



Drinking Water Capacity Development Program Report to the Governor

Submitted to Governor Jared Polis



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Executive summary

Over 2,000 active public drinking water systems exist in Colorado. Drinking water systems range in size 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 drinking water state revolving fund grant requirements 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 \$21.8 million annually, so Colorado would risk about \$4.4 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 capacity development strategy. In addition, associated work plans focused on specific efforts to accomplish goals of the strategic plan are developed on a rotating 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. EPA has approved Colorado's strategy and work plan. 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 created will 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 helped drinking water systems comply with 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 attributed to these efforts.

In fiscal year 2020, 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. This amount is similar to the grants received in FYs 2018 and 2019. Furthermore, the recent grants reflect an approximate \$7 million increase over FY 2017.

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. These struggles have been significantly compounded by the challenge of providing safe

drinking water during the COVID-19 global pandemic. Additionally, Coloradans are increasingly struggling with the impact of unregulated contaminants in drinking water such as per- and polyfluoroalkyl substances.

As a result there are new demands for workforce development and an increased 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 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 and unexpected threats.

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 2018 through 2020.
- 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 publications¹. This website lists documents and resources related to capacity development, including a copy of the 2017 capacity development report to the governor.

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

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

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.

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 2020, the combined federal program grant and capitalization grant to Colorado was approximately \$21.8 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 2020, failure to implement a capacity development strategy would have resulted in a loss of nearly \$4.4 million in federal set-aside funding. 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 approximately 5,500 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 community development and partnership section 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 work planning efforts to guide program activities. Colorado's capacity development strategy is revised regularly, most recently in June 2018.

The 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 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 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. EPA reviews and approves each work plan. 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 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 is guided by the results of analysis to identify and evaluate trends in compliance failures and areas of greatest weakness at water systems. Analytical results have identified failure to plan as a key shortcoming of Colorado water systems. Furthermore these analytical results provide a valuable baseline for comparing, measuring, and evaluating the effectiveness of capacity development program activities. Work plan development is also guided by various other factors including new regulations and other Colorado Initiatives.

The following sections describe the capacity development activities of the safe drinking water program, including the community development and partnership, 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 Community development and partnership section

The community development and partnership section includes the capacity coach and training team, the drinking water pursuing excellence program, the facility and operator outreach and certification board liaison and the source water assessment and protection program. The section 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 section 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 focuses primarily on voluntary preventative strategies to protect sources of drinking water prior to treatment. The unique combination of functions provides enhanced operator training, contaminant prevention strategies and public drinking water system assistance. Finally, the section 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 community development and partnership section shares responsibilities of responding to acute drinking water emergencies within the state with other safe drinking water program sections and units.

