

2021 Fort Collins Drinking Water Quality Policy Annual Report



Fort Collins Water Treatment Facility

In October 1993, Fort Collins City Council Resolution 93-144 adopted the Drinking Water Quality Policy (Attachment A) to ensure the continuous delivery of high-quality drinking water to Fort Collins Utilities' (Utilities) customers. This 28th annual report is a requirement of the Drinking Water Quality Policy and summarizes the actions taken in support of policy goals during 2021.

GOAL 1

The City will provide water services that meet or exceed customer expectations for quality, quantity and reliability.

Reliability, Capacity, and Redundancy

Utilities owns an 87-million gallon per day capacity water treatment facility that operates 24 hours a day, seven days a week to ensure that a continuous supply of high-quality drinking water is delivered to our customers. Staff is always available to respond to customer complaints and concerns regarding drinking water quality and reliability of service.

In 2021, the plant produced 8.4 billion gallons of drinking water. Peak day production occurred June 16, and was 47.40 million gallons/day, or 54% of plant capacity. At this rate, available treated water storage would meet 17.0 hours of peak demand, exceeding the benchmark of storage capacity for 12 hours of peak demand.



Figure 1 – System Redundancy

The treatment plant has multiple systems and processes in place to provide high

reliability with low risk of failure. For example, Utilities has two water sources, three raw water pipelines, multiple chemical storage tanks, delivery systems, treatment trains, filters and storage reservoirs. Systems integral to the treatment process have redundant backups.

Utilities also has a robust asset management and preventative maintenance program that helps ensure the provision of safe drinking water to the community and that standards are met for community firefighting and emergency needs.

The microhydro unit, commissioned in 2019, uses the pressure of the incoming Horsetooth raw water source to generate electrical energy. The generator has performed well and met 18% of the plant's electrical energy demand in 2021. The unit has lower output when water levels in Horsetooth Reservoir are lower, which they were for significant periods in 2021.

Including the solar field, 22% of the plant's electrical demand was met by on-site renewable generation.

Plant energy efficiency was 4,253 kBTU per million gallons produced for total energy consumption and 3,928 kBTU per million gallons produced for non-renewable energy. This meets the American Water Works Association energy benchmark of 4,427 kBTU/ million gallons. These values include both electrical energy and natural gas.

Regulatory Changes

The Environmental Protection Agency's (EPA) revisions to the lead and copper rule were finalized in late 2021. The revisions require monitoring in schools/licensed daycare facilities, and the development of a lead service line inventory. In support of the new requirements, staff began developing the protocol for monitoring schools and daycares, as well as the language for an inventory statement that is due in Q4 2024.

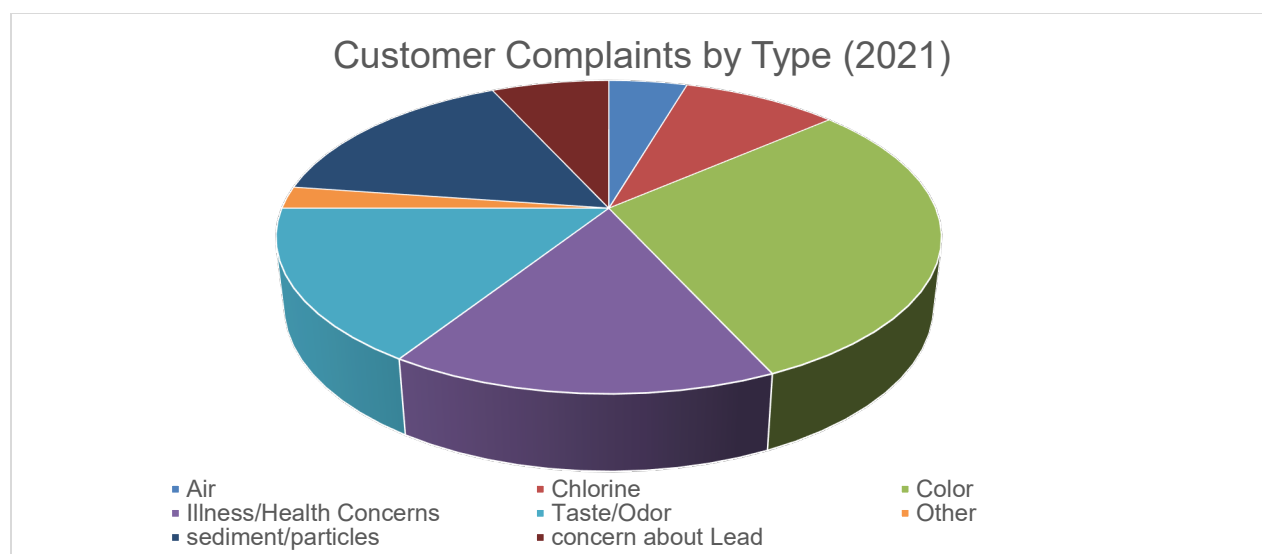
Approximately every five years, EPA issues a new set of unregulated parameters for drinking water providers to monitor. The data is used by EPA in determining whether the parameters warrant future drinking water regulation. In 2021, EPA finalized a rule for utilities to monitor 29 per- and polyfluoroalkyl substances and one metal during four consecutive quarters in the 2023-2035 time period.

In 2020, CDPHE finalized an update of the technically enhanced naturally occurring radioactive materials (TENORM) regulation that had the potential to apply to the treatment plant residuals. In late 2021, a characterization of the residuals determined they are exempt from the regulation.

Water Quality Complaints

In 2021, the City received 44 drinking water quality complaints, equating to a rate of 0.24 per 1,000 customers. This was an increase of 26 complaints, or 144%, from 2020, but remains well under benchmark goals. To protect the health and preserve the critical functionality of the laboratory, staff made very limited visits to customers' homes to collect samples during the COVID-19 pandemic. Based on the 2017 Benchmarking Manual from the American Water Works Association, 23 other participating utilities had a median number of technical water complaints of 5.4 per 1,000 customer accounts. The "best" quartile rate observed by other participating utilities was 1.1 per 1,000. At 0.24 per 1,000, the City of Fort Collins was "better than the best."

