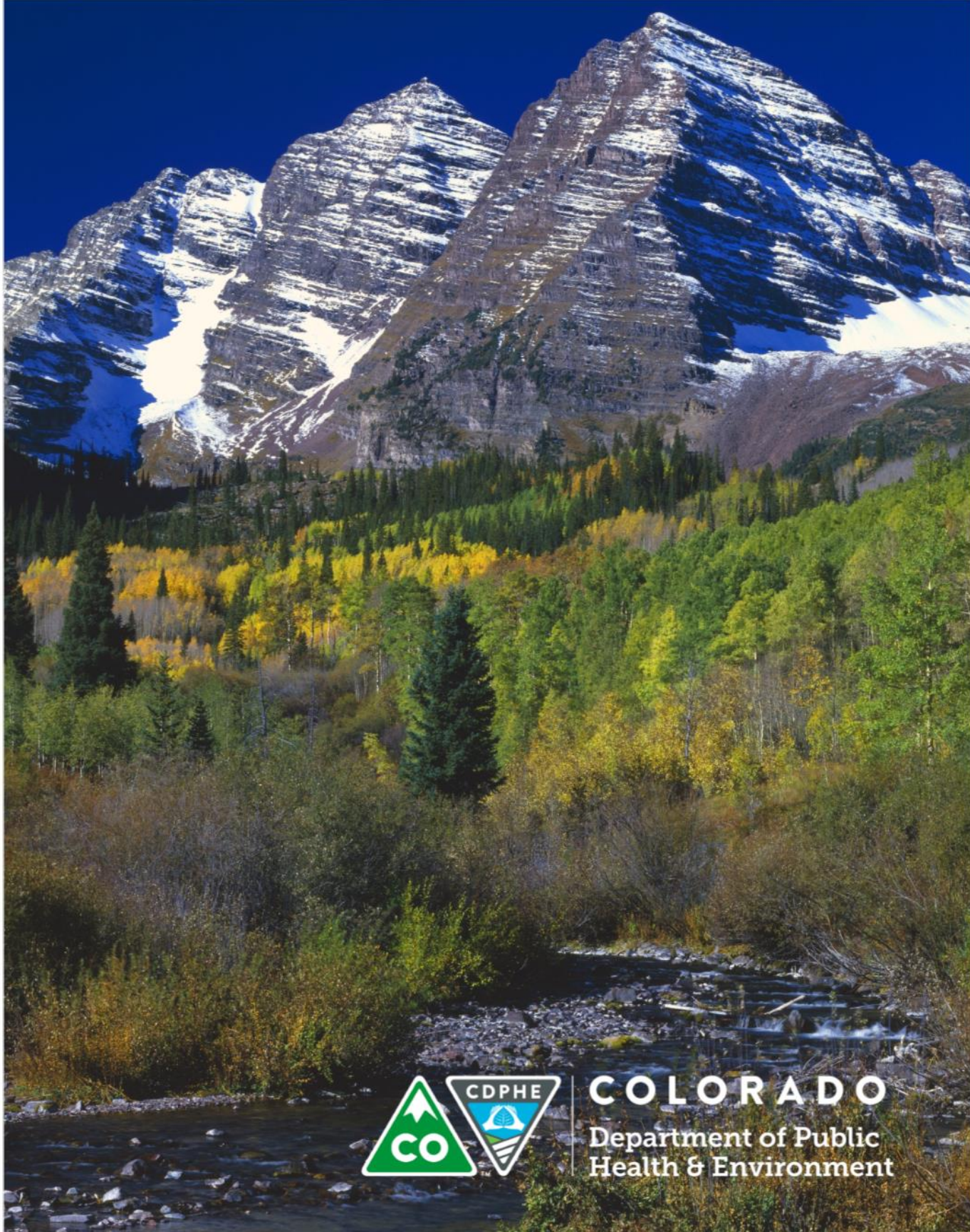


Drinking Water Capacity Development Program Report to the Governor

Submitted to Governor John W. Hickenlooper

Water Quality Control Division

2014



COLORADO
Department of Public
Health & Environment

Table of contents

Executive summary.....	1
1.0 Introduction	2
2.0 Overview of the Safe Drinking Water Act	3
2.1 Required state activities	4
2.2 Voluntary state activities	4
2.3 Capacity development strategy	4
3.0 Colorado capacity development activities	5
3.1 Local assistance unit.....	6
Capacity coaching and training services.....	6
Facility operator certification services	7
Security and emergency preparedness services	8
Drinking water excellence awards.....	9
Operator reimbursement project.....	9
Training partnerships	9
Source water assessment and protection.....	11
3.2 Drinking water compliance assurance section	12
3.3 Engineering section	13
3.4 Field services section	14
3.5 Clean water program, watershed section	15
4.0 Efficacy of the Colorado capacity development strategy.....	15
5.0 Summary and conclusions	16
5.1 Retention of drinking water program primary enforcement authority.....	17
5.2 Retention of capacity development set-aside full capitalization grant allotment	17
5.3 Future challenges	17

Executive summary

Over 2,000 active public drinking water systems exist in Colorado. Systems range from small restaurants or communities of 25 people to a service area the size of metropolitan Denver. Some use groundwater wells as a supply source and some use the state's rivers, lakes and reservoirs. Treatments at public water systems span a broad range from a simple well and chlorinator to complex treatment systems that have a construction and operations price tag in the millions of dollars annually. For all public water systems, the complexity of the Safe Drinking Water Act can 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 by Sept. 30 of every third year risk losing 20 percent of the annual federal drinking water state revolving fund capitalization grant the state is otherwise eligible to receive. At risk was nearly \$3.1 million in fiscal year 2014 (20 percent of the full \$15.4 million drinking water state revolving fund capitalization grant). 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 has developed a strategic plan for the capacity development program, providing direction to the long range goals. In addition, associated work plans are developed on a rotating three to five year schedule to focus on specific efforts to accomplish goals of the strategic plan. The rotating schedule is used to keep consistency in the year to year work efforts yet adjust to the changing environment.

