

# 2018 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 25<sup>th</sup> annual report is a requirement of the Drinking Water Quality Policy and summarizes the actions taken in support of policy goals during 2018.

# 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 available at all times to respond to customer complaints and concerns regarding drinking water quality and reliability of service.

In 2018, the plant produced 8.8 billion gallons of drinking water. Peak day production occurred on July 10, and was 49.0 million gallons/day, or 56 percent of plant capacity. At this rate, available treated water storage would meet 16.6 hours of peak demand, exceeding the benchmark of storage capacity for 12 hours of peak demand.

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.

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.

To increase reliability of electrical power to the Water Treatment Facility, the Water Production Division submitted a budget offer in 2016 to switch power suppliers for the Water Treatment Facility from Xcel to Fort Collins Utilities Light and Power.

Construction of necessary infrastructure was completed in 2018. Negotiations of legal details stretched completion of the switchover into 2019. In addition to increasing system reliability, this change also will create a more collaborative environment for use of on-site renewable electricity generation.

## Regulatory Changes

The anticipated revised lead/copper rule did not get drafted or finalized by the Environmental Protection Agency (EPA) in 2018. Currently, EPA is working on the rule with an unknown proposal date. It is anticipated the rule will address lead service line replacement, improved optimal corrosion control treatment requirements and the potential role of point-of-use filters.

Approximately every five years, Utilities is required to monitor for a list of unregulated contaminants in the source and/or finished water. Monitoring for the next list is scheduled to begin in 2019 and will continue into 2020. In 2018, Utilities prepared for this by researching, evaluating, selecting and contracting with a laboratory to perform the analyses.

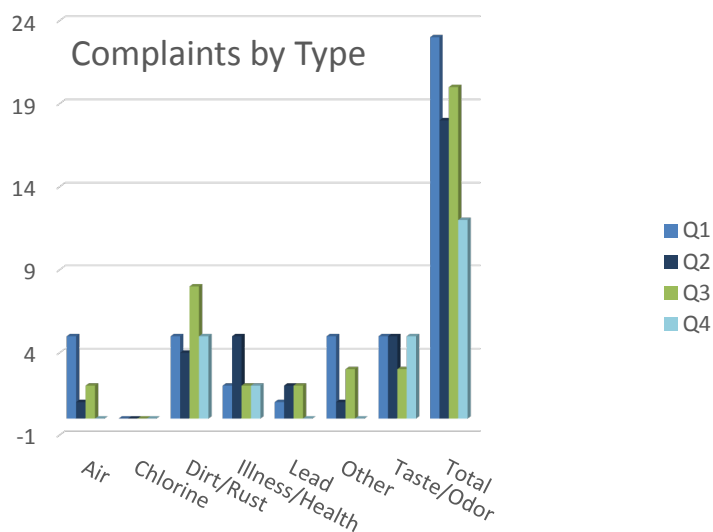
In 2018, Utilities worked closely with the Colorado Water and the Colorado Wastewater Utility Councils to help the Colorado Department of Public Health and Environment (CDPHE) shape a legislative bill regarding the potential regulation of Technically Enhanced Naturally Occurring Radioactive Material (TENORM). The legislation requires that CDPHE develop TENORM regulations by December 2020. CDPHE has stated that the regulation will focus on Radium and its progeny.

## Water Quality Complaints

In 2018, the City received 73 drinking water quality complaints, equating to a rate of 0.58 per 1,000 customers. This was an increase of 13 complaints, or 22%, from 2017, but remains well under benchmark goals. Staff responded to 53 of the complaints on-site to talk with customers and collect water samples. 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 0.58 per 1,000, the City of Fort Collins was “better than the best.”

Figure 1



## 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.**

### Code Updates

- Revised and published Water, Wastewater and Stormwater Development Construction Standards.
- Updated and received Council approval of the Cross-Connection Manual.

### Partnership for Safe Water (PSW)

The Water Treatment Facility maintained its President's Award status for 2018. The President's Award is the first tier of Phase IV of the PSW, which is the final phase. The Award is bestowed upon top-tier water plants that have demonstrated commitment to providing superior quality water to their customers, beyond the requirements of the EPA regulations. While the Director's Award, which was maintained by the Water Treatment Facility for the previous 16 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. Staff will evaluate the Facility's readiness to proceed to the Excellence in Water Treatment Award in 2020, which is the second tier of Phase IV of the partnership and the highest level recognized. Due to other priorities, staff was unable to devote sufficient time to this evaluation to proceed in 2018 or 2019.

