F I N A L R E P O R T

for the Colorado Water Conservation Board

Colorado Water Collaboratory

Phase 1

June 19, 2017

The Colorado Water Collaboratory is a partnership among Colorado Mesa University (CMU), the University of Colorado – Boulder (CU-Boulder), and the One World One Water Center (OWOW) at Metropolitan State University of Denver (MSU Denver) and their water suppliers: the City of Grand Junction, the City of Boulder, and Denver Water. The purpose of this effort is to utilize the three university campuses as living laboratories for indoor and outdoor water conservation and efficiency for new technology testing, public awareness assessment and behavioral change.

Background

The OWOW Center at MSU Denver was the grant applicant for this Project, and was also the fiscal agent. Funds were distributed to the OWOW Center's account at the MSU Denver Foundation, Inc. which is recognized as a 501(c)(3) tax-exempt organization under the Internal Revenue Code, and classified as a public charity as described in Section 170(b)(1)(A)(vi).

The OWOW Center has three major functions:

1) Offer an interdisciplinary Water Studies minor and Water Studies Certificate to complement a wide variety of majors;
2) Provide enriching co-curricular activities; and
3) Enhance water stewardship on and beyond the Auraria Campus by promoting effective use of water resources.

The primary contact person at MSU Denver is Tom Cech, Co-Director of the OWOW Center, MSU Denver, 1045-9th Street Park, Denver, Colorado 80217, tcech@msudenver.edu, 303.352.7400.

Goals of the Project

The Colorado Water Collaboratory focuses on the campus itself as a laboratory for innovating and understanding better ways to manage water resources. To this end, the ongoing research efforts of the Collaboratory are a summation of many small activities, projects, and studies that look at the home campus as a living laboratory to measure innovation, best practices, and human behavior.

In addition, the Colorado Water Collaboratory will serve as a catalyst for a broader sharing of research and information related to understanding water use and conservation. This research

can be used by other universities/colleges and water providers across the state to augment their own demand management efforts.

Expected outcomes of the multi-phased Colorado Water Collaboratory include:

- Greater awareness of the need for water use efficiency
- Identification of potential urban water use efficiency practices (particularly outdoor)
- Improved water use efficiency practices at the three universities
- Technology/information transfer from the three university campuses to individual homes of students, faculty and staff.
- Increased interest in students, faculty and staff to adopt improved water use efficiency practices on campus and at home.

The Project will promote the benefits of water resource conservation through improved information related to current water use practices on the three university campuses. In addition, the surveys will provide a base level of information regarding student, faculty and staff knowledge and attitudes toward water use efficiency. This Project will demonstrate the current status and potential benefits of water use efficiency – a goal of the CWCB – on the three university campuses.

Individuals Involved in the Project

Metropolitan State University of Denver

- Tom Cech, Co-Director, One World One Water Center, Project Manager
- Nona Shipman, Manager, One World One Water Center, Project Assistant
- Dr. Chad Mortensen, Professor, Department of Psychology, survey development, administration and analysis

Colorado Mesa University

- Hannah Holm, Coordinator, Hutchins Water Center, Co-Project Manager
- Dr. Gigi Richard, Director, Hutchins Water Center, Co-Project Manager

University of Colorado – Boulder

- Paul Lander, Associate Professor Adjunct, Department of Geography, Co-Project Manager

Project Item #1: Baseline Data - Determine monthly on-campus Water Use (both Indoor and Outdoor)

Gathering campus water-use data proved particularly challenging as practices used by the three universities to collect, compile, and analyze monthly water use data varied. The first challenge was to locate and connect with the person responsible for gathering monthly on-campus water use data. At MSU Denver, the data collection process took several months to finally identify and obtain a response from the individual in charge. A variety of reasons are responsible for this delay – changing job responsibilities, overloaded work days, and lack of water conservation

data management priorities. The other universities were able to obtain information more quickly, but then the issue of comparing water use data between the project participants became a challenge due to differing reporting methods, wide variances in campus infrastructure, and sources of water.

Because of the variability in the format and quality of the data, it is not possible at this time to compare the water use between campuses or to draw any significant conclusions other than that more work is necessary. In addition, it is generally not possible to separate indoor from outdoor water use as both indoor and outdoor water uses are often measured from a single meter. More time will be needed for discussions with appropriate facilities staff on each campus to determine what is known about how the water is used from each meter. Most likely, additional sub-meters will have to be installed if a detailed analysis of campus water use is to be performed. A brief summary of the data acquired from each campus is included below and the raw data are included in Appendix 1.

Colorado Mesa University

Colorado Mesa University's main campus in Grand Junction receives its water from the City of Grand Junction. The physical campus has undergone significant growth in the last ten years, including 13 new buildings (residence halls, academic buildings, student center and other support services) totaling nearly 600,000 gross square feet. The majority of the expansion occurred in formerly residential neighborhoods, and as a result, most of the new buildings are metered separately.

Roughly half of the outdoor watering on campus is from untreated irrigation water and the remaining part of campus is irrigated with treated city water. The gravity irrigation pipe that provides irrigation water does not have the capacity to provide irrigation water for the entire campus. Additional water storage on campus would be necessary to irrigate the entire campus with untreated irrigation water. The following summary only considers the treated domestic water usage.

Water use on the CMU main campus is measured by 31 water meters on buildings (includes some outdoor irrigation) and 12 water meters for irrigation and athletic fields, all served by domestic treated water from the City of Grand Junction. Most of the domestic water systems on campus are interconnected, so water can move in different directions depending on the demand, which makes it difficult to compare water use among individual buildings. In addition, the domestic water use measured by the building water meters may include water used outside for irrigation. Roughly speaking, the western, newer half of campus is irrigated with domestic treated water. Some of that use is metered by the irrigation meters and some is metered by the building meters.

Water data were obtained from CMU's Facilities Services Department. Monthly usage for January 2015 through June 2016 are included in this study. The raw data included all buildings owned by CMU on all campuses. Working with facilities staff, the meters for buildings and

facilities not on the main CMU campus were identified and excluded from this study. The buildings were grouped as either residence halls or other academic buildings (includes classrooms, student center, recreation center, offices, facilities shops, etc.). The outdoor water use categories were athletic fields (includes some associated indoor facilities, such as locker rooms) and for other outdoor irrigation (i.e., landscaping and lawns).

The highest water use is during the warmer months (March through October), when evaporative cooling and irrigation demands are highest, and the largest water user year-round is the residence halls. The monthly data provided show that water use metered at the building meters (includes both indoor and outdoor watering) exceeds those uses measured by the irrigation and athletic meters year-round (Figure 1).

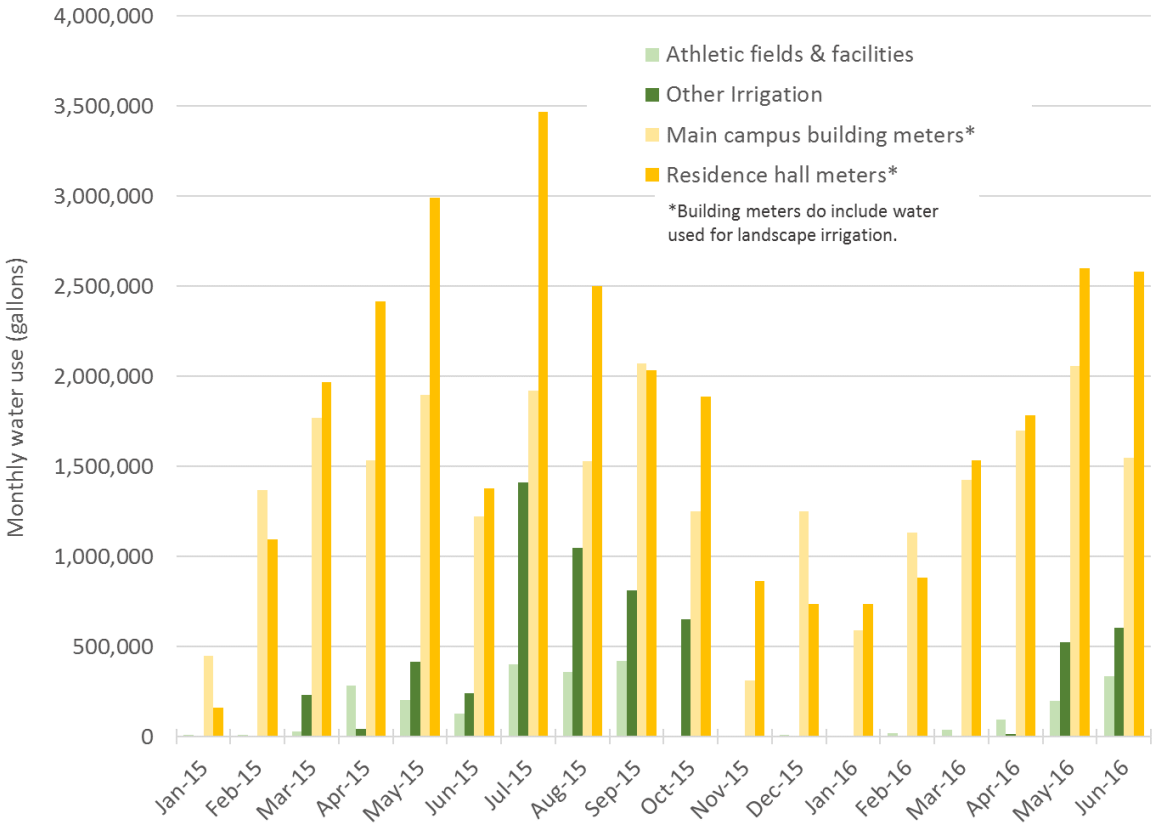

Figure 1 - Water use at CMU's main campus for January 2015 to June 2016.

