

Greeley Water Conservation Report 2014

FOR MEASURES IMPLEMENTED IN 2012

EXECUTIVE SUMMARY

The purpose of this document is to inform and update the Greeley Water & Sewer Board what conservation measures have been implemented and the results of those actions. An effective water conservation program is multifaceted with different types of programs to appeal to a wide variety of customers and needs. Some conservation measures can be easily quantified to gauge actual water savings attained as a direct result of the program by comparing pre and post water consumption. Other programs call for a more qualitative approach. Measures relating to irrigation must be evaluated based on improvements in efficiency rather than just consumption. Water savings from other measures such as education are more difficult to calculate.

The results of this report show that the Greeley water conservation program has been successful in many areas and is well on its way to meeting its long term conservation goals. This report is for programs that were implemented in 2012. A full year of consumption data is required to make an accurate assessment of savings and/or efficiency. The update will feature programs and information that is more current, but the numerical results will reflect 2012 programs and use. In 2012¹, 191.13 acre-feet of water were conserved through water conservation measures at a cost of \$2,000 per acre-foot. This is well above the 144 acre-feet goal outlined in the 2009 Conservation Plan.

Appendix A provides a summary of water savings of the various conservation measures. Appendix B documents the anticipated water savings from the Water Conservation Plan. Appendix C shows an overall decline in gallons per capita per day (gpcd) since 1997.



¹ Although it is 2014, please note that in order to gather accurately data on savings, significant time must be allocated to allow measures to be implemented. For example, an irrigation audit conducted in 2012 will have the consumption from 2011 (pre-audit) compared to 2013 (post-audit).

BRIEF HISTORY OF THE PROGRAM

Water is an important part of Greeley's past, present, and future. In addition, Greeley has a long history of water conservation, from the first watering restrictions in 1907 to the recent Conservation Plan. Greeley is a leader in water conservation, and has a legacy of obtaining, managing and securing our precious water resources in a forward thinking manner. Greeley, in partnership with citizens should value the water we have by using it efficiently through a dynamic and diverse water conservation program. Greeley boasts one of the largest water conservation programs in the State of Colorado.

Greeley Water and Sewer Board adopted a Conservation Plan in 2008 that the State of Colorado approved in 2009. An updated water conservation plan is in the early stages of development and should be published in the fourth quarter of 2014. Part of the 2009 plan required that current conservation programs be continually and regularly evaluated as well as updating the plan every 5-7 years per state requirements. As a result of the ongoing conservation program, Greeley Water and Sewer anticipate more than eight percent reduction in water demand over the next 20 years when compared to projected future demand without conservation. For each measure, Greeley will evaluate and monitor the program's progress toward the water savings goal.

The Conservation Plan addresses demand-side measures and programs including:

- Water efficient fixtures and appliances
- Landscape efficiency
- Industrial and commercial efficiency
- Distribution system efficiency
- Public outreach and marketing

Several measures were already being implemented prior to the completion of the Conservation Plan in 2009. A part-time seasonal employee was converted to full time in 2006 to assist with communication and education of the water conservation program. Two full time employees were hired in 2007 to concentrate on commercial and irrigation programs. In addition, the budget was doubled to nearly \$500,000. These measures were evaluated and this report details the status of current water conservation projects.

2012 Weather and Production Summary

Snowpack levels were extremely low in 2012 reaching only 51% of average by the end of March and steadily decreasing to 0% by mid-May. Runoff was at a record low (<50% of average) causing extremely dry conditions which did not improve with above average summer temperatures. Total precipitation for the year was well below average at 8.6 inches. Total metered water use inside Greeley was 22,467 acre-feet, 112% of the 5-year average. Peak day demand of 50 mgd occurred on June 26. Residential gpcd was 130 gallons compared to 119 gallons in 2011 and a 5-year average of 118 gallons.



MEASURE 1:

LAWN WATERING RESTRICTIONS AND LAWN PLANTING ORDINANCE

Measure Description

Greeley introduced lawn watering restrictions in 1907² and imposed fines for violations. At that time restrictions were alternate day watering: even addresses watered on even numbered days and odd addresses watered on odd numbered days. No watering was allowed in the middle of the day.

Greeley ordinance establishes lawn watering restrictions for residents. During the drought of 2002-2004 Greeley formed a committee of landscape and irrigation professionals and developed horticulturally-sound watering restrictions. These restrictions were then taken to a larger statewide meeting. Greeley’s watering restrictions were subsequently adopted by most cities and water utilities on the Front Range. Since 2005, Greeley has had the following watering restrictions:

	Single family residences & duplexes with even numbered addresses ending in: 0,2,4,6,8	Single family residences & duplexes with odd numbered addresses ending in: 1,3,5,7,9	All others: home owner association common areas, multi-family residences, apartments, businesses, government, non-profit, churches, commercial, industries, and institutions.
January 1 - April 14	No Lawn Watering		
April 15 - December 31	Sunday, Tuesday, Thursday	Monday, Wednesday, Saturday	Sunday, Tuesday, Friday
<i>No Watering 12 p.m. to 5 p.m.</i>			

Table 1: Greeley watering restrictions that have been in effect are listed with modifications during droughts.

- Hand watering a lawn is allowed on any day. Greeley encourages customers not to hand water lawns between 10 a.m. and 6 p.m. Watering trees, shrubs, flower and vegetable gardens may done at any time by hand, drip irrigation, low volume bubblers or by weeping-type soaker hoses.³
- Occasional washing/hosing off of paved surfaces, vinyl siding, and roof gutters is allowed with minimal runoff.
- Home car washing is allowed with a restrictive nozzle hose and bucket, and minimal runoff.
- New lawn watering variances are available with proper soil amendment (four cubic yards per 1,000 square feet of lawn).

² Taken from Greeley Ordinance No. 172, Adopted December 10, 1907.

³ In June 2011, an ordinance change included allowing hose-end sprinkler to water trees, shrubs, or flowerbeds at any time. Ordinance §14.08.290 Sprinkling restriction; drought levels; penalty.