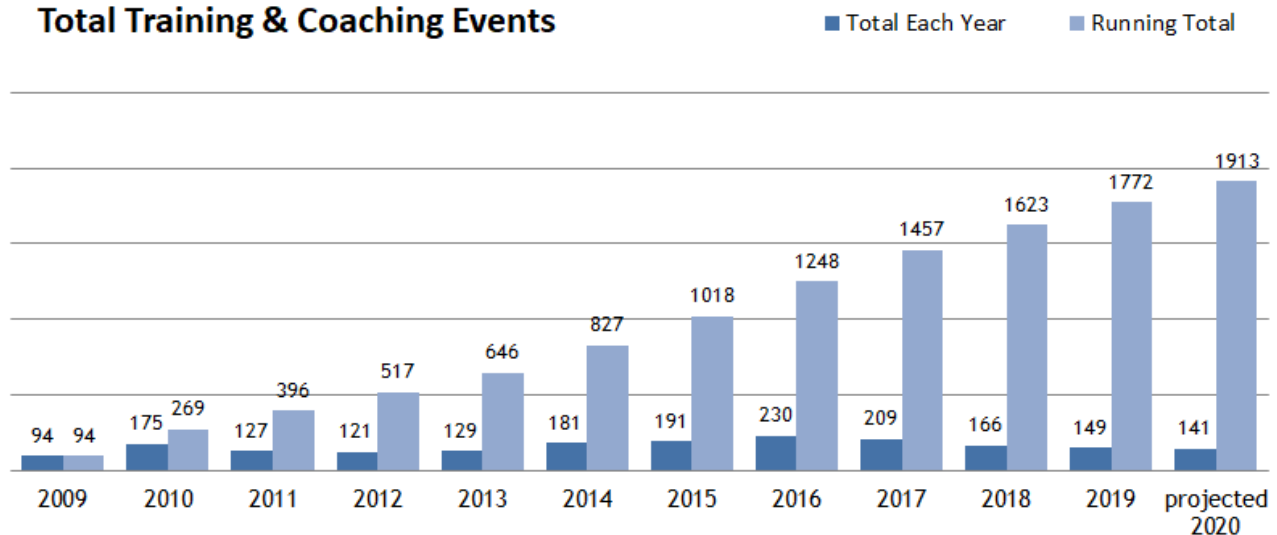
Capacity coaching and training services

The capacity coach and training team includes three technical, managerial and financial capacity coaches. One of the coaches is a certified water professional and holds operator certificates in water and wastewater treatment and collection and distribution systems. The second coach is a specialist in water system managerial and financial capacity. The third coach is a specialist in training development and implementation. 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 and other system documentation, 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 2019, 76% of all systems assisted by coaching made an improvement. So far in 2020, 73% 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 coaching program began in 2009. For 2020, capacity coaches are averaging 12 coaching and training assistance events per month to help small systems deliver safe drinking water. The reason for the decrease in the number of events over the past few years may be attributed to a shift to more “classroom” based training events. This approach allows for increased efficiency as many on-site assistance visits involve many hours of travel by the coach. However it is often found that the system did not need the customized in-depth assistance of a site visit and would have equally benefited from assistance in a group setting. The shift to this approach allows coaches to assist many systems at the same time (18 systems per event on average). This approach results in less events overall while reserving travel and time capacity for the systems in the most need of targeted on-site assistance. The 2020 COVID-19 pandemic has also likely reduced the number of events provided by coaching staff. However, adaptations have been made to both on-site and classroom events to provide assistance and training remotely thus minimizing the impact.

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 5,514 water and wastewater certified water professionals holding 11,693 certificates of which 6,605 of those certificates are for water treatment and distribution.

Compliance with operator certification requirements is a safe drinking water program priority. In calendar year 2019, the compliance rate with the certified operator requirements was 98 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 and providing training.
- 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 Pursuing Excellence Program encourages regulated entities to maintain long-term compliance, exceed regulatory compliance, and/or take proactive steps to overcome challenges all with the goal of ensuring that an entity is operating at the highest possible level to protect public health and the environment. The awards program is the result of collaboration between the department, drinking water utilities, industry and universities. The program consists of two branches, one of which provides awards to high performing systems each year, and the other provides funding to help struggling systems. This other branch is called the Assistance Grants Program.

The Assistance Grants Program awards funds up to \$25,000 to systems with an identified infrastructure need. Since 2018, the program has awarded funds to 26 systems, totaling \$410,430, with contracts in place to award an additional six systems and spend \$145,000 in 2020. Some of the projects include improved filtration, additional water system security, improving the emergency interconnection

between two small rural systems, installing optimal corrosion control treatment, repairing and inspecting tanks, and installing nitrate treatment.

Training partnerships

A well trained workforce is integral to providing safe drinking water. Until the last couple of years, set-aside funds used to support and fund training and technical assistance have seen a decrease since 2014, forcing reductions in those activities. This includes adjusting historical partnerships with a diverse group of businesses, agencies, schools and nonprofit organizations statewide. 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 historic and current partnerships since 2017.

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 (but were cancelled in 2020 due to COVID-19). In addition, the Leadville Operators Training Conference is offered in Leadville each year (also canceled in 2020 due to COVID-19). Each school is typically four or five days, and covers either basic or advanced curriculum in drinking water treatment or distribution system management. For many years, these schools have not received 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. In partnership with Colorado State University a three year study was conducted that 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. Coaches and other staff use the results of this project to provide significant time and cost savings options for small water systems across the state. Additionally, the coaches and other staff assist small systems to perform on-site tracer studies so they can better understand the disinfection they are achieving.

Distribution systems training center: In partnership with Red Rocks Community College in Lakewood, the design and construction of a hands on training facility for water distribution operators was completed in 2012. This project is the culmination of a joint partnership that leveraged federal grants supplied by the drinking water program, donations made by public water utilities, and labor volunteered by Red Rocks Community College students and staff. 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 section 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. Until recently, 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 location of the rural areas they serve. However starting in 2019, this grant program has been reinstated and will continue to be funded as available set-aside balances allow.

Source water assessment and protection

The Safe Drinking Water Act amendments of 1996 directed each state to 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 (SWAP) program team manages and implements the integrated project plan, the wellhead protection program and set aside work plan (as part of the local assistance and other state programs set-aside work plan), and a statewide grant program providing technical and financial support for protection planning activities. Through the statewide grant program, the SWAP team provides source water protection entities with grant funding or technical assistance opportunities including:

- Protection plan development and implementation grants.
- Protection plan development and implementation financial and 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 team continues to coordinate with various Division clean water and drinking water staff including the watershed section, field services section, capacity coach and training team, 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 235 public water systems with a total financial assistance of \$1,332,328. The source water program has reported 237 substantially implemented protection plans covering approximately 2.8 million Colorado citizens (Environmental Protection Agency 2020 Performance Accountability Report). In addition, the current statewide number of public water systems in some stage of protection planning development is 284.

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	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	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	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 and classroom training to over 400 small public water systems from 2018 through 2020.
- In 2019, 76% of all systems assisted by coaching made an improvement. So far in 2020, 73% of all systems assisted have made an improvement as a result of coaching.
- The successful implementation of the drinking water excellence awards and assistance grants program. Some of the participants in the program are doing projects that include improved filtration, additional water system security, improving the emergency interconnection between two small rural systems, installing optimal corrosion control treatment, repairing and inspecting tanks, and installing nitrate treatment.
- 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 295 on site sanitary surveys of community water systems and oversight of approximately 120 field evaluations of non-community groundwater systems.
- The provision of technical and financial assistance to complete development and implementation of source water protection plans for 235 public water systems with a total financial assistance of \$1,332,328; and the substantial implementation of 237 source water protection plans covering approximately 2.8 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.

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. Work plan development and implementation has directly contributed to the achievement of safe drinking water program successes such as no water borne disease outbreaks since 2008, significant E. coli violation reduction (reduced from 134 in the 1990s to 56 in the 2000s to 34 in the 2010s) and the institution of a growing culture of health among program staff and water system owners, operators and utility staff. Overall, tap water in Colorado has never been safer, but there are still challenges for the future as mentioned below.

5.0 Summary and conclusions

The Safe Drinking Water Act Amendments of 1996 substantially improved drinking water safety, while presenting many challenges to the safe drinking water program, including new regulatory requirements, source water protection, operator certification, plus 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.

The safe drinking water program continues to implement a proactive and comprehensive cultural change program focused on the primary mission to protect human health and designed to detect and address contaminants in public water supplies in a timely manner. The program recognizes that organizations with a broad, well-developed culture of health will be best equipped to deal with drinking water challenges. The safe drinking water program actively champions and pursues this culture of health, and believes that the culture of health must extend to water system owners, operators and utility staff.

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 and a culture of health 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 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 drinking water state revolving fund capitalization grant. These requirements include the development and subsequent approval by EPA of a 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.

Capacity development strategy and asset management requirements of the America's Infrastructure Act

The 2018 America's Infrastructure Act (AWIA), Section 2012, requires states to include efforts encouraging the development and implementation of asset management plans by public water systems in the triennial Governor's report no later than September 30, 2023. If a capacity development strategy, however, is revised to comply with AWIA prior to September 30, 2020, asset management promotion must be addressed in the 2020 Report to the Governor.

Colorado's capacity development strategy has not yet been revised to include the asset management requirements of AWIA. Therefore, as allowed by AWIA, a description of all efforts to encourage the development and implementation of asset management by public water systems will be provided in the 2023 Governor's report.

By December 31, 2021, the safe drinking water program plans to revise the Colorado capacity development strategy in order to comply with the AWIA requirements. The revision is planned to include a description of how asset management will be promoted through addressing EPA's five-core-question framework of asset management. For example, Colorado's strategy could identify different approaches to promote asset management planning such as providing asset inventory tools, system mapping assistance or asset management software development.

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 2020, 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 2020 appropriation was similar to grants received in FYs 2018 and 2019 and is approximately \$7 million more than the FY 2017 appropriation.

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 and provide safe drinking water. The program anticipates future ongoing challenges associated with public water system aging infrastructure, the lead and copper rule revisions and the challenges presented by unregulated contaminants in drinking water such as per- and polyfluoroalkyl substances.