



Drinking Water Capacity Development Program Report to the Governor

Submitted to Governor John W. Hickenlooper



2017

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Executive summary

Over 2,000 active public drinking water systems exist in Colorado. Drinking water systems range from small restaurants or communities that serve 25 people to a service area the size of the City of Denver. Drinking water sources include groundwater wells, surface water such as rivers, lakes and reservoirs, or a combination of both. A public water system's treatment spans from a simple well and chlorinator to a complex treatment system that can cost millions of dollars to construct. For public water systems, the complexity of meeting drinking water standards can sometimes make compliance with regulatory requirements difficult to achieve.

The 1996 amendments to the Safe Drinking Water Act added provisions for each state to create a capacity development program to assist public water systems in developing technical, managerial and financial capabilities to strengthen their ability to supply safe drinking water to the public. States that fail to implement a capacity development program and fail to submit a report on the effectiveness of the program to the governor every three-years are at risk of losing 20 percent of the annual federal drinking water state revolving fund capitalization grant. The drinking water state revolving fund program receives approximately \$14.3 million annually, so Colorado would risk about \$2.9 million per year if these requirements were not met. This report is intended to meet federal requirements.

The Water Quality Control Division, Safe Drinking Water Program at the Colorado Department of Public Health and Environment fully implements a capacity development program aligned with requirements of the act. As required by the 1996 amendments, the safe drinking water program developed a strategic plan for the capacity development program. In addition, associated work plans focused on specific efforts to accomplish goals of the strategic plan are developed on a rotating three to five year schedule. The rotating schedule is used to keep consistency in the year to year work efforts yet provide a routine opportunity to revise and update work plans.

The strategic and work plans focus on three key areas: new public water systems, existing public water systems and program administration. For new drinking water systems, the program focuses on a review of the technical, managerial and financial capacity of the proposed system to ensure the system is creating a sustainable drinking water system in order to consistently provide safe drinking water. Further, for new and existing systems, the program has delivered a wide variety of training and assistance efforts directed towards helping systems achieve technical, managerial and financial success. These efforts have had positive impacts on the drinking water systems ability to meet their regulatory obligations. For example, systems receive inspection preparation training and routinely indicate that the training was beneficial and well received. Upon later inspection, the inspector often indicates that these systems had no violations or deficiencies, which can be contributed to these efforts.

In fiscal year 2017, Colorado received the full amount of water infrastructure funding from the U.S. Environmental Protection Agency because the state is implementing a capacity development program that aligns with the requirements of the Safe Drinking Water Act. However, this amount was \$124,000 less than the amount Colorado received in fiscal year 2016. Furthermore, since 2014 (the year of the last report to the governor) Colorado has seen the following reductions in funding:

- 2015 - \$101,000 less than 2014.
- 2016 - \$825,000 less than 2015.
- 2017 - \$124,000 less than 2016.

Successful implementation of Safe Drinking Water Act requirements necessitates spending at a level that exceeds the yearly grant amount. This has resulted in significant reduction in historic federal grant balances. Because of this, many services described in this report will not be sustainable.

Colorado typically exceeds the national goal that 94 percent of the population served by community water systems receives water that meets all health based standards. However, many small rural water systems face ongoing struggles with a number of issues, such as high levels of naturally occurring radionuclides like uranium and radium in their source water, increasing complexity of drinking water regulations and treatment technology, and an aging workforce with respect to operators who manage the systems. As a result there are new demands for workforce development and an increase need for high quality and affordable training for drinking water operators to better manage these issues.

The safe drinking water program anticipates the continued use of drinking water state revolving fund capitalization grant funds to fully implement Colorado’s capacity development program and to help public water systems achieve and maintain technical, managerial and financial capacity. We responsibly steward of these financial resources and use data to direct decisions on work plan priorities. It is important that decisions are transparent and priorities are well defined and well communicated. The capacity development program will continue to evolve as the program evaluates its successes, failures, budget constraints and the new challenges drinking water systems face complying with new, existing, and revised drinking water regulations.

1.0 Introduction

This report was developed to provide an overview of the capacity development program as required by the Safe Drinking Water Act. The report is written for the governor of the State of Colorado and also provides an excellent basis for anyone to understand the structure and effectiveness of the safe drinking water capacity development program in Colorado.

Capacity development is a frequently misunderstood term since it can be interpreted as “building infrastructure”. The capacity development program is not designed to build physical infrastructure, but rather to enhance a water systems ability to manage and operate their existing infrastructure effectively and to identify situations where infrastructure changes are essential. The program is designed to build capabilities in public water systems to continuously provide safe drinking water to customers. Capacity development has three components:

1. Technical: Physical infrastructure and operational ability.
2. Managerial: Personnel expertise, institutional and administrative capabilities.
3. Financial: Monetary resources.

This report includes:

- Section 2.0: An overview of the Safe Drinking Water Act and the 1996 amendments which included provisions for the creation of the capacity development program.
- Section 3.0: A description of activities during fiscal years 2015 through 2017.
- Section 4.0: A discussion of the efficacy of the strategy.
- Section 5.0: Summary and conclusions.

If additional capacity development information is desired, please visit our webpage [Water quality: Public water system vulnerabilities and deficiencies](http://www.colorado.gov/pacific/cdphe/wg-public-water-system-vulnerabilities-and-deficiencies)¹. This website lists documents and resources related to capacity development, including a copy of the 2014 capacity development report to the governor.