When landscaping a new home or planting seed or sod in an established yard, residents must get a variance to water during restricted periods to provide adequate water for establishing a new lawn. Ordinance also requires residents to prepare the soil with compost (organic matter) before receiving a variance. Under the 2002 ordinance, new lawns require proof of adequate compost. The requirements to get a lawn watering variance are as follows:

- Sod and compost receipts must be provided to verify installation.
- Four cubic yards of compost must be applied for every 1,000 square feet of sod or seed installed.
- The compost must be rototilled and the property owner must provide photos or tiller rental receipts as proof.
- Greeley employees must verify the new lawn and compost installation.
- The property owner must post a variance notice when the off-hour irrigation is occurring.



Watering Restrictions	2007	2008	2009	2010	2011	2012
Warnings	326	359	173	162	127	150
Variances	226	258	235	183	194	222

Table 2: Variances are primarily for new lawns, but may include: large property permits, one day variances for fertilizer or pre-emergent applications, or variances for hardship, religious reasons, or overseeding an existing lawn.



Why is this measure important?

This measure shows the long-term commitment that Greeley has shown to water conservation. Restricting lawn watering in the heat of the day saves water that would be lost to evaporation. Another purpose of watering restrictions is demand management to reduce peak use and defer water system upgrades. The requirement of using compost was added during the 2002 drought as a way of making sure that customers installed their lawns properly and added organic matter. Adding compost can reduce the amount of water needed to establish new lawns by as much as 30 percent.



Conclusion

Watering restrictions have been an effective method to manage peak day demand and discourage midday watering. Customers are accustomed to the watering restrictions and savings from lawn watering variances. This also creates a community conservation ethic and reminds residents that water is an important resource that should not be wasted.

**MEASURE 2:
WATER WASTE ORDINANCE**

Measure Description

An ordinance enacted in 2002 prohibits water waste of any kind in Greeley. Staff is empowered to enforce this ordinance and issue tickets with inclining fines for repeat violations.

Why is this measure important?

This measure was enacted during severe drought restrictions. Although a waste ordinance was on the books before 2002, it was never enforced because the term "waste" was too subjective. The ability to ticket waste is important because a customer could be following the watering restrictions and still waste water. Greeley wanted the customer to know that water running in the gutter is not allowed, even if the customer is in compliance with the watering schedule. When the customer is more aware of waste, they make more of an effort to improve water efficiency. The Plan estimates 10 acre-feet of savings per year for this measure.⁴



⁴ Per the 2008 Water Conservation Plan, program matrix seen in Appendix B

MEASURE 3:

TOILET, CLOTHES WASHER, AND IRRIGATION EFFICIENCY REBATES

Measure Description

Greeley has offered rebates for the purchase and installation of low-flow toilets, ultra-low flow toilets and high-efficiency front loading washers since mid-2006. In 2008, irrigation devices were added to the list of rebated products.

Previously, only ultra low flow toilets (ULFT) using 1.28 gallons per flush (gpf) were eligible for rebates in Greeley. The EPA WaterSense qualifying list (www.epa.gov/watersense) is used for approval of the ULFTs. The Stealth toilet using 0.8 gallons per flush made its way into big box stores marketed under the store brand and were also available in bulk purchases by Niagara Conservation. Greeley offered \$50.00 rebate for ULFT toilets and \$75.00 for the Stealth toilets.

A recycling program was also implemented to get the old toilets out of service and keep them out of the landfill. Staff worked with Greeley Streets Division to recycle them into aggregate for road base.

In 2012, Greeley continued to offer a rebate of \$100 for the purchase of a high-efficiency (HE) clothes washer. Only washers on the "qualifying list" are eligible for the rebate. The qualifying list is generated by the Consortium for Energy Efficiency (www.cee1.org) and lists both an energy factor and water factor for each qualifying washer. The water factor is based on how many gallons of water are needed to wash one cubic foot of laundry. The qualifying list is available on the Greeley's web site (www.greeleygov.com/rebates).

The following sprinkler and irrigation devices that were rebated were Evapotranspiration (ET) controllers, rain sensors, pressure reducing valves and contractor grade medium and large rotors. The Irrigation Association's (IA) qualifying controllers list (www.irrigation.org) was used to approve the ET clocks.



Greeley's rebate programs operate under the following rules:

- Rebates are subject to available funds.⁵
- For each year's rebate, products must be purchased between January 1 and December 31 of the year the customer requests the rebate. Applications must be submitted within 90 days of purchase and those purchased after October 15th of any year must be submitted before January 15th of the following year.
- The original sales receipt must be attached to the application and include the date of purchase, price, brand name, and model number.
- Products must be for use at an address that receives a Greeley water bill.
- The owner bears responsibility for installation.
- Greeley reserves the right to inspect and verify the purchase and installation location of any appliance or device for which a rebate is provided.
- The rebate is for a maximum of two toilets per customer and one washer per household.
- Sprinkler rebates are only offered to customers after an irrigation audit.

A list of the Program rebate efforts from 2006 to 2012 is shown in Tables 3 and 4. Products have been offered and or removed depending on the market availability, cost, and customer interest.

Residential Rebates	2006	2007	2008	2009	2010	2011	2012
1.28 gpf toilet	0	4	25	135	215	254	391
1.6 gpf toilet	224	142	223	96	0	0	0
Dual-flush toilet	0	2	1	17	24	26	61
HE clothes washer	458	456	451	458	406	372	304
Pressure Reducing Valve	0	0	0	0	0	4	6
ET controller	0	0	17	10	5	7	8
Rain Sensors	0	0	5	1	0	0	2
Large Rotors	0	0	62	79	0	57	0
Medium Rotors	0	0	63	130	0	60	133
Dollars spent	\$57,000	\$54,150	\$60,045	\$69,338	\$68,150	\$59,671	\$63,796

Table 3: Shows the number of rebates for each product and the dollars spent on the rebate. Amounts are rounded to the nearest dollar.

⁵ The budget for 2012 was \$85,000 per year for both commercial and residential customers. The actual total for 2012 was \$138,379 which was considerably more than was budgeted. Additional funds came from other Water Conservation accounts.

Beginning in 2008, Greeley’s rebate program expanded to include commercial properties and irrigation products such as rain sensors, irrigation heads, and ET controllers. Rebates were also available for toilets and urinals, air cooled ice machines, conductivity controllers (for cooling towers) and high-efficiency washers.

