2020

SALT LAKE CITY WATER CONSERVATION PLAN

Public Utilities

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INTRODUCTION

Salt Lake City Department of Public Utilities (Department) has completed an update of its water conservation plan (Plan). Working with Bowen Collins & Associates, Inc., the Department has prepared this Plan in accordance with the State of Utah Conservation Plan Act 73-10-32, as well as under guidelines outlined in the American Water Works Association *Manual M52: Water Conservation Programs* and the State's Regional Conservation Goals.

At its simplest, water conservation is the effort of learning to use less water while maintaining quality-of-life standards. There are many reasons to conserve water, and for a community, it makes sense to plan that conservation effort.

Planning helps quantify water supply and assess historical demand so that conservation goals may be established that help us live within and sustain limited water resources. Planning helps ensure that water conservation programs are adequate to achieve established goals. Planning helps communicate complex issues that affect short- and long-term conservation efforts, such as climate change and growth. And finally, conservation planning can convey the need to conserve, identify tools and resources available to the community for use in their conservation efforts, and build a shared water steward ethic that motives us all to achieve the desired, and necessary, conservation goals.

CHAPTER ONE HIGHLIGHTS

DEMAND
- Demand without additional conservation
  - 2020 Demand = 95,000 AF
  - 2060 Demand = 127,200 AF

SUPPLY
- Supplies for dry year conditions
  - Existing = 97,620 AF
  - Future = 126,120 AF

RISK
- Potential water supply vulnerabilities
  - Equipment failure
  - Earthquake
  - Wildfire
  - Climate change

RECOMMENDATIONS

Future Supply 126,120 AF — Recommended redundant supply to mitigate risk 15,000 AF = Reliable Future Supply 111,120 AF

Demand without additional conservation 127,200 AF > Reliable Future Supply 111,120 AF

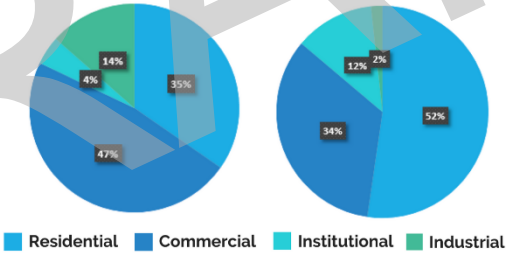
The city must continue to pursue a robust conservation program to meet future demands.

CHAPTER TWO HIGHLIGHTS

HISTORICAL USE
- 285 gpd per capita total use (2000)
- 174 gpd per person residential use (2000)
- 693 gpd per capita peak day use (2000) (216.3 mgd systemwide)

CURRENT USE
2016 Through 2018
- 206 gpd per capita total use
- 123 gpd per person residential indoor/outdoor use
- 48 gpd per person residential indoor use
- 480 gpd per capita peak day use (171 mgd systemwide)

% Total Indoor use By Group **% Total Outdoor use By Group**



CONSERVATION IMPACTS
Since 2000
- 27.7% Reduction in total water demand
- 31% Reduction in peak day demands
- 16,400 AF average saved each year

CHAPTER THREE HIGHLIGHTS

GOAL

	Current	2025	2030	Long Term
Gallons Per Capita (gpd)	206	192	183	160
% REDUCTION		6.9%	11.3%	22.3%

OVERALL TARGETS
- Indoor use → 50 gpd/person (14.2% reduction)
- Outdoor use → 24" average irrigation (14.6% reduction)

WATER USE REDUCTION
- Annual water use reduction since 2000 = 16,400 AF/year
- Needed additional water use reduction = 16,100 AF/year

Additional Water Use Reduction by Classification (AF/year)

	Residential	Commercial	institutional	Industrial	Total
Indoors	2,818	2,596	193	282	5,890
Outdoors	5,342	3,447	1,257	165	10,210
Total	8,160	6,043	1,450	447	16,100

CHAPTER FOUR HIGHLIGHTS

Outreach Program
- 11 Practices currently active or completed
- 6 Practices proposed or to-be-developed

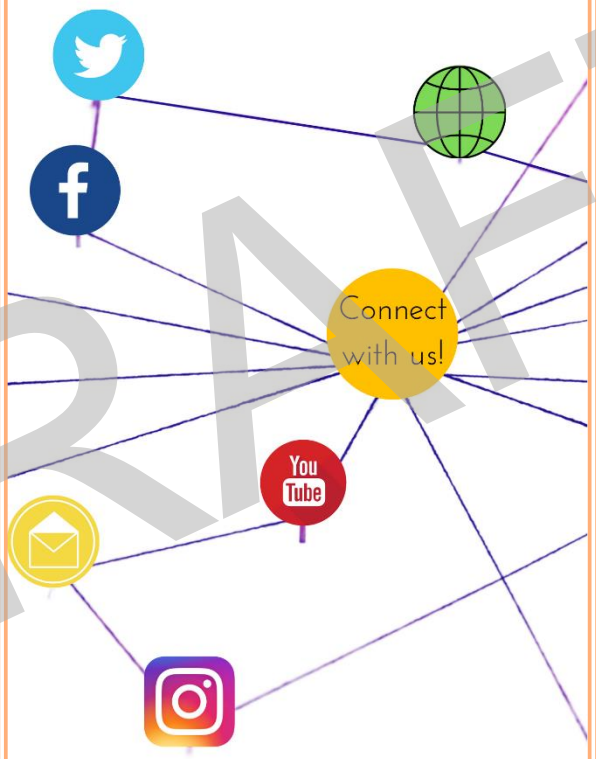
Economic Program
- 4 Practices currently active or completed
- 6 Practices proposed or to-be-developed

Utility Program
- 12 Practices currently active or completed
- 1 Practices proposed or to-be-developed

Law & Policy Program
- 11 Practices currently active or completed
- 2 Practices proposed or to-be-developed

Research & Metrics Program
- 14 Practices currently active or completed
- 5 Practices proposed or to-be-developed

CHAPTER FIVE HIGHLIGHTS



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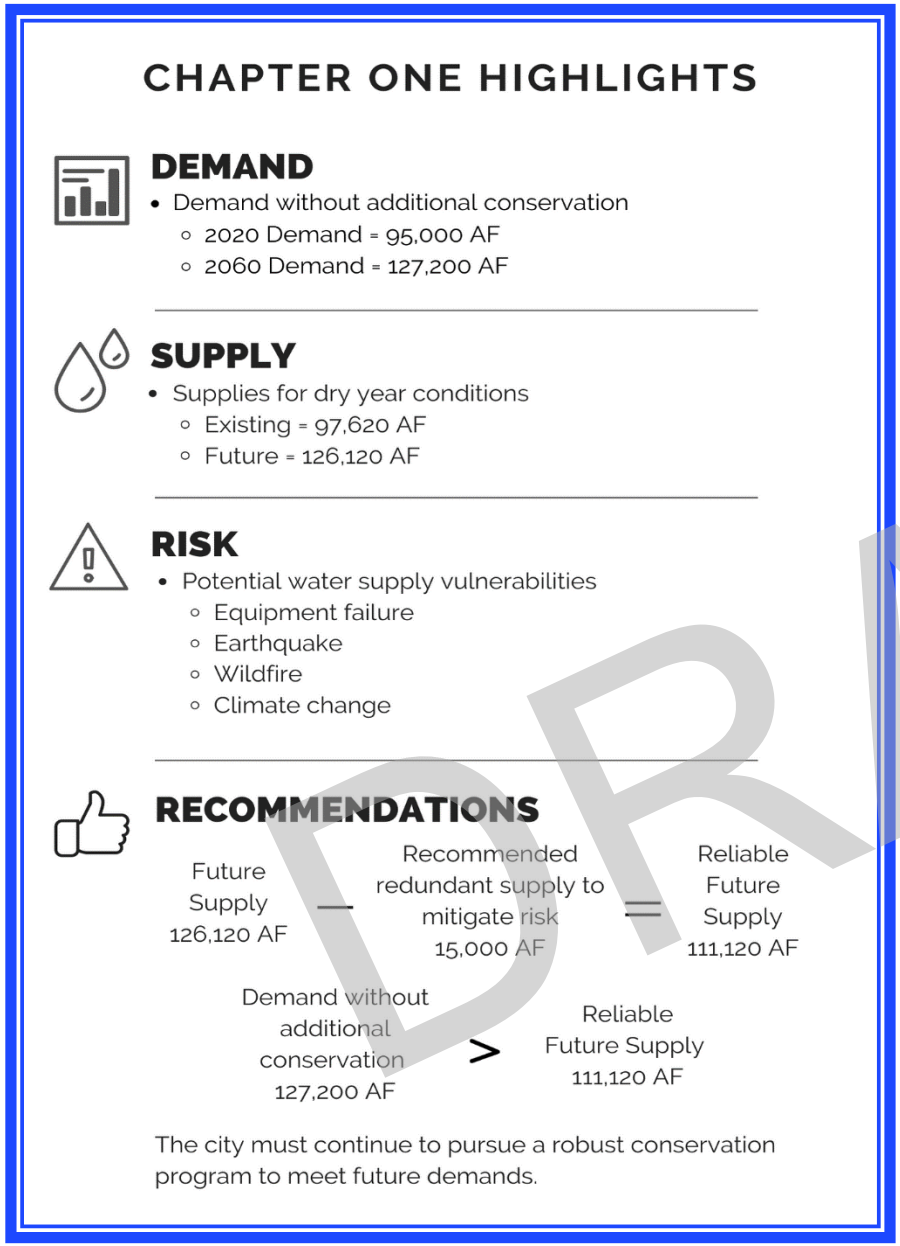
- A SLCDPU Water Service Area Map
- B MWDSLS ULS Report 2019, Table 4: Salt lake City Water Usage and Conservation Trends
- C State Division of Water Resources 2018 Water Conservation Plan Checklist
- D ANSI/AWWA G480-13 Water Conservation Program Operation and Management Standard, First Edition July 1, 2013
- E Water Conservancy Budget 2020/21
- F 17.16.092: Water Shortage Management
- G 21A-48-055 Water Efficient Landscaping Standards
- H Public Utility Advisory Committee Minutes/Water Conservation Plan Discussion
- I Metropolitan Water District of SLC & Sandy Board Minutes/Water Conservation Plan
- J Salt Lake City Council Transmittal, Minutes, & Resolution
- K Links & References
- L Glossary of Terms, Abbreviations & Acronyms



CHAPTER ONE: SUPPLY AND DEMAND

1.0 Introduction

Salt Lake City Department of Public Utilities (Department or SLCPU) retained Bowen Collins & Associates (BC&A) to complete a supply and demand master plan for its water system[1]. The purpose of that study was to compare the availability of water supplies to the existing and future demands on the system. The results of that study are meant to guide the Department's decisions regarding supply management and development, as well as inform the Department's decisions regarding demand management, including the establishment of conservation targets. Key elements of that study are summarized here to ensure consistency within the Department's multiple planning processes.

The details contained in this chapter are derived nearly entirely from the *Salt Lake City Water Supply and Demand Master Plan, 2019* (*Supply and Demand Plan*), including service area, demand projections, current and future water supplies, water supply risks, and recommended actions. As summarized in the highlights to the left, future demand (without additional conservation) will outpace future supply by approximately 14 percent, owing in part to anticipated growth. A number of potential risks have been identified, though impacts from climate change bring the widest range of variables and may alter both water supply and demand projections.

A number of strategies have been identified to meet this potential water supply shortfall. One strategy already in place is to plan for reserve water supplies through the use of operational and planning practices. Continued research related to climate change will improve our understanding of supply and demand impacts, lessening uncertainty. Lastly, and the subject of this plan, is to expand an already robust conservation program by improving our understanding of water use behaviors and patterns to further enhance water conservation efforts and meet newly established demand reduction goals.

[1] *Salt Lake City Water Supply and Demand Master Plan*, Bowen Collins & Associates, February 2019

1.1 Salt Lake City Public Utilities Service Area

Salt Lake City (City) currently provides all retail water service within Salt Lake City corporate boundaries. It also provides retail service to portions of other communities on the east side of the Salt Lake Valley. This includes portions of South Salt Lake, Mill Creek, Holladay, Murray, Cottonwood Heights, and unincorporated Salt Lake County. The service area is shown in Figure 1-1 with a larger, more detailed map included in the appendix to this plan.

The City service area is shown in pink. It should be noted that there are two private water providers completely surrounded by the City's service area. The University of Utah (shown in red) and Holliday Water Company (shown in blue) have their own sources and distribute water within their respective service areas. They also purchase water from the City, with that purchased water included within this analysis.

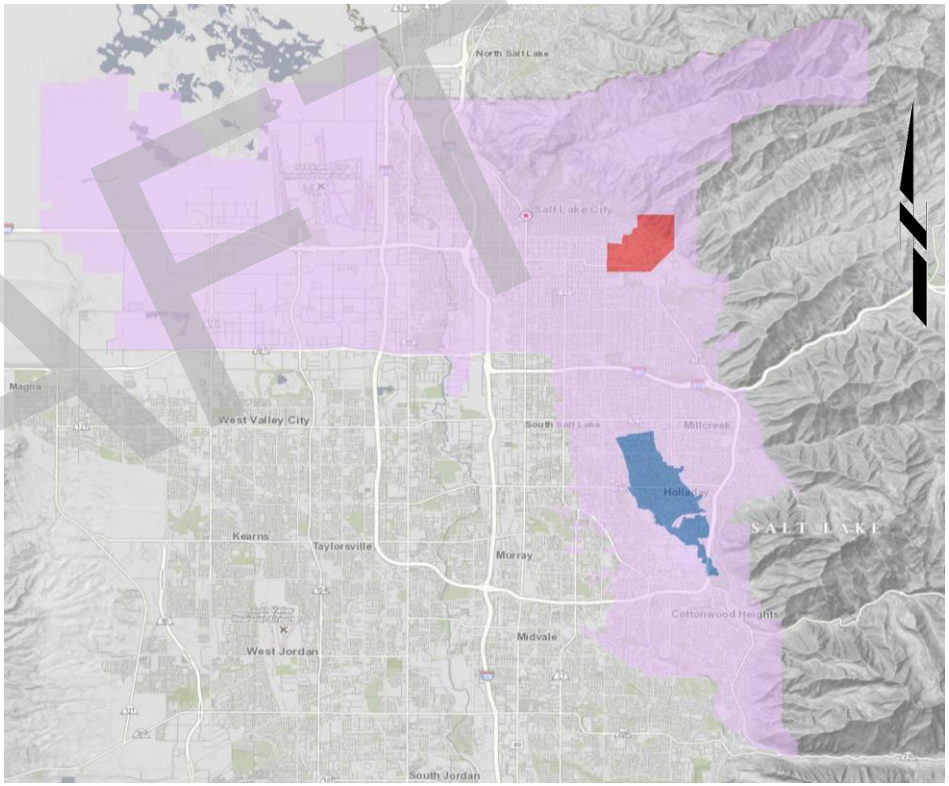
1.2 Demands on the Water System

When discussing water demand, system water volume is measured either as production or water sales. Water supply needs typically are discussed in terms of production, where water demand is assessed by analyzing water sales.

Water Sales. Water sales (sometimes referred to as "water use") refers to the amount of water metered at the point of connection to customers. This total amount is reported to the State of Utah Division of Water Rights and Central Utah Project (CUP) annually for tracking water use and conservation progress. Because of the more detailed information available regarding individual water customers, water sales are used for calculating use and reduction values in Chapters 2 and 3.

Production. Evaluation of supply is based on demands on the water system expressed in terms of production requirement. The production requirement is the amount of water that must be produced at wells and treatment plants, and be purchased from wholesale providers, in order to meet the entire water supply and water storage needs of the system and our customers. Water sales do not represent the full volume of water within the system. Inherent in any system is water loss, which is the difference between produced water and authorized consumption. This water loss may be real losses (such as leakage, unmetered authorized uses such as firefighting water, and storage tank overflows) and apparent losses (such as meter inaccuracies at the point of delivery, data errors, or theft of water).

Figure 1-1
Water System Service Area



As future production requirements are evaluated, there are limitations in making these projections. We cannot predict actual demand, but we can project future use by evaluating select demographic factors. This information then informs projections of total water use.

Water production requirements in the service area were estimated by first developing projections for the four characteristics predictive of demand as shown in Figure 1-2:

- Residential Population to predict residential indoor use;
- Employment Population to predict commercial and institutional indoor use;
- Industrial Area to predict industrial uses; and
- Irrigated Area to predict outdoor use for all water user classifications (residential, commercial, institutional, and industrial).

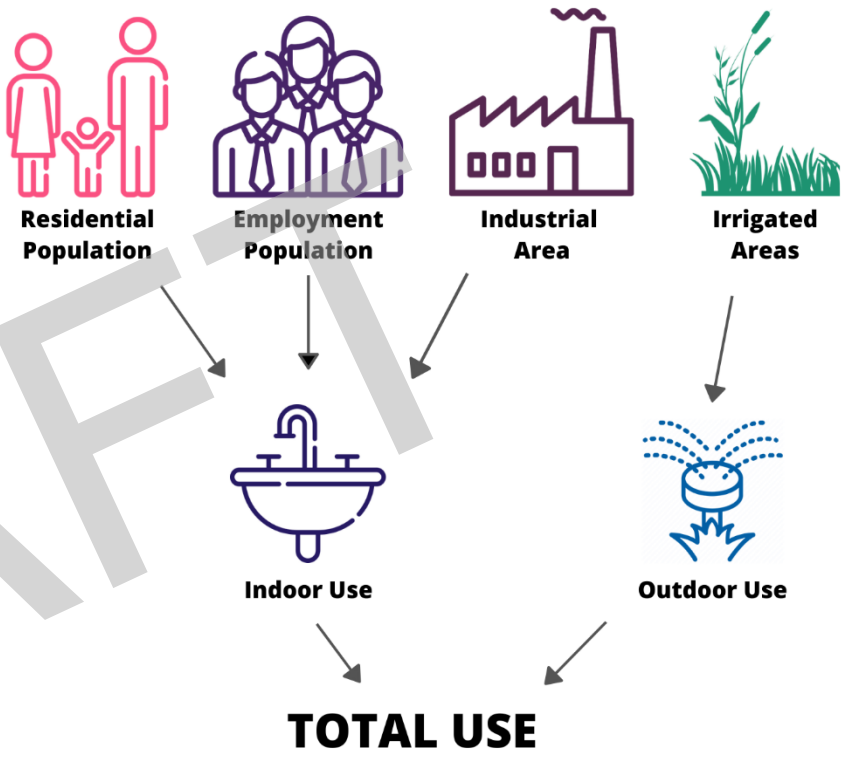
The water production for each characteristic was projected with respect to anticipated growth and development. The predictions of system growth are based on planning data (e.g. SLC zoning maps), regional planning data (e.g. U.S. 2010 census and Wasatch Front Regional Council growth projections), and coordination with City officials. For additional detail, please refer to the *Supply and Demand Master Plan.*

With growth in each component projected, it is then possible to model future indoor and outdoor water use:

Indoor Use. For most indoor use, it was determined that water demand could be reasonably estimated using residential population (to project residential water use) and employment projections (to project commercial and institutional water use). The only type of indoor use that did not appear to be well represented by these two parameters is industrial use. For industrial demands, water use was projected based on total developed industrial area.

Outdoor Use. Outdoor use was determined by evaluating estimated total irrigatable area multiplied by historical outdoor water use. This was initially estimated to be 3.5 af/acre (or 42 inches of water per season) in 2001[2], but has gradually decreased to an estimated current use of 2.84 acre-ft (34 inches of water per season)[3].

FIGURE 1-2
DEMOGRAPHIC FACTORS PREDICTIVE OF DEMAND



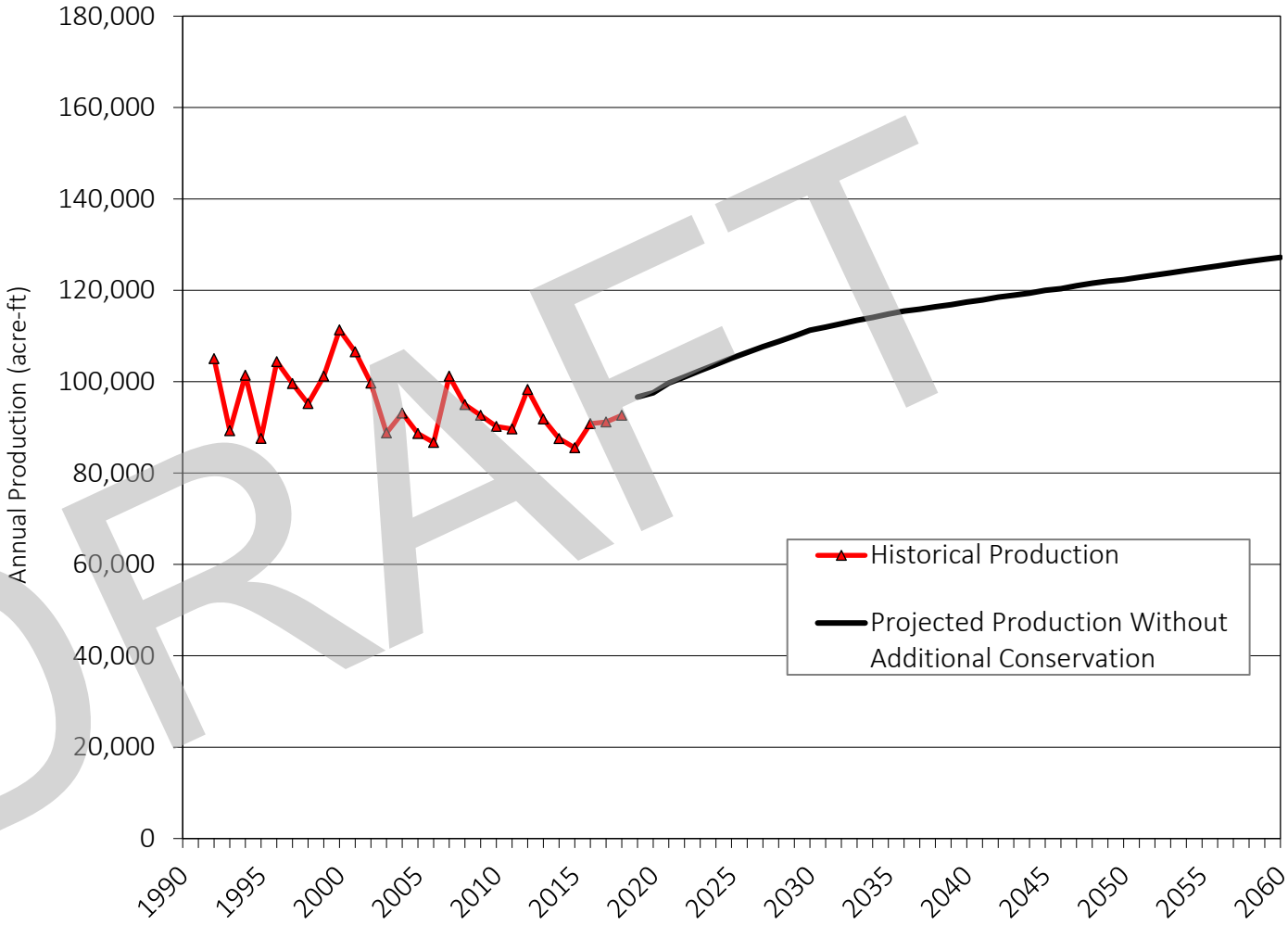
The final step of projecting demands is to combine the projected indoor and outdoor water demand.

[2] Per 2001 irrigation water use data. See *Salt Lake City Water Supply and Demand Master Plan*, p2-9

[3] Per recent water use data (2016-2018). See Chapter 2. Please note that these values are for water production. Actual application rate at the point of delivery (including system losses) will be 10 to 12 percent less.

The outcome of this analysis is displayed in Figure 1-3, which shows the historical and projected water production requirements in terms of annual production. This projected water production is based on expected demands if no additional conservation is achieved beyond what has been accomplished to date. Without increased levels of conservation, required production is expected to increase from 95,000 acre-ft today to about 127,200 acre-ft by the year 2060, or roughly a 34% increase in production to meet population growth over the next 40 years.

FIGURE 1-3
PROJECTED SLCPU SERVICE AREA ANNUAL PRODUCTION REQUIREMENTS



1.3 SLCPU WATER SUPPLY

The City has a number of existing water sources and is also planning future supplies. Like nearly all water sources, the water produced is tied to precipitation. As intuition would suggest, in years with above average snow and rainfall, sources almost always produce more, and sometimes a lot more. Conversely, in dry years, sources usually produce less water. Consecutive dry years can exacerbate pressures on supplies and result in reduction in source water. This reduction can then be compounded by increased demands due to hotter and drier periods. Water demand management during times of drought is addressed in the *Drought and Water Shortage Contingency Plan*, which can be found on line at www.slc.gov/utilities/conservation. Available water associated with both existing and future sources for both average and dry water years is summarized in the following sections.

1.3.1 EXISTING SOURCES

The existing water supply comes from a number of different sources, and for planning purposes, have been grouped into three categories:

Surface Water Sources. Salt Lake City and the Department hold water rights for a number of surface water sources. This includes surface water treated at the following utility-owned and operated treatment plants: Big Cottonwood Water Treatment Plant (BCWTP), Parleys Water Treatment Plant (Parleys WTP), and City Creek Water Treatment Plant (CCWTP). This category also includes portions of surface water in Little Cottonwood Creek. This water is treated at Little Cottonwood Water Treatment Plant (LCWTP), a plant owned and operated by Metropolitan Water District of Salt Lake & Sandy (MWDSLS). Expected yields for each source based on historic flow records, available storage, and available treatment capacity at each of the plants are summarized in Table 1-1.

TABLE 1-1
PROJECTED ANNUAL YIELD OF SLCPU SURFACE WATER SOURCES

Source	Average Year Yield (acre-ft)	Dry Year Yield (acre-ft)	Comments
BCWTP	22,000	18,900	Dry Year in 2015
Parleys WTP	11,200	3,100	Dry year based on firm yield of Little Dell Reservoir
CCWTP	5,950	4,500	Dry Year in 2015
LCC (LCWTP)	20,350	14,320	Dry year in 2015
Total	59,500	40,820	

Groundwater Sources. Salt Lake City and the Department hold water rights for a number of groundwater sources. For evaluation purposes, groundwater sources have been broken into two categories:

Base Wells and Springs. The City has several springs and artesian wells that require little or no pumping. Water from these sources is used year-round. The estimated average production of these sources is 7,500 acre-ft per year. This is for both average and dry water years.

Peaking Wells. All remaining ground water sources are generally used only during the summer months to meet peak demands. Annual water production from these wells will vary significantly based on needs, but has an estimated maximum of 10,400 acre-ft.

Preferred Storage Rights through Metropolitan Water District of Salt Lake & Sandy (MWDSLS). This category of supply consists of water received through membership in MWDSLS. This includes water stored in Deer Creek and Jordanelle Reservoirs and comes in two components as follows:

MWDSLS Provo River Project (PRP) Storage. The average year production of this source is 53,760 acre-ft. This is based on the full MWDSLS allotment of 61,700 acre-ft less 7,940 acre-ft of preferred storage reserved for Sandy City. Dry year production from this source has been estimated at 18,900 acre-ft. This is based on a 43.5% percent allotment from Deer Creek Reservoir as was experienced during the recent drought (2013).

MWDSLS Central Utah Project (CUP) Storage. The available supply from this source is assumed to be 20,000 acre-ft in both average and dry years, which is the contractually defined amount.

Utah Lake System Water. The City petitioned Central Utah Water Conservancy District (CUWCD) for Central Utah Project (CUP) water through the planned Utah Lake System (ULS). This system was completed this year and is expected to supply 3,100 acre-ft going forward.

1.3.2 FUTURE SOURCES

Aquifer Storage and Recovery (ASR). In conjunction with Sandy City and MWDSLS, the City is currently investigating the utilization of aquifer storage and recovery. This option will utilize high spring runoff from surface water sources to be injected or infiltrated into the aquifer and documented with the State Engineer. Then, in dry years, this water would be available for extraction through wells. It is estimated that potential dry year yield of this source will be 5,900 acre-ft. This amount could be greater depending on sustained conservation efforts, as reduction in demand would reduce extraction volume.

New Well Development. Development of additional groundwater has been planned to meet future growth and estimates development of current rights could yield up to 12,000 acre-ft additional groundwater.

Wastewater Reuse. Opportunities for wastewater reuse have been studied. Initial plans for wastewater reuse would produce approximately 4,200 acre-ft annually.

Additional Surface Water Development. Another potential supply is development of a treatment plant to treat water from Millcreek Canyon or from other surface water sources. Based on historic flow records for Millcreek, potential yield from this source is estimated to be 3,970 acre-ft in an average year and 3,300 acre-ft in a dry year.

Secondary Water. Recently, an analysis of potential opportunities for using secondary water on City properties within its service area[4] was completed. While there are some limited opportunities for the use of secondary water, the analysis concluded that most of these opportunities were not viable at this time. The analysis also concluded that nearly all of the secondary water rights would be needed for other purposes in a dry year and correspondingly would not add appreciably to the reliable annual water supply of the City. A final consideration is that within the City watershed, secondary water is generally derived from the same sources as is culinary water, that is, from snow melt from the Wasatch Mountains. With this in mind, secondary water does not offer a new or discrete supply and so does not fully alleviate culinary demand burdens.

1.3.3 TOTAL ANNUAL WATER SUPPLY

The total projected production of each category of supply described above is summarized in Table 1-2. For dry year conditions, annual supply is expected to increase from its existing yield of 97,620 acre-ft to a total future yield of 126,120 acre-ft.

TABLE 1-2
SLCPU PROJECTED DRY YEAR PRODUCTION
EXISTING AND FUTURE SOURCES

Supply Category	Projected Average Year Production (acre-ft)[1]	Projected Dry Year Production (acre-ft)
Existing Surface Water Sources	59,500	40,820
Existing Groundwater Sources	7,500	17,900
Existing Storage Sources	73,760	38,900
New Wells	0	12,000
Additional Surface Water (MCWTP)	3,970	3,300
ULS	3,100	3,100
ASR[2]	-5,900	5,900
Reuse	4,200	4,200
Total[3]	146,130	126,120

1. New Wells are projected at no production in the average year not because they are not available, but because they are not needed during average (or wet) years.

2. ASR is shown to have a negative production in the average year to represent the use of excess surface water source in the spring for injection into the aquifer. Thus, it will be a new demand, represented here as a "negative" source. This activity will occur in average years to make water available for extraction in dry years.

3. Secondary water supply is not included in this table as it is already being used for other purposes or was determined to not be a viable source of water at this time. Refer to *Salt Lake City Secondary Water Irrigation Master Plan*.

[4] *Salt Lake City Secondary Water Irrigation Master Plan,* Bowen Collins & Associates, February 2019.

1.4 Water System Risk

When planning for water supply, it is important to prepare for uncertainty by identifying and addressing risk and vulnerability to water supplies and within the system infrastructure. Regardless if these uncertainties take the form of extreme weather conditions, system interruptions or failures, or other events, careful analysis and planning can mitigate or ameliorate negative outcomes. Four important questions were considered when analyzing long term water supply projections in relation to mitigating risk:

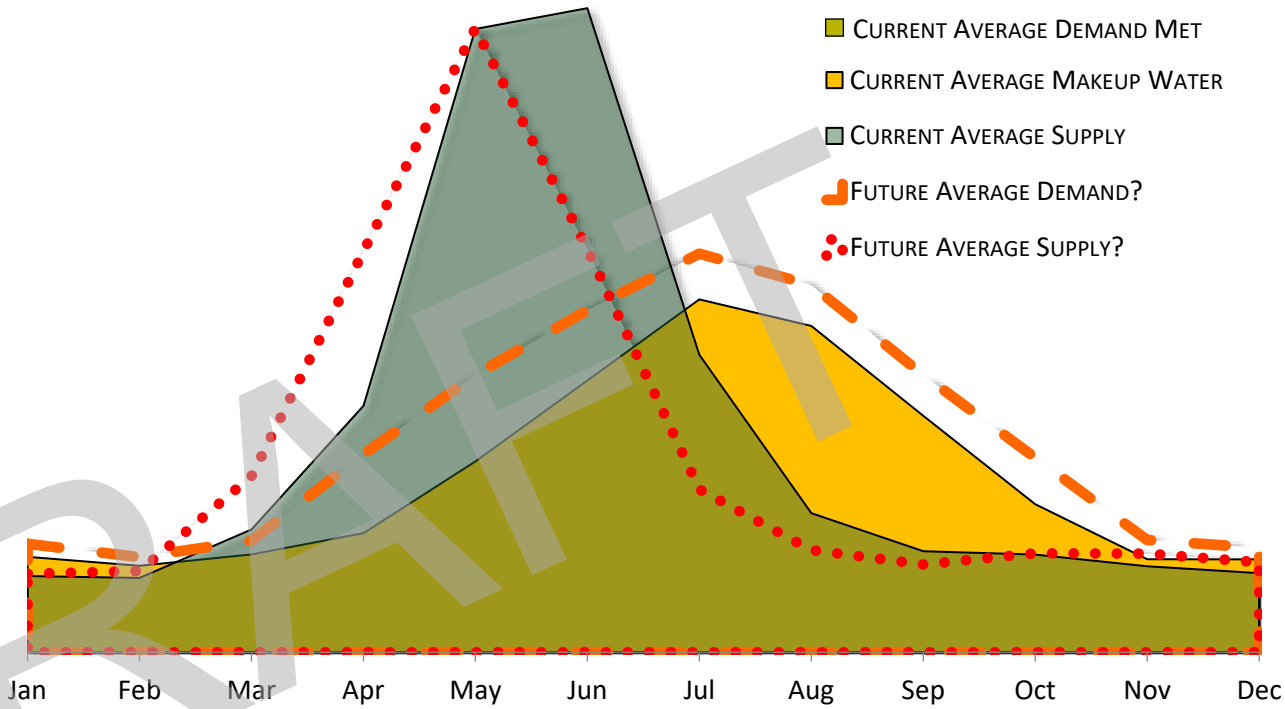
i. **Is the historical data an appropriate indication of future source performance in the critical planning scenario (i.e. the "dry year")?**

The last 30 years have been drier than the long-term measured period of record[5]. However, this 30-year dry period is typical of dry periods in the paleo record[6]. Therefore, the use of historical data (over the past 30 years) to describe future source performance appears to be an appropriate starting point.

ii. **Are there factors (such as climate change) that would cause water supplies to perform differently than they have in the past?**

There are several conceivable events that might affect future supplies in such a way that would cause future performance to be different than the historical record might suggest. These events can range from temporary supply interruptions (with causes such as sudden equipment failure, earthquake, or wildfire) to long term changes to supply performance (with causes such as climate change).