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 - 2018.

## 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.

A key aspect of the EMS is reduction in



**ENVIRONMENTAL  
MANAGEMENT SYSTEM**

energy use and greenhouse gas footprint. In support of this, the facility has participated in the Colorado Industrial Energy Challenge, sponsored by the

Colorado Governor's Energy Office and the U.S. Department of Energy. Electrical system improvements resulted in inaccurate measurement, with usage in a major system (backwash pumping) being under-reported in 2017 and over-reported in 2018. This makes it impossible to accurately report reduction in energy usage overall. Electrical power purchased from the grid was reduced from 2017 by 0.4% percent. Purchased energy use levels equate to a 22.6% reduction in greenhouse gas footprint from 2005 levels, which continues the City's Climate Action Plan goal of 20 percent reduction by 2020.

Plant staff continue to pursue energy efficiency improvements to reduce the greenhouse gas footprint and control operating costs associated with energy in the face of rising treated water demands.

In 2018, we completed construction of a micro-hydro electrical power generation system, which will be commissioned early in 2019 and is predicted to meet more than 20% of our current electrical demand.

Another significant aspect of our EMS is waste stream management, of which treatment residual solids make up 96%. Cooperation began with the Low Impact Design program to provide some of this material for testing as treatment media for removal of phosphorous from stormwater runoff. If successful, this beneficial use has the potential to divert 20 tons per year of our treatment residuals from the landfill. This amounts to about 20% of the total residuals generated in a year.

Staff contributed to a recommended revision of the City's Environmental Policy, which was approved by the City Manager.

## 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**.



# 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 Protection**

The City of Fort Collins' drinking water supply comes from two sources: the upper Cache la Poudre River (Poudre River) and Horsetooth Reservoir. Beginning as rain and snow in the mountains, Poudre River water originates 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.

In 2016, with assistance from the Colorado Rural Water Association, Utilities, 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 directly supports 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."

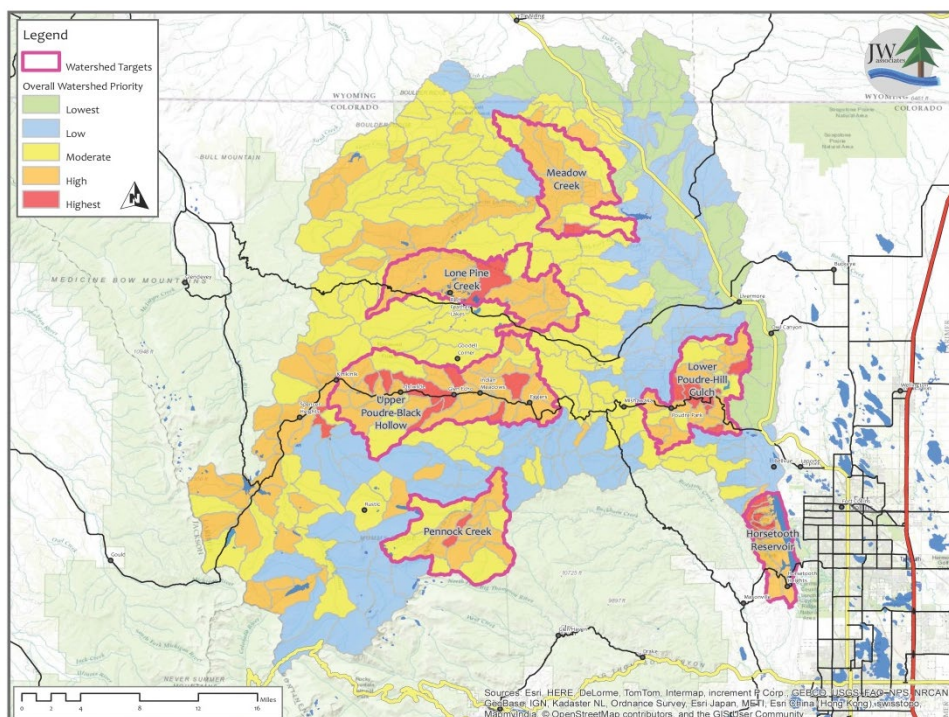
The SWPP ([fcgov.com/source-water-monitoring](http://fcgov.com/source-water-monitoring)) identifies potential sources of contamination to water supplies; ranks those sources according to risk to the City's drinking water infrastructure and source water quality; and identifies best management practices to mitigate those risks.