In 2012, the Pines at Southmoor, a large apartment complex by the Greeley Mall, retrofitted 394 toilets with the Niagara Stealth toilet which only uses 0.8 gpf. This project was implemented in May 2012 and by December the complex had saved nearly six million gallons of water (18.4 AF) resulting in an annual savings of 34 AF. The owner’s retrofitted another smaller complex in 2013 with this same toilet.



Commercial Rebates	2008	2009	2010	2011	2012
Air cooled ice machine	4	1	1	0	0
Commercial clothes washer	4	2	4	26	9
Toilet or Urinal (1.6)	162	37	0	0	0
ULF Toilet (1.28)	0	6	15	450	11
Stealth (.8)	0	0	0	0	394
ET Controller	3	3	0	17	43
Irrigation Controller	4	0	0	0	4
Large Rotors	68	116	0	0	0
Rotator Nozzles	0	0	0	2032	1900
Wireless Rain Sensor	3	14	0	0	0
Pressure Reducing Valve	0	0	0	0	22
Cooling Tower conductivity controller	12	0	0	0	0
Dollars spent	\$31,367	\$12,170	\$2,050	\$70,058	\$55,383

Table 4: Number of rebates for the commercial sector and dollars spent.

Why is this measure important?

Indoor water use in Colorado presents a significant ongoing opportunity for water savings. High efficiency fixtures and appliances result in long-term demand reductions. Replacement and incentive programs speed the adoption of high efficiency devices.⁶ The rebate program provides the customer a favorable connection to the Water Department and the Program. Retrofit and upgrades on the irrigation system are the greatest opportunity for savings because of the volume of water being applied to lawns. A large portion of water can be saved by installing ET clocks and sensors which can make seasonal adjustments for the customer.

Conclusion

There is an overall savings for devices installed; however, in some cases water consumption has increased. For single family residential accounts, possible causes for this may be that the house has been sold and washer moved out, or the occupancy level has changed. Commercial accounts consumption correlates with business patterns which are difficult to measure since businesses are unique. For example, a restaurant may have installed a water saving air-cooled ice machine, but because their business has served more customers, consumption may still have increased.

MEASURE 4: WATER EFFICIENCY AUDITS AND REBATES

Measure Description

Irrigation Audits

Free irrigation efficiency audits are offered to customers interested in learning about ways to improve the efficiency and operation of their irrigation systems. Customers can call, sign up online or fill out forms sent to them in their bill to request an audit to evaluate sprinkler systems.

The irrigation audit program has been gradually modified each year since 2001 to meet the changing needs of customers applying lessons learned from previous seasons. More emphasis has been made toward auditing large commercial properties, HOAs and campus type office spaces. Because of the large acreages, there is more potential for water savings.

	Number of Audits Performed	Water Saved (AF)	Cost per AF (\$)
2012 Residential	155	12.02	\$3,400
2012 Commercial	67	18.65	\$2,200

Table 5: Summary of irrigation audits. Please note that significant saving in acre-feet of water can be realized with only a small increase in efficiency.

One lesson learned has been with customers installing ET controllers. If they just replace the clock and don't adjust the schedule or fix problems, the ET controller will not save water. As a result,

⁶ Colorado WaterWise and CWCB. 2010. Guidebook of Best Practices for Municipal Water Conservation in Colorado. Aquacraft, Inc., Boulder, Colorado.

their water consumption potentially could go up and often did. The rebate is now contingent upon users getting an audit and following the recommendations.

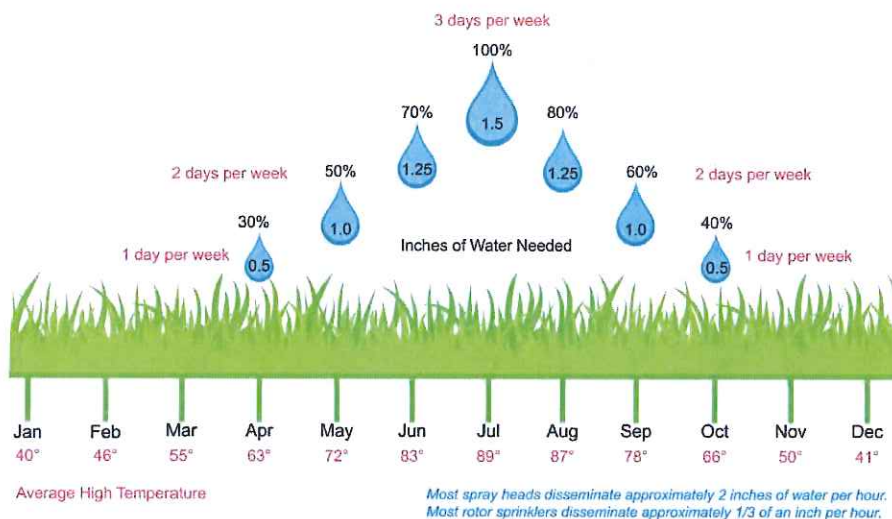
Staff has developed working relationships with Homeowner Association Boards, property managers, and contractors to build trust. Over time many have realized that this is a business opportunity for the contractor and a way to upgrade the system for the HOA Board.

In 2012, contractors started contacting staff for advice and appointments on their properties. Staff met with and guided HOA board members and contractors during irrigation upgrades at the Village at Foxhill, the Devon at Foxhill, College Green Corner, Villa Serena, and Owl Ridge per audit recommendations. Commercial outdoor rebates increased significantly in 2012 due to these new relationships. It is important to note that a follow up audit is needed after new products have been installed to make sure the schedule is the right one. Retrofitting should shave time off the schedule.



Why is this measure important?

Historically, 55 percent of the water used by customers goes to watering lawns. Some customers watering with automatic irrigation systems overwater. By targeting the large water users, the potential for increasing water efficiency is greater.



The top areas for savings on sprinkler systems are:

- The best system in the world will decrease in efficiency after a couple of seasons without regular maintenance
- Correct pressure for the system
- Adjusting the watering schedule based on precipitation rate, distribution uniformity and weather

Figure 2: This graphic was created to help customers with watering to the need of their lawn rather than a schedule. It is a sticker that can be placed directly onto the sprinkler clock.

Data Sources

Pre and post consumption data were collected and compared to the annual irrigation water requirement (IWR) to determine whether the properties audited became more efficient.