Figure 1-4
Potential Impacts of Climate Change on Supply and Demand



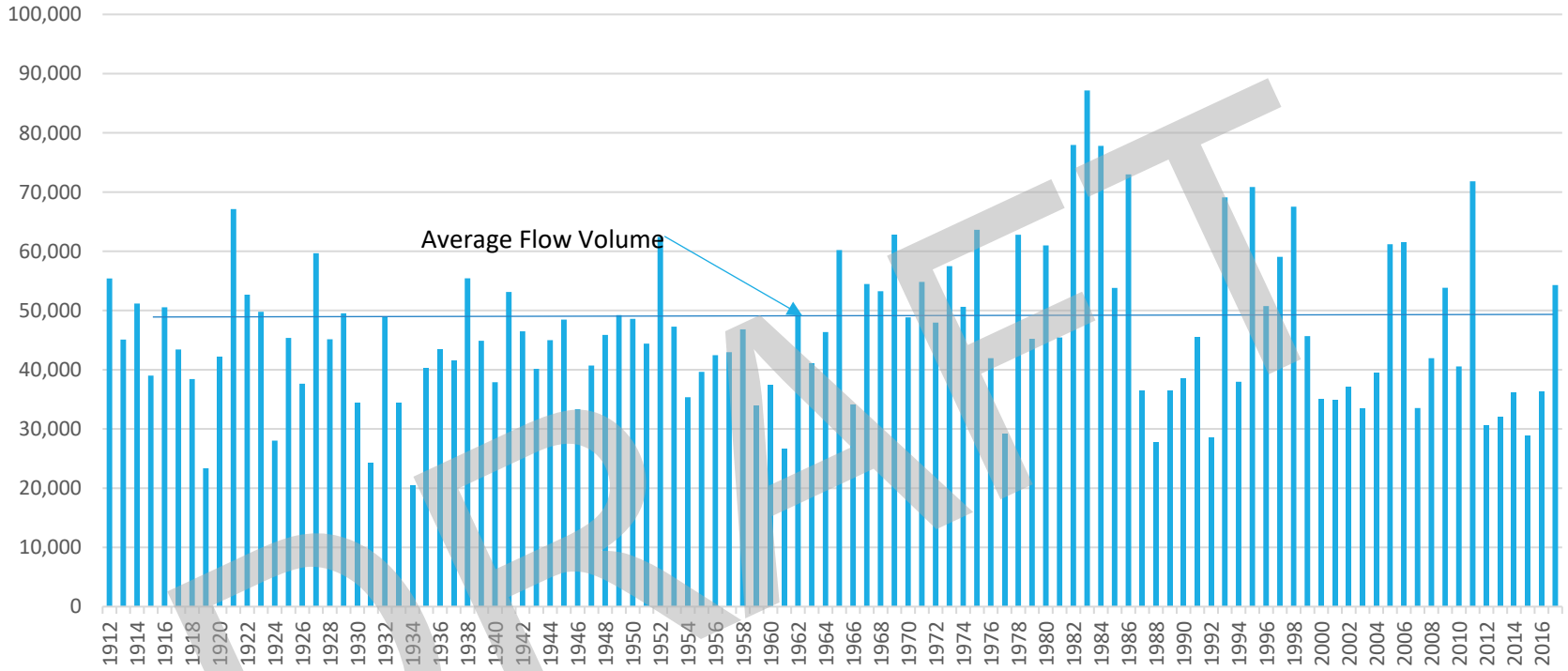
Climate change analysis is incorporated into long-term water resource planning. Though immediate changes in climate or weather variability are addressed in the *Drought and Water Shortage Contingency Plan*, increasing frequency or duration of these variables will affect day-to-day water demand. As such, it is important to consider the impacts of climate change not only to supply, but also to demand as conceptually shown in Figure 1-4[7]. The EPA Climate Change Adaptation Resource Center identifies water demand

[5] See Figures 4-2 and 4-3 from the *Water Supply and Demand Master Plan.*
[6] See Figures 4-4 and 4-5 from the *Water Supply and Demand Master Plan.*

[7] Climate Resilience Approaches in Salt Lake City. May 16, 2018. *Laura Briefer*. American Water Resources, Utah Section.

modification as one of many viable strategies for increasing water supply resilience and security in the face of climate change.

FIGURE 1-5
LITTLE COTTONWOOD CREEK-ANNUAL FLOW VOLUME AT LCWTP



iii. What level of system redundancy is reasonable to address possible supply interruptions, such as a source failure or outage?

As part of its *Water Supply and Demand Master Plan,* several supply redundancy criteria have been adopted to address potential supply interruptions. This includes different levels of redundancy for single source loss and catastrophic loss of water supplies. Additional detail regarding these redundancy criteria are contained in the *Water Supply and Demand Master Plan*. (See Figure 1-5).

iv. How can demand management and conservation proactively reduce potential impacts to supply or system as a result of risk?

Demand management can be an effective tool in ameliorating future potential negative impacts related to risk and vulnerability of supply. This is the primary topic of this plan and is addressed in Chapter 4.

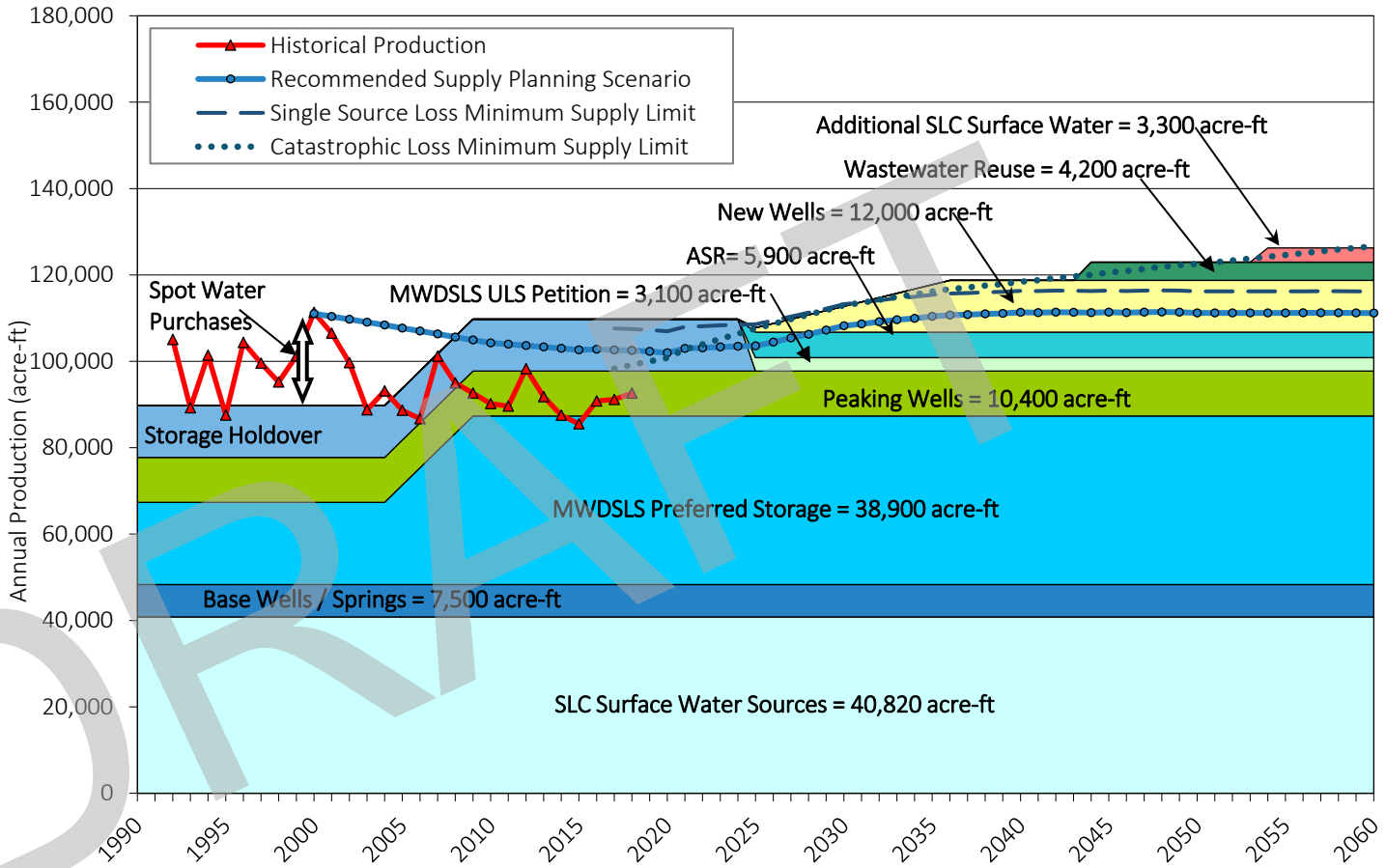
Relative to risk, it should be noted that all practical and necessary steps are undertaken to minimize these types of risks. This includes regularly scheduled maintenance, regular inspections of key equipment, advanced asset management tracking, and rehabilitation and replacement planning. Additional discussion pertaining to risk, vulnerability, and potential mitigation can be found in the *Drought and Water Shortage Contingency Plan.*

1.5 Future Annual Production Requirements Compared to Future Demand

Figure 1-6 compares the total dry year water supply (including new supplies that have not yet been developed) with SLCDPU's recommended supply planning demand scenario (including applicable provisions for risk). The scenario assumes that:

- Conservation will, minimally, continue to maintain pace with recent levels and the previous State Conservation goal (25% reduction in per capita water usage by 2025) through 2025.
- The new conservation goals (see Chapter 3), which meet or exceed the State's newly adopted regional conservation goals; and
- Required production will include provisions to meet both the "Single Source Loss" and "Catastrophic Loss" levels of supply risk as described in the previous section.

Figure 1-6
Projected SLCPU Annual Production Requirements vs. Supply (Dry Year) With Supply Redundancy Buffers



*Volumes given are for 2060 projected supply.

As can be seen in Figure 1-6, as long as the recommended supply planning scenario is met by the end of the planning window, current and anticipated future supplies are sufficient for long term projected system demands. However, the figure also shows that there will be very little excess capacity when supply risk and recommended redundancy is considered. This means that failing to meet the conservation goals could results in risk of inadequate water supply for projected demands. Reviewing and reevaluating these goals to lessen risk, decrease pressure on reserved water, improve supply redundancies, and optimize changes in technology and behavior related to demand management is recommended.

1.6 Recommendations

Based on the analysis summarized above, the following actions identified in the *Water Supply and Demand Master Plan* are recommended for inclusion in the *SLC Water Conservation Plan*:

Increase Efforts in Water Conservation Programming to Achieve Short- and Long-term Goals. Water supply challenges will occur if conservation programming efforts and outcomes to achieve the recommended planning scenario goals defined in this report (see Chapter 3) are not reached. Details of the conservation program proposed to meet these goals is discussed in Chapter 4 of this plan.

Protect and Manage Water Supply. The City will require all identified water supplies to accommodate future growth with adequate buffer to address reasonable risk to the water supply. This includes:

- Developing an Aquifer Storage and Recovery (ASR) program (Estimated completion time =2025)
- Developing new groundwater wells (gradually added between 2026 and 2036)
- Keeping options open for reuse and additional surface water development (not needed until 2045 or later)
- The City should continue to monitor supplies and demands into the future and refine project timelines accordingly.

Monitor Effects of Climate Change. Climate change impacts analysis should continue to remain a component of long-term water resource planning. Though immediate changes in climate or weather variability can be addressed in the *Salt Lake City Drought and Water Shortage Contingency Plan (2019)*, increasing frequency or duration of these variables will affect day-to-day water demand. As such, it is important to consider the impacts of climate change not only on supply, but also demand. The US Environmental Protection Agency Climate Change Adaptation Resource Center identifies water demand modification as one of many viable strategies for increasing water supply resilience and security in the face of climate change. Continued monitoring of the water supply and demand is recommended, modifying this plan as necessary to address changing circumstances associated with climate change. [8]

Review and Reevaluate Conservation Goals. Regular review of conservation goals and outcomes will help to reduce risk, increase resiliency, and improve the ability to respond to changes in demand and supply.

[8] *Resilient Strategies Guide for Water Utilities*. US-EPA 2019

CHAPTER TWO HIGHLIGHTS

HISTORICAL USE

- 285 gpd per capita total use (2000)
- 174 gpd per person residential use (2000)
- 693 gpd per capita peak day use (2000)
  (216.3 mgd systemwide)

CURRENT USE
2016 Through 2018

- 206 gpd per capita total use
- 123 gpd per person residential indoor/outdoor use
- 48 gpd per person residential indoor use
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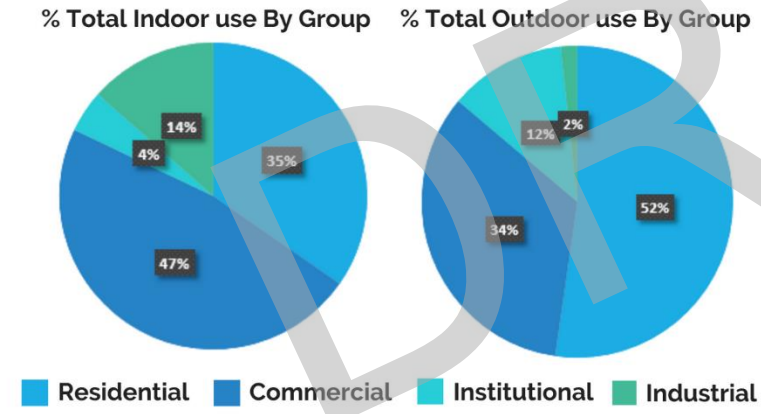


CONSERVATION IMPACTS
Since 2000

- 27.7% Reduction in total water demand
- 31% Reduction in peak day demands
- 16,400 AF average saved each year

CHAPTER TWO: HISTORICAL WATER USE

2.0 Introduction

Measuring water demand in terms of water production is the common practice for supply planning; however, water sales can be a more useful measurement when considering water use by connection and customer. This measurement is useful because water delivery meters are tied to specific end users. As discussed in Chapter 1, water use data reported to the State of Utah Division of Water Rights is based on water sales.

The service area has been fully metered at the customer connection for nearly one hundred years. Meters are read every month and bills are issued to every water customer, including city and other government entities. This depth of metering history and data informs planning processes, and in particular, shapes the nature of water demand management and conservation planning.

To analyze historical water use, we consider not only total water sales, but also general characteristics of those using the water, as well as the nature of water use patterns. Identifying types of customers and aggregating them into groups–classifications–helps us more effectively analyze water use, recognize patterns, chart trends, and anticipate future water needs based on the characteristics of our customers (user classifications) and the numbers of customers within each classification. This analysis informs planning across all aspects of the Department and is particularly useful in conservation planning.

This chapter documents historical water use based on total water sales, water sales in several classifications and subclassifications, water use as expressed as gallons per capita day (gpcd) and impacts of historical water conservation. Additionally, water loss–the difference between water produced and water sold–is also discussed, as well as an overview of water conservation program impacts.

2.1 Total Water Use

Water sales data has been collected, analyzed, and reported water by customer classification for many years. A summary of the reported sales values is shown in Table 2-1.

Table 2-1
Water Sales (Acre-Ft)

Year	Total Sales Reported to DWRi (AF)	SLCPU Internal Sales Records (AF)
2000	89,138	99,682
2001	91,712	95,623
2002	85,306	85,306
2003	80,641	79,387
2004	78,900	78,900
2005	71,297	71,297
2006	76,645	78,406
2007	87,190	87,190
2008	75,843	75,843
2009	74,697	74,697
2010	75,755	75,755
2011	70,130	70,130
2012	83,611	83,611
2013	80,196	80,196
2014	75,300	75,300
2015	72,722	72,722
2016	75,261	80,188
2017	78,310	80,044
2018	77,867	82,393

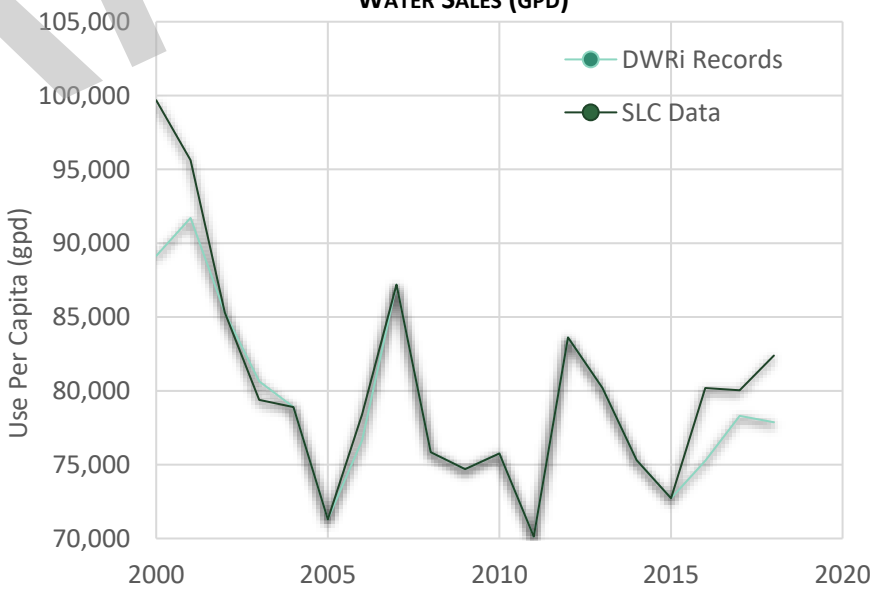
Data Discrepancies: Two sets of data are included in Table 2-1. One is based on information contained in the database maintained by the Division of Water Rights (DWRi). The second is based on internal records kept by the Department. As can be seen Figure 2-1, the data from these two sources matches for the majority of years on record. However, there are some years where the numbers deviate slightly.

The water sales data reported to DWRi has been assembled from a Department-developed data base pioneered in the 1980s and updated regularly over the years. A consequence of these updates may be changes in how data is identified and recorded, resulting in inconsistencies in historical data records.

Significant improvements have been made over the last several years in how water sales are tracked by classification, resulting in a slight difference between data recently extracted from the sales database and the historical method used to extract and categorize data for reporting to DWRi.

The source of these discrepancies has not yet been identified. A study is being conducted relating to data collection and reporting processes to identify the discrepancy, but it is not expected be completed in time to inform this Plan. In the meantime, because the new data is considered to be more accurate and is conservatively higher than the old data, the new data will be used for all subsequent analysis and discussion. Once the results of the data collection analysis are available, the final numbers will be revisited and updated, and the resulting assumptions and recommendations reviewed and amended as necessary.

Figure 2-1
Water Sales (GPD)



2.2 Per Capita Use

The primary way in which the State has chosen to measure water use and conservation progress is based on per capita water sales. Per capita water sales are calculated by dividing total water sales by a census-based population, a simplistic statistical analysis representing complex use characteristics. Per capita water sales for the service area over the past 18 years is shown in Figure 2-2. Consistent with the previous section, results for both DWRi records and SLC internal sales data is shown.

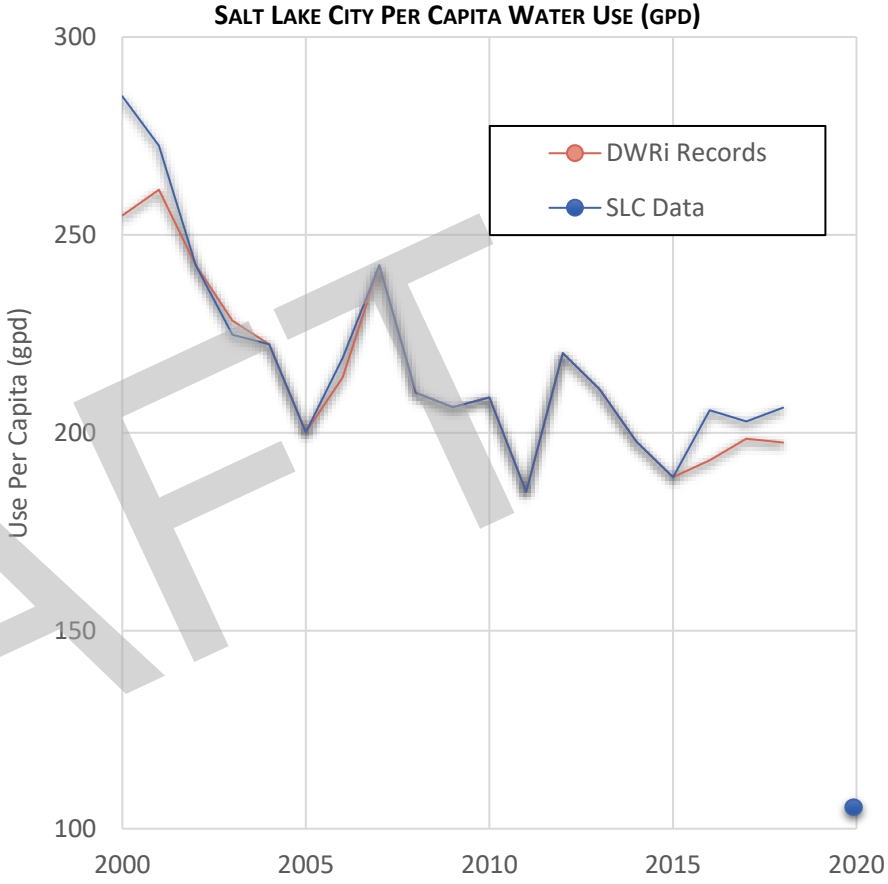
The per capita measuring approach is commonly used by the State of Utah as it provides a uniform methodology that can be applied to the many water systems it regulates. Unfortunately, there are also a number of weaknesses associated with measuring water and conservation progress based on per capita water sales.

System Losses. Basing calculations on water sales rather than water production does not capture the effect of system losses on water consumption. Consequently, elimination of leaks and other system losses has no effect on per capita water sales even though these kinds of savings are an important part of overall conservation efforts. This may also result in undervaluing water loss programing as an effective conservation tool, as this method of calculation does not account for water loss and therefore reducing water loss does not alter gallons per capita calculations.

Effects of Land Use. Per capita water sales can be misleading because it does not adequately communicate the effects of density and other land use aspects on water use. For example, if a community significantly increases its population density, the amount of outdoor water use associated with each person may go down. This may result in lower per capita water sales even if the actual efficiency of water use does not improve. While this type of decrease in per capita water sales may reduce peak demand, it may not reflect overall changes in water use as a result of densification.

Demand Forecasting. Frequently used to forecast future water demand, the use of per capita consumption assumes that water use increases in a predictable manner as population grows. This, however, ignores a number of national trends important to determining use levels, including but not limited to drought,

Figure 2-2
Salt Lake City Per Capita Water Use (gpd)



recession, changes in demographics, changes in household or lot size, changes in commercial and industrial profiles, and improvements in technology. Additionally, assuming use increases with population ignores the role of conservation planning, education, and improvements in efficiencies related to use.[1]

Misinterpretation. Per capita consumption may also be misinterpreted to mean "volume of water used per person," when in fact, it includes much more than

[1] *Water Conservation Programs M52*, page 41

direct use by individuals. As noted above, it also includes water use from all other classifications (commercial, institutional, and industrial) averaged across the population. Comparing gallons per capita of communities with differing demographics or commercial and industrial bases can lead to misleading comparisons or characterizations of how water is actually being used. This may also affect an individual's response to calls to conserve as they may not relate to the volume of water described in the gallons-per-capita statistic. When looking at residential use only, use per person in 2018 was only about 123 gpd (indoor and outdoor use).

Adjustment for Equivalent Employment Population. While the weaknesses above are universal to all water providers, there are also some other weakness to using per capita water sales that are unique to the situations of individual water providers. One of these weaknesses is the impact of daytime employment population on water demand. Salt Lake City has a larger daytime worker population compared to other cities in Utah. Not only is the total magnitude large, but the ratio of workers to permanent population is also much larger than most other communities, even when compared to similarly sized communities across the country. This was demonstrated as an outcome of the 2000 US Census. The consequence of this larger-than-average worker population is that, in calculating per capita water sales, the standard calculation does not account for a daytime population surge of nearly 50 percent of the residential population. This in turn could result in under-projecting daytime water needs and distribution capacity. Additionally, this daytime surge may result in inflated daily per capita calculations.

To account for this issue, a revised methodology has been developed which calculates per capita water sales based on a revised population number[2]. This revised population number includes both permanent residents and an equivalent residential population representing the higher than average worker population. This revised population has been used to generate the results in Figure 2-10. Because of these weaknesses, tracking water use and conservation on a per capita basis does not provide as complete a view of actual water use patterns as is necessary to properly analyze and evaluate water use patterns and trends for planning purposes. However, since this is the method traditionally used by the State to track water use, it will continue to be referenced here.

Additional metrics will also be added where useful to help define and clarify water use and conservation within the service area.

2.3 System Losses

As discussed in Chapter 1, water use (as measured through sales at individual delivery points), does not encompass all of the water held or consumed in the water system. Water loss is defined as the difference between water produced and authorized consumption (such as metered water sales or fire protection). The resulting "unaccounted for" water may be apparent loss, such as theft or data analysis errors, or real losses, which consist of water lost through all types of leaks and breaks within the water infrastructure system. Understanding the nature of system loss is critical to developing effective management and mitigation strategies, with the goal of reducing system-wide losses.

A comparison of water sales to metered production can identify the magnitude of water losses in the system. This is summarized in Table 2-2.

Table 2-2
Estimated System Losses 2016-2018

YEAR	Sales (Acre-ft)	Production (Acre-ft)	System Losses (Acre-ft)	System Losses (%)
2016	80,188	90,815	10,627	11.7%
2017	80,044	91,158	11,114	12.2%
2018	82,393	92,618	10,225	11.0%

To verify and address system losses, several steps are being taken, including evaluation of data collection and analysis, enhancement of the leak detection program, and a planned implementation of a water loss and control audit in accordance with AWWA M36[3] recommendations. More details of these programs can be found in Chapter Four: Water Conservation Programs.

[2] Documentation of MWDSLS Conservation Performance – ULS Supply Petition, Bowen Collins & Associates, April 28, 2006

[3] American Water Works Association (AWWA). 2017. *M52 Water Conservation Programs: A Planning Manual, Second Edition*. Denver, Colorado.

2.4 Use by Classification and Sub-Classification

To provide additional background and context for developing, evaluating, and ultimately implementing conservation measures, it is useful to understand the details of how water is used within the service area. The figures and tables contained in this section have been assembled to provide additional detail regarding the breakdown of use by customer classification. These same classifications and sub-classifications will be used in the discussion of conservation programing in Chapter 4.

Customers have been organized into a number of classifications based on shared characteristics such as use patterns and costs of service. This includes both broad classifications (residential, commercial, industrial, and institutional) and more narrowly defined sub-classifications (single-family residence, triplex, hospital, restaurant, etc.). The classifications and sub-classifications used for this analysis are summarized in the corresponding graphic.

Total numbers of existing connections by classification as reported to the DWRi are summarized in Table 2-3. Reported use by classification is summarized in Table 2-4 and Table 2-5. Table 2-4 includes a long-term record of use by

Figure 2-3
Water Use Classification and Sub-Classification

Residential	Commercial	Institutional	Industrial
Single Residence	Business	School	Industrial customers of all types
Duplex	Hospital	Church	
Triplex	Hotel or Motel	Parks	
Fourplex	Restaurant	Government	
	Apartment		
	Miscellaneous		

classification as reported to the DWRi. Table 2-5 includes records from 2016-2018 based on improved customer classification data as discussed previously. Total use by classification and sub-classification are shown graphically in Figures 2-4 and 2-5, respectively.

TABLE 2-3
TOTAL CONNECTIONS

YEAR	Residential	Commercial	Industrial	Institutional	Total
2018	73,559	7,046	199	2,801	83,605

TABLE 2-4
REPORTED WATER SALES TO DIVISION OF WATER RIGHTS (ACRE-FT)

YEAR	RESIDENTIAL[2]	COMMERCIAL	INDUSTRIAL	INSTITUTIONAL[1]	TOTAL
2005	42,625	14,841	3,018	10,785	71,269
2006	44,108	26,090	2,962	3485	76,645
2007	50,043	19,573	4,005	13,569	87,190
2008	43,096	17,683	3,432	11,632	75,843
2009	42,432	16,943	3,790	11,532	74,697
2010	43,283	17,584	3,397	11,491	75,755
2011	40,703	16,534	2,688	10,205	70,130
2012	48,611	18,813	3,331	12,856	83,611
2013	44,454	19,078	3,459	13,205	80,196
2014	42,283	18,587	3,699	10,731	75,300
2015	40,702	17,723	3,474	10,823	72,722
2016	42,695	17,858	3,527	11,181	75,261
2017	43,534	20,313	3,662	10,801	78,310
2018	44,272	18,792	3,627	11,176	77,867

1.In 2005 and 2006, a portion of SLC water use was reported under a customer class labeled as "Other". This use has been included under the institutional classification in Table 2-4.
2. For purposes of this table and consistency with State reporting documents, apartments are included in the residential classification. However, apartments will be considered commercial for all subsequent portions of this report.

TABLE 2-5
UPDATED WATER SALES DATA (ACRE-FT)

YEAR	Residential	Commercial[1]	Institutional	Industrial	Total
2016	35,540	31,845	6,991	5,813	80,188
2017	35,290	32,268	6,774	5,713	80,044
2018	36,737	32,944	7,224	5,488	82,393

1. Including apartments.

FIGURE 2-4
VOLUME OF USE BY CLASSIFICATION (AF/YEAR)

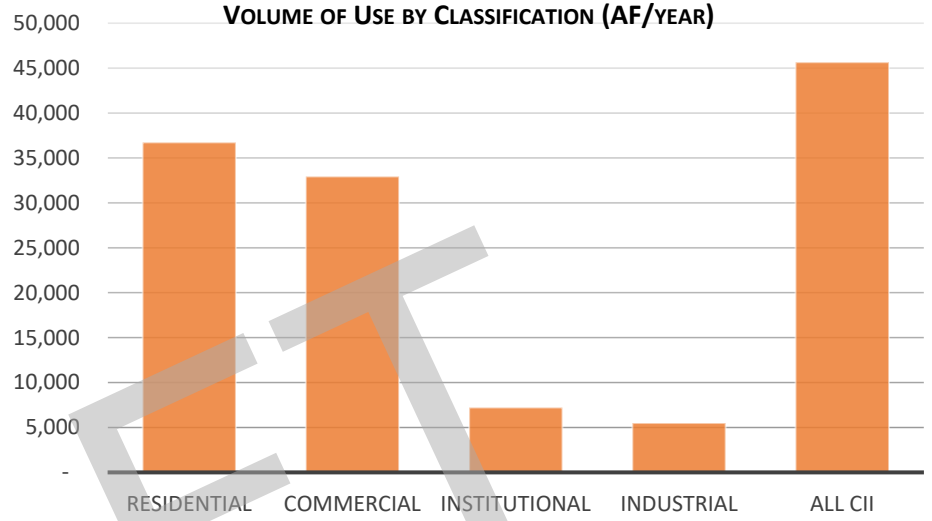
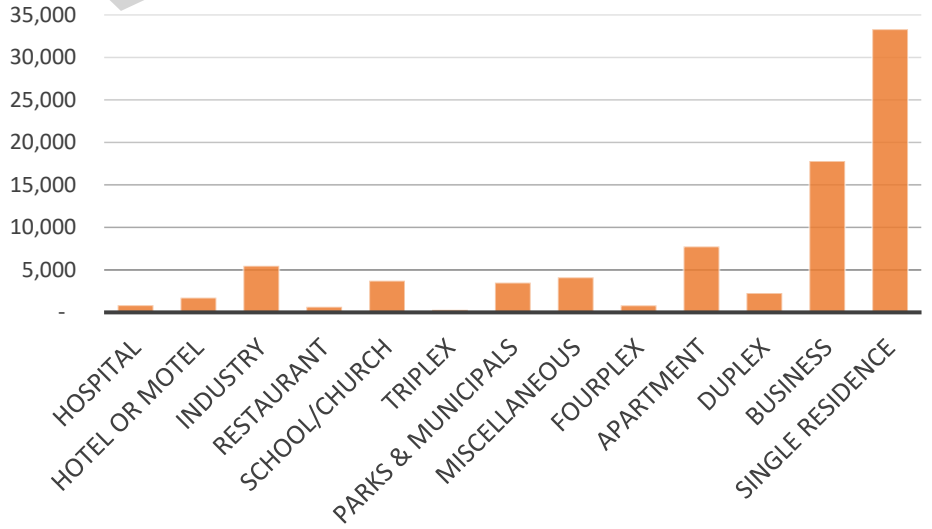


FIGURE 2-5
VOLUME OF USE BY SUBCLASSIFICATION (AF/YEAR)



2.5 Indoor and Outdoor Water Use

Water meters are read and recorded every month (or more factually, by a range of days approximating a month).

Understanding not only how much water is used, but also when it is used helps in both supply planning and demand management.

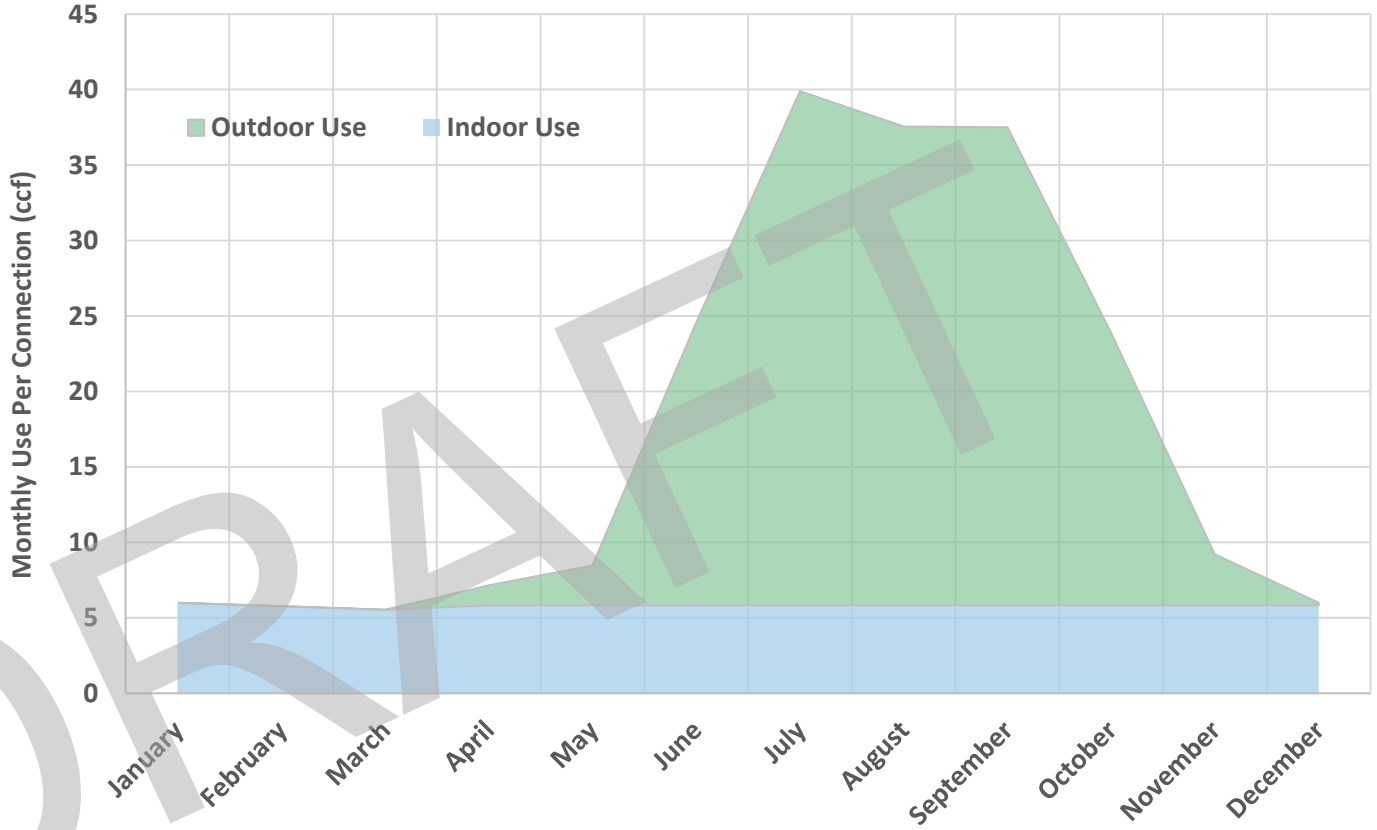
One way to evaluate water use is to consider whether the water is being used indoors or outside. As this region has a distinct winter season, some inferences can be made regarding water use based on the time of year of the use.