¹ <https://www.colorado.gov/pacific/cdphe/wg-public-water-system-vulnerabilities-and-deficiencies>

2.0 Overview of the Safe Drinking Water Act

The Safe Drinking Water Act, originally enacted in 1974, established a national program to ensure the safety of drinking water for the public by public drinking water systems. The original emphasis was directed primarily at establishing maximum contaminant levels in water supplied at the consumer's tap. It also provided grant funding and authority to states to implement the public water system supervision program after receiving EPA approval called primacy.

The act was significantly amended in 1986 to improve control of microbiological contaminants, organic contaminants from natural and man-made sources, sources of contamination after water treatment and during distribution as well as to encourage protection of drinking water sources.

Regulations developed by the EPA to address the requirements of the 1986 amendments began the transition to a set of significantly more complicated and protective regulations. However, broad transformation for the act and its implementing framework arrived with the 1996 amendments. These amendments continued the traditional regulatory approach but on a more demanding schedule. The amendments established a strong new emphasis on preventing contamination and creating new public water systems with adequate technical, managerial and financial capacity. Federal funding was provided for associated costs through a new and unique approach - the use of set-asides from the newly authorized revolving fund capitalization grant. This emphasis transformed the previous law, which had an after the fact regulatory approach, into a law that recognized the need and provided for capital resources to prevent the multiple risks of contamination that threaten public drinking water. Four explicit themes characterize the 1996 amendments:

- Making available to consumers more and better information about drinking water.
- Improving drinking water regulation development with better science, risk assessment and prioritization of effort.
- Providing new funding for infrastructure construction through the drinking water state revolving fund and for state drinking water programs through use of set-asides from the loan fund capitalization grant; and last.
- Encouraging new and stronger approaches to prevent drinking water health risks through source water protection, operator certification and capacity development programs.

A fifth theme, not clearly visible in the 1996 amendment, is the need for significantly increased resources for states to adopt and implement a vast array of highly complicated regulations and associated administrative requirements. These regulations include the Long Term 2 Enhanced Surface Water Treatment Rule, The Stage 2 Disinfection and Disinfection Byproducts Rule, the Federal Ground Water Rule and the Revised Total Coliform Rule. These rules are technically complicated and difficult to implement. Additionally, the EPA is subject to an ongoing mandate to develop and publish new rules in the future. State programs are required to adopt and implement these new rules once finalized by EPA or face either losing primary enforcement authority or a substantial portion of their capitalization grant under the drinking water state revolving fund provisions.

2.1 Required state activities

In order to maintain primacy, the Safe Drinking Water Act requires that states adopt regulations that are at least as stringent as new or amended federal regulations and maintain adequate procedures for enforcement of such regulations. If a state fails to perform these activities, the EPA is required to revoke the state's primary enforcement authority and all associated federal funding that supports the safe drinking water program. In fiscal year 2017, the combined federal program grant and capitalization grant to Colorado was more than \$14.3 million. Without these funds, the state would not have the resources to

provide compliance assistance or infrastructure improvements and Colorado public water systems would still be subject to compliance with all of the national primary drinking water regulations.

Colorado has completed all mandatory activities required under the act to maintain EPA's approval of the state's primary enforcement authority and the capacity development program.

2.2 Voluntary state activities

As listed in the 1996 amendments, voluntary state activities include operator certification, revolving loan fund program and capacity development programs.

Failure to implement voluntary activities would not result in loss of primacy, but would result in losses to the capitalization grant. In 2017, failure to implement a capacity development strategy would have resulted in a loss of nearly \$2.9 million in federal set-aside funding. The state determined it would cost less to implement voluntary activities than would be lost in federal grant funds. More importantly, these activities represent essential components of a public health program based on prevention of human health impacts rather than after the fact correction.

Operator certification: The Colorado operator certification program provides oversight of nearly 5,700 certified water and wastewater operators. Program activities include establishing and maintaining standards and procedures for the testing and certification of new operators, on-going professional development, operator recertification, establishing and maintaining minimum standards of performance for certified operators, enforcing the requirement each water and wastewater facility to be under the supervision of a certified operator in responsible charge, classification of all water and wastewater facilities, and the discipline of operators who violate provisions of certification.

Drinking water state revolving fund: The act as amended in 1996, established the drinking water state revolving fund to make funds available to drinking water systems to finance infrastructure improvements. The fund is managed by a partnership of Water Quality Control Division staff, the Department of Local Affairs, and the Colorado Water Resources and Power Development Authority. This partnership has proven effective and enhances the integration of the fund with other loan and grant programs supported by the state or other federal agencies.

Capacity development program: The safe drinking water program implements a capacity development program that aligns with the requirements of the act. The safe drinking water program's local assistance unit maintains the capacity development strategy and set-aside work plans approved by the EPA.

2.3 Capacity development strategy

As part of a capacity development program, the 1996 amendments require states to develop a capacity development strategy to help public water systems achieve and maintain technical, managerial and financial capacity. This strategy serves as the foundation of several work plans developed each year to guide program activities. Colorado's capacity development strategy is revised regularly, most recently in June 2015.

The current capacity development strategy is focused on three key areas: program administration, new drinking water systems and existing drinking water systems. The plan has nine strategic goals, each directing efforts toward one or more of these key areas.

1. Provide a system of education, training, and technical assistance that provides assurance to the public that the drinking water provided to them by their public drinking water system is consistently safe.

