Removing barriers: building capacity to implement critical water conservation and efficiency programs

75% Progress Report
08.30.20 to 01.30.21

Western Resources Advocates (WRA) is pleased to submit the attached invoice and 75% progress report of work performed to date.

During this time period, we successfully:

- organized and completed one webinar with our collaborators
- participated in the Colorado Water Wise Symposium
- initiated direct technical assistance with Fort Collins Utilities (FCU)to develop a water budget
- provided educational assistance to three communities/organizations.

Tasks Performed to Date Since 50% Report

TASKS		
Task	% Complete	Amount $
Task 1. **Education, Resource and Information Sharing** WRA and Water Demand Management (WDM) successfully completed one webinar in January 2021 that was attended by approximately 30 participants. The webinar included the following educational information: • a short summary of the project and its background • the history of water budgets and how they are used • a discussion of different types of water budgets • a discussion on how to use water budgets and how they can be tied to rate structures • a case study examples of best practices WRA, along with Aurora Water and the Brendle Group, participated and presented on a panel at the annual virtual Colorado Water Wise (CWW) Symposium held on October 27, 2020. The panel, entitled "*Understanding Urban Conservation Programs in Colorado*", provided participants with an overview of the results of a statewide survey administered in August 2020 regarding of the state of conservation programs across Colorado, including discussions related to the measurable objectives of Colorado's Water Plan,	85%	$7,743

the 1051 CWCB database, and grant and funding opportunities available to communities for the implementation of conservation programs. We plan to hold one additional webinar in March 2021.		
Task 2. **Grant Writing Workshops** Due to ongoing measures to prevent the spread of COVID-19, WRA was not able to provide grant training workshops as part of this grant. We have, however, continued to pursue direct education and outreach to communities with regards to implementation support (Task 3). Following the CWW Symposium, WRA was contacted by three organizations/communities about education and funding opportunities. In consultation with, and agreement from, Colorado Water Conservation Board (CWCB) staff we decided to dedicate the remaining funds under this section towards direct community support for program implementation, as well as targeting communities to provide support to update their Water Efficiency Plans (Task 3).	50%	$10,496.66
Task 3. **Implementation Support** Following the CWW Symposium, WRA and WDM were approached by FCU to discuss the potential to apply for a CWCB grant for the creation of single-family residential water budgets. After consultation with, and agreement from CWCB, WRA and WDM held multiple meetings to discuss the scope of work and initiated the provision of technical support for the development of the water budgets. Since our outreach with Northern Water to identify the status of Water Efficiency Plans (WEPs) of their allottees, outlined in our previous report, we also collaborated with CWCB, who provided us with a list of WEPs across Colorado to use as reference for prioritizing community help. As an initial step, WRA researched priority communities and targeted stakeholders to contact. We plan to continue this effort during the remaining 6 months of the grant.	70%	$7,818.57

Task 4. **Metrics of Success** WRA has created a document that tracks funding success rates, including lessons learned and other barriers to implementation. Due to the current state funding discussions and processes stemming from COVID-19 repercussions, the CWCB approved grants at the July Board meeting, rather than the May meeting. Data stemming from that meeting was added to our tracking document. WRA has initiated efforts to develop a reporting tool to track the success of the CWCB program as a function of the measures achieved through the grants submitted in relation to the CWP criteria. We expect to work closely with the CWCB in the upcoming 6 months to refine this component of the project.	50%	$2,100
Reporting WRA has completed the 75% report – delivered herein.	75%	$420
TOTAL	75%	$28,578.57

Project Goal

The overall goal of this grant is to accelerate the implementation of Colorado's Water Plan (CWP) by enabling communities to plan for and meet their water conservation targets, ultimately achieving greater water security, as well as becoming model regional leaders and champions.

Project Objectives

The overall objective of this grant is to accelerate the number of water conservation and efficiency programs implemented across Colorado, resulting in measurable advances towards the goals of the CWP.

More specifically, our objectives are to:

1. Provide educational webinars, workshops, resources and other tools to 35-45 communities to support their efforts to increase water conservation and efficiency, and water security.
2. Provide educational workshops, resources and other tools to support successful grant applications by up to 15 water providers to the CWCB to undertake water conservation and efficiency projects, and water and land use planning integration implementation projects, to advance the goals of the CWP.
3. Provide direct assistance to at least 15 water providers to submit grant applications to the CWCB to undertake water conservation and efficiency, and water and land use planning integration implementation projects.
4. Provide direct technical assistance to at least 5 communities who submitted successful grants, to ensure the successful implementation of the projects.
5. Track conservation and efficiency measures of CWCB grants programs to enable CWCB to determine the impact of specific programs and policies on implementation of water efficiency and conservation efforts.

Project Deliverables

Task 1 - **Education, Resource and Information Sharing**

This task is aimed at providing a suite of 3 webinars to inform water providers and other community stakeholders about the types of grants, technologies, and programs available to help advance the implementation of water conservation and efficiency projects.

Progress to date:

WRA, along with collaborators from the Brendle Group and Aurora Water, presented on a panel at the annual virtual Colorado Water Wise (CWW) Symposium on October 27, 2020, attended by approximately 45 participants. The panel entitled "*Understanding Urban Conservation Programs in Colorado"* discussed the following:

- problem statement about what we know (and don't know) about urban water conservation programs in Colorado
- draft survey findings and lessons learned for the State of Colorado and CWW
- resources available to utilities, including grant funding, technical assistance programs, and resource materials

WRA and WDM along with our collaborators from FCU, ran an interactive educational webinar in January 2021 that was attended by approximately 20 stakeholders. The information presented in the webinar included:

- An overview of Fort Collins Utilities and their conservation programs, including their reasoning for wanting to pursue developing robust single-family residential water budgets.
- A history of water budgets, how they are and can be used.
- A discussion about the different types of water budgets and the similarities and differences of each based on the targeted use.
- A discussion of how water budgets can be used to develop and implement water conservation and efficiency programs and incentivize water users to reduce indoor and outdoor water use.
- A Presentation case studies of successful water budgets and their implementation in Colorado and nationwide.

The webinar was hosted by FCU and targeted 30 stakeholders including elected officials, decision-makers and staff from across five departments.

Deliverables:

- Webinar outlining the development, use, and importance of water budgets for developing effective and equitable water programs.
    - *Webinar – Appendix A – Copy of Presentation*
- A written brief summarizing community interests, barriers and needs.
    - *To be included in Final report*
- Summary sheet of lessons learned to integrate into future webinars.
    - *To be included in Final report*

Challenges and Lessons Learned:

Overall, during this period, we have not encountered any specific challenges relating to webinars and panel discussions. In fact, the panel presentation was welcomed enthusiastically, and we learned that there are many communities who are still not accessing information regarding funding and assistance opportunities that are available to all providers. These lessons will inform a discussion on how this information could be stored in a centralized area with access to current resources provided by both the state and other organizations, with links included in newsletters and webpages of different organizations who are primary partners and collaborators.

Task 2 - **Grant Writing Workshops**

The aim of Task 2 is to run a suite of workshops targeted specifically at identifying funding programs tailored to explicit community needs, providing resources and examples of best practices for writing grants, providing direct grant-writing support, and ensuring each participant completes the workshops with a drafted grant proposal.

Progress to Date:

Due to the ongoing COVID-19 issues, we were unable to hold the scheduled workshops. However, following our panel presentation at the 2020 annual virtual CWW symposium, we were approached by three communities/organizations regarding grant and funding opportunities and technical assistance. Several educational/informational meetings were held, including the agreement (following discussions with and approval by CWCB) to provide direct technical assistance to Fort Collins Utility to create water budgets for their single-family residential sector rather than apply for a CWCB grant for this phase I (see Task 3).

Deliverables:

- Three workshops for water provider and community leaders providing direct grant-writing, educational, and skill-building opportunities.
    - *None to date – shifted to Task 3.2*
- Summary sheet describing lessons learned from each workshop, including examples of successful applications and reasons for less successful applications to integrate into future workshops.
    - *None to date – shifted to Task 3.2*

Challenges and Lessons Learned:

In an effort to ensure we were able to provide continued assistance, WRA discussed with CWCB alternative opportunities for engagement through direct assistance as discussed under Task 3. In consultation with and agreement from CWCB staff, we decided to dedicate the remaining funds under this section towards direct community support for program implementation, as well as targeting communities to provide support to update their Water Efficiency Plans.

Task 3 - **Implementation Support**

The aim of Task 3 is to provide direct grant writing assistance to interested communities to ensure they can submit grant applications. (3.1), and once funding is granted, provide direct assistance for implementation of the conservation and efficiency programs. (3.2). Further, we are providing direct assistance to communities more generally.

Progress to Date:

3.1 – *Direct Grant Writing Support*

Following the change in the CWCB grant cycle and the lack of funding available through CWCB for project support and implementation, our focus has shifted more towards providing direct technical support to communities. If opportunities and needs arise to help prepare a grant we will continue to provide that support.

3.2 – *Direct Implementation Support*

Given the challenges caused by COVID-19 and our inability to move forward with Task 2, WRA has pivoted towards opportunities to accelerate our focus on Task 3.2.

This direct assistance is in the form of helping define and implement specific community projects (such as with Fort Collins Utility), as well as identifying and undertaking outreach to communities requiring support in updating their Water Efficiency Plans.

