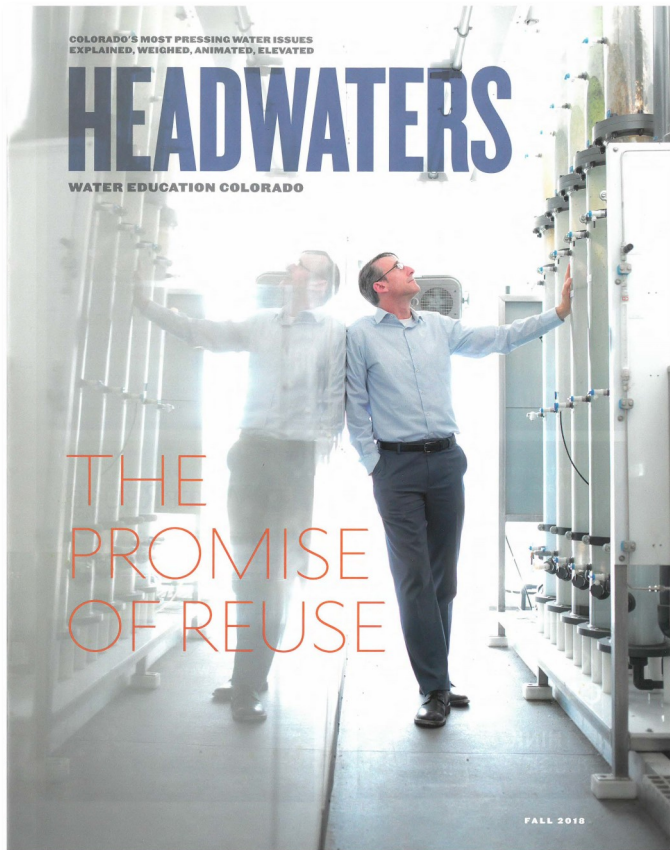


Planning for ReUse

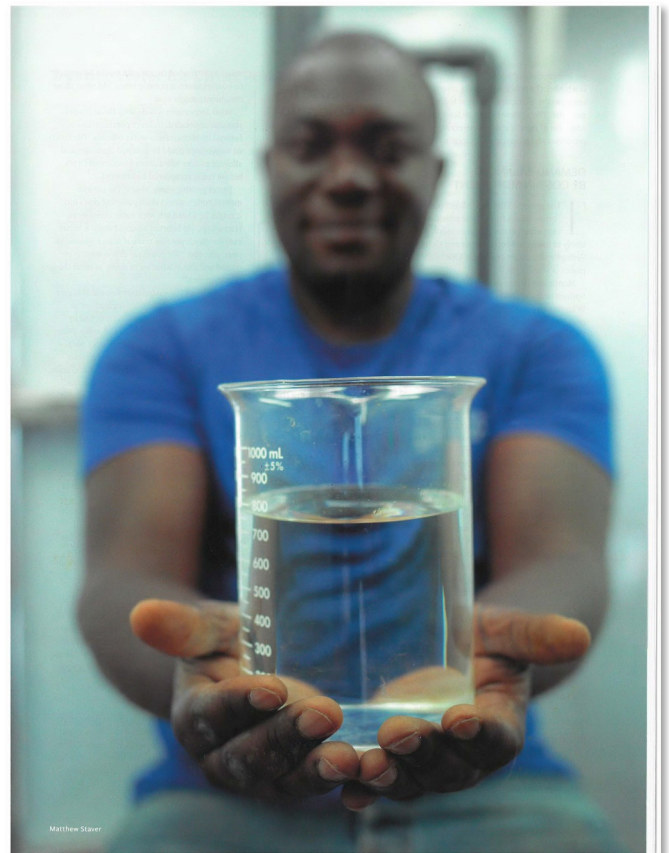
By: Sandi Aguilar, Customer Relations Program Manager

Regionally

To highlight the Headwaters magazine in which Castle Rock's reuse project was featured and to educate the public on purified reuse water, Water Education Colorado partnered with WateReuse Colorado to host an informational event. On Oct. 18, at the Wildlife Experience, water providers such as Castle Rock, Meridian and Denver Water showcased how reuse water is in use or on the horizon. Beer and wine made with Denver's Pure Water (reuse pilot project) was served. Carollo Engineering and several others also displayed the technical and logistical parameters of reuse water in Colorado.



Cover of Headwaters magazine



Lanre Ajayi, Water Plant Operator III

Continued on next page

OUR VISION

We will be a national leader among water utilities focused on customer satisfaction and delivering outstanding quality and value.

Locally

With another water supply source on the horizon - reuse, Castle Rock Water reached out to our customers with a booth at Starlighting on Nov. 17. Several Castle Rock Water staff members braved the freezing temperatures to talk about how reuse water will be one of the most cost effective solutions to our water supply. We informed customers about the process of treating wastewater to regulatory standards and releasing that into East Plum Creek, 5.5 miles downstream the water is captured again in Plum Creek and returned to our Plum Creek Water Purification Facility (PCWPF). It will then be retreated at the PCWPF to the purity of drinking water standards. Additionally, we had two beakers of water - one with treated wastewater and the other with creek water. Everyone was amazed at how the treated wastewater looked better than the creek water.



Mark Marlowe, Director of Castle Rock Water shows a beaker of treated wastewater and creek water

Planning for Reuse

Castle Rock Water
Securing our future drop by drop

Castle Rock Water serves a community of 62,000 residents and is expected to grow to 105,000 by 2050. With or without growth, the existing deep ground water supply that the Town has been so reliant upon is a nonrenewing resource that is not by itself sustainable for the Town, long-term. Climate conditions are also significantly impacting supply and demand. Plans for securing water for the Town of Castle Rock include renewable surface water, importing water and reuse.

Additional Conservation	Box Elder Imported	16%
Other Imported Water		3%
Reuse Program 36%		
Lawn Irrigation Return Flows		5%
WISE Imported		6%
Groundwater		25%
Native Plum Creek		9%

Securing our future drop by drop

2018

Plum Creek Water Purification Facility expansion for Advanced Treatment is in design

CRgov.com/WaterReuse

2019

Several large irrigation accounts are slated for nonpotable reuse, including the municipal golf course

Plum Creek Water Purification Facility

2020

Reuse water taken from East Plum Creek will be purified to drinking water standards for Town-wide household and business consumption

Reuse Pilot Project

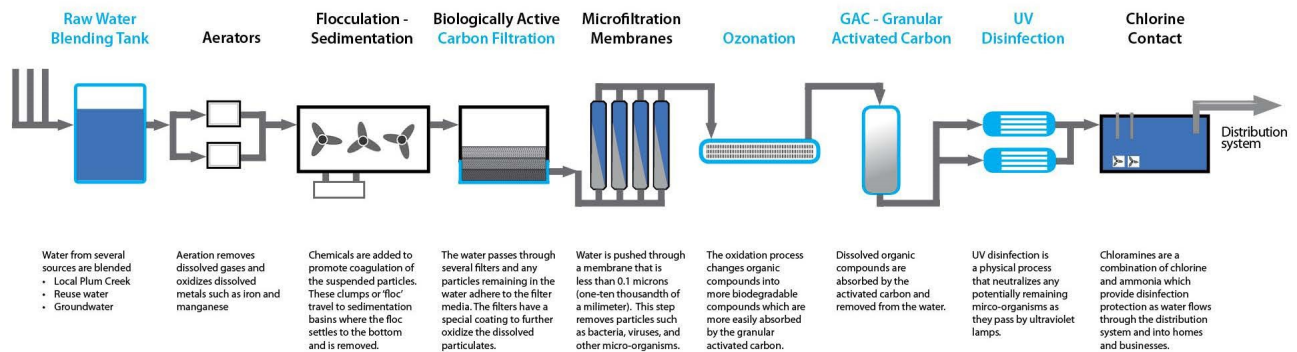
ENVIRONMENTALLY SOUND COST EFFECTIVE SUSTAINABLE

Planning for Reuse

Plum Creek Water Purification Facility with Advanced Treatment

Plum Creek Water Purification Facility is being expanded to include Advanced Treatment processes, which are denoted in blue. While treatment already meets local, state and federal regulations for safe drinking water regardless of sources, the Advanced Treatment processes provide added redundancies, focus on removal of contaminants of emerging concern (CEC), and address new standards being established by reuse systems throughout Colorado and the U.S.