2. Develop and apply a measurement system for all capacity development projects to ensure the program has a measurable and documented beneficial impact on public health, compliance rates, and public trust in the state drinking water program and in their own public water supplier.
3. Apply a proactive approach to systems of concern, so these systems are provided the tools and resources needed to regain compliance and full capacity.
4. Develop a program that will support collaboration among all drinking water systems, assist those smaller systems in order for them to understand their problems and potential solutions, and use performance based approaches to developing training.
5. Use available resources in an efficient and timely manner, with a focus on continuous improvement of the program.
6. Develop and distribute an effective needs assessment to drinking water systems of Colorado, evaluating the technical, managerial and financial needs, capital needs, and impact of shortfalls on system performance on the health of the populations served.
7. Integrate sustainability into program projects wherever possible, to ensure that resource expenditures develop ongoing programs that provide measurable impacts, and do not result in a short-term, single project.
8. Ensure all new systems have adequate technical, managerial, and financial capacity to remain a viable and sustainable drinking water system into the foreseeable future.
9. Establish and foster partnerships with other federal, state, and local drinking water organizations.

Specific capacity development program activities designed and implemented to achieve goals contained in the capacity development strategy are described in the following section.

3.0 Colorado capacity development activities

As part of the capacity development program, Colorado is required to provide the EPA with drinking water state revolving fund set-aside work plans describing activities designed to achieve the goals contained in the capacity development strategy. Individual work plans are developed for set-aside funds for state program management, local assistance and other state programs, and small system training and technical assistance. If there are set-aside fund balances available in the administration set-aside, Colorado may develop and provide to EPA a work plan to use these funds for technical assistance. The EPA reviews and approves each work plan. For state fiscal years 2013 - 2015 EPA did approve the work plan submitted by Colorado for the administration set-aside; however, Colorado has not developed a work plan for that set-aside since. Colorado also identifies work plan activities and costs for each of these set-asides in the annual intended use plan for the capitalization grant, which is presented to, and approved by the Water Quality Control Commission.

Work plan development occurs on a three or five year schedule to allow for flexibility in the staging of projects. Work plans often continue many of the elements of the previous work plan periods to allow for continuity of capacity development activities.

It is important to note that work plan development continues to be guided by the results of the safe drinking water program's Failure and Root Cause Analysis Project Report², which identifies and evaluates trends in compliance failures at public water systems in Colorado. The analysis report summarizes compliance data collected at public water systems over a three year period, from July 1, 2005 through June 30, 2008. The report highlights the areas of greatest weakness at water systems and thereby helps to direct the use of resources to obtain optimal results. The report also provides valuable baseline data for comparing, measuring and evaluating the effectiveness of capacity development program activities in years ahead. The safe drinking water program evaluates the findings of this report annually to ensure the best use

² Oxenford, Jeff and Williams, Sharon Israel, Capacity Building Unit, Safe Drinking Water Program. September 2009. *Failure and Root Cause Analysis Final Report*. Available for download at: <https://www.colorado.gov/pacific/cdphe/wq-public-water-system-vulnerabilities-and-deficiencies>

of resources. Furthermore, work plan development is also guided by various other factors including new regulations such as the Revised Total Coliform Rules and other Colorado initiatives.

The following sections describe the capacity development activities of the safe drinking water program, including the local assistance unit, drinking water compliance assurance, engineering and field services sections. Select capacity development activities of the Water Quality Control Division's standards unit which are incorporated into the drinking water state revolving fund set-aside work plans are also described.

3.1 Local assistance unit

The local assistance unit includes the capacity coach and training workgroup, the drinking water pursuing excellence program, the facility and operator outreach and certification board liaison and the source water assessment and protection workgroup. The unit provides training, assistance and management support services to public water systems so they can strengthen their ability to supply safe drinking water to the public. In this function, the local assistance unit directly provides capacity coaching and training services, security and emergency preparedness services, drinking water excellence awards, and utilizes drinking water state revolving fund set-asides and other EPA grants to retain contractors to provide additional services. The source water protection program is an integral part of the local assistance unit that focuses primarily on voluntary preventative strategies to protect sources of drinking water prior to treatment. The unique combination of unit functions provides enhanced operator training, contaminant prevention strategies and public drinking water system assistance. Finally, the unit is responsible for providing division staff, the Water and Wastewater Facility Operators Certification Board and facility owners and operators expert advice and assistance on operator certification policy and regulatory matters as well as making recommendations regarding certified operator disciplinary actions.

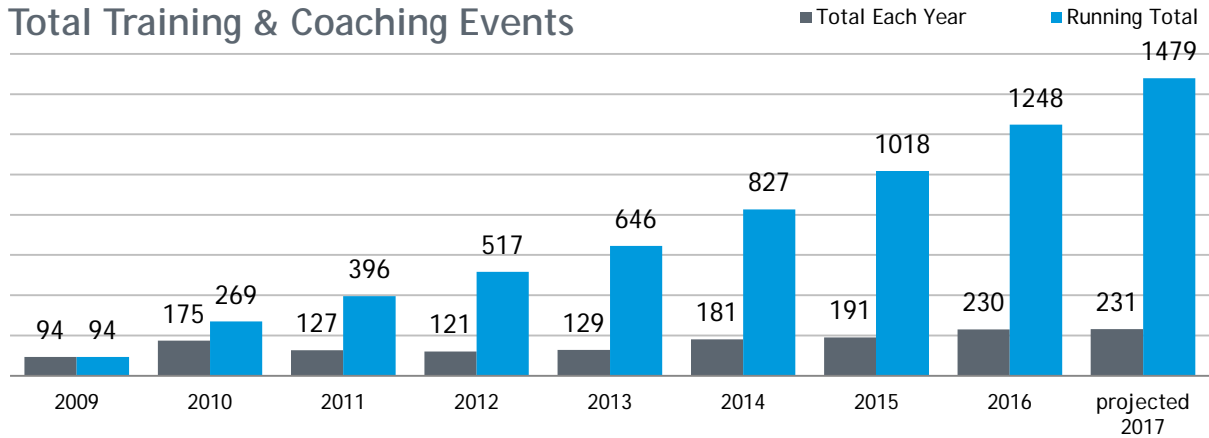
The local assistance unit shares responsibilities of responding to acute drinking water emergencies within the state with other safe drinking water program sections and units.