Specifically, WRA and WDM focused on two tasks during this period:

- Research and analysis of priority communities and points of contact to discuss providing assistance to update their Water Efficiency Plans (WEP).
    - CWCB provided WRA and WDM a list of the status of WEPs across Colorado. We then parsed them according to the date of expiry, the technical assistance needs, and the potential impact on improving water conservation and efficiency efforts.
    - WRA also used their database of informational interviews to understand which of those priority communities had a strong conservation ethic, political will, and potential desire to make effective use of direct assistance.

- WRA and WDM have created a short list of communities, including the City of Fort Morgan, City of Salida, City of Sterling, Durango, Dacono, Town of Frederick, and Town of Estes Park. We will be reaching out in the months of January and February 2021 to discuss the technical assistance that we can provide in updating those WEPs in the next two to three months.

- Direct technical support to FCU to create water budgets for single-family residential units.
  - As part of our discussions, WRA and WDM met with staff from FCU to discuss options for either submitting a grant to create these budgets, or to provide direct support to create these given the expertise and past experience in creating similar budgets. Following consultation with CWCB, we proceeded with providing direct technical support, through the development of a SOW and MOU in November and December 2020.
  - Initial data analysis has been conducted and draft water budgets were presented in early January to FCU for discussion. A second additional data analysis and budget refinement effort is taking place and will be presented to FCU in February.
  - In conjunction with FCU, WRA and WDM held a webinar with 30 utility staff, elected officials and decision-makers to educate a broad group of potential stakeholders about the utility of water budgets for helping not only water users decrease their water consumption, but also as a basis for creating incentives and programs, such as rate structures (see Task 1). A follow-up webinar will be given in March 2021 discussing the research and analyses results, the water budgets created for FCU, and the potential next steps for helping educate the broader (customers and providers) community about how to build programs and policies to support great water conservation and efficiency practices. We are also in discussions about creating a best-practices report for creating and using water budgets.

Deliverables:

- A brief summary of the type and amount of direct assistance provided to communities in the form of grant writing technical expertise and to support grant application following a workshop.
  - *Not Applicable*
- A brief summary of the type and amount of direct assistance provided to communities, in the form of project implementation technical expertise, to support the development of water budgets.
  - *Appendix B – SOW with Fort Collins Utilities- Water Budget assistance*

Challenges and Lessons Learned:

Despite our outreach efforts through our networks and some one-on-one meetings, we discovered that many communities and providers were not necessarily aware of the assistance provided through this grant. However, following the panel presentation at the annual virtual CWW Symposium, interest from communities in seeking direct assistance and informational education increased. This resulted in our work with Fort Collins Utilities. We will continue to increase our outreach activities by advertising our grant writing and technical assistance support through our networks, to ensure that we continue to have the greatest impact. We propose to further advertise this more clearly on our webpage and CWW newsletters.

Task 4 - **Metrics of Success**

The aim of Task 4 is to build, in collaboration with the CWCB, a reporting tool that will track conservation and efficiency measures implemented through grant programs (Task 4.1) and to measure the impact of implemented policies and programs in relation to changes in water demand captured in the current CWCB 1051 database reporting tool (Task 4.2). Together, these tools will enable the CWCB to track the effectiveness

of its funding, the return on investment, and the impact of given programs and policies that can be shared regionally across water provider networks.

Specifically, we aim to track the grant funding success rate at the end of each cycle, including lessons learned regarding enabling factors and barriers to success (Task 4.1) and to develop a simple reporting tool with the CWCB that captures the criteria of each CWCB grant program and specific conservation measures achieved by the funded projects (Task 4.2).

Progress to date:

4.1 – *Tracking Project Funding Rate*

WRA has drafted a preliminary tracking database. This database is primarily focused on grants submitted to CWCB beginning in FY 2019-2020. This database will track the project focus area, funding requested, matching funds, measurable criteria reported, success in project funding, lessons learned, and barriers to implementation. The database may evolve to include additional metrics. Due to the changes in the budget and grant administration approved at the July CWCB Board Meeting, including extending the current funds over a three-year period and changing the application deadlines from two rounds per year to one (December 1), this database now will also include information tracking all projects submitted to CWCB grant program, with particular focus on Colorado Water Plan Grants (CWPG), Water Efficiency Grants (WEG) and Water Supply and Reserve Fund grants (WSRF).

4.2 – *Reporting Tool*

WRA has drafted a preliminary reporting tool that will track CWP criteria and metrics. WRA and WDM will continue to work closely with the CWCB to understand what information will be most useful to track and ensure it is streamlined with other CWCB tools and processes—particularly as it may relate to, and support, CWP updates.

Deliverables:

- Final yearly summary document of lessons learned.
    - *To be included in final report*
- Summary sheet listing the communities the document was shared with.
    - *To be included in final report*
- Reporting tool created and implemented.
    - *Included in 50% report and implemented tool to be included in the final report*

Challenges and Lessons Learned:

- The main challenge faced in the development and implementation of the tracking and reporting tools is to define the actual need and components of such need, as they relate to the CWCB. In order to make this most efficient and impactful for the CWCB in tracking project success, we hope to have more discussions to understand how this may be framed around areas such as updates to the HB-1051 database already administered by CWCB, as well as how this may support any of the ongoing CWP update structures and activities.

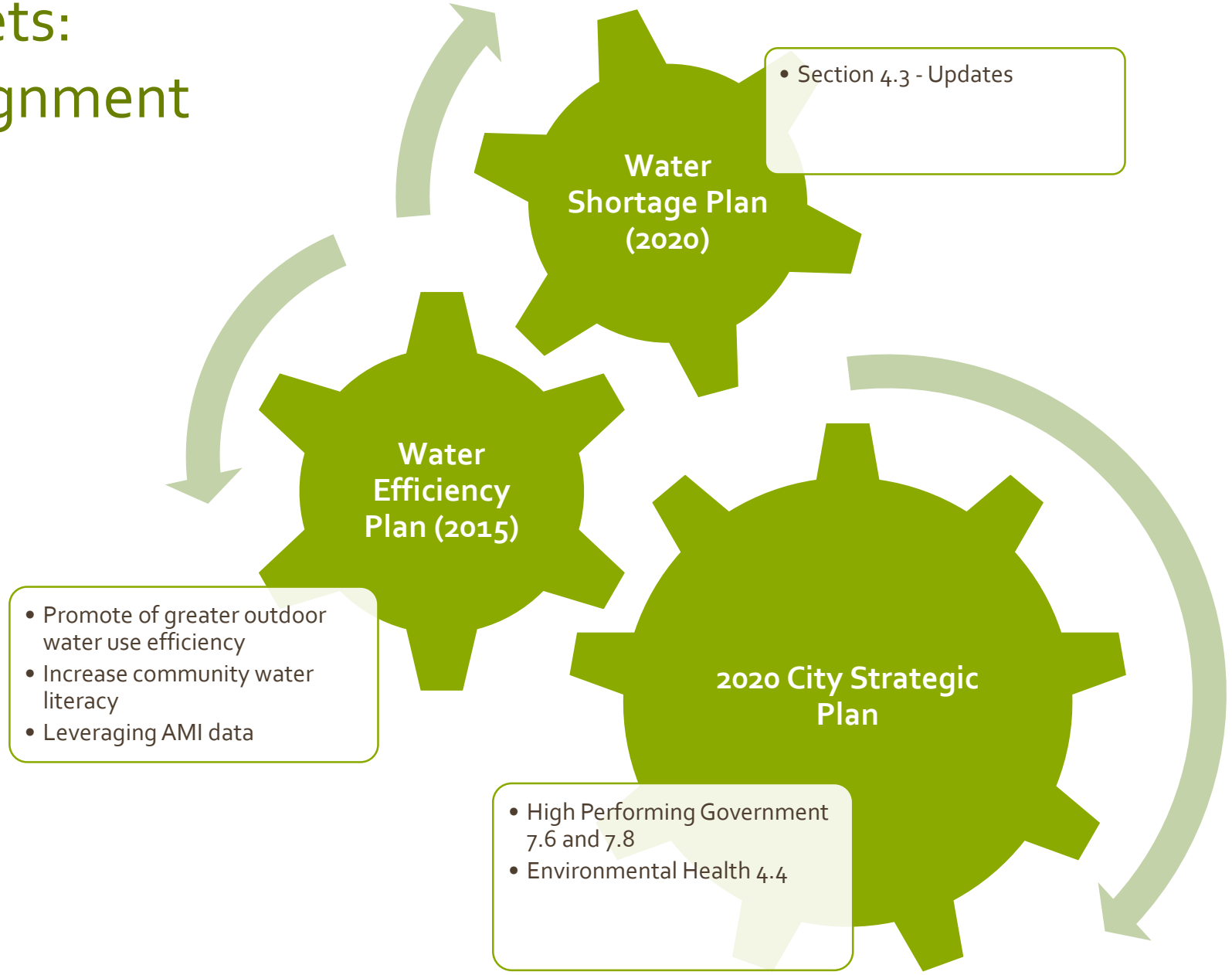
Appendix A - CWCB #2583

Water Budgets:

Introduction and Review of an Innovative Management Tool

Mariel Miller, Fort Collins Utilities
Abbye Neel, Fort Collins Utilities
Charlotte Roehm, Western Resource Advocates
Peter Mayer, WaterDM

Water Budgets: Strategic Alignment



Water Budgets:
Water Conservation's Objectives

1. Improve customers' water use understanding
2. Determine customer eligibility for programs
3. Home Water Report - messaging for better demand management
4. Build upon success of commercial and HOA landscape water budgets (outdoor only)
5. FUTURE: Manage demand during a water shortage

Community Technical Assistance

- Western Resource Advocates (WRA) and Water Demand Management (WDM)
  - CWCB Grant Jan 2020 – Jun 2021
  - Provide **free technical assistance** for:

- Grant writing - to communities and water providers seeking funds to implement water conservation and efficiency, land use and water integration, and reuse projects and programs.