Current and reuse treatment systems include physical, chemical and biological processes for a more thorough treatment for purity in drinking water. These processes are designed to remove Giardia, Cryptosporidium, viruses, suspended solids, bacteria, algae, fungi and CECs, making drinking water reliable and safe.



WISE Project - ACEC Honor Award

By: Walt Schwarz, P.E., Project Manager

A current source of imported, renewable water to the Town is from the Water Infrastructure and Supply Efficiency (WISE) Project. WISE water deliveries are being received through a 5.2-mile-long (36-inch diameter) pipeline installed from the Parker Water & Sanitation District (PWSD) water distribution system along Outer Marker Road in Douglas County. Castle Rock Water anticipates northern water supplies to the Town to increase in the future (capacity of the WISE pipeline is approximately 14 MGD from PWSD).

Every year, the American Council of Engineering Companies (ACEC) recognizes engineering firms for projects that demonstrate an exceptional degree of innovation, complexity, achievement, and value. Burns & McDonnell Engineering Company was the design engineer on record for this project and was awarded a 2019 Engineering Excellence, Honor Award by ACEC in the Water Resources Category. A team approach during the design phase and contributions by Castle Rock Water staff helped ensure a successful project that was constructed on schedule and under budget by approximately \$822,000.



Rocky and steep terrain, combined with overhead powerlines, made pipeline installation difficult.

WISE Local Infrastructure Project

CASTLE ROCK, COLORADO



This metal drill head steered and guided trenchless installation of the waterline.

The Town of Castle Rock is working toward providing a renewable surface water supply for its rapidly growing community of 67,000 people. The WISE Local Infrastructure Project connects assets from neighboring water utilities to meet increasing demands for clean water throughout the southern metropolitan Denver region. Burns & McDonnell planned, designed and permitted more than 5 miles of large-diameter waterline connecting the Canyons Waterline to Castle Rock's Ray Waterman Regional Water Treatment Center.



Specialized equipment was mobilized from Texas to cut the rock ahead of installation. This was a much safer method than blasting through the bedrock.

Crossing through residential areas and frequently trafficked roads and trails, this project had the potential to significantly disrupt citizens with noise, road and trail closures, and impacts to daily commutes over an eight-month construction period. Our use of innovative design technologies minimized these impacts. Castle Rock is now able to receive and process up to 14 million gallons of additional water per day through the new waterline from the Parker Water & Sanitation District distribution system.



Drilling mud was used to keep the tunneled hole from collapsing and to lubricate the waterline as it was pulled into place.



36-inch PVC pipe has a long service life and is unaffected by overhead transmission lines and highly corrosive soils.



Use of trenchless technologies significantly reduced the amount of site restoration (asphalt and sod replacement), resulting in cost savings.

BURNS & MCDONNELL
Centennial, CO 80112

TOWN OF CASTLE ROCK
Castle Rock, CO 80109

ACEC
AMERICAN COUNCIL OF ENGINEERING COMPANIES
100 Years of Excellence



ALL ABOUT CONSERVATION

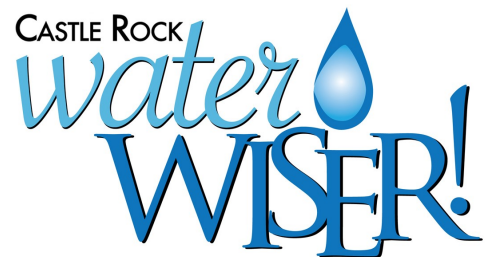
SMARTSCAPES SOLUTIONS FOR YOUR LAWN AND HOME

New in 2018 - Non-residential Smartscape Rebates

In 2018, given the success of the residential Smartscape Renovation program, Castle Rock Water expanded the program to include non-residential customers. The initial budget was \$100,000. Similar to the residential program, non-residential customers received \$1 per square foot for the removal of high water use plant material and replacement with a low water landscape or hardscape.

During this first year of the program, three Homeowner Associations (HOAs) participated - Sapphire Pointe, The Woodlands, and Castlewood Ranch. A total of 30,362 square feet of high water use plant material was removed and replaced with low water or no water material. In these cases, the overhead irrigation system was removed or replaced with a drip system in these areas. Other HOAs have expressed interest in the program but were not able to participate due to budgetary restrictions. Moving forward, they plan to include this in their future budgets.

Below are some before and after of how these three HOAs took advantage of this program:



Smartscape solutions for your lawn and home.



Before

WOODLANDS



In progress: High water grass was killed and aeration completed

CASTLEWOOD RANCH



Before



After



Before



After



Before



After

SAPPHIRE POINT



UPDATE ON REBATES

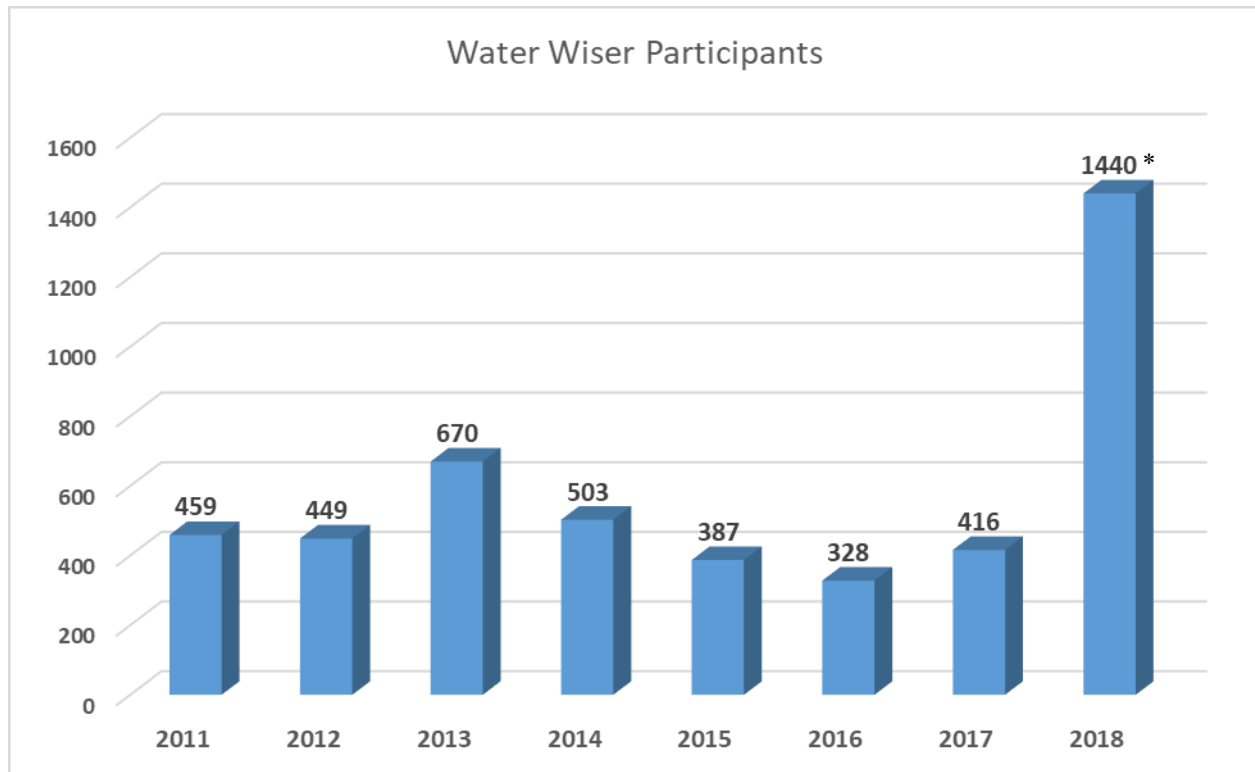
Smartscape Renovations continue to be popular with 42 applications being submitted. An evaluation of past customers taking part in these programs indicate a water savings of about 21 percent.