Capacity coaching and training services

The local assistance unit's capacity coach and training workgroup includes three capacity coaches. Two of the coaches are certified water professionals and hold operator certificates in water treatment and distribution systems. The third coach is a specialist in water system managerial and financial capacity. Capacity coaches provide onsite training and technical, managerial and financial assistance to small systems throughout Colorado. Coaching priorities include ensuring adequate disinfection, supporting the development of monitoring plans, assisting systems struggling to stay in compliance with regulatory requirements and coaching select systems in need of in depth capacity building support to deliver safe drinking water. During each site visit, capacity coaches work closely with water system owners and operators to troubleshoot and improve water system performance, address technical questions, explain complex regulatory requirements, and assist owner and operators to resolve system deficiencies identified through sanitary surveys. In 2016, 79% of all systems assisted by coaching made an improvement. So far in 2017, 70% of all systems assisted have made an improvement as a result of coaching.

The following chart shows the number of training and coaching events given each year to assist public water systems since the workgroup began in 2009. For 2017, capacity coaches are averaging 19 coaching and training assistance events per month to help small systems deliver safe drinking water. The reason for the increase in the number of events over the past few years can be attributed to the proactive approach the workgroup has taken in targeting systems to offer assistance before they receive a sanitary survey and the focus on collaborating with other training providers to provide more training opportunities throughout the state.

Total Training & Coaching Events



Capacity coaches also support and conduct a wide variety of special projects, workshops and group training efforts requiring specialized technical experience. The coaches routinely represent the safe drinking water program in training activities with the Rocky Mountain Water and Wastewater Plant Operators School, the Colorado Rural Water Association and the American Water Works Association. The coaches have partnered with EPA, local universities, community colleges and industry to provide additional water operator training opportunities throughout the state. They also provide invaluable support in the conception, development and facilitation of new workshops for small water system operators.

Facility operator certification services

In 1999, the EPA issued operator certification program guidelines specifying minimum standards for certification and recertification for operators. The goal of the operator certification program is to ensure that skilled professionals are overseeing the treatment and distribution of safe drinking water. Operator certification is important to protecting public health and the environment and promoting compliance with the Safe Drinking Water Act.

On June 22, 2001, the operator certification program was approved as consistent with the *Final Guidelines for the Certification and Recertification of the Operators of Community and Non-Transient Non-Community Public Water Systems*, 64 CFR 5916.

Colorado regulations require every water treatment and water distribution facility to be operated under the supervision of a certified operator in responsible charge holding a certificate equal to or greater than the classification of the facility. The regulation also requires all process control and system integrity decisions to be made by the certified operator in responsible charge or another operator holding a certificate equal to or greater than the classification of the facility. This operator must be available at all times during operating hours of a water treatment or distribution facility. Colorado has 5,661 water and wastewater certified water professionals holding 12,170 certificates of which, 6,721 of those certificates are for water treatment and distribution.

Compliance with operator certification requirements is a safe drinking water program priority. In calendar year 2016, the compliance rate with the certified operator requirements was 94 percent.

The certification board liaison outreach efforts include participating in and presenting at conferences, seminars and training events. These presentations provide additional opportunities for contact with the public, public water system owners, special district and town boards, trustees, city councils and other municipal officials and certified water professionals.

Security and emergency preparedness services

Security and all hazards emergency preparedness and response services are provided throughout the state's drinking water community. Services include educating the drinking water community through courses, workshops, exercises and information exchange; providing tools and resources for developing and implementing emergency planning capabilities; and fostering partnerships through Colorado's Water/Wastewater Agency Response Network (CoWARN) and the National Incident Management System (NIMS) initiative.

- The security and emergency preparedness services continue to support utilities by maintaining and hosting the CoWARN website, sponsoring meetings, participating in steering committee decisions, providing resources and tools in the areas of security and emergency preparedness, providing training, and leading the Rocky Mountain Section's Joint Security and Emergency Preparedness Committee.
- NIMS provides a consistent nationwide approach for state, local, and non-governmental organizations to work together to prepare for, respond to and recover from domestic incidents. The security program brings NIMS training to its stakeholders by hosting courses developed and offered by the EPA, Department of Homeland Security and Urban Area Security Initiative.

Drinking water excellence awards

The safe drinking water excellence awards program recognizes any drinking water utility going above and beyond to improve public health from source to tap. The awards program is the result of collaboration between the department, drinking water utilities, industry and universities. The local assistance unit is currently reaching out to provide resources and training on industry best practices to drinking water utilities looking to improve performance, while benefiting from an award through the program. Currently, there are 30 systems participating in the program.