- Water Efficiency Plan (WEP) writing – to help update or write WEPs

- Project implementation - to support communities and water providers implement projects and programs

WESTERN RESOURCE ADVOCATES

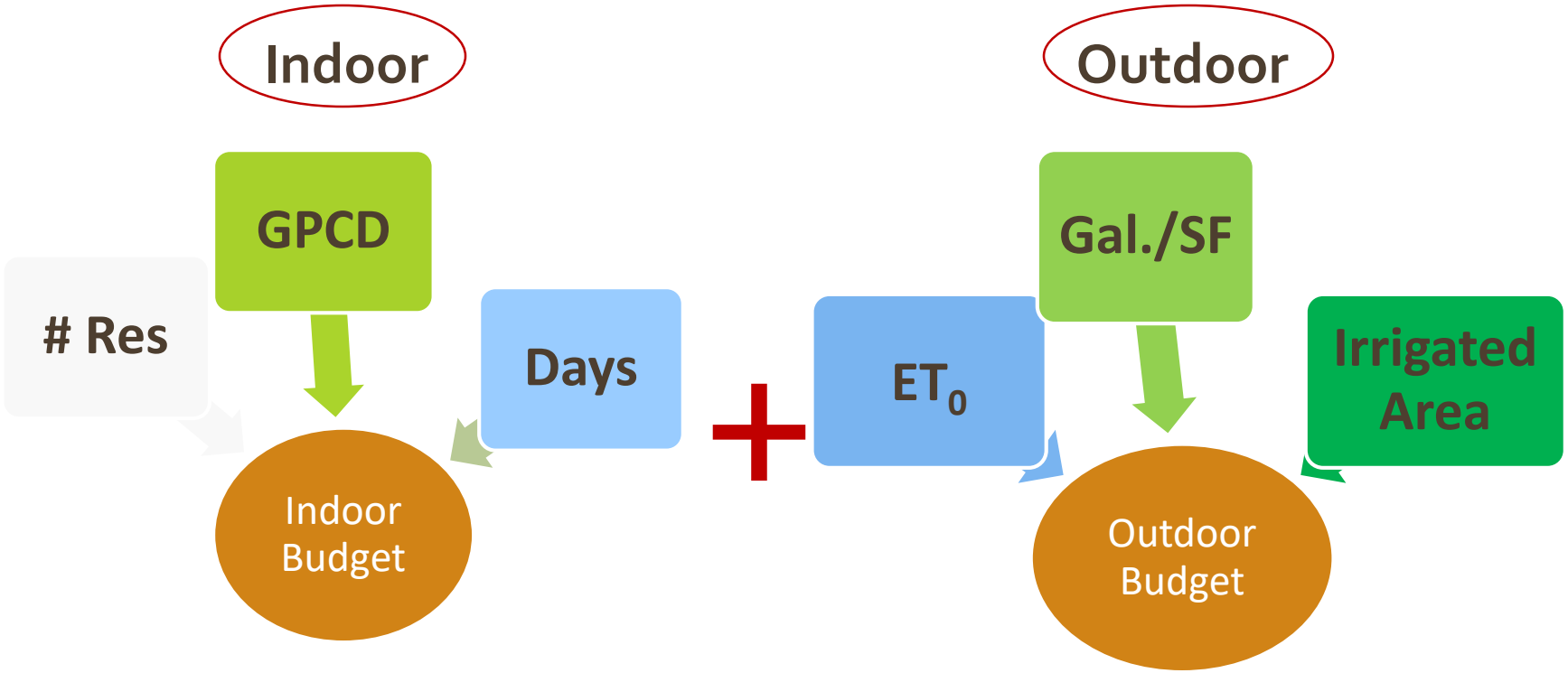
WaterDM DEMAND MANAGEMENT

COLORADO Colorado Water Conservation Board Department of Natural Resources

What Are Water Budgets?

- A water management tool used to estimate the volume of water a building and or a landscape will reasonably require through the year.
- The landscape water budget considers the size of the landscape, the landscape water requirement, climate, and other factors.
- The building (indoor) water budget considers the number of people, and other factors.
- Water budgets are used informationally to communicate with customers or connected to an inclining block rate billing structure.
- In Fort Collins – "water budgets" are distinct from "water allotments".

Creating Customer Water Budgets - Example



(# Residents) (50 gpcd)(365) + (SF Landscape Area) (Water Requirement) = Water Budget

History of Water Budgets

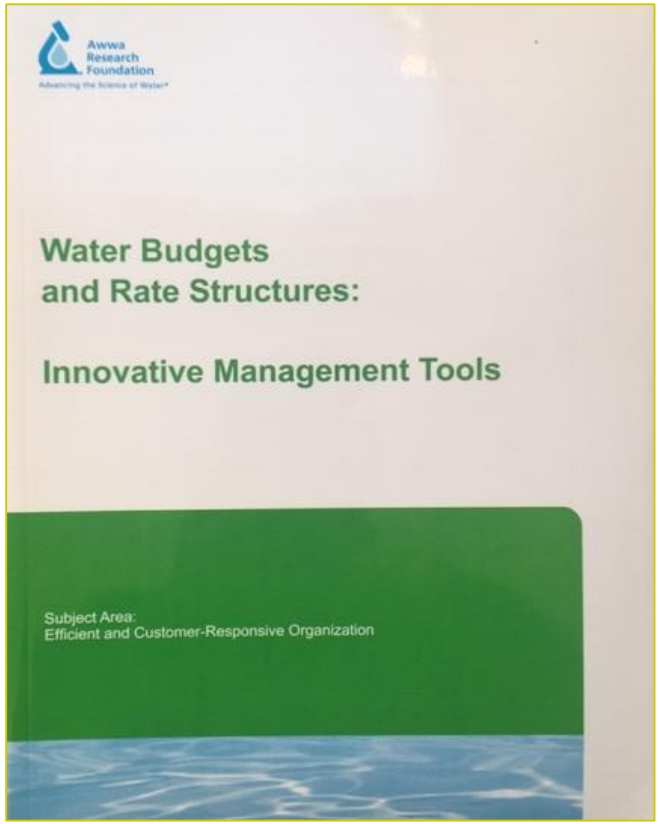
First used in agriculture.
Standard practice to calculate the water needs of a crop or field.
Concept adapted to urban landscapes.

1991-1993 – California

- Irvine Ranch Water District
- Otay Water District
- San Juan Capistrano, CA

2021 – California

- Los Angeles DWP
- Eastern Municipal WD
- Moulton Niguel WD
- Western Municipal WD
- El Toro WD
- Las Virgenes Municipal WD
- Rancho California WD
- Coachella Valley WD
- Inland Empire Utilities Agency
- Elsinore Valley Municipal WD
- Valencia Water Company
- *and many more….*



2008 Water Research Foundation Study documents 20% - 37% reductions in water use in California utilities after moving to water budget-based rates.

Colorado Water Providers that Use Water Budgets

Water Budgets + Tiered Rate Structure

- Centennial Water District (2003!)
- Castle Rock
- Boulder
- Greeley

Water Budgets for Water Management

- Denver Water
- Westminster
- Northern Colorado Water Conservancy

Essential Water Demand Management Tool

- CA providers used water budgets to manage recent drought response.
- 2020 research from the Alliance for Water Efficiency shows utilities with water budgets had among the most effective drought response.
- CA is using water budgets to understand utility water use at a state planning level.

Centennial Water & San. District - Water Budget History

- In response to the 2002 drought, the District implemented a water budget rate structure in 2003
- 27 inch budget from April 15 – October 15, based on bluegrass plant water requirement (27 inches)
- Commercial and non-residential irrigated area is submitted by customer and verified by CWSD
  - Non-residential indoor water budgets are calculated based on the size of the meter servicing the business. Each customer is allotted 189,000 gallons per ¾" equivalent.
- Outdoor residential budget is based on lot size. 45% of lot size is considered irrigable
  - Indoor is 6,000 gallons per month, based on 65 gpcd for a family of 3

CENTENNIAL
WATER AND SANITATION DISTRICT

Centennial Improvements Since Adoption in 2003

- Permit program to increase the water budget over a 3 week period once per year for customers wanting to add new sod or make repairs in April, May, September or October discourages planting during the heat of the summer.
- A variance for households with a population greater than three persons supports fairness throughout the service area.
- Water budgets were increased by 1,000 gallons per equivalent per month during the winter to accommodate winter watering of trees and shrubs
- In 2007 the non-residential irrigation water rates for water use above 100% of budget were increased in order to help encourage more water conservation in that customer group.
- Non-residential indoor water budgets were changed from allotments based on historical usage to an allotment based on meter size. Historical usage was not effective in promoting conservation.