Program Category	2010 Actual	2011 Actual	2012 Actual	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual
SmartScape Renovation Residential*	\$51,142	\$50,392	\$54,152	\$23,400	\$21,407	\$14,649	\$24,192	\$28,271	\$29,344
SmartScape Renovation Non-residential*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$30,566
Rotary Nozzle Retrofit Residential	\$3,699	\$2,309	\$794	\$1,200	\$2,461	\$1,538	\$1,669	\$720	\$2,995
Rotary Nozzle Retrofit Non-residential	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$2,000
Rain Sensor	\$112	\$131	\$34	\$150	\$183	\$115	\$93	\$159	N/A
Smart Irrigation Controller	\$2,876	\$1,262	\$584	\$750	\$2,995	\$4,261	\$6,270	\$6,327	\$14,866
Slow the Flow Irrigation Audits	\$17,502	\$9,372	\$4,318	\$4,500	\$3,500	\$2,980	\$3,088	\$3,915	\$2,339
Total, All Programs	\$75,331	\$63,466	\$59,882	\$30,000	\$30,546	\$23,543	\$35,312	\$39,392	\$82,110

*Represents Smartscares through 12/4/2018; does not include those awaiting final inspection

WATER WISER WORKSHOPS

There were 18 Water Wiser Workshops held in 2018. At these workshops, our customers were shown examples of how easy it is to increase your water efficiency by learning how to detect leaks, identify water waste, and manage your irrigation system to achieve maximum effectiveness. These workshops continue to be very popular with our customers. Since 2011, over 4,700* customers have received this comprehensive education on water efficiency.



** Includes 808 Water Wiser participants who renewed their status for another five years.*



Plan Review Update

By Tina Close, Plan Review Supervisor

Castle Rock Water reviewed 75 applications (see below) this month which compares to 89 during the same time period in 2017. The average assigned due date by Development Services was 13.3 days, and Castle Rock Water completed the reviews in an average of 11.9 days.

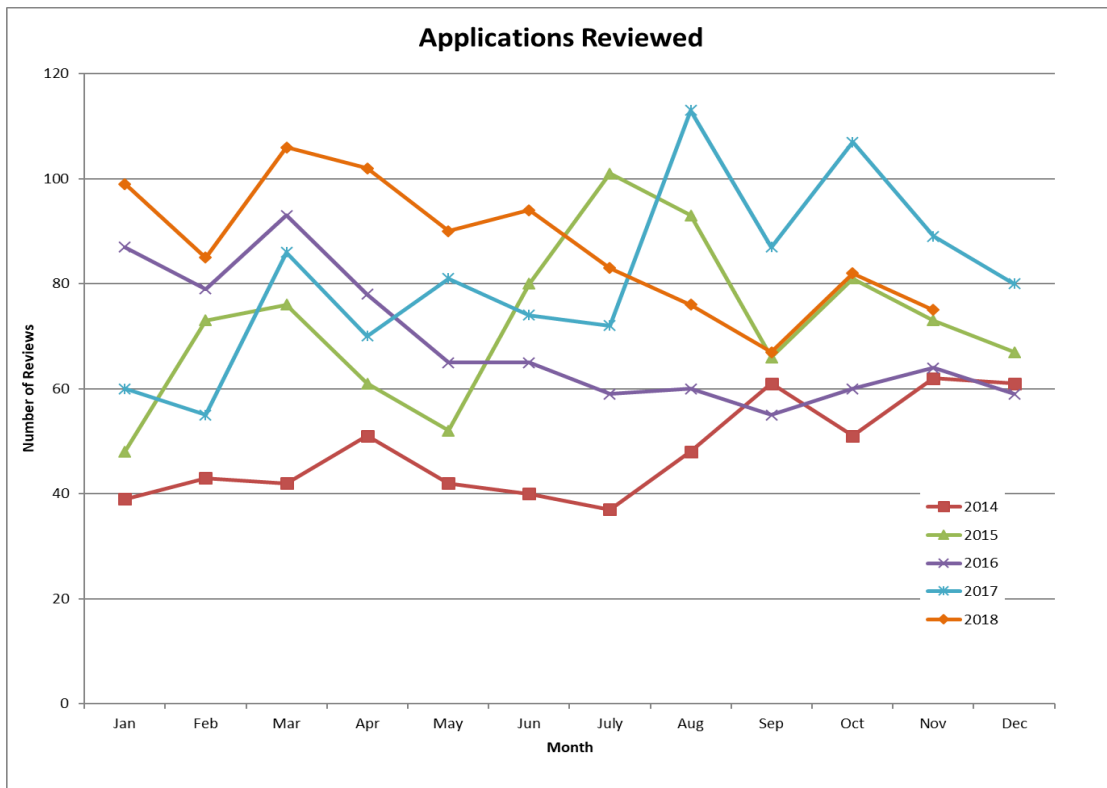
- 9 Agreements
- 8 Field Change Orders
- 11 Grading, Erosion, and Sediment Control (GESC) Plans
- 2 Floodplain Developments
- 2 County Referrals
- 7 Plats
- 3 Preliminary Project Applications
- 14 Construction Drawings
- 13 Site Development Plans
- 5 Technical Criteria Variances
- 1 Miscellaneous

The applications reviewed consisted of:

- 39 1st submittals
- 14 2nd submittals
- 11 3rd submittals
- 11 Special reviews
- 13 Completed late
- 62 Completed on-time as scheduled

In addition, Castle Rock Water completed 41 building permit reviews and associated system development fees.

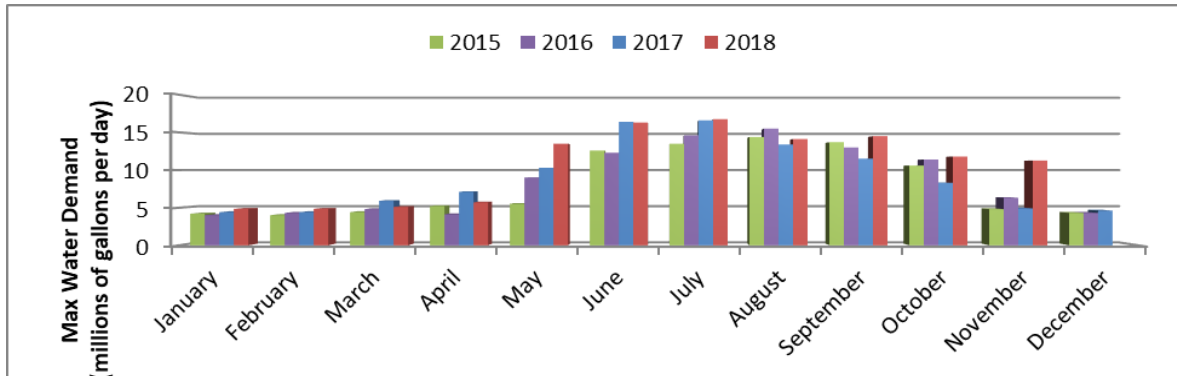
Castle Rock Water provides plan review for all water, wastewater and stormwater projects submitted through the development review process. The line graph (below) shows development activity data (by month and year) since 2014.



2018 Water Demands

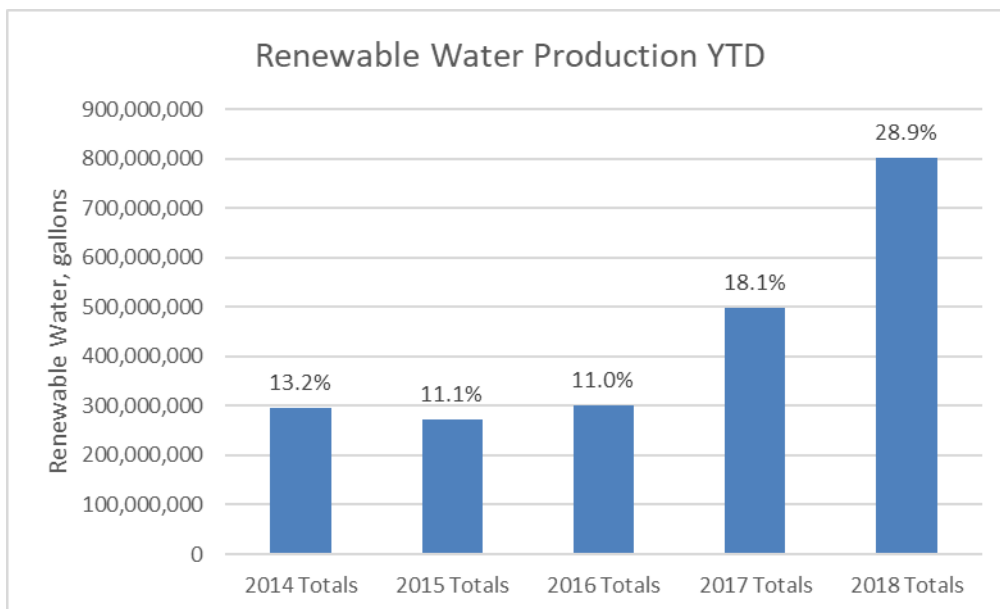
By: Lauren Moore, Water Resources Program Analyst

The maximum daily water demands are plotted by month from 2015 to the current month. As observed by the data, the maximum demand for the month of November was 11.3 million gallons per day (MGD) which was 77% greater than the 5-year average maximum daily demand for the month. This abnormal peak demand was due to a line break and the associated tanks (Tank 12A, 12B & 8) that were drained as a result. The second highest maximum demand was 6.5 MGD, which more closely resembles the monthly trend. Maximum demands inform us of the size of the infrastructure necessary to provide water service over short periods of time and help us to plan future water resources needs. The water demand total for November was 146.2 million gallons (MG), which was about a 23.6% decrease from the October 2018 total of 191.5 MG, and a 6.3% increase from the November 2017 demand of 137.6 MG.