Figure 2



GOAL 2

The City will protect and maintain high water quality in the development of all codes, policies, plans and specifications related to the acquisition, production and delivery of water services to its customers.

The quality of Fort Collins drinking water remains very high. During 2021, the plant produced an average filtered water turbidity of 0.02 NTU, which is far below our maximum goal of 0.10 NTU. The system always maintained disinfectant levels well above the minimum 0.2 mg/L level, required by regulation.

Code Updates

- Ordinance No. 005, 2021, Amending Chapter 26 of the Code of the City of Fort Collins to Clarify Water and Sewer Plant Investment Fees
- Ordinance No. 016, 2021, Amending Chapter 26 of the Code of the City of Fort Collins to Clarify Utilities' Right of Entry into Buildings and onto Premises to Access Utilities Equipment, Facilities, and Appurtenances for Utilities Purposes

Partnership for Safe Water (PSW)

The Water Treatment Facility maintained its President's Award status for 2021, for the fifth year in a row. The President's Award is the first tier of Phase IV of the Partnership for Safe Water (PSW) and is bestowed upon top-tier water plants that have demonstrated commitment to providing superior quality water to their customers, beyond the requirements of regulations. While the Director's Award, which has been maintained by the Water Treatment Facility for the last 21 years, requires higher performance of the overall filtered water quality, the President's Award requires the performance of each individual filter to be evaluated. Only 36 treatment facilities throughout the nation have achieved this level of recognition.

The staff at the Water Treatment Facility developed a plan and began efforts to achieve the Excellence in Water Treatment Award, which is the second tier of Phase IV

and the highest level of recognition in the partnership.

The PSW is an alliance of six drinking water organizations including the EPA. This voluntary program strives to enhance water quality through continuous optimization of treatment processes. Operators, managers, and administrators are provided self-assessment and optimization tools to improve performance above and beyond current and proposed regulatory levels.



The PSW was originally designed with a focus on the treatment of drinking water but has expanded to inspire and recognize excellence in distribution systems. The City's distribution system was awarded the Partnership's Director's Award for distribution excellence in 2015 and has maintained that status in 2016 – 2021, making six years in a row.

Environmental Management System

The Water Treatment Facility has established a formal Environmental Management System (EMS) that is certified to conform to the ISO 14001:2015 standard.

One key objective of our EMS is to manage energy consumption sustainably. One of the

projects implemented in support of this objective is the replacement of all lighting fixtures at the facility with LED fixtures. This project has taken place in small phases over several years, and significant progress was achieved in 2021. This project will be completed in 2022. The Water Treatment Facility has now completed all projects identified to achieve significant improvements in energy efficiency. Future gains will likely be much smaller or near flat. This objective will move into a phase of maintaining improvements achieved.

Another significant aspect of our EMS is waste stream management, of which treatment residual solids make up 96%. Over the past two years, the Water Treatment Facility has cooperated with the Low Impact Design program to provide some of this material for testing as treatment media for removal of phosphorous from stormwater runoff. This beneficial use has the potential to divert 100% of the total residuals



generated from the landfill. This program has completed laboratory research and field pilot studies and has received final approval from Colorado Department of Health and Environment (CDPHE). Full implementation will require a separate permitting process through CDPHE and staff have not had sufficient bandwidth to begin this permitting process.

Environmental Leadership Program

The Environmental Leadership Program (ELP) is a statewide environmental recognition and reward program administered by the CDPHE Sustainability Program.

The ELP offers benefits and incentives to members that voluntarily go beyond compliance with state and federal regulations and who are committed to continual environmental improvement.



As the result of process improvements and the ISO 14001:2015 certification of the EMS, the facility has received and maintained recognition as an ELP **Gold Leader**.

The ELP has been redesigned by the State and, starting in 2022, will be known as the Green Business Network.

GOAL 3

The City's water supply, treatment, storage, delivery, and laboratory facilities will be planned, designed, constructed, maintained, staffed and operated to assure safe, reliable and cost-effective service to the residents of Fort Collins and all those served by the City's water utility.

Source Water Quality Monitoring

The City of Fort Collins' drinking water supply comes from two primary sources: the upper Cache la Poudre River (Poudre River) and Horsetooth Reservoir. Poudre River water originates as rain and snow in the mountains on the eastern slope of the Continental Divide, northwest of Fort Collins. Horsetooth water is delivered from the Colorado River Basin on the western slope via the Colorado-Big Thompson (C-BT) Water Project.

Utilities collaborates with other regional drinking water providers and watershed stakeholders to monitor water quality trends in the [Poudre River](#) and [Horsetooth Reservoir](#). Monitoring includes a variety of chemical, physical and biological parameters at more than 20 study locations throughout our source watersheds.

Upper Cache la Poudre River

Since 2008, the Utilities' Watershed Program has led the collaborative upper Cache la Poudre Water Quality Monitoring Program. Partner utilities include the City of Greeley and Soldier Canyon Water Authority. This monitoring program assists partners in meeting current and future drinking water treatment goals by reporting short and long-term water quality trends in source water quality. Seasonal, annual and five-year water quality reports are available on the Watershed Program's webpage: fcgov.com/upper-poudre-monitoring.

The [Cameron Peak Wildfire](#) ignited west of Chambers Lake in the Rawah Wilderness on Aug. 13, 2020, and was not considered fully contained until Dec. 2, 2020. The fire is the largest in Colorado history and burned nearly 209,000 acres of forest types ranging from high elevation spruce fir communities near the Medicine Bow and Mummy Ranges to low elevation Ponderosa Pine forests and scrublands in the foothills of the lower Poudre River and Big Thompson River Watersheds. High intensity, large scale wildfires like the Cameron Peak Wildfire can result in significant post-fire water quality pollution from ash and hillslope erosion.

The Watershed Program developed a Cameron Peak Wildfire response plan that outlined the City's strategy for monitoring water quality of our raw water supplies while the fire was still active. The Watershed Program also developed a water quality monitoring recovery plan, which outlines how the City will monitor water quality during the recovery phase of the fire, which is ongoing. The recovery plan utilizes long-term monitoring and reporting as part of the Upper Cache la Poudre Monitoring Program to better understand the fire's short-and long-term impacts on water quality and the timeline for recovery.