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 primarily to ensure the system developer is creating a sustainable drinking water system able to provide consistently safe drinking water. For new and existing systems, the program has delivered a wide variety of training and technical assistance efforts directed toward helping systems meet their future needs. These efforts, including capacity assessments, assistance programs, coaching and training have had positive impacts on the capabilities of new drinking water systems. For example, a system received inspection preparation training and indicated that the training was to the point and well received. When the system was later inspected, the inspector indicated that the system had no violations or deficiencies.

In fiscal year 2014, Colorado received the full amount of water infrastructure funding from the U.S. Environmental Protection Agency (EPA) because the state is implementing a capacity development program that aligns with the requirements of the Safe Drinking Water Act. This funding was nearly the same as the amount Colorado received in fiscal year 2013. Although this is not a cut, successful implementation of Safe Drinking Water Act requirements necessitates spending at a rate that exceeds the yearly grant amount and mines grant balances. If this trend continues, 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 high levels of naturally occurring radionuclides like uranium and radium in their source water. Increasing complexity of drinking water regulations and treatment technology, in addition to an aging workforce, is placing new demands on workforce development and increasing the need for high quality and affordable training for drinking water operators.

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 take stewardship of these financial resources seriously and are increasingly using 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 and failures, and as drinking water systems face new challenges in complying with new and revised 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 directed toward the governor of the State of Colorado and provides an excellent basis for anyone to understand the structure and effectiveness of the safe drinking water capacity development program.

Capacity development is a frequently misunderstood term because it sounds like it is building infrastructure. The capacity development program is not designed to build physical infrastructure but to enhance the ability of the water system to manage and operate their existing infrastructure effectively and to identify those situations where infrastructure changes are essential. The program is designed to build capabilities in public water systems to provide continuously 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 2012 through 2014;
- Section 4.0: A discussion of the efficacy of the strategy; and
- Section 5.0: Summary and conclusions.