When the building water meter data are normalized by building square footage, the residence halls use more water per square foot than the other campus buildings in all months except for two (Figure 2). The building meters do include some outdoor water use, so this comparison is only valid if all the buildings irrigate roughly the same amount of landscaping per square foot of building. More investigation is necessary to determine if this is a valid assumption. Total campus monthly water use of treated domestic water is given in Figure 3.

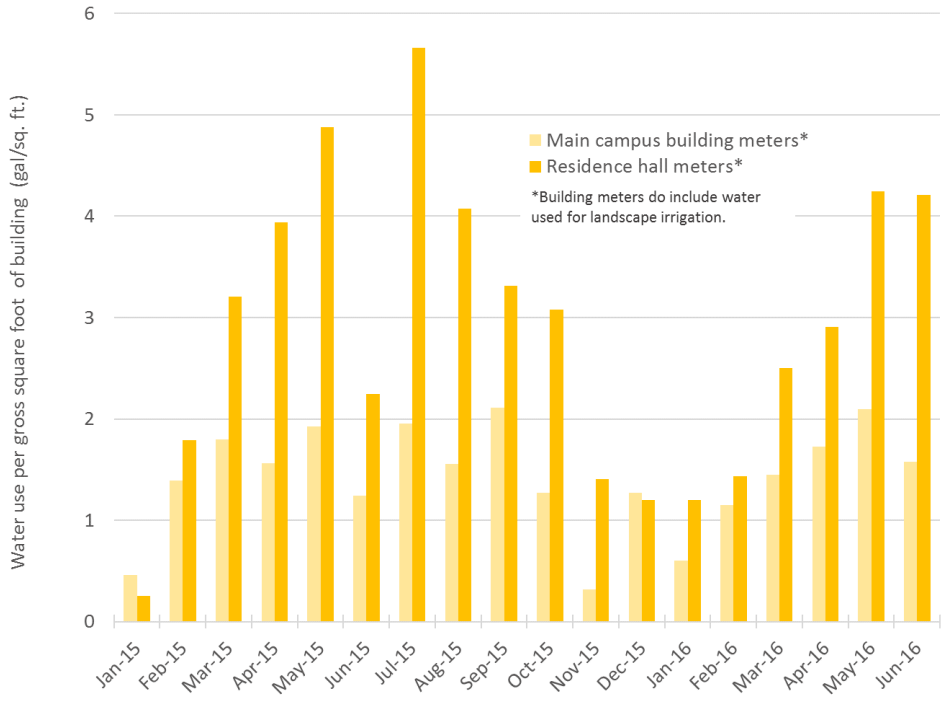

Figure 2 – Water use at CMU's main campus measured at building meters and normalized by the gross square footage of the buildings. Water use at these building meters may include some outdoor water use.

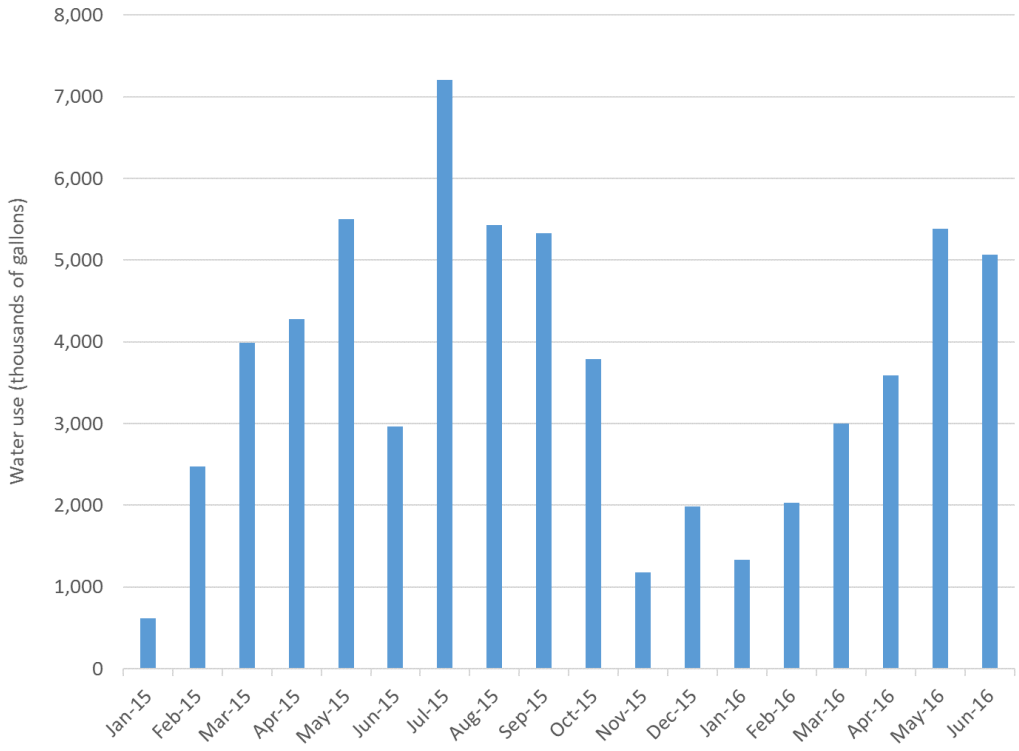

Figure 3 – Total monthly treated domestic water use for CMU's main campus

Between October 2014 and May 2017, CMU facilities installed a total of 443 low-flow showerheads (Bricor B-100 Max 1.0 GPM) in the residence halls. While expensive, these showerheads were deemed to be very durable and allow the user to adjust the stream size. The amount of water savings as a result of the showerhead installation has not been estimated because, as mentioned earlier, some irrigation is tied into the residence hall meters. In addition, the occupancy levels of the residence halls would be needed to determine if the saving were a result of the showerheads or just fewer showers being taken.

Another issue has arisen as the custodians remove the showerheads to clean them and do not necessarily return them to the same floor where they were originally installed. When the showerheads were installed, the manufacture provided a pressure rating per floor to achieve the one gallon per minute (gpm) rating. When the showerheads are not returned to the same floor they do not necessarily achieve the one gpm rating.

MSU Denver

MSU Denver is located in downtown Denver on the Auraria Campus, which is home to three different institutions (MSU Denver, CU-Denver and the Community College of Denver). Treated domestic water is supplied to campus by Denver Water, and untreated irrigation water is provided by an alluvial groundwater well (Flour Mill Well), which is part of an augmentation plan (Augmentation Plan Decree Case No. 03CW083). The augmentation plan restricts pumping to 97.5 acre-feet per year and only from March 1 to November 30. The well water is used only for irrigation, and does not flow through any other meters on campus.

MSU Denver monthly water use data were obtained from AHEC (Auraria Higher Education Corporation) for July 2015 through June 2016 from 48 water meters. Recently, Denver Water worked with AHEC to install separate meters for all buildings on the Auraria Campus. More work will be necessary to determine how to best handle the variety of buildings and water uses on this shared campus. No effort was made at this point to determine the types of buildings or the type of water use at each meter. For example, some of the meters are noted to be on parking garages and it is unclear how this water is used. More investigation will be necessary if we want to identify indoor vs. outdoor water uses.

The data obtained show that MSU Denver's monthly water use pattern is similar to CMU's with the highest water use being in the warmer months from April to September (Figure 4).