As a subset of the excellence awards program, the local assistance unit has also put together a pilot program aimed at helping disadvantaged systems pursue excellence. The System Improvement Pilot awards funds up to \$25,000 to systems with an identified infrastructure need. Some of the projects include improved filtration, additional water system security, and improving the emergency interconnection between two small rural systems.

Additionally, in order to promote drinking water excellence, the local assistance unit has assisted the Rocky Mountain Section of the American Water Works Association to offer advanced operator training workshops designed to provide an advanced and highly specialized technical training opportunity for operators who hold level A and B certifications. The hands on workshops focus on evaluating the capacity of water treatment processes, identifying and prioritizing performance limiting factors and managing water quality data to aid in the support of treatment decisions and treatment optimization.

Training partnerships

A well trained workforce is integral to providing safe drinking water. Unfortunately, set-aside funds used to support training and technical assistance have seen a decrease since 2014, forcing the local assistance unit to reduce these activities. This includes adjusting historical partnerships with a diverse group of businesses, agencies, schools and nonprofit organizations statewide. To the extent that funding allows, the local assistance unit has continued to utilize the 2015 Public Water System Training Strategy Report³ and 2015 Public Water System Training Strategy Administrative Framework⁴ to inform how we support training

³ Williams, Sharon Israel, Capacity Building Unit, Safe Drinking Water Program. July 2010. *Colorado 2015 Public Water System Training Strategy*. Available for download at: <https://www.colorado.gov/pacific/cdphe/wq-public-water-system-vulnerabilities-and-deficiencies>

⁴ CDPHE Administrative Framework Project. Available at: <http://www.rmsawwa.org/page/AdminFramework>

partnerships. The support is now almost entirely in kind and consists of lending time and expertise as resources allow.

The following describes the current status of the unit's historic and current partnerships since 2014.

Short schools: Two short schools, the Rocky Mountain Water and Wastewater Plant Operator School and the Colorado Distribution and Collection Systems School, are offered each year. In addition, the Leadville Operators Training Conference is offered in Leadville each year. Each school is typically four or five days, and covers either basics or advanced curriculum in drinking water treatment or distribution system management. Over at least the last three years, these schools did not receive state subsidies offered through the drinking water state revolving fund set-aside funds and thus participant registration fees have likely increased.

Treatment and distribution system training: The unit has partnered with training committees from the Rocky Mountain Section of the American Water Works Association to develop and provide operator workshops throughout the state. Workshop attendees receive in depth, hands-on instruction on topics including water main breaks, storage tank maintenance and management, filtration and disinfection best practices, sampling techniques and preventing cross connections. Operator demand for the classes has consistently exceeded available class space.

Storage tank baffling factor studies: Many small water systems are faced with difficulty regarding the ability of their current treatment system design to meet the requirements for adequate disinfectant contact time for their disinfection process. The unit partnered with Colorado State University on a three year study focused on treatment system designs that enhances contact time and provides simple guidance to water systems for providing adequate contact time from existing or new tanks. The unit's coaches use the results of this project to provide significant time and cost savings options for small water systems across the state. Additionally, the unit assists small systems to perform on-site tracer studies so they can better understand the disinfection they are achieving.

Distribution systems training center: In 2009, the unit partnered with Red Rocks Community College in Lakewood to design and construct a hands on training facility for water distribution operators. This project is the culmination of a joint partnership that leveraged federal grants supplied by the local assistance unit, donations made by public water utilities, and labor volunteered by Red Rocks Community College students and staff. Construction for this project was complete in 2012. This outdoor training center consists of five hands on elements designed for students and operators to gain skills and experience in safe and reliable drinking water distribution. The facility is currently being used by utilities to train their distribution system operators and community college courses to train students. The unit continues to support the college by providing guest lectures on regulations and partnering on additional operator training.

Public water system training grants program: The state has historically utilized drinking water state revolving fund set-asides to support training projects that improve technical, managerial and financial capacity for operators and owners of small public water systems in rural Colorado. The program awarded training grants of up to \$25k to selected training providers through a competitive process. However, since 2014, available set-aside funds have decreased thus no projects have been funded. This creates difficulty for the many operators and owners that don't have access to training opportunities due to the remote local of the rural areas they serve.

Source water assessment and protection

The Safe Drinking Water Act amendments of 1996 directed each state develop a source water assessment program. This program is part of the Water Quality Control Division's source water assessment and protection program which is designed to provide the consumer with information about their drinking water, as well as provide the community a mechanism to become involved in protecting the quality of their

drinking water. In the first phase of the program, an assessment of all public water supplies is conducted providing an understanding of where each public water system's source water comes from, potential contaminant threats and source water susceptibility to those contaminants. In the second phase of the program, public water systems are encouraged to develop and implement a source water protection plan which incorporates community based involvement and preventive management strategies to ensure that all public drinking water resources are kept safe from future contamination.

The source water assessment and protection program work group manages and implements the integrated project plan, the wellhead protection program and set aside work plan, and a statewide grant program providing technical and financial support for protection planning activities. Through the statewide grant program, the work group provides source water protection entities with grant funding or technical assistance opportunities including:

- Protection plan development and implementation grants.
- Protection plan development and implementation technical assistance.
- Susceptibility analysis continuation, new source water assessment area delineations and report generation.
- Safe drinking water information system and other data and analysis tools improvements.