With this in mind, it is assumed that water use which occurs in winter months (November through March) is used indoors. Water use during the months of April through October (approximating the landscape irrigation season) is a combination of outdoor and indoor use. Outdoor use, (assumed to be water primarily used to support landscapes) is therefore determined to be the volume of water use during the irrigation season, less the volume of water during the winter months. This process has shortcomings, in that other water use patterns may alter with shifts in the season, but it represents the best estimate based on available data and is accepted industry practice. Figure 2-6 illustrates this analysis within the single-family residential classification.

While the reasonableness of this assumption might make sense with residential properties, it is less certain that the same assumption can be made for commercial, institutional, and industrial customers. However, to simplify the discussion of seasonal water use and for purposes of this plan, outdoor water use is water used during the non-winter months and is assumed to be used on landscapes. As installation of AMI technology (Advanced Metering Infrastructure, or smart meters), CII analysis, and WaterMAPS™ is completed, this analysis will greatly improve in accuracy.

Estimates for winter and summer usage by customer classifications follow.

Figure 2-6
Seasonal Water Use, Single Residence (2016-2018)



Water Use by Classification (Figures 2-7 through 2-9). When looking at the broader classifications, the two largest water users are the residential and commercial classifications. Residential use accounts for about half of all outdoor use and a third of all indoor use. Conversely, commercial water accounts for about half of indoor use and a third of the outdoor use. Because more water is used outdoors than indoors, residential water use is greater overall.

The percentage of water used indoors and outdoors varies significantly between the various classifications. More than 75 percent of institutional water use occurs outdoors while industrial outdoor use is less than 15 percent. This makes sense, given that institutional users include parks, schools, and other sub-classifications that are responsible for and maintain outdoor public spaces. Overall, about 45 percent of the water is used indoors and 55 percent is used outdoors.

FIGURE 2-8
% TOTAL INDOOR USE BY CLASSIFICATION

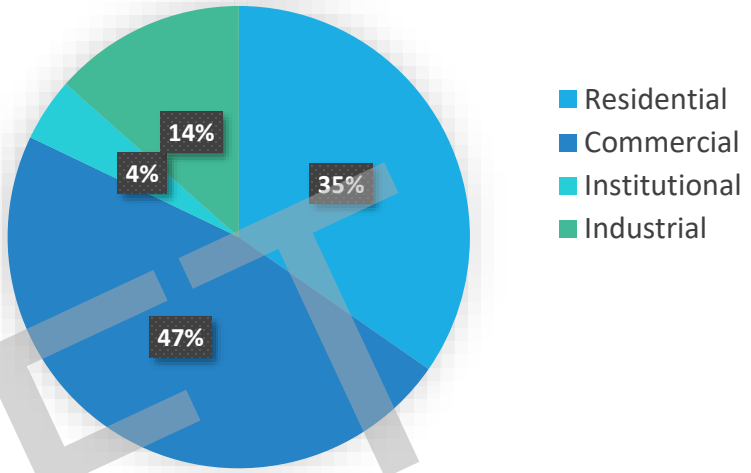


FIGURE 2-7
LOCATION OF USE BY CLASSIFICATION

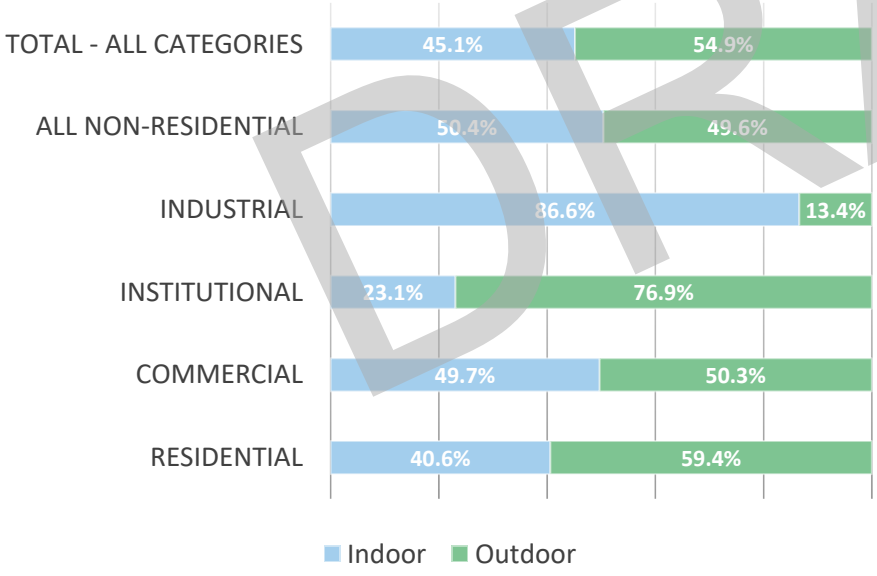
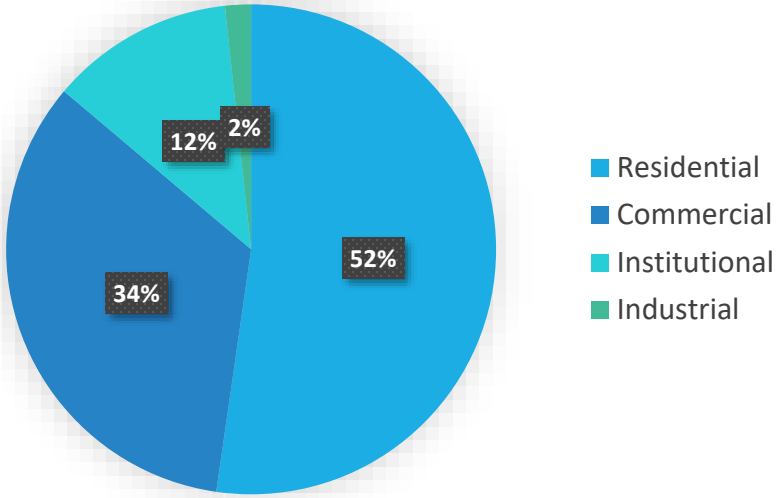


FIGURE 2-9
% TOTAL OUTDOOR USE BY CLASSIFICATION



Water Use by Sub-Classifications (Figures 2-10 through 2-12). Water use varies between sub-classifications. The sub-classification of single-family residence uses more water both indoors and outdoors than other sub-classifications. While the total portion of indoor water use by single-family customers is slightly more than indoor use by businesses, it is more than double the outdoor use of any other sub-classification. This may not be due to overuse but may be a result of property characteristics unique to this sub-classification. Analyzing use at this level, for instance, through programs like WaterMAPS™, can improve conservation programming design, and therefore, effectiveness. This in turn will help to assure that conservation goals are achieved in a manner that is timely, cost effective, and fair.

Water use also varies within larger classifications. Residential outdoor use varies from 67 percent for single-family residential use to 34 percent for higher density properties. Among commercial users, Miscellaneous uses more water outdoors, while restaurants and hotels use more indoors. It is not unexpected that Parks has their highest percentage of use outdoors, and should not in itself be interpreted as overuse, but may indicate opportunity to conserve.

FIGURE 2-10
LOCATION OF USE BY SUB-CLASSIFICATION

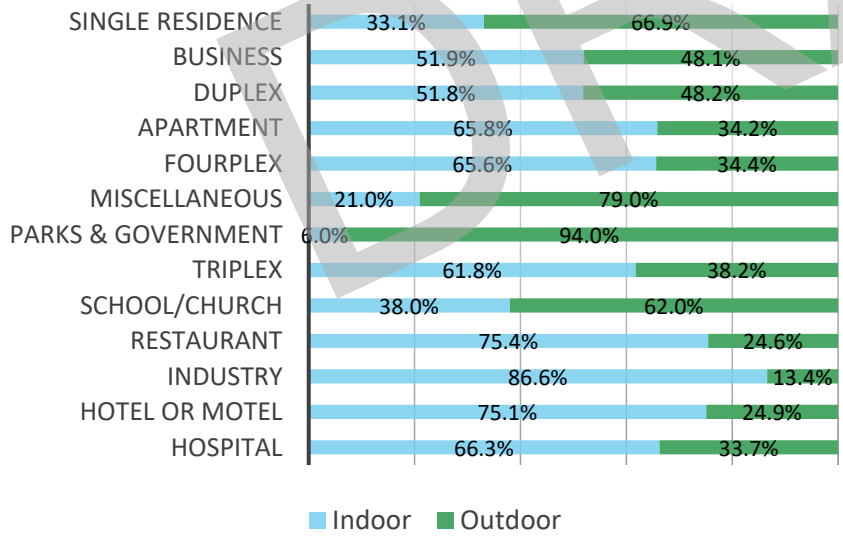


FIGURE 2-11
% TOTAL INDOOR USE BY SUB-CLASSIFICATION

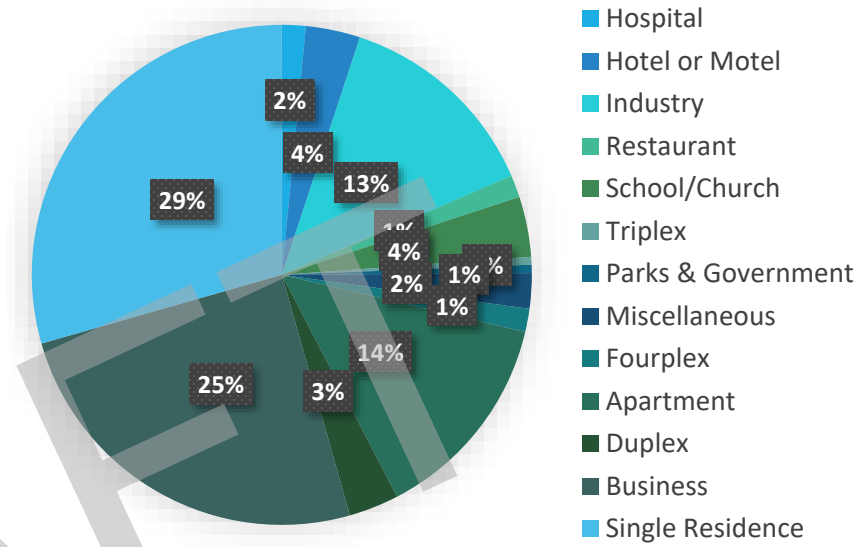
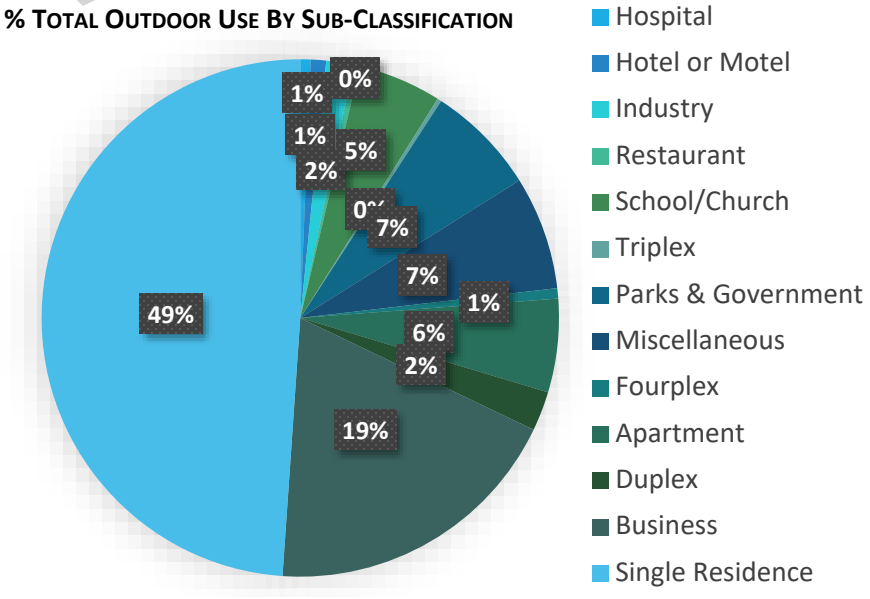


FIGURE 2-12
% TOTAL OUTDOOR USE BY SUB-CLASSIFICATION



Total Volume of Indoor and Outdoor Use (Figures 2-132 and 2-14). Figures 2-13 and 2-14 summarize indoor and outdoor water use by classification and sub-classification in terms of total volume (based on 2018 water use data). This provides some perspective on the total potential for conservation savings in each area.

Consistent with previous conclusions, these figures confirm that much of the volume of water saved through conservation will need to come from single-family residences. However, the combined volume of other user types is also significant and cannot be overlooked. Detailed analysis for the commercial, industrial, and institutional classifications will ensure a clearer picture of water use patterns within these sectors. Understanding how businesses, offices, and industry use water helps identify opportunities for conservation, facilitating the development and implementation of effective demand management strategies. Commercial, industrial, and institutional customers are integral partners in the community, and helping them become better water stewards while not imperiling the economy benefits everyone.

FIGURE 2-13
VOLUME OF USE BY LOCATION OF USE AND CLASSIFAICATION (AF/YEAR)

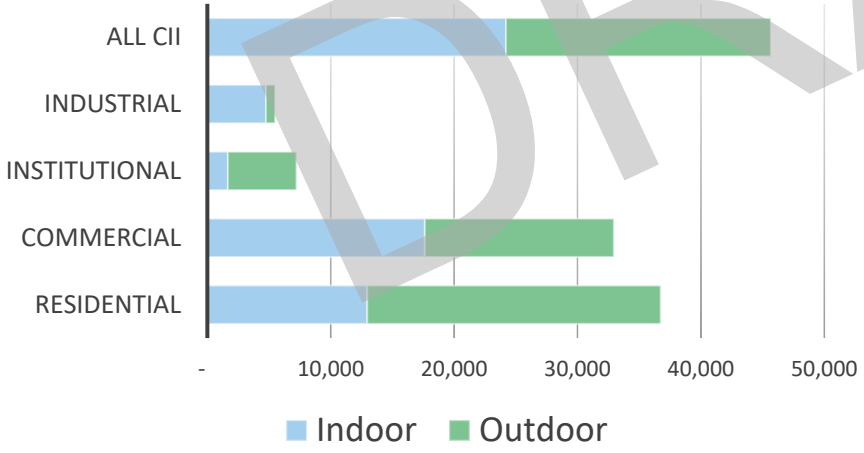
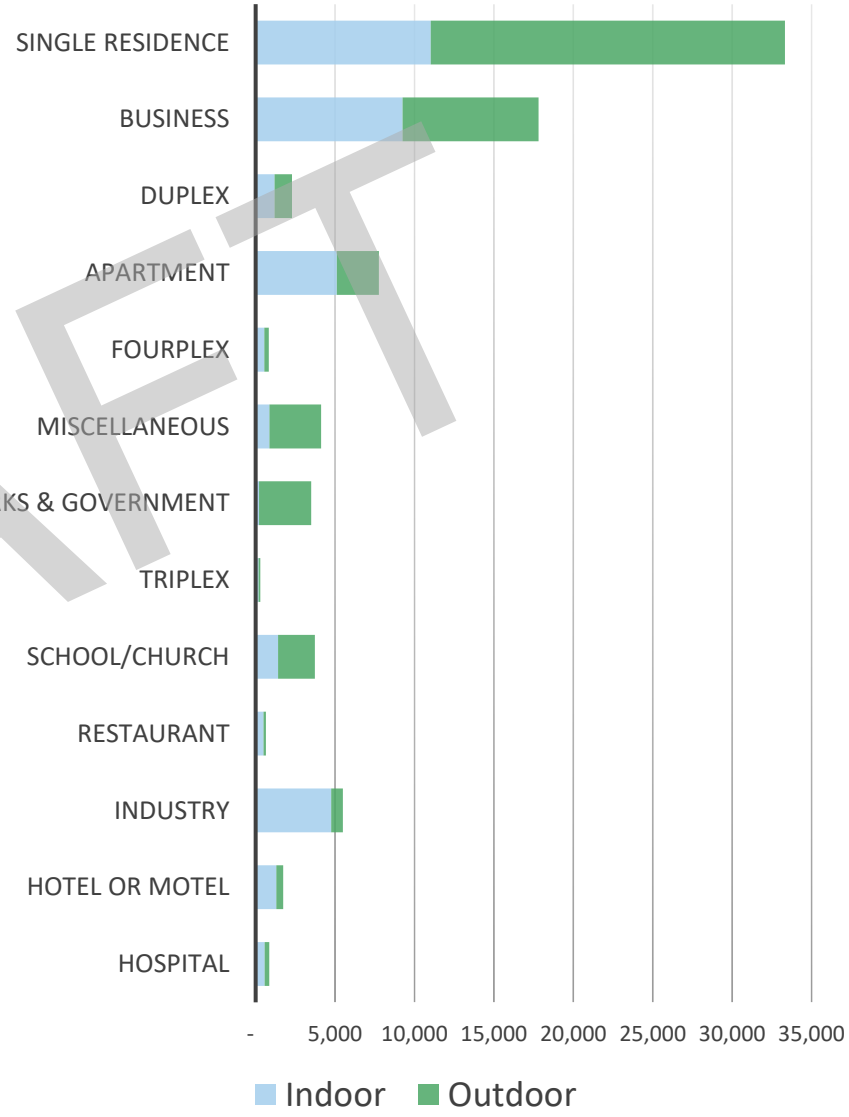


FIGURE 2-14
VOLUME OF USE BY LOCATION AND SUB-CLASSIFICATION (AF/YEAR)



Summary of Per Capita Use by Classification (Table 2-6 and Figure 2-15). Table 2-6 and Figure 2-15 summarize use by classification on a per capita basis as requested in the State's guidelines for conservation plans. Results are shown for 2018 water use. It should be noted that the per capita calculation has been based on the same equivalent population as used for generating Figure 2-1. As a result, while the figure and table are consistent with previous per capita calculations and may be useful in visualizing the ratio of use between the various classifications, they should not be interpreted as an accurate calculation of per person water use on a residential basis.

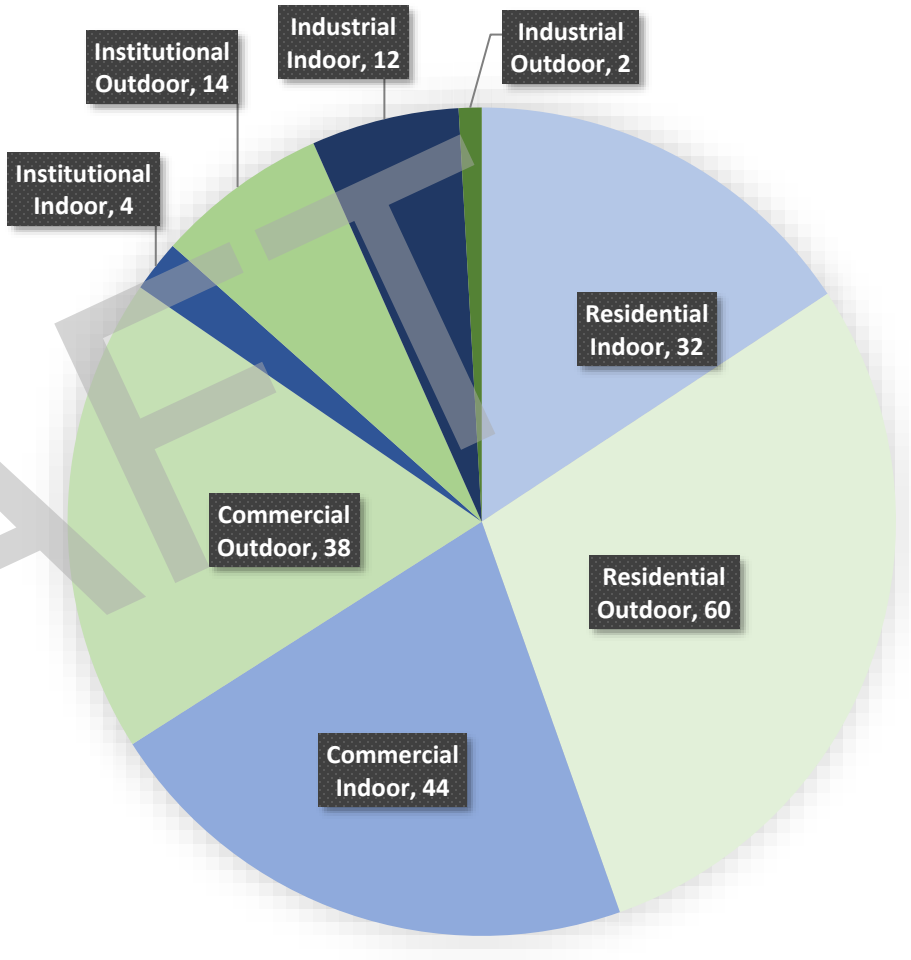
Additionally, the range of characteristics within the commercial and industrial classifications is far greater than those within other classifications, making evaluations of per capita use by classification dubious in value. For example, commercial classifications contain small clothing boutiques (low water users) and large, many-tabled restaurants (high water users). Oil refineries are included in the industrial classification (high water user), but so are retail shipping warehouses (low water users). Even the residential classification is diverse, including single-family homes and multistory apartments with hundreds of units.

Advances in metering technology, improvements in data and records keeping, and continued CII and WaterMAPS™ analysis will refine the data and bring more relevance to this particular statistical report.

TABLE 2-6
PER CAPITA WATER USE BY CLASSIFICATION

	Residential	Commercial	Institutional	Industrial	Total
Indoor	32	44	4	12	93
Outdoor	60	38	14	2	113
Total	92	83	18	14	206

FIGURE 2-15
PER CAPITA WATER USE BY CLASSIFICATION (GPD)



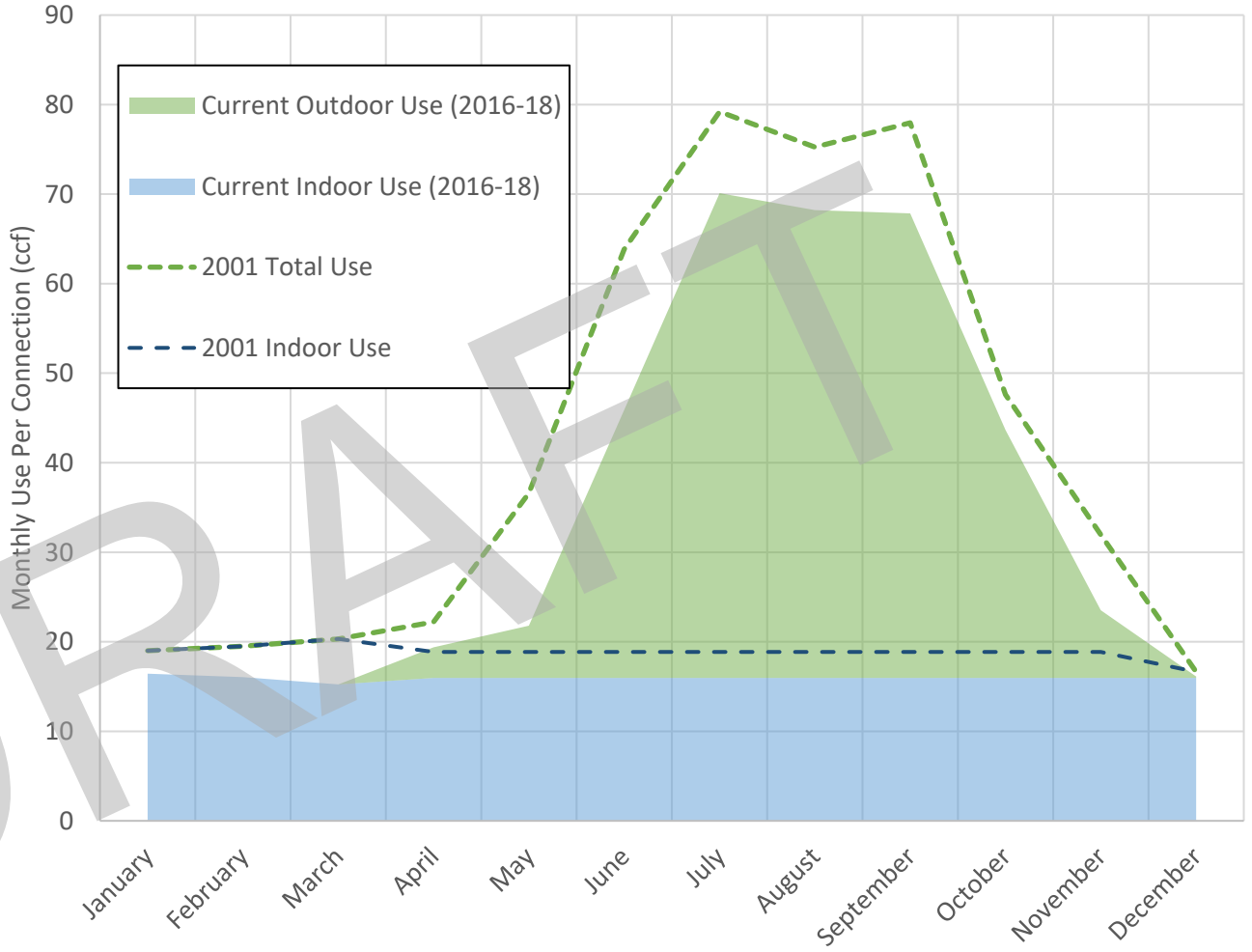
Total All Classifications = 206 gpd

2.6 Conservation Progress to Date

Significant progress has been made in improved efficiencies and conservation over the last two decades. While detailed records are not available for 2000, detailed analysis of water use patterns for each subsequent year was conducted. To evaluate where and how water was conserved, the water use patterns from 2001 have been compared to water use patterns over the 2016-18 period. The results are shown in Figures 2-15 through 2-18.

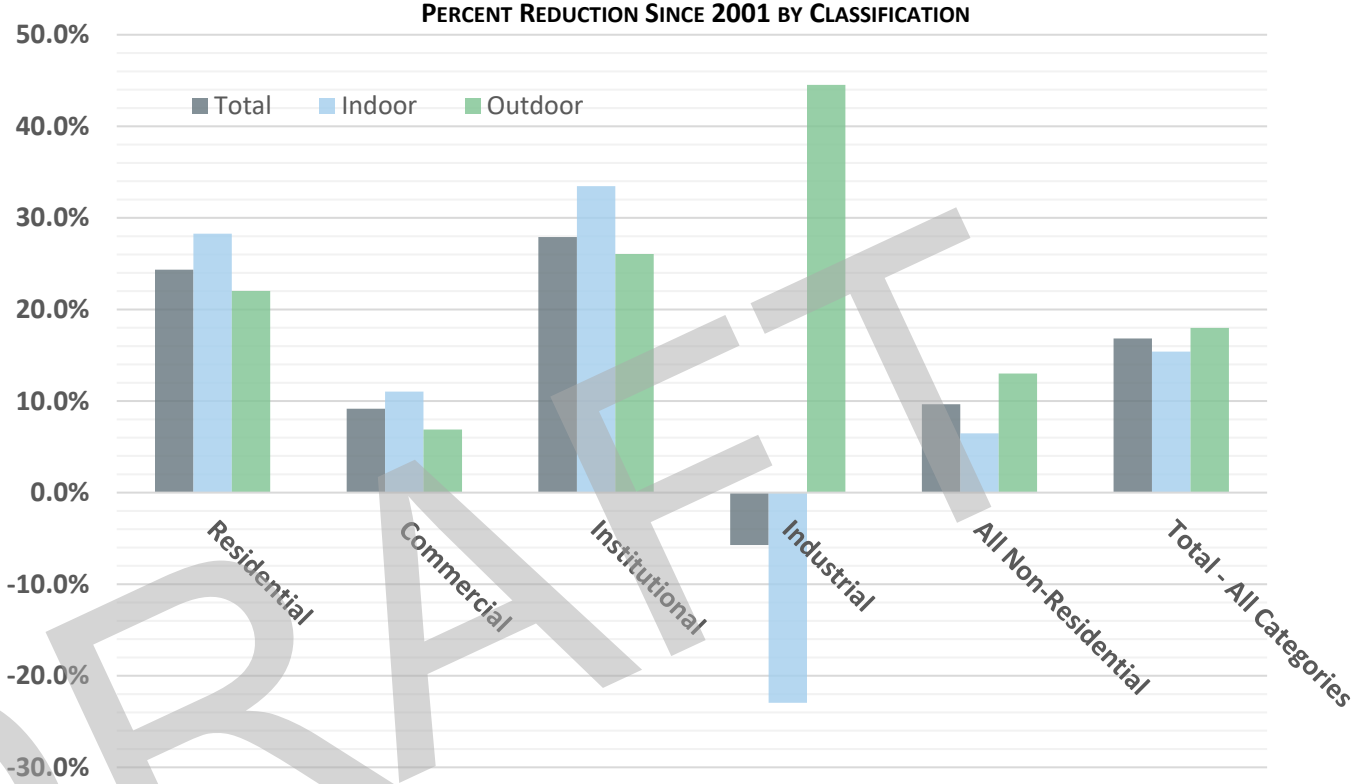
Monthly Conservation Averaged Across Connections (Figure 2-16). Figure 2-16 shows estimated indoor and outdoor water use in the service area over the course of the year for both recent (average of 2016-18) and historical (2001) water use patterns. As can be seen in the figure, the community has done an excellent job in saving water both indoors and outdoors and throughout the course of the year. This seems to indicate that the conservation program and messaging has been helpful in increasing overall awareness of the value of water, the importance of conservation, and implementing effective strategies for accomplishing sustained water use reductions.

Figure 2-16
Monthly Conservation, Average of All Connections



Percent Water Use Reduction by Classification (Figure 2-17). Figure 2-17 shows the percent reductions by customer classification since 2001. These results have been calculated based on the reduction in water sales per connection. A few interesting trends can be observed in this figure:

FIGURE 2-17
PERCENT REDUCTION SINCE 2001 BY CLASSIFICATION



i. Conventional thinking has been that conservation will need to come primarily from outdoor water use. However, the percent savings between estimated indoor and outdoor water since 2001 is about the same. There is slightly more savings outdoors than indoors (18.0% vs. 15.4%), but the difference is less than might have been expected.

ii. Commercial savings are a little less than half of the savings observed for residential customers since 2001. This does not necessarily indicate that commercial customers have not reduced water use appropriately. Further analysis is required to determine the capacity to reduce water use based on current practices and technologies. Continuing efforts to disaggregation of water use within all CII classifications will improve understanding of water use patterns and enhance programing opportunities.

iii. Institutional customers have seen the largest reduction in total use of all classifications. This demonstrates the efforts of large property managers in golf, parks, and other open spaces to reduce water use. While there is always more to do, this means institutional users have taken a good first step in conserving water on its properties.

iv. Industrial customers appear to be showing an increase in indoor water use since 2001. In considering this result, it should be emphasized that the values reported here are based on sales per connection. While it is possible that per-connection water use has increased since 2001, it is also possible that new industrial connections have been added since 2001, accounting for the apparent increase in average use per connection. Ideally, these results could be presented in a format that only looked at water used by industrial customers that existed in 2001 to see how their actual water use has changed. Unfortunately, the data does not exist to make this distinction. Work is on-going to clarify water use within this classification. For more detailed information, refer to Chapter 4. Industrial customers, however, had the greatest reduction in outdoor use between classifications.

Percent of Water Use Reduction by Sub-Classification (Figure 2-18). Figure 2-18 shows the percent of water use reduction by sub-classification. This provides some additional detail regarding where reductions in per connection water use have occurred since 2001. Similar to what was observed for industrial customers in Figure 2-16, the "negative savings" observed for hospitals, hotels, and apartments are not believed to be per capita increases in water use, but a function of an increase in the number of connections or expansion in service within these sub-classifications since 2001. The conservation reported for indoor use in the miscellaneous classification may not be representative of actual savings, but a function of change in how customers in this classification are being reassigned to other classifications. As work continues in CII analysis, understanding of water use patterns and actual use reductions will improve.

Volume Water Use Reduction by Classification (Figure 2-19). Figure 2-19 shows the estimated volume of water saved each year by each customer classification as a result of conservation. These results are an approximation of water volume use reductions as calculated by multiplying the percent reduction per connection by the average use per connection. As a result, it continues to reflect the same problem with industrial use as noted previously. However, it does provide some indication of the magnitude of reductions in various areas.

As can be seen in Figure 2-19, use reductions outdoors accounts for slightly more than 60% of the total reduction. While the percent reduction of indoor use to outdoor use is comparatively similar (as noted previously), the larger total volume of water used outdoors results in a greater volume of conservation reductions . A similar conclusion can be made regarding residential water use reductions. About two-thirds of the total decrease in use is derived from residential customers. This is not because residential customers are saving at substantially higher rates, but simply because they, as a classification, use more water than other classifications. Research being conducted utilizing WaterMAPS, the CII Analytics Tool, and other methodologies will help to increase understanding of water use, demand reduction, and capacity to conserve across all classifications. See Chapter 4: Water Conservation Practices for program details.