The watershed program also utilizes two water quality meters installed in the Poudre River approximately two miles and 20 miles upstream of the City's Poudre River Drinking Water intake to provide real-time data to Utilities' staff and our regional partner utilities. These meters provide early-warning alerts to water treatment staff when a post-fire pollution event is occurring on the river. These events are often tied to localized, intense precipitation events and subsequent erosion and water quality pollution. In 2021, Watershed Program staff collected several water quality samples associated with 'black water' pollution events.

Lastly, Watershed Program staff have been leading regional cost-share collaborative science and monitoring efforts to address several post-fire recovery questions. Targeted studies will address how ash impacts water quality; how high mountain reservoirs may be impacted and water quality implications to our raw water supply; and whether smoke-related taste and odor compounds are present in raw and finished water.



Fig. 3. Photos showing Jared Heath, Watershed Specialist conducting maintenance on a water quality meter (left) and collecting a black water sample (right) from the Poudre River.

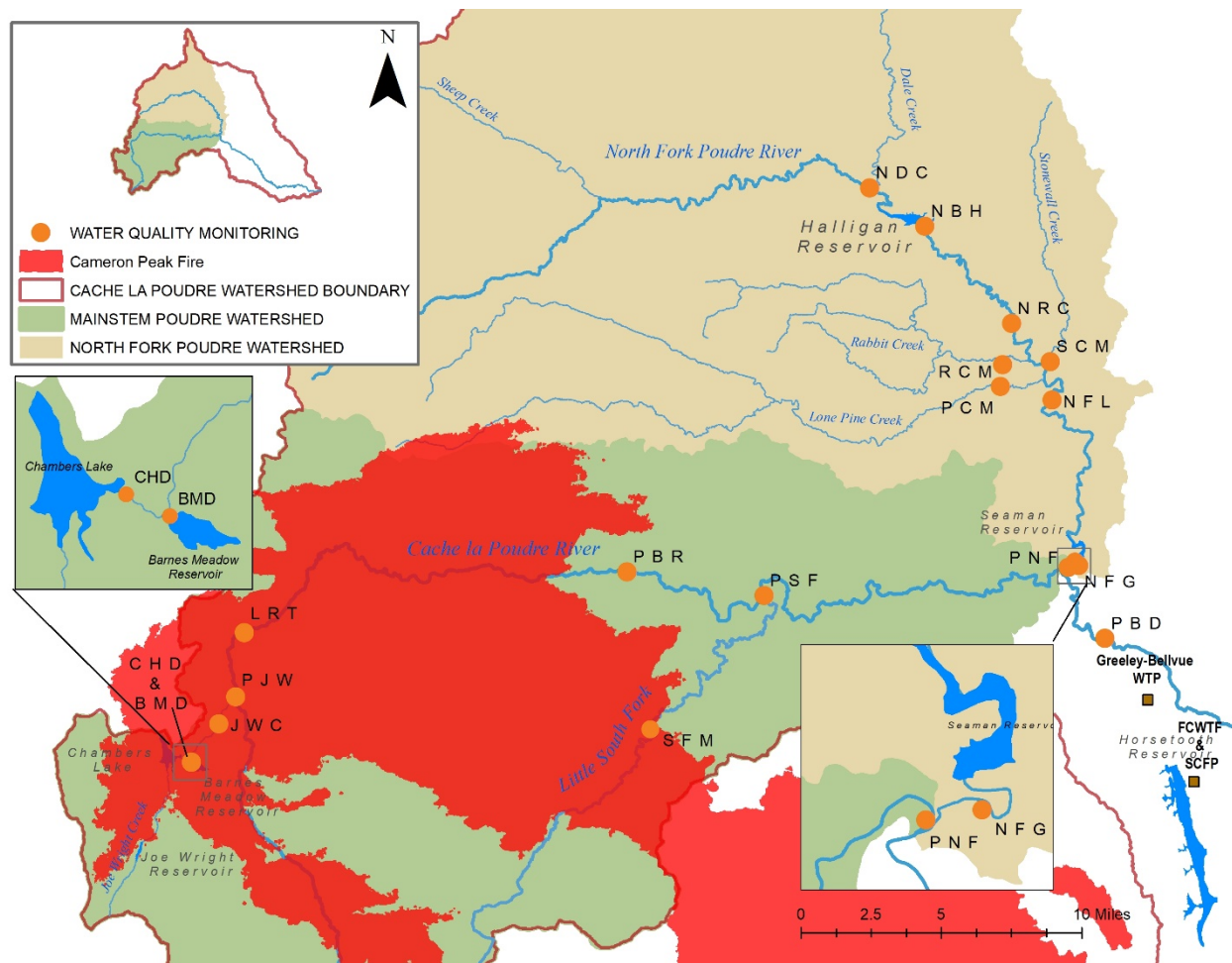


Figure 4. Map showing the locations of Upper Cache la Poudre River Monitoring Program study sites within the Poudre River Watershed in relation to the Cameron Peak Wildfire burn scar.



Fig. 5. Photo showing a stand of lodgepole pine near Chambers Lake that was burned at high intensity during the Cameron Peak Wildfire.

Horsetooth Reservoir

Utilities has actively monitored the water quality in Horsetooth Reservoir since the mid-1980s. In 2015, Utilities' Watershed Program began partnering with Northern Water in a cost-share collaborative program to monitor water quality in Horsetooth Reservoir. Northern provides up-to-date information about water quality conditions and periodically completes trend reports. Water quality data and Northern Water's most recent Horsetooth water quality report are available at northernwater.org/WaterQuality/MonitoringPrograms.aspx. In exchange for these services, Fort Collins' Water Quality Laboratory provides chlorophyll-a analysis for up to 200 samples collected from sites within Northern Water's monitoring network as an in-kind contribution to the program. Northern Water's water quality network includes streams, canals, lakes and reservoirs throughout the C-BT and Windy Gap projects.