The CR-1 diversion produced an average of 0.71 MGD for the month of November. The Town's thirteen alluvial wells and CR-1 produced a total of 42.2 MG of renewable water. In total, renewable supplies accounted for 30.1% of the total water supply for the month (140 MG or 431 acre-feet) and 28.9% of the annual water supply (2,773 MG or 8,511 acre-feet).

Renewable supplies are those water sources that are replenished by precipitation (think of our alluvial wells and CR-1), whereas reusable supplies are those waters that are either from the Denver Basin (deep wells) or imported supplies (such as WISE and RHR) that can be used over and over, to

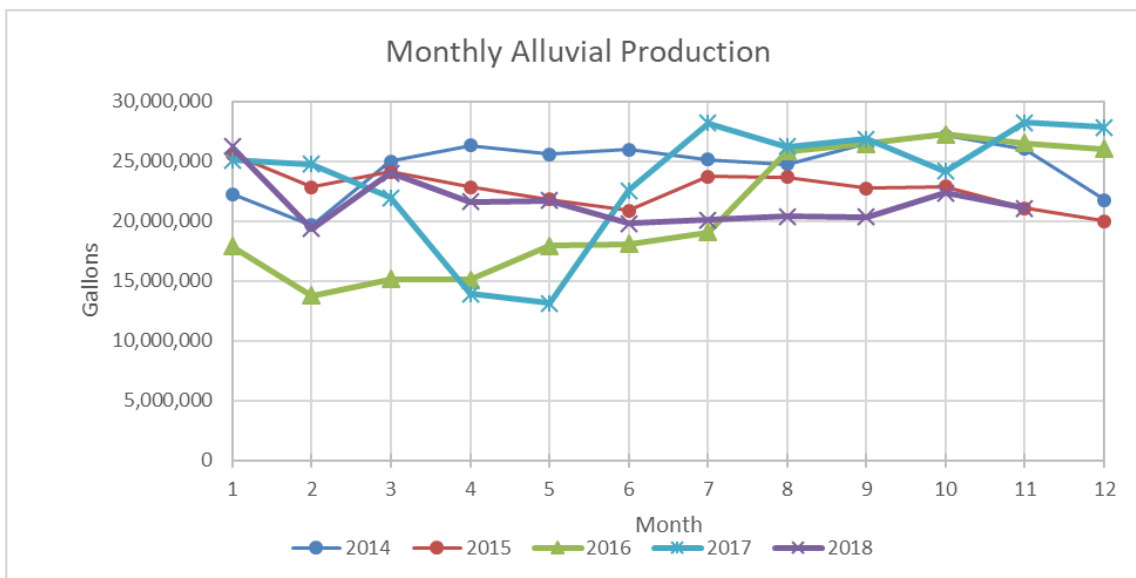


The percentage shown on top of the bars is the amount of renewable water relative to total water production.

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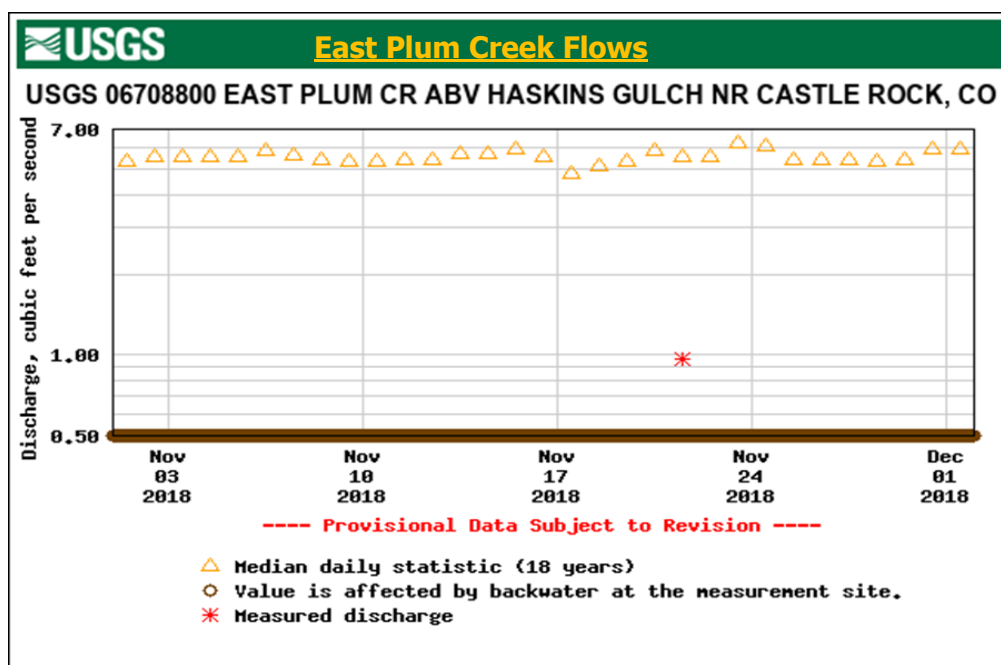
Water Demands, continued

The following graph shows the monthly production of the Town's alluvial well system. The production from the alluvial wells in November 2018 was 21.0 MG, which is less than the second half of 2017. Lower production combined with decreasing water levels is primarily due to low stream flows in East Plum Creek. Well rehabilitation is scheduled for this fall/winter.



The flow hydrograph represents stream flows in East Plum Creek taken from the stream gauge located above Haskins Gulch. As the graph illustrates, data for the month is not available due to backwater at the measurement site. The U.S.G.S. is currently working on this issue.

There were active calls on the South Platte River in November. Some of the active calls have had a more senior water right than some of the Town's water rights. This means that those diversions are out-of-priority, so the stream depletions will be covered by non-tributary return flows. This also means that the Town will have slightly less reusable water going down Plum Creek during an active call. The priority date on a river call may change each day depending on the stream flow available and the seniority of the diversions that need water on that day.



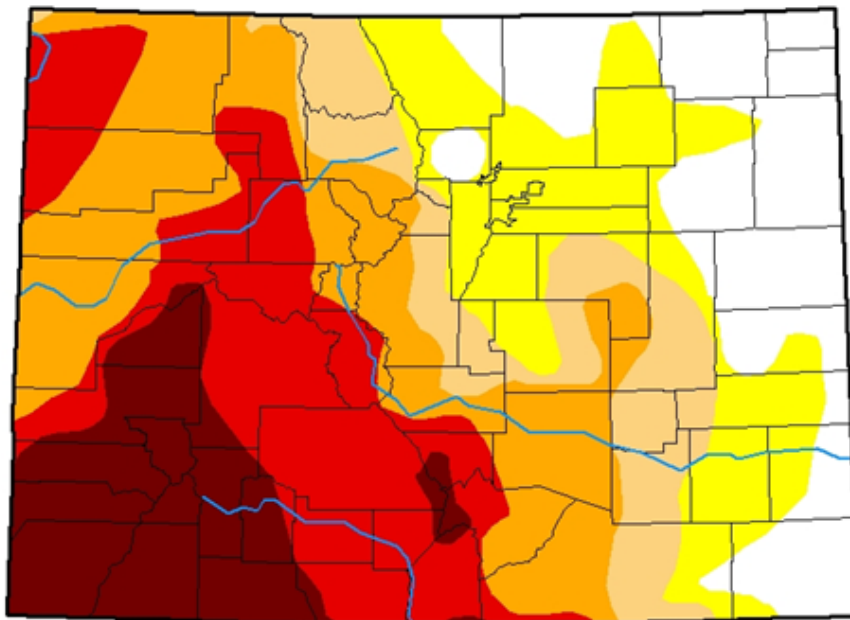
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Water Demands, continued

According to the U.S. Drought Monitor from USDA, Douglas County is abnormally dry, while roughly 70% of Colorado is experiencing Moderate to Exceptional drought. In April 2018, Town Council approved a Town of Castle Rock Drought Management Plan. This plan uses a Water Supply Index (WSI) for the Town that is similar to the U.S. Drought Monitor in that it provides us an indicator to drought level; however, the WSI accounts for local conditions relative to the Town's capability to address our water resources and daily water demands. The WSI is calculated by taking the sum of our supply (deep groundwater, alluvial wells, surface water, and WISE) and dividing that by our maximum daily demand. We generally want to see a WSI above 1.1, which means that we have enough resources to meet our demands. Anything below a 1.1 will trigger a drought stage relative to its severity. The average WSI for October was 2.7, above the 1.1 trigger level, which is considered "good."