FIGURE 2-18
PERCENT REDUCTION SINCE 2001 BY CLASSIFICATION

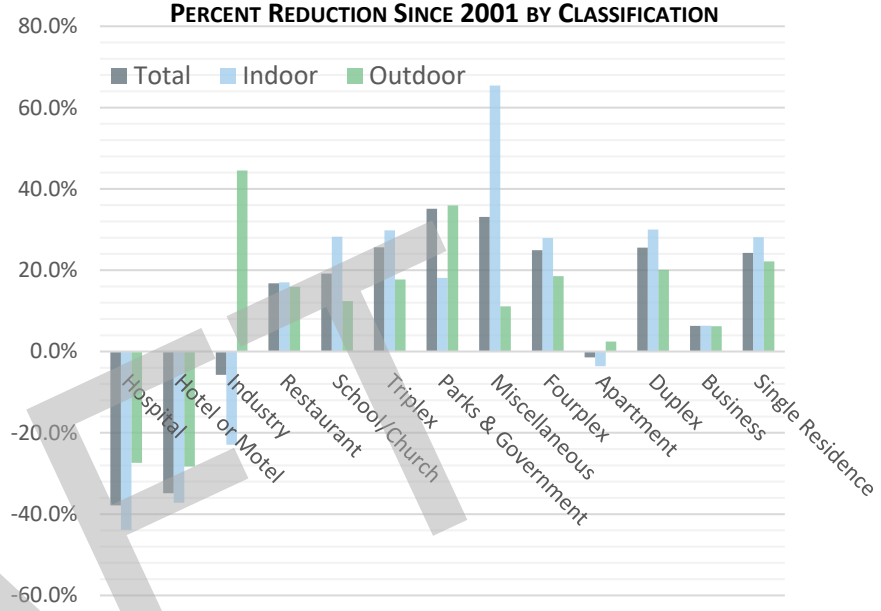
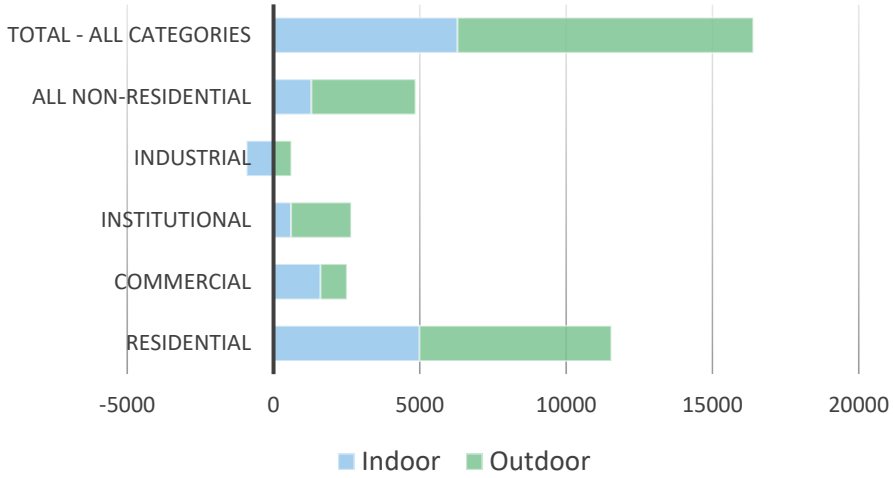


FIGURE 2-19
VOLUME OF CONSERVATION SINCE 2001 BY LOCATION OF USE AND CLASSIFICATION (ACRE-FT/YEAR)

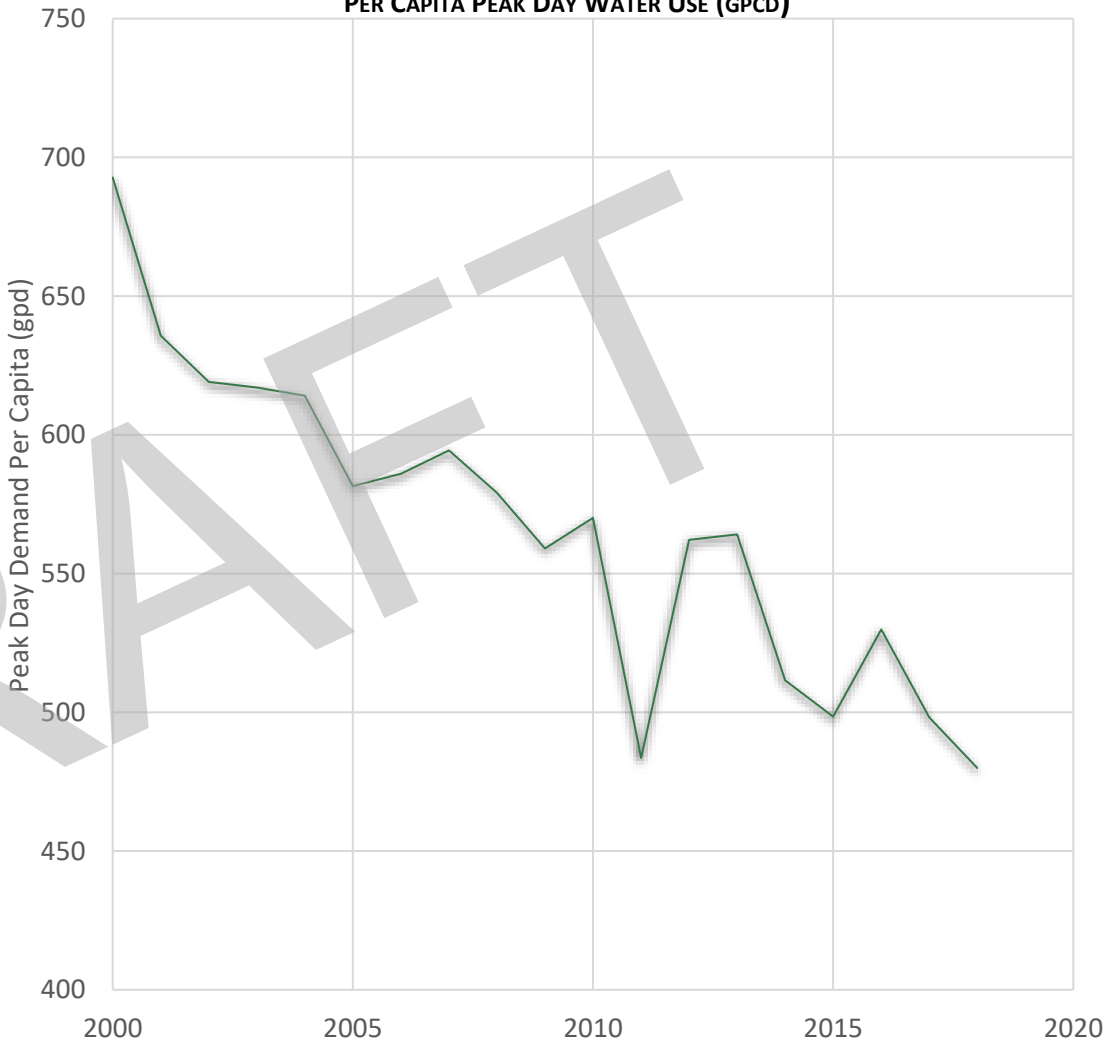


Peak Day Water Use Reduction (Figure 2-20). All of the previous figures have focused on reductions in the volume of water used annually. However, significant strides have been made in reducing peak demands. This is important because most of the water infrastructure facilities must be sized to meet peak demands. Reducing these demands translates to significant savings for the service area.

In system-wide numbers, peak day demand has been reduced from 216.3 million gallons per day (mgd) to 171.0 mgd in 2018. This is a reduction of 21 percent. While this is impressive in itself, the reduction is even greater when growth is taken into account. If peak day demand is converted into a per capita value following the same procedure described for total annual demands (see description of Figure 2-1), the observed reduction increases to 31 percent. Figure 2-20 shows how the reduction in per capita peak demand has occurred over time.

Water savings associated with this reduction in demand are sizable, as identified in the recently completed storage and conveyance plan When this new plan[4] (using updated demand projections with conservation) is compared to the previous plan[5] (based on historical demands without conservation), several projects are now able to be eliminated or decreased in size or scope because of reduced peak demands. Estimated savings associated with downsized or eliminated conveyance project resulting from recent and projected conservation exceed $20 million[6].

FIGURE 2-20
SALT LAKE CITY DEPARTMENT OF PUBLIC UTILITIES
PER CAPITA PEAK DAY WATER USE (GPCD)



[4] *Salt Lake City Water Storage and Conveyance Plan*, BC&A, 2020
[5] *Major Conveyance Study*, BC&A, January 2007
[6] Based on elimination or downsizing of projects identified in the 2007 *Major Conveyance Study* that are no longer needed. This includes elimination of the 4500 South Transmission Main and Storage Tank (Project 3.3B), 7800 South Low Improvements (Projects 3.6A, 3.6B, 3.6C, and 3.12B), and adjustments to the size of the East-West Aqueduct (Projects 3.1A and 3.1B).

CHAPTER THREE HIGHLIGHTS

GOAL

	Current	2025	2030	Long Term
Gallons Per Capita (gpd)	206	192	183	160
% REDUCTION		6.9%	11.3%	22.3%

OVERALL TARGETS

- Indoor use → 50 gpd/person (14.2% reduction)
- Outdoor use → 24" average irrigation (14.6% reduction)

WATER USE REDUCTION

- Annual water use reduction since 2000 = 16,400 AF/year
- Needed additional water use reduction = 16,100 AF/year

Additional Water Use Reduction by Classification (AF/year)					
	Residential	Commercial	institutional	Industrial	Total
Indoors	2,818	2,596	193	282	5,890
Outdoors	5,342	3,447	1,257	165	10,210
Total	8,160	6,043	1,450	447	16,100

CHAPTER THREE: CONSERVATION GOALS

3.0 Introduction

As discussed in Chapter 1, conservation is an essential part of water resource planning to meet the future water needs of its community. The purpose of this chapter is to articulate and describe the goals for conservation that will:

- Keep on track to meet its long-term water supply needs.
- Facilitate efforts to increase resource and system resilience in the face of identified risks, including climate change.
- Encourage the continued wise use of an important limited resource; and
- Be consistent with conservation goals established by the State, Central Utah Project, Alliance for Water Efficiency, US-Environmental Protection Agency, and this plan.

This chapter highlights historical and proposed goals from various sources that are relevant to current conservation planning efforts. Included are discussions of specific goals articulated in the Governor's Water Conservation Goal, the Utah Lake System contract with the Central Utah Project, and the newly published State Regional Conservation Goals.

Achievements towards programmatic goals are also discussed in this chapter, such as those outlined in the Governor's Strategic Water Plan, American Water Works Association (AWWA) G-480 Checklist, Alliance for Water Efficiency (AWE) Landscape Guidelines, and the State Division of Water Resources Water Conservation Plan Checklist. Additionally, the Appendices contain these guidelines and goals in checklist format.

Central to this chapter and the contained discussions are these newly developed established conservation goals. These goals have been developed based on outcomes of the *Salt Lake City Water Supply and Demand Master Plan* and reflect current and future projections of both supply and demand within the service area. While not identical to the State Regional Goals, these goals meet or exceed these regional goals and are more in keeping with our own system, resources, and characteristics.

3.1 Conservation Goals

3.1.1 GOVERNOR'S 2001 STATEWIDE WATER CONSERVATION GOAL

In 2001, Governor Mike Leavitt published a statewide conservation goal to reduce per capita water use by 25 percent (as compared to water use from the benchmark year of 2000). Governor Gary Herbert later enhanced that goal by reducing the timeline to be met by 2025.

While the conservation goals over the years have been guided by supply and demand, as well as climate and drought concerns, the Governor's Statewide Goal has been used as a benchmark for measuring program achievements. Additionally, the statewide goals were incorporated into the water supply plan as part of the *2007 Major Conveyance Study*. As documented in Chapter 2, water users within the service area have thus far stayed significantly ahead of this goal in its efforts to reduce water use.

3.1.2 CENTRAL UTAH PROJECT CONSERVATION AGREEMENT (UTAH LAKE SYSTEM CONSERVATION GOALS)

As part of its request for water from the Utah Lake System (ULS), the City has entered into an agreement (through Metropolitan Water District of Salt Lake and Sandy) with Central Utah Water Conservancy District (CUWCD) to achieve a minimum level of conservation. This conservation requirement specified a reduction in per capita water use (from year 2000 levels) of 12.5 percent by 2020 and 25 percent by 2050. While this is an important goal from a contractual standpoint, it has not been the driver of conservation programming goals as internal conservation goals have been more aggressive. However, achieving this goal results in avoided additional cost on water purchased through these agreements, adding to the value of the conservation programming beyond the achievement of water use reduction goals.

3.1.3 RECOMMENDED STATE WATER STRATEGY, JULY 2017

In 2013, Governor Gary Herbert convened a group of stakeholders with extensive backgrounds to form the State Water Strategy Advisory Team. Out of this process, a diverse group of water practitioners, advocates, and academics were asked to help devise a state water strategic plan. Stephanie Duer, the City's water conservation manager participated in this process, representing both Salt Lake City specifically, but also municipal interests in general. The group examined a range of issues, including, but not limited to conservation, competing demands on water, the roles of technology and science, how law and policy affect our relationship with water, and sustainability and the environment.

The outcome of this process is the *Recommended State Water Strategy,* published in 2017. Strategies were organized into eleven categories, with the first being the role of conservation in supporting a sustained water supply. Conservation, demand management, demand reduction, improvements in efficiencies, and the role of technology and science also appear in each of the other ten strategies.

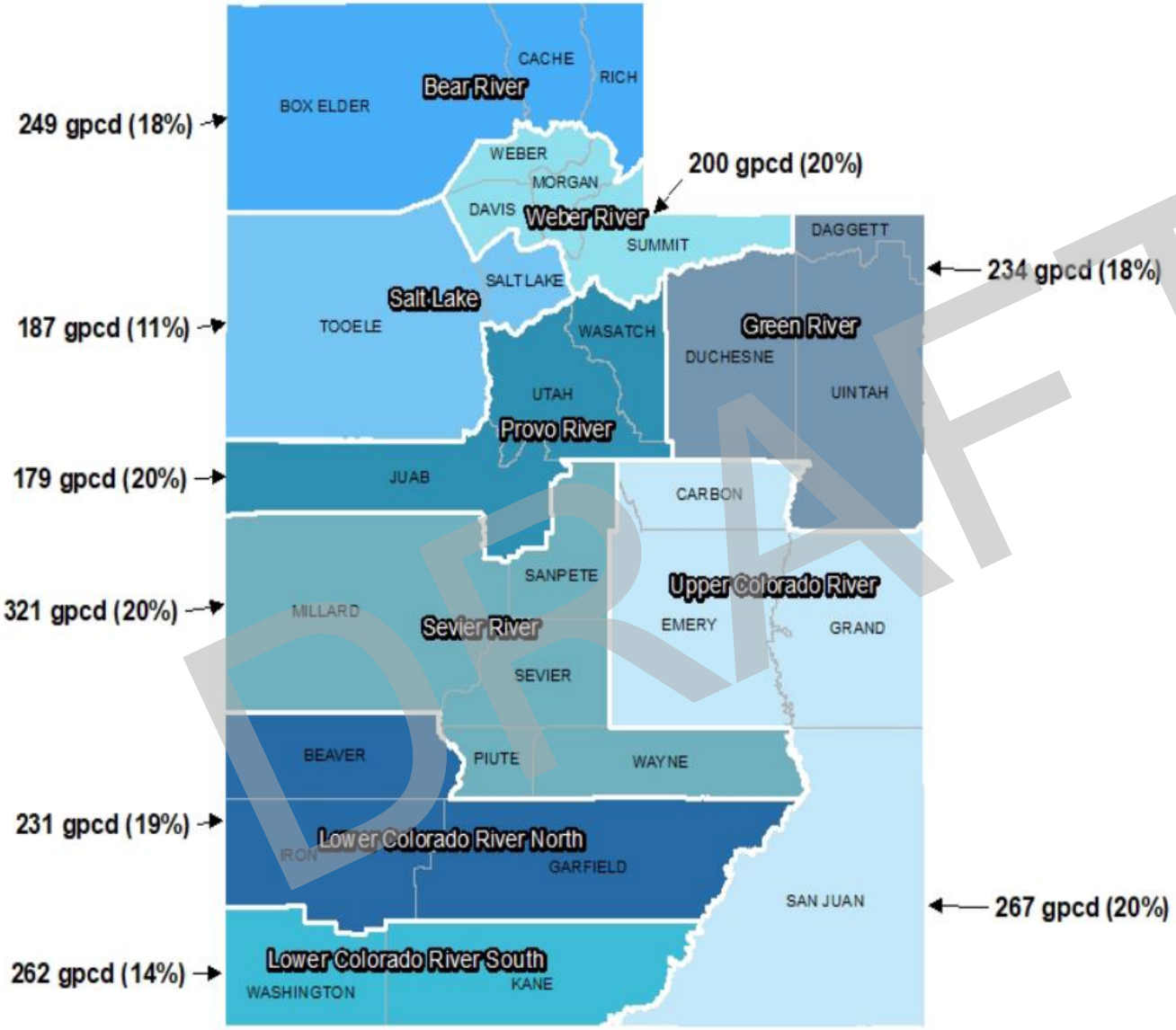
Though this strategic plan does not articulate specific goals, it does outline ideas and approaches to enhancing and building on conservation efforts. Those strategies pertaining most closely to urban demand management and conservation have been collected and organized in a list in the appendices. These strategies were tracked as part of the development of this plan and have also been integrated into day to day programming as appropriate.

3.1.4 UTAH'S REGIONAL M&I WATER CONSERVATION GOALS, NOVEMBER 2019

Over the last several years, efforts have been made to better understand how the State of Utah manages water conservation efforts in the state, including the process for identifying and assigning water use reduction goals. These efforts include a legislative audit completed in 2015 and the *Recommended State Water Strategy* completed in 2017 by the Governor's Water Strategy Advisory Team (GSWAT) (see Section 3.1.3). One of the major conclusions of both documents was a need to update the State's conservation goal to make it more regionally appropriate and relevant.

One of the limitations of the historical statewide water conservation goal is that it failed to integrate the effects of regional climate, local and discrete supply, and water use pattern differences. Utah is a large state with diverse terrain, climates, populations, development patterns, and attitudes that affect what water is available and how it is used. With this in mind, the State commissioned a study to reevaluate the statewide conservation goal, and to establish water conservation goals that reflect each region's characteristics, challenges, and opportunities as related to water. The result is Utah's *Regional M&I Water Conservation Goals.*

FIGURE 3-1
UTAH'S REGIONAL M&I WATER CONSERVATION GOALS



The goals established in the *Utah's Regional M&I Water Conservation Goals* are shown in Figure 3-1[1]. For the Salt Lake region (consisting of Salt Lake and Tooele Counties), the new goal is to reduce per capita water use to 187 gallons per capita per day (gpcd), an additional 11% reduction from the average use in the region observed in 2015. The target timing for reaching this level of water use is 2030, but the report acknowledges that, for many of the actions recommended in the report, "these measures will require time to enact and implement". Thus, "the State of Utah recommends a five-year flexibility period to achieve these 2030 goals". Correspondingly, the official regional goal for the Salt Lake region is 187 gpcd by no later than 2035.

While not official "goals", the study also identifies some projected future levels of conservation. This includes achieving per capita use of 178 gpcd by 2040 (also assumed to have a five-year flexibility period) and 169 gpcd by 2065.

The service area is contained in the Salt Lake Region, which also includes all of Salt Lake and Tooele Counties.

[1] *Utah's Regional M&I Water Conservation Goals*. Utah Division of Water Resources. November 2019.

3.1.5 SALT LAKE CITY WATER SUPPLY AND DEMAND MASTER PLAN CONSERVATION GOALS

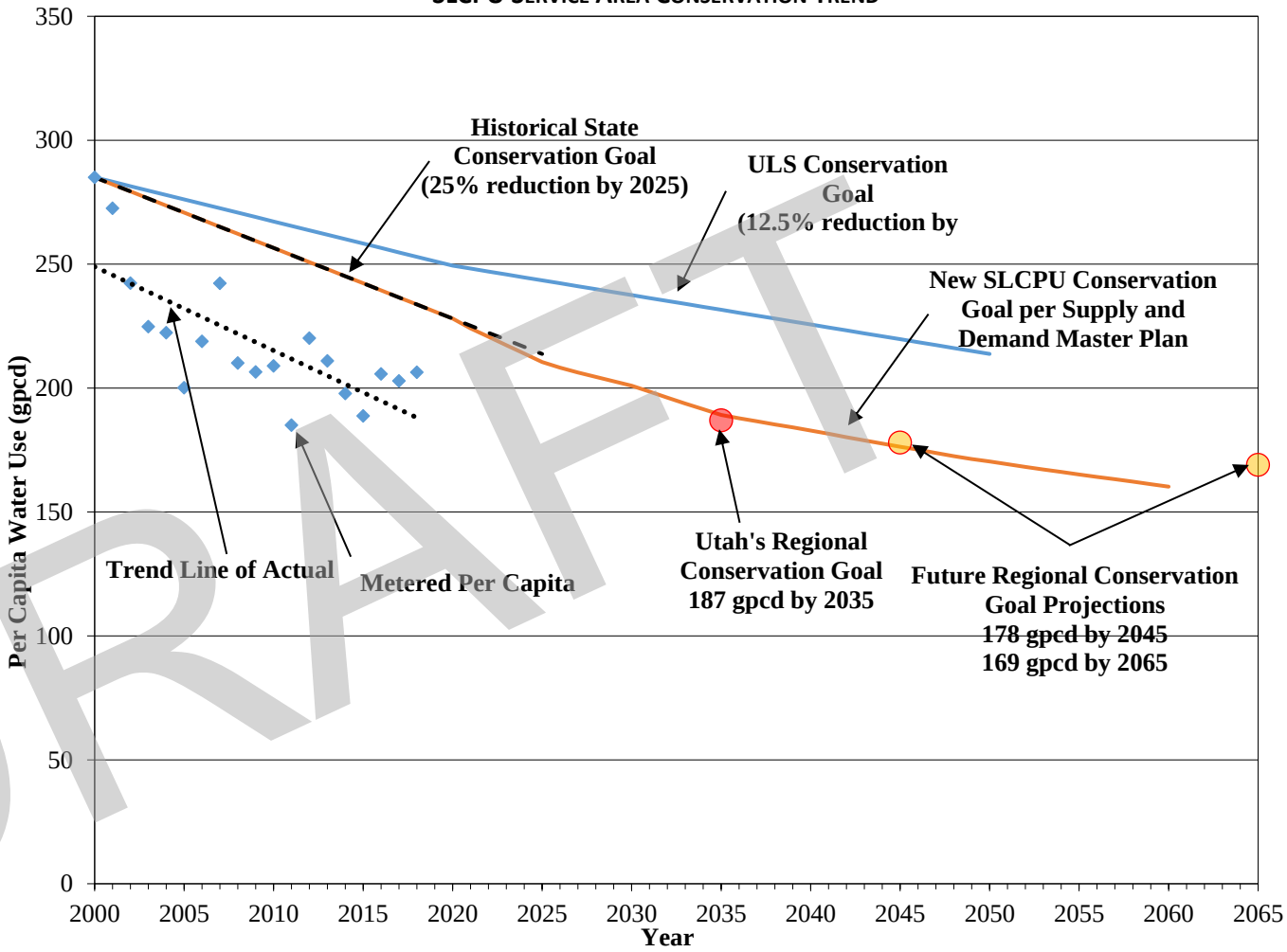
As part of its water supply and demand study, a number of conservation scenarios were considered. These scenarios parallel similar scenarios developed for the State's regional conservation goals.

Ultimately, a scenario was selected (referred to as Scenario 2 in the *Salt Lake City Water Supply and Demand Master Plan*[2]) that both achieves the goal of continuing to reliably supply water for long-term needs and is slightly more aggressive than the new state regional goals. This scenario is the new conservation goal moving forward.

3.1.6 COMPARISON OF CONSERVATION GOALS

Historical and proposed water conservation goals are summarized and compared in Figure 3-2. All values are shown in terms of per capita water use, based on equivalent population adjusted for employment (see Chapter 2). As shown in the figure, the proposed conservation goal for this plan is consistent with the State's regional conservation goals and meets or exceeds all other historical goals.

FIGURE 3-2
SLCPU SERVICE AREA CONSERVATION TREND



Included in the figure is also the observed per capita water use in the service area. From the figure, it can be seen that customers within the service area are meeting or exceeding all of its previously established goals. There has been a slight rebound in per capita water use over the last few years. Even with the excellent results achieved to date, this emphasizes the need for continued and increased efforts in the promotion of long-term conservation, including enhanced education and outreach efforts.

[2] Salt Lake City Water Supply and Demand Master Plan, page 2-11

3.2 Details of SLCPU Conservation Goals

While an overall conservation goal is an important first step in planning, it will be difficult to turn the goal into reality unless we understand the individual components of the goal, that is, who is using the water, and how and when they are using it. The purpose of this section is to provide additional information regarding the conservation goals so that more detailed plans can be developed to achieve discreet components of the goal.

3.2.1 OVERALL CONSERVATION GOAL

For the planning window of the *Salt Lake City Supply and Demand Master Plan*, the long-term conservation goal can be expressed in the following metrics summarized in Table 3-1 and Table 3-2.

TABLE 3-1
LONG-TERM CONSERVATION GOALS
EXPRESSED AS PER CAPITA USE (GALLONS PER DAY)[3]

Historical Governor's Conservation Goal for 2018	2018 SLCPU Observed	Utah's Regional M&I Goal Long-term (2065)	SLCPU Long-term Goal (2060)
234	206	169	160

TABLE 3-2
PERCENT REDUCTION IN PER CAPITA USE TO ACHIEVE LONG-TERM GOALS

State Regional Long-term Goal (2065)	SLCPU Long-term Goal % Reduction from Historical Goal for 2018	SLCPU Long-term Goal % Reduction from 2018 Actual
19.5%[4]	31.4%	22.4%

As can be seen in the tables, long-term goals exceed Utah's Regional M&I Conservation Goals for the Salt Lake region.

3.2.2 CONSERVATION GOAL BY CUSTOMER CLASSIFICATION

As a starting point, it is useful to define the water use characteristics that will need to be achieved in order to reach long-term water use reduction goals.

Changes in per capita water demands may result from a number of factors, not all of which are the result of more prudent water use. For example, increases in density (and the corresponding decrease in average lot size) may significantly decrease per capita outdoor water use, even if water use patterns do not otherwise change. Economic growth and socio-economic conditions, improvements in fixture and appliance efficiency, and climate change are examples of other factors that may, for better or worse, affect demand.

To better measure where savings will be derived through conservation activities, we need first understand the who and how of water use. Besides the factors mentioned above, it is also helpful to examine water use by grouping customers together that exhibit similar characteristics, demographics, or water use behaviors. For example, homeowners use water differently than do businesses, and both have water use patterns different from schools. By grouping water users into classifications with similar characteristics, we can improve water use analysis and enhance programing to achieve demand reduction. Setting conservation goals for water use reduction in specific water use areas will enhance our opportunities to successfully achieve our conservation goals.

For conservation planning purposes, customers have been disaggregated into the primary classifications of residential, commercial, institutional, and industrial, which are the same classifications used in Chapter 2 to facilitate analysis of historical water use. These groups have been further divided into subclassifications (see Section 2.3). The analysis of historical use and projected future growth presented in Chapter 2 is used here to estimate how much

[3] Based on equivalent population adjusted for employment as described in Chapter 2.

[4] State Regional Goals measured as reduction from 2015 water use.

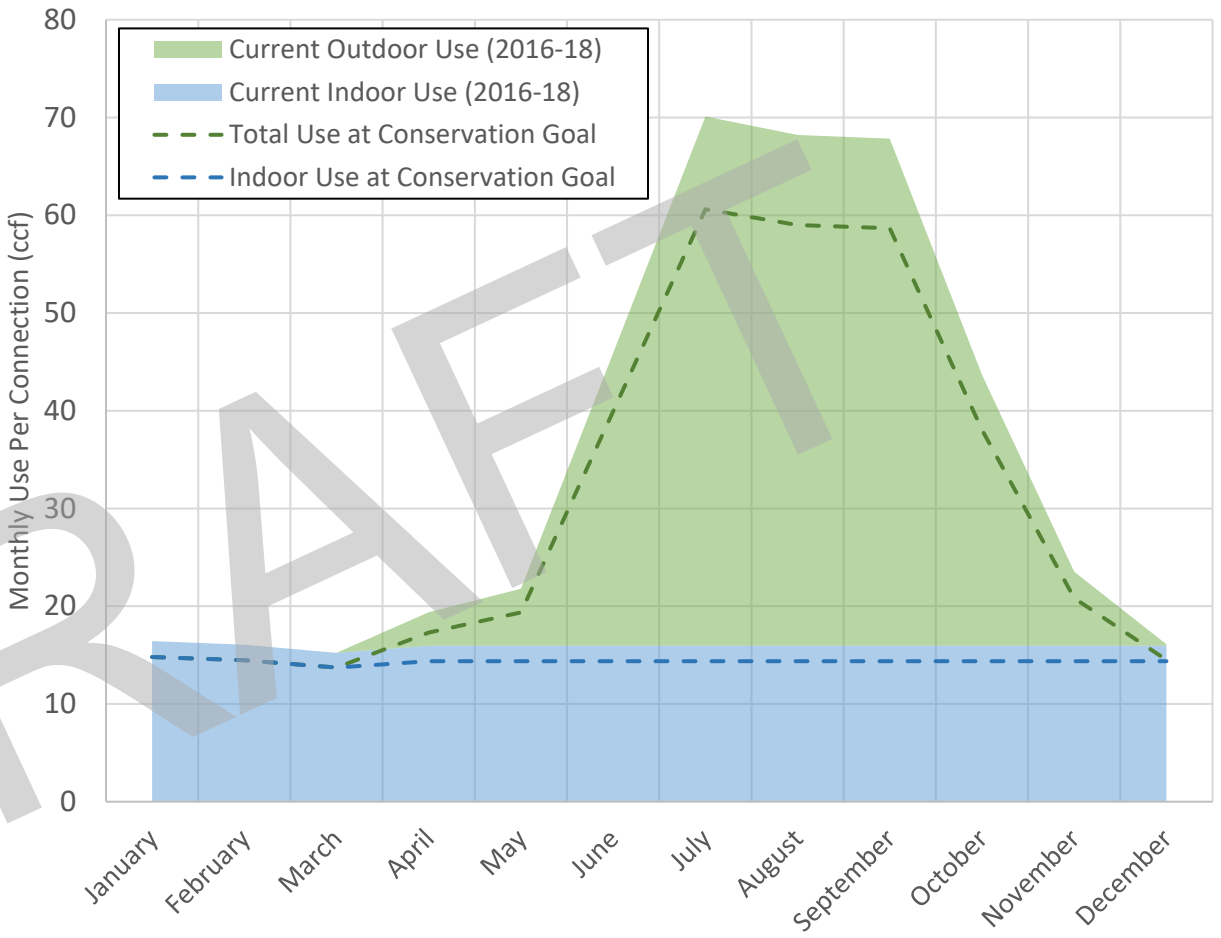
savings may come from each classification and subclassification based on the following general assumptions:

- Residential indoor water use to be reduced to 50 gpcd (14.2% reduction from 2018 water use)
- Outdoor water use to be reduced to 24 inches average irrigation (14.6% reduction from 2018 water use)
- CII indoor reduction to be determined

For Commercial, Industrial, and Institutional customers (CII), it has been assumed that outdoor conservation will occur at the same rate as in the residential classification, but indoor water use will be reduced in an amount equal to approximately 50 percent of the reduction observed in residential use.[5]. This is based on maintaining the same ratio of conservation between residential and non-residential classifications as observed in the past (see Chapter 2). As work continues in evaluating water use in CII sectors, enhanced understanding of disaggregated water use patterns will facilitate establishment of more meaningful goals within the CII sector. For more details, see Chapter 4.

Based on these assumptions, projected conservation by classification and season of use is summarized in Figures 3-3 through 3-5.

FIGURE 3-3
ADDITIONAL CONSERVATION BY MONTH AVERAGED ACROSS ALL CONNECTIONS



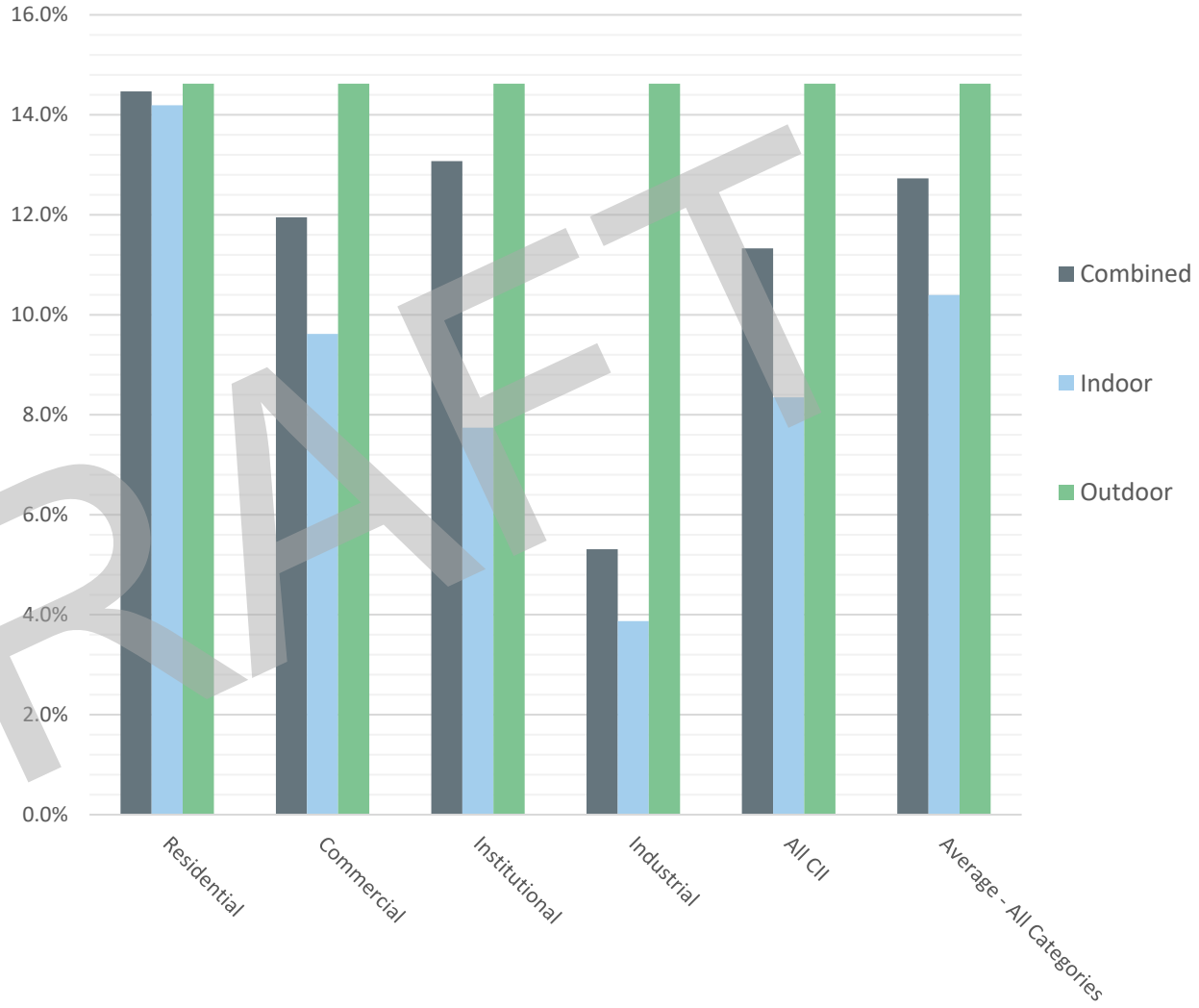
Additional Conservation Throughout the Year (Figure 3-3). Figure 3-3 shows current indoor and outdoor water use over the course of the year, as well as projected demand reductions needed to attain the planned long-term conservation goal. As seen in the figure, additional conservation is needed both indoors and outdoors, as well as throughout the course of the year.

[5] The exception to this is the apartment sub-classification where it has been assumed that indoor water savings will be the same as residential.

Estimated Additional Conservation by Customer Classification (Figure 3-4). Figure 3-4 provides estimated, disaggregated conservation targets for both indoor and outdoor water use by customer classification. Target outdoor conservation on a percentage basis is identical for all groups. Indoor targets vary depending on the estimated potential conservation for each group based on historical average use by classification.