The [East Troublesome Wildfire](#) ignited on Oct. 30, 2020, near Kremmling, CO, and burned nearly 194,000 acres. It wasn't considered fully contained until Nov. 30, 2020. The fire rapidly advanced across the landscape as a crown fire and ultimately burned a substantial portion of the watersheds contributing to the C-BT west slope collection system in the upper Colorado River Basin. The

impacts of the East Troublesome Wildfire on C-BT water quality, including Horsetooth Reservoir, are being evaluated. Watershed Program staff have developed a Horsetooth Reservoir Water Quality Monitoring Recovery Plan. The plan utilizes the Horsetooth Reservoir Water Quality Monitoring Program to understand short- and long-term water quality trends; real-time and additional weekly sample collection at the inlet to the reservoir; monitoring for algae blooms; and possible future water quality modelling to better anticipate changes in water quality.

Source Water Protection

In 2016, Watershed Program staff, with assistance from the Colorado Rural Water Association, CDPHE and a local steering committee completed a Source Water Protection Plan (SWPP) for the Poudre River and Horsetooth Reservoir. This document guides the City's water quality monitoring and water supply protection priorities and addresses the City's Drinking Water Quality Policy:

“The City will protect raw water sources from contamination or any other activities that would diminish the quality of water provided to customers, or that would result in increased treatment costs.”

The SWPP (fcgov.com/source-water-monitoring) identifies potential sources of contamination to water supplies, ranks those sources according to relative risk to the City's drinking water infrastructure and source water quality, and identifies best management practices to mitigate those risks. The Watershed Program plans to update the SWPP in 2023, using a regional cost-share collaborative approach.

Forest Health/Wildfires – High Priority

Forest health and the threats of water quality pollution and damage to the City's drinking water infrastructure from future wildfires is a high priority threat to the City's source water supplies.

Since 2013, Utilities has worked collaboratively with the Coalition for the Poudre River Watershed (CPRW) and other stakeholders to improve the health and resiliency of the Poudre River. The City provided an initial two years of funding for establishing the organization, continues to provide sustaining funding, and retains a reserved seat on CPRW's Board of Directors alongside other partner utilities and watershed stakeholders.

In 2016, CPRW worked with community stakeholders to complete the Poudre River Watershed Resiliency Plan (poudrewatershed.org), which is used by Utilities to prioritize forest treatment/wildfire mitigation projects in the Poudre and Horsetooth watersheds.

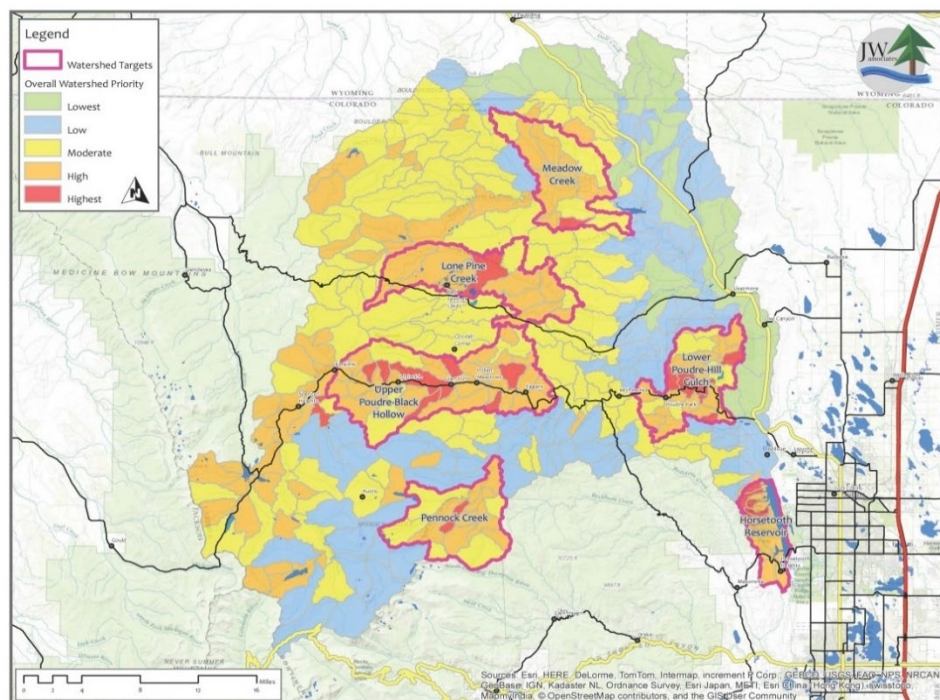


Figure 6. Map showing the forest health and wildfire risk reduction priority watersheds that were identified as part of the Upper Poudre Watershed Recovery and Resiliency Plan.

Utilities continues to allocate funding for collaborative wildfire restoration and mitigation projects to protect our source watersheds. In 2021, Cameron Peak Wildfire watershed restoration efforts largely focused on stabilizing erosive hillslopes by applying wood mulch to priority acres of the watersheds using helicopters. Mulch was applied to approximately 5,000 acres in 2021, with additional acres targeted for treatment in 2022. Additional point mitigation efforts were also implemented in 2021, including culvert upgrades/replacements; straw wattles to lessen erosion to waterways; sandbagging and other protections structures; and other best management practices.



Figure 7. Photos of a post-fire stream degradation and damaged road crossing and culvert (left) and Watershed Program and contractor field staff preparing to board a helicopter to conduct aerial inspections of mulch applications (right).

In addition, several forest thinning projects have successfully been completed outside of the Cameron Peak burn area to reduce fuel loads and mitigate the risk of future large, high-severity wildfires that could impact our source water. The 2017 Elkhorn Creek Forest Health Initiative is a great example of a collaborative project that successfully reduced fuels in a priority area of the Poudre River. The project was completed using funding, labor and equipment from more than a dozen partners, including Utilities. Wildfire risk was significantly reduced with treatments that included hand thinning, piling and burning; mechanical treatment; and prescribed fire. The successes of this project provided a project implementation template that was used at a larger scale on additional wildfire mitigation projects within the Elkhorn Creek Watershed and Lory State Park on the west side Horsetooth Reservoir in 2019.

The Lory State Park Project was a cost-share collaborative wildfire mitigation project, including the Colorado State Forest Service, Colorado Parks and Wildlife, Peaks to People Water Fund, Northern Water Conservancy District and City of Fort Collins Utilities that was completed in 2019. Approximately 146 priority acres were treated, primarily by mastication, with some areas of hand thinning and slash piling. Fort Collins Utilities contributed \$20,000 to this project.