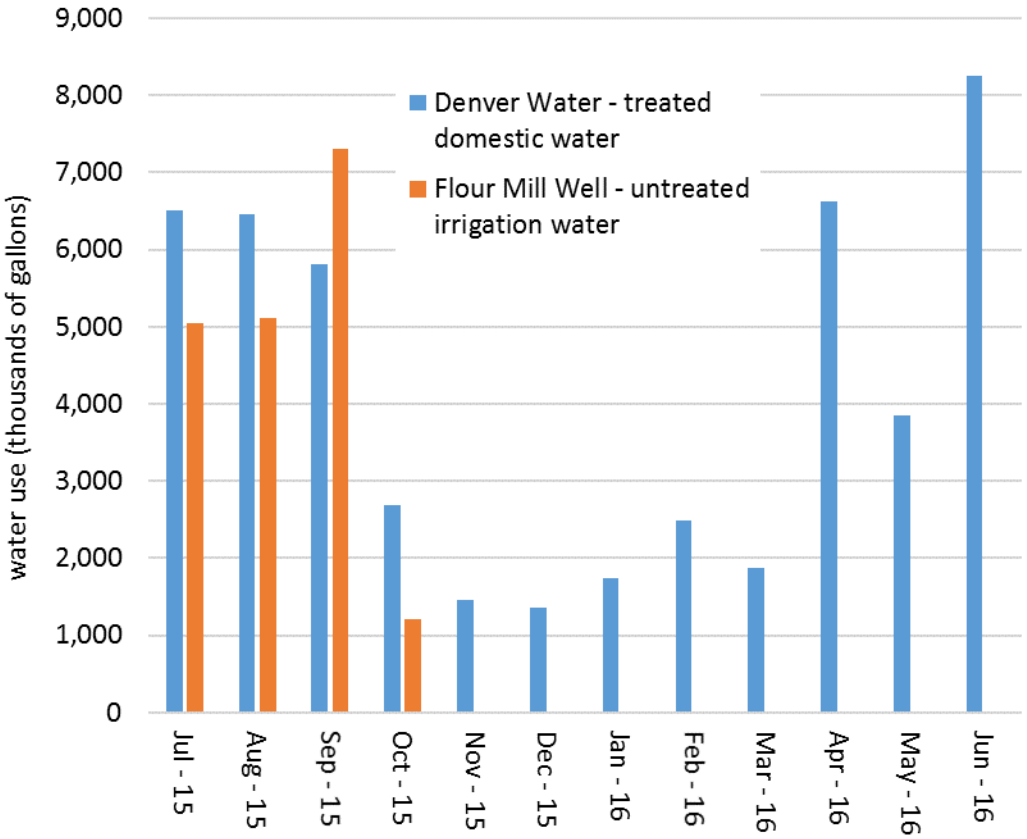

Figure 4 – Summary of MSU Denver's monthly water use from July 2015 to June 2016

CU-Boulder

The CU-Boulder campus receives treated domestic water from the City of Boulder. Annual water usage data were obtained for a total of 97 meters for the 2014 through 2016 fiscal years. The data for Main Campus are included in Appendix 2. The building name, square footage and use are noted in the spreadsheet, which will make analyzing water use by building type easier, however the data are not monthly, so it is not possible to look at how water use varies by season. In addition, similar to both the CMU and MSU-Denver data, it is not clear if there is irrigation being performed with water from building water meters, so it may be challenging to separate indoor and outdoor water uses. Based on these raw data, the total main campus water use at CU-Boulder declined from FY 2014 to FY 2016.

CU-Boulder currently uses the gross-reading meters to satisfy the drinking water services provided by the city of Boulder. In addition, there are some buildings that have sub-meters for more accurate monitoring, but there is currently no regular, quality monitoring and reporting of the many sub-meters on campus. Any future Collaboratory efforts will look to increase the meaningful use of sub-metering, as well as the full utilization of the many soil-moisture-sensors that have been installed in the past decade.

Project Item #2: Create, Conduct & Analyze Survey to Assess Baseline Water Conservation Attitudes on Campuses

Campus Survey Method

Surveys were distributed to faculty, staff, and students on all three campuses in both online and paper and pencil formats. The data were gathered to both measure attitudes and beliefs regarding water conservation among these groups, as well as measure what predicted water conservation behaviors. To meet the latter goal, we used a "Theory of Planned Behavior" approach, which predicts a specific behavior by measuring people's specific behavioral intentions.

These intentions are predicted by 1) attitudes, 2) norms of close others (e.g., what close friends and family do and approve), and 3) perceived behavioral control (PBC), which is people's beliefs that they have the ability to carry out a particular behavior. We focused on two behaviors: engaging in behaviors that conserve water, and installing water efficient appliances.

The survey questions are included in Appendix 2 and included 32 questions about water use and behavior, followed by 13 demographic questions. The questions were answered on a scale of one to seven. The midpoint of the scale was used as the breakpoint for the analysis of the results below.

Campus Survey Results

Overall, we received 1382 completed surveys. Of these, 532 were from Metropolitan State University of Denver, 599 were from Colorado Mesa University, and 251 were from the University of Colorado, Boulder. The participants were 175 faculty members, 182 staff members, and 981 students (44 unreported).

Using midpoints of scales as cutoffs, the data showed that intentions to conserve water were very high overall, with 68.9% indicating intentions to engage in behaviors to conserve water. Most people (78.4%) had a positive attitude toward water conservation, while somewhat less (61.3%) indicated that the norms of close others were in favor of these behaviors. The vast majority (90.3%) reported positive PBC, indicating they believed they were able to engage in these behaviors.

Results related to intentions to install water efficient appliances differed somewhat. Only 31.3% reported intentions to install water efficient appliances, even though 88% had a positive attitude toward doing so. Barely a majority (52.3%) reported norms among close others for installing water efficient appliances, and only 59.3% reported positive PBC—far lower than the percentage for engaging in water conservation behaviors reported above.

Using attitudes, norms, and PBC to predict behavioral intentions allows us to discover what can be targeted for psychological interventions in order to encourage these behaviors. For water

conservation behaviors, the data actually show that all three predict water conservation behavioral intentions at a significant level (all *p*'s < .001). This indicates that targeting attitudes, norms, and PBC can all lead to changes in water conservation behaviors. This, however, was not the case for installing water efficient appliances. Though norms and PBC still predicted intentions to install water efficient appliances (*p*'s < .001), attitudes were not related (*p* = .50). This indicates that trying to improve people attitudes toward water efficient appliances would be unlikely to lead to significant increases in this behavior. Instead, we should target people's perceptions of the norms of close others and their perceptions of their own ability to install these appliances. Interventions to change these perceptions for other behaviors have been successfully implemented frequently in the past. Also, most of the survey respondents were students, many of whom live in rental units and residence halls where they have little perceived control over installation of water efficient appliances. Increasing PBC among students in rental housing may be less effective.

Notably, changing perceptions of norms related to water conservation has been successful in increasing water conservation behaviors in several studies sponsored by OWOW and the Colorado Water Institute that are included in an article authored by Dr. Chad Mortensen and others that is currently under review (Mortensen et al., 2017).

Project Item #3: Assess Water Reduction Techniques at Other University Campuses

The Colorado Water Collaboratory can benefit from the important work being done through a consortium of campuses looking at water use, organized by Michelle Maddaus, Maddaus Water Management, CA, with information hosted by the Alliance for Water Efficiency (AWE). The AWE group has over 125 campus members, holds quarterly conference calls, and features case studies on a host of water-related work from campuses across the country.

The techniques being used on campuses can be grouped into three primary categories:
1. Stormwater management
2. Landscape design & irrigation management
3. Water Reuse

Some leading examples in these three areas include are described below.

Stormwater Management

At Butler University in Indianapolis, Indiana, the portion of Sunset Avenue that runs through campus was redesigned based on a complete streets approach to accommodate pedestrians, bicycles, and vehicle traffic. In addition to multimodal transportation elements, the streetscape design also includes linear rain gardens to manage stormwater within the right of way and reduce the volume of stormwater discharged to the nearby White River. The street redesign project included the first permeable asphalt bike lane in the City of Indianapolis. The Green

Infrastructure elements are anticipated to reduce runoff by up to 50% and the rain gardens manage stormwater from largest impervious surface on campus.

Many similar projects have resulted from the EPA Campus Rainworks Challenge, a program specifically designed to engage students in creating solutions towards a more sustainable campus. More examples of similar green infrastructure projects can be found on the EPA website: https://www.epa.gov/green-infrastructure/campus-rainworks-challenge-0.

Landscape design & irrigation management

One campus leader in landscape water-use efficiency is Stanford University, which has used real-time data to create metrics and best management practices for water managers (https://suwater.stanford.edu/efficiency-overview). This on-site information provides a custom framework for creating baseline data, future goals, and progress measures.