The work group continues to coordinate with various Division clean water and drinking water staff including the watershed section, field services section, capacity coach and training work group, and others to improve source location data, provide technical expertise and assistance to local watershed initiatives, local governments, and community and non-community drinking water systems in obtaining technical and financial assistance to develop and implement source water protection plans.

To date, the source water program has provided technical and financial assistance to complete development and implementation of source water protection plans for 209 public water systems for a total of \$1,202,328. The source water program has reported 203 substantially implemented protection plans covering approximately 2.5 million Colorado citizens (Environmental Protection Agency 2017 Performance Accountability Report). In addition, the current statewide number of public water systems in some stage of protection planning development is 265.

3.2 Drinking water compliance assurance section

The drinking water compliance assurance section develops regulations and policies, establishes compliance requirements, monitors self-reported data, determines violations, maintains the public water system inventory, violation and enforcement database, and tracks formal and informal enforcement actions. The section communicates regulatory requirements to public water systems through stakeholder processes and compliance assistance and training activities. The section includes the compliance and enforcement north unit, the compliance and enforcement south unit, the technical and regulatory implementation and coordination unit, and the data, reporting and records workgroup. The compliance assurance section shares responsibilities responding to acute drinking water emergencies within the state with other safe drinking water program sections and units.

The compliance assurance section conducts the following capacity development activities and tasks:

| General activity | Specific tasks |
|---|--|
| Drinking water training and assistance to public water systems. | <ul style="list-style-type: none"> • Communicate effectively with systems to understand compliance responsibilities. • Provide training and assistance to public water systems. • Provide training and assistance to public water systems preparing to meet new regulations. • Develop and analyze policies and procedures that assist both public water system and safe drinking water program staff. • Assist public water systems with understanding performance monitoring requirements and provide technical assistance. |

3.3 Engineering section

The engineering section establishes and implements criteria for proper design and operation of public drinking water facilities throughout Colorado by reviewing designs of facilities. The section provides technical, managerial and financial reviews for all new water systems and technical reviews for treatment modifications and distribution systems, along with storage tanks for new and existing water systems. The section coordinates these activities amongst the various staff in order to meet deadlines on design reviews to maintain primacy for Colorado and to ensure protection of public health and the environment. The section also manages several special projects which involve the development of policy used to interpret the Colorado Primary Drinking Water Regulations. The section establishes updates for the Design Criteria for Potable Water Systems. The engineering section, in cooperation with the drinking water compliance assurance section, is also responsible to help make modifications to the CPDWR as necessary and to provide technical insight to the drinking water compliance assurance section with regard to technical interpretation and application of the regulations. The engineering section also supports enforcement with determinations of economic benefit, appropriate response schedules, and compliance assistance. The section also performs support services for the drinking water state revolving fund program by reviewing the technical-managerial-financial capacity of the system, preliminary engineering reports, eligibility assessments, and the design of the proposed improvements. The section shares responsibilities for responding to acute drinking water emergencies with other safe drinking water program sections and units.

The engineering section conducts the following capacity development activities and tasks:

| General activity category | Specific tasks |
|--|---|
| Drinking water sanitary survey | <ul style="list-style-type: none"> • Perform sanitary surveys of public water systems. • Identify significant deficiencies, violations, and observations. • Follow-up with the system(s) regarding outstanding significant deficiencies. • Oversee the quality and consistency of the sanitary survey program. <ul style="list-style-type: none"> ○ Lead internal training. ○ Develop standard operating procedures. ○ Standardize the outreach to public water systems. • Oversee the sanitary survey training at operator schools. |
| Drinking water revised total coliform rule level 2 assessments | <ul style="list-style-type: none"> • Perform level 2 assessments of public water systems • Identify sanitary defects. • Follow-up with the system(s) regarding outstanding sanitary defects. • Oversee the quality and consistency of the level 2 assessment program. <ul style="list-style-type: none"> ○ Lead internal training. ○ Develop standard operating procedures. ○ Standardize the outreach to public water systems. • Oversee the level 2 assessment training at operator schools. |
| Drinking water technical assistance/support | <ul style="list-style-type: none"> • Provide technical assistance to public water systems. • Support state revolving fund loan program by providing eligibility and capacity development reviews. • Prepare and distribute technical assistance materials concerning proper operations. • Provide technical leadership and consultation to the Safe Drinking Water Program and external entities. • Serve as a technical leader on the SDWP's efforts with respect to drinking water treatment techniques and emerging technologies, establishing and interpreting drinking water design criteria, drinking water treatment residuals management, challenging design or sanitary survey issues, addressing new drinking water rules, distribution systems, eligibility and capacity development review process to support the state revolving fund loan program. • Technical review for treatment modifications and distribution storage tank for new and existing systems. |

3.4 Field services section

The field services section ensures proper operation of public drinking water facilities throughout Colorado via the implementation of the sanitary survey program. The section coordinates these activities amongst the various staff in order to perform the necessary inspections to maintain primacy for Colorado and ensure protection of public health. This section shares responsibilities for responding to acute drinking water emergencies within the state with other program sections and units.