Figure 8. Forest fuels reduction efforts within the Elkhorn Creek drainage

The 2019 North Rim Road wildfire mitigation project was located to the south of and above Elkhorn Creek, was funded by City of Fort Collins Utilities (\$42,000), the Colorado State Forest Service (\$42,000), and the Colorado Department of Local Affairs (\$130,000). Approximately 85 acres were treated at the project site, on two private properties adjacent to US Forest Service lands. Most of the treated area was masticated, with the remainder treated by hand thinning and slash piling. Slash piles were burned during late spring 2020 by the Forest Stewards Guild. The before and after treatment photos demonstrate the effectiveness of these treatments in reducing forest fuels.



Figure 9. Forest treatment crews create (left) and burn (right) slash piles

The Watershed Program also continues to participate in the [Northern Colorado Fireshed Collaborative \(NCFC\)](#), which consists of local federal natural resource agencies, state agencies, local government, researchers, community groups and non-profits. NCFC partners work closely

together to prioritize and align their wildfire mitigation projects to achieve broader landscape level watershed protection and further leverage project funding.

The Watershed Program committed \$17,250 in 2020 to a cost-share collaborative project on the South Fork of the Poudre River near Jack's Gulch. The project is managed by CPRW and partners include Colorado State Forest Service, City of Greeley and private landowners. The project will include forest treatments on more than 160 acres of high-priority acres. This project will be aligned through the Northern Colorado Fireshed Collaborative to achieve a greater broader wildfire mitigation effect. The project was delayed in 2020 due to the Cameron Peak Wildfire, and is rescheduled for 2022.

The Watershed Program also contributed \$20,000 in 2021 to help fund a cost-share collaborative wildfire mitigation project in the Cedar Park drainage of the Big Thompson Watershed. The project was managed by the Big Thompson Watershed Coalition and included partners Colorado State Forest Service and Northern Water. The project treated more than 100 acres on the Sylvan Dale Ranch, which shares a boundary with planned United States Forest Service (USFS) Cedar Park treatments as part of the Northern Colorado Fireshed Collaborative. The targeted treatments have been identified as high risk to the City's Horsetooth source water supply.

Utilities' Watershed Program completed a Drinking Water Infrastructure Wildfire Risk Assessment for the Cache la Poudre River in 2019. The study combined site visits and desktop analyses to determine a range of best management practices designed to reduce the risk damage from future wildfires to key infrastructure, such as intakes, diversions, pipelines, reservoirs, and ditches. The study also identified additional wildfire mitigation priorities near key infrastructure such as Joe Wright Reservoir and Halligan Reservoir. The Watershed Program is currently pursuing cost-share collaborative wildfire mitigation projects to address these concerns.



Figure 10. Photos show a diversion tunnel, reservoir and section of pipe that were evaluated as part of the Drinking Water Infrastructure Wildfire Risk Assessment.

In 2021, the Watershed Program began developing a cost-share regional collaborative project with the Colorado State Forest and Colorado Parks and Wildlife. The goals of the project are to work collaboratively to identify, assess and implement mitigation measures to protect the

Michigan Ditch water supply from the effects of catastrophic wildfire. In order of importance, priorities for treatment in the Michigan Ditch area are to mitigate risks to:

1. hillslopes above the ditch from the risk of fire
2. the ditch from the risk of fire moving upslope from the west
3. cabins, ditch, and other built infrastructure.

The project is currently in the planning phase and is set to begin in the summer of 2022.

State Highways – Moderate Priority

State highways were identified in the SWPP as a moderate threat, in part, due to chemical spills from vehicle accidents. To address this threat, the Watershed Program completed a Source Water Spill Response Plan in 2019 to reduce the risk of spills to the City's Horsetooth and Poudre River drinking water supplies. The Source Water Spill Response Plan includes procedures, methods, equipment and other necessary information to help Utilities prepare for and respond to water contamination from chemical spills within their source water protection areas (SWPAs). The plan was implemented in January 2020. The Watershed Program continues to facilitate annual staff training for the Source Water Spill Response Plan.



Figure 11. Photos show a truck accident in 2009 on the banks of the Poudre River (left) that resulted in an asphalt spill and spill contaminant booms (right) that were deployed to contain the spill.