Note that indoor industrial conservation is indicated as only about half of what is expected for other CII customers. This does not mean that industrial users are not expected to make the same effort to conserve water as other CII customers. An active conservation program among industrial customers is recommended and necessary. All industrial users are expected to look for ways in which they can improve their water use. The lower indoor conservation target at this writing is a recognition that there is a great deal of variability in the nature of industrial water use that makes the establishment of a single, aggregate reduction goal difficult. Further analysis is necessary to better understand water use patterns and the capacity to conserve within this and other CII sub-classifications.

FIGURE 3-4
ESTIMATED ADDITIONAL PERCENTAGE BY CUSTOMER CLASSIFICATION

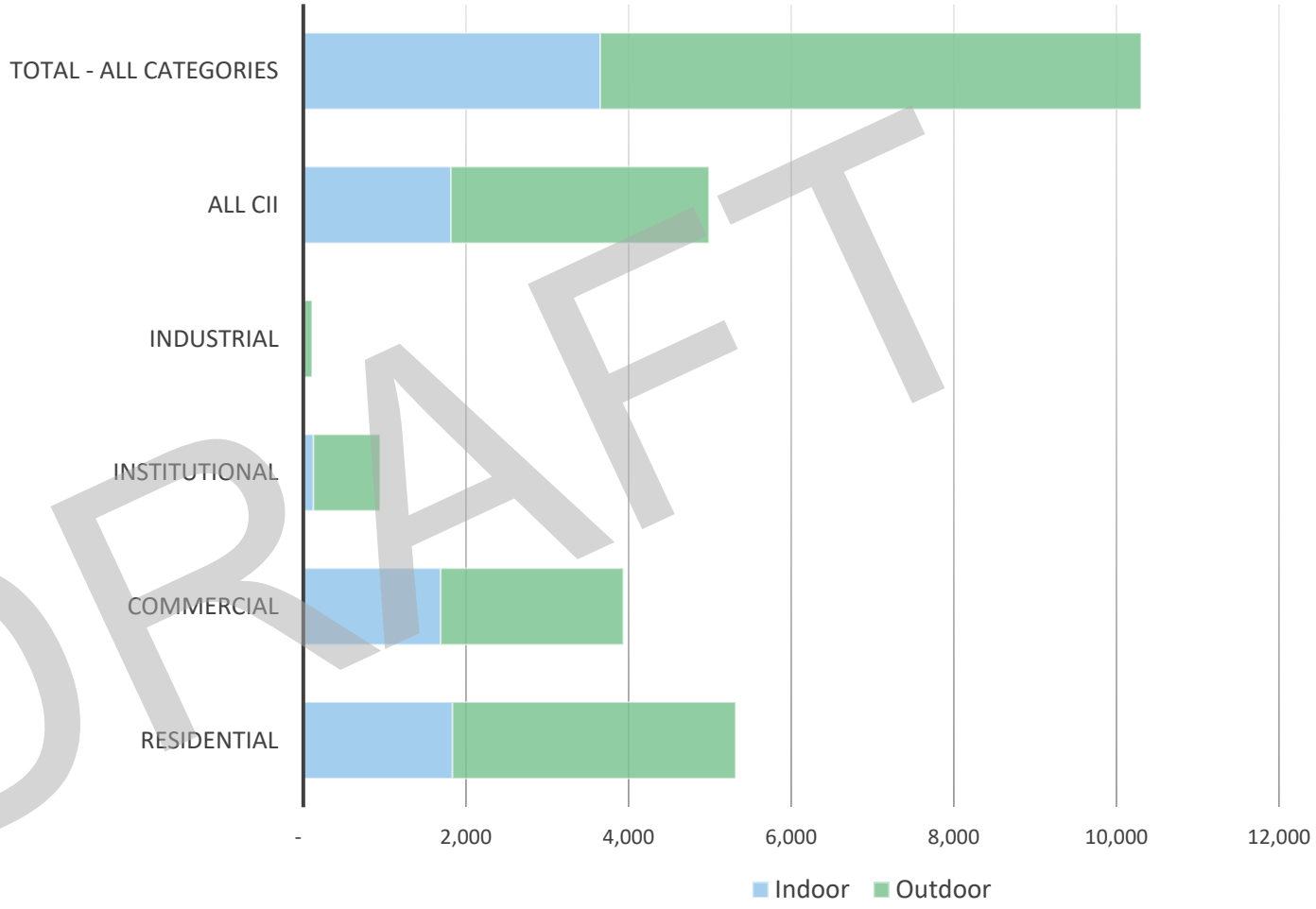


Estimated Additional Conservation Per Classification by Volume (Figure 3-5). In addition to considering percent reductions, it is often useful to understand the accompanying volume of water that will need to be reduced within each classification. Figure 3-5 provides perspective in this regard.

As can be seen in the figure, most of the water reduction in the service area will need to come from residential customers. This is not a conscious attempt to target these customers but simply a reflection of the size of this customer classification, its current volume of use, and the estimated capacity to conserve within this classification.

Even though other customer classifications may currently appear to have lower reduction demands expressed, conservation will be needed in all areas to reach planned short- and long-term goals. Also, as understanding and evaluation of water use continues, with the accompanying analysis of the capacity to conserve, these conservation targets should be reviewed and refined.

FIGURE 3-5
VOLUME OF ADDITIONAL CONSERVATION NEEDED TO ACHEIVE LONG-TERM GOAL BY LOCATION OF USE AND GROUP (ACRE-FT/YEAR, EXISTING CUSTOMERS)



3.2.3 CONSERVATION GOALS BY SUB-CLASSIFICATION

As with analysis of historical water use, conservation goals may also be divided into sub-classifications, a practice helpful in the design and implementation of conservation strategies. The result is highly targeted, efficient programs. The limitation is that there is a great deal of difference between customers within the classifications, and so a stated reduction goal that is averaged for the larger classification may not align reasonably with specific water patterns of discrete customers within a classification.

For example, while the residential classification generally has similar patterns between its sub-classifications, commercial and industrial classifications are very diverse, from art galleries to grocery stores and bottling plants to oil refineries. Being aware of these variabilities highlights the need for further analysis.

With these caveats in mind, projected conservation by sub-classification and season of use is summarized in Table 3-3 and Figure 3-6. It should be emphasized that savings in each sub-classification are an estimate for planning purposes only. As additional information and insight is gained, modifications to these numbers will occur and it may be determined that more conservation is appropriate for some groups and less in others. These types of adjustments are expected and to be encouraged, as conservation programing is adjusted to optimize its program impacts while ensuring water use reduction "burdens" are shared equitably between all water customers.

It should also be noted that total volumes contained in Table 3-3 are for existing customers only. As future customers are added, these new customers, whether residential or CII, will also need to contribute toward achieving water conservation goals. Although not a true "reduction" in water use (since they have not yet used water), future customers will contribute to reducing per capita water use as they implement the same improvements in water use efficiency as is being pursued by existing customers. When the efforts of both existing and future users are combined, the total volume of reduced water use (compared to existing water use patterns) is expected to be an additional 16,100 AF/year over the current annual reduction levels. When considering only the new reduction goal and not what has already been achieved, approximately 8,300 AF/yr. of this total is expected to come from residential customers with the remaining 7,800 AF/yr. coming from CII classifications.

FIGURE 3-6
VOLUME OF ADDITIONAL CONSERVATION NEEDED TO ACHEIVE LONG-TERM GOAL BY LOCATION OF USE AND CUSTOMER CLASS (ACRE-FT/YEAR, EXISTING CUSTOMERS)

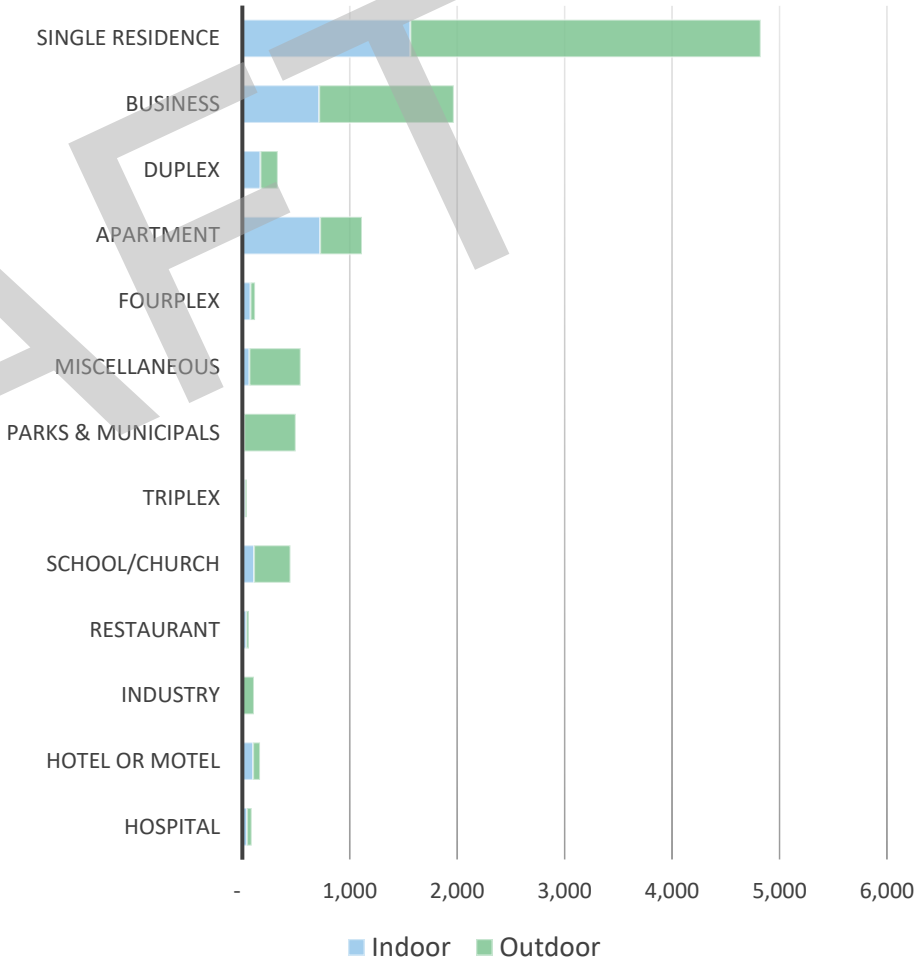


TABLE 3-3

ADDITIONAL CONSERVATION BY SUB-CLASSIFICATION

	Location of Use	Hospital	Hotel or Motel	Industry	Restaurant	School or Church or Charity	Triplex	Parks & Government	Miscellaneous	Fourplex	Apartment	Duplex	Business	Single Residence	Total
Current Annual Use (AF)[6]	Total	858	1,735	5,488	651	3,726	297	3,498	4,124	827	7,760	2,288	17,815	33,324	82,393
	Indoor	569	1,303	4,753	491	1,415	184	211	864	543	5,110	1,186	9,250	11,024	36,902
	Outdoor	289	433	735	160	2,311	114	3,287	3,260	284	2,650	1,102	8,566	22,300	45,491
Daily Use Per Connection (gpd)	Total	22,523	11,560	24,745	1,991	6,547	511	4,972	5,296	690	4,722	457	2,517	445	884
	Indoor	14,928	8,678	21,431	1,502	2,486	316	300	1,110	453	3,110	237	1,307	147	396
	Outdoor	7,596	2,881	3,314	489	4,061	195	4,673	4,187	237	1,613	220	1,210	297	488
Goal for Future Annual Use (AF)	Total	772	1,571	5,197	590	3,278	255	3,001	3,580	709	6,648	1,959	15,847	28,499	71,904
	Indoor	525	1,202	4,569	453	1,305	158	194	797	466	4,385	1,018	8,533	9,460	33,065
	Outdoor	247	369	628	137	1,973	97	2,807	2,783	243	2,263	941	7,313	19,039	38,839
Required Reduction in Annual Use (AF)	Total	86	164	291	61	447	43	497	543	119	1,113	329	1,969	4,825	10,488
	Indoor	44	101	184	38	110	26	16	67	77	725	168	716	1,564	3,837
	Outdoor	42	63	107	23	338	17	481	477	42	388	161	1,252	3,261	6,651
% Savings	Total	10.1%	9.5%	5.3%	9.4%	12.0%	14.4%	14.2%	13.2%	14.3%	14.3%	14.4%	11.0%	14.5%	12.7%
	Indoor	7.7%	7.7%	3.9%	7.7%	7.7%	14.2%	7.7%	7.7%	14.2%	14.2%	14.2%	7.7%	14.2%	10.4%
	Outdoor	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%
Savings Per Connection (gpd)	Total	2,266	1,093	1,314	188	786	73	706	698	99	677	66	278	64	112
	Indoor	1,156	672	830	116	192	45	23	86	64	441	34	101	21	41
	Outdoor	1,111	421	485	72	594	29	683	612	35	236	32	177	43	71

[6] For the purposes of this table, all volumes are shown for existing customers only. As future users join the system, it is assumed that they will use water at the same reduced level as identified in the conservation goals.

3.2.4 FIVE- AND TEN-YEAR CONSERVATION GOALS

As noted previously, current goals are ahead of the Governor's Water Conservation Goals and ULS Goals. With this in mind, it is not enough to meet the new Regional goals; more aggressive goals will be important–both to keep pace with long-term supply plans and to model good water resource stewardship. Correspondingly, this conservation plan has identified 5- and 10-year conservation goals as summarized in Table 3-4. These goals follow the overall structure of the regional goals[7] but are more aggressive to account for conservation reductions already achieved and the need to both sustain those achievements and meet additional water use reductions.

To assist Department personnel in identifying and implementing the practices and programming needed to meet these goals, Table 3-6 provides the estimated water use reduction need of the various classifications. This table calculates the needed reduction in total volume required to reach the goals, along with disaggregation of how this reduction might be divided between indoor and outdoor use. While it is not necessary to achieve the exact mix of conservation shown in this table, and it is certain that these volumes will need to be revised over time as more information is collected, this table provides staff with a starting point to estimate how and where conservation efforts should be initially focused.

TABLE 3-4
RECOMMENDED INTERIM CONSERVATION GOALS

	2018	5-year	10-year	Long-Term
Per Capita Use	206	192	183	160
Percent Reduction Per Capita	-	6.9%	11.3%	22.3%
Percent Reduction Indoors	-	3.2%	5.3%	10.4%
Percent Reduction Outdoors	-	4.5%	7.4%	14.6%
Percent Reduction Total Use	-	3.9%	6.5%	12.7%

TABLE 3-5
ADDITIONAL CONSERVATION NEEDED BY CLASSIFICATION (ACRE-FT/YEAR)

Classification	Location	5-Year	10-Year	Long-term
Residential	Indoors	867	1,431	2,818
	Outdoors	1,644	2,712	5,342
	Total	**2,511**	**4,143**	**8,160**
Commercial	Indoors	799	1,318	2,596
	Outdoors	1,061	1,750	3,447
	Total	**1,859**	**3,068**	**6,043**
Institutional	Indoors	59	98	193
	Outdoors	387	638	1,257
	Total	**446**	**736**	**1,450**
Industrial	Indoors	87	143	282
	Outdoors	51	84	165
	Total	**138**	**227**	**447**
All Classifications	Indoors	1,812	2,990	5,890
	Outdoors	3,142	5,184	10,210
	Total	**4,954**	**8,174**	**16,100**

[7] *Utah's Regional M&I Water Conservation Goals* for the Salt Lake Region indicates that just over half of the long-term goal should be achieved in the next ten years (234 gpcd to 201 gpcd [2030 Goal] vs. 169 gpcd [2065 long-term projection]). This same ratio has been assumed for the 10-year goal, adjusted to account both the lower initial starting point and more aggressive goal. The 5-year goal has been similarly interpolated.

CHAPTER FOUR HIGHLIGHTS

Outreach Program
- 11 Practices currently active or completed
- 6 Practices proposed or to-be-developed

Economic Program
- 4 Practices currently active or completed
- 6 Practices proposed or to-be-developed

Utility Program
- 12 Practices currently active or completed
- 1 Practices proposed or to-be-developed

Law & Policy Program
- 11 Practices currently active or completed
- 2 Practices proposed or to-be-developed

Research & Metrics Program
- 14 Practices currently active or completed
- 5 Practices proposed or to-be-developed

CHAPTER FOUR: CONSERVATION PROGRAMS, PRACTICES, AND MEASURES

4.0 Introduction

Few resources are as critical to a community's health, well-being, or economy as water. Over the duration of its history, the City has protected its water resources, from the critical watersheds, through urban riparian corridors, in the stormwater system, and, of course, by practicing and promoting the wise and efficient use of water. This plan not only reflects that history of conservation, it demonstrates the continued commitment to lead through example. With reliance on research, science, and experience, and in partnership with the community, academicians, and stakeholders, the City strives to achieve sustainable reductions in water use in order to ensure a reliable and secure water supply today and for the future.

Critical first steps in developing effective programing are to understand how much water there will be, who are the customers and how they have used water, and what does future water use look like in order to ensure a sustained supply and fair access. Chapters One, Two, and Three address these questions, respectively. This chapter describes the programming that will help maintain a sustainable, reliable supply.

Programs, practices, and measures need to consider short- and long-term conservation goals and improve water efficiency or reduce water waste while maintaining quality-of-life standards. Programs must be relevant to how water is used or wasted, present meaningful opportunities for engagement, and be equitable in reach and access. Foremost, conservation programming must move attitudes, behaviors, practices, and actions in such a manner as to facilitate meaningful, measurable, and sustained conservation.

This chapter focuses on the programs initiated or proposed that meet the above criteria and support and facilitate short- and long-term water use reductions that will help to meet the conservation goals outlined in Chapter 3.

4.1 Conservation Planning Process

There are many manuals, texts, and papers describing methods for successful conservation planning and programming and this planning process has been informed and benefitted from those resources.

The first steps of assessing supply and demand, evaluating historical use, and establishing water use reduction goals systemwide as well as by customer classification have been described in previous chapters. This chapter addresses the discussion of program selection criteria, description of programs, and summary of evaluation processes. Though these steps are identified here linearly, the process is fluid and iterative, reflecting both the nature and dynamics of planning processes.

4.1.1 Criteria

The criteria for program selection are simple; programming should:

- Help to reduce water use or water waste,
- Enhance water stewardship ethos,
- Have community and political support,
- Be equitable and fair, and
- Provide a cost-benefit to the City and its rate payers.

Though not all programs exhibit all of these criteria, all programs have most of these criteria.

4.1.2 Evaluation

Program evaluation is not as straightforward as identifying a quantity of water saved. Some programs, such as outreach, may be difficult to measure in terms of gallons saved, but they bring a high degree of community benefit and add to our understanding of water. Research and metrics, on the other hand, by its very nature present ample opportunity for measuring program outcomes, either through gallons saved or participants reached. Every effort was made to identify some method of measurement and provide a benchmark or metric to facilitate program evaluation; these measures are provided in Tables 4-2, 4-3, 4-4, 4-5, and 4-6. Other methods for evaluation include industry best practices or regulatory frameworks for plan development. The appendices include checklists that informed the development of this plan and against which it is compared.

- EPA WaterSense Program
- ANSI/AWWA G480 Conservation Program Operations and Management
- Utah DWRe Water Conservation Master Plan Checklist
- State of Utah Regional Goals

4.1.3 Resource allocation

A necessary step in this process is the establishment of fiscal and staffing resource budgets. Fiscal year 2020/21 allocations for specific program measures are included in this plan and are included in program measure focuses where available and listed in Tables 4.2, 4.3, 4.4, 4.5, and 4.6. More extensive future budget planning is a component of the Research and Metrics Program.

Combined program budget allocation for the 2020/21 fiscal year is approximately $680,000. This does not include program measure funds derived from partnerships, grants, or other sources.

4.1.4 Terminology

Within this chapter and throughout the plan are various terms used to express conservation planning, goal setting, and program development. Some terms used extensively in this chapter follow:

Water conservation. Those practices, techniques, and technologies that reduce water consumption, water loss, and water waste, or improve the efficiency of water use.

Practice. An action or system that is beneficial, empirically proven, cost-effective, and widely accepted in the professional community.

Measure. A device, incentive, or technology targeted at a particular type of end user or water use that, when implemented, will save water.

Program. A set of conservation practices and measures planned to be implemented together.

For a more extensive glossary, please refer to the Appendices.

4.2 Conservation by Connection

To identify the water conservation goals expressed in this plan, projections of future reliable water supply coupled with the optimal strategy to plan to not use every drop (reserved water) were analyzed through the lens of historical water use patterns and future predicted growth. These goals are expressed in terms of millions of gallons and acre feet by classifications and subclassifications. While these expressions meet the language of various standards for conservation planning, they hardly meet the intent, which is to derive meaningful, actionable goals to guide and measure conservation programs and outcomes for actual water users. It is this level of conservation goal setting that is attempted here.

Using population and economic growth indicators data, connections, and historical use by classification and sub-classification, along with future supply and demand projections, we derive water use reduction goals within classifications by connection as summarized in Table 4-1.

Table 4-1
Additional Reduction in Per Connection Use Needed (gpd/Connection)

Classification	Location	5-Year	10-Year	Long-term
Residential	Indoors	7	11	22
	Outdoors	13	22	43
	Total	**20**	**33**	**65**
Commercial	Indoors	52	86	169
	Outdoors	69	114	224
	Total	**121**	**200**	**393**
Institutional	Indoors	30	50	99
	Outdoors	198	327	643
	Total	**228**	**377**	**742**
Industrial	Indoors	0	0	0
	Outdoors	149	246	485
	Total	**149**	**246**	**485**

There are limitations to these calculations. As mentioned previously in earlier chapters, while the customers in some classifications are relatively uniform in use characteristics (residential), others are much more diverse (commercial and industrial). Even within the residential classifications, there are distinctions in use patterns. The differences in water use patterns between single-family homes and multi-family units, small urban and large suburban lots, owners and renters, are examples of the complexity of this task.

Another limitation is that the assumption of future use based on historical practice does not account for innovations in technology that will inevitably change how water is used or measured. Installation of Advanced Metering Infrastructure (AMI) will greatly enhance our understanding of water use and waste at the connection-level, but we do not yet fully know how the utility of this technology will impact use as an influencer of behavior. Assumptions made regarding landscapeable area and irrigation requirements described in Chapter 2 (see Figure 1-2) depended on data from the year 2000. But we know from observation, turf studies conducted by the Center for Landscape Efficiency (CWEL), as well as initials findings derived from WaterMAPS™ that those estimates are likely too unnecessarily generous. As research continues, we will gain insights into the capacity to conserve in landscapes, and thus inform that area of programing and also future planning scenarios.

The limitations become more obvious when CII classifications are evaluated. Landscape nurseries, laundromats, and breweries are all classified as Commercial, though it is apparent they would have vastly different water use profiles as well as different needs when addressing conservation. Industries range from shipping warehouses with little water demand to oil refineries, much greater consumers of water by comparison. The CII Analytics project, as well as AMI will greatly enhance understanding of water use by discreet commercial and industrial profiles. Collaboration with Alliance for Water Efficiency (AWE), US-EPA Water Sense, and other conservation programs throughout the region and country will help identify benchmarks and standards by which to evaluate these classifications and develop meaningful programming.

Even with these limitations, the value of moving towards goals of this nature should not be ignored or overlooked. As understanding of water use patterns is deepened, these initial estimates for water use reduction will be refined and made even more relevant.

4.3 Socioeconomic Impacts of Conservation

Effective conservation programming considers the characteristics of the customers using water, both as individuals and within user classifications. While it is commonplace to consider characteristics such as "single-family residence", "apartment", or "restaurant", less common is the integration of demographics and socioeconomic characteristics into the analytical and programing framework. According to Beecher, et al[1], neglecting the unintended effects of conservation programming on socioeconomic groups can result in unexpected analytical, practical, and political consequences, which may undermine desired program outcomes and have negative impacts on some customer groups.

As conservation programming is developed, understanding the relationship between water use and socioeconomic and other demographic characteristics enhances program outcomes while ensuring that the end user has the tools and support necessary to make good choices regarding water use. Additionally, this understanding also helps to identify potential barriers to participation, improving overall program design, reducing unintended consequences, and increasing participation.

Conservation programing can be an effective tool to mitigate the impact of inevitable price increases across all user classifications and socioeconomic characteristics. Helping customers understand their relationship with water and providing meaningful and actionable tools and knowledge to make better choices helps customers manage water costs while also reducing their water footprint.

The service area is a diverse community in both its characteristics and its water needs. Understanding, and being responsive to this diversity helps to build positive relationships and ensure we meet our long-term goals of a resilient water supply. Income, household composition, housing, language and ethnicity, education, and special needs are all important characteristics that may affect water use. Businesses, too, have characteristics that need to be identified and analyzed so that programing builds partnerships and increases participation.

To be successful and sustainable, everyone—every person, business, industry, school, church, government agency—needs to be engaged in reducing water demand and protecting our water resources. Effective programing should facilitate water demand reduction across all sectors and user classifications, without placing the burden for conservation on one group, or excluding any group. Striving for equity and fairness in program implementation, whether through well-thought-out pricing structures, availability of product and behavioral incentives, or access to educational materials and classes will help to remove barriers to participation, improve program reach, and avoid unintended consequences that limit access or unfairly shift the burden of conservation.

In addressing these variables, conservation programming can:

- Improve affordability for customers;
- Enhance customer relationships;
- Respond to environmental justice concerns;
- Manage risk and uncertainty of water supplies;
- Achieve efficiency gains; and
- Reduce water utility revenue losses.

[1] Beecher, Janice A., Thomas Chesnutt, David Pekelney. Socioeconomic Impacts of Water Conservation. AWWA Research Foundation and American Water Works Association. 2001.

4.4 Water Conservation Programs, Practices, and Measures

Water conservation is a critical component of water resource management and should not be viewed as a temporary measure or as a public relations tool. Effective water conservation can sustain and extend water supplies; alleviate infrastructure capacity issues; mitigate impacts to supply and demand due to weather and climate variability; address affordability; and foster a sense of community-shared stewardship. To achieve this, conservation programming needs to provide the necessary tools to achieve and sustain these effects, and therefore, needs to fully address the how, who, when, and where of water use. At the core of this conservation plan are the programs, practices, and measures encouraged, supported, and funded through the water conservation program.

For conservation programming to achieve and sustain the necessary water use reductions, it needs to address the diverse nature of water use within the service area. To ensure programming reflects the complexity of the water infrastructure and the diversity of end users, practices have been organized into five program focuses: Outreach, Economics, Utility Operations, Law and Policy, and Research and Metrics. Within each of these programs is a selection of practices and measures that meet the criteria identified on page 4.2. Some, like lawn watering guides and Water Check, has been active since the conservation program was created in June 2001. Other practices, such as WaterMAPS™ and the CII analytics tool, are recent and still in development. There are also practices new to the program planned for the coming years, including rebates and commercial audits. Though the practices are varied, they all meet the criteria of providing targeted, meaningful, and equitable programing that will facilitate meeting and sustaining short- and long-term water conservation goals.

4.4.1 Programs

The water conservation program is comprised of dozens of practices and measures organized into one of five programs:

Outreach. Education, information, and community engagement are how we inform and encourage the adoption of practices, behaviors, and technologies that reduce water use and water waste. Sometimes considered “soft” practices, due in part to the difficulty of isolating and quantifying practice outcomes and effectiveness, none the less, these practices are typically simple to enact and have limited barriers to customer participation. This program focuses on conveying information and engaging in community dialogue that facilitates the meeting of conservation goals. And though difficult to measure, they are informed by the outcomes of the Research & Metrics program, and so are based in actionable science.

Economic. The price of water is an important mechanism through which to convey the value of water. Though, to clarify, it is not merely the rate at which water is charged, but also the other information that is conveyed in a water bill. Even more fundamentally, that meters are read, and bills are generated and

provided in a timely manner also help to inform the customer and convey the value of this limited resource. There are other ways, too that economics can play a role in water conservation. Illustrating avoided costs can also be an incentive to reduce water use, whether it is the avoided costs associated with water use in a higher tier, or the avoided costs of not having to develop new sources of water. More direct incentives, in the form of rebates, can also help to reduce water use and offer the added benefit of potentially providing measurable outcomes.

Utility Operations. To be a leader in water conservation, it is not enough to have a plan, but to integrate that plan into daily operations, maintenance, and capital programs. This program focuses on identifying and implementing opportunities to integrate conservation best practices into all aspects of department functions. From landscape management to construction of stormwater wetlands and street-side biofiltration; water supply planning to distribution system operations, conservation can and does support broader Department functions.

Law & Policy. Salt Lake City has landscape code provisions that proactively encourage the implementation of best practices in landscapes; periodic review of these provisions ensures that the City continues to meet the intension of these provisions. Currently lacking are codes that clearly state water use prohibitions. Though codes exist that allow the regulation of water use, the codes as currently written to not clearly address water waste, so review will facilitate addressing this lack. There are also codes that support a variety of planning processes, including conservation and drought planning. City policy can also support conservation efforts by addressing the adoption of actions internally to City departments and divisions which support conservation. A review of City codes and policies that support conservation is planned over the next several years.

Research & Metrics. Fundamental to the implementation and effectiveness of conservation programming is the adoption of programs that provide the necessary outcomes. Science, research, and analytics are at the core of conservation programming, ensuring that all other programs and practices have a basis in knowledge, research, and science.

4.4.2 Practices and Measures

Within each program is a selection of practices and measures designed to facilitate the achievement of short- and long-term water conservation goals. These practices and measures are directed at specific end users to address various types of water use. They are designed to be implemented alone or in combination and all meet one or more of the identified criteria. For practice and measure details, see the corresponding practice tables.

4.4.3 Program Tables

Each practice and measure are listed in one of the following tables (Tables 4.2, 4.3, 4.4, 4.5, and 4.6), with select practices receiving more detailed coverage in section focuses. Within the tables, practices are generally described by title, target audience, practice timeline, project cost, metric or measurement, and partnership.

Number (No.). Each practice is assigned a number within its initiative. This is useful when identifying practices relevant to specific documents, grant applications and similar circumstances where space constrains limit the full title of description of a practice.

Practice Title. The name of the practice, which is sometimes broadly descriptive, as in the case of “Brochures,” and sometimes specific to a single practice, such as in WaterMAPS™. Effort has been made to keep the names descriptive and brief.

Classification. Not all practices are for every customer. This column organizes and identifies practices by classification. These classifications correspond to the classifications described and used throughout this plan. They include Residential (Res), Industrial (Ind), Commercial (Com), and Institutional (Inst). (See Figure 2-2).

Brief Description. Generally, an expansion on the practice title or a broader, though short, description.

Practice Timeline. Timeline details may range from a single event, for instance, the development of a study or plan, to ongoing practices such as meter replacement or monthly billing. “Active” column indicators include “√” (Active), “ID” (In Development), TBD (To Be Determined), or NA (Not Applicable or Not Active). Implementation indicates when the practice was active or is planned to be active.

Cost/Funding. Costs mostly reflect current budget allocations or future planned allocation estimates. Costs over the practice lifetime have not been calculated, unless noted. In some cases, funding has been provided in the form of grants,

memorandum of understanding, or as a component of partnership, which have been noted accordingly. The development of recommended five- and ten-year budgets is a component of the Research and Metrics program and is currently underway.

Reach/Metrics. Measuring practice effectiveness helps determine if resources (staff time or budget) are being allocated in a manner that supports program goals or allocated sufficiently to ensure practice success. Some of these measures are soft, such as the number of visitors to a garden, brochures mailed, website visits; some are hard, as in Water Checks performed, metered reduction, or commercial audits completed. Not all programs should be measured by the same metric; for one thing, that isn't practical or pragmatic. A demonstration garden may serve multiple purposes but how do you measure how much water has been saved due to its existence? How much water is saved when schoolrooms are visited, or when phone calls are answered? This is where the measurement of reach helps to inform practice evaluation: how many visitors, how many classrooms, how many brochures. These practices bring value, even if the measure of success is knowing the reach, as they have value in the relationships built, the assistance provided, and opportunity for inspiration.

Partnerships. The City has been fully vested in conservation programing since 2001 and much has been accomplished due to the commitment and hard work of staff. But success not been achieved alone. Partnerships have been instrumental to the ongoing success of the conservation program and will continue in importance as work towards achieving current and future water use reduction goals continues. Some partnerships are more singular and tied to specific practices, such as the contract with Tracy Aviary and its nature study classes. Other partnerships revolve around funding, particularly grants, as is the case of drought planning and the Bureau of Reclamation. A few new partnerships are in the works, as planning progresses with CUWCD and DWRe pertaining to CII studies. Some partnerships, such as the one with Utah State University (USU), have relevance beyond the scope of specific practices, informing conservation efforts across the reach of programing and providing invaluable collaboration. However, the most valued partner is the community; the people, businesses, industry, and institutions served who do the work of saving water every day.

Savings. Ideally, every conservation practice or measure has demonstratable water savings. This is, however, difficult to assess for most practices. Improvements in metering technology and the integration of GIS/IT technologies in conservation programing will improve this moving ahead. In the meantime, where possible, historical and projected water savings have been provided.

Not every practice can be described with all these details, but every effort has been made to provide as much detail as possible within these pages. Where details are either not available or not relevant, it has been so indicted. For instance, some programs have no direct cost, such as developing internal City department conservation plans. In other cases, practice metrics may be difficult to determine; how, for instance, do we measure the impact of a garden or brochure?

Within each program there are summaries of select practices and measures, intended to offer more detail, including timeline, budget, and desired outcomes. These select practices represent current and proposed programming that is reflective of short- and long-term conservation goals, as well as the needs and interests of water customers across all classifications.

4.5 Outreach

Education and public outreach are a necessary component of successful conservation programing. Though the types of programing vary, they share the common attributes of informing and educating customers of the needs and benefits of conservation; the risks to the community and environment in not conserving; and actions to take to achieve water conservation goals.