Conclusion

Irrigation audits are an effective tool to reduce water usage and more importantly increase efficiency in lawn watering. The greater potential for savings is in the commercial sector simply because the volume of water is greater. Irrigation audits along with ET controllers, proper maintenance, scheduling, correct pressure and rain sensors will increase efficiencies even more. The challenge is getting property owners to implement recommendations, take advantage of rebates and then maintain the systems in subsequent years.

The value of irrigation audits with residential customers is having the one on one time with the customer to explain the steps of the audit, why each step is important, and also to help them understand their controller better. Many customers do not realize their clocks have functions that are not being utilized. The audit not only serves as an educational tool, but also improves public perception about the Water Department and conservation in general.

A television commercial (<http://greeleygov.com/Water/audit.aspx>) was developed for GTV and YouTube to help the customer better understand what an audit is and what they can expect.

Commercial Rebates

Commercial, industrial and institutional (CII) customers account for 37 percent of the total water consumption in Greeley. The irrigation auditor and commercial auditor work in tandem whenever possible to audit both the indoor and outdoor commercial property uses at the same time. Suggestions are made and rebates are offered for plumbing fixtures and appliances when applicable.

One sector of customers who are benefitting from the rebates is landlords. More landlords and property managers are retrofitting toilets and washing machines as properties are vacated and rented, or as they acquire new properties. The majority of commercial rebates go to these customers.

Commercial Rebates 2012	Number of Accounts	Dollars spent	Total Savings AF	Cost per AF
Outdoor	10	\$22,566	6.93	\$3,300
Indoor	33	\$32,600	32.10	\$1,100

Table 7: Commercial rebates issued in 2012. Indoor rebates consisted mostly of toilets but also included HE washers. The 32 AF for indoor rebates was for 394 toilets that were replaced at the Pines at Southmoor, an apartment complex south of the Greeley Mall.

MEASURE 5: PUBLIC INFORMATION AND EDUCATION

Measure Description

Public information and education is an essential element of a vibrant and well-rounded utility-based water conservation program. The program continues to provide proactive public information and marketing for all water conservation programs. Every program has a significant portion of time and resources dedicated to education and information. Each year a Water and Sewer Communications plan is developed to help focus, monitor and evaluate the department's outreach efforts. Conservation information and initiatives are an important part of Greeley Water and Sewer's overall public messaging.

A mix of media is important to any public outreach campaign. Different people rely on different information sources to get information.

In 2012, Greeley won the 1st annual Mayor's Water Conservation Challenge. This was a nationwide contest to see which cities could have the most people pledge to be water efficient and protect water quality. This placement as a winning city is due in large part to our public information and marketing programs.

Face to Face Marketing

Communication research studies have shown that personal contact is often more persuasive in changing behaviors than advertising. Greeley is steadfast in the belief that personal contact is the most effective element of its education program. Staff strives to be visible in the community, meet with as many citizens as possible, and spend one-on-one time with customers explaining compost requirements for installation of a new lawn, covering the water saving potential of a sprinkler system audit and tune-up, and answering questions when customers complete paperwork for a rebate. These are valuable and positive education opportunities that often lead customers to participate in additional programs.

Public Events

Educational opportunities are provided to teach children and adults appreciation of water, practical water conservation techniques and facilitate a community conservation ethic. Greeley sponsors and participates in a broad array of events and educational activities to foster face-to-face interaction. Greeley participates in fairs, events sponsored by other organizations, and children's water festivals. These events offer ready-made outreach opportunities to a receptive audience. Added to those educational efforts are neighborhood meetings, speaking engagements, discussions with local civic groups, and classroom visits.

Greeley continues to co-sponsor the Children's Water Festival which hosts more than 1,000 children and 200 adults at Island Grove Regional Park in a full day of hands-on activities. The Festival is held during the last week of April. Each year Council and Water Board are invited to tour the festival and have lunch with the committee.



Community Relations

Staff members also are involved with professional organizations, such as Rocky Mountain Section American Water Works Association Conservation Committee, Colorado State University Cooperative Extension Master Gardeners, American Water Resources Association, Colorado WaterWise, EPA WaterSense Promotional Partner, Alliance for Water Efficiency, Green Plumbers, Irrigation Association, Greeley Garden Tour, and the Association of Landscape Contractors of Colorado (ALCC)

The Caring for Our Watersheds project is sponsored by the Poudre Learning Center and Agrium. Staff supports the project by judging projects and mentoring students through implementation. In this project, high school students must answer the question: "What can I do to improve my watershed?" They must research and develop a project that is implementable and solves a watershed issue.



Xeriscape Demonstration Garden

Xeriscape Demonstration Garden at 23rd Avenue Reservoir is a public example of low water use landscaping.

In 2013, the Program hired a new seasonal to help with Xeric maintenance and education. Water Conservation began a new Xeric volunteer program at the garden, and re-landscaped the hill in front of the Oasis Art project. A new informational kiosk was installed. Greeley's Xeric Garden was featured on the Garden Tour in June and over 200 people visited it.

Media Relations

Information is sent to the media in the form of news releases. Twenty news releases are sent out each year in an effort to get positive news coverage and also answer media inquiries about water conservation projects.

Paid Advertising

The Program has an advertising budget of \$15,000. Larger projects are promoted through paid advertising in print, radio and online. With the increased costs of advertising, this budget is used thoughtfully and strategically to target those who may be interested in water conservation programs in Greeley.

Promotional Items

Items are purchased to promote water conservation. These items are designed to keep water conservation in mind and are distributed at community events and in our office. This includes pens, water bottles, and stickers with lawn watering suggestions, refrigerator magnets and more. In 2013, the program printed coffee sleeves for use at local coffee shops with water conservation tips and coasters to be used at restaurants. Magnets are also purchased for Greeley vehicles promoting irrigation audits. These items are frequently requested by other departments to put in goodie bags at their events.



Direct Mail

Approximately six times per year, water conservation information is inserted into customer's water bills. In 2014, the program aims to insert messages into the bills every month of the year. Many of these flyers have forms that residents send back to sign up for conservation programs including irrigation audits. These efforts have provided good results. Separate mailings are also targeted to groups to promote particular programs to a receptive audience and to those who are over their water budgets.