Water Resources and Storage

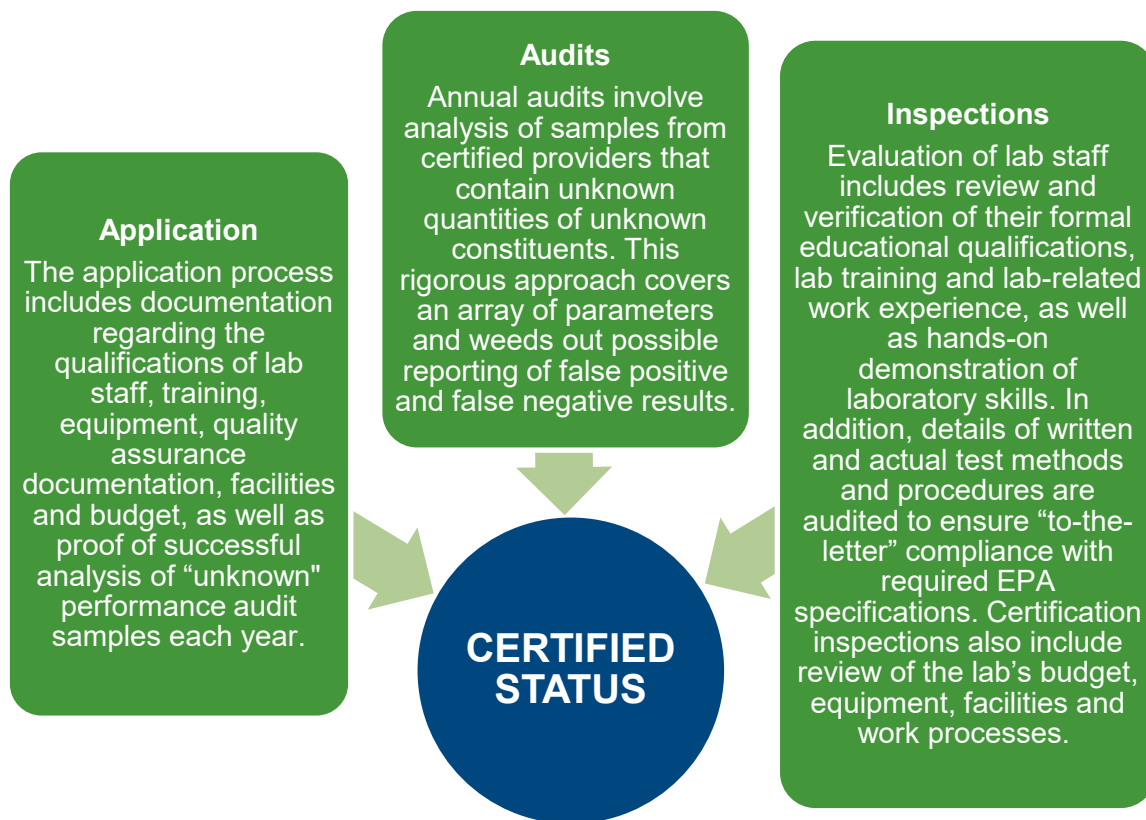
- **Water Supplies:** Despite the impacts of the Cameron Peak and East Troublesome wildfires in 2020, Utilities' water supplies continued to be adequate and met customer demands. Given the uncertainty around storm events over the Cameron Peak fire burn area, Utilities went on a voluntary Water Shortage Watch during most of the irrigation months to help keep demands down. Ultimately, Utilities was able to treat about 88% of its average Poudre River diversion in water year 2021.
- **Water Supply and Demand Management Planning:** Staff made significant progress on the Water Resources Matters in the Growth Management Area (GMA) Study, which focuses on identifying the challenges and opportunities to the City organization of having multiple water providers in the GMA. This study is expected to be completed in early 2022. This study will help with future elements of the Water Supply and Demand Management Policy, which will be updated in the coming years.
- **Water Supply Requirements (WSR):** Staff was successful in making significant changes to the Utilities' WSR. This included working with Water Conservation staff and others on substantial changes to the amount of water required, with a focus on commercial requirements being based on business type (instead of tap size). In addition, significant updates to the WSR fee (formerly known as the cash-in-lieu fee) were also made. All WSR changes were adopted by City Council after extensive outreach efforts and were effective on Jan. 1, 2022.
- **Halligan Water Supply Project:**
 - The federal permitting process continues for the project. The focus by the U.S. Army Corps of Engineers (Corps) is preparing a final Environmental Impact Statement (EIS) responding to the 60 public comments received on the project in early 2020. The final EIS is expected to be released in early 2023.
 - Work continued for two required State permitting processes: 1) a Fish and Wildlife Mitigation and Enhancement Plan (FWMEP), led by Colorado Parks and Wildlife and 2) a 401 Water Quality certification, led by CDPHE. In each process the State takes a more detailed look at the project. The FWMEP is anticipated to take one to two years and the 401 certification will take three to four years due to additional water quality analyses required.
 - Significant progress was made by the design and construction team for the project. The team is working toward a 30% design, which will help better define project costs and is anticipated to be completed in early 2023. A significant decision in this process was to pursue a realignment of the existing dam just downstream of the reservoir.
 - Significant work continued with landowners and others that will be affected by the project to secure easements for the construction and operations of the project and associated facilities.

Certified Laboratory

The City is required to comply with state and federal drinking water standards. These standards mandate that a certified laboratory perform all regulatory compliance testing. The City's Water Quality Laboratory staff provides state-certified regulatory compliance and other testing and reporting for Utilities as well as 13 other regional water agencies.

The Water Quality Lab first achieved certification in bacteriology testing in 1978. Since that time, the lab has gained certified status for a large array of water quality tests. Certified status is achieved through a multistep process shown in Figure 12.

Figure 12 – Certified Status Achievement Process



The Water Quality Services Division completed a master plan in 2017, which included a condition assessment of the Water Quality Lab and evaluated different alternatives for renovation or replacement. Opportunities for constructing a new combined laboratory or other replacement options are currently being explored.

In addition to the State certified laboratory, the Water Treatment Facility performs chemical and physical analyses at key process control points to optimize treatment processes. In 2021, process analysts:

- Performed 20,727 laboratory analyses for process control, including 12,802 control instrumentation validation quality assurance checks.
- Performed 16 jar tests to optimize plant performance.
- Performed 33 chlorine dioxide demand curves to optimize pre-oxidation.
- Performed 69 odor profile analyses on raw and finished samples. These are normally performed weekly, but were performed more frequent during spring runoff in order to monitor the effects of runoff from the Cameron Peak burn scar. These analyses continue under a modified method to make it safe for analysts during the continuing COVID-19 pandemic.
- Provided other additional analyses beyond normal workload to monitor effects of runoff from the Cameron Peak burn scar.
- Performed 10 FlowCam analyses and 31 microcystin screening tests during late summer and fall as part of the Cyanotoxin Monitoring Plan.

Asset Management

Utilities continued risk-forecasting efforts within its water production and distribution asset base throughout 2021. The asset management risk forecast is a process to evaluate the condition of the equipment, piping and facilities, the types of risks associated with the system, and determinations as to timeline for replacement.

Some 2021 highlights:

Water Production

- 99% of the plant's lighting has been converted to LED.
- PLC builds and upgrades including one lines.
- 6 filter effluent flowmeters have been replaced.
- Flowmeters upgraded north of plant to radar style.
- Train 3 sludge gearbox was rebuilt.
- Train 5 major repair done before runoff.
- New fluoride analyzer.
- New alkalinity analyzers.
- New TOC analyzers researched for 2022.
- Pandemic split shift with all PMs done on time.
- Supported process lab and WQL when issues arose.
- Worked on GIS maps for our facility.
- New flowmeter installed for the Goathill tank.
- Created a new hourly position to help operations and maintenance.
- Cleaned and inspected Goat Hill.

Meter and Distribution System Maintenance

The Water Distribution crews are responsible for the operation and maintenance of the City's water distribution system. Some of the main responsibilities of the group are to manage, implement and set annual goals for defined maintenance programs.