CENTENNIAL
WATER AND SANITATION DISTRICT

Centennial 2019 Rate Structure and Rates

% of Water Budget	Inches of Water
0 - 100	0 - 27"
101 - 120	27 - 32"
121 - 140	32 - 38"
> 140	> 38"

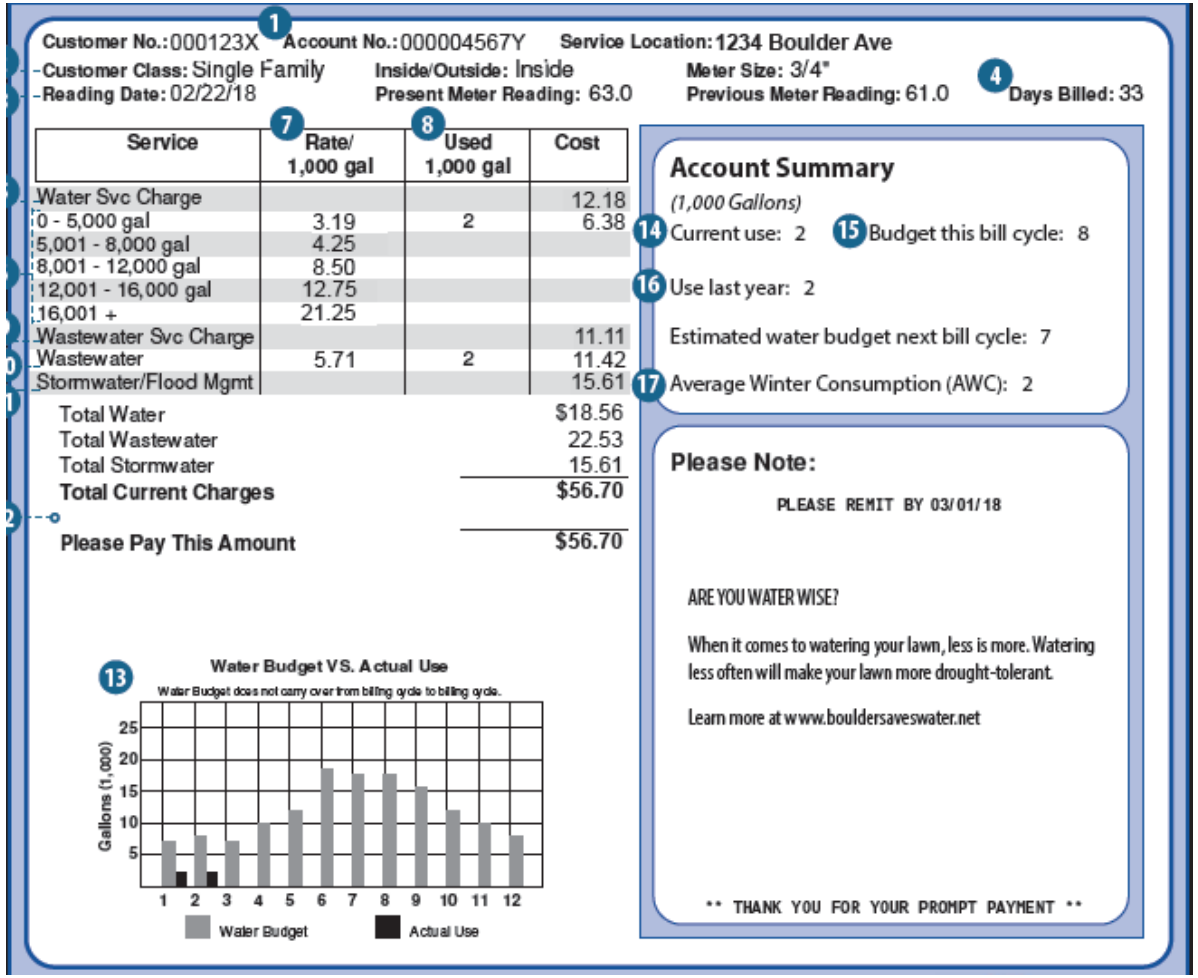
Future Of Water Budget???

- Vegetation specific budgeting (currently implemented at 1 HOA)
- Reduction of budget from 27 inches

WATER
Intentional
Sustainable
Efficient

CENTENNIAL
WATER AND SANITATION DISTRICT

Boulder



Customer No.: 000123X (1) Account No.: 000004567Y Service Location: 1234 Boulder Ave
Customer Class: Single Family Inside/Outside: Inside Meter Size: 3/4"
Reading Date: 02/22/18 Present Meter Reading: 63.0 Previous Meter Reading: 61.0 (4) Days Billed: 33

Service	(7) Rate/ 1,000 gal	(8) Used 1,000 gal	Cost
Water Svc Charge			12.18
0 - 5,000 gal	3.19	2	6.38
5,001 - 8,000 gal	4.25		
8,001 - 12,000 gal	8.50		
12,001 - 16,000 gal	12.75		
16,001 +	21.25		
Wastewater Svc Charge			11.11
Wastewater	5.71	2	11.42
Stormwater/Flood Mgmt			15.61
Total Water			$18.56
Total Wastewater			22.53
Total Stormwater			15.61
Total Current Charges			**$56.70**
Please Pay This Amount			**$56.70**

(13) Water Budget VS. Actual Use
Water Budget does not carry over from billing cycle to billing cycle.
Gallons (1,000): 25, 20, 15, 10, 5
1 2 3 4 5 6 7 8 9 10 11 12
Water Budget Actual Use

Account Summary
(1,000 Gallons)
(14) Current use: 2 (15) Budget this bill cycle: 8
(16) Use last year: 2
Estimated water budget next bill cycle: 7
(17) Average Winter Consumption (AWC): 2

Please Note:
PLEASE REMIT BY 03/01/18

ARE YOU WATER WISE?

When it comes to watering your lawn, less is more. Watering less often will make your lawn more drought-tolerant.

Learn more at www.bouldersaveswater.net

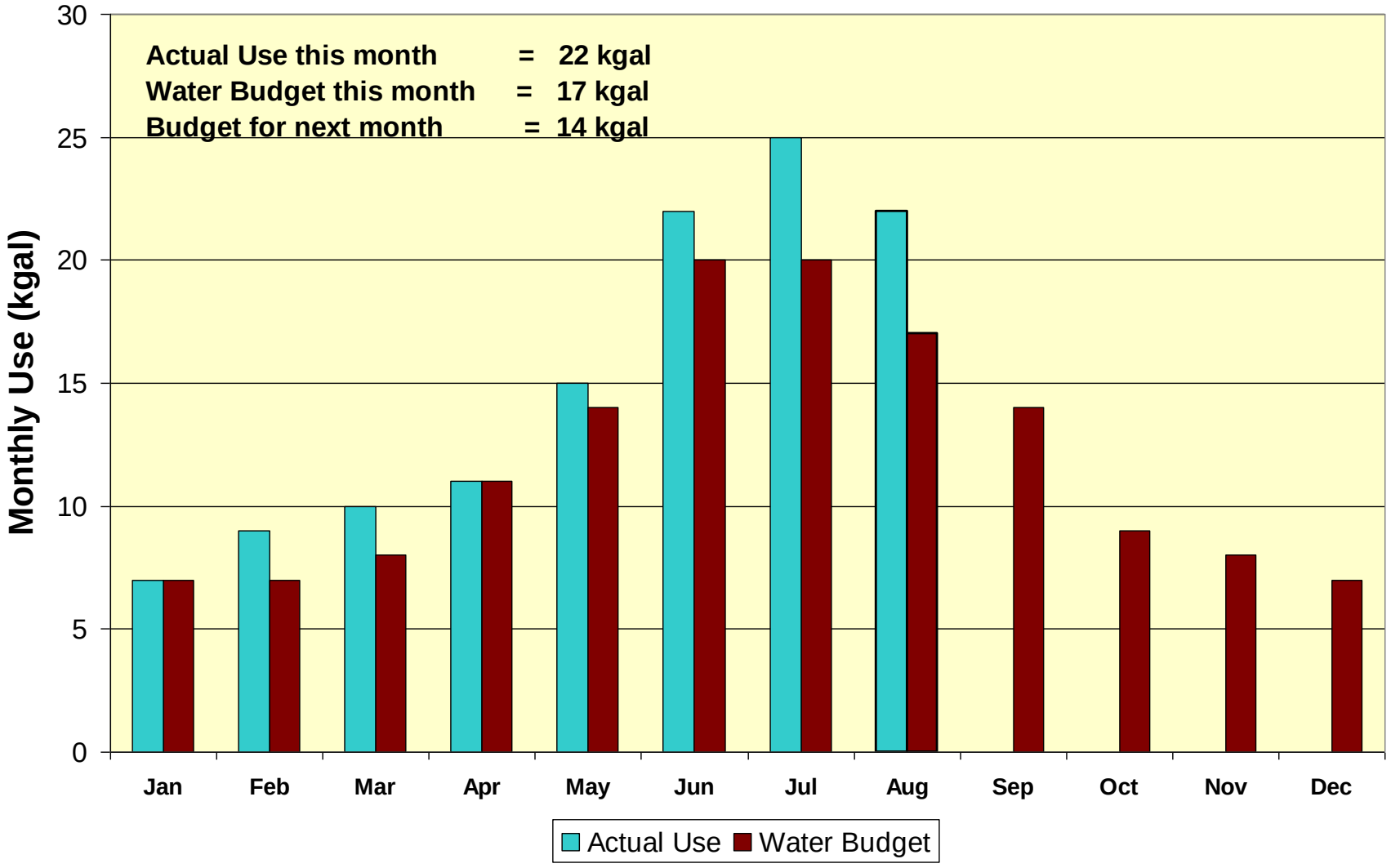
** THANK YOU FOR YOUR PROMPT PAYMENT **

In 2008, in response to the drought of 2002, City of Boulder implemented a five-tier water budget-based rate structure.

