to the legislation, DOW has made more transparent and participatory information regarding the TMDL process. DOW's requirements regarding transparency and participation in the assessment, listing and TMDL processes, including:

- Developing a website that lists all waters that have been placed on the list of impaired waters, as reported to the U.S. Congress every two years.
- Providing information regarding the method by which the DOW determines that a water is impaired.
- Providing information regarding the method by which the DOW is developing TMDLs.
- Developing a system to notify interested parties of the proposed listing of a waterbody on the impaired waters (303[d]) list.
- Developing an annual report to the General Assembly on TMDL development for the following year.
- Providing public notice of the removal of water bodies from the impaired waters list.

The TMDL Section expanded information about impaired waters on the website and invited public enrollment in an impaired waters distribution list, and more than 250 people have been added Furthermore, updates are being distributed through the impaired waters distribution list, the TMDL Facebook page and through the TMDL Twitter account.

Website: http://water.ky.gov/waterquality/Pages/TMDLProgram.aspx

Facebook: https://www.facebook.com/KentuckyTMDLProgram

Twitter: https://twitter.com/KYTMDLProgram

The TMDL Section publishes pre- and post-monitoring reports that seek to educate people about the Clean Water Act and relay scientific information. If a stream is selected for TMDL development, the watershed is assessed to understand the potential sources of pollution and determine where the study sites will be located. This pre-monitoring process is described in the Initial Watershed Report.

The **Initial Watershed Report** describes why the watershed is being monitored, where the impaired streams are within the watershed and where the TMDL Section will monitor the watershed. Once the year-long study is complete, the data are used to determine the current state of the watershed. This post-monitoring process is described in the Watershed Health Report, which not only highlights where improvement is needed within the watershed, but also highlights the strengths of the watershed in hopes of protecting areas that are not yet impaired.

In the **Watershed Health Reports**, both signs of water quality and signs of biological health receive a letter grade of “A” through “F” based on numeric criteria or ecologically significant values. These grades are then averaged to achieve an overarching watershed grade to demonstrate the overall health of the system. The Health Reports are at http://water.ky.gov/waterquality/Pages/TMDLHealthReports.aspx.

Water Quality Certification

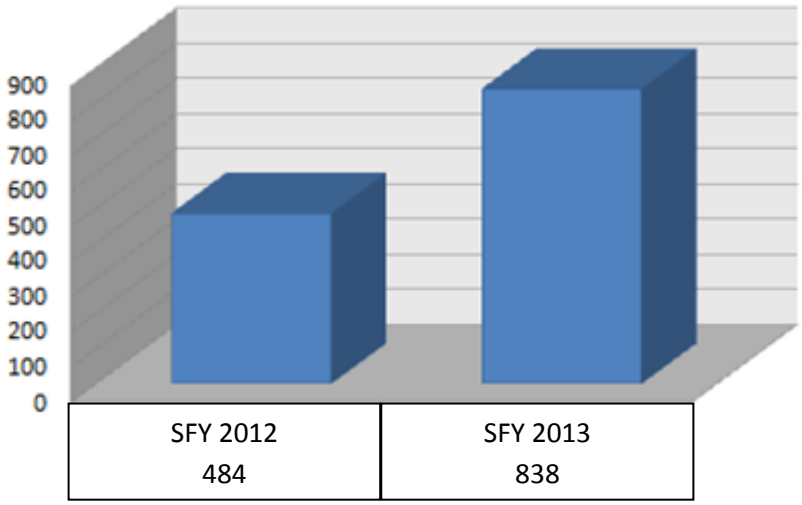
The Water Quality Certification (WQC) Section administers water quality certifications through the Clean Water Act Section 401 and administers grants relating to wetland assessment. The certification issued by the section certifies that any federal permit involving a discharge to waters of the Commonwealth does not violate water quality standards. Water quality certifications also address mitigation measures when waters are proposed to be altered or affected from their natural functioning.

The USACE 404 dredge and fill permit is the most common permit certified. Licenses from the federal Energy Regulatory Commission and civil projects through USACE are also among certifications issued.

Examples of activities that may require a Section 401 water quality certification include filling of jurisdictional streams and wetlands, stream relocations, construction of structures within streams and wetlands, and stream and wetland restoration projects.

Data collected at the end of SFY 2013 reveal that the number of proposed projects reviewed, approved and inspected by the WQC Section increased. The WQC Section continues to strive for additional public education by developing and modifying existing guidelines and program reference material while maintaining an increasing workload.

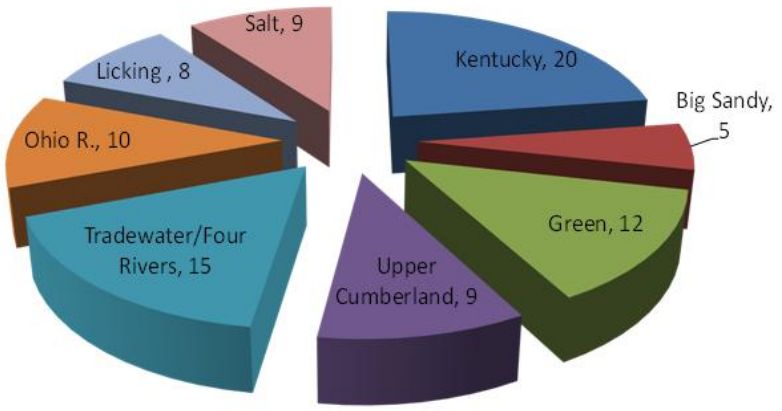
Water Quality Certifications Reviewed



Of the 838 WQC applications reviewed, 84 applications either did not meet the general conditions outlined in the General Water Quality Certifications or were exempt from further WQC review, thus requiring that an Individual WQC be issued for the proposed or after-the-fact project.

WQC staff routinely conduct site visits to inspect proposed projects, including compliance inspections, follow-up inspections, mitigation monitoring compliance visits, technical assistance visits, and reported violation inspections. All forms of inspections and site visits increased between fiscal years 2012 and 2013.

During SFY 2013, the WQC Section issued 88 individual water quality certifications (see chart below).



Individual Water Quality Certifications issued in SFY 2013 (88 total) grouped by river basin

Water Quality Certification Review Fees Collected

Commonwealth of Kentucky
Governor Steven L. Beshear

Energy and Environment Cabinet
Secretary Leonard K. Peters

Kentucky Department for Environmental Protection
Commissioner R. Bruce Scott, P.E
Deputy Commissioner Aaron Keatley

Kentucky Division of Water
Acting Director Peter Goodmann

Branch Managers

Resource Planning and Program Support	Peter Goodmann (acting)
Compliance and Technical Assistance	Tom Gabbard
Surface Water Permits Branch	Jory Becker
Water Infrastructure Branch	Shafiq Amawi
Watershed Management Branch	Paulette Akers
Water Quality Branch	Clark Dorman