## ***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 continues to be 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 and retains a fixed seat on CPRW's Board of Directors alongside other partner utilities and stakeholders.

In 2016, CPRW worked with community stakeholders to complete the Poudre River Watershed Resiliency Plan ([poudrewatershed.org](http://poudrewatershed.org)), which is used by Utilities to prioritize watershed protection projects in the watershed.



*Figure 1. 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. To date, restoration efforts have largely focused on projects within the 2012 High Park Fire burn area to control soil erosion. Unnamed Tributary-3 is a small tributary to the Poudre River near the Munroe Tunnel Inlet. Heavy debris flows from the drainage following the High Park Fire completely clogged the tunnel, interrupting water supply and damaging infrastructure. The drainage was identified as a high priority for restoration following the fire due to its instability and risk for additional erosion. In 2012, CPRW began a multi-year project with Fort Collins Utilities and other partners to stabilize the drainage. The project is slated for completion in spring 2019.





*Figure 2. Project partners and volunteers work together to stabilize the Unnamed Tributary-3 drainage*

In addition, several forest thinning projects have successfully been completed outside of the burn area to reduce fuel loads and mitigate the future risk of 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 will be used at a larger scale on additional wildfire mitigation projects within the Elkhorn Creek Watershed and Horsetooth Reservoir in 2019.



*Figure 3. Forest fuels reduction efforts within the Elkhorn Creek drainage*

Utilities' Watershed Program also 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, ditches and diversions.





*Figure 4. Photos show a diversion tunnel, reservoir and section of pipe that were evaluated as part of the Drinking Water Infrastructure Wildfire Risk Assessment.*

### **State Highways – Moderate Priority**

State highways were identified in the SWPP as a moderate threat, in part, due to the potential for spills from vehicle accidents. 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).



*Figure 5. Photos show a truck accident 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.*

### **Abandoned and Active Mines – Low Priority**

The SWPP identified abandoned and active mines as a high priority threat. An abandoned mine inventory and assessment were completed in September 2016 to determine whether heavy metals from mine sites are a risk to our infrastructure and source water quality in the Poudre River. The study concluded that there is no known mine drainage to the Poudre River or its tributaries, which was consistent with metals data from routine Poudre River monitoring from 2008-2016. Fort Collins' water supplies are currently considered at low risk of contamination from historical mining activity.

### **Source Water Quality Monitoring**

Utilities collaborates with other local drinking water providers and water stakeholders to monitor water quality trends in the [Poudre River](#), [Big Thompson River](#) and [Horsetooth Reservoir](#). Monitoring includes more than 25 different chemicals and physical and microbiological contaminants at 35 locations throughout our source watersheds. As in previous years, 2018

water quality data indicated that the City's source watersheds continue to provide high-quality water.

### 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 seasonal, short term and long-term trends in source water quality. Seasonal, annual and 5-year water quality reports are available on the Watershed Program website, [fcgov.com/upper-poudre-monitoring](http://fcgov.com/upper-poudre-monitoring).