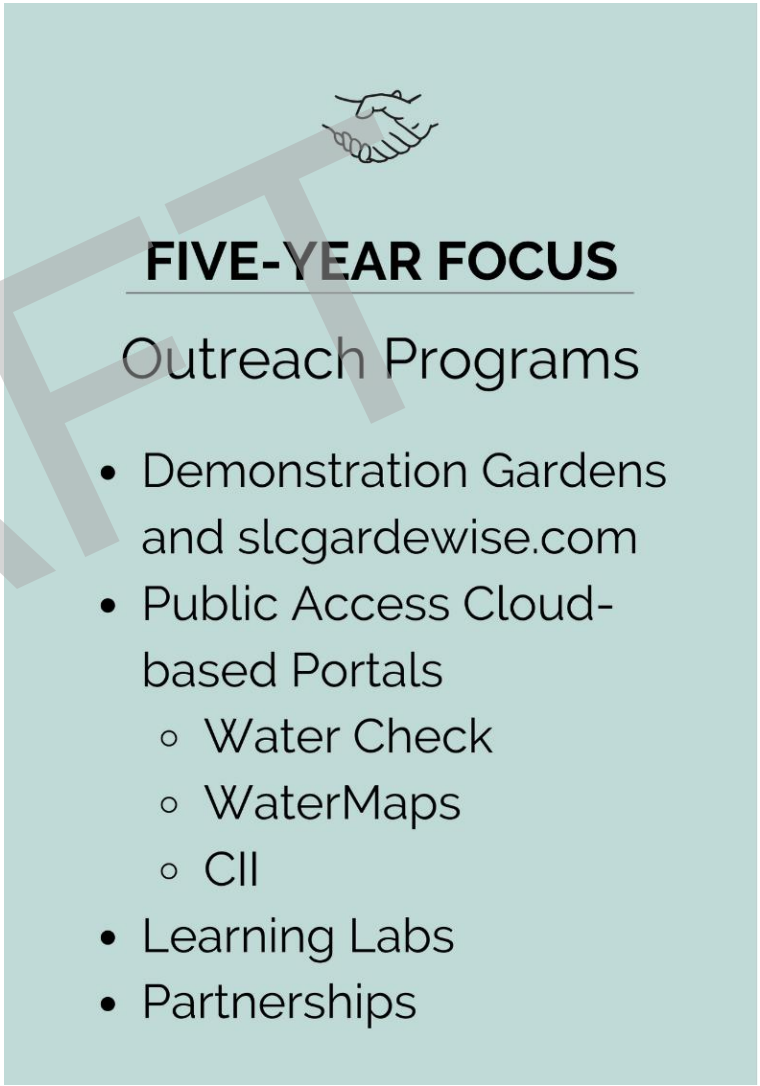
Outreach initiatives are characterized as being customer-focused, low-input programs with an emphasis on education and information to motivate changes by either adopting or abandoning general or specific practices. These initiatives are thought of as "soft programs," in that they depend on behavioral changes and not changes to fixtures or infrastructure. Programs can generally be organized by those designed to change behavior or to encourage the adoption of new methodologies and techniques.

Outreach also includes education and messaging campaigns, designed to provide actionable, proven techniques and methods for reducing water use. Such campaigns include "Never Waste," "Rain On/Sprinklers Off," and "7 Gallon Challenge", to name a few.

Outreach practices also create opportunities for reciprocal, iterative dialogue, leading to community engagement and acceptance, critical for program success and the achievement of short- and long-term conservation goals. It is in classroom settings, community gatherings, and social media that we, as practitioners, can hear and learn from the customers for whom these programs are designed, to make programming accessible, meaningful, and actionable.

Outreach isn't "just talk." The Water Check program provides site-specific guidance to assist property managers or homeowners in improving irrigation efficiency. WaterMAPS delivers relatable and actionable information to property owners to enhance understanding of the relationship between landscape characteristics and water need. Providing actionable information commercial, industrial, and institutional customers will enhance engagement by those sectors in conservation efforts and deliver meaningful results in demand reduction. Residential leak detection programs inform homeowners of indoor water loss, while delivering messages of the importance of managing all water use and waste. Learning labs offer education, advice, and guidance in improving landscape practices, leak detection and repair, and other areas of conservation.

Following are details of select conservation programs which reflect short- and long- term goals as outlined in Chapter 3 and address community feedback on existing programming.



4.5.1 Demonstration Gardens And SLCGARDENWISE.COM [0-3, 0-4, 0-5]

Timeline: 2005 to present
2021 Budget:
Partners: Greater Avenues Community Council, TreeUtah
Reach: Across all customer classifications
Savings: N/A

While it may be difficult to measure the worth of public gardens, water conservation gardens bring value to conservation programming as well as to the neighborhoods where gardens reside. Offering information, education, and inspiration of best practices in landscaping methods and plant selection, demonstration gardens provide self-directed as well as led experiences. These spaces also create opportunities for volunteering, bringing value to the program and making learning a hands-on experience.

Demonstration gardens also create opportunities to bring value to neighborhoods by providing beautiful and sustainably managed landscapes to enjoy and inspire. For example, the 900 South Stormwater Wetland and Demonstration Garden is located along a former stormdrain ditch and abandoned railroad corridor. The conversion of this space into a stormwater wetland and conservation demonstration garden created multiple values for the City and the neighborhood.

The Greater Avenues Conservation Garden sits on what was once an abandoned lot in the Avenues neighborhood. Its location adjacent to urban-wildland interface areas presented an opportunity to demonstrate not only water-wise techniques, but also how site sensitive landscaping can support wildlife and community aesthetic values. And lest there is concern that a formerly un-watered site is now receiving previously undelivered resources; Greater Avenues Garden has not been irrigated for over seven growing seasons.

As enjoyable as actual demonstration gardens can be, weather or other impediments may discourage visitors. Learning opportunities may also be limited as it is impossible to include every plant or incorporate multiple design concepts. Slcgardenwise.com provides an alternative visitor experience, offering examples of water-wise gardens from throughout the service area. Virtual tours, landscape solutions, and an extensive and locally developed plant database makes slcgardenwise the next best thing to actual garden tours.

Future focus for the demonstration gardens and slcgardenwise is to upgrade landscape features and irrigation systems, update learning materials, and create on-site learning opportunities.

4.5.2 Public Access, Cloud-based Portals [0-17]

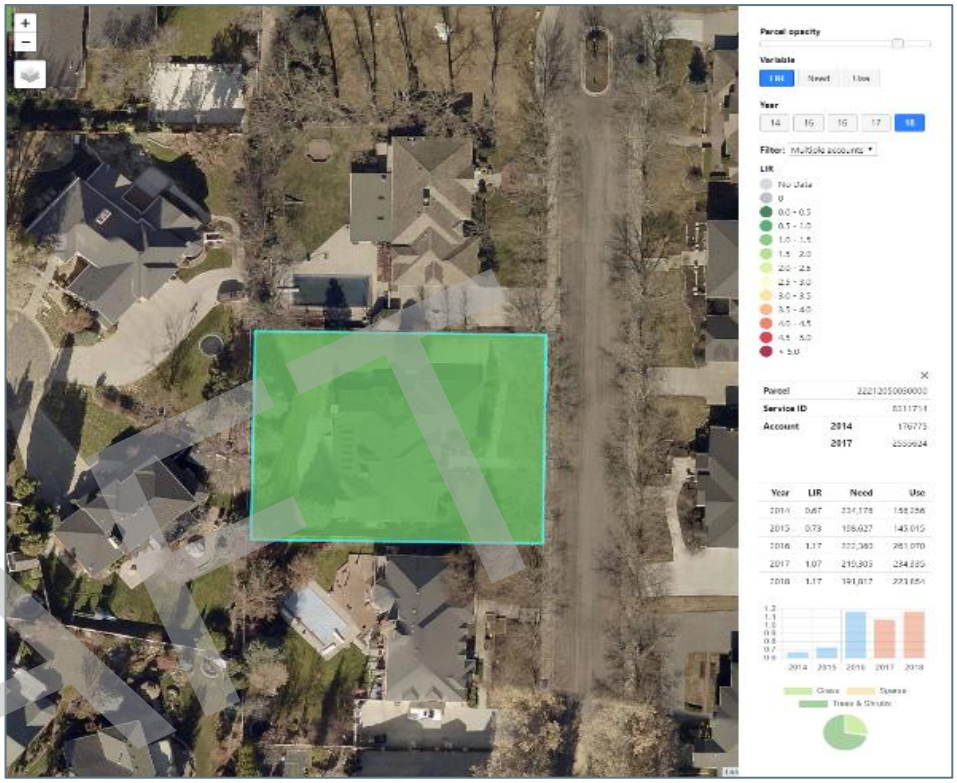
Timeline: 2021
Budget: TBD
Partners: Utah State University, EWIG
Reach: Residential and CII customers
Savings: TBD

Advanced Metering Infrastructure (AMI), Water Checks, WaterMAPS, and CII Analytics are providing data that not only informs conservation programming but offers opportunities to provide timely and actionable information directly to water customers. Older methods of communicating information, such as brochures and even web-based communication, are giving way to up-to-the-moment, customer-targeted information via cloud-based communications applications.

Water Checks, a well-established, proven program has benefitted from recent technological updates. With funds received through Extension Water Innovation Grants (EWIG), USU, conservation programming, and Department GIS/IT staff, Water Check reporting added cloud-based reporting, messaging, and mapping capabilities. Water Check participants now receive GIS-generated irrigation zone maps with site details, online reports, tips, and support via direct messaging. This portal will also support efforts to promote other conservation programing, as well as to facilitate pre-qualification and post-verification of program measure implementation, where appropriate.

Outdoor water use plays a significant role in current demand and future water use reductions. WaterMAPS, a USU-developed program, helps identify our capacity to conserve in the landscape. Getting this information to the customer requires a cloud-based communications system.

Homeowners and landscapes are not the only customers with the capacity to conserve. Commercial, Industrial, and Institutional customers (CII) are also an important part of our water conservation strategy. While these customers' water use profiles can be more complex than that of residential users, they have the same need for timely, meaningful, and actionable information. Improving the depth and range of information to CII customers will enhance engagement in conservation programing and increase opportunities to successfully achieve stated conservation goals.



4.5.3 Conservation Learning Labs [0-14]

Timeline: 2022
Budget: TBD
Partners: USU/CWEL, UofU Lifelong Learning, EPA-WaterSense
Reach: Residential
Savings: TBD

Research indicates that Utah residents, including those within the service area, believe in the need for, and are committed to water conservation. What is lacking is not the will, but the knowledge of the best, most effective ways to reduce water use. Homeowners want to know how best to water to support conservation while sustaining a landscape. They have questions: how to select plants, plan the landscape, or convert sprinklers to drip.

Homeowners also have questions about water efficiency indoors, and ask about toilets, the best way to wash dishes, and how to find and repair leaks? In short, customers have a lot of questions. We have answers.

Improving access to solid, up-to-date information and strategies to help homeowners make sensible, sustainable choices will help achieve current and long-term water use reduction goals. Lectures, hands-on labs, and how-to webinars offer up-close and personal opportunities to convey useful and relevant information.

This program will focus on maximizing existing resources to deliver high-quality learning experiences focused on water conservation. Partnerships with USU/CWEL, University of Utah's Lifelong Learning, and US-EPA WaterSense will ensure quality instruction and content.

Conservation education must be an essential, if not always quantifiable, part of any conservation plan. As noted in the State of Utah *Regional Water Conservation Goal Report*[2],

> *"When projecting future water use and conservation potential, it is important to understand that water users' choices regarding water use will be influenced by a complicated combination of factors…"*

Thus, even though specific water savings may not be directly attributable to a given conservation program or practice, conservation education and outreach through learning labs and other educational venues is a necessary component of the "combination of policies" that must be in place to motivate and facilitate the ultimate conservation action.

Covid-19 has presented challenges to this program, but opportunities exist and will be explored that utilize web- and cloud-based meeting and learning mediums, including on-line classes, YouTube videos, and other meeting venues.

4.5.4 PARTNERSHIPS [PROGRAM WIDE]
Timeline: Ongoing
Budget: TBD
Partners: USU/CWEL, UofU Lifelong Learning, EPA-WaterSense, AWE
Reach: Utility-wide
Savings: NA

Collaborations and partnerships are integral to conservation program success. Building on these relationships, as well as developing new partnerships will help to ensure continued success and the achievement of newly stated conservation goals.

[2] *Regional Water Conservation Goal Report,* Hansen Allen & Luce and Bowen Collins & Associates, November 2019, p. 16

Table 4-2
OUTREACH

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
O-1	Brochures	√	√	√	√	Develop and distribute brochures relating to water conservation and best practices	√	2001 - ongoing	$10,000 per mailing/service area	Quantities mailed. Spikes in visits to related websites	NA	NA	NA
O-2	Water Stewardship Calendar	√	√		√	12-month calendar with information and tips covering a variety of water issues.	√	2007 - ongoing	$30,000 for 25,000 copies.	Distributed to SLC schools, SL City and County Libraries	NA	NA	NA
0-3	Demonstration Gardens	√	√	√	√	Design and construct demonstration gardens throughout service area	√	2001 - ongoing	$5,000 from GACC for Greater Aves Garden	TBD	Greater Avenues Community Council (GACC)	*	*
0-4	SLCTV 17 GardenWise	√	√	√	√	Develop and distribute water conservation-focused programming for SLC TV17	√	2001 - ongoing	NC	Site visits and other web metrics	SLC-IMS	*	*
O-5	SLC *Gardenwise*: Virtual Water Conservation Garden tours	√	√	√	√	Develop virtual garden tours on web site, include plant data bases, design tips, watering/maintenance guidance. Incorporates several past program initiatives.	√	6/2014 (SLC Gardenwise)	$25,000 + annual licensing fee	Site visits	Bureau of Reclamation; GardenSoft, Inc.	*	*

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined – **C** Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

Table 4-2
OUTREACH

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
O-6	Water Check	√	√	√	√	Promote and conduct lawn sprinkler check-ups for residential, commercial, and institutional properties	√	(S) Estab. 1988; Partnered with USU 2007. Ongoing.	$60,000 provided by MWDSLS annually. SLCDPU funds additional components, including APP, portal, and GIS capability ($45,000)	Map and track use.	MWDSL&S		47,000 gallons per residential participant annually
O-7	SLC Landscape BMPs: Design, Planting and Maintenance Guide	√	√	√	√	Develop guide to support best practices in landscape design, implementation, and maintenance to support conservation, stormwater protection, and riparian corridor health.	√	10/1/2011 (see E-8)	Part of in-kind contribution for BoR Grant	TBD	SLC Code Enforcement; Northern Colorado Water District; Green Industries of Colorado (GreenCO); UNLA	*	*
O-8	Commercial and Industrial Certification			√		Develop and implement a water-wise certification program for commercial and institutional water customers	ID	2021, in conjunction with CII Tool and CII audits/direct installs	TBA	Map and track use	TBA	NA	NA
O-9	CII Conservation Plans			√		Encourage and publish water conservation plans	ID	2021, in conjunction with CII Tool, CII, audits/direct installs, Water Check, and WaterMAPS	NC	Map and track use	NA	NA	TBD

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined – **C** Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

Table 4-2
OUTREACH

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
O-10	Classroom Programs	√	√			Develop package programs and activities to facilitate classroom learning focused on water conservation	√	Ongoing	###	Tabulate students served	Tracy Aviary	NA	NA
O-11	Landscape Assessment and Check-ups	√				Provide residential landscape assessments to enhance water efficiencies	ID	Some landscape assessment is included in Water Check. Expansion contingent on staff capacity.	TBA	Map and track use	TBA	*	*
O-12	Private Garden Project	√	√	√	√	Promote institutional, commercial, and residential properties to be water-wise demonstrations	ID	Dependent on staff capacity	NC	Map with public access	TBD	*	*
O-13	Residential Leak Detection and Repair	√				Provide low or no-cost leak detection and repair to qualifying households	ID	TBD	TBD	Map and track use	TBD	-	Ave. 490 gallons/ person/ year 480 AF/year for utility
O-14	Learning Labs	√	√	√	√	Workshops on water conservation techniques and strategies	√	Summer 2020	NC	tabulate	UofU Lifelong Learning, WCG, USU	NA	NA

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined – **C** Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

Table 4-2
OUTREACH

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
O-15	CitySourced App	√	√	√	√	Mobile app allowing users to submit notifications of observed water waste and other water issues	√	20## - Ongoing	NC - Program supported thru GIS/IT functions	Map locations receiving notifications; chart trends; design proactive measures to address recurrent issues	NA	-	-
O-16	WaterMAPS	√	√	√	√	Outreach focused on WaterMAPS outcomes	√	Summer 2020	$100,000	Customer response; target survey; track use	USU/CWEL; EWIG grant	-	TBD
O-17	Cloud-based Public Portals	√	√	√	√	Provide cloud-based, secure access of water use analytics to customers across sectors	TBD	In development	TBD	Visitors; customer response	TBD	-	-

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined – **C** Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

4.6 Economics

Economic initiatives are focused on pricing, rebates, and other programs that offer financial incentives to customer participation or offer services that provide economic value to customers. These programs encourage changes in behavior or upgrades to fixtures, while generating opportunities to measure program effectiveness by monitoring and analyzing water use pre- and post-product or fixture installation, or before and after changes in pricing signals. The targeted nature of these programs will also assist in the challenges of meeting specific, short- and long-term conservation goals.

Financial incentives may either be built around avoided costs, such as inclining tiered rates leading to larger bills for more water use; or they may encourage improvements to landscapes or indoor fixtures through product or service discounts or rebates. All conservation incentives should be designed and implemented in such a way as to help to achieve water use reduction goals in a manner that is transparent, cost-effective, and fair, all while ensuring that such programs do not place any undue burdens or create unintended costs for some customers.

when creating programs with financial incentives, there are several key issues to keep in mind, whether the signal is a carrot or a stick. If using pricing signals, they need to reflect the cost of water and all that it takes to acquire, treat, and deliver that water; the structure should provide some level of revenue stability; and rates should be fairly and equitably set so as to encourage appropriate use while also making essential water affordable. It is important to note that billing messages may be as important as the bill itself in driving and reducing demand.

Rebates and cost-sharing may help reduce water use by encouraging customers to use improved technologies, install better fixtures, renovate landscapes, or otherwise change behavior. As with pricing signals, product or service rebates and cost-shares should provide incentives for a range of customer classifications, help achieve meaningful and sustainable use reductions, demonstrate measurable outcomes, and be equitable.

According to a recent Alliance for Water Efficiency (AWE) study, the most effective and efficacious rebate programs are targeted to specific user classifications or uses (residential or commercial, indoor or outdoor); and have clearly stated pre-qualifications and post-evaluation components. This is to ensure that the rebate provided achieves the desired goal for both customer and utility.

When used appropriately, incentive pricing and rebates can be highly targeted tools for achieving short- and long-term water use reductions goals while providing value and benefits to customers.

4.6.1 CII Audits and Direct Installs [E-10]

Timeline: 2020 (proposed)
Budget: Phase I $95,000
Partners: CUWCD
Reach: CII
Savings: TBD

Though conservation practices have historically focused on outdoor single-family residential water use, that use reflects roughly one-fourth of all use. Though comprising only 12 percent of water connections, CII water use (both indoors and out) accounts for more than half of all metered water sales. With this in mind, programing in the CII sector has increased to include enhanced analytics, identification of sector-specific water use standards, and establishment of preliminary water use reduction goals.

One way to assist select CII customers in reducing water use is to identify inefficient practices or fixtures and to incentivize changes. This project proposes audits of select CII accounts including assessment of water use records and trends, review of standard practices, and inventory and measurement audits of appliances and fixtures.

Phase I of this project will focus on small hotels and motels, restaurants, and public and assisted housing. Sites have been selected through water use analytics, identifying properties that show higher than average water use within each sector. After conducting initial assessments, recommendations will be made for fixture, appliance, and practice changes. Some fixture and appliance practices may provide incentives or rebates through matched funding.

Besides directly assisting participating CII customers in reducing water waste and overall water use, this project will provide invaluable data regarding common practices within specific CII sectors, as well as building relationships between CII customers and conservation program staff.

4.6.2 Rebates [E-4, E-6, E-7, E-8]

Timeline: 2021
Budget: 2020/21 $25,000 (proposed)
Partners: CUWCD
Reach: Residential
Savings: TBD

Customers within the service area have done a remarkable job reducing water use. Since 2001 and the beginning of the water conservation program, total water use has reduced nearly 28%, and residential household use has reduced by 29%. As good as these numbers are, there is still more to do as indicated in the Water Supply and Demand Study. To sustain future supplies and with within our water means, residential water users will need to reduce an additional 14% indoors, and as much as a third of our outdoor use.

Up to now, conservation has been achieved primarily through voluntary actions as home and property owners adopt better practices or make improvements to homes and landscapes. To meet new water conservation goals and to support homeowners in their efforts, a series of pilot rebate programs have been proposed. Irrigation spray heads, rain sensors, lawn trades, and low-flow fixtures are being considered. Additionally, this program will also work to increase consumer awareness of existing rebates available through partnership with Central Utah Water Conservancy District (CUP).

Recently published studies by the AWE indicate that program success depends on proper customer vetting, prequalification, and post-engagement verification. WaterMAPS and Water Check programs are well suited to provide the necessary quality control measures to ensure rebate program effectiveness.

Not all customers have issues with outdoor watering, but rather, need to manage general use or bill amounts. Rebate programs focused on leak detection and repair, and fixture replacement will help qualifying households reduce water use and waste, and reduce their water bills, keeping essential indoor water use affordable.

Directed at both indoor and outdoor water use, these programs should help customers achieve greater levels of efficiency and reduce waste. Following water use of participating households will provide greater insight into residential water use patterns, which will inform future programs, and building relationships within the community will further enhance conservation efforts.

4.6.3 Rates Evaluation [E-2]

Timeline: TBD
Budget: TBD
Partners: N/A
Reach: Residential, Commercial, Industrial, and Institutional
Savings: TBD

Incentives are typically thought of as programs that offer discounts or cash back on water conservation fixtures or technologies. Incentives can also deliver messages regarding avoided costs associated with changes in water use behavior. Water rates are an example of incentives based on the value of avoiding unnecessary water use or water waste, thus creating an opportunity to spend less money on water. Water, sewer, and stormwater rates are regularly evaluated to determine if the rates are adequate to sustain the functions of each of the utilities, and if rates distribute the costs to customers in a manner that is fair, legal, and reflects goals to protect and sustain limited resources.

A tiered rate structure was adopted in 2003 and rate studies have subsequently been conducted several times since then. Increasing tiered structures reward reasonable water use and charge more as more water is used. Customers can avoid higher rates by being mindful of wasteful practices, identifying and repairing leaks, and through thoughtful landscape management. Water bills can provide valuable information to customers not only of the cost of the water used, but also the value of efforts to use less. These principles apply to homeowners, businesses, industries, and institutions alike.

Periodically re-evaluating the format and information provided on bills will ensure that we continue to deliver messages consistent with conservation program goals. Another consideration is to determine how best to convey this same information to those customers who do not receive paper bills, such as those who pay with auto-payment or who pay on-line. This is also a challenge to deliver these messages to those water users who do not receive any bill, such as renters.

The Water Demand and Supply Study has helped to establish water use reduction goals needed to achieve long-term conservation efforts to support future water supply levels. Future rate studies will need to take these newly established goals into account to ensure capital, operating, and maintenance costs can be met while water use declines. Particularly, an evaluation of irrigation-only budgets will need to be conducted in order to ensure continued synergy with short- and long-term water use reduction goals.

Related to this issue is the need to better understand how other utility rates and bills affect water affordability. The City also provides sewer, stormwater, and street lighting utilities within Salt Lake City boundaries. Customers also have other utility costs unassociated with the City that need to be taken into account when considering issues relating to utility affordability.

Awareness of the relationship of these expenses helps inform rate evaluations, ensuring that adequate revenue is generated while still being mindful of affordability, equity, and fairness. Communicating conservation goals to customers will enhance understanding and acceptance of future rate changes. Understanding how water is used and what changes are needed will support fair and equitable rates. Current and on-going analysis in landscape, residential, and CII water use will inform and enhance this process.

Table 4-3
ECONOMICS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
E-1	Irrigation Meters and Budgets	√	√	√	√	Establish budgets for accounts with dedicated irrigation-only meters	√	2003	NA	Map and track use. Map eligible sites not currently using irrigation meters; chart potential savings/budget impacts	NA	*	*
E-2	Rate Structuring	√	√	√	√	Utilize a rate structure to encourage responsible use of water	√	2003	NA	Track water use through various tiers over time.	NA	-	-
E-3	Volumetric and loading Sewer Charge	√	√	√	√	Base sewer rates on metered winter water usage	√	2000	NA	Track use and discharge over time	NA	-	TBD
E-4	Rebate: Irrigation Rain Sensors	√	√	√	√	Incentivize installation of irrigation rain sensors through rebates	ID	2020	Pilot: $10,000	Pre-quality/verify through Water Check; Map locations; track/compare use	USU Water Check	*	*
E-5	Rain barrels	√				Provide for purchase rain barrels to homeowners	√	2015	$15,000/215 barrels + shipping	Map barrel locations. Track water use. Can we identify locations of barrels purchased elsewhere?	NA	*	*
E-6	Rebate: HE Irrigation Spray Heads	√	√			Incentivize installation of high-efficiency irrigation spray heads through rebates	ID	2020	Pilot: $10,000	Pre-quality/verify through Water Check; Map locations; track/compare use	USU Water Check	*	*

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

Table 4-3 ECONOMICS												
No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
E-7	Rebate: Turf Trades	√	√	√	√	Incentivize utilization of low-water, low-input turf grasses, either as seed or sod, in new landscape or as retrofits.	ID	2020	Pilot: $5,000	Track water use	USU Water Check; TWCA	-	2.3 AF per acre of turf conversion
E-8	Rebate: Pressure Regulators	√				Incentivize installation of pressure regulation devises to improve indoor and outdoor efficiency and enhance product/appliance wear.	ID	2021	TBD	Track water use	TBD	-	TBD
E-9	Residential Leak Detection and Repair	√	√			Provide low or no-cost leak detection and repair to qualifying households; fixture replacement.	ID	TBD	TBD	Map and track use	TBD	-	490 gallons/ person/ year 480 AF/year for utility
E-10	CII Audits and direct installs			√		Conduct audits and provide direct-installs on select CII properties.	ID	2020	Pilot: $95,000	Track water use	CUWCD: $25,000	-	TBD

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed

***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

4.7 Utility Operations

The City is committed to be a leader in water conservation. With that in mind, these initiatives represent adopted actions and practices that will help ensure infrastructure is built and maintained in a manner which optimizes water efficiency, minimizes or eliminates waste, and demonstrates best practices.

Salt Lake City has been fully metered since the 1920s, making it one of the earliest and longest running metered water systems in the Western United States. Historically, meters have been read monthly (or more technically, each meter is read roughly every 28 to 31 days), and from those readings' bills are generated and mailed. Until recently, meter technology has not changed a great deal; Advanced Metering Infrastructure (AMI) profoundly changes both when and the how of meter reading. Utilizing long-range radio systems, AMIs record and report water use more accurately and with much greater frequency than has been possible. Utilizing this new technology, water use can be monitored in increments as small as 15-minute intervals. Work has begun to replace all of meters (roughly 92,000) with AMIs.

Outdoor water use, specifically, landscape water use and waste, is an important component of managing and reducing our water footprint. While it may seem that conservation and landscape programs focus on single-family residential customers, every landscape can be more efficient. Last year, a comprehensive audit of Department landscaped properties was conducted, with the intent to develop a strategy to increase outdoor water use efficiency. This program aims to reduce water use and greenhouse gas emissions while demonstrating best practices.

The *Residential End Uses of Water*[3] estimated that an average of 12 percent of residential indoor water use is lost to leaks. This water loss can account for as much as 10,000 gallons per year. Imagine then, how much water is lost within an entire water system. According to the *Salt Lake City Supply and Demand Master Plan*, water loss within the water infrastructure system is estimated to be between 10 to 12 percent, an amount over 11,000 AF of water annually. Implementation is planned for conducting water system audit modeled after AWWA-M36 methodologies to identify the volume of water loss, determine what proportion of this water is apparent or real loss, and identify appropriate steps and practices to address this loss.

[3]Footnote: DeOreo, William, Peter Mayer, Benedykt Dziegielewski, Jack Kiefer. *Residential End Uses of Water 2016.* Water research foundation. Denver, Co

4.7.1 Implement AMI Technologies [U-7, U-9]

Timeline: 2020
Budget: TBD
Partners: N/A
Reach: Utility-wide
Savings: TBD

Utilization of water meters, coupled with regular readings and billing statements, helps to manage water supplies and convey specific and critical information to water users. Water users can then use this information to make good decisions regarding future water use. Since the 1920's, water use has been metered, read, and billed throughout the service area. Outside of the computerization of meter and billing data functions, this practice has seen little change over its history. Though this process might have been adequate, it did present shortcomings for conservation programming. Receiving regular meter billing data helps inform customers, but it is a snapshot of past behavior and lacks immediacy. The development of advanced metering infrastructure technologies (AMI) has revolutionized this process.

Currently, residential and CII mechanical meters are being replaced with AMI technology. This will provide daily information to water managers and water customers, enhancing resource management response and improving customer understanding of water use. AMI technologies are providing live-time water use data, improving leak detection, and enhancing understanding of water use patterns, all of which is informing current and future water conservation programs.

4.7.2 Landscape Upgrades and Maintenance [U-2, U-10, U-11]

Timeline: 2020
Budget: $95,000 (proposed annually)
Partners: N/A
Reach: Utility-wide
Savings: 480 AF/year for upgrades to City properties including Parks and Golf properties

Approximately 55 percent of water use within the service area is used to maintain landscapes, and landscape and irrigation design, installation, and maintenance affect water use. Improving site management helps to reduce water waste. With this in mind, a comprehensive practice has been established for landscape and irrigation design and management that addresses existing properties and to-be-developed properties.

For newly developed properties, staff engineers and consultants work with water conservation staff on site design, ensuring that best practices are followed, and new landscapes are efficient, sustainable, and attractive.

Existing properties are also a component of this program. Properties have been catalogued and are being evaluated for irrigation and landscape characteristics, maintenance histories, as well as water use. After completing the WaterMAPS™ assessments, landscapes will be classified and prioritized for improvements, including irrigation and landscape improvements. In the meantime, water conservation staff are working closely with the stormwater and distribution divisions to enhance site management, ensuring reduction in water use and other inputs.

Additional to proposed and planned landscape upgrades, conservation and stormwater staff are collaborating to develop specifications and guidelines for implementation of biofiltration and other Low Impact Design (LID) infrastructure. The purpose will be to facilitate the construction of biofiltration retention and other green infrastructure in order to improve and protect stormwater quality. The synergistic collaboration between stormwater and conservation programing will ensure that future LIDs support both stormwater and conservation goals.

4.7.3 Infrastructure Leak Detection and repair [U-3]

Timeline: 2020
Budget: TBD
Partners: N/A
Reach: Utility-wide
Savings: 1,450 AF/year This assumes that system losses can be reduced from 12% to 9% (see R-19) and that 50 percent of the saved system losses come from leak detection and repair.

An outcome of conducting the *Salt Lake City Water Supply and Demand Master Plan* was an initial assessment of estimated water loss within the infrastructure system. In anticipation of conducting the AWWA M36 water audit, a robust leak detection and repair program has begun. Use of state-of-the-art technologies to identify leaks, coupled with innovations in data reporting and workflow

improvements has increased the number of leaks identified while reducing repair response times.

4.7.4 Landscape Best Practices for Water Resource Efficiency and Protection Manual Update [U-2, O-7]

Timeline: 2020/21
Budget: N/A
Partners: varied
Reach: Utility-wide
Savings: NA

The *SLC Landscape BMPs for Water Resource Efficiency and Protection* was first published in 2011 and written in partnership with several Salt Lake City departments and divisions, including Parks, Urban Forestry, Planning, and Zoning Enforcement. Subject experts from USU/CWEL, University of Utah, Westminster College, and industry experts were also consulted.

In 2014, the BMPs were identified in Salt Lake City's ordinance (21A.48.055: Water Efficient Landscaping) as a reference document for commercial landscape specifications, as well as for general guidelines for efficient and low-impact landscapes. Beginning in 2020, guided by conservation and stormwater staff, will conduct a review.

4.7.5 Contract Specifications for Landscape and Irrigation Design, Installation, and Maintenance Review [U-2, O-7]

Timeline: 2020/21
Budget: N/A
Partners: Internal
Reach: Utility-wide
Savings: NA

A normal component of doing business is the inclusion in contracts of specifications which ensure that capital projects and the subsequent management and maintenance of those projects is carried out in a manner consistent with accepted best practices. Some of these capital projects are built to support stormwater protection, riparian corridor management, and water conservation demonstration programs. New specifications to address conservation best practices are proposed to ensure these facilities be designed, constructed, and maintained in a manner consistent with long-term ethos of resource protection and stewardship.

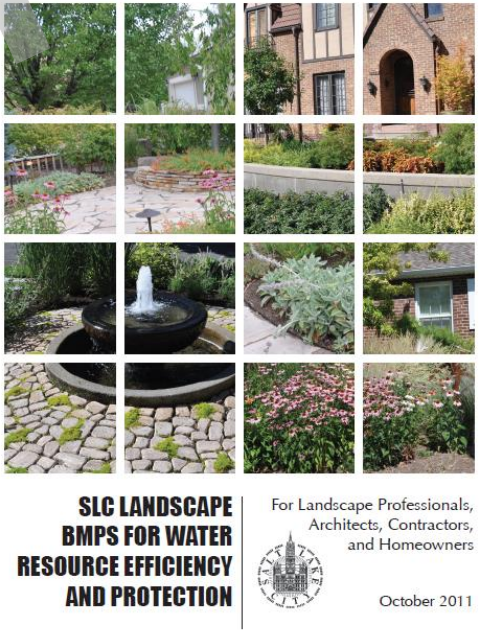


Table 4-4
UTILITY OPERATIONS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
U-1	Customer Use Change Notification	√	√	√	√	Notify customers when water usage exceeds winter usage by 20 percent.	√	Currently only applied to commercial and industrial customers.	NA	Map. Compare addresses to home age, frequency of notification. Can we reduce this number?	NA	-	TBD
U-2	Landscape Upgrades				√	Inventory and assess Utility properties for water efficiencies and make necessary upgrades.	√	Recommendations of practice scope to be derived from updated Supply and Demand Study, and WaterMAPS Analysis.	Varies	Map utility locations, water usage. Assess landscape change potential, ROI.	NA	-	480 AF/year (Including Parks and Golf)
U-3	Leak Detection and Repair				√	Implement program to ensure enhanced distribution system efficiencies; identify and repair system leaks in a timely manner.	√	Utility participated AWWA study to develop industry metrics in 2003.	NA	Mapped through CityWorks. Can we quantify water savings?	NA	-	1,450 AF/year
U-4	Monthly meter reading and billing	√	√	√	√	Provide timely and accurate information to customer to increase awareness of water use.	√	1928	NA	Track use	NA	-	-

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** - Completed

Table 4-4
UTILITY OPERATIONS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
U-5	Public Utility Advisory Committee				√	Standing citizen committee to advise in conservation policy and programming.	√	1930's	NA	Board support and engagement in programing.	NA	-	-
U-6	SLC Dept/Div Conservation and Drought Plans				√	Encourage and publish water conservation plans from City Departments and Divisions.	√	Some completed as part of 2014 Water Conservation Master Plan Update; planned for 2019 WCMP update.	2019: $75,000 + in-kind match	Track response and use levels during drought per drought plan guidelines.	2019 Update funded through Bureau of Reclamation Grant for $75,000	-	-
U-7	Universal metering and meter replacement	√	√	√	√	Each account is metered and meter replacement program in place.	√	2000s	NA	Map meter replacement locations? Map different types of meters? Measure pre/post change usage.	NA	900 AF for every 1% of lost accuracy recovered	900 AF for every 1% of lost accuracy recovered
U-8	Water Re-use Study				√	Study feasibility of water re-use pilot project.	C	Study completed in 2015	$###	See study outcome recommendations.	NA	-	
U-9	Advanced Meter Technologies	√	√	√	√	Adopt new technologies that allow for instant reading of meters while facilitating data analysis	√	Utility implementing AMI installation for residential and CII customers.	$	Map locations; meter use analysis.	NA	-	TBD

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** - Completed

Table 4-4
UTILITY OPERATIONS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
U-10	Landscape Specifications			√	√	Update landscape and irrigation specifications for inclusion in SLCPDU construction projects.	ID	2020/21	TBD	TBD	NA	-	480 AF/year
U-11	Landscape Maintenance				√	Implement BMPs for maintaining SLCDPU properties to enhance conservation and sustainability.	√	Contract implemented 2019	Varies	Track water use on sites.	NA	-	480 AF/year
U-12	EPA WaterSense Partnership				√	Become a partner in EPA WaterSense.	√	2020	NA	NA	US-EPA	-	-
U-13	AWWA/AWE Program Certification				√	Submit documentation for review and scoring of conservation program.	√	2020	NA	NA	AWWA, AWE	-	-

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** - Completed

4.8 Law and Policy

Since the inception of the conservation program, the City has depended predominantly on volunteer engagement to achieve its water use reduction goals. There are examples of ordinances and policies that support conservation, including landscape codes and the billing rate structure. In order to achieve the next level of goals, there are ordinances and policies that would support further conservation by codifying some best practices and addressing egregious water waste.