Web and Social Media

Digital communications is a relatively inexpensive and effective way to send messages to the public. The Water Conservation website is updated frequently to promote programs. Information is also posted on the Greeley's home page to promote conservation. In addition, a water conservation e-newsletter is published each month and a water topic is included in every issue of the Greeley's *City Scoop* e-newsletter.

Residents can get water conservation information on Facebook. Currently, over 2,100 people "like" Water Conservation's Facebook page. On average three messages per week are sent about conservation. Twitter is used to interact with the public and the larger water and environmental community. Currently the Twitter account has over 1,800 followers. Water videos are also posted to YouTube. You can view the large selection of videos on Greeley's YouTube channel.

YouTube Videos

As part of a Front Range collaborative project, the Program acquired ten videos on various water conservation topics. The collection of videos went online in the spring of 2013. Three of the videos address indoor topics: fixing leaks, replacing toilets and how to do a WaterSense mini-makeover. The remaining seven videos focus on outdoor watering: plant selection and placement, water run times, catch cups, the ET rate, new irrigation technologies, monthly sprinkler tune ups, and car washing. These videos are promoted on the Greeley's website, through social media, e-newsletters and Greeley's YouTube page. Watch the entire playlist at <http://ow.ly/yHYMV>

Why is this measure important?

Public information, education and effective communication are the cornerstones of any conservation program. All measures need to have an element of education. Accurate information is essential to obtain customer buy-in, participation, and compliance of all other conservation initiatives. Savings from education are estimated at 23 acre-feet per year.⁷

MEASURE 6:

WATER EFFICIENCY PRODUCT DISTRIBUTION AND RETROFITS

Measure Description

Water Conservation Kits

The Program has distributed water conservation kits to residential customers for over 10 years. Greeley distributes approximately 350 conservation kits to homeowners per year. A bulk purchase is made every few years and the kits are distributed to Greeley water customers and event attendees for free. These kits include:

⁷ Per the 2008 Conservation Plan, conservation program matrix seen in Appendix B

- Dye tablets to check toilets for leaks
- Kitchen aerator
- Bathroom aerator
- Teflon tape to assist with installation
- Showerhead

Showerhead Exchange

In lieu of the kits, the 2013 Program began offering a showerhead exchange program for residents. This program was a popular method of getting new WaterSense labeled fixtures in the hands

of residents. The exchange is more effective than the kits since we know that people have to install the new showerheads because they turned in their old ones. At these events, faucet aerators, shower timers and other water conservation products are distributed. Several landlords/property managers have come to the office to exchange showerheads for their properties that they own in our service area. The savings so far this year has been .2 AF. This has been a good customer service and people are impressed with choice in showerheads. These are very preliminary results and will be reported on in the 2013 report.



Year	Showerheads Exchanged	Aerators Kitchen & Bath
2013	266	270
2014	239	217
Total	505	487

Table 8: Number of showerheads given to customers at several events in 2013-14.

Garden-In-A-Box Program

In 2012, Greeley began a partnership with the Boulder based non-profit Center for ReSource Conservation (CRC) and the Garden-In-A-Box (GIAB) program. For many years, the CRC has partnered with professional landscape designers to create easy to plant xeric gardens that will flourish in Colorado. The GIAB kits include everything that residents need to plant a water saving garden that provides beautiful perennial plants that are attractive from spring to fall. GIAB covers a 70-100 square foot area with professional “plant-by-number” designs, a selection of 15-29 ready to plant perennials in 4” pots, and planting and care instructions. This program helps residents reduce turf areas with Xeriscape in a simple and cost effective way. In 2012, 31 gardens were sold. GAIB program has increased steadily each year; many customers have come back each year to convert more of their yard to Xeric plantings.



Retrofits of Greeley Facilities

Greeley also actively retrofits municipal facilities and parks. In 2012, the conservation program paid for 24 1.28 gpf flush valve toilets and 10 urinals to retrofit the UCCC facility. The toilets were installed in 2013 by facilities staff.

Why is this measure important?

These programs are both good public relations and provide water savings. This also provides Greeley an opportunity to educate the customer on conservation issues.

MEASURE 7:

PARK & GOLF COURSE LANDSCAPE WATER BUDGETS

Measure Description

The plan also features efforts to improve irrigation efficiency. In 2001, the conservation program spent \$500,000 to purchase a central irrigation control system for the Greeley Parks department. A central irrigation control system computes the efficient water application rate for each park individually and greatly assists with irrigation management.



The Water Department installed water meters on all parks and golf courses. Furthermore, water budgets based on evapotranspiration demands have been developed for all of these properties and the meters are read weekly during the irrigation season. The consumption data is put into a database and provided to the park managers every week showing their park’s consumption in relation to the water budget. The park managers are not billed for their water use but find the regular feedback on their water budget helpful in maximizing the efficiency of their irrigation system and recreation demands.

Year	% IWR
2006	98%
2007	107%
2008	111%
2009	105%
2010	84%
2011	92%
2012	74%
Average	105%

Table 9: Parks percentage of Irrigation Water Requirement. 2012 showed a significant decrease in water use. Early in the year when it appeared to be a lower than average water year, the Parks Department was asked to prioritize parks according to use. Athletic fields, golf courses and high use parks were given priority and other parks waited to water until later in the season.

Why is this measure important?

Greeley has significant acreage in irrigated park area and assuring water is used efficiently saves Greeley water. It is also important that Greeley lead by example. Many of the parks because of their schedules and acreages cannot water within the watering restrictions. It was important to show the citizens that parks were watering what the lawn needed and not wasting. Once this was explained to the citizens, they felt like this was a good approach.

MEASURE 8: WATER LOSS CONTROL

Measure Description

Greeley has a regular leak detection and repair regime that is followed to maintain a tight distribution system. In 2012, Greeley crews repaired 35 leaks Greeley's system losses have averaged less than five percent since 2000. Many utilities consider 10 percent system losses to be acceptable so Greeley is operating a particularly tight system.

Greeley also had an active Cement Mortar Lining (CML) program where older parts of the treated water system are rehabilitated to increase longevity and reduce unaccounted for water. In 2012, Greeley completed the CML project.