U.S. Drought Monitor Colorado

November 27, 2018
(Released Thursday, Nov. 29, 2018)
Valid 7 a.m. EST



Intensity:

-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Richard Heim
NCEI/NOAA



<http://droughtmonitor.unl.edu/>

**Welcome to
our Team!**



Lindsay Bryson
GIS Intern

NEW CERTIFICATIONS

The water, wastewater and stormwater utility business is highly technical and regulated. As such, Castle Rock Water has to maintain an extensive staff of professionally licensed individuals. Most of these licenses require specialized education and the passing of state testing, as well as proof of continuing education. Below is a list of those passing various certifications this month:

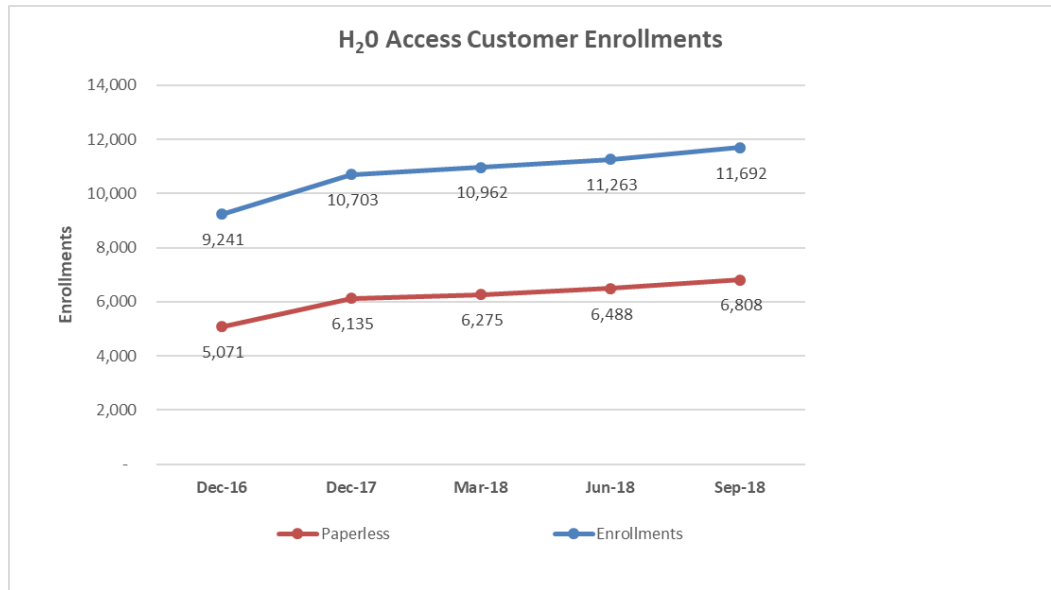


Matthew Anderson
Commerical Driver's
License (CDL)

Customer Statistics

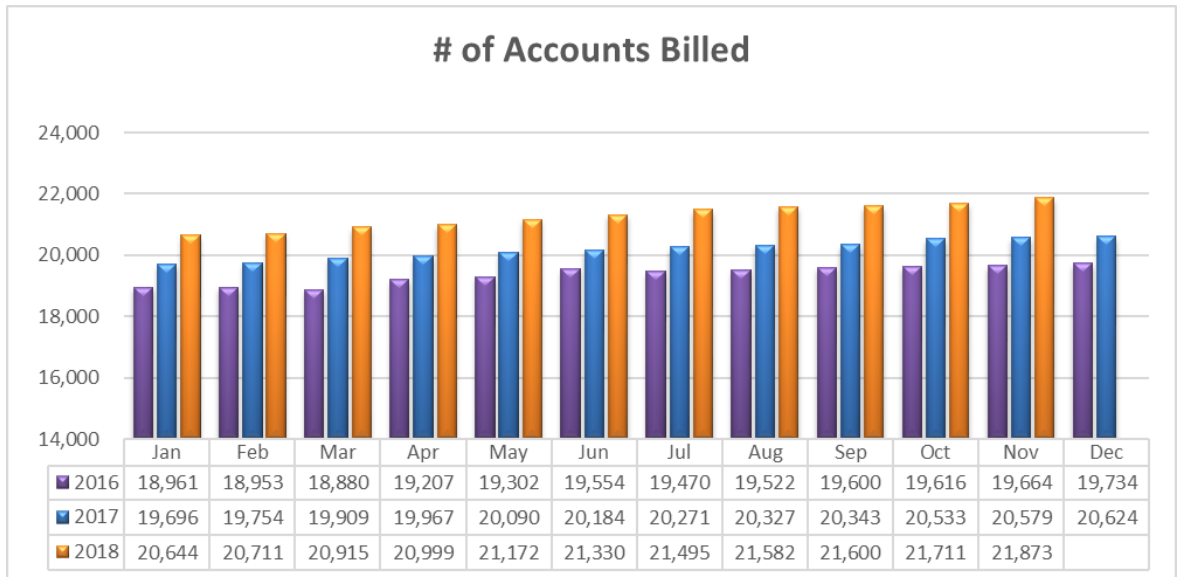
By: Anne Glassman, Business Solutions Manager

Our Business Solutions Team continues to track a host of statistics and data as we continue to evaluate our levels of service and look for efficient ways to improve on these levels.



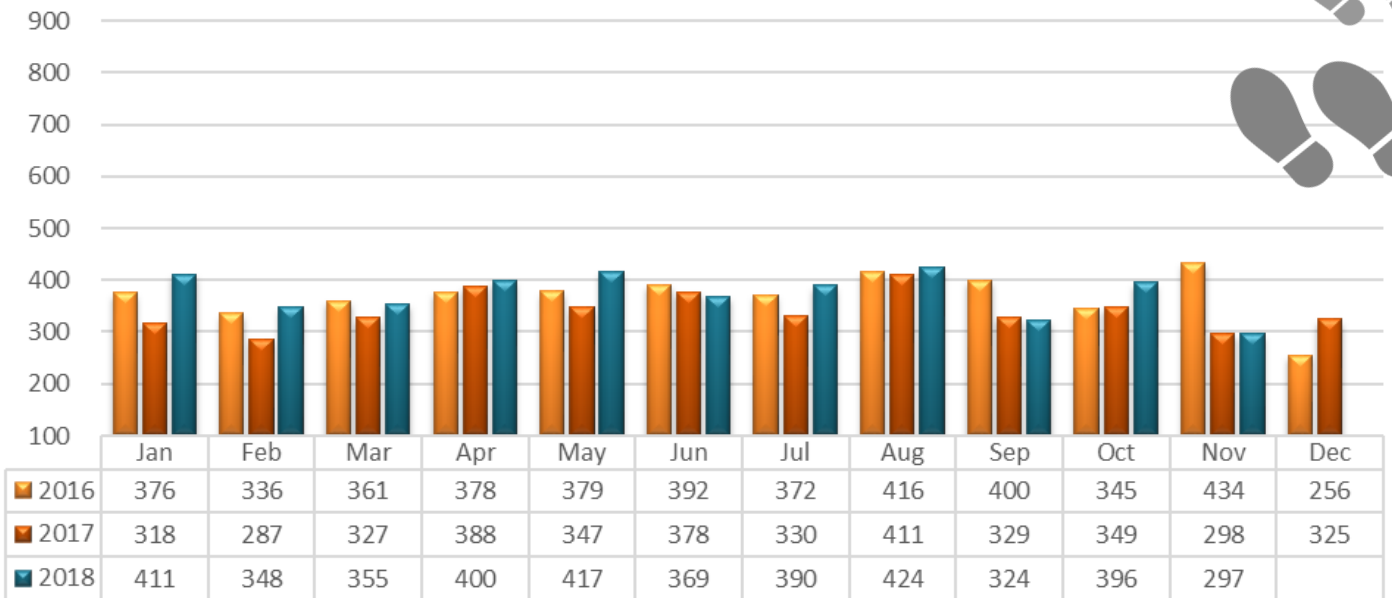
Updated quarterly - Data reported quarter ending 9/2018

The number of customers enrolled in paperless billing has remained steady at 57 percent over the last several months.