The field services section conducts the following capacity development activities and tasks:

| General activity category | Specific tasks |
|--|---|
| Drinking water sanitary survey | <ul style="list-style-type: none"> • Perform sanitary surveys of public water systems. • Identify significant deficiencies, violations, and observations. • Follow-up with the system(s) regarding outstanding significant deficiencies. |
| Drinking water revised total coliform rule level 2 assessments | <ul style="list-style-type: none"> • Perform level 2 assessments of public water systems. • Identify sanitary defects. • Follow-up with the system(s) regarding outstanding sanitary defects. |
| Drinking water training and assistance to public water systems | <ul style="list-style-type: none"> • Provide technical assistance to public water systems. • Prepare and distribute technical assistance materials concerning proper operations. • Provide compliance assistance to public water systems prior to, during, and after sanitary survey visits. |

3.5 Clean water program, standards unit

Within the Clean Water Program, a portion of the set-aside funds support staff in the standards unit to assist with evaluating drinking water sources and whether or not well water may be under the direct influence of surface water.

Specifically, the standards unit conducts activities and tasks associated with:

| General activity category | Specific tasks |
|---|---|
| Evaluate geology and hydrology for well sources | <ul style="list-style-type: none"> • Analyze geologic and hydrologic information. • Model groundwater movement. • Evaluate site geology. • Review consultants monitoring results. • Under direction of the compliance assurance unit manager, train appropriate staff to assess water quality data for determination of groundwater under the direct influence of surface water. |

4.0 Efficacy of the Colorado capacity development strategy

Colorado's capacity development strategy has been an effective tool in guiding the development and implementation of capacity development activities designed to assist public water systems in building and maintaining technical, managerial and financial capacity. The incorporation of the strategy into the Water Quality Control Division Safe Drinking Water Program's major activities and the daily work of staff maximize influence and efficacy.

Some specific outcomes from implementing the capacity development strategy include:

- The provision of one-on-one technical assistance coaching site visits to over 600 small public water systems from 2015 through 2017.
- In 2016, 79% of all systems assisted by coaching made an improvement. So far in 2017, 70% of all systems assisted have made an improvement as a result of coaching.
- The successful implementation of the drinking water excellence awards program. Some of the participants in the program are doing projects that include improved filtration system, additional water system security, and improving the emergency interconnection between two small rural systems.
- Continued implementation of the 2015 training strategy to establish a vision for public water system training services and to provide in-kind support of statewide training partnerships including: short schools for water operators, treatment and distribution system training, disinfection baffling factor studies, Red Rocks Community College Distribution Systems Training Center and a variety of statewide training seminars and conferences.
- The annual completion of over 200 on site sanitary surveys of community water systems and oversight of approximately 300 field evaluations of non-community ground water systems.
- The provision of technical and financial assistance to complete source water protection grant applications for 209 public water systems for a total of \$1,202,328; and the substantial implementation of 203 source water protection plans covering approximately 2.5 million citizens in Colorado.

Under the scope of the capacity development program, the Water Quality Control Division has continued to effectively utilize data to identify issues that drinking water systems face, direct training and technical assistance resources to the identified issues, coordinate solutions with training partners and stakeholder organizations, and report changes and outcomes to relevant parties.

Furthermore, the local assistance unit worked with the Rural Community Assistance Partnership to conduct a similar failure and root cause analysis project on a nationwide scale. Additionally, the local assistance unit created and is utilizing a database to track all coaching assistance requests and individual improvements systems make as a result of receiving coaching assistance. This allows the coaching workgroup to trend data and measure the positive impact it is having. Finally, ongoing efforts enable the safe drinking water program to better track, evaluate and report on:

- Annual noncompliance rates.
- The number of sanitary surveys or other onsite evaluations conducted using capacity development funds.
- As a result of provided training, the decreases in the number of deficiencies identified during site visits and increases in the number of deficiencies resolved.
- Effectiveness of compliance teams in assisting systems with compliance difficulties to resolve their problems.
- Changes in the compliance status of systems identified on the enforcement targeting tool as required by the EPA's enforcement policy. This allows the local assistance unit to reach out to systems before they become a target for enforcement.

The safe drinking water program has also successfully used state revolving fund set-aside work plans to coordinate and communicate the key issues the program intends to address and how set-aside funds will be used to support program initiatives. Strategic work plan development and implementation has directly contributed to the achievement of safe drinking water program strategic plan goals and measures, including but not limited to:

- Zero (0) waterborne disease outbreaks.
- Ninety eight percent (98 percent) of the population served by community public drinking water systems receives drinking water that meets all health-based standards.
- Ninety five percent (95 percent) of community public drinking water systems meet all health based standards.
- Less than 5 percent (5 percent) of community public drinking water systems have unresolved significant deficiencies.
- Eighty percent (80 percent) of public water systems are in compliance with all regulatory requirements.

5.0 Summary and conclusions

The Safe Drinking Water Act Amendments of 1996 presented many challenges to the safe drinking water program, including new regulatory requirements, source water protection, operator certification, revolving fund and capacity development program requirements. The amendments also present many challenges to public drinking water systems in the state; challenges that many smaller systems have a difficult time addressing. However, the amendments also provide states with a funding mechanism to augment state and other federal funding to complete the many tasks the state is required to perform. This mechanism includes specific set-asides from the drinking water state revolving fund capitalization grant, which provide funds for capacity development, program management, wellhead protection, and small system training and technical assistance. Colorado has developed and implemented a robust capacity development strategy to use set-aside funds to support public water systems so they can strengthen their ability to supply safe drinking water to the public.

This report provided details on the use of set-aside funds to accomplish these tasks and demonstrates that it is in Colorado's best interest to continue to support these efforts, provide the necessary state funds to keep drinking water programs effective and viable, and to continue to support program growth with the necessary state resources to make all public water systems in the state a strong, integral part of the state's public health protection efforts.