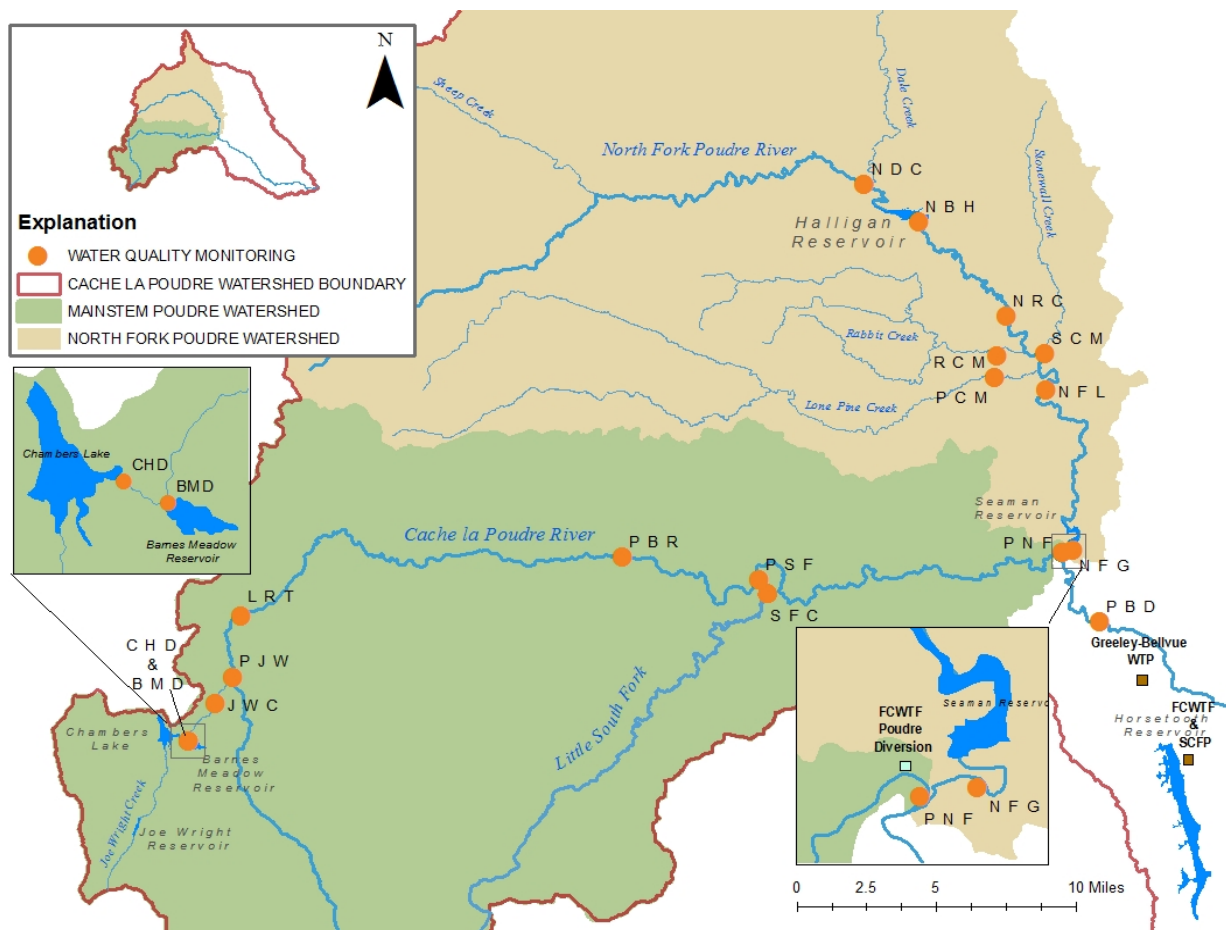


Figure 6. Map showing the locations of Upper Cache la Poudre River Monitoring Program study sites within the Poudre River Watershed.

## **Horsetooth Reservoir**

Utilities has actively monitored the water quality in Horsetooth Reservoir since the mid-1980s. In 2015, Utilities entered into a cost-share agreement with Northern Water for the monitoring of Horsetooth Reservoir water quality to conserve resources. Northern provides up-to-date information about water quality conditions, periodically analyzes data and writes trend reports. In exchange for these services, the Fort Collins Water Quality Lab 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 Colorado Big-Thompson and Windy Gap projects. Water quality data and Northern Water's most recent Horsetooth water quality report are available at [northernwater.org/WaterQuality/MonitoringPrograms.aspx](http://northernwater.org/WaterQuality/MonitoringPrograms.aspx)

## **Big Thompson River Watershed**

Utilities is a major funder and member of the board of directors for the Big Thompson Watershed Forum (BTWF), along with the City of Greeley, City of Loveland, Northern Water, Weld County and Soldier Canyon Water Authority. The BTWF manages a routine water quality monitoring program, through a contract with the U.S. Geological Survey, on the Big Thompson River, a major component of the C-BT system, which delivers water to Horsetooth Reservoir. Northern Water also monitors additional C-BT Project canals and reservoirs upstream of Horsetooth. This collaborative approach to monitoring large watersheds reduces sampling costs and provides a significant shared knowledge base between partners. For more information, visit [btwatershed.org](http://btwatershed.org).