If additional information is desired, the [2011 drinking water capacity development program report](#)¹ is also available. The report website also lists documents and resources related to capacity development.

¹ <https://www.colorado.gov/pacific/cdphe/wq-publications>

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 for 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, 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 2014, the combined federal program grant and capitalization grant to Colorado was more than \$15.4 million. Without this support, Colorado public water systems would still be subject to compliance with all of the national primary drinking water regulations, but the state would not have the resources to provide compliance assistance or infrastructure improvements.

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 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 2014, failure to implement a capacity development strategy would have resulted in a loss of nearly \$3.1 million in federal infrastructure 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 5,500 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 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 2012.

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 as well as with their own public water supplier.
3. Apply a proactive approach to systems of concern, so systems are provided the tools and resources needed to regain compliance and full capacity.
4. Develop a program that supports collaboration among all drinking water systems, assists smaller systems with understanding their problems and potential solutions, and uses 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 that evaluates the technical, managerial and financial needs, capital needs, and impact of shortfalls for system performance on the health of the populations served.
7. Integrate sustainability into program projects wherever possible to ensure resource expenditures provide measurable impacts and do not result in a short term, single project.
8. Ensure all new and proposed public water systems have adequate technical, managerial, and financial capacity to remain viable, sustainable drinking water systems 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 of state program management, local assistance and other state programs, small system training and technical assistance, and the four percent set-aside for administration and technical assistance. The EPA reviews and approves each work plan. Colorado also identifies work plan activities and costs 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 in recent years work plan development has been 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 will reevaluate the findings of this report in 2015.

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 watershed program, 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 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 training and source water protection assistance provides enhanced operator training, contaminant prevention strategies and public drinking water system assistance.

The Water Quality Control Division has dedicated staff to provide facility compliance determinations, outreach to facility owners and to serve as a liaison between the Water and Wastewater Facility Operators Certification Board and the Water Quality Control Division. In 2013 the safe drinking water program moved this staff position from the drinking water compliance assurance section into the local assistance unit. Outreach to facility owners and the liaison role between the board and the division stayed with the position now in the local assistance unit. Since drinking water compliance assurance section staff is best positioned to monitor ongoing facility compliance with facility operator certification requirements this responsibility was left in the drinking water compliance assurance section. The expected results of this move are improved alignment with capacity development efforts including training and certification challenges and improved assistance to system owners.

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

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

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>

in water treatment and distribution systems and 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.

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 2014, capacity coaches are averaging 19 coaching and training assistance events per month to help small systems deliver safe drinking water. The reason for this increase in the number of events 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 addition of a specialist in December 2013 to address managerial and financial issues many small systems struggle with.



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. They also provide invaluable technical, managerial and financial 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 (guidelines).

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.

Compliance with operator certification requirements is a safe drinking water program priority. In calendar year 2013, the compliance rate with the certified operator requirements was 90 percent.

Colorado has 5,419 water and wastewater certified water professionals holding 10,902 certificates; 6,142 of those certificates are for water treatment and distribution. The certification board liaison outreach efforts include participating in and presenting at conferences, seminars and trainings. These specifically targeted 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.

- CoWARN garnered national attention in March 2008 when the network of members successfully responded to a waterborne salmonella outbreak in Alamosa. This marked the first time that a response network was used for a system wide contamination event by a waterborne pathogen and changed the mindset that response networks were only beneficial for responding to natural disasters.
- The CoWARN network was critical in facilitating assistance that helped nine communities recover from the 2013 flooding events. This includes the communities of Lyons, Estes Park, Evergreen, Jamestown, Meadow Mountain, Peetz, Lookout Mountain, Upper Thompson and Aristocrat Ranchette.
- 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

In 2014, the safe drinking water program expanded its drinking water excellence awards program to recognize all drinking water utilities going above and beyond to improve public health from source to tap. The expanded 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 and get awarded through the new program. Drinking water systems will receive 2014 excellence awards during national drinking water week 2015.

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 holding level A and B certificates. 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.