Indoor Budget is fixed at 7,000 gallons/month.

Outdoor budget is based on landscape area. The gallons per square foot provided is reduced as the landscape size increases.

Boulder Water Bill Graphic



City of Greeley - Why Water Budget?
A History

Drought of early 2000s galvanized the need for improving water efficiency.

2011: Pilot program to provide informational water budget to small group of single-family residential (SFR) customers

2013: All single-family residential customers received informational water budget on their bill

2016: Begin marketing and education on Water Budget

2017: Went live with Water Budget to all single-family residential customers with rates.

2020: Budgets adjusted (reduced) to make more reflective of actual use.

Greeley Water Budget Calculation – Summer Month

Household X: 4 persons ; 6,618 sq ft
Billing period: 9/15/2015-10/14/2015

Irrigated Area = 3,641 sq ft

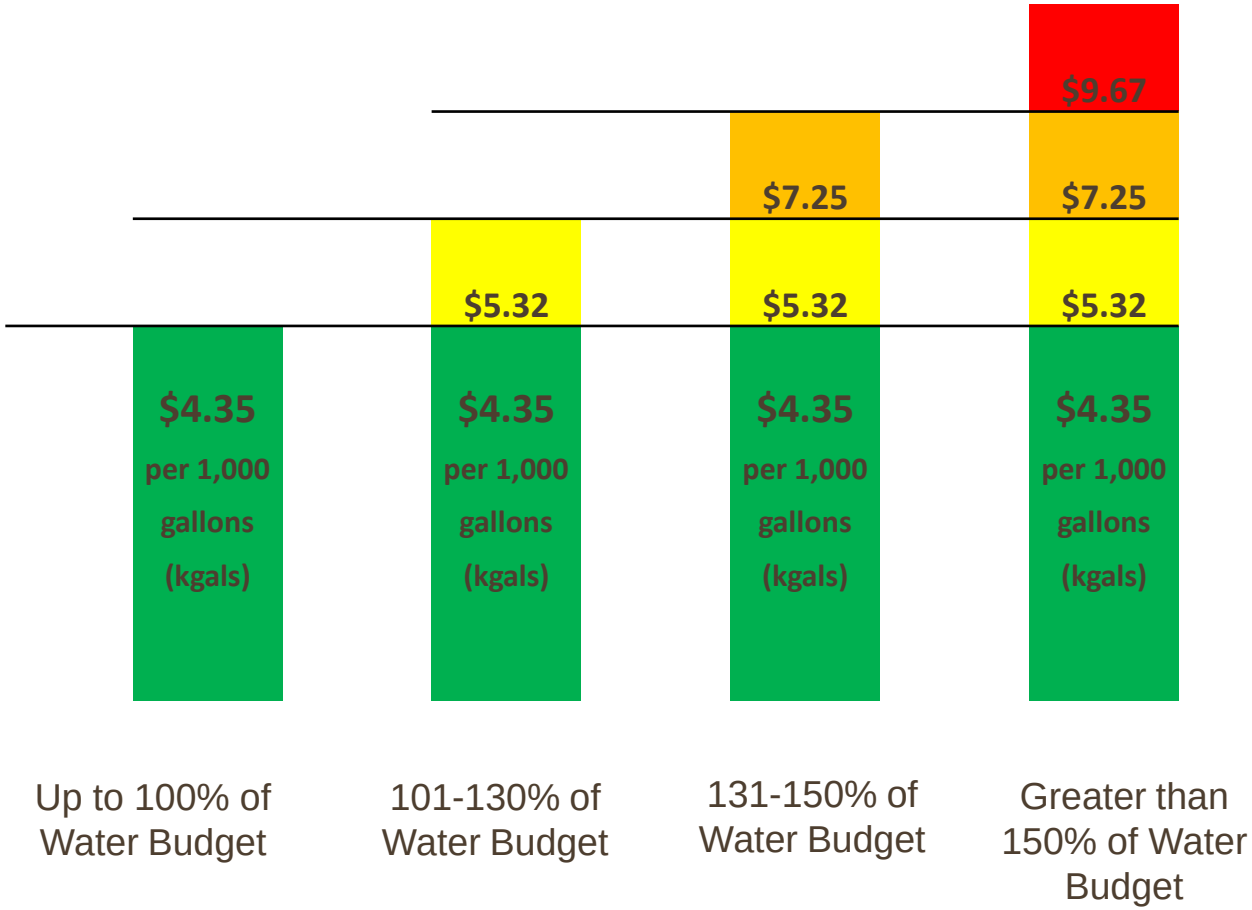
Irrigable Area = 6,618 sq ft

Indoor budget = PPH x **55 GPPD** x days
= 4 x 55 x 30
= 6,600 gallons
(round up to nearest kgal)
= **7 kgal**

Outdoor budget = IA x **IWR**
(IWR for billing period = 2.56 gal/sq ft – summer month)
= 6,618 x 2.56
= 16,942 gallons
(round up to nearest kgal)
= **17 kgal**