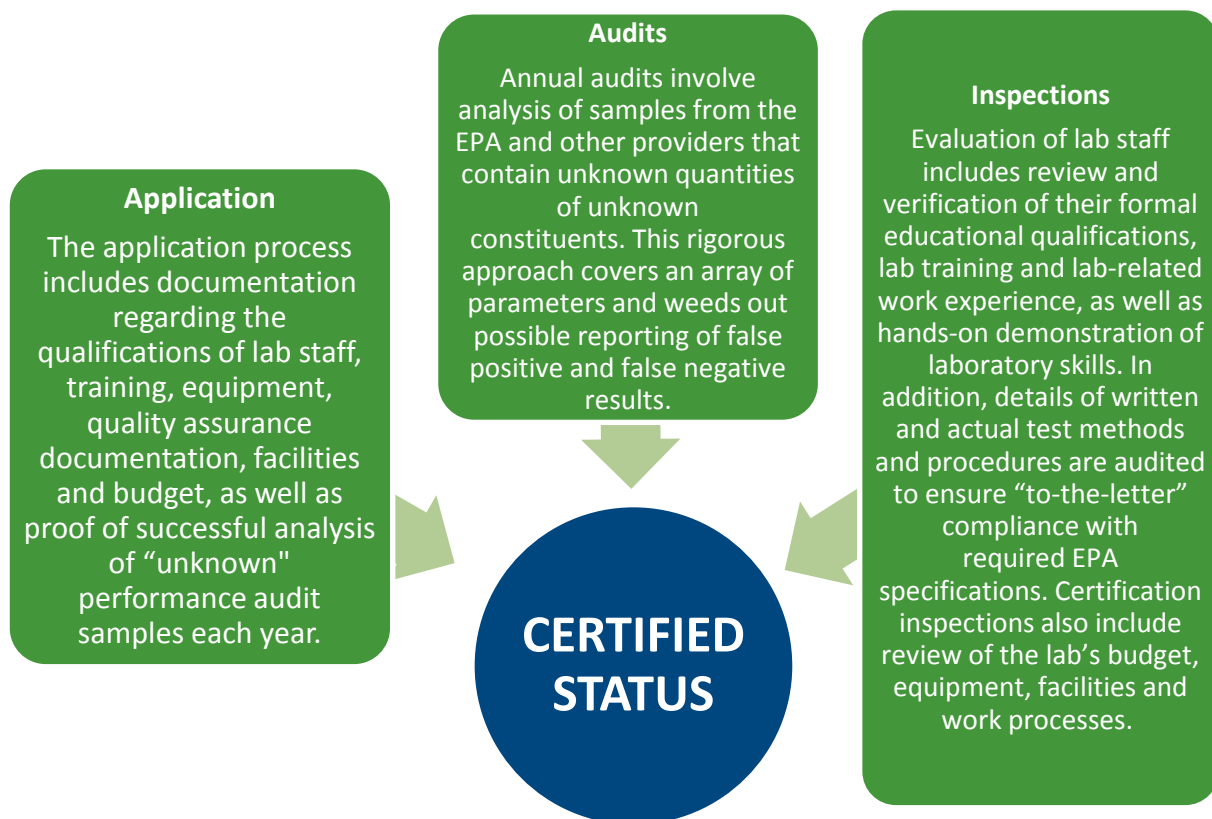


## Certified Laboratory

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 Lab staff provides state-certified regulatory compliance testing and reporting for Utilities as well as 10 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 below:

**Figure 4 – 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. Through the Master Plan and additional feasibility studies, it was determined that a combined water-wastewater laboratory, designed and constructed in partnership with Rocky Mountain Innosphere, offers the highest benefit for cost. In March 2019, Fort Collins City Council approved the terms of this partnership and the design process was initiated, with an expected completion in early 2021. The facility will house the Utilities Water Quality Lab, the Pollution Control Lab and the Watershed Program operations.