The University of CA-Merced, leveraged the statewide conservation mandate to create campus-specific goals for reducing water use 36% by 2025. Their work includes a master water plan approach that delineates program goals and measures for new buildings, and for landscape design/irrigation management. More details about this project can be found at the AWE website: http://www.allianceforwaterefficiency.org/

Water Reuse

Emory University has implemented an award-winning program of fully utilizing water reuse throughout their campus. The plan included a thorough inventory of current water use, reuse potential, and creation of water source-use metrics. A central piece of this program is a 'Water Hub' that houses state-of-the-art, ecological, decentralized water treatment that provides water for reuse water across campus (http://www.campserv.emory.edu/fm/energy_utilities/water-hub/).

UCLA has pursued an aggressive approach to reclaiming water for reuse, looking primarily at sources from air handlers, vacuum pumps, and autoclaves. Their current yield of reuse water varies between 92,000 and 114,000 gallons per day, depending upon humidity. The goal is to increase that capacity another 30% at full build-out (https://www.sustain.ucla.edu/our-initiatives/water/).

Project Item #4: Assess How Other University Campuses are Measuring/Monitoring Campus Water Use

The AWE group has also documented how other universities are measuring and monitoring their campus water use. Several examples are given below. More details about these case studies can be found at the AWE website: http://www.allianceforwaterefficiency.org/.

Many California universities have recently upgraded their metering systems to help compliance with state-mandated water conservation goals. At the UC-Santa Cruz, they installed cellular

connections in 2015, to nearly 400 campus water meters to provide more regular water-use reporting and management.

A leader in this area is Yale University, who not only utilizes ~300 'revenue meters' across campus (for paying local utility charges), but has installed two dozen sub-meters in critical, water-intensive sites for their own water management needs.

A resource receiving more attention each year is that of GIS systems. At CSU-San Bernardino, they have mapped all of their water delivery, sewerage, and water use systems for complete utility integration and campus-wide resource management.

At Colgate University, a student-led effort identified different types of water that runs through campus, with the idea of better matching water quality with water service. Their 2011 report identified the blue, green, and grey water sources found on campus. Blue is 'fresh water', from the surface or ground, Green is water stored in the soil and available as soil moisture, and grey is that impacted by human use and available to dilute water pollution in local sources.

Cornell University has a very impressive web-based water portal that allows a user to check water usage in any campus building (from campus meters), as well as links to various water issues and programs on campus. They also provide all incoming freshman with quality, reusable water bottles.

Project Item #5: Conduct Preliminary Analysis of Meters/Data Loggers that could be used to Provide Better Indoor/Outdoor Data

The opportunity to better manage water on campuses increases with more refined data. These data can be obtained with the use of sub-meters. Sub-meters are placed throughout the campus in key, water-intensive facilities, in new buildings, and in multi-sourced buildings. As the case studies above have illustrated, many campuses are moving to gather more fine-grained water use and water source data from across their campus to better manage the resource.

All of the large meter companies (e.g., Meter Master, Badger, Sensus, Neptune, Elster, and Hersey) produce meters for installation in sub-metering applications. These are usually metal, permanent meters that can be manually or remotely monitored, and are usually priced in the $75-$500 range. In addition, there are number of less expensive, but less durable meters on the market for less than $100, that may be useful for 'spot' or temporary measurement of flows.

Another option for baseline/snapshot measurement is the use of data loggers. These also come in variety of qualities and features and provide the opportunity to log water use data on a short-term, but highly detailed basis. Several studies by the Water Research Foundation (Meyer et al., 1999, and DeOreo et al., 2016) have utilized this technology to provide very detailed analysis of residential and commercial water use patterns across North America. This

could easily be implemented in a campus environment to better understand the flows of waters in use across buildings and landscapes.

Many of the smart irrigation systems utilized in campuses across the country now include data collection of time, flow rate, pressure, zones, soil moisture, etc., that could be used as an integral part of a campus water management program.

There are many options for metering flow, depending on the accuracy needed, maintenance required, etc. (Table 1). On most campuses, there is a large gap in metered water data at the resolution necessary to inform cost/benefit analysis and general management decisions. Pursuing a plan of more in-depth metering and reporting will result in better water management in most campus environments.

Table 1 – Common Water Flow Meter Technologies and Key Criteria from the U.S. Department of Energy's *Metering Best Practices Guide* (2015)

Goal	Positive Displacement	Orifice	Venturi	Turbine	Vortex Shedding	Ultrasonic Dop/TT
Accuracy	Good	Moderate	Good	Good	Good	Moderate
Turndown Ratio	10:1	<5:1	< 5:1	10:1	20:1	10:1/20:1
Repeatability	Good	Good	Good	Low	Very good	Good
Installation Ease	Easy	Easy	Moderate	Challenging	Moderate	Very easy
Pressure loss	Medium	Moderate	Low	Moderate	Low	None
Recalibration Needs	Infrequent	Frequent	Infrequent	Frequent	Infrequent	Moderate
Capital Cost	Low	Low	Moderate	Moderate	Moderate	High
Installed Cost	Moderate	Low	Moderate	Moderate	Moderate	Low
Maintenance Cost	Low	High	Moderate	Moderate	Low	Low

Project Item #6: Develop Future Research and Water Use Questions

Phase 2 will expand the work of Phase 1 to implement water-use efficiency practices both on the three university campuses as well as 3-4 additional college/university campuses, as well as at the homes of students, faculty and staff. As part of future phases, outreach could also begin with the local water providers to include non-university water users.

Phase 2 of the Colorado Water Collaboratory

- Students develop campus water conservation strategies for implementation (include campus sustainability groups), and may include social media and other communication methods
- Metering installation begins to determine campus outdoor and indoor use
- Directly involve the water providers of the three initial universities
- Develop demographic trends of campus community

- Develop a National Science Foundation Grant, perhaps with the Denver Botanic Gardens
- Expand the program with other universities to begin with Phase 1 work. We would explore including Adams State University, Colorado State University – Pueblo, Western State Colorado University, and Fort Lewis College
- Provide community reports (to local water utilities and other organizations) to share best practices with the general public
- Conduct a survey to assess changing water conservation behavioral change
- Final Report for Phase 2

Phase 3 of the Colorado Water Collaboratory

- Water/Energy Nexus – Retrace work in Phases 1-2, but with an energy savings emphasis
- This work would begin with MSU Denver, Colorado Mesa, and CU-Boulder, but would later expand to other colleges and universities in the state

Project Item #7: Begin Preliminary Assessment of How Best to Include Campus Facilities Employees

The campus water-use data collection effort that was part of Phase 1 demonstrated some of the challenges that will be faced in the future as we continue to include campus facilities employees in our efforts. Campus facilities personnel are generally very busy throughout the year, and focusing on daily water saving efforts is not necessarily their first priority. Additional staff would help with monitoring water use, gathering data, pursuing best water management practices, etc., but tight budgets make adding new positions difficult or impossible. So, it is readily apparent that campus facilities employees must be engaged to want to become more water use efficient and they will need to be provided with the resources (both staff and equipment) so they can work on these challenging projects. Future water-conservation efforts will need to keep in mind work-overload situations for these most important front-line water use individuals.

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Mortensen, C. R., Neel, R., Cialdini, R. B., Jaeger, C. M., Jacobson, R. P., & Ringel, M. M. (2017 – in review). Trending Norms: A lever for encouraging behaviors performed by the minority. *Social Psychology and Personality Science*, In review.