MONTHLY WATER BUDGET = **24** KGAL

Greeley 2019 SFR Water Budget Rate Structure

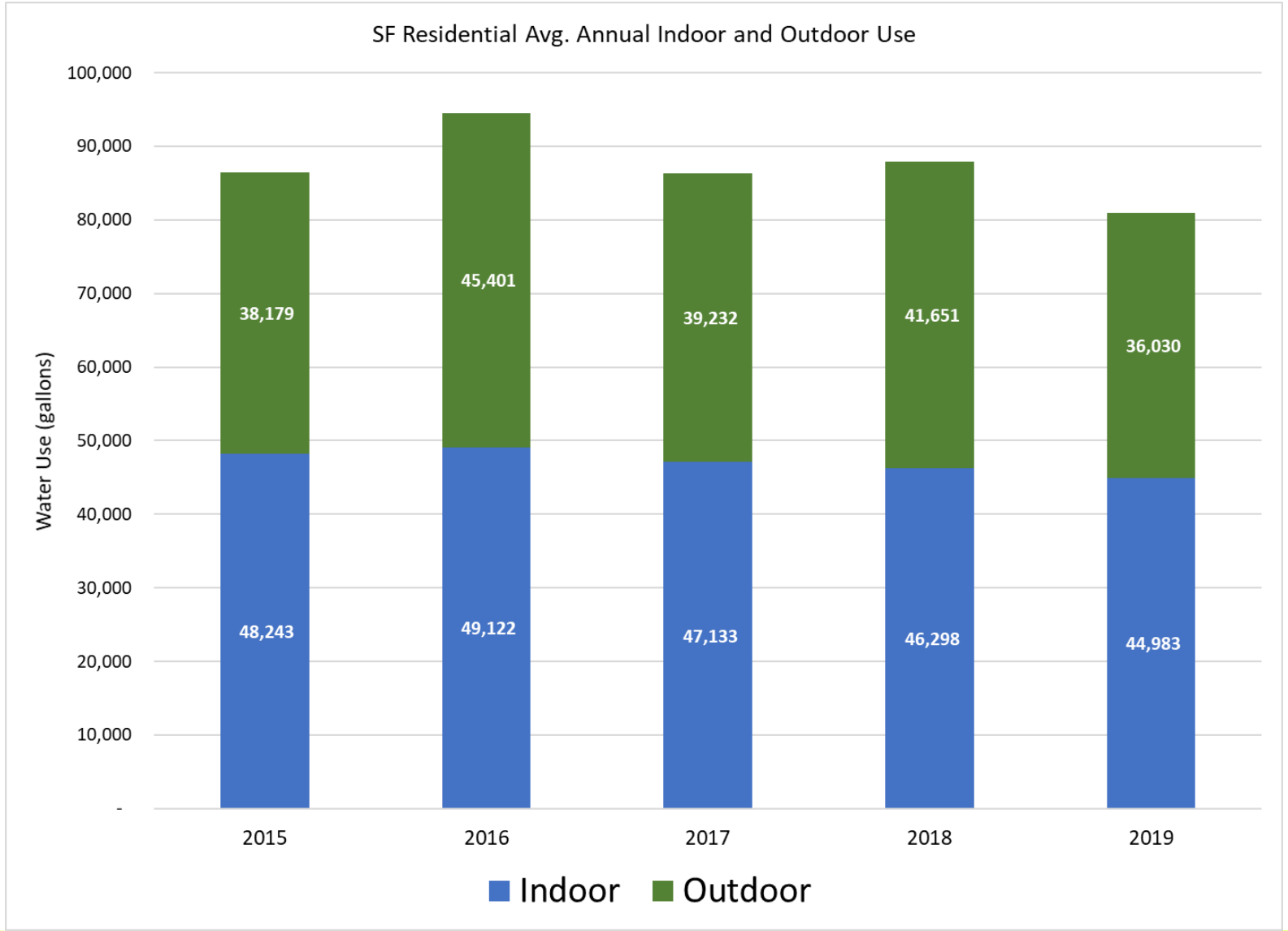


Water Budgets and Drought Response

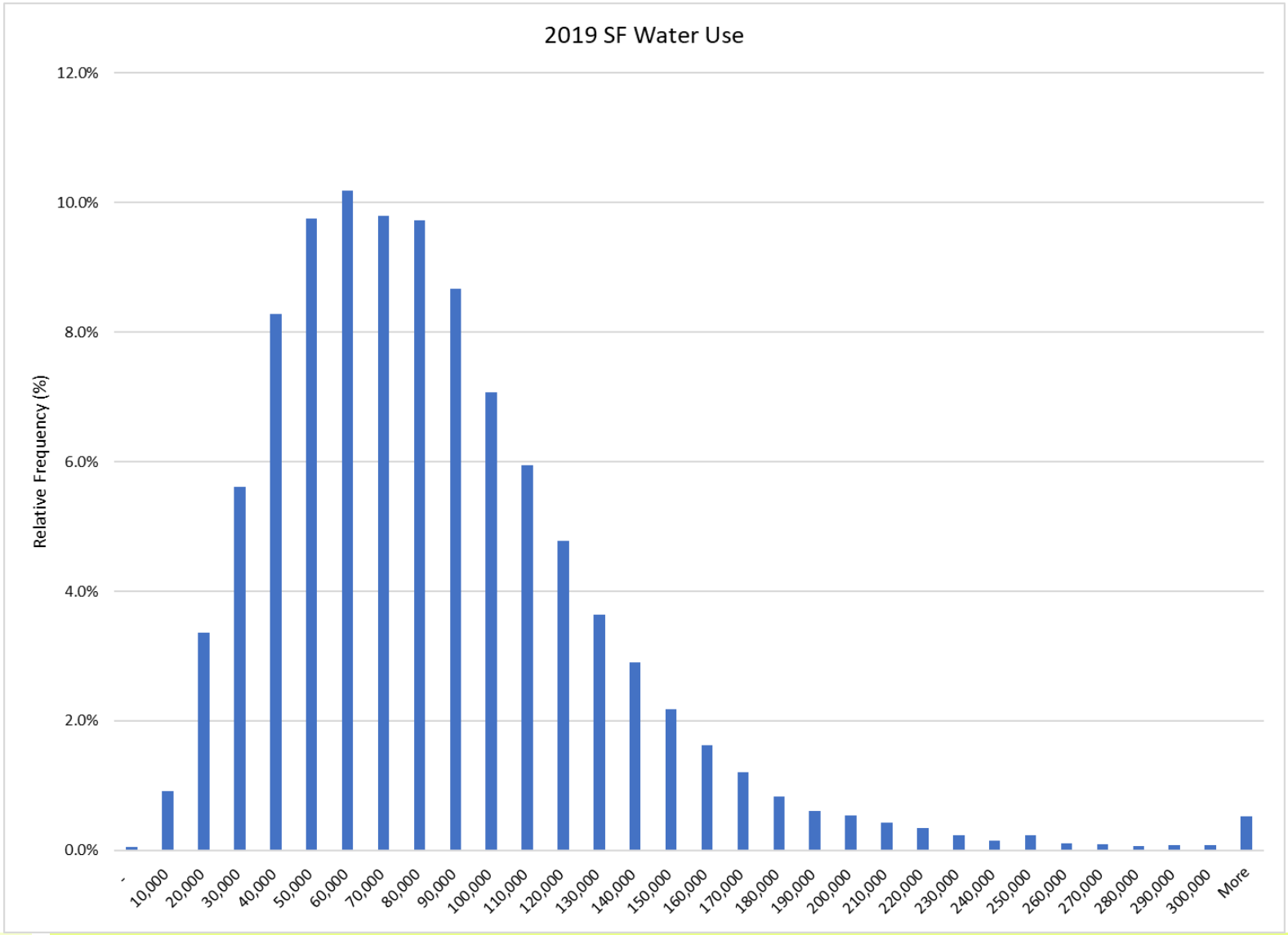
During a Drought……

- Landscape water budgets can be reduced as necessary (10%, 20%, ….)
- Percent reduction impacts large landscapes and small landscapes differentially and equitably.
- The monthly water budget (indoor & outdoor) becomes a method for monitoring compliance with drought response – for every customer, every month.
- 2020 research from the Alliance for Water Efficiency shows utilities with water budgets had among the most effective drought response.