## Asset Management

Utilities continued risk-forecasting efforts within its water production and distribution asset base throughout 2018. 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 2018 highlights:

- Staff continued to add asset information to the IBM Maximo Enterprise Asset Management System for the Water Treatment Facility and the distribution system.
- Continued using data from the IBM Maximo Enterprise Asset Management System to analyze and benchmark maintenance metrics. We continue to exceed our benchmark goal of four planned maintenance events for every one corrective maintenance event.
- In the process of replacing media in filter #7, discovered that the underdrain design for filters 1-8 required updating. Began work on updating filter 7.
- Performed annual maintenance on all filters, including treatment of filter media with chlorine dioxide.
- Replaced the sludge removal equipment in Treatment Train 4 and applied a protective coating to the concrete on the flocculation basin of the train.
- Completed multiple asset replacement projects that had been identified in the Master Plan, including high-priority upgrades to the electrical systems, ensuring the continued reliability of the plant.
- Added new lime injection points for better process control.
- Upgraded lime system with filters for reliability.



- Installed side hatches in all lime batching and storage tank for increased safety while cleaning these tanks.
- Drained and cleaned the Chlorine Contact Basin after its first full year of operation.
- Cleaned and inspected the Goathill and Foothills storage reservoirs.
- Conducted a comprehensive engineering inspection of the east side of the Foothills Reservoir.



- Completed a detailed condition assessment of the 24-inch Poudre raw water supply pipeline.
- Installed new clearwell bypass valves and bypass flowmeter.
- Calibrated the main plant effluent flow meter.
- Updated six programmable logic controllers.
- Cleaned both Backwash ponds.
- Repaired the bottoms of solids ponds 1 & 2.
- Replaced the Motor Control Center at the High Service Pump Station.
- Installed a redundant turbidimeter on the combined filter effluent.
- Re-piped the activated carbon feed system for more flow and better accuracy.
- Added a Total Organic Carbon analyzer at the Chlorine Contact Basin.
- Replaced the sodium bisulfite day tank and plumbing.
- Replaced the portable diesel emergency electric generator.
- In cooperation with IT, upgraded database servers.
- Completed requirements gathering for future unification of GIS operations across all wet utilities.
- Received Council approval to proceed with design of a new state-of-the-art combined Drinking Water Quality and Water Reclamation Laboratory. The City

will work with Innosphere on the design and construction of a new shared facility that will be part of the current Innosphere campus in the old downtown area on East Vine Drive.

- Made significant progress in converting all reporting to the new ICONICS database, the final step before completely decommissioning the old Viewpoint system.
- Completely renovated the Process Control Laboratory in the Water Treatment Facility.



- Procured and began configuration and implementation of a new Laboratory Information System (LIMS). This is a database to manage analyses in all the laboratories.
- Continued work on the Water Distribution and Wastewater Collection Master Plan, which will identify capital improvements necessary to maintain levels of service in these systems.
- Performed 1,849 backflow surveys and inspections.
- Took 389 cathodic protection test station readings.



- Designed and constructed the replacement 10,769 linear feet of water distribution pipe, or 2.04 miles, of water mains out of 542 total miles of pipe in the system. This equates to an annual replacement rate of ~0.38%. The 2018 replacement rate was 17% higher than the 2017 replacement rate. Plans are being developed to increase this rate to 1% replacement per year by 2020.