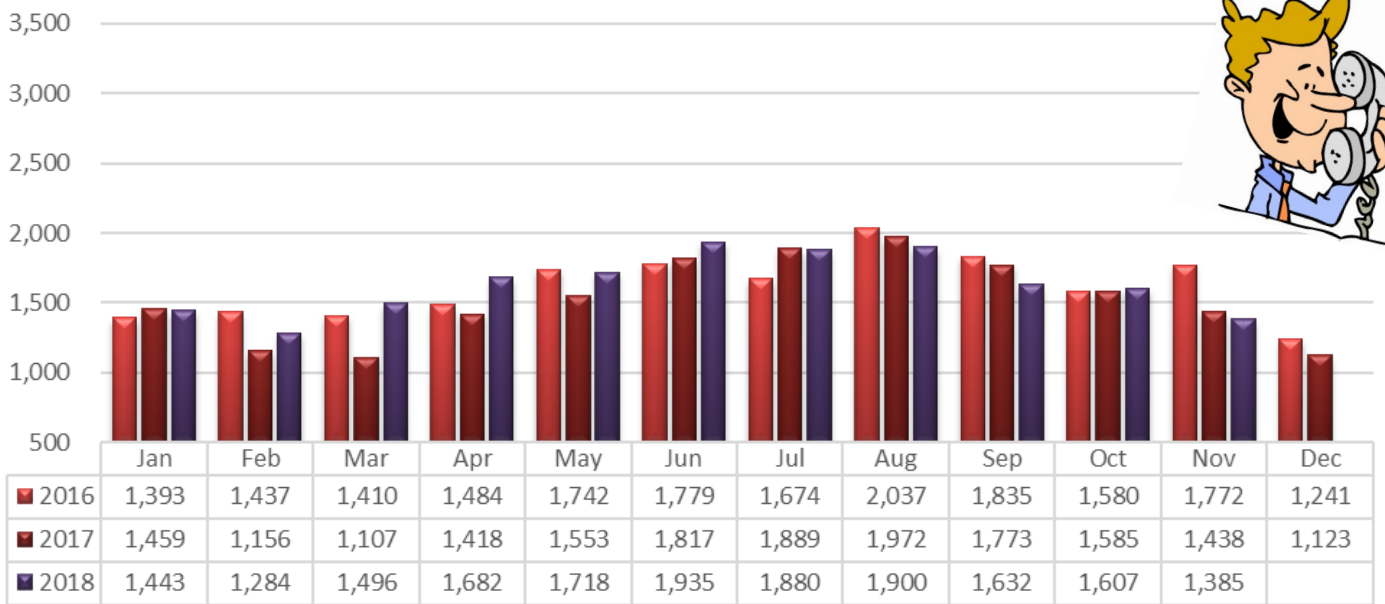
The number of accounts billed continues to increase year over year due to new residential and commercial growth.

Walk-In Customers



Walk-in customers are consistent with this time of year.

Customer Phone Calls



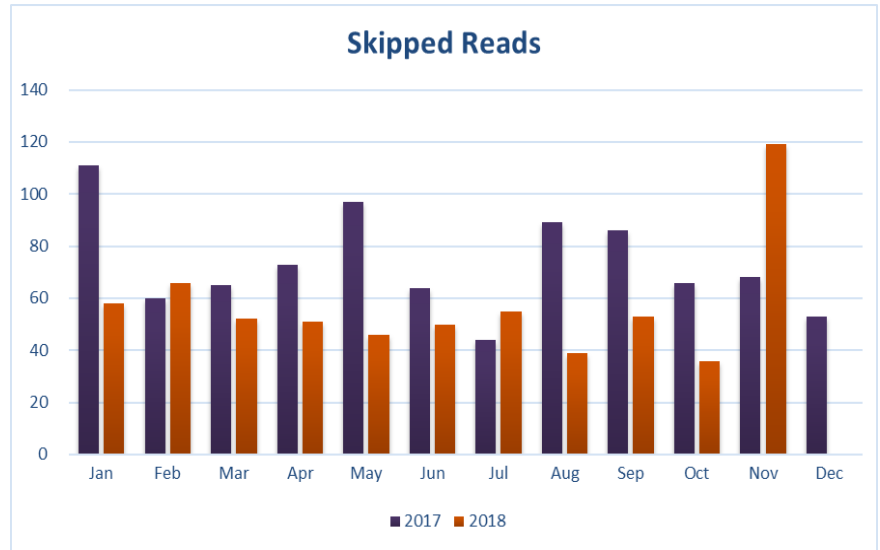
Customer phone calls are consistent with this time of year.

METERS

Skipped Reads

The American Water Works Association (AWWA) standard for skipped reads is 2 percent, so at 0.54 percent in November, we still continue to stay well below the industry average. This is a result of continued maintenance and repair efforts on meter infrastructure.

The skipped reads in November were up due to batteries dying from cold weather. Some batteries that are at the end of their life cycle will go dead with the onset of cold weather.

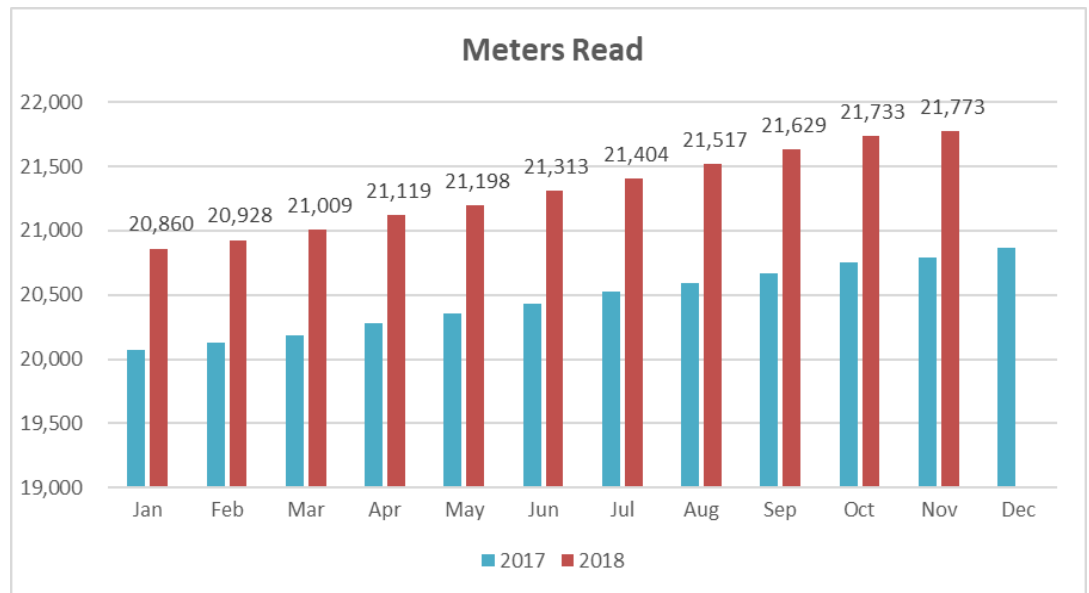


WHY IS THIS IMPORTANT?

It is a strong indication of the level of preventative maintenance being done by our team. A skipped read is indicative of a problem with the metering infrastructure (i.e. battery, wiring, etc.). Fewer skipped reads means more properly working meters, which is good for all our customers.