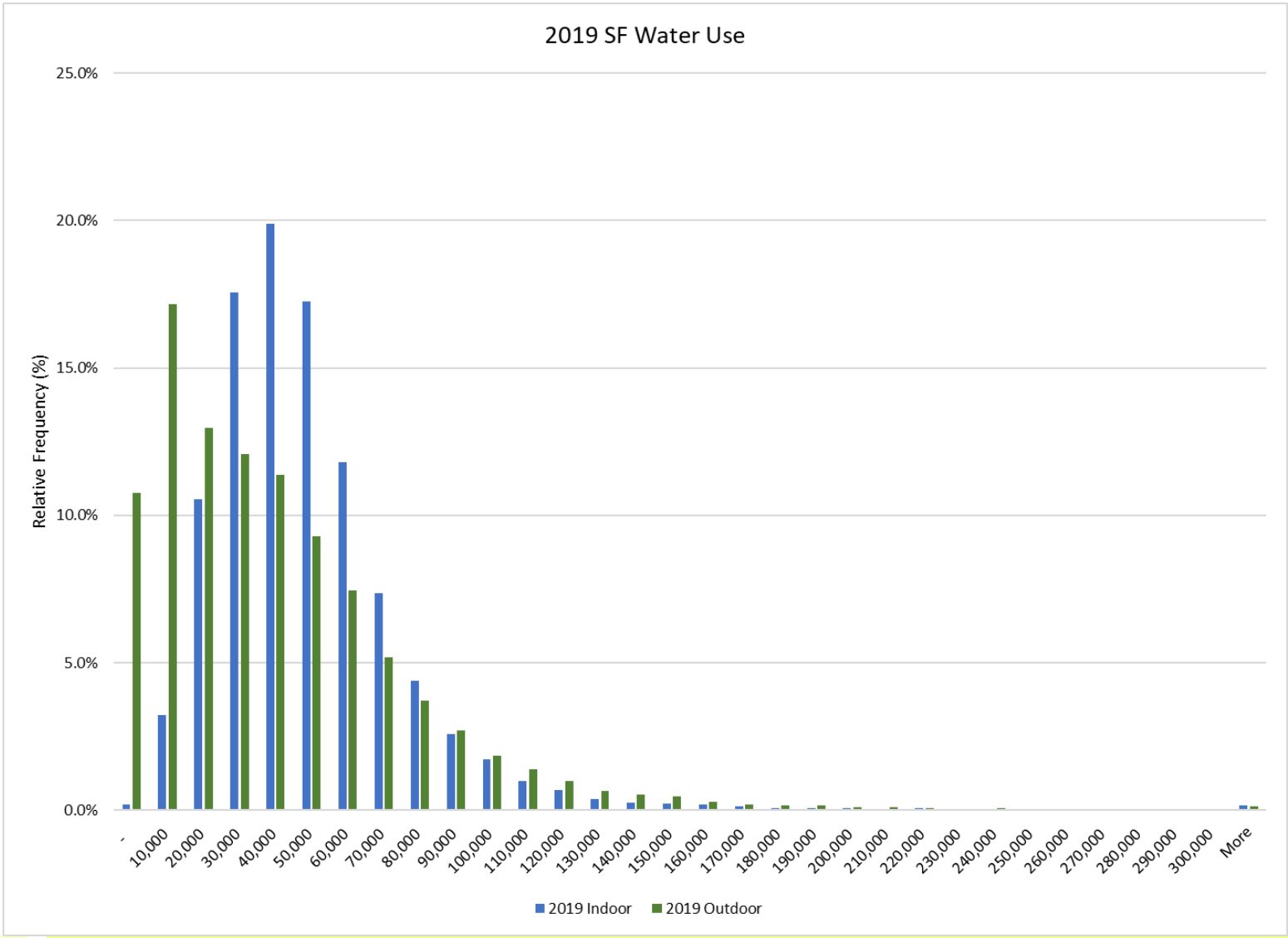
Fort Collins SF Indoor and Outdoor

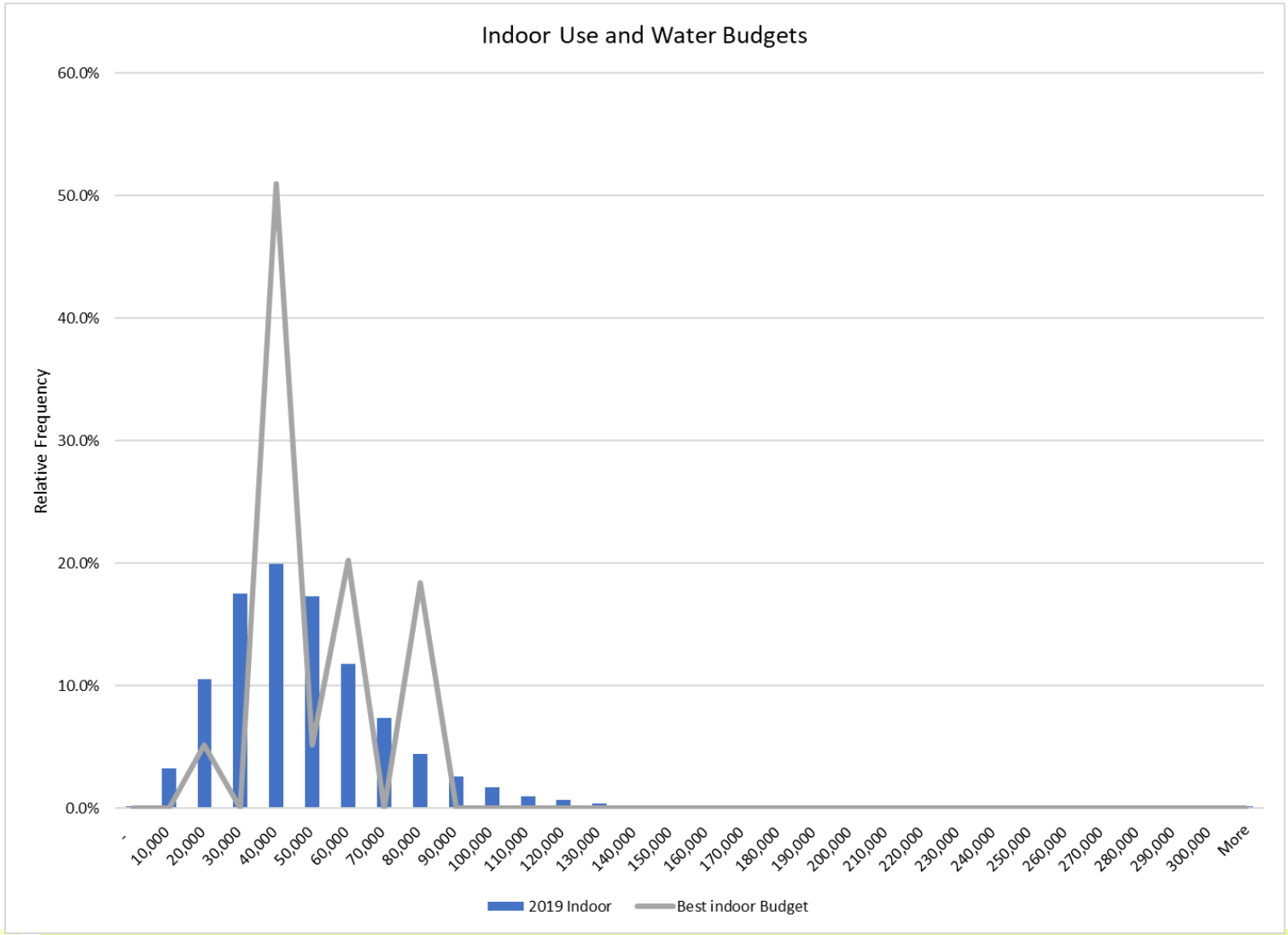


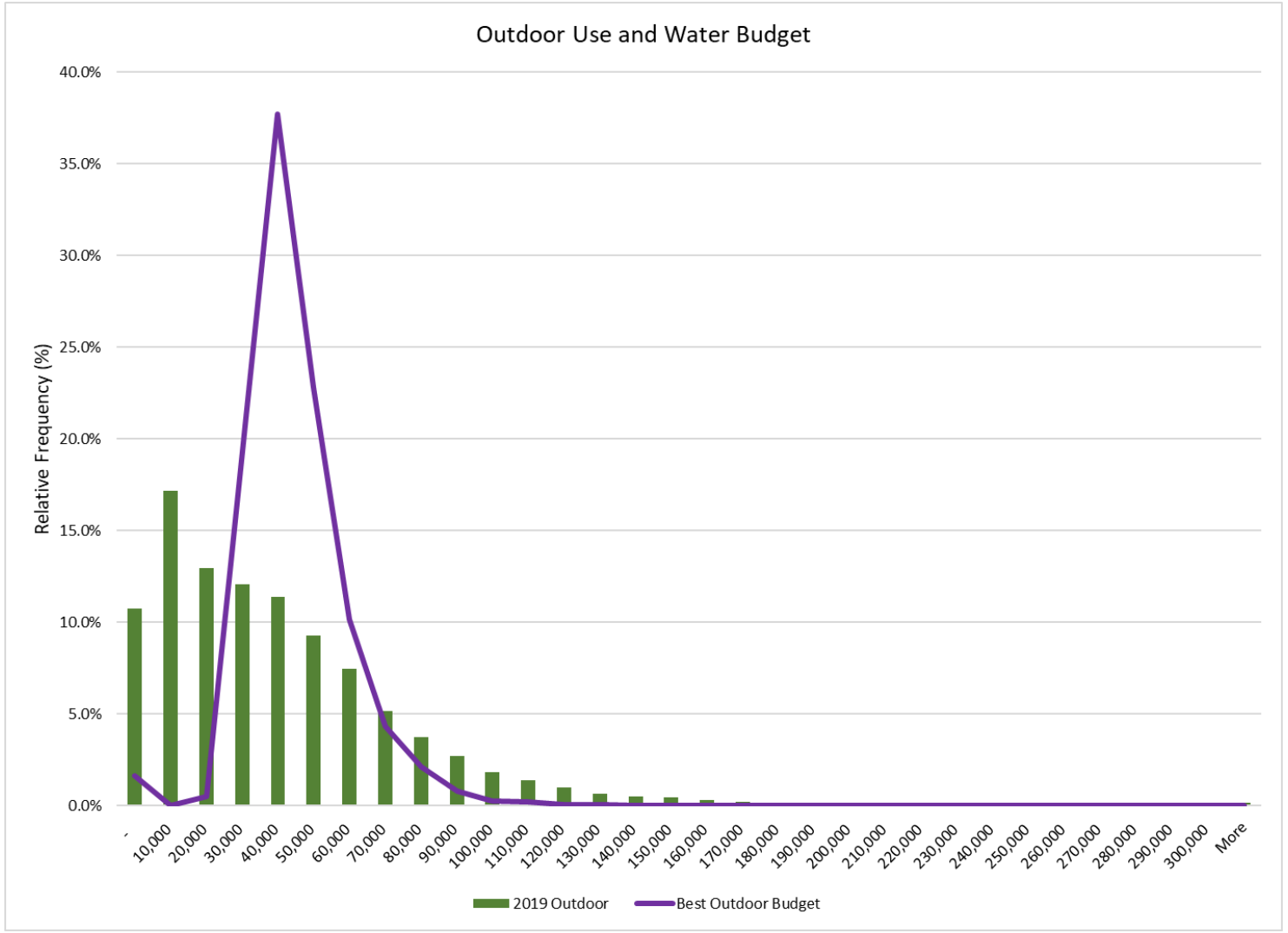
2019 Single-Family Water Use Distribution