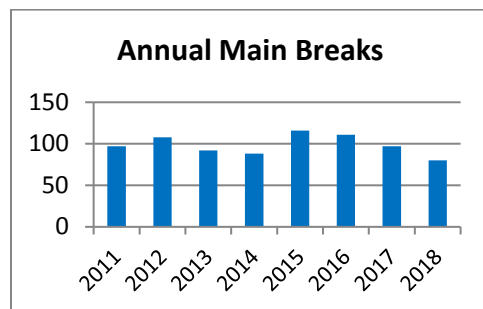
- Installed 67 new valves and 13 fire hydrants during our annual water distribution system replacement program
- Replaced 1,811 meters, 1,728 were for routine scheduled replacement and 83 were to correct problems.
- Installed 233 new meters.
- Conducted 1,785 tests on meters and 755 inspections of meters and bypasses.
- Maintained the AMI Radio Module functionality by responding to 2,138 AMI Events, including 26 Silent modules, 1,920 stopped modules and 192 modules with a Tilt/Tamper status. As a result, a total of 1,301 radio modules were returned to the manufacturer for warranty replacement.
- Repaired 163 valves, 54 fire hydrants, 55 service lines and 12 service leaks.
- Repaired 80 water main breaks, 47 were electrolysis, 26 were beam breaks, and four were longitudinal breaks
- Performed maintenance checks on 1,147 valves, three air valves and 945 fire hydrants.
- Flushed the water mains on the west side of the water distribution system from Catalpa Drive to College Avenue and four quarter sections in the Town of Laporte, operating 917 fire hydrants during that program
- Checked 132 miles of water distribution pipes for leaks.

## Distribution System Maintenance

The Water Distribution Crews are responsible for the operation and maintenance of 544 miles of water mains, 807 locator stations, 494 cathodic protection test stations, 13,354 valves, 3,827 fire hydrants and 38,067 water service lines in the City's water distribution system.

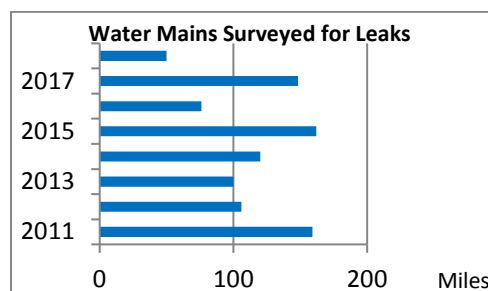
In 2018, the group was responsible for responding to 947 customer complaints during regular hours and 242 after hours. They repaired 163 valves, 54 fire hydrants, 55 service lines and 12 service leaks. Additionally, 80 water main breaks were repaired, 47 were electrolysis, 26 were beam breaks, and four were longitudinal breaks. Three miscellaneous repairs were made to the water mains.

**Figure 2**



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

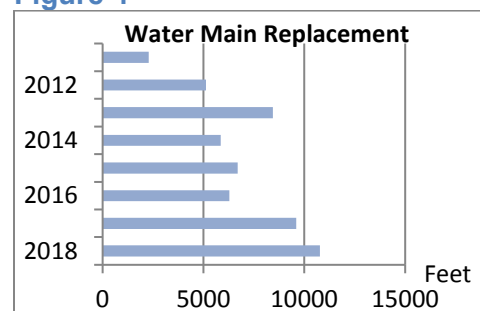
**Figure 3**



Following is a list of replacement projects:

- E. Lake Street – Prospect Road to Lake Place – 400 LF
- Redwood Street – Willox Lane to Bayberry Circle – 1,150 LF
- E. Myrtle Street – Myrtle Street to Cowan Street to Mulberry St. – 900 LF
- Suniga Road – Blondel Street to N. College Avenue – 1,250 LF
- Skyline Drive – Crestmore Place – 900 LF
- Silverwood Drive – Centennial Road to Brookwood Drive – 2,100 LF
- Fauborough Court. – Oxborough Lane to south end of Fauborough Court – 250 LF
- Cook Drive – Crestmore Place to Homer Drive – 675 LF
- N. Crestmore Court – Crestmore Place to north end of N. Crestmore Court – 150 LF
- S. Crestmore Court – Crestmore Place to south end of S. Crestmore Court – 150 LF

**Figure 4**



## Certified Operators

The Treatment Facility operators are certified by the Colorado Water and Wastewater Facility Operators Certification Board as certified water professionals. As of 2017, the Director of Plant Operations (operator in responsible charge, or ORC), Manager of Plant Operations, both Lead Plant Operators, solids management staff, and seven of our eight Plant Operators had earned A certification, the highest level of Water Treatment Plant Operator certification, which also carries the professional credential, "Certified Water Professional." The eighth operator has obtained a 'C' level certification and is 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.

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, and the Manager of Plant Operations holds a level 3 certification. 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. Two maintenance staff hold level D certifications, as do both 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 Certification
- ASE Mechanic 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