System Statistics

- 565 miles of water mains
- 842 water main locator stations
- 411 cathodic protection test stations
- 14,150 valves
- 3,969 fire hydrants
- 37,709 service lines
- 311 miles of water mains leak surveyed
- 35,840 water meters
- 35,694 communication devices
- 2,025 bypasses



Figure 13 – Repairing a main leak

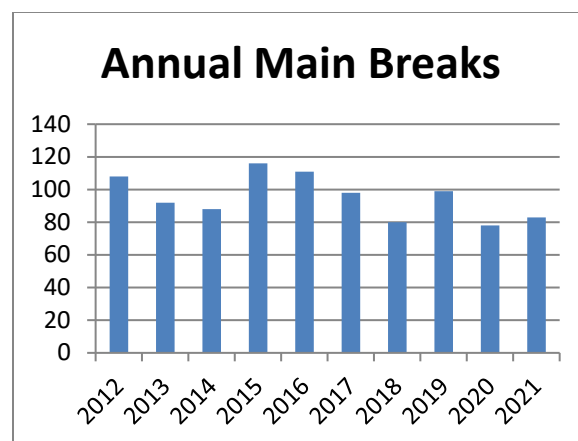
In 2021, the group was responsible for responding to 788 customer complaints

during regular hours and 179 after hours. They repaired 38 valves, 21 fire hydrants, 99 service lines and 6 service leaks. Additionally, 83 water main breaks were repaired: 55 - electrolysis, 24 - beam breaks, 4 - longitudinal breaks and 3 - miscellaneous repairs to the water mains.



Figure 14 – Repairing a main leak

Figure 15

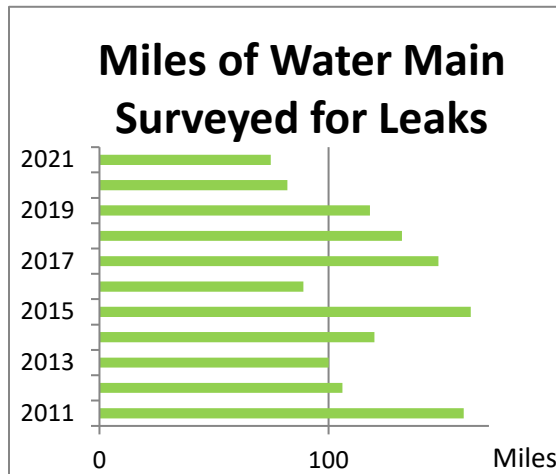


- Crews inspected 784 bypasses on meters sized 1.5 inches and larger to ensure the valves were properly positioned and secured.
- Operators performed 177 inspections and installed 152 meters on new

construction single-family, multifamily residential and commercial services.

- 1,017 meter tests were conducted. Of those, 1,005 were done on City-owned meters. 12-meter tests were performed for external customers and were repaired and reconditioned as requested. Meters were tested using state-of-the-art technology, to ensure they met the American Water Works Association standards for accuracy and reliability. Tests were performed prior to installation and upon removal.
- The Meter Shop had a contractor start installing meter boxes in yards so the meter could be moved out of crawl spaces. 45 meters were relocated this year.
- Crews performed maintenance checks on 309 valves and 434 fire hydrants.
- Watermain flushing was cancelled this year due to 2020/2021 pandemic. 2019 Crews flushed the water mains on the east side of the water distribution system from College Avenue to Northern Lights, operating 1,084 fire hydrants during that program.
- Leak detection operations were performed on 81.6 miles of water main and 411 cathodic protection test station readings were collected.

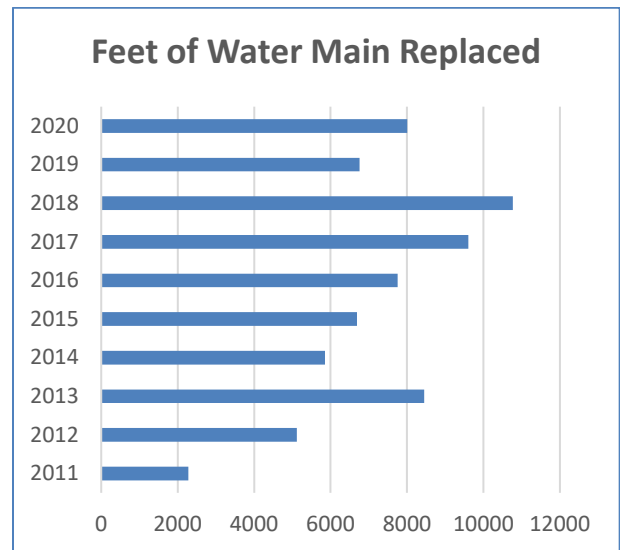
Figure 16



- Cross Connection Control performed 128 backflow surveys and inspections.
- Construction crews replaced a total of 6,450 feet of water main and installed 30 new valves and nine fire hydrants during our annual water distribution system replacement program.

Additional distribution maintenance information is available in the asset management section on the previous two pages.

Figure 17



Following is a list of replacement projects:

- 300 Blk. E. Magnolia St. – Mathews St. to Peterson St, 601 LF
- 900 Blk. Kimball Rd. – W. Elizabeth St. to W. Plum St, 730 LF
- 2900 Berkeley Ct, 249 LF
- 4400 Blk. Seneca St. – E. Harmony Rd. to Silvergate Rd, 1,134 LF

- 2300/2400 Blk. Brookwood Dr. 1300 Blk. Rollingwood Ln. – Brookwood Dr. to Parkwood Dr, 1,388 LF
- 800 Blk. Tyler St. – W. Plum St. to Orchard Pl, 789 LF
- 4300 Michaud Ln, 1,482 LF
- 3900 Blk. Benthaven St, 478 LF

The following capital projects were undertaken in support of goal three:

Northeast Loop Water Line Cathodic Protection Project

- Funding Source: Water
- Estimated Project Budget: \$1,610,000
- Final Cost: Estimated \$1,500,000
- Status: Complete - online
- Project Details: This project included the design and construction of five rectifiers along the Northeast Loop Water Line that supply an impressed current along the pre-tensioned concrete cylinder water line to cathodically protect the line from further corrosion. Five 10-inch diameter well bores were drilled approximately 300–400 feet deep at each location, six anodes were hung on electrical wires within each well bore column and wires were connected to rectifiers that apply an electrical current to the pipe. Installation of antennas allowed the transmission of the electrical monitoring information back to the SCADA system. This system helps protect the water main that supplies water to Fort Collins and a major brewery.