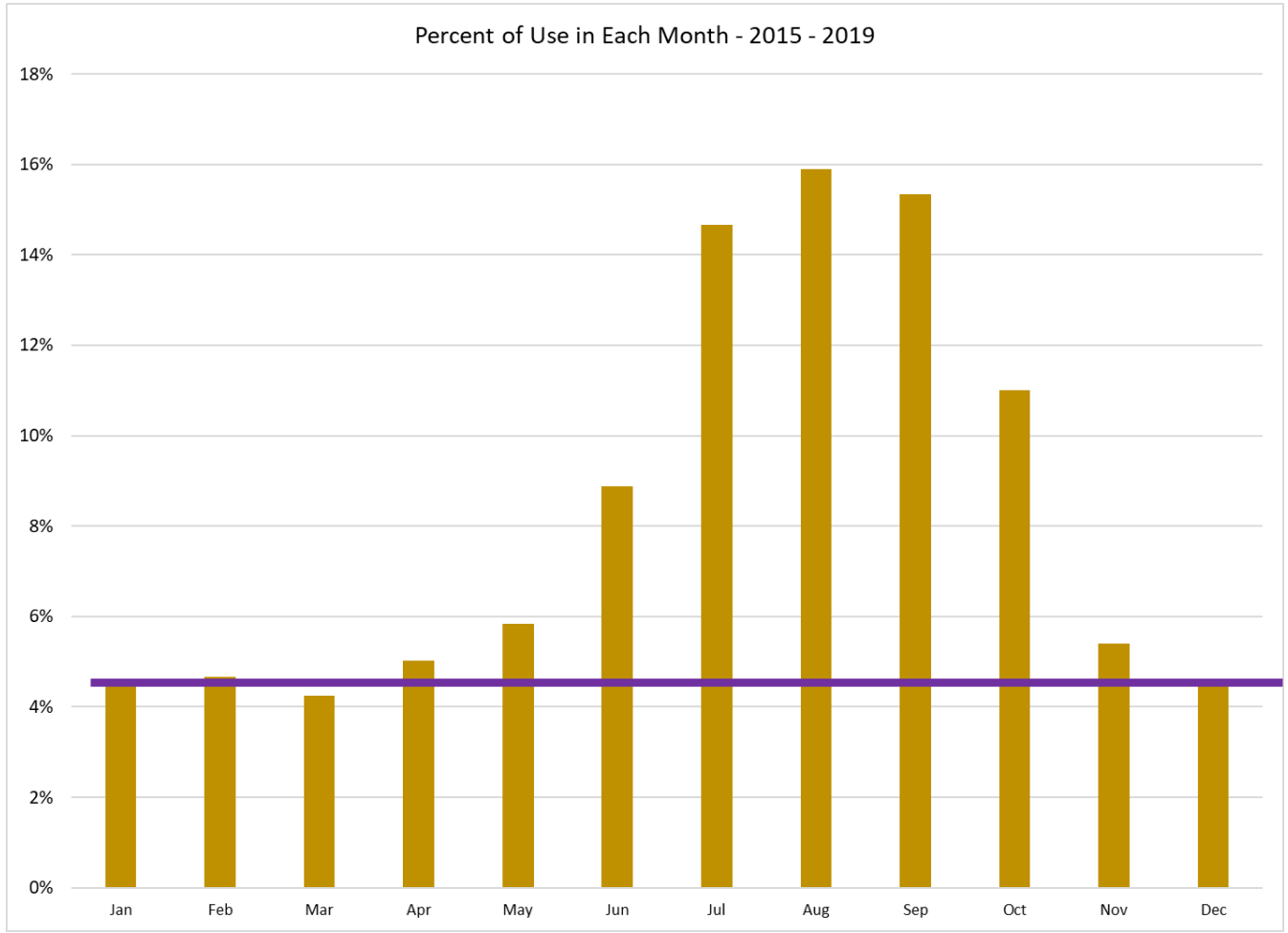


2019 SF Indoor and Outdoor Water Use Distributions

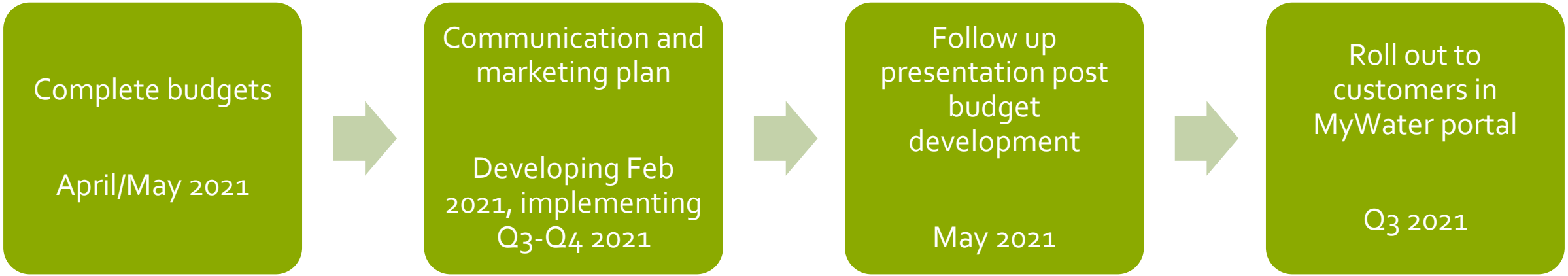



Indoor Use and Water Budgets
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Relative Frequency
-
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
110,000
120,000
130,000
140,000
150,000
160,000
170,000
180,000
190,000
200,000
210,000
220,000
230,000
240,000
250,000
260,000
270,000
280,000
290,000
300,000
More
2019 Indoor
Best indoor Budget


Outdoor Use and Water Budget
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
Relative Frequency (%)
-
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
110,000
120,000
130,000
140,000
150,000
160,000
170,000
180,000
190,000
200,000
210,000
220,000
230,000
240,000
250,000
260,000
270,000
280,000
290,000
300,000
More
2019 Outdoor
Best Outdoor Budget


Percent of Use in Each Month - 2015 - 2019
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Next Steps



FUTURE: Demand management tool during water shortages in lieu of water restrictions

Appendix B – CWCB #2583

Scope of Work

Fort Collins Utilities Single-Family Water Budgets

Project Team

Peter Mayer, P.E., Principal, WaterDM
Charlotte Roehm, Ph.D., Deputy Director for Water Planning, Western Resource Advocates

Project Goal

The goal of this project is to develop water budgets for the approximately 29,000 single-family residential customers of Fort Collins Utilities and to advise on the potential utilization of water budgets to manage water demand.

Project Management and Team

This project will be funded through a CWCB grant already awarded to Western Resource Advocates and WaterDM to provide technical assistance to Colorado water providers in relation to conservation and demand management programs. Charlotte Roehm is the Project Manager and primary point of contact for this grant and the Fort Collins water budget project. Peter Mayer is the Project Engineer and will develop the water budget methodology and implementation. The final deliverables will be prepared by the team.

The project is envisioned to take five months to complete. The project team will hold bi-weekly teleconferences with Fort Collins Utilities staff to advise them on the project progress.

Task 1 – NDA, Kickoff, Data Exchange, and Staff Presentation

The project will commence upon full execution of a non-disclosure agreement (NDA) between Fort Collins and the Team. Once this is complete, the team and Fort Collins staff will hold a kickoff meeting. This meeting is tentatively scheduled for Tues., December 15, 2020.

At the kickoff meeting data requested by the project team will be reviewed. The following items are requested for the development of water budgets.

- Limited account-level information for each residential customer from the utilities billing database including[1]:
  - Account Number
  - Address
  - Meter make, model, size (if available)
  - Number of residential units (single-family and small multifamily will be included)
  - Monthly billed consumption (gallons) for 2015 – 2019 (60 months).
- County tax assessor records for each residential customer, to be linked via Account Number
- 2009 and 2016 land cover analysis for each residential customer, to be linked via Account Number, (data will include a count of bedrooms)
- MyWater occupancy data and US Census Data[2]

[1] Personal information such as customer name and billing information are specifically not required or requested.
[2] US Census Bureau Quick Facts average from 2014 – 2018 for Fort Collins was 2.46 persons per household.

Following the kickoff meeting, Fort Collins staff will begin providing the requested data to the project team. This task will be completed by January 1, 2021.

On January 20, 2020, the project team will make a zoom presentation to the Fort Collins staff. Topics will include:

- Outline of the project and the basic formulation of residential water budgets
- Discussion of what is possible with water budgets
- Information on how budgets can help with water use management and how they are being used by other utilities across the US

Task 2 – Develop Water Budgets

The project team will assemble and align the data sets provided by Fort Collins, matching data via the unique account number. Individual water budget estimates will be developed for each residential customer and compared against actual usage at the property.

Water Use Data

Water use data will be used to compare actual consumption against the hypothetical water budget developed for each customer. Water use data will be summarized for each customer and an estimate of indoor and outdoor use will be developed for each of the five years for which data are provided. Indoor use will be estimated using the average winter consumption method. Outdoor use will be calculated by deducting the indoor estimate from total use. The average of indoor, outdoor, and total use from 2015 – 2019 will be calculated for each customer in Fort Collins.

Assessor and Land Cover Analysis

To develop the outdoor water budgets, available measurements of lot size, building footprint, and landscape area coverage analysis will be aligned from two separate data sets.

Estimate of the irrigable area (e.g. the area that is or could be irrigated) for each residential customer will be developed from available sources. In many cases it may be possible to develop this estimate from both assessor records and the land cover analysis and then compare the results.

The project team will review the irrigable area estimate with Fort Collins staff. The goal of the project team is to use the best available estimate of irrigable area to develop the landscape water budgets.

Calculate Water Budgets

A unique water budget will be calculated for each residential customer in Fort Collins provided that sufficient data are available to make a reasonable calculation.

Indoor water budgets will be calculated by two methods. First – by using the reported number of bedrooms from tax assessor records; and second - multiplying the number of people per household by average indoor gallons per day (gpcd). Fort Collins staff will review the results and select the preferred method to use in the final budget calculation.

Outdoor water budgets will be calculated by multiplying the irrigable area at each customer property by an estimate of the gallons per square foot (gpsf) required to irrigate the landscape through the year.

Task 3 – Refine Water Budget Calculations

Once the preliminary water budgets have been prepared, the project team and Fort Collins staff will meet to review and explore the results. Through this process input parameters used to calculate the water budgets may be adjusted to reflect actual usage and resource priorities more accurately.

The final water budget formulation will be carefully and clearly described in both a report and the final worksheets provided.

Task 4 – Project Deliverables

Once Fort Collins staff approve on the refined water budget calculations, the final project deliverables will be prepared. These will include:

- Technical Memorandum – describing the work completed and detailing the final water budget calculations. The memo will also address the following forward-looking topics:
    - Uses of water budgets during normal years and during drought.
    - Best practices for communicating water budgets to customers.
    - Discussion of challenges and options for preparing commercial budgets.
    - Water budgets and water supply requirements – ideas for aligning these processes.
    - Adjustments and updates to water budgets in the future.
- Water budget worksheet – final worksheet will include data and water budget calculations for all residential customers in Fort Collins.[3]
- Initial Presentation -On January 20, 2020, the project team will make a zoom presentation to the Fort Collins staff. Topics will include:
    - Outline the project and the basic formulation of residential water budgets
    - Discussion of what is possible with water budgets
    - Information on how budgets can help with water use management and how they are being used by other utilities across the US
- Final Presentation – Peter Mayer and Charlotte Roehm will present project results (likely via Zoom) to Fort Collins staff (and any chosen others) in early May 2021.

Project Schedule

A six-month project schedule is proposed with kickoff in December 2020 and final deliverables in early May 2021.

	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21
Task 1 – NDA, Kickoff, Data Exchange, and Staff Presentation						
Task 2 – Develop Water Budgets						
Task 3 – Refine Water Budget Calculations						
Task 4 – Final Project Deliverables		Presentation 1			Tech Memo	Presentation 2

[3] Minimum data requirements must be met for a water budget to be calculated.

Project Budget

There will be no invoices or billing to Fort Collins Utilities under this scope of work. The project team will be paid for their work from an existing CWCB technical assistance grant.