Leak Detection

Leaks are an inevitable part of the water distribution system. Because of Greeley's proactive stance on seeking and repairing leaks, Greeley has as little as seven leaks per mile.

Leak detection is done on an on-going basis. The goal is to survey a portion of the pipelines every year with a priority placed on areas that have been prone to leaks. Crews use a Metrotech Correlator and Leak Logger with a LD12 Listening Device connected to the water main from a fire hydrant, valve or meter to identify leaks in the main. Any suspected leak sounds will be evaluated to authenticate the existence of a leak to be repaired.

Greeley Leak History Summary

YEAR	SYSTEM			ANNUAL	ANNUAL	LEAK
	MILES OF PIPE	ANNUAL # LEAKS	LEAKS/100 MILES PIPE	MILES INCREASE	PERCENT INCREASE	DETECTION MILES
2012	618.82	35	9.3	2.32	.95	35.3
2011	616.5	53	8.6	5.8	0.95	52
2010	610.7	55	9	1.8	0.3	60
2009	608.9	42	6.9	-1.8	-0.29	76.3
2008	610.7	51	8.4	0	0	51
2007	610.9	77	12.6	6.39	1.06	36.6
2006	604.51	68	11.2	8.51	1.43	29
2005	596	68	11.4	12.4	2.12	23.5
2004	583.6	46	7.9	9.6	1.67	18
2003	574	54	9.4	11.7	2.08	31
2002	562.3	65	11.5	20.34	3.75	12
2001	541.96	47	8.6	15.21	2.89	20
2000	526.75	51	9.7	11.57	2.25	37
1999	515.18	54	10.5	12.96	2.58	61
1998	502.22	51	10.2	18.68	3.86	104
1997	483.54	34	7	5.84	1.22	32

Table 10: shows the miles of pipe Greeley maintains and the number of leaks since 1997. Greeley began its active leak detection program in 1997 and on average actively searched for leaks on 35 miles or six percent of Greeley total pipeline infrastructure each year. The leak detection equipment also proves valuable information when a leak surfaces (often not immediately above the leak) as crews can pinpoint where the leak actually is so that crews don't unnecessarily tear up street.

Cement Mortar Lining (CML) Project

75 miles of Greeley's pipelines were installed before 1950 and had no lining for protection against corrosion and deterioration. When these pipes age, the rust on the inside causes restricted flow problems, rusty water, and make the pipes more susceptible to leaks. The technology exists to take these pre-1950 pipes out of service while maintaining water service to customers. The CML process scrapes the pipes on the inside and lines them with cement mortar to prevent future buildup of rust. The CML process can be done at half the cost of replacing the old pipe with very little inconvenience to customers.

The Water Department began pipe cleaning and CML in 1991 to improve water flow, water quality, and to minimize leaks. At the same time, all lead service lines were replaced with new copper fittings further reducing leak potential.

Greeley CML Projects

Year	Footage	Pipe Size	Cost
1991	23,822	20"	\$364,908
1992	35,400	20"	\$413,843
1993	43,700	20"	\$448,820
1993	3,309	6-8"	\$59,377
1994	44,820	20"	\$416,880
1995	3,800	6-8"	\$94,438
1996	13,587	4-16"	\$355,413
1998	5,180	4-6"	\$220,915
1999	22,750	4-20"	\$559,884
2001	18,888	4-27"	\$552,766
2002	57,476	4-20"	\$1,207,736
2004	39,830	4-20"	\$1,137,876
2006	26,688	4-20"	\$955,324
2008	32,400	4-12"	\$1,023,798
2012	30,154	4-20"	\$1,008,085
Total	401,805		\$8,820,063
Average	26,787		\$588,004

Table 11: History of the cement mortar lining project costs and feet of rehabilitated pipeline since 1991. Data in charts is provided by the Operations Manager and Distribution Division. No CML project was done in 2009, 2010 or 2011. The final CML project was completed in 2012.

Why is this measure important?

By cleaning and lining the pipes, the pipes are less likely to burst wasting water and putting customers out of service. A tight and well maintained water system is cost-effective because lost water cannot be used by Greeley or sold to customers.

Conclusion

Both the leak detection and CML projects are considered by the Water Department as sound operational practices. The water conservation aspect is a bonus end product of the projects.



MEASURE 9: INFORMATIONAL WATER BUDGET

Measure Description

A Water Budget is intended to get customers who far exceed their actual need to reduce water consumption. The Water Budget provides individual households with a monthly estimate of projected water requirements based on individual lot size and assumed persons per household. The Water Budget Study is a four-year process to evaluate the effectiveness of empowering customers with information to improve their water efficiency.

In 2010, plans were made to implement a water budget program over the next few years. The first year of the program was completed in 2011. An informational Water Budget pilot project was conducted with approximately 250 volunteers. Most of the participants who completed the survey (94.6 percent) found the Water Budget to be helpful and increased the understanding of household water needs. A large percentage (75.5 percent) of the respondents felt like they would like additional information on how much water the lawn needs. The survey found that customers do not spend a lot of time looking at their water bill, but during the Water Budget pilot study that time increased potentially making people more aware of their personal water use.

The water budget program was expanded in 2012 to include a random sample of up to 1,000 residential customers in addition to existing volunteers. The water budget was modified to forecast the customer's water demand, based on historic averages, instead of calculating the previous month's water needs based on actual temperatures and rainfall as was done in 2011. The modified plan allowed customers to be aware of the water budget prior to use. Overall, 18 percent of customers in the pilot group were over by an average of 36 percent. Extensive outreach was made to this pilot group including a letter at the beginning of the growing season explaining how their budget was calculated and water budget graphs were placed on their bill each month. Several postcards were also sent throughout the season reminding them to compare their use to the bill.

A survey was sent at the end of the season and 129 responses including 62 comments were received. Here is a summary:

- 25 positive comments about the project.
- 15 suggestions on how to better the program.
- 8 comments suggested the need for more outreach.
- 6 were negative comments.
- 4 comments about the need for the city to crack down on excessive water users.

Some of the lessons learned were that the budgets were too generous with 4 people per household and giving 100 percent credit for pervious area of the lots. There was no statistical difference between the pilot group and the control group. Public response to outreach takes time. Overall, the customers find this valuable information and want to continue receiving it.