Appendix 1 – University water-use data

Colorado Mesa University – Monthly water use data for treated domestic water from City of Grand Junction

City of GJ Meter Name or Loca	Gross Bldg sq. ft.	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Total 7/15-6/16
Athletic Fields																				
Softball		5000	5000	5000	3000	3000	2000	3000	1000				5000	4000	2000	5000	3000	3000	2000	28,000
Softball		0	0	4000	7000	1000	0	7000	1000	5000			0	0	0	20000	6000	2000	7000	48,000
Softball		0	0	1000	6000	1000	0	2000	3000	8000			1000	0	0	0	3000	3000	1000	21,000
Softball		1000	0	1000	10000	15000	9000	31000	27000	19000			1000	1000	14000	2000	3000	12000	10000	120,000
Water - Bergman Field								2000	1000				0	0		8000		2000		13,000
Baseball		0	2000	6000	6000	1000	2000								0		3000		4000	7,000
Baseball		0	0	7000	242000	162000	95000	348000	318000	386000			0	0	0	0	70000	171000	310000	1,603,000
LaCross?		1000	2000	4000	7000	19000	19000	6000	6000				1000	1000	1000	4000	5000	7000	2000	33,000
Total Athletic Field water use		7000	9000	28000	281000	202000	127000	399000	357000	418000	0	0	8000	6000	17000	39000	93000	200000	336000	1,873,000
Irrigation																				-
Irrigation?				118000	0	171000	109000	689000	531000	416000	276000	1000		0	0	0	3100	318000	348000	2,582,100
Irrigation?		0	0	0	43000	68000	36000	119000	72000		115000		0	0	0	0	5000	44000	47000	402,000
Irrigation?			0	112000	0	176000	93000	605000	444000	393000	260000	1000		0	0	0	7000	161000	207000	2,078,000
Irrigation						0	0	0	0	0	0	0		0	0		0	0	0	-
Total Other Irrigation		0	0	230000	43000	415000	238000	1413000	1047000	809000	651000	2000	0	0	0	0	15100	523000	602000	5,062,100
																				-
Total Athletics and Irrigation Meters		7000	9000	258000	324000	617000	365000	1812000	1404000	1227000	651000	2000	8000	6000	17000	39000	108100	723000	938000	6,935,100
																				-
Main campus admin + classroom building meters																				-
Fine Arts	38,843		8000	108000	14000	146000	98000	261000	210000	201000	175000	10000		2000	7000	15000	13000	65000	118000	1,077,000
Dominguez Or Escalante?	76,888	0	110000	25000	18000	17000	5000	8000	5000	24000			18000	2000	18000	19000	19000	18000	9000	140,000
Maverick Center	232,754	86000	222000	253000	228000	346000	227000	55000	27000	203000			210000	255,000	254000	263000	250000	284000	49000	1,850,000
Mav Ctr		195000	244000	272000	206000	186000	123000	246000	170000				262000	155000	245000	242000	272000	186000	222000	2,000,000
Dev Ctr	15,570		19000	24000	25000		17000		23000	20000	26000	21000		8000	15000	21000	19000	21000	19000	193,000
Houston	80,940		25000			22000		31000	8000		43000				19000			33000	15000	149,000
Houston				35000	38000	34000	17000	10000		40000		22000		6000		37000	21000			136,000
Albers	4,648	2000	4000	4000	6000	7000	13000	20000	15000				10000	9000	6000	8000	11000	8000	14000	101,000
Admissions/Res Life/ OP	20,537	0	0	0	0	0	0	0	0				0	0	1000	0	0	0	0	1,000
Wubben Science/Library	207,593		73000	316000	192000	310000	332000	669000	500000	598000	682000	148000		24000	52000	130000	368000	396000	319000	3,886,000
LHH	41,238		25000	29000	27000	29000	22000	35000	22000	26000	29000	27000		12000	22000	23000	25000	24000	20000	265,000
Dominguez	56,882	7000	24000	31000	36000	44000	19000	39000	65000	130000			29000	5000	25000	34000	36000	274000	53000	690,000
Mpac	74531		24000	39000	30000	39000	0	0	66000	87000	134000	85000		37000	41000	59000	114000	93000	73000	789,000
Foundation	2,108		4000	27000	3000	60000	23000	109000	112000	101000	110000		4000	3000	4000	3000	3000	60000	80000	589,000
CSA Shops	15,921		4000			5000	6000	20000	16000	15000	12000		6000	5000	6000	4000	6000	6000	7000	103,000
CSA	9,867		1000	20000	2000	25000	10000	38000	31000	32000	38000		2000	1000	2000	1000	3000	5000	72000	225,000
UC	104,502	160000	580000	584000	709000	626000	308000	380000	260000	595000			707000	66000	414000	566000	538000	585000	478000	4,589,000
																				-
Total academic buildings	**982,822**	**450,000**	**1,367,000**	**1,767,000**	**1,534,000**	**1,896,000**	**1,220,000**	**1,921,000**	**1,530,000**	**2,072,000**	**1,249,000**	**313,000**	**1,248,000**	**590,000**	**1,131,000**	**1,425,000**	**1,698,000**	**2,058,000**	**1,548,000**	16,783,000
Water use per s.f.		0.5	1.4	1.8	1.6	1.9	1.2	2.0	1.6	2.1	1.3	0.3	1.3	0.6	1.2	1.4	1.7	2.1	1.6	17
																				-
Residence Hall Meters																				-
OASH	59,360	59000	153000	183000	223000	194000	61000	115000	70000				246000	91000	233000	246000	313000	333000	205000	1,852,000
Monument	46,695	3000	11000	15000	13000	13000	6000	8000	5000	19000			16000	2000	13000	13000	14000	13000	7000	110,000
Mary Rait	42,883	13000	43000	61000	153000	208000	94000	281000	261000	221000			53000	8000	40000	52000	54000	146000	184000	1,300,000
Walnut Ridge	28,080	0	0	0	109000	186000	126000	411000	478000				0	63000	0	0	11000	159000	357000	1,479,000
NASH A + B Bldg	37,089		96000	139000	140000	144000	83000	103000	35000	90000	141000	135000		32000	82000	109000	95000	101000	59000	982,000
Tolman	44,178	29000	92000	96000	93000	94000	21000	1000	1000				97000	6000	77000	105000	115000	104000	27000	533,000
Pinon	42,507	5000	2000	2000	0	0	0	8000	1000				23000	1000	25000	30000	31000	30000	5000	154,000
Garfield B	48,389	18000	128000	167000	156000	154000	37000	55000	24000				168000	7000	161000	173000	171000	176000	29000	964,000
Grand Mesa	80,100		99000	529000	105000	742000	271000	1319000	1060000	1038000	924000	114000		24000	84000	118000	159000	525000	809000	6,174,000
Elm Hall	6,720		6000	3000	5000	3000	2000	2000	2000	2000	3000		3000	3000	0	2000	3000	2000	1000	23,000
Garfield A Bldg	45,261	31000	115000	149000	869000	632000	312000	800000	306000	86000			128000	117000	9000	137000	195000	335000	460000	2,573,000
NASH C Bldg	59,200		160000	236000	204000	191000	124000	121000	76000	196000	294000	275000		84000	155000	218000	229000	231000	196000	2,075,000
Wingate																				-
BASH	72,500		191000	386000	346000	430000	240000	246000	180000	380000	527000	339000		300000	1600	332000	394000	447000	242000	3,388,600
																				-
Total residence halls	**612,942**	**158,000**	**1,096,000**	**1,966,000**	**2,416,000**	**2,991,000**	**1,377,000**	**3,470,000**	**2,499,000**	**2,032,000**	**1,889,000**	**863,000**	**734,000**	**738,000**	**880,600**	**1,535,000**	**1,784,000**	**2,602,000**	**2,581,000**	21,607,600
Water use per s.f.		0.3	1.8	3.2	3.9	4.9	2.2	5.7	4.1	3.3	3.1	1.4	1.2	1.2	1.4	2.5	2.9	4.2	4.2	35
																				-
Total Building Meters		**608,000**	**2,463,000**	**3,733,000**	**3,950,000**	**4,887,000**	**2,597,000**	**5,391,000**	**4,029,000**	**4,104,000**	**3,138,000**	**1,176,000**	**1,982,000**	**1,328,000**	**2,011,600**	**2,960,000**	**3,482,000**	**4,660,000**	**4,129,000**	38,390,600
																				-
Total Campus Water Use		615,000	2,472,000	3,991,000	4,274,000	5,504,000	2,962,000	7,203,000	5,433,000	5,331,000	3,789,000	1,178,000	1,990,000	1,334,000	2,028,600	2,999,000	3,590,100	5,383,000	5,067,000	45,325,700

MSU Denver (Auraria Campus)