4.8.1 Proposed Ordinances [LP-4, LP-7, LP-8]

Timeline: 2020
Budget: N/A
Partners: N/A
Reach: Utility-wide
Savings: NA

Squandered Water Ordinance [LP-8]

Even before the creation of the water conservation program, water customers acted promptly and appropriately to calls for temporary reductions in water use. As a result of this long history, the conservation program has come to depend on this volunteer spirit to facilitate our initial water use reductions. However, after nearly twenty years, not everyone is part of the solution. Usually, when asked to change or correct a behavior, requests are positively received; sometimes it is not. Sometimes, property owners insist on watering daily; an absentee owner won't repair a leaking swamp cooler; or a remote corporate office isn't concerned with the broken and geysering spray head at a grocery store, miles, or states away. This disregard for a limited and valued resource is the definition of squandering and is why it may be time to consider such an ordinance.

Clarification of Irrigation-only Meter Ordinance

In 2003, a seasonal tiered rate structure was adopted as a means to enhance the message of the value of water and to ensure that those who use the most water pay the most for that water. Along with establishing rates for residential and CII customers, irrigation-only meter accounts were also established. These meters are intended to service outdoor water use during irrigation season months. Each account receives site-specific, monthly water budgets based on landscapeable area and modified evapotranspiration equations. Staying in budget means water is charged in the second tier, identified as reasonable outdoor use. Occasionally, a property owner or manager doesn't turn off their irrigation system and the irrigation-only meter continues to be used. Owing to vague language in the rate ordinance, this un-authorized winter use of irrigation-only meters has been billed in the first tier, as is all other winter water use.

Evaluation of Irrigation-only Meter Budgets [LP-12]

As mentioned above, irrigation-only meters and budgets were established in 2003 to encourage responsible outdoor water use while maintaining landscape health, support efforts to sustain water supplies for necessary and beneficial uses, and to help achieve both overall water use reduction as well as reduction of peak water demand. These budgets, developed in conjunction with Utah State University Plants, Soils, and Climate Department, consider irrigated area, reference evapotranspiration, and irrigation efficiencies of 60 percent. Since then, through continued research, understanding of actual turf water need has grown, an adequate science exists to indicate that it is time to review and reassess these budgets. It is now better understood how use plays a role in turf water demand and have newer and better forms of turf that require less water. Additionally, better technology helps deliver water more efficiently. Given the new goals as outlined in the Water Supply and Demand Study and articulated in Chapter 3 of this plan, it is important to align irrigation-only budgets with current science and long-term outdoor water reduction goals.

Evaluation of Seasonal Rates

An inclining tier rate structure is utilized to recover cost of service, encourage appropriate use, and maintain reasonable priced water for the most essential uses. Tiered rates are only used April through October; all winter water use is charged in the lowest tier. Given the findings of the Supply and Demand Study, with its accompanying recommendations on both indoor and outdoor water use reductions, an evaluation of this practice should be conducted. Maintaining fair and equitable rates will still remain a priority.

Review Existing Landscape Ordinances and Policies

Salt Lake City's Code 21A.48.055: Water Efficient Landscaping establishes best practices to help reduce water waste in landscapes and park strips. Reviewed periodically over the years, given new understanding of landscape water need and improved technologies, it is an appropriate time to review and evaluate these codes to ensure appropriate alignment with newly established outdoor water use reduction goals.

Table 4-5
LAW AND POLICY

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
LP-1	Graywater	√	√	√	√	Research issues regarding Graywater use and establish appropriate policy.	√	Initial research completed 2017	NA	Is there a way to identify where graywater is being used?	USU	-	-
LP-2	Irrigation Audit Policy			√	√	Develop and adopt an ordinance requiring Irrigation Audits on all new commercial and institutional properties, and accounts which exceed target or set CCF.	√	7/2014 Can be compelled through Landscape Ord	NA	Number of audits and report outcomes	NA	*	*
LP-3	Irrigation Efficiency Standards		√	√	√	Develop and adopt Irrigation Efficiency Standards for all commercial and institutional properties.	C	7/2014 Landscape Ord/new construction	NA	NA	NA	*	*
LP-4	Landscape Ordinance	√	√	√	√	Amend existing landscape code to accommodate and encourage water-wise landscaping in front yards.	C	2014	NA	NA	NA	*	*

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

Table 4-5
LAW AND POLICY

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
LP-5	Parkstrip Code	√	√	√	√	Develop and adopt ordinance to accommodate and encourage non-traditional, lower water plantings.	C	Adopted 2004 (currently in review)	NA	NA	NA	*	*
LP-6	Rainwater Harvesting				√	Research issues relating to rainwater harvesting and support appropriate legislation.	C	Adopted by State 2010 (SB 32)	Initial investment of $14,000. Barrels sold at cost sustains program.	Track water use of known participating households.	NA	*	*
LP-7	Rain Sensor Ordinance and Policy			√	√	Require all properties with automated outdoor sprinkler systems to be fitted with rain sensors.	C	A component of 2014 water efficient landscape code	NA	NA	NA	*	*
LP-8	Squandered Water Ordinance	√	√	√	√	Develop and adopt ordinance prohibiting the squandering of water.	ID	TBD	NA	NA	NA	-	TBD
LP-9	Sub-surface or Low-impact Irrigation for Small Areas			√	√	Require sub-surface or low-impact irrigation on medians, parkstrips, and in parking lots.	C	Landscape code prohibits standard irrigation in these areas	NA	NA	NA	*	*

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

Table 4-5
LAW AND POLICY

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
LP-10	Water Shortage Contingency Plan	√	√	√	√	Identify specific calls for action during water shortages and emergencies.	√	2003; update planned	$75,000 WaterSmart grant with $78,000 in-kind match.	See Plan for monitoring details.	Funded through grant from Bureau of Reclamation	-	-
LP-11	Irrigation-only Meters		√	√	√	Review existing policy and make recommendations.	√	Review existing policy	NA	Map: locations, meters that exceed target/frequency by user class; potential sites not currently metered	NA	*	*
LP-12	Sub-metering on New Multi-Family Dwelling Units		√			Explore requiring all new multi-family dwelling units to be sub-metered and address metering in mixed use development	ID	TBD	TBD	Identify and map submeters	NA	-	-
LP-13	Alternative Water Sources Use Recommen-dations				√	Establish guideline for implementation pertaining to alternative water sources, including secondary water	C	Study on secondary water sources for park sites was completed 2018.	$62,500	See study	NA	-	-

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed

***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

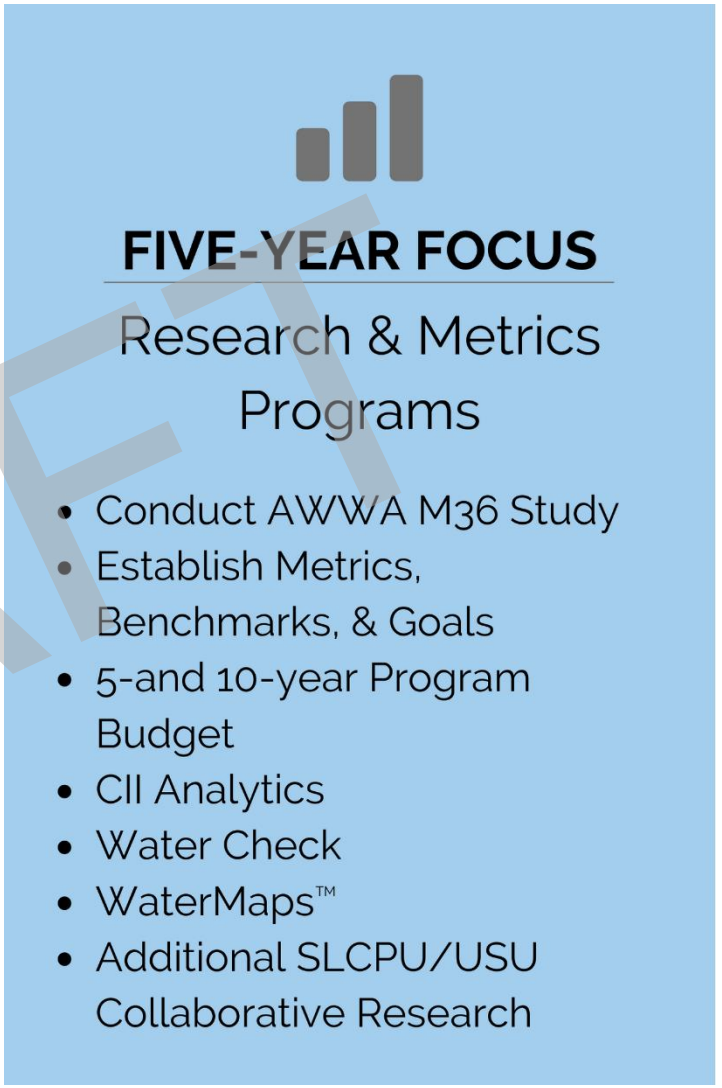
4.9 Research and Metrics

Successful conservation programs require an understanding of the community served, including the relationship of the end water user to their water use. Continuing research helps to identify the ways in which water is used; how it may be over- or misused; and the best means for altering behavior or practices to improve use efficiencies and reduce or eliminate waste. It is also crucial to understand program efficacy and effectiveness. In this regard, identifying meaningful benchmarks and metrics is key to program evaluation, review, and improvement.

The value of research and establishment of metrics should not be underestimated; the Governor's Strategic Water Master Plan devotes an entire chapter to the role of science and technology in enhancing our understanding as well as to develop practical and actionable steps to meet our future water needs. According to the strategic plan, science, technology, and innovation are crucial components of meeting water needs, now and in the future.

Fortunately, conservation staff have developed collaborative and cooperative relationships with many academic institutions and professional organizations that offer opportunities to extend knowledge, build understanding, and devise meaningful strategies to move towards water conservation goals. Internally, the water conservation program works with team members from GIS/IT, finance, billing, metering, and engineering to identify areas of study and meaningful benchmarks.

For example, through the Water Check program, we know that, while residential property owners tend to apply nearly twice as much water as is necessary to support lawns, commercial and institutional users may irrigate three to four times as much as needed. Though the overall footprint of landscaped area of non-residential property is less than that of residential property, this represents a great opportunity to reduce water waste, given the degree of overwatering. Applying WaterMAPS™ to commercial and institutional properties will help to quantify the potential water savings, while surveys and focus groups will identify how best to capture that savings. Research into emerging technologies and practices will continue as a critical component of effective conservation programing in order to achieve newly established water use reduction goals.



4.9.1 Conduct AWWA M36 Study [R-19]

Timeline: 2020
Budget: $125,000 (proposed)
Partners: N/A
Reach: all
Savings: 2,900 AF (900 million gallons) per year if system losses are reduced to 9%. Note that these savings are not associated with the audit alone, but with the actions taken to eliminate system loss as a result of the audit.

Currently, a leak detection program and water data analysis programs are underway. In addition to these programs, a water loss and control study be conducted in keeping with the *AWWA Manual of Water Supply Practices: M36 Water Audits and Loss Control Program*. This comprehensive study will facilitate improvements in water resource management, optimize revenue recovery while promoting equity among rate payers, minimize distribution system interruptions, enhance system integrity, and reduce water waste through identification of metering and system losses. Over the last five years, system losses have averaged approximately 12 percent. While it is not reasonable to expect zero system losses, it is believed that system losses could be reduced to somewhere between 8 to 10 percent with proactive leak detection and repair. Thus, potential water savings could be estimated to be in the hundreds of millions of gallons per year.

4.9.2 Establish Metrics, Benchmarks, and Goals for Conservation Programing [R-1, O-6]

Timeline: On-going
Budget: TBD
Partners:
Reach: all
Savings: TBD

Over the lifetime of the conservation program, 16,000 acre-feet of water have been saved annually. Establishing metrics, benchmarks, goals, and potential water savings for conservation programing will facilitate understanding how those savings were achieved, and how best to sustain and enhance those savings. Not all metrics and benchmarks will be identical; for instance, the impact of a brochure or demonstration garden cannot be measured in the same manner as would the effectiveness of rain sensor rebates or Water Checks. Reliance on industry best practices, research by AWE, US-EPS, and AWWA, as well as efforts by other conservation programs to identify benchmarks and metrics will facilitate this program measure.

4.9.3 5- and 10-Year Proposed Water Conservation budget

Timeline: 2020/21
Budget: N/A
Partners: Internal
Reach: Utility-wide
Savings: NA

Continued program continuity and success depends on the ability to plan ahead. The establishment of 5- and 10-year budget proposals will facilitate program planning, support partnership arrangements, and optimize grant opportunities. Past budget and program performance, future stakeholder and partnership opportunities, outside conservation program examples, and AWE and AWWA program estimate costs will be consulted in establishing proposed budgets.

4.9.4 CII Analytics

Timeline: 2017-2022
Budget: $135,000
Partners: N/A
Reach: CII
Savings: TBD

The service area is comprised of a diverse customer base, from suburban residential properties to high-density urban core dwellings, and from art spaces to tattoo parlors, health food stores to hospitals, model toy stores to airports, and gas stations to oil refineries. While our residential base is rich in its diversity, understanding water demand, use patterns, and barriers to behavioral change seem straightforward when compared to the diversity and complexity of our CII customers.

Conservation staff began working on CII analytics in earnest in 2015. Since that time and working with a team of consultants, we have developed a method for gathering, analyzing, and assessing water use within the CII sector. With tools developed by Radian Inc., we can now begin to develop realistic water efficiency targets for commercial, industrial, and institutional (CII) clients through better understanding of demand patterns, specific CII sector analysis, and comparisons to newly developing national standards data. Through this process advanced

and automated reporting queries, automatic updates for consumption, weather, GIS, and AMI data with usage and other predefined alerts have been developed to provide valuable information to conservation program staff.

By integrating existing commercial billing data and established NAICS codes with external data sources including GIS, AMI, and weather, a clearer picture of water demand emerges. This in turn helps support water use reduction efforts in the CII sector in a meaningful, actionable way.

CII customers comprise roughly 12 percent of the connections within the service area, and their total water demand accounts for half of water use. In order to more fully integrate CII customers with conservation planning, it is necessary to understand how water is used in order to drive sustainable conservation within this sector to achieve long-term water reduction goals while still maintaining a vibrant, healthy economy.

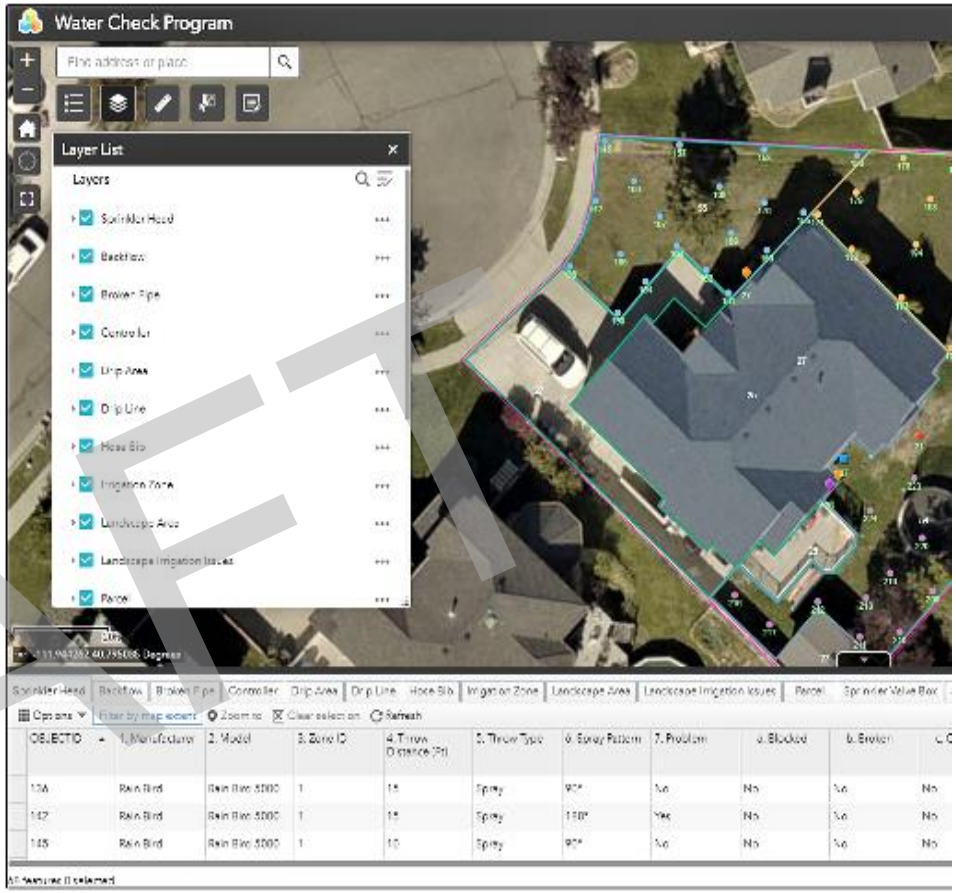
4.9.5 Water Check [R-1, O-6]

Timeline: On-going
Budget: $10,000 (proposed)
Partners: USU, MWDSLS, Sandy City
Reach: Residential, CII
Savings: TBD

Landscape irrigation accounts for almost 25% of water use within the service area. Understanding how water is used and communicating better practices to home and property owners supports long-term water use reduction goals. The Water Check irrigation audit program was created in 1999 and is provided by Utah State University and the Center for Water Efficient Landscaping, with financial and technical support from department conservation staff and Metropolitan Water District of Salt Lake & Sandy (MWDSLS).

Typical Water Check participants know they have a problem but don't know what to do about it. The Water Check program provides recommended site-specific irrigation schedules as well as irrigation system and landscape action items to help increase their landscape irrigation efficiency.

By comparing pre and post water check water usage, we know that having a water check typically results in a 30% reduction in water use in subsequent years. It's important to note that audits need to be done regularly to maintain efficiency.



GIS technology has been integrated with the Water Check application for enhanced data accuracy including use area, asset location, attributes (nozzle spray pattern, etc.), and condition (broken, tilted, etc.). A further benefit is that property owners now receive, along with an electronic report, a site map indicating location, zone, and condition of spray heads.

Water Check will also be incorporated into future landscape incentive programs. Studies indicate landscape program success depends on pre-qualification and post-verification to ensure landscape interventions are appropriately implemented. Water Check will assist in providing those functions, ensuring that program goals for incentives are met.

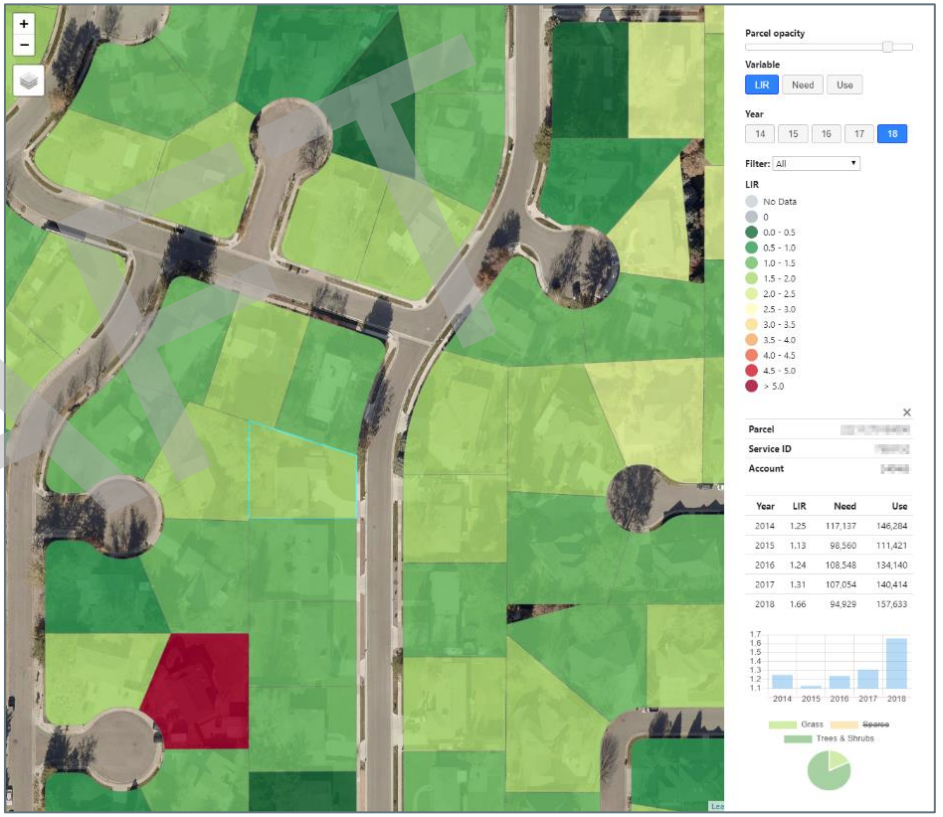
4.9.6 WaterMAPS™ [R-5, O-16]

Timeline: 2018-2022
Budget: $95,000
Partners: USU/CWEL, EWIG
Reach: Utility-wide
Savings: TBD

WaterMAPS is a collaboration between the WaterMAPS™ team in USU's Center for Water Efficient Landscaping (CWEL) and the Water Conservation Program of SLCDPU. WaterMAPS provides SLCDPU with technical assistance and science-based analysis to locate and quantify additional landscape water conservation potential so it can determine when, where, and how to deliver current and future outdoor-focused water conservation programs. Besides providing detailed information on outdoor water use to customers, this project will help to effectively utilize existing programs such as Water Check and optimize implementation of new programs such as landscape incentives.

How much water conservation potential exists within the landscapes of the service area and how is that potential savings captured? What tools are most effective with any given group of water users to eliminate waste, increase efficiency, and reduce use? The answers to these questions will enable SLCDPU to prioritize delivery of future outdoor water conservation programs and help the community to be adaptive and responsive in its relationship with water in order to create a more sustainable water supply now and for the future. However, we do not know how much water is actually being wasted on existing landscapes. Analysis of city meter data can provide clues as to watering practices, but the question remains: How much irrigation water currently being applied is not necessary to support existing urban landscapes?

Application of USU Water Management Analysis and Planning Software (WaterMAPS™) addresses this specific information need. WaterMAPS™ is a custom software application that has been developed by an interdisciplinary team of USU researchers for the purpose of promoting urban landscape water conservation (visit watermaps.usu.edu). WaterMAPS™ integrates water meter data with property records, weather data, and landscape classifications into one database, then enables different time-step calculations of site-specific Landscape Irrigation Ratios (LIRs) that compare landscape water use to landscape water need. The LIRs represent an efficiency standard, with values under 1 indicating efficient use and increasingly higher numbers indicating "capacity to conserve" (or water waste). Various patterns in how LIRs change over time can signal the need for delivery or refinement of conservation messaging and programming. In this project, several different innovations will be implemented in the application of WaterMAPS™ to help SLCDPU meet the challenge of refining and focusing outdoor water conservation programs in the future.



4.9.7 ADDITIONAL USU/SLCPU Study and Research Collaborations

Timeline: 2020
Budget: TBD
Partners: USU/CWEL, USDA-FRRL, EWIG, SLC-Golf
Reach: Utility-wide
Savings: TBD

4.9.7.1 Golf Course Turfgrass Study

Timeline: 2018-2022
Budget: $45,000
Partners: USU/CWEL
Reach: CII
Savings: TBD

In 2018, conservation programs began working collaboratively with Salt Lake City Golf (SLC-Golf); Utah State University Department of Plants, Soils, & Climate (USU/CWEL); and the United States Department of Agriculture-Agricultural Research Service Forage and Range Research Laboratory (USDA-FRRL) to find solutions that reduce water demand and eliminate water waste while supporting the golf division in enhancing long-term sustainability of its courses by managing fiscal impacts of increasing water costs, all while supporting playability and economic viability of City courses.

Conservation staff, SLC-Golf, USU/CWEL, and USDA-FRRL devised field-based research in the areas of drought tolerant grass research, soil surfactant application, water conditioning evaluations, and soil temperature measurement. Outcomes from these studies will not only provide actionable information for SLC-Golf but is already influencing landscape management decisions at department sites and is helping to inform incentive and rebate program planning.

This study has been recommended for an additional two-year extension.

4.9.7.2 Alternative Turfgrass Study

Timeline: 2020-2023
Budget: $10,000 (proposed)
Partners: USU/CWEL
Reach: CII
Savings: TBD

Outdoor water use has been an important focus of water conservation efforts locally and statewide over the last twenty years, and in the center of this focus sits Kentucky Blue grass.

Over the last fifteen years, USU has conducted field studies of *Poa* species (blue grass), as well as other grass species and varieties with the intent of identifying alternative turfs to traditional lawn grass. The outcome of these studies has been the identification of turfs requiring fewer inputs while still delivering on the aesthetic and environmental qualities that make lawns so compelling a landscape choice.

Conservation staff propose to work with USU and other partners to increase the use of these turf grasses within the service area as well as regionally, through a number of strategies. These will include turf demonstration areas, installation of these turfs on department properties, development of educational and promotional materials, collaboration with seed and sod growers, and consideration for inclusion in incentive programming.

4.9.7.3 Synthetic Grass Study

Timeline: 2021
Budget: $25,000 (proposed)
Partners: USU/CWEL
Reach: all
Savings: N/A

It is commendable that we strive to identify new ways to reduce water use and eliminate water waste. As part of this search for solutions, however, it is also important that impacts to other areas of environmental concern are incorporated into decision making. It is also important that as best as possible, unintended consequences are also considered.

Synthetic grass has been presented as a solution to reducing water use in landscapes. When lifecycle water use is calculated, this premise seems more

tenuous. Research provides information regarding impacts to human health, urban heat island effect, and water quality.

USU, working with conservation staff, conducted a metastudy on research pertaining to artificial turf, with a desire to identify any potential negative impacts to soil health, surrounding landscape health, surrounding landscape water demand, and insect populations. Study outcome indicates there is little or no scientific research pertaining to these questions. As a result, a collaborative research study is being designed and proposed to conduct field and modeling studies to measure impacts, if any, of synthetic turf on landscape, soil, and beneficial insect health.

4.9.7.4 Irrigation-Only Meter Budgets Review

Timeline: TBD
Budget: TBD
Partners: USU/CWEL
Reach: utility-wide
Savings: TBD

In 2003, a seasonally tiered rate structure was adopted. A component of those rates was the establishment of rates specific for those properties with meters that serviced only outdoor, landscape water needs. Those accounts are referred to as Irrigation-Only Meter Accounts. In conjunction with USU, budgets based on square footage of landscaped area and evapotranspiration were established for each property with irrigation-only meters. Improvements in best practices, irrigation system technologies (including irrigation controllers and sensors), and turfgrass may allow for revisions of established budgets without negatively effecting landscapes. Additionally, new conservation goals articulated in *the Salt Lake City Water Supply and Demand Plan* indicate a greater level of outdoor water conservation is necessary to achieve short- and long-term water use reduction goals. Accordingly, a review of the landscape water budgets is in order.

Table 4-6
RESEARCH AND METRICS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
R-1	Water Check	√	√	√	√	Promote and conduct lawn sprinkler check-ups for residential, commercial, and institutional properties	√	(S) Estab. 1988; Partnered with USU 2007. Ongoing.	$60,000 provided by MWDSLS annually. SLCDPU funds additional components, including APP, portal, and GIS capability ($45,000)	Map and track use.	MWDSL&S		47,000 gallons per participating residential customer annually
R-2	EPA Residential Study	√				Measure and evaluate water efficiency in newly constructed homes.	√	Completed 2011[4]	$20,000/ $360,000 grant and partners	Map participating households.	EPA Grant; Aquacraft, Inc., 8 participant cities	NA	NA
R-3	Irrigation Controller Study	√		√	√	Test and evaluate weather-based irrigation controllers.	√	On-going (USU)	NA	Study outcomes inform recommend-dations	USU/CWEL	*	*
R-4	Irrigation Intervention Study	√				Investigate impediments and barriers for homeowners in correcting irrigation system defects.	√	Initial studies conducted 5/2015, 2018	Funded in FY2013-14 cons. budget; matched by USU	NA	USU	NA	NA

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

[4] DeOreo, William, and Salt Lake City Department of Public Utilities. *Analysis of Water Use in New Single-Family Homes*. Boulder Co. January 2011

Table 4-6
RESEARCH AND METRICS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
R-5	WaterMAPS	√	√	√	√	Utilize technology developed by USU to analyze potential water-use savings in landscape settings.	√	Phase1: Study began August 201#. Phase 2: begin implementing WaterMAPS software over service area.	Phase 1: $49,000; Phase 2: $50,000 with EWIG match grant	Monitor LIR by parcel, sector	USU/CWEL; EWIG	*	*
R-6	Landscape Inventory	√	√	√	√	Inventory alternative landscapes and quantify savings.	√	2019	NA	Identify, map, measure, compare	USU, SL Co Master Gardeners, community citizen scientists	*	*
R-7	Residential Plumbing Fixtures Inventory	√	√		√	Inventory upgrades in plumbing fixtures and calculate quantity of remaining, older fixtures.	TBD	TBD	TBD	Compare water use between sites; refer to End Water Use Study	TBD	-	TBD
R-8	Water Softener Study	√	√	√	√	Research effects on water softener use on waste stream quality and impacts on water re-use water quality.	TBD	TBD	TBD	TBD	TBD	-	TBD

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

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RESEARCH AND METRICS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
R-9	Conser-vation and Storage and Conveyance Master Plan				√	Analyze the impacts of conservation on the assumptions pertaining to storage and capacity.	√	Component of 2020 Water Conservation Master Plan and Storage and Conveyance Master Plan	SLCPU Engineering	-	Consultant: Bowen Collins	-	Since 2007 projected peak demand 270 MGD; current projection 200 MGD
R-10	Conser-vation, Climate Change, and Resiliency	√	√	√	√	Review existing research on climate change; evaluate impacts of conservation on risk reduction and mitigation.	√	Study currently being conducted		-	-	-	-
R-11	Secondary Water Irrigation Master Plan	√	√	√	√	Study availability, quality, and opportunity to use non-culinary water sources.	C	2019	Water Resources Division budget and SLC Public Services	Map locations using non-culinary water: by customer class and water source.	SLC Public Services Consultant: Bowen Collins	-	-
R-12	Commercial and Industrial Water Demand Study			√		Evaluate C&I was use patterns and water-use reduction innovations.	√	2015 - Ongoing	Phase 1 & 2 Initial startup: $20,000 $$$	Analysis and monitor CII water use sector, account	Phase 1 & 2: funded $10,000 each budget cycle 2015/16 and 2016/17 Phase 3 & 4: $50,000 funded in 2017/18	-	TBD

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

Table 4-6
RESEARCH AND METRICS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
R-13	Behavior and Policy Study	√				Conduct studies linking consumer behavior and policy development.	C	completed	2017/18:	Can we map participant locations?	USU Consumer study and iUtah study.	-	-
R-14	Incentives	√	√	√	√	Study incentive programs; investigate.	ID	Proposed for 2020	n/a	Survey/audit to determine reach/interest/ product. Map and track use.	USU/CWEL, AWE, US-EPA, IA	-	TBD
R-15	Turf Study	√	√	√	√	Turf bluegrass and alternative turfs to identify best qualities/applications.	√	2017/18; Golf Turf Study completed summer 2019 – recommend contract extension. Mapping begun Fall 2019.	$50,000	Comparative water use	Funded $25,000 in 2017/18 budget, with $25,000 match from USU. USDA-FRR	-	TBD
R-16	Program Effec-tiveness	√	√	√	√	Where appropriate, develop methodology to measure practice impact.	ID	2020-21	TBD	varies	USU/CWEL	-	-
R-17	Projected Demand	√	√	√	√	Develop baseline and projected customer-class water demand.	C	Water Supply and Demand Master Plan Study (2019)	SLCPU Engineering	WaterMAPS, CII tool	Consultant: Bowen Collins	-	-

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed
***** Past irrigation savings = 10,100 AF. Future irrigation savings = 10,200 AF. Total includes combined effects of all irrigation water reduction programs.