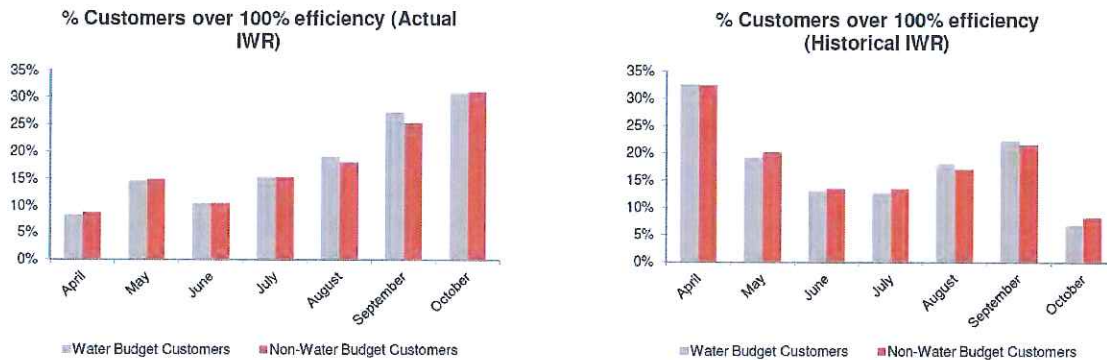


Figure 2: Graphs from the 2012 Board presentation show little difference in water use between water budget customers and non-water budget customers.

Why is this measure important?

The goal of this program is to show customers how much water they are using and how much they should be using to sustain households and landscapes. This is not just about using less water; this is about using water in the best and most efficient manner. It can alert customers when they are not being efficient and more clearly link the cost of water to the amount of water used. Greeley can also use the data generated from the water budget to help target communication to those whom are most in need of water conservation services.

Conclusion

A water budget can be a tool for homeowners to evaluate their household water use. It can be an effective tool when customers take the time to look closely at their use. Most people just pay the bill and don't look closely at usage; a water budget rate structure may make more people aware of their monthly use.

APPENDIX A: 2012 ACTUAL BUDGET AND SAVINGS SUMMARY

Metered Conservation Measures	Measure	Number of Accounts	Dollars Spent	Total Savings (AF)	Cost per AF
Commercial Indoor Rebates	4	33	\$ 32,600	32.18	\$ 1,100
Commercial Outdoor Rebates	4	10	\$ 22,566	6.93	\$ 3,300
Residential Outdoor Rebates	3	15	\$ 17,026	1.76	\$ 9,700
Commercial Outdoor Audits	4	67	\$ 40,000	18.65	\$ 2,200
Residential Outdoor Audits	4	155	\$ 40,000	12.02	\$ 3,400
Front Loading Washers	3	283	\$ 32,900	4.00	\$ 8,300
Commercial Indoor Audits	4	2	\$ 10,000	0.00	-
Residential Indoor Audits	4	55	\$ 10,000	1.80	\$ 5,600
Multiple Rebates	-	62	\$ 9,893	6.71	\$ 1,500
Dual Flush Toilet	3	36	\$ 4,250	0.53	\$ 8,100
Ultra Low Flow Toilet	3	243	\$ 27,119	6.45	\$ 4,300
Total Savings and Cost from Metered Measures			\$ 246,354	91.03	\$ 2,800
Other Conservation Measures					
Soil Amendment Ordinance	1	200	\$ 10,000	16.30	\$ 700
Water Waste Ordinance	2	ALL	\$ 10,000	10.00	\$ 1,000
Conservation Education Program	5	ALL	\$ 100,000	23.00	\$ 4,400
Conservation Kit Distribution	6	450	\$ 10,000	2.80	\$ 3,600
Water Loss Control	8	1		25.00	
Natural Replacement	See Appendix B	1090		23.00	
Total Estimated Savings from Other Measures in 2012			\$ 130,000	100.1	\$ 1,300
Total Savings in 2012			\$ 376,354	191.13	\$ 2,000

The numbers in Appendix A may not match other rebate tables because they report the number of devices while the Appendix reflects the number of accounts. For example, several toilets may be installed at one account: 20 accounts -50 toilets.