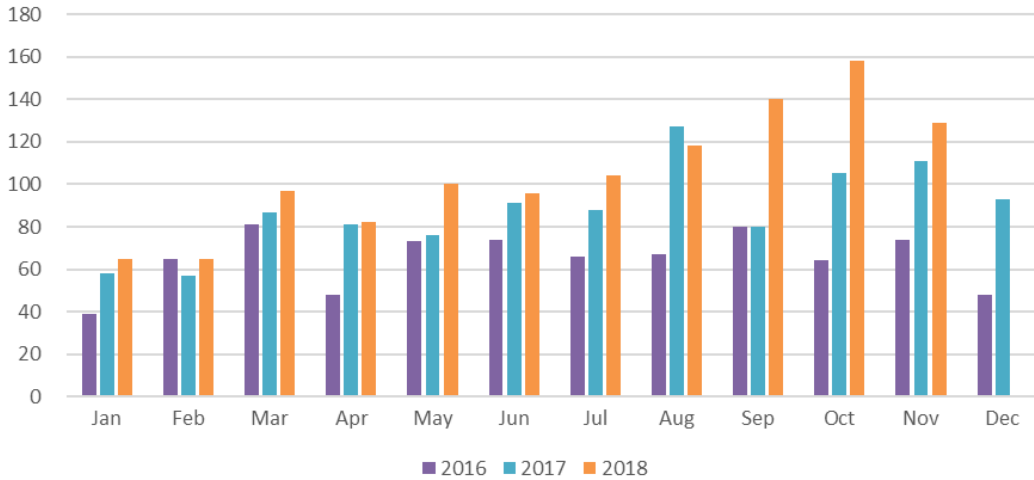
Meter Sets

Month-to-Date 86
Year-to-date 1,053



The meters read continues to increase month-to-month due to new residential and commercial accounts, with a significant increase year-over-year.

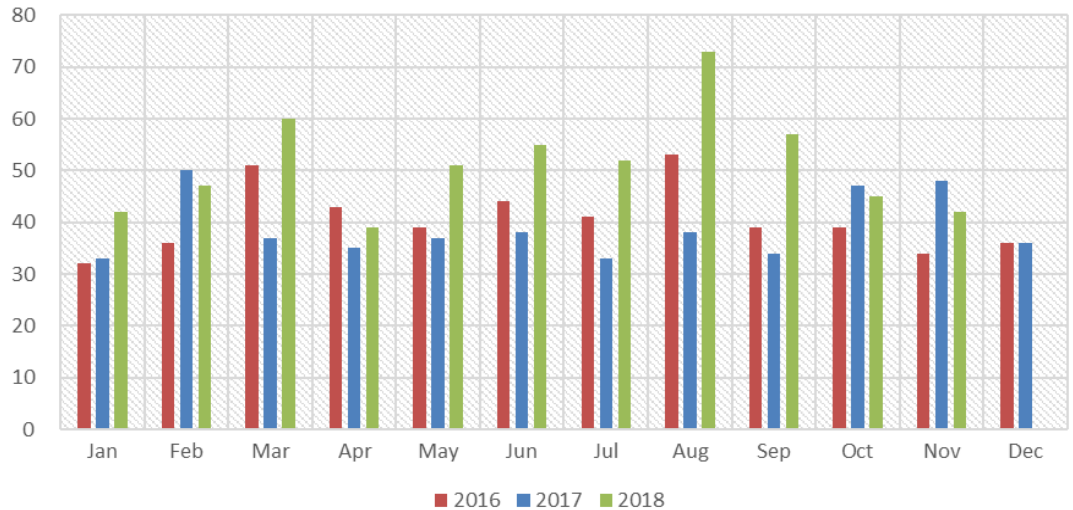
Residential Meter Sets



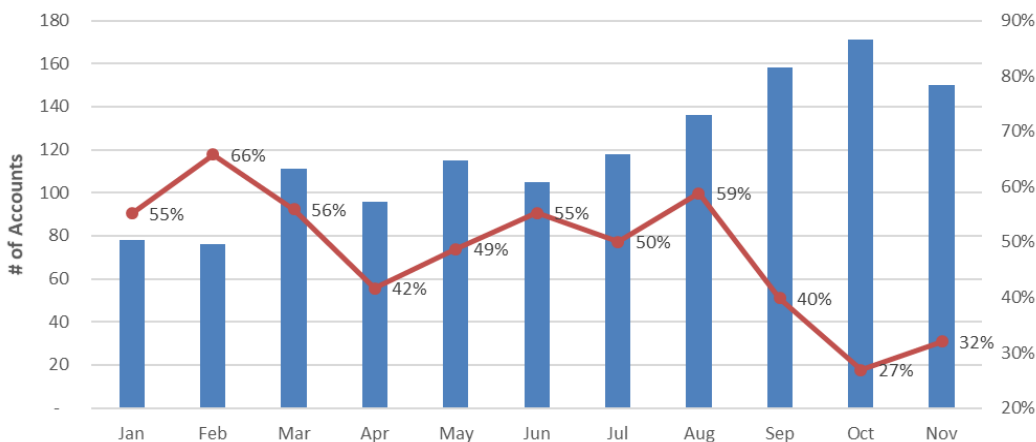
Residential meter sets continue to remain high due to new residential development.

Residential meter set re-inspections are trending down, which is a good indicator that more of the original inspections are passing.

Residential Meter Set Re-Inspections

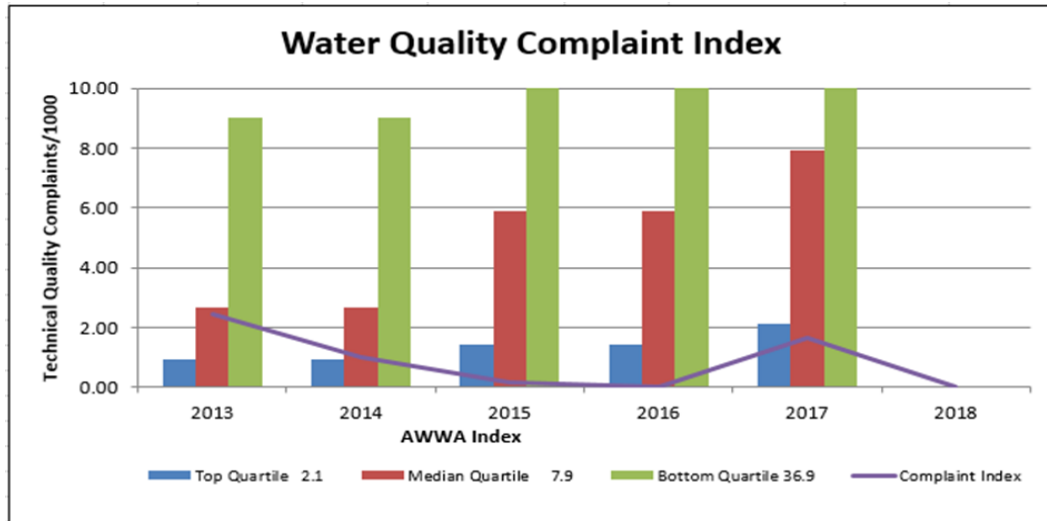


2018 % of Meter Sets that are Re-Inspected Residential & Non-Residential



Residential meter sets are down slightly in November compared to October; however, meter set re-inspections are up 5% in November compared to October. In 2018, on average, 46% of the meter sets require at least one re-inspection from the initial inspection.

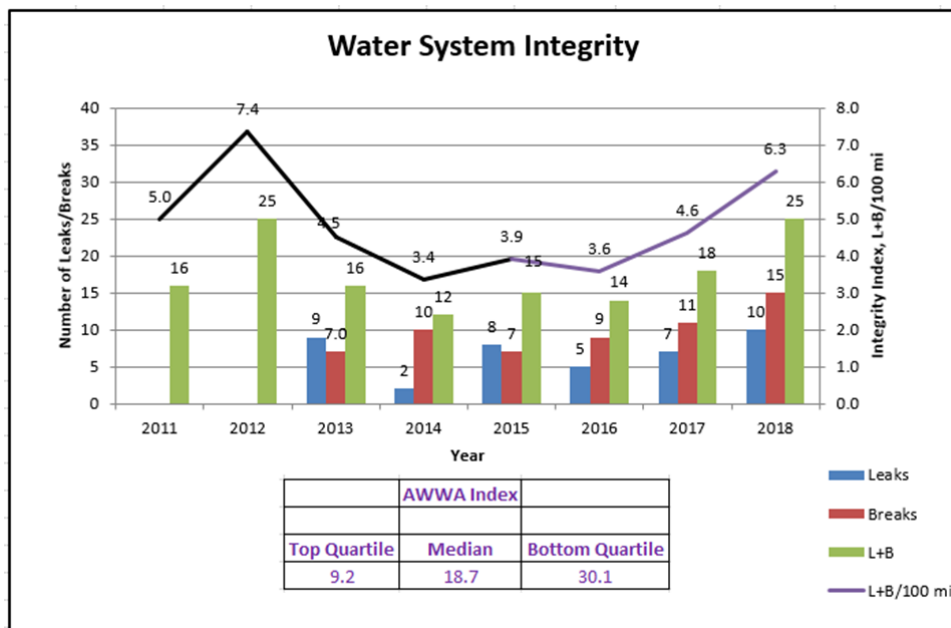
Water Quality Complaints



The Water Quality Complaint index shows that we are doing very well in this category; rating in the top quartile since 2015 according to the American Water Works Association (AWWA). There were no water quality issues in November.