Table 4-6
RESEARCH AND METRICS

No.	Practice	Classification				Brief Description	Practice Timeline		Cost/Funding	Reach/Metric	Partnership	Savings	
		Res	Ind	Com	Inst		Active	Implementation				To Date	Projected
R-18	Artificial Turf Study	√	√	√	√	Study impacts of artificial turf on landscape water need and soil health	√	Metastudy completed 2019; field study proposed	TBD	-	USU/CWEL	-	-
R-19	Water Loss Control Study				√	Complete loss audit based on AWWA M36 standards and implement findings.	ID	Scheduled for FY 2021	$125,000	Track percentage loss after implementation of plan components.	NA	-	2,900 AF/year

ID - In Development **NA** - Not Applicable **NC** - No Cost **TBD** - To Be Determined **C** – Completed
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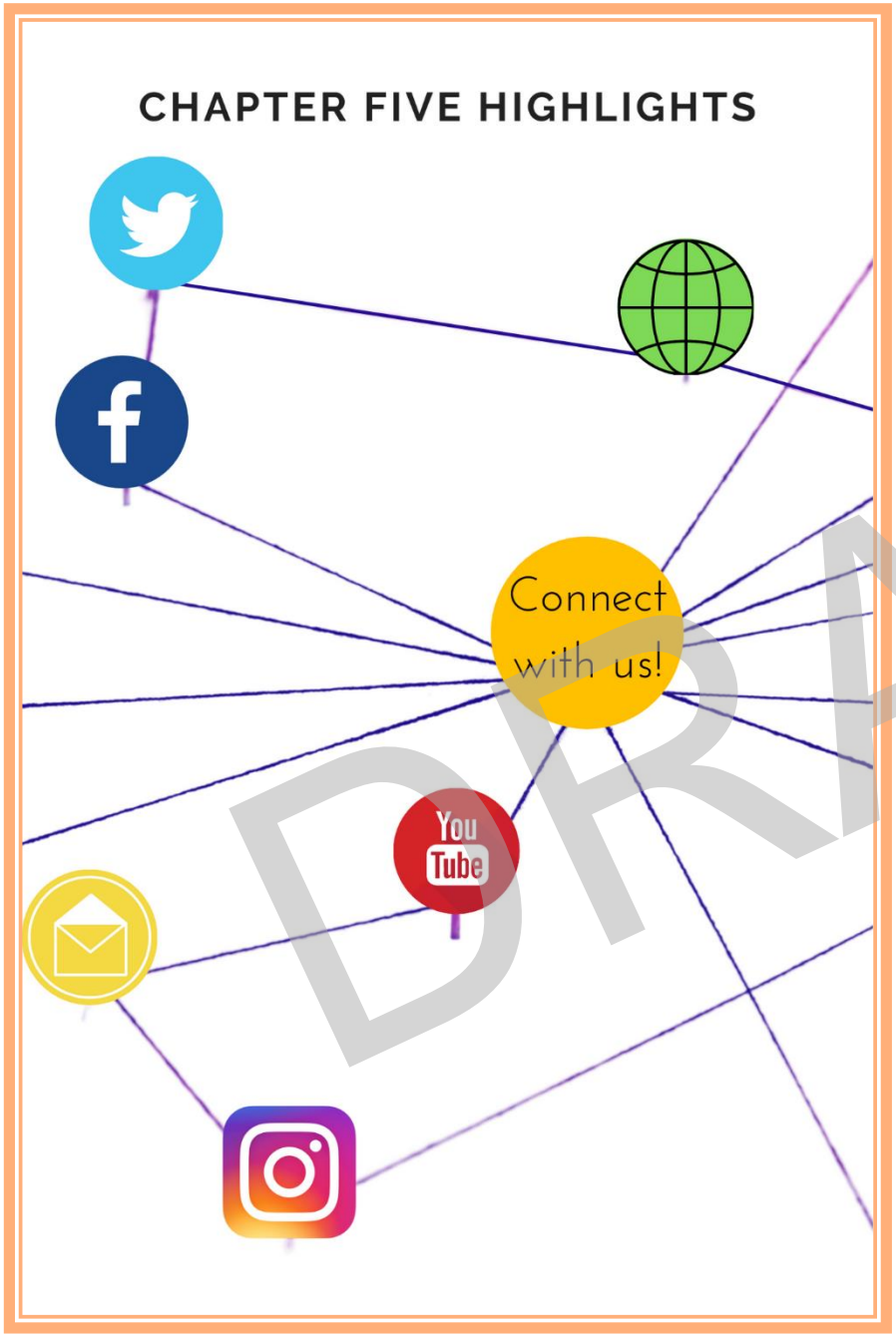


CHAPTER 5: PUBLIC OUTREACH AND COMMUNICATION PLAN

5.0 Introduction

The purpose of this communications and outreach plan (COP) is twofold: first, to solicit feedback and comment from customers and stakeholders during plan development; and second, provide a process that will be used to inform those groups when implemented.

This outline is intended to provide general steps to follow during the public outreach phases of the project. Due to the COVID-19 pandemic and resulting restrictions on public gatherings and closures of public buildings, modifications will be made to traditional engagement methods such as community meetings, open houses, and tabling at public events. Every effort will be made to use online and cloud-based platforms for public meetings. Recognizing that not all members of the community have equal access to the internet, we will utilize more traditional options at community centers, libraries, and other public venues if available.

5.1 Goals and Objectives

To ensure the achievement of the desired outcomes, the goals of the COP are to:

- Create meaningful opportunities for community feedback during the development of the water conservation plan;
- Identify various stakeholders within the community and ensure that as many groups as possible are represented within the planning process directly, and that the voices of those not directly represented are heard;
- Facilitate the transfer of technical information and materials to the community to both inform and encourage engagement;
- To ensure that community responses, questions, and concerns regarding the plan are relayed in a timely manner;
- Be seen as credible and accountable during the planning process; and,
- Gain support within the community of adoption of the plan.

5.2 Stakeholders and Special Interests

Though in the truest sense, all customers are stakeholders, there are groups with specific insights or concerns whose interests may be directly affected by this plan. Some are internal to the City, such as the Golf and Parks and Public Lands Divisions. Others are external, such as property management companies, trade organizations, and citizen and environmental advocacy groups. Meetings with stakeholders have offered insights into a variety of topics and helped to inform program decisions. Continuing this dialogue will strengthen this plan and help to ensure that conservation goals are met.

Additionally, meetings with the following groups will also be scheduled:

- Public Utility Advisory Committee
- Metropolitan Water District of Salt Lake & Sandy
- SLC Mayor's Office
- Salt Lake City Council
- Partner cities

5.3 Media and Social Platforms

Though open houses, public meetings, and other traditional venues for community dialogue still bring value, social media has become an integral part of regular communication between government agencies and the public. With this in mind, the Project Manager will work closely with the SLCPU communications team to optimize opportunities for dialogue regarding the plan.

News Releases. SLCPU will coordinate with the SLC Mayor's Office to release press announcements timed for milestones related to the WCMP. These milestones could include completion of initial plan draft, web-based sites to facilitate review and submittal of comments, and announcements of public hearings.

slc.gov/utilities/water-conservation-plan-2020 Materials related to the Plan will be maintained on the Water Conservation Page. Documents and materials will be posted as developed but will still be in draft form until adopted. Processes will be established to allow for comment. Links to this site will be placed on various City websites, including Sustainability, Watershed, and the Utility main page. The project manager will also reach out to the City Council and Mayor's Offices of all the participating cities to link to the conservation page.

Blogs. The project manager will facilitate developing content to post on a variety of blogs, including the SLC Sustainability blog. These blogs can be factual and technical, but also should share the narrative of the process, the value of participation, and actions after adoption and implementation.

www.facebook.com/slcpu**.** The SLCPU Facebook page will be used to direct the community to meetings, community events (including Community Council Meetings), the website, and other venues. Plan-related stories will be posted twice per month. Frequency will be evaluated as the process progresses. A live Townhall meeting will be hosted by the City, with the recorded meeting posted to the Plan web page.

twitter.com/slcpu. The SLCDPU twitter feed will be used to direct followers to events, blogs, or as direct calls for action. Plan-related tweets will be shared twice per month. Frequency will be evaluated as the process progresses.

Instagram.com/slcpu. This vehicle is especially adapted to photos, graphic information, and interaction with the community. Posts could include a Q and A approach to encourage direct interaction from the public about specific parts of the plan.

www.youtube.com/user/SLCtvmedia**.** Utilize Salt Lake City TV media site is well suited to provide news regarding the plan process. This medium will help to provide videos relating to "how-to's" for specific programs.

Other Media Outlets. The project manager will reach out to community outlets, such as the SL Chamber "Building Utah" podcast, local community radio stations, and other news outlets to develop story opportunities that will reach a variety of community.

5.4 Avenues of Communication

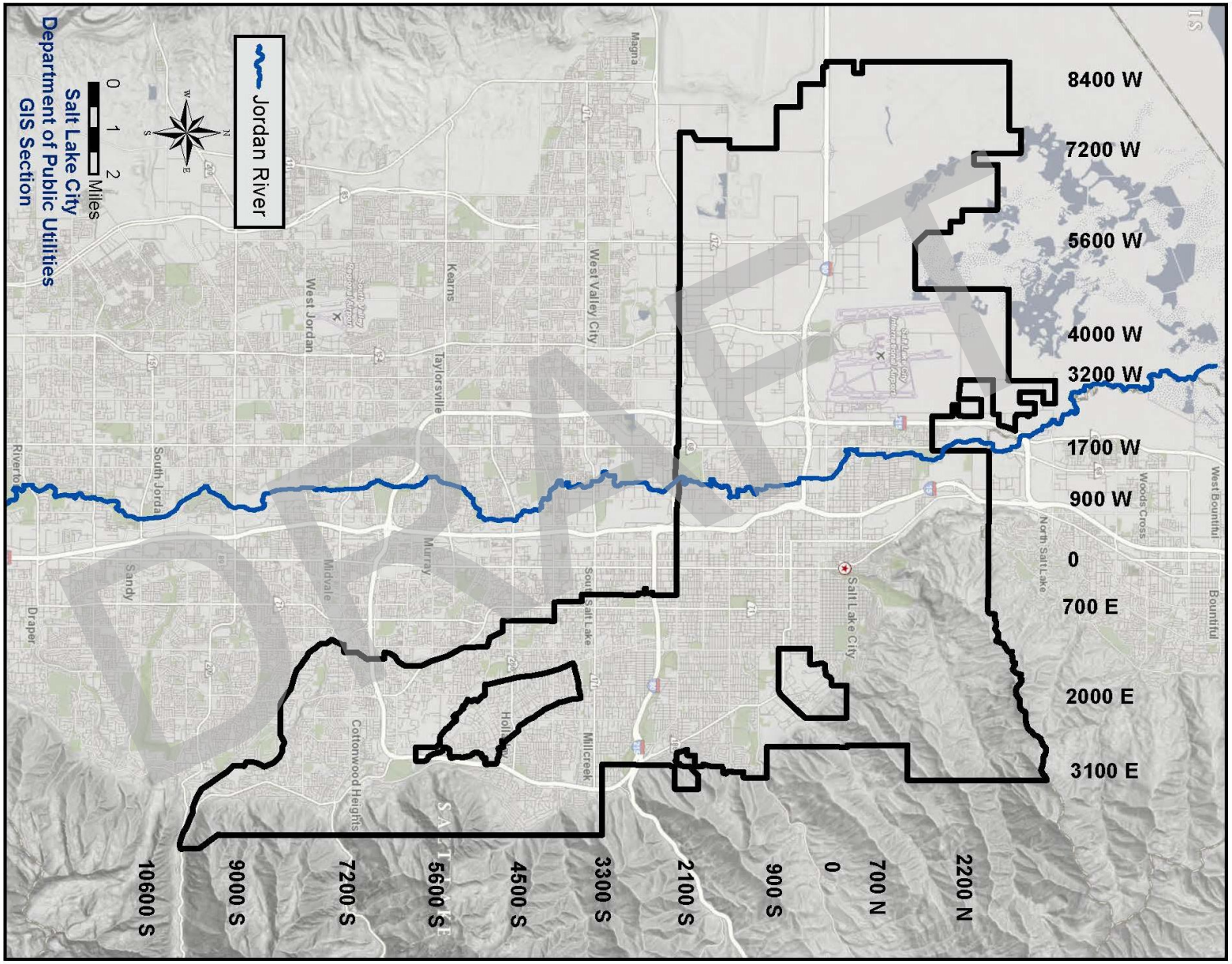
Comments on the process, technical materials, and drafts will be received via email, phone, letter, social media responses. Communications will be monitored, collected, and shared with SLCPU for consideration, inclusion, or for response. The Project Manager will be established as contact.

APPENDICES

- A SLCDPU Water Service Area Map
- B MWDSLS ULS Report 2019, Table 4: Salt lake City Water Usage and Conservation Trends
- C State Division of Water Resources 2018 Water Conservation Plan Checklist
- D ANSI/AWWA G480-13 Water Conservation Program Operation and Management Standard, First Edition July 1, 2013
- E Water Conservancy Budget 2020/21
- F 17.16.092: Water Shortage Management
- G 21A-48-055 Water Efficient Landscaping Standards
- H Public Utility Advisory Committee Minutes/Water Conservation Plan Discussion
- I Metropolitan Water District of SLC & Sandy Board Minutes/Water Conservation Plan
- J Salt Lake City Council Transmittal, Minutes, & Resolution
- K Links & References
- L Glossary of Terms, Abbreviations & Acronyms

A.

PUBLIC UTILITIES
SERIVCE AREA



B. MWDSLS ULS Report 2019, Table 4: Salt Lake City Water Usage and Conservation Trends

Table 4 - Salt Lake City Water Usage and Conservation Trends

Documentation of Conservation Performance

Metropolitan Water District of Salt Lake & Sandy

	Without Consideration of Worker Population			*Population Adjusted Based on Worker Population Relative to WFRC Average*								
Year	Population	Annual Metered Sales (gallons)	Per Capita Use (gpcd)	Population	Employment	Average Employment Based on Population	Worker Population Above Averages	Total Equivalent Population	Annual Metered Sales (gallons)	Per Capita Use (gpcd)	ULS Goal (gpcd)	State Goal (gpcd)
0	287,431	32,479,397,940	310	287,431	255,161	148,889	106,272	312,192	32,479,397,940	285	285	285
1	287,405	31,156,592,852	297	287,405	259,575	148,876	110,699	313,198	31,156,592,852	273	283	282
2	287,379	27,795,222,972	265	287,379	264,066	148,862	115,204	314,221	27,795,222,972	242	281	279
3	287,353	25,866,715,160	247	287,353	268,634	148,849	119,785	315,263	25,866,715,160	225	280	276
4	287,327	25,709,610,476	245	287,327	275,242	148,835	126,407	316,780	25,709,610,476	222	278	274
5	287,300	23,230,740,000	222	287,300	280,500	148,821	131,679	317,981	23,230,740,000	200	276	271
6	288,445	25,546,829,220	243	288,445	283,762	149,415	134,348	319,748	25,546,829,220	219	274	268
7	289,765	28,409,000,000	269	289,765	285,060	150,098	134,962	321,211	28,409,000,000	242	273	265
8	290,671	24,713,538,800	233	290,671	285,951	150,568	135,383	322,215	24,713,538,800	210	271	262
9	291,312	24,339,970,111	229	291,312	286,582	150,900	135,682	322,926	24,339,970,111	207	269	259
10	291,953	24,684,871,280	232	291,953	287,213	151,232	135,981	323,637	24,684,871,280	209	267	257
11	309,664	22,851,774,007	202	309,664	283,183	160,406	122,777	338,271	22,851,774,007	185	265	254
12	310,387	27,244,926,535	240	310,387	283,844	160,780	123,064	339,061	27,244,926,535	220	264	251
13	310,516	26,132,150,545	231	310,516	284,292	160,847	123,444	339,279	26,132,150,545	211	262	248
14	311,066	24,536,287,605	216	311,066	284,740	161,132	123,608	339,867	24,536,287,605	198	260	245
15	312,281	23,694,971,212	208	312,281	286,633	151,144	135,489	343,850	23,694,971,212	189	258	242
16	316,028	24,524,178,919	213	316,028	290,072	152,958	137,115	347,976	24,524,178,919	193	257	239
17	319,820	25,515,449,124	219	319,820	293,553	154,793	138,760	352,152	25,515,449,124	199	255	237

C. State Division of Water Resources 2018 Water Conservation Plan Checklist

State Div of Water Resources 2018 Water Conservation Plan Checklist		
Section	**Requirement**	**Documentation**
System Profile		
1 Population, Serive Area, Existing Water Users		
1.1	Provide map of current service area.	*Page 1-2 and Appendix B*
1.2	List number of M&I water connections, categorized by type: (Residential/Domestic, Commercial, Institutional, Industrial, Unmetered)	*Table 2-3*
2 Supply		
2.1	Chart current water supply, categorized by source (Wells, Springs, Surface, Purchased, Exchanged)	*Section 1.3.1 and 1.3.2*
2.2	Describe when applicable, occurrences of groundwater depletion, aquifer recharge (artificial and natural) and storage and recovery practices.	*No groundwater deletion has occurred. Aquifer Recharge and Recovery program discussed on page 1-5 and 1-6.*
2.3	Provide comparison graph, which includes a) reliable supply through 2050, b) current water use projections and c) efficient use.	*Figure 1-4*

State Div of Water Resources 2018 Water Conservation Plan Checklist		
Section	**Requirement**	**Documentation**
2.4	If after reaching conservation targets, use exceeds supply, list future water sources and cost projections.	*Not applicable. Please see the SLC Water Supply and Demand Master Plan.*
3 Water Measurement and Billing		
3.1	List current water measurement methods and practices. (percent of metered connections by type, reading frequency, calibration schedule, new development laws & replacement schedule)	*1) 100% of connections are metered;* *2) Meters are read roughly every 30 days;* *3) Solid-state multijet and ultrasonic meters are sealed in factory and calibrated to AWWA Standards and not calibrated in field. Flow tests may be conductyed in field. when meters do not perform to AWWA standards they are replaced ; Non-AMI meters 1.5" and up are field tested at a rate of appox 1000 meters per year.* *4) All new connections are required to be metered per code;* *5) All 3/4" and 1" meters within SLCPU service area are scheduled to be replaced with AMI within next 6 years.Larger meters are replaced as needed, though 85% of 1.5" meters and up are OMNI C1 or OMNI F2.*
3.2	List water (by volume: Acre-Feet or M Gallons) and revenue losses and the control practices implemented to minimize both. If utilizing the AWWA Free Water Audit Software© please list water audit validity grade.	*See Table 2-2 Current system loss is estimated to be 11% of production volume, or 10,225 AF. Implementation of M36 is a proposed pratice, see Table 4-35 and Table 4-6.*
3.3	List current tiered pricing structure(s). (UT S.B. 28 2016)	http://www.slcdocs.com/utilities/PDF%20Files/UtilityRates/WaterrateswebCurrent.pdf
4 Water Use		
4.1	Gather 2005-current records of potable and non-potable water use by sector and service area population. Please check for accuracy and consistency with what is submitted to Water Rights at: www.waterrights.utah.gov/wateruse/WaterUseList.asp	*Table 2-1 and Table 2-4.*

State Div of Water Resources 2018 Water Conservation Plan Checklist		
Section	**Requirement**	**Documentation**
4.2	List current total potable and non-potable water deliveries by volume (please specify volume: Acre-Feet or M Gallons) categorized by type: (Residential/Domestic, Commercial, Institutional, Industrial, Wholesale and Un-metered).	*Table 2-1 and Table 2-4.*
4.3	Chart current per capita water use in gallons per capita per day (GPCD) by type and use: (Total water deliveries/365/Total service area population=GPCD).	*Table 2-6 and Figure 2-14.*
4.4	Graph your water efficiency progress: Take 2005-today, total potable and non-potable water use by sector and population records and go to: www.conservewater.utah.gov/compliance.html for a Conservation Goal Calculator and Graph. Then input data and produce graph for WCP.	*Figure 2-1*
Conservation Practices		
5 Conservation Practices		
5.1	Provide update on ongoing practices and list and detail all ongoing and new conservation practices. When implementing new practices provide costs, partnerships and implementation timeline. (BMP options at www.conservewater.utah.gov/compliance.html)	*See Chapter 4, Tables 4-2, 4-3, 4-4, 4-5, 4-6*
5.2	Provide names and contact information for those responsible for meeting efficiency goals. (i.e. Administrative staff, conservation coordinator(s), conservation committee members, Mayor, town council and/or board members.)	*Stephanie Duer, SLCPU Water Conservation Program Manager stephanie.duer@slcgov.com 801.483.6860*

State Div of Water Resources 2018 Water Conservation Plan Checklist		
Section	**Requirement**	**Documentation**
5.3	Share evaluation of existing water conservation best management effectiveness	*Over the past 18 years of active program implementation, SLCPU has seen a 27.7% reduction in total water use; 31% reduction in peak demand (see Chapter 2 Highlights). Achievements have exceeded goals set by Gov's Office and CUP Contract.*
5.4	List new Best Management Practice(s) and implementation plan(s).	*See Tables 4-2, 4-3, 4-4, 4-5, 4-6.*
5.5	List and detail all Conservation Public Awareness practices implemented.	*See Table 4-2*
5.6	List and detail all Education/Training practices implemented.	*See Table 4-2*
5.7	List and detail all Rebates/Incentives/Rewards currently implemented.	*See Table 4-3*
5.8	List and detail conservation Ordinances & Standards currently implemented.	*See Table 4-5*
5.9	List Reviews or Updates to City Codes/Requirements pertaining to : Water Waste Prohibition, Model Landscape Ordinance, Water Shortage Plan, Climate Resiliency Plan	*See Table 4-5*
5.1	After receiving approval from DWRe to move forward with Public/Board/Council Adoption. Provide City Council Resolution/Adoption signatures and meeting minutes.	*See Appendices ###*

D. ANSI/AWWA G480-13 WATER CONSERVATION PROGRAM OPERATION AND MANAGEMENT STANDARD, FIRST EDITION. JULY 1, 2013

Section	Requirement	Documentation	To Do	Date Completed
4.1 Regulatory Requirements				
4.1.1	Demonstrate meet or exceed applicable regulatory requirements for jurisdiction: 1) Utah Water Conservation Plan Act 73.10.32: Submit Water Conservation Plan to State DWRe every five years 2) Utah Governor's Conservation Goal (non-mandatory): reduce water use by 25% from baseline year 2001 (Exceeded) 3) CUP Conservation Goal (Exceeded)	1) Have submitted Water Conservation Master Plans (WCMP) as required and to standards 2) have consistently exceeded State-wide conservation goals (see 2020 WCMP Chapter 3, Figure 3-2) 3) Have consistently exceeded ULS Contractual Conservation Goal (see 2020 WCMP Chapter 3, Figure 3-2)	1) 2020 Water Conservation Master Plan in process	1) 1999, 2004, 2009, 2014 2) on-going 3) on-going
4.2 Top Level Organizational Functions				
4.2.1 Staff for conservation initiatives				
4.2.1	Assign dedicated water conservation coordinator	Provide job description of staff person assigned duties (5.1.1)		June, 2001
4.2.2 Water conservation planning				
4.2.2	Create, implement, and maintain a water conservation plan	www.slc.gov/utilities/conservation/2020conservation plan	2020 Plan Update to be completed by Oct 2020	1999, 2004, 2009, 2014
	Plan guided by AWWA M52 – *AWWA Water Conservation Programs – a Planning Manual* or some other guidance	Refer to this list and corresponding referencing.		
	Plan must: • Address water conservation across all relevant customer categories	See 2020 WCMP Chapter 3, and in particular Table 3-3. See Chapter 4, Tables 4-2, 4-3, 4-4, 4-5, 4-6.	See 2020 Water Conservation Master Plan	To be completed and adopted Fall 2020

Section	Requirement	Documentation	To Do	Date Completed
	Plan should include: 1. Clearly defined and measurable program performance goals 2. A suite of benchmarks that can be used to assess progress in implementation of the program 3. A supply assessment 4. Water conservation strategy 5. Water conservation goals 6. Plan evaluation 7. Ongoing plan maintenance	*See 2020 WCMP* *A.* Chapter 3, *B.* *Chapter 3, Table 3-3* *C.* *Chapter 2* *D.* *Chapter 4, Tables 4-2, 4-3, 4-4, 4-5, 4-6* *E.* Chapter 3 *F.* Chapter 4 *G.* Chapter 4		Ongoing with each Plan implementation
4.2.3 Water conservation in integrated resources planning				
4.2.3	Treat conservation equally to other water supply options	LINK to APPROPRIATE docs: Water Conservation participated in or led development of the 2019 Major Conveyance Study, Supply and Demand Study, Water Resources Data Study, 2019 Drought Plan (Water Shortage Contingency Plan)		These studies were updated or completed in 2018-19; engagement in implementation is ongoing
	Where appropriate, include water made available through conservation as part of the supply portfolio when conducting supply and demand forecasting analyses	See SLC Water Supply and Demand Master Plan, and 2020 WCMP Chapter 2, Figure 1-5		
4.2.4 Public information and education program				

Section	Requirement	Documentation	To Do	Date Completed
	Develop or incorporate into existing programs information efforts aimed at: • raising awareness • fostering a culture of conservation and behavior change	www.slc.gov/utilities/conservation		On-going
4.2.4	Components of program should include: • Effectively communicating the value of water • Information on methods and opportunities for reducing consumption • Deliver consistent and persistent messages	*See 2020 SLC Water Conservation Master Plan, Chapter 5.*		Fall 2020
4.2.5 Water waste ordinance				
4.2.5	Develop or support creation, implementation, and maintenance of an enforceable water waste ordinance	See 2020 WCMP, Chapter 4, Section 4.7.1, and Appendix ##	Proposed in 2020 Water Conservation Master Plan.	
4.3 Internal Utility Actions and Requirements				
4.3.1 Metering Practices				
4.3.1	Implement metering practices that promote conservation, including metering of: • All water sources • All service connections	Salt Lake City has been fully metered on the user side since the 1920s. Monthly billing to all of its customers commenced shortly after. Computerized billing began in the 1970s. Bills are now available as mailing or electronically. Most source waters are metered at treatment locations; improvements to source metering is subject of Water Resources Data Study and Program	RFP in process to meet Water Resources study recommendations; program implementation expected to take 12 to 16 months.	Varies; see documentation.

Section	Requirement	Documentation	To Do	Date Completed
4.3.1.1 Universal metering	Move towards implementing universal metering of all service (private and public) connections	*Metering completed in 1920s. Currently converting to AMI technology.*	Remaining AMI conversion expected to take 4 to 6 years	On-going for AMI implementation
	Establish goal to meter 100 percent of all service connections	*SLCPU has been fully metered since 1920's.*		1920s
4.3.1.2 Source water metering	Implement metering of all sources including: • Groundwater • Surface water • Reclaimed water	*Water sources are metered; improved system metering and data collection is subject of Water Resources Data project, currently underway.*	Proposed for FY2021	
4.3.2 Rate structures				
4.3.2	Use a nonpromotional water rate that provides incentive for customers to reduce water use	http://www.slcdocs.com/utilities/PDF%20Files/UtilityRates/WaterrateswebCurrent.pdf		2003
4.3.3 Billing practices				
4.3.3	Bill customers based on metered use	http://www.slcdocs.com/utilities/PDF%20Files/UtilityRates/WaterrateswebCurrent.pdf		1920's
4.3.3.1 Billing frequency	Bill at least bi-monthly	*Billing occurs on monthly basis (see above attachment)* http://www.slcdocs.com/utilities/PDF%20Files/UtilityRates/WaterrateswebCurrent.pdf		1920's
4.3.3.2 Reporting Consumption	Clearly indicate units for consumption	*See Attachment ****		2003
4.3.4 Landscape efficiency program				
4.3.4	Establish a program to improve and maintain water efficient landscapes and irrigation	*(See Chapter 4 for program details) Many programs support landscape water efficiency, including:* Water Check		

Section	Requirement	Documentation	To Do	Date Completed
		WaterMAPS SLC Landscape Best Practices Manual Landscape Code 21A.48 Landscaping and Buffers		
4.3.4.1 Design, installation, and maintenance practices	Develop program intended to maximize water efficiency through proper design, installation, and maintenance of new and existing landscapes and irrigation systems. Programs may include: • Audits • Financial incentives • Design information • Ordinances • Development standards • Education • Examples of how to properly design and operate irrigation systems	Water Check WaterMAPS SLC Waterwise 21A.48 Landscaping and Buffers, parkstrip and front yard codes SLC Landscape Best Practices Manual	Learning Labs Rebates	FY 2021
4.3.4.2 Irrigation scheduling	• Encourage customers to water based upon plant needs • Discourage customers from overwatering or watering during the times of day when water loss to evaporation and wind drift is greatest	Plant and Hydrozone list SLC Gardenwise Code 21A.48 Landscapes and Buffers, hydrozoning Lawn watering guide Water Checks	Water Waste ordinance	2021
4.3.4.3 Landscape water budgets	• Where appropriate, implement landscape water budgets to address water use and encourage efficiency	See Attachment: Irrigation-Only Meters and Rates		2003
4.3.5 Distribution system and pressure management				
4.3.5.1 Water utility audit	Conduct an annual audit of the system using AWWA/IWA Water Audit Method, including AWWA Water Audit Reporting Worksheet	M36 Study to be completed FY2021	FY2021	

Section	Requirement	Documentation	To Do	Date Completed
4.3.5.2 Water loss control program	Develop a water loss control program	Leak detection and repair program		
4.4 External Policy Requirements				
4.4.1 Water efficiency in building codes and standards				
4.4.1	Encourage: • adoption of water efficient codes and standards • adoption at both state and local level	**Provide evidence that water efficiency is addressed in local building codes for new buildings. (5.1.8)** 21A.48 Landscapes and Buffers		
4.4.2 Promote water efficient products and services				
4.4.2	Promote the use and maintenance of water efficient: • Products • Practices • Services	Water Stewardship Calendar Water Check program CUP Rebates partner		
4.5 Wholesale Agency Requirements				
4.5	Directly implement: • 4.1 Regulatory Requirements • 4.2.4 Public Information and Education Program • 4.3 Internal Utility Actions and Requirements	Water Conservation Master Plan completed in accordance with State requirements. Plan includes a communications and public engagement component (Chapter 5 of Plan). See Chapter 4, Utility Programs section of Conservation Master plan for utility actions.		
	May provide: • Regional coordination on conservation issues and program • Technical assistance to their retail agencies	*Note how met.*		
	May manage conservation activities that are more effectively implemented on a regional scale	*Note how met.*		

E. WATER CONSERVANCY BUDGET 2020/21

5103600 Water Conservation **Stephanie Duer**

Object Code	2019 Actual	2020 Actual	2020 Amended Budget	2021 Council Adopted	$ Change
2318 Public Relations	26,744	39,066	60,000	60,000	0
2324 Special Consultant	-3,013	27,128	50,000	155,000	105,000
2329 Other Professional & Tech Serv	45,412	37,500	185,000	163,092	-21,908
233601 Telephone Monthly Base	0	59	0	0	0
233605 Telephone Emergency Circuit	0	0	300	600	300
2522 Memberships	0	1,305	2,300	2,300	0
2523 In City Conventions & Workshop	125	0	500	500	0
2525 Out Of Town Travel	0	719	2,400	3,500	1,100
2590 Other Expenses	0	0	0	20,000	20,000
Charges/Services/Fees	**$69,267**	**$105,777**	**$300,500**	**$404,992**	**$104,492**
Charges and Services	**$69,267**	**$105,777**	**$300,500**	**$404,992**	**$104,492**
2211 Books	0	144	0	0	0
2221 Stationery Supplies	58	0	0	0	0
222599 Computer Supp-Controlled Fa	946	0	0	0	0
2275 Laundry & Linen Supplies	0	54	0	0	0
227701 Outside Ground Maint Supplies	39,953	38,743	0	95,840	95,840
2278 Grounds Supplies	133	0	50,000	50,000	0
227901 City Buildings Supplies	0	8,605	0	0	0
2293 Photographic Supplies	0	0	2,500	2,500	0
2298 Small Tools & Equipment	0	32	200	200	0
Materials and Supplies	**$41,091**	**$47,578**	**$52,700**	**$148,540**	**$95,840**
Operating & Maintenance Supply	**$41,091**	**$47,578**	**$52,700**	**$148,540**	**$95,840**

F. 17.16.092: WATER SHORTAGE ORDINANCE

A. Declaration Of Policy: Given the prevailing semiarid climate of the region, the limited water resources available to Salt Lake City, and the vitally important role an adequate supply of municipal and industrial (M&I) water plays in maintaining a healthy and safe environment in the community, it is hereby declared to be the policy of Salt Lake City that, during times of water shortage caused by drought, facilities failure or any other condition or event, M&I water usage within the city's water service area shall be managed, regulated, prioritized and restricted in such a manner as to prevent the wasteful or unreasonable use of water, and to preserve at all times an adequate supply of M&I water for essential uses.

B. Water Shortage Contingency Plan: The director of the department of public utilities shall cause to be prepared and implemented a water shortage contingency plan (the "plan"). Such plan may be included as part of, or prepared separately from, the water conservation master plan provided for in section 73-10-32, Utah Code Annotated, and shall be revised from time to time as conditions and circumstances warrant. The plan shall, among other things: 1) establish graduated stages of water shortage severity, and 2) establish appropriate M&I water use restriction response measures for each stage. The plan shall include guidelines and criteria for determining the appropriate stage to be implemented under various water supply, delivery, and demand conditions. Each plan stage of water shortage, and the accompanying use restrictions, shall be implemented by declaration of the mayor, upon the advice and recommendation of the director pursuant to the plan guidelines.

C. Compliance: Compliance with the water use restriction response measures called for under any applicable plan stage may be either recommended or mandatory, as specified in the plan. The plan may not provide for mandatory restrictions on residential or commercial customers until either: 1) the projected water supply from all sources is sixty percent (60%) or less of the average annual water supply, or 2) the director otherwise determines that, in the exercise of his or her best professional judgment, the city is unable to meet anticipated essential water needs without implementing such mandatory measures.

D. Enforcement: The director shall enforce compliance with all mandatory response measures set forth in the plan through the imposition and collection of civil fines, as provided in section 17.16.792 of this chapter. Nothing herein or in section 17.16.792 of this chapter shall prevent the city from exercising any other available means, either in law or equity, of enforcing compliance with the plan.

E. Plan Nonexclusive: The creation and implementation of the plan shall be in addition to, and not exclusive of, any other steps taken by the city from time to time to conserve water or manage limited water supplies, including mayoral proclamations issued pursuant to section 17.16.080 of this chapter. (Ord. 50-03 § 1, 2003)

G. 21A-48-055 Water Efficient Landscaping Standards

A. Submittal Requirements: In addition to the submittal requirements set forth in section 21A.48.030, "Landscape Plan", of this chapter the applicant shall complete any additional submittal requirements identified in the "Salt Lake City Landscape BMPs For Water Resource Efficiency And Protection". The landscape submittal packet shall be prepared by a licensed landscaped architect, licensed civil engineer, licensed architect, certified irrigation professional, or other landscape professional appropriately licensed or recognized by the state of Utah or Salt Lake City. It shall contain the submittal information listed in the "Salt Lake City Landscape BMPs For Water Resource Efficiency And Protection" unless specifically waived in writing by the zoning administrator in consultation with the public utilities department director.

B. Review Procedures: The following review procedures shall be followed for all landscaping plans and irrigation systems subject to this section:
   1. Landscaping plans shall be submitted concurrently with a development application.
   2. Backflow prevention plans shall be reviewed by the public utilities department.

C. Standards: All developments subject to this section shall comply with the following standards:
   1. Required Plants: All landscapes in developments subject to this section shall use plants identified in the "Salt Lake City Plant List And Hydrozone Schedule" or plants identified as being water wise or low water plants in other guides approved by the public utilities department as listed in the "Salt Lake City Landscape BMPs For Water Resource Efficiency And Protection".
   2. Plant Substitutions: Landscaping shall be installed consistent with the approved planting plans, but plant substitutions may be made provided that the substituted plants are from the same hydrozone and of similar plant type (grass for grass, tree for tree, etc.) as the plant originally specified in the approved landscape plan.

3. Hydrozones: All landscape plans shall identify and indicate each plant, and all plants shall be grouped into appropriate hydrozones as listed in the "Salt Lake City Plant List And Hydrozone Schedule" and as described in the "Salt Lake City Landscape BMPs For Water Resource Efficiency And Protection". Mixing plants from different hydrozones and with different water demands is strongly discouraged. Landscape areas with a mix of plants from different hydrozones shall be designated on landscape submittals as being of the hydrozone of the highest water demand plant within that irrigation zone.
4. Water Budget: All developments with a total landscaped area greater than one-half (1/2) acre must install an irrigation meter at the expense of the applicant and shall be assigned a tier 2 water target by the public utilities department.
5. Small Landscaped Areas: To prevent overspray and water waste, landscaped areas eight feet (8') or smaller in any perimeter dimension, including, but not limited to, park strips, parking lot islands, and landscaped areas separated by walkways from other landscaped areas, shall only be irrigated with a system designed to prevent overspray.
6. Soil Amendment/Preparation: Where appropriate, the