Regulations cannot cover all contingencies, monitoring is not continuous but fixed in time, and enforcement actions are only taken after a problem has occurred. Regardless of the regulations, monitoring, assistance and enforcement, the only way to assure continuously safe drinking water and sustainable drinking water systems is to proactively ensure all systems have technical, managerial and financial capacity to operate at the very best of their capabilities, and to support and empower operators and managers to strive for excellence in their daily operations.

5.1 Retention of drinking water program primary enforcement authority

The Colorado capacity development program is one part of the overall safe drinking water program. Federal funding will not be available to fund its activities unless Colorado retains primary enforcement authority for the Safe Drinking Water Act. Safe drinking water program staff has continued to meet all the EPA requirements to retain primary enforcement authority. This ensures that Colorado public water systems receive the services that offer technical assistance and encourage compliance. The safe drinking water program will continue to implement all activities under the Safe Drinking Water Act to ensure all available federal funding.

5.2 Retention of capacity development set-aside full capitalization grant allotment

In addition to the requirements to retain primary enforcement authority, other requirements must be met to retain the capacity development program, the related set-aside funding and the full allotment of the capitalization grant. These requirements include the development and subsequent approval by the EPA of a current capacity development strategy, work plan and implementation report. Inadequate response in any of these areas can result in the EPA withholding a portion of the capitalization grant. Colorado has successfully complied with all requirements of this program during the three years of this report period.

5.3 Future challenges

The drinking water program currently receives approximately 80% of its funding through federal dollars, 15% from the general fund, and 5% from cash revenues. The most important challenge facing the program is maintaining adequate program funding.

In the past, state drinking water programs with primary enforcement authority received federal funding only through an annual performance partnership grant. However, the Safe Drinking Water Act Amendments of 1996 provided additional funding through the annual federal capitalization grant in the way of set-asides. In fiscal year 2017, Colorado received the full amount of the annual federal capitalization grant set-aside funding from the U.S. Environmental Protection Agency because the state is implementing a capacity development program that aligns with the requirements of the Safe Drinking Water Act. States that fail to implement a capacity development program risk losing 20 percent of the capitalization grant. The fiscal year 2017 appropriation was \$124,000 less than the amount Colorado received in fiscal year 2016. Although this is not an enormous cut, successful implementation of Safe Drinking Water Act requirements necessitates spending at a level that exceeds the yearly grant amount and depletes grant balances. As it stands today, the available set-aside fund balances previously saved are extremely depleted and many of the services designed to help public water systems achieve and maintain technical, managerial, and financial capacity to continuously provide safe drinking water to the public and described in this report, are not sustainable.

The decrease in federal appropriations and depletion of historic set-aside balances has had a profound impact on the program considering the percentage of federal money the program relies on. As a result, beginning in August 2017 the drinking water program implemented strategies to offset the increase cost of personal services by reducing services in different areas of the program. This included the following:

- Reduction in about 40 sanitary survey inspections per year. On average about one significant health risk is detected per inspection, so this directly raises the threat of water contamination.
- Delays in water infrastructure design reviews. Currently, staff complete only 25 percent of projects within a 45 day target. The backlog of projects is typically three to four months. This performance level will worsen. This will result in a slowdown of needed construction projects for infrastructure that support safe water, and support the economy and job creation.
- Delays in evaluating new and existing shallow wells for pathogens. Typically, the department evaluates about 60 shallow wells per year. This will be reduced to approximately 30 per year. This directly increases risk of water contamination. The department will have to consider not approving new shallow-well sources unless the well owner provides the analysis formerly done by the department.
- Canceling planned roundtable meetings around Colorado designed to assist small, rural water systems in understanding and complying with the Lead Rule. Going forward, the department will only be able to provide very limited assistance to meet service needs warranted since the Flint, Michigan water crisis in 2016.

- When filled, one abolished position would have been re-directed to provide assistance to water systems with sample site location quality assurance. This position also would have been able to help water systems establish that they only need to sample every three years for lead due to low risk. The abolishment of this position will result in the minimum sampling frequency remaining at one year for lead at all water systems.
- The department conducts over 200 assistance events for public drinking water systems annually. To save costs, this service will be reduced by 30 percent in FY 2017-18. Approximately 75 percent of water systems improve performance after receiving assistance; preventing problems before they happen.
- Reduced compliance assistance efforts that decrease violations including:
 - Less staff time reviewing self-reported monitoring data.
 - Less support to ensure required sampling is completed.
 - Less time reviewing and addressing system operator qualifications.
 - Fewer trainings provided.
- These changes will increase the numbers of violations issued to public drinking water systems, all of which require some form of public notice.
- Only minimal assistance will be provided to water systems regarding unregulated contaminants, such as cyanotoxins, perfluorinated compounds and other contaminants included in EPA Unregulated Contaminant Monitoring Rule Four.
- The department provides source water protection planning and implementation services to public drinking water systems via current staff efforts and contract support. Staff efforts are being reduced in FY 2017-18 and the contract will be reduced or eliminated. Contamination risks increase when source waters are not protected.
- Eliminating contracts with local health departments to conduct sanitary survey inspections.
- Contracts for technical assistance have been eliminated over the years and no new contracts will be available.
- The Safe Drinking Water Program newsletter will transition to electronic only production in 2018.