Monthly water use data for treated domestic water from Denver Water

MSU Denver

Summary of Monthly Usage by Commodity AN - 25PT

	Mnthly water usage in Kgal												
Meter name	**Jul - 15**	**Aug - 15**	**Sep - 15**	**Oct - 15**	**Nov - 15**	**Dec - 15**	**Jan - 16**	**Feb - 16**	**Mar - 16**	**Apr - 16**	**May - 16**	**Jun - 16**	**Total**
1015	0	1	1	1	1	0	0	1	1	1	1	1	9
1020	0	0	1	1	0	1	0	0	0	1	0	0	4
1024 (Ninth Street)	0	0	1	0	1	0	1	0	1	0	1	1	6
1027	1	1	1	0	0	0	1	0	1	1	1	1	8
1033 (Ninth Street)	0	1	2	1	2	0	1	2	2	1	1	1	14
1041	15	16	15	18	13	7	10	11	11	13	13	15	157
1045 (Ninth Street)	0	1	1	2	1	0	1	1	1	1	0	1	10
1050	0	0	1	0	0	0	1	0	0	1	0	0	3
1051	0	0	0	0	0	0	0	0	1	0	0	0	1
1056 (Ninth Street)	1	0	0	1	0	0	0	1	0	0	1	0	4
1059 (Ninth Street)	1	1	0	1	1	0	1	1	1	1	1	1	10
1061	0	1	0	0	1	0	0	0	0	1	0	0	3
1068	1	0	1	0	1	0	1	0	1	1	0	1	7
5th Street Garage	207	269	239	51	0	0	0	0	0	0	72	139	977
5th Street Hub	0	0	1	1	2	1	2	2	2	2	1	0	14
7th Street Classroom	11	35	22	23	17	5	38	27	25	21	3	5	232
7th Street Garage	33	7	8	8	8	5	7	8	7	8	7	7	113
Admin	319	346	319	121	53	31	62	76	60	70	181	340	1,978
Arts	27	119	140	136	169	309	81	175	224	186	38	41	1,645
Bear Creek (Childrens College)	390	213	214	30	0	3	1	1	0	0	1	244	1,097
Boulder Creek (Tech)	138	153	211	63	19	6	31	44	42	32	125	204	1,068
Central	32	117	98	62	38	23	0	63	56	56	72	22	639
Cherry Creek (SO)	185	262	232	120	65	21	71	91	66	77	122	181	1,493
Clear Creek (St. Francis Center)	96	92	93	29	2	1	2	2	2	2	3	113	437
Early Learning Center	59	47	48	47	42	44	41	48	47	48	39	101	611
Emmanuel Gallery	0	0	0	1	1	0	0	0	1	0	0	1	4
Facility Services	10	11	0	7	12	6	7	6	6	6	6	6	83
Facility Services Annex B	11	11	25	10	5	10	53	8	7	10	8	9	167
Golda Meir	0	0	1	0	0	0	0	0	1	6	1	0	9
IRR_CITY_WATER	1,573	1,170	1,420	259	0	0	0	256	0	0	450	1,340	6,468
King Center	460	471	411	286	113	59	293	273	197	196	185	351	3,295
Library Media Center	41	87	83	89	66	32	58	76	58	75	82	191	938
MC-7 (Mod Classrooom)	3	11	13	12	6	2	12	18	0	13	3	5	98
Mercantile	16	26	25	24	13	10	13	16	18	18	17	0	196
Metro Mod Office (MO-1)	1	1	1	1	1	2	5	5	0	3	1	1	22
North	466	541	450	309	167	81	188	324	268	444	520	497	4,255
North Chiller Plant	300	225	176	33	0	0	1	0	7	31	190	300	1,263
PE - Events Center	206	219	185	125	121	42	126	236	82	87	215	238	1,882
Plaza	121	164	142	149	66	212	109	90	79	101	110	222	1,565
Science	912	856	777	556	421	407	482	578	556	506	568	831	7,450
South Chiller Plant	282	272	196	56	0	0	0	0	1	69	170	383	1,429
St. Cajetan's Center	48	50	54	43	21	26	21	35	26	20	11	19	374
Tivoli Parking Garage	11	0	0	0	0	0	0	0	0	0	0	1	12
Tivoli Student Union	516	648	196	8	6	6	8	12	10	13	444	1,060	2,927
To Be Placed	0	0	0	0	0	0	0	0	0	4,495	180	1,365	6,040
Utility Building	10	9	7	4	4	4	4	4	13	2	5	20	86
Total	**6,503**	**6,454**	**5,811**	**2,688**	**1,459**	**1,356**	**1,733**	**2,491**	**1,881**	**6,619**	**3,849**	**8,259**	**49,103**

MSU Denver (Auraria Campus)

Flour Mill Well Pumping Data

Table 1 - Pumping (gallons)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996				6,000,000	5,147,000	7,683,600	8,625,900	9,018,300	2,200,400	2,313,900			40,989,100
1997													
1998			37,168				11,443,494	5,655,326	5,442,083	2,775,398		190,525	25,543,994
1999						6,955,190	4,864,248	3,225,312	968,487	1,587,742	1,326,129	479,589	19,406,697
2000	14,205	50,352	273,433	1,315,155	3,891,768	5,949,876	5,840,963	4,029,197	2,433,854	1,444,514	12,313	0	25,255,630
2001	8,213	6,183	121,095	796,450	4,625,900	7,424,750	6,726,310	6,467,140	4,808,375	2,819,155	6,407,450	0	40,211,021
2002		40,000	1,176,594	2,016,501	3,072,515	5,626,328	6,103,230	4,744,632	1,767,504	654,599	98,847	0	25,300,750
2003	0	0	0	0	638,737	3,531,143	6,441,020	5,445,597	2,586,393	2,976,315	0	0	21,619,205
2004	0	0	681,108	206,760	2,765,200	2,440,863	4,615,171	2,346,859	3,639,583	372,423	0	0	17,067,967
2005	0	0	296,606	212,150	3,128,677	5,582,105	6,474,113	6,762,654	4,445,826	1,738,589	0	0	28,640,720
2006	0	0	0	1,293,919	4,707,753	6,713,578	4,918,558	4,281,336	2,859,192	548,368	0	0	25,322,704
2007	0	0	0	249,329	575,580	4,752,987	5,696,335	4,292,760	3,815,464	919,327	0	0	20,301,782
2008	0	0	0	859,140	3,509,425	4,825,026	4,279,316	4,057,291	4,216,893	1,519,238	424,322	0	23,690,651
2009	0	0	444,591	507,812	2,922,808	2,080,288	4,140,251	4,567,037	3,992,177	1,599,690	0	0	20,254,654
2010	0	0	0	0	2,317,450	7,266,777	5,222,673	4,985,658	3,964,283	1,138,424	0	458,569	25,353,834
2011	0	0	0	659,734	1,817,471	5,803,158	3,664,267	6,624,615	3,275,027	895,567	0	0	22,739,839
2012	0	0	0	1,223,546	6,030,234	5,335,645	5,264,830	4,956,328	3,088,631	1,589,245	0	0	27,488,459
2013	0	0	0	15,856	1,032,688	7,071,456	5,438,215	5,820,374	3,117,836	415,645	0	0	22,912,070
2014	0	0	0	698,274	2,372,815	3,552,509	4,672,500	3,036,726	2,506,748	458,569	0	0	17,298,141
2015	0	0	0	246,875	0	1,954,713	5,048,362	5,107,450	7,300,788	1,205,664	0	0	20,863,852
2016	0	0	0	0	0	0	4,394,197	4,403,528					8,797,725

Table 2 - Pumping (acre-feet)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	0.0	0.0	18.4	**15.8**	**23.6**	**26.5**	**27.7**	**6.8**	**7.1**	**0.0**	0.0	125.8
1997													0.0
1998	0.0	0.0	0.1	0.0	**0.0**	**0.0**	**35.1**	**17.4**	**16.7**	**8.5**	**0.0**	0.6	78.4
1999	0.0	0.0	0.0	0.0	**0.0**	**21.3**	**14.9**	**9.9**	**3.0**	**4.9**	**4.1**	1.5	59.6
2000	0.0	0.2	0.8	4.0	**11.9**	**18.3**	**17.9**	**12.4**	**7.5**	**4.4**	**0.0**	0.0	77.5
2001	0.0	0.0	0.4	2.4	**14.2**	**22.8**	**20.6**	**19.8**	**14.8**	**8.7**	**19.7**	0.0	123.4
2002	0.0	0.1	3.6	6.2	**9.4**	**17.3**	**18.7**	**14.6**	**5.4**	**2.0**	**0.3**	0.0	77.6
2003	0.0	0.0	0.0	0.0	2.0	10.8	19.8	16.7	7.9	9.1	0.0	0.0	66.3
2004	0.0	0.0	2.1	0.6	8.5	7.5	14.2	7.2	11.2	1.1	0.0	0.0	52.4
2005	0.0	0.0	0.91	0.65	9.60	17.13	19.87	20.75	13.64	5.34	0.00	0.00	87.9
2006	0.0	0.0	0.0	4.0	14.4	20.6	15.1	13.1	8.8	1.7	0.0	0.0	77.7
2007	0.0	0.0	0.0	0.8	1.8	14.6	17.5	13.2	11.7	2.8	0.0	0.0	62.3
2008	0.0	0.0	0.0	2.6	10.8	14.8	13.1	12.5	12.9	4.7	1.3	0.0	72.7
2009	0.0	0.0	1.4	1.6	9.0	6.4	12.7	14.0	12.3	4.9	0.0	0.0	62.2
2010	0.0	0.0	0.0	0.0	7.1	22.3	16.0	15.3	12.2	3.5	0.0	1.4	77.8
2011	0.0	0.0	0.0	2.02	5.6	17.8	11.2	20.3	10.1	2.7	0.0	0.0	69.8
2012	0.0	0.0	0.0	3.75	18.5	16.4	16.2	15.2	9.5	4.9	0.0	0.0	84.4
2013	0.0	0.0	0.0	0.05	3.2	21.7	16.7	17.9	9.6	1.3	0.0	0.0	70.3
2014	0.0	0.0	0.0	2.14	7.3	10.9	14.3	9.3	7.7	1.4	0.0	0.0	53.1
2015	0.0	0.0	0.0	0.8	0.0	6.0	15.5	15.7	22.4	3.7	0.0	0.0	64.0
2016	0.0	0.0	0.0	0.0	0.0	0.0	13.5	13.5	0.0	0.0	0.0	0.0	27.0