Operator reimbursement project

Drinking water treatment and water distribution operators pay application, examination and administration fees totaling \$115 for their certifications. The goal of the defunct operator reimbursement project, funded under the expense reimbursement grant, was to offset these expenses by reimbursing the \$115 certification cost to certified water treatment and water distribution operators. In addition, eligible operators were reimbursed an additional \$115 to cover travel costs and ancillary training expenses associated with each certification. The safe drinking water program and operator certification program staff worked together to receive applications and manage the disbursement of the funds. This project benefited operators who successfully completed certification testing in water treatment and water distribution, and who applied for the reimbursement following division guidelines. Funding for this project ended when the expense reimbursement grant expired on December 31, 2012.

Training partnerships

Safe drinking water doesn't happen without a well trained workforce. The local assistance unit leverages drinking water state revolving fund set-asides to support training and technical assistance partnerships with a diverse group of businesses, agencies, schools and nonprofit organizations statewide. In July 2010, the local assistance unit (then the capacity building unit) prepared the 2015 Public Water System Training Strategy Report³ to establish a vision for public water system training services through 2015, and to direct the annual work planning and priority setting related to public water system training.

This training strategy is the culmination of a 12 month, four phase project designed to 1) assess the most common failures at Colorado's public water systems, 2) establish a baseline and preliminary gap analysis of existing training and technical assistance services for public water systems, 3) convene a roundtable of technical assistance providers to collect critical

³ Williams, Sharon Israel, Capacity Building Unit, Safe Drinking Water Program. July 2010. *Colorado 2015 Public Water System Training Strategy*. Available for download at: <http://www.colorado.gov/cs/Satellite/CDPHE-WQ/CBON/1251597566798>

input from the training community, and 4) apply project results to develop a five year strategic plan for training services.

The 2015 strategy establishes five overarching goals:

1. Set standards for high quality courses.
2. Define core curriculum.
3. Support statewide training.
4. Coordinate training offerings and schedules.
5. Cultivate a supportive learning environment.

In fall 2011, the local assistance unit in partnership with the Rocky Mountain Section of the American Water Works Association set out to develop a framework for implementing the goals of 2015 training strategy. The project involved reconvening critical training partners to develop the processes, guidelines, and expected outcomes of statewide training activities. The drinking water operator training framework is the result of this collaborative project. It creates a foundation for improving and enhancing drinking water operator training program and includes the following components:

- Need to know criteria for drinking water operators, curriculum pathways and core curriculum at each level of operator certification.
- A career roadmap to help drinking water operators assess where they are in the learning process and what they should do next.
- A train the trainer tool set to develop and support excellent instructors.
- A training assessment plan to gather feedback and identify opportunities for improvement.
- A web portal to provide easy access to the above components and access to all operator training opportunities statewide. The local assistance unit is currently partnering with RMSAWWA and Colorado Environmental Certification and Testing Incorporated to design and build the web portal.

Since 2011, the implementation of the 2015 training strategy has been reflected in the following training and technical assistance partnerships:

Short schools: Two short schools, the Rocky Mountain Water and Wastewater Plant Operator School and the Colorado Distribution and Collection Systems School, are hosted by training partners at the University of Colorado at Boulder, College of Engineering, and are offered in Boulder each year. In addition, the Leadville Operators Training Conference, hosted by training partners at the Colorado Mountain College, the Rocky Mountain Section of the American Water Works Association, and the Rocky Mountain Water Environment Association, are offered in Leadville each year. Each school is typically four or five days, and covers either basics or advanced programs in drinking water treatment or distribution system management. These schools have operated with state subsidies offered through the drinking water state revolving fund set-aside funds to keep participant registration fees relatively low.

Distribution system training: Funding was used to support the development of distribution system management training focused on the needs of water operators in rural Colorado. The training series includes three training courses spanning five days, offered cost free and close to home for water system operators across the state. Workshops attendees received in depth, hands on instruction on topics including water main breaks, storage tank maintenance and management, and sampling techniques and preventing cross connections. Since spring of 2010 when the workshops were first

offered, operator demand for the classes has consistently exceeded available class space.