For more information, view the current water quality report at CRgov.com/waterqualityreport.

Water System Integrity



As the Water System Integrity chart indicates we have consistently remained in the top quartile for water system integrity based on American Water Works Association (AWWA) benchmarking since 2011. There were five water system integrity issues in November.

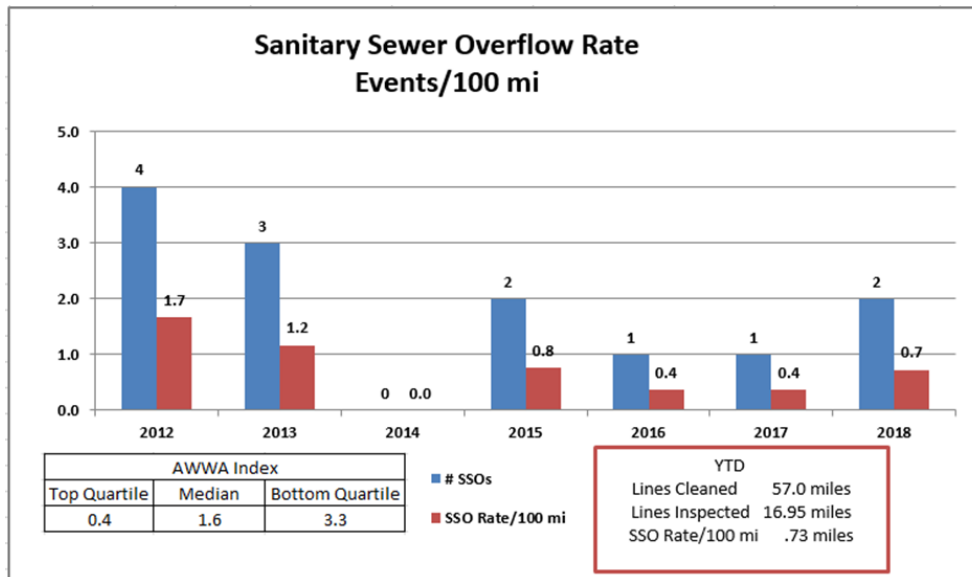
Sanitary Sewer Overflows

How do we avoid overflows?

We are tracking in the Median Quartile in the Sanitary Sewer Overflow Rate, according to the American Water Works Association (AWWA), showing two incidents for the year. There were no sanitary sewer issues in November.

Our team runs a camera through the sewer mains to look for problems. When problems are identified, they are cleared with a high pressure water jet. So far, we have cleaned and inspected 57 and 18 miles, respectively.

The goal this year is to clean and inspect approximately 33 percent of the collection system or about 90 miles.



NOVEMBER LEVELS OF SERVICE

Drinking Water Compliance

Castle Rock Water will deliver water that meets or exceeds both Primary Drinking Water Regulations and Secondary Maximum Contaminant Levels 100% of the time.

Ninety routine samples were completed. All samples were within the parameters set forth by the Safe Drinking Water Act and Colorado Drinking Water Standards. Our annual Consumer Confidence Report is available to view at CRgov.com/waterquality.

Pressure Adequacy

< 1% of our customers will experience less than 43 pounds per square inch (psi) of pressure at the meter during normal operations.

The downtown area had lower than normal water pressure for approximately four hours during multiple line breaks on Prairie Hawk Dr. and Park St.

Sewer System Effectiveness

<1% of our customers will experience a sewer backup caused by the utility's sewer system per year.

There were no sewer system issues in November.

Drinking Water Supply Outages

<5% of our customers will experience water outages for one or more events totaling more than 30 hours/year.

In November, this level of service was met.

- There were two line breaks on Prairie Hawk Dr. 12-inch PVC pipe.
- Street flooding occurred during the Wolfensberger Rd. 8-inch ductile iron pipe water main break. There was a large corrosion hole near the bell of the pipe.
- Castle Rock Water's pipeline contractor repaired the water main at the Plum Creek Diversion.
- The distribution team also repaired a service line leak in The Meadows.



Before you start a project, call 811. Whether you are planning to do it yourself, or hiring a professional, we will help you do it safely. The local 811 Call Center will contact Castle Rock Water. We will schedule a time to come out to locate public water and wastewater lines in the road and in your project area.

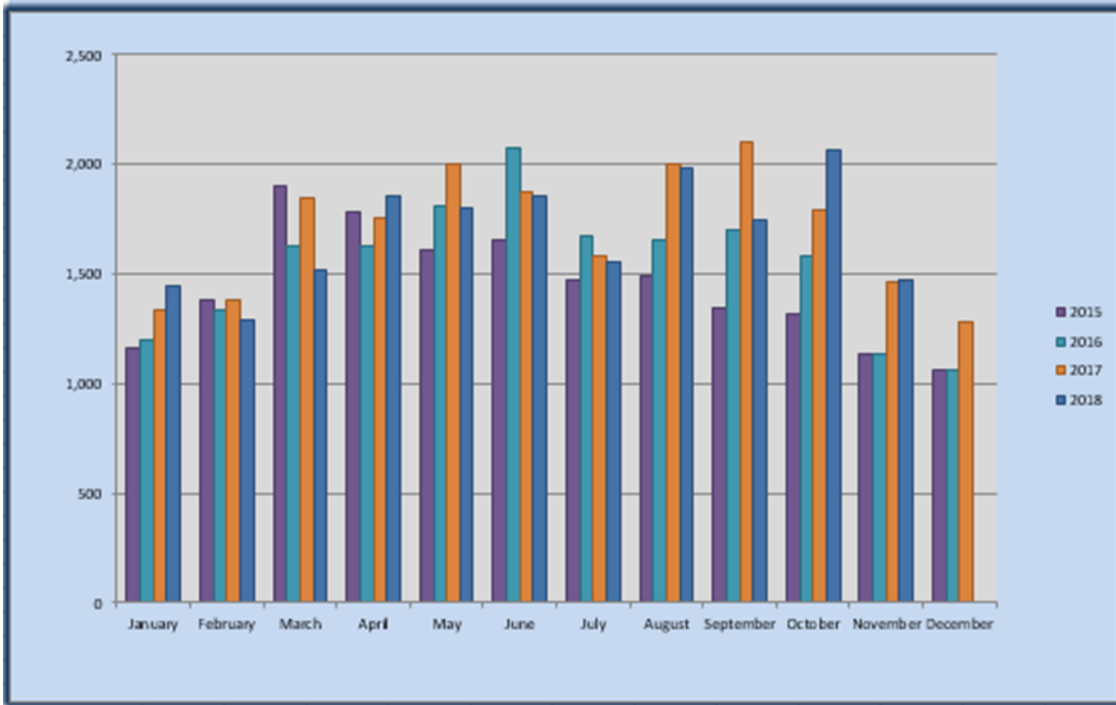
ANNUAL UTILITY LOCATES

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
January	577	475	617	1,190	1,289	1,162	1,199	1,334	1,442			
February	521	485	538	1,094	1,093	1,383	1,334	1,378	1,293			
March	660	552	818	1,437	1,349	1,906	1,625	1,851	1,514			
April	838	681	1,025	1,482	1,552	1,784	1,631	1,760	1,856			
May	853	863	985	1,541	1,531	1,609	1,809	2,002	1,801			
June	969	844	982	1,314	1,399	1,654	2,075	1,872	1,854			
July	680	582	859	1,350	1,392	1,477	1,675	1,582	1,556			
August	901	723	1,123	1,476	1,468	1,494	1,651	2,001	1,986			
September	880	723	1,029	1,240	1,373	1,343	1,701	2,102	1,747			
October	715	688	1,155	1,501	1,376	1,314	1,579	1,792	2,064			
November	536	518	1,041	1,072	866	1,134	1,131	1,460	1,469			
December	415	405	925	1,005	1,043	1,063	1,059	1,277				
Totals	8,545	7,539	11,097	15,702	15,731	17,323	18,469	20,411	18,582			



*Know what's below.
Call before you dig.*

4 Year Locate Trend



Castle Rock Water's locate requests from 811 have continued to rise, year over year. Our locating team has correctly marked all locate requests. To date, there has not been damage to lines as a result of incorrect locate marks.