Notes:

1) Maximum annual total pumping is **97.5 acre-feet** and pumping is only allowed from March 1 - November 30th based on Augmentation Plan Decree (Case No. 03CW083).
2) When annual pumping exceeds **92.5 acre-feet,** be aware that the resulting depletions for the following year will exceed the 78 acre-feet depletion limit, the maximum annual net depletion limit for the Flour Mill Water Right (Priority Date: 11/3/1958), assuming the water right will not be in priority at any time during the following year.

CU-Boulder Main Campus Annual Water Use

Treated domestic water provided by City of Boulder

			Total Use (KGAL):			
Building:	**Sq. Footage:**	**Primary Use:**	**FY 2014**	**FY 2015**	**FY 2016**	**2017 YTD (10/16)**
202 (ClubA6)202 (Club)	0	Admin Office	275	277	445	85
205 (UMC)	268,951	Food Service	17,274	16,113	10,898	3,281
207 (Den)	5,471	Admin Office	145	32	16	3
208 (Hend)	32,390	Museum	95	90	118	26
209 (EPRK)	148,055	Parking Structure	16	9	16	14
210 (TLC)	16,810	Admin Office	601	121	106	39
211 (MCOL)	45,225	Research	743	644	649	278
212 (COTT)	5,686	Admin Office	16	18	18	2
215 (ECON)	34,177	Classroom	146	127	124	26
216 (GUGG)	26,630	Classroom	77	70	76	17
217 (EDUC)	50,002	Classroom	535	533	512	149
218 (THTR)	70,985	Other-Entertainment/Public Assembly	486	394	398	228
221 (HLMS)	116,225	Classroom	1,975	770	894	256
224 (CHEM)	147,810	Lab	8,412	6,854	6,522	2,281
225 (CIRE)	30,043	Lab	79	55	28	22
226 (EKLC)	136,740	Lab	5,800	2,478	3,143	676
229 (VAC)	184,512	CLassroom	1,479	1,447	965	222
231 (ATLS)	74,769	Museum	365	327	373	95
232 (KTCH)	58,544	General Office	345	222	65	37
235 (HALE)	46,186	Classroom	896	389	576	169
237 (MKNA)	22,965	General Office	180	309	144	23
239 (MAIN)	25,293	Other-Entertainment/Public Assembly	99	156	89	31
241 (WDBY)	78,599	Admin Office	436	584	809	212
243 (MCKY)	87,251	Other-Entertainment/Public Assembly	83	59	50	18
244 (GH-1)	3,299	Greenhouse	N/A	N/A	N/A	N/A
245 (LIBR)	335,081	Library	6,136	2,048	1,857	381
249 (ALUM)	8,719	Admin Office	218	274	141	56
251 (VPMP)	401	Other-Services	N/A	N/A	N/A	N/A
302 (C4C)	317,286	Food Service	10,393	10,049	9,374	3,130
309 (RGNT)	95,507	Admin Office	801	1,199	1,159,02	284
10 (UCTR)	15,174	Admin Office	109	127	115	25
312 (TB19)	2,050	Admin Office	19	17	15	4
324 (WARD)	65,760	Medical Office	610	627	613	151
326 (CHEY)	112,505	Residence Hall	2,285	2,138	2,132	441
327 (WLRD)	107,098	Residence Hall	1,554	1,620	1,560	333
330 (HLET)	93,226	Residence Hall	1,164	1,144	1,187	263
332 (REED)	25,715	Residence Hall	480	615	653	66
334 (MUS)	106,860	Classroom	798	812	739	114
336 (FRND)	164,033	Residence Hall	5,809	5,463	5,262	1,137
338 (CROS)	27,480	Residence Hall	633	775	814	110
339 (ADEN)	26,914	Residence Hall	270	317	336	57
340 (CKRL)	26,625	Residence Hall	408	453	408	113
344 (ENVD)	60,429	General Office	4,044	4,588	4,044	472
346 (BKER)	113,649	Residence Hall	683	2,172	2,287	602
348 (LIBY)	117,068	Residence Hall	4,519	3,378	3,305	558
350 (BRKT)	26,914	Residence Hall	1,193	939	936	61
354 (WDEP)	26,891	Drinking Water Treatment & Distribution	31,450	24,275	28,003	6,970
355 (JILA)	160,171	Lab	373	295	320	77
355A (JILA ANNEX)	N/A	Lab	688	539	376	-
355X (JILA X-WING)	N/A	Lab	351	171	170	45
357 (LASP)	33,167	General Office	3,692	3,775	3,411	722

			Total Use (KGAL):			
Building:	Sq. Footage:	Primary Use:	FY 2014	FY 2015	FY 2016	2017 YTD (10/16)
359 (DUAN)	194,512	Lab	557	515	466	110
363 (BESC)	95,844	Lab	721	637	514	94
369 (MATH)	61,346	Classroom	902	744	788	293
370 (RAMY)	111,546	Research	975	927	803	212
373E (GBB)	137,197	Research	8,278	6,161	2,149	625
373N (PORT)	108,986	Research	2,134	1,939	3,168	480
373S (MUEN)	153,630	Research	1,199	1,052	1,076	298
378 (STAD)	148,635	Stadium	2,093	2,498	1,700	547
378E (STSB)	141,065	Other-Stadium	960	959	1,275	592
379 (IPRC)	N/A	Fitness Center	N/A	N/A	N/A	N/A
380 (SWILL)	99,993	Residence Hall	3,548	3,486	3,377	606
382 (CLRE)	43,349	General office	551	679	765	281
384 (REC)	320,509	Fitness Center	1,951	6,030	6,490	2,389
386 (CARL)	57,243	Fitness Center	1,221	626	590	145
387 (FH)	69,153	Other-Stadium	134	85	101	8
387E (FHPB)	20,735	Other-Stadium	60	60	60	15
388 (CHMP)	213,137	Other-Stadium	N/A	N/A	1,381	638
389 (DALW)	102,933	Other-Stadium	2,275	2,536	1,399	121
391 (GRNS)	165	other-Stadium	265	-	-	N/A
393 (HPHY)	2,589	N/A	63	2	-	-
403 (WLAW)	183,609	Classroom	1,746	1,713	1,557	561
405 (LAW)	128,086	classroom	788	651	717	138
407 KITW)	74,296	Residence Hall	1,510	1,483	1,320	291
408 (KITC)	100,134	Dormitory/Residence Hall	2,150	9,237	14,137	291
409 (SMTH)	95,237	Residence Hall	2,017	2,036	2,015	433
410 (ANDS)	62,685	Residence Hall	1,965	1,378	1,376	253
411 (BUCK)	68,301	Residence Hall	1,140	1,033	976	262
412 (ARNT)	63,434	Residence Hall	1,281	1,234	1,165	282
414 (FISK)	20,425	Other-Entertainment/Public Assembly	236	99	113	30
416 (OBSV)	8,571	Lab	2	10	1	0
418 (SLHS)	22,558	General Office	201	285	196	80
420 (EVNT)	202,321	Indoor Arena	2,203	2,189	2,261	597
427 (EDEP)	N/A	N/A	N/A	N/A	N/A	908
430 (KOBL)	176,718	Classroom	1,847	1,664	2,061	481
431 (EC)	587,611	Lab	11,617	10,304	7,467	2,632
445 (ITLL)	36,322	Lab	722	504	617	192
447 (DLC)	51,030	Lab	278	483	1,503	65
455 (LESS)	3,427	General Office	95	51	77	106
458 (EHSC)	22,713	General Office	73	73	65	16
482 (PDPS)	33,922	Police Station	246	243	273	80
484 (RPRK)	336,125	Parking Structure	N/A	N/A	N/A	N/A
486 (GROC)	N/A	Other-Utility	N/A	13	164	60
493 (CPMP)	478	Other-Services	N/A	N/A	N/A	N/A
499 (TB86)	N/A	General Office	N/A	N/A	N/A	N/A
MCAMPUS (Campus)	0	N/A	24,307	15,269	13,585	12,694
MGROUNDS (Grounds)	0	N/A	1,885	2,251	2,500	988

Appendix 2 - Campus survey questions

Instructions

Many questions in this survey make use of rating scales with 7 places; you are to choose the number that best describes your opinion. For example, if you were asked to rate "The Weather in Amherst" on such a scale, the 7 places should be interpreted as follows:

The Weather in Amherst is:

bad :_____1____:_____2____:_____3____:_____4____:_____5____:_____6____:_____7____: good

extremely quite slightly neither slightly quite extremely

If you think the weather in Amherst is extremely good, then you would fill in the number 7 on your answer sheet.