APPENDIX B: CONSERVATION MEASURES AND PROJECTED SAVINGS

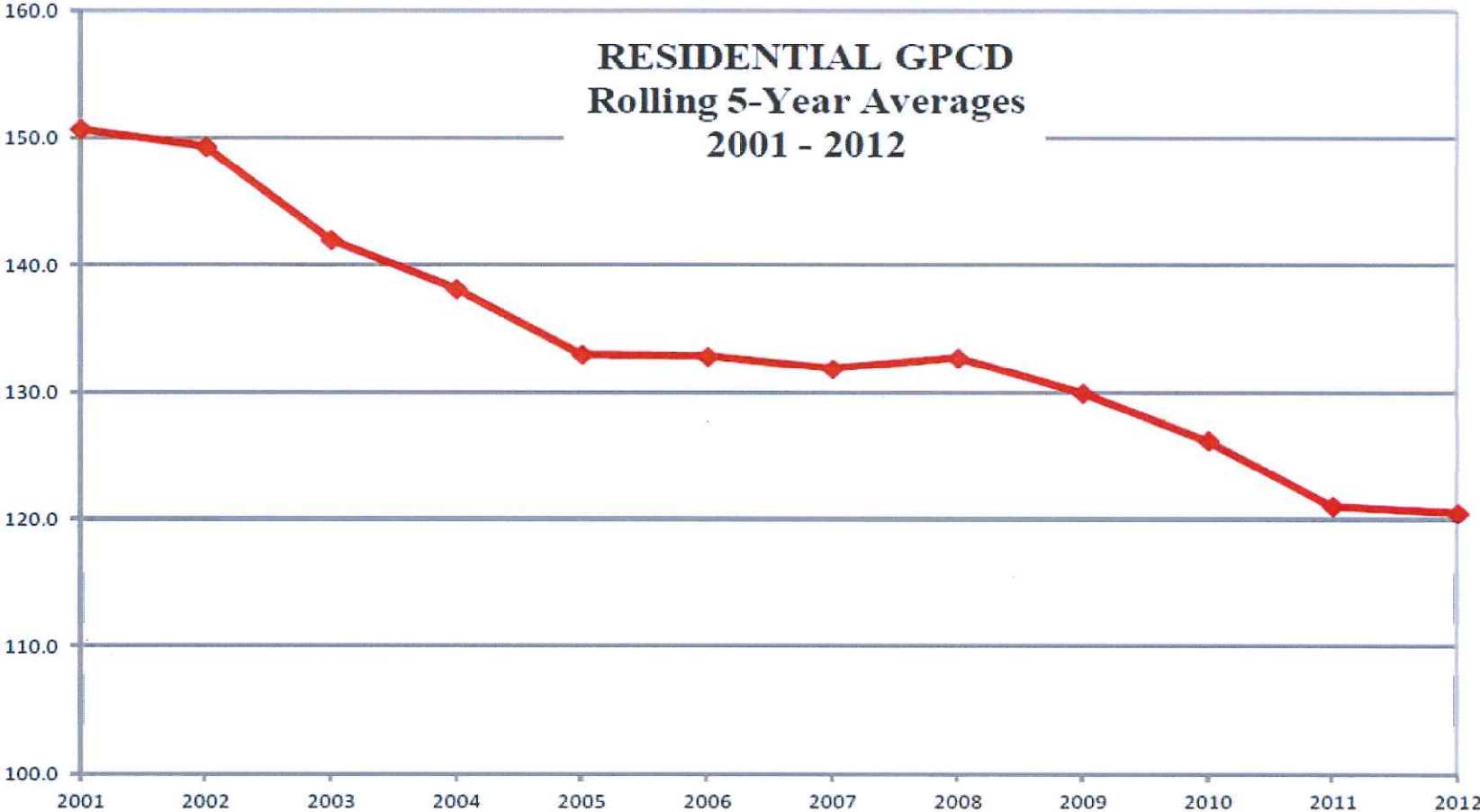
Current Program/Measures	# of Customers Impacted Per Year	Estimated Savings Per Account (kgal/year)	Estimated Total Savings Per Year (AF)	Comments	Citation
Mandatory watering restrictions (3 days per week)	All	0		Existing program for 100 years. Unprecedented. Key benefits include: reduced peak demand, more regularized demand patterns, useful education tool, keeps water use and efficiency in public eye.	
Soil amendment ordinance	200	16.3	10	Estimate based on discussions with Ruth Quade.	"30% less water is needed" - A1
Water waste ordinance	All		10		
ULF toilet rebate (\$50)	161	9	4.4	Based on average savings level determined at 95 % confidence level	<i>Residential End Uses of Water - AWWA, 1999; EPA Residential Retrofit Study - Aquacraft, 2004; Handbook of Water Use and Conservation, A. Vickers 2001.</i>
HET toilet rebate (\$100)	4	10	0.1	Based on average savings level determined at 95 % confidence level. Note: As more HET models become locally available, the numbers will increase.	
Clothes washer rebate (\$100)	456	5.5	7.7	Based on average savings level determined at 95 % confidence level and current clothes washer water use data	<i>EPA Residential Retrofit Study - Aquacraft, 2004; Handbook of Water Use and Conservation, A. Vickers 2001; Consortium for Energy Efficiency</i>
Indoor commercial efficiency audits	225	29.1	20.1	Calculation based on data from Ruth Quade (if they take advantage of retrofits)	
Conservation education program (indoor/outdoor)	Many/all	0.5	23.0	Estimate based historic demand patterns and education program implementation timeline. Assumes 50 % of customers save 500 gallons per year through educational efforts.	<i>"As We See It -- Education on Water Use Is Essential as Population, Demand Soar", Fender, Douglas H. Journal AWWA, Vol. 95 Iss. 2, February 2003; Handbook of Water Use and Conservation, A. Vickers 2001.</i>
Conservation kit distribution	450	2	2.8	Assumes not all kits are installed and only limited savings achieved.	<i>Handbook of Water Use and Conservation, A. Vickers 2001.</i>
Irrigation audits	300	20	18.4	Engineering estimate	

Water loss control	1	N/A	25	Based on a measured 1 % reduction in system loss between 97-01 and 02-07 (-6% vs. -5%) amounting to a 0.1% reduction per year. Reductions will likely taper off at the -3% to -4% level, but the program effort is probably worthwhile to maintain such a low level of system losses.	Greeley water use data
Estimated Annual Savings From Current Programs/Measures			121.5	Does not include significant peak usage reductions resulting from watering restrictions that could be reducing coincident peak day demand by 30 - 40%.	
Natural Replacement					
Residential toilet retrofit (1% per year)	140	9	3.9	Assumes 1% of residential customers per year replace toilets. Some apply for the available rebate and some do not.	<i>Residential End Uses of Water - AWWA, 1999; EPA Residential Retrofit Study - Aquacraft, 2004; Handbook of Water Use and Conservation, A. Vickers 2001.</i>
Residential CW replacement (3% per year)	450	5.5	7.6	Assumes 3% of residential customers per year replace their washer. Some apply for the available rebate and some do not.	
CII toilet replacement (1% per year)	250	10	7.7	Assumes 1% of CII customers will replace toilets each year. Water savings estimate is on the low side of scale. Savings are dependent upon usage frequency of the old and new fixture.	<i>Commercial and Institutional End Uses of Water - AWWA, 2000; A Practical Approach to Water Conservation for Commercial and Industrial Facilities, Mohan Seneviratne, 2007; Handbook of Water Use and Conservation, A. Vickers 2001.</i>
CII faucet replacement (1% per year)	250	5	3.8	Assumes 1% of CII customers will replace faucet aerators each year. Water savings estimate is on the low side of scale. Savings are dependent upon usage frequency of the old and new fixture.	
Estimated Annual Savings From Natural Replacement			23.0		
Total Estimated Annual Savings From Current Programs and Natural Replacement⁸			144.4	50 AF = 0.1% of total annual demand. The amount represents approximately 0.28% of Greeley's total annual demand. The expected range of savings should be + or - 10% of the total (128 - 166 AF). When developing these savings into a long-term demand forecast changes in technology and program implementation rates must be considered.	

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⁸ Greeley water conservation program matrix, estimated water savings, and source citation

APPENDIX C: RESIDENTIAL GALLONS PER CAPITA PER DAY AVERAGES



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