Monitoring plan/technical managerial and financial training workshops: The 2009 Failure and Root Cause Analysis Report (see section 2.0) showed that the absence of monitoring plans and failure to monitor were the most common causes of compliance violations and sanitary survey deficiencies among small water systems. Without monitoring, it is impossible to determine if water is safe and if small system operators understand and are applying the practices that ensure safe drinking water. To address these issues, we developed and provided daylong monitoring plan workshops designed to help small groundwater system owners and operators understand and implement a complete monitoring plan for their system. This training series is combined with a second daylong workshop focused on providing tools and resources for building technical, managerial and financial capacity for small water systems.

Storage tank baffling factor study: Many small water systems are faced with difficult decisions regarding the ability of their current treatment system design to meet the requirements for adequate disinfectant contact time for their disinfection process. We 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 results of this project will provide significant time and cost savings for small-business owners across the state.

Distribution systems training center: In 2009, we 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.

Public water system training grants program: The state utilized drinking water state revolving fund set-asides to support training projects that improved 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. In 2012, four projects that provided 32 hands on trainings and 14 webinars were funded. In 2013 and 2014, nine projects were awarded funding providing 76 hands on trainings and 31 webinars. Many of the operators and owners receiving these training don't normally have access to training opportunities due to 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 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 work group leader manages and implements the integrated project plan, the wellhead protection program, and a statewide grant program providing technical and financial support for protection planning activities. Through the statewide grant program, the leader provides source water protection entities with grant funding or technical assistance opportunities including:

- Protection plan pilot project grants.
- Protection plan development and implementation grants.
- Protection plan development 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 source water program was moved from the division's watershed section, restoration and protection unit into the local assistance unit. However, coordinators from the watershed section continue to 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 132 public water systems for a total of \$823,050. The source water program has reported 135 substantially implemented protection plans covering approximately 720,373 Colorado citizens (Environmental Protection Agency 2014 Performance Accountability Report). Currently, the statewide number of public water systems in some stage of protection planning development is 219.

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 includes compliance and enforcement north and south units, regulatory development and support workgroup and program data and reporting workgroup. The compliance assurance section shares responsibilities responding to acute drinking water emergencies within the state with other safe drinking water program units and sections.

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

General activity	Specific tasks
Drinking water training and assistance to	<ul style="list-style-type: none"> • Communicate effectively with systems to understand compliance responsibilities.

public water systems.	<ul style="list-style-type: none"> • 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 through reviewing designs of facilities. The section provides technical, managerial and financial reviews for all drinking water state revolving fund water systems and new water systems. The engineering section also provides technical reviews for treatment modifications and distribution system storage tanks for all state revolving fund water systems and new and existing water systems. Meeting the capacity review requirements ensures that the system will operate into the future with fewer difficulties, financial security and managed with the best interests of the water users in mind. The section coordinates these activities amongst various staff in order to meet timely deadlines on design reviews to maintain primacy and ensure protection of public health and environment.

The section also manages several special projects which involve formulation of policy for interpretation of the *Colorado Primary Drinking Water Regulations* as well as establishes updates for the design criteria for potable water systems. In cooperation with the compliance assurance section, this section is also responsible for modifications to regulations as necessary and providing technical insight to the compliance assurance section with regard to technical interpretation and application of the regulations. The section shares responsibilities for responding to acute drinking water emergencies with other safe drinking water program units and sections. The section also supports enforcement with determinations of economic benefit, appropriate response schedules and compliance assistance and performs support services for the funding program with review of technical, managerial and financial capacity, preliminary engineering reports and eligibility assessments.

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

General activity	Specific tasks
Drinking water technical assistance/support.	<ul style="list-style-type: none"> • Provide technical assistance to public water systems not performing within goals. • Support drinking water 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 efforts with respect to

	<p>eligibility and capacity development review process to support the state revolving fund loan program.</p> <ul style="list-style-type: none"> • Serve as a technical leader on 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. • 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 via the implementation of the sanitary survey program. A sanitary survey is an onsite review of a system’s adequacy in producing and distributing safe drinking water. The section coordinates amongst various staff in order to perform the necessary inspections to maintain primacy and ensure protection of public health. This section shares responsibilities for responding to acute drinking water emergencies within the state with other program units and sections.