If you think the weather in Amherst is quite bad, then you would fill in the number 2.

If you think the weather in Amherst is slightly good, then you would fill in the number 5.

If you think the weather in Amherst is neither bad nor good, then you would fill in the number 4.

In making your ratings, please remember the following points:

* Though you are allowed to skip any question, please answer all items if you can.

* Never fill in more than one number on a single scale unless instructed otherwise.

Please answer each of the following questions by filling in the number on your answer sheet that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. If a question regards a behavior that is beyond your control, you are encouraged to still answer the question. Please read each question carefully.

This set of questions asks about <u>engaging in behaviors that use less water</u>.

1. If I were to engage in behaviors that use less water in the next six months, it would be
bad :___1__:___2__:___3__:___4__:___5__:___6__:___7___: good

2. If I were to engage in behaviors that use less water in the next six months, it would be
unpleasant :___1__:___2__:___3__:___4__:___5__:___6__:___7___: pleasant

3. Most of the people who are important to me approve of engaging in behaviors that use less water in the next six months.
disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

4. When it comes to engaging in behaviors that use less water in the next six months, I want to do what people who are important to me think I should do.
disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

5. Most of the people who are important to me will engage in behaviors that use less water in the next six months.
unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7___: likely

6. When it comes to engaging in behaviors that use less water in the next six months, I want to be like people who are important to me.
not at all :___1__:___2__:___3__:___4__:___5__:___6__:___7___: very much

7. How common do you think engaging in behaviors that use less water is **<u>now</u>** among people who are important to you?
uncommon :___1__:___2__:___3__:___4__:___5__:___6__:___7___: common

8. How common do you think engaging in behaviors that use less water will be **<u>1 year from now</u>** among people who are important to you?
uncommon :___1__:___2__:___3__:___4__:___5__:___6__:___7___: common

9. How common do you think engaging in behaviors that use less water will be **<u>6 years from now</u>** among people who are important to you?

uncommon :___1__:___2__:___3__:___4__:___5__:___6__:___7___: common

10. I am confident that I can engage in behaviors that use less water in the next six months.
false :___1__:___2__:___3__:___4__:___5__:___6__:___7___: true

11. Engaging in behaviors that use less water in the next six months is up to me.
disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

12. I will engage in behaviors that use less water in the next six months.
unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7___: likely

13. In the past six months, I have engaged in behaviors that use less water.
false :___1__:___2__:___3__:___4__:___5__:___6__:___7___: true

This set of questions asks about <u>installing water efficient appliances/devices</u>.

14. If I were to install water efficient appliances/devices in the next six months, it would be
bad :___1__:___2__:___3__:___4__:___5__:___6__:___7___: good

15. If I were to install water efficient appliances/devices in the next six months, it would be
unpleasant :___1__:___2__:___3__:___4__:___5__:___6__:___7___: pleasant

16. Most of the people who are important to me approve of installing water efficient appliances/devices in the next six months.
disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

17. When it comes to installing water efficient appliances/devices in the next six months, I want to do what people who are important to me think I should do.
disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

18. Most of the people who are important to me will install water efficient appliances/devices in the next six months.
unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7___: likely

19. When it comes to installing water efficient appliances/devices in the next six months, I want to be like people who are important to me.
not at all :___1__:___2__:___3__:___4__:___5__:___6__:___7___: very much

20. How common do you think installing water efficient appliances/devices is **now** among people who are important to you?
uncommon :___1__:___2__:___3__:___4__:___5__:___6__:___7___: common

21. How common do you think installing water efficient appliances/devices will be **1 year from now** among people who are important to you?
uncommon :___1__:___2__:___3__:___4__:___5__:___6__:___7___: common

22. How common do you think installing water efficient appliances/devices will be **6 years from now** among people who are important to you?
uncommon :___1__:___2__:___3__:___4__:___5__:___6__:___7___: common

23. I am confident that I can install water efficient appliances/devices in the next six months.
false :___1__:___2__:___3__:___4__:___5__:___6__:___7___: true

24. Installing water efficient appliances/devices in the next six months is up to me.
disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

25. I will install water efficient appliances/devices in the next six months.
unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7___: likely

26. In the past six months, I have installed water efficient appliances/devices.
false :___1__:___2__:___3__:___4__:___5__:___6__:___7___: true

27. [Answer this question only if you do not own your home] If I owned my home, I would install water efficient appliances/devices in the next six months.
unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7___: likely

Please indicate the degree to which you agree or disagree with the following:

28. Water conservation is an issue I am personally concerned about.
disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

29. I participate in water conservation strategies in my daily life.
disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

30. I do not pay much attention to issues related to conserving water.
disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

31. The issues that relate to the conservation and availability of water don't personally affect me too much.
disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

32. Conserving water at one's home should be voluntary.
disagree:___1__:___2__:___3__:___4__:___5__:___6__:___7___: agree

33. Thinking of the following water users, which do you think uses the most water in Colorado?

    1 = Industrial and commercial businesses

    2 = Households

    3 = Farms and ranches

34. What is your sex?
    1. Male
    2. Female
    3. Other

35. What is your age?
    1. 18-20
    2. 21-25
    3. 26-30
    4. 31-35
    5. 36-40
    6. 41-45
    7. 46-50
    8. 51-55
    9. 56-60
    10. Over 60

36. What is your ethnicity?
    1. Hispanic or Latino/a
    2. Not Hispanic or Latino/a
    3. Unknown

37. What is your race? (More than one answer is allowed)
    1. American Indian or Alaska Native
    2. Asian
    3. Native Hawaiian or Other Pacific Islander
    4. Black or African American
    5. White
    6. Arab or Middle Eastern
    7. Other/Unknown

38. Are you faculty, staff, or a student?
    1. Faculty
    2. Staff
    3. Student

39. If faculty, in which department or academic area do you work (if applicable)?
    1. Social and Behavioral Sciences
    2. Biological, Physical, and Environmental Sciences
    3. Business
    4. Health Sciences
    5. Humanities and Languages
    6. Music, Art, Design, and Theater Arts
    7. Engineering, Computer Science, Math, and Statistics
    8. Teacher Education
    9. Not affiliated with a department
    10. Other

40. If staff, in what capacity do you work (if applicable)?
    1. Academic and Student Affairs (e.g., Departmental Administrative Staff, Administration, Program Coordinator, Program Manager, Advising)
    2. Finance (Human Resources, Budget, Accounting, Office of Sponsored Research or Grant Coordination)
    3. Maintenance or Facilities Management
    4. Custodial Staff
    5. Marketing and Communication
    6. Athletics
    7. Health
    8. Student Activities
    9. Information Technology
    10. Other

41. If you are a student, which of the following best categorizes your major?
    1. Social and Behavioral Sciences
    2. Biological, Physical, and Environmental Sciences
    3. Business
    4. Health Sciences
    5. Humanities and Languages
    6. Music, Art, Design, and Theater Arts
    7. Engineering, Computer Science, Math, and Statistics
    8. Teacher Education
    9. Undeclared
    10. Other

42. If you are a student, what is your class standing?
    1. Freshman
    2. Sophomore
    3. Junior
    4. Senior

43. Where do you live?
    1. In a residence I own
    2. In a residence my family owns
    3. In a residence I rent off campus
    4. In a residence I rent on campus
    5. Other

44. How much exposure have you had to environmental studies, earth science, environmental science, or similar topics?
    none at all :___1__:___2__:___3__:___4__:___5__:___6__:___7___: very much

45. For how many years have you lived in Colorado?
    1. 1 or less
    2. 2
    3. 3
    4. 4
    5. 5
    6. 6
    7. 7
    8. 8
    9. 9
    10. 10 or more