Westside Water Line Cathodic Protection Project

- Funding Source: Water
- Estimated Project Budget: \$521,000
- Final Cost: TBD
- Status: under construction
- Project Details: This project includes the design and construction of one rectifier on the Westside Water Line to supply an impressed current on the 60" pre-tensioned concrete cylinder water line and cathodically protect the line from further corrosion. One 10-inch diameter well bore is to be drilled

approximately 300-400 feet deep, with six anodes hung on electrical wires within the well bore column and wires connected to a rectifier to apply an electrical current to the pipe. Installation of antennas will provide for the transmission of the electrical monitoring information back to the SCADA system at the WTF. This system will help protect the water main that supplies water to west and south areas of Fort Collins and surrounding water districts.

Horsetooth Alternative Water Supply Project

- Funding Source: Water
- Estimated Project Budget: \$3.2 million
- Final Cost: approximately \$1,300,000 (including design of two preliminary alternative water supply locations, final design of water supply location, procurement, construction and demobilization)
- Status: completed and demobilized from temporary site
- Project Details: Northern Water shutdown the Horsetooth Reservoir Outlet at the Soldier Canyon Dam starting Oct. 15-Nov. 5, 2020, to repair an inline valve under the dam and replace the inlet trash racks. During this period, the Cache la Poudre River was Fort Collins' only water source. Fort Collins Utilities worked and cost-shared with the Tri-Districts and Platte River Power Authority on this project to supply Horsetooth water via an alternative location – the Hansen Feeder Canal off the north end of Horsetooth Reservoir. The project included construction of a permanent connection on the Pleasant Valley Pipeline

and a temporary pump station connected between the Hansen Canal and the Pleasant Valley Pipeline. All remnants of surficial equipment and materials have been removed and demobilized from the temporary easement site.

Anheuser Busch Brewery Meter Replacements

- Funding Source: Water
- Estimated Project Budget: \$200,000
- Final Cost: \$172,170
- Status: Completed February 2019
- Project Details: Design and construction as required to replace two 10-inch turbo meters, four 10-inch gate valves, SCADA system, strainers, and all piping in the water metering vault at the brewery

27-inch Poudre Canyon Raw Waterline Project

- Funding Source: Water
- Estimated Project Budget: \$3.2 M
- Status: Final Design done in 2021 and Construction to begin Fall 2022
- Estimated Completion Date: August 2023
- Project Details: The goal of this project is to ensure the structural integrity and operational longevity of the City's 27" raw waterline in the Poudre Canyon. An existing, exposed section of the pipeline in the river near Gateway Natural Area will be replaced to eliminate the risk of failure which ensures the continued delivery and reliability of raw water from the Poudre River to the Water Treatment Facility. The design will develop a long-term solution, which may require pipe alignment modifications, deeper burial depths of the pipeline, consolidation of both pipelines and/or localized river channel stabilization. Mitigating the existing situation provides an opportunity to modify the pipe alignment to provide increased integrity to the system.

Belt Press Building Project (Solids Handling Facility)

- Funding Source: Water
- Estimated Project Budget: \$575,000
- Status: In Design
- Estimated Completion Date: June 2021
- Project Details: This project will develop a 50% set of design documents for the Water Treatment Facility's solids handling improvements project (known as the Belt Press Building Project). The improvements will reduce the liquid loading of the existing lagoons by mechanically separating the solids from the sediment basin sludge stream by applying pressure with a belt filter press. This system will prevent violation of water quality and solid waste regulations. The project scope and resulting documents are intended to provide a level of design that can be used to develop and advance the Opinion of Probable Cost and be used in a future solicitation for a Construction Manager at Risk (CMAR) project delivery method. The City will pick up the design of the system at a future date and advance it to 100% with the selected contractor on the team.

Certified Operators

The Treatment Facility and Distribution System operators are certified by the Colorado Water and Wastewater Facility Operators Certification Board as certified water professionals. As of 2021, the Director of Plant Operations (operator in responsible charge, or ORC), Manager of Plant Operations, and both Lead Plant Operators, had earned 'A' certification, the highest level of Water Treatment Plant Operator certification, which also carries the professional credential, "Certified Water Professional." Due to a high level of turnover in operations staff in recent years, only three of the Plant Operators currently hold 'A' certification. Of the other five operators, two have obtained 'B' level certification and one has obtained 'C', one has obtained 'D', and the newest hire will begin the testing cycle in April 2022. All are progressing on schedule toward certification at the 'A' level. All staff in the operations on-call rotation are certified 'A' operators. Operation of the Water Treatment Facility requires supervision by a certified Water Treatment Plant Operator A, and all supervisory staff in the operations chain of command meet this qualification.

Operation of our pump stations and storage reservoirs requires supervision by a certified Water System Operator 3. The Director of Plant Operations (ORC) holds a level 4 distribution system Operator Certification, as does the Manager of Plant Operations. Several plant operators and other staff also are certified distribution system operators, varying from level 1 to level 4.

Additionally, several non-operations personnel hold operator certifications. Other plant personnel are encouraged to pursue certification as plant operators, as well as other professional certifications that increase their skills. Three maintenance staff hold level D certifications, as does one of the Process Chemists. One staff member holds Professional Operator (PO) certification through the Certification Council for Environmental Professionals. Other certifications held by plant staff include:

- Professional Engineer
- Certified Control Systems Technician
- Certified Water Quality Analyst
- Hazardous Materials Technician
- Occupational Health and Safety Technician
- Journeyman Electrician
- DOT/CDL Certification

The Water Field Operations Manager (ORC) holds a level 4 Water System Operator certification. All crew chiefs are certified to at least level 2, many to level 4, and most crew members hold certification varying from level 1 to level 4. Operation of our distribution system requires supervision by a certified Water System Operator 4.

This report was compiled by the Water Production Division in collaboration with:

- Water Quality Services Division
- Environmental Regulatory Affairs Division
- Water Field Operations Service Unit