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

General activity	Specific tasks
<p>Drinking water sanitary survey.</p>	<ul style="list-style-type: none"> • Perform sanitary surveys of public water systems, including systems funded with state revolving fund loans. • Identify significant deficiencies, violations and observations. • Follow up with the system(s) in regard to outstanding significant deficiencies. • Oversee the quality and consistency of the sanitary survey program. • Lead internal training. • Develop standard operating procedures. • Standardize the outreach to public water systems. • Oversee the sanitary survey training at operator schools.
<p>Drinking water training and assistance to public water systems</p>	<ul style="list-style-type: none"> • Provide technical assistance to public water systems not performing within goals. • Prepare and distribute technical assistance materials concerning proper operations. • Assist public water systems to interpret filter profile results when performance goals are not achieved. • Be the primary contact for systems within a given set of counties.

3.5 Clean water program, watershed section

The watershed section's restoration and protection unit, non-point source project coordinators 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 non-point source watershed plans and/or source water protection plans as part of the source water assessment and protection program.

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 2011 through 2014.
- Coaching assistance leading to the completion over 500 site specific monitoring plans for small water systems.
- The revitalization of the drinking water excellence awards program.
- The development and implementation of the 2015 training strategy to establish a vision for public water system training services and to support statewide training partnerships including: short schools for water operators, distribution system training, monitoring plan training workshops, the Colorado State University tank baffling factor study, Red Rocks Community College Distribution Systems Training Center, public water system training grants program to provide 108 hands on trainings and 45 webinars since 2012 for small water systems in rural Colorado, and a variety of statewide training seminars and conferences.
- The development of the operator training framework to enhance and coordinate drinking water training throughout Colorado.
- The annual completion of over 300 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 132 public water systems for a total of \$832,050; and the implementation of 135 source water protection plans covering approximately 720,373 citizens.

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. One example of becoming more data driven was the development and application of the 2009 Failure and Root Cause Analysis Project Report (section 2.0) to assess compliance rates at public water systems and evaluate the overall effectiveness of the capacity

development program. Since publication of that report, the local assistance unit has continued to assess similar data trends to continue making data driven decisions.

Furthermore, the local assistance unit is currently working 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 a new database to track all coaching assistance requests and individual improvements systems make as a result of receiving coaching assistance which allows the coaching workgroup to measure the positive impact it is having. Finally, ongoing efforts will enable the safe drinking water program to better track, evaluate and report on:

- Noncompliance rates of new public water systems that were approved after October 1999, and that were subject to the complete technical, managerial and financial capacity review prior to approval.
- 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.
- The effectiveness of onsite third party training and technical assistance in helping systems achieve and maintain compliance.
- 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 presented many challenges to the drinking water systems of the state, challenges that many smaller systems have a difficult time addressing. However, the amendments also provided states with a funding mechanism to augment state and other

federal funding to complete the many tasks required of the state. This mechanism includes specific set-asides from the drinking water state revolving fund capitalization grant that 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-asides to support public water systems and 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.

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 helpful 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 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 grants.

In fiscal year 2014, Colorado received the full amount of the annual federal capitalization grant funding from the U.S. Environmental Protection Agency (EPA) because the state is implementing a capacity development program that aligns with the requirements of the Safe Drinking Water Act.

This funding was nearly the same as the amount Colorado received in fiscal year 2013. Although this is not a cut, successful implementation of Safe Drinking Water Act requirements necessitates spending at a rate that exceeds the yearly grant amount and mines grant balances. If this trend continues, many of the services designed to help public water systems achieve and maintain technical, managerial, and financial capacity to provide continuously safe drinking water to the public and described in this report, will not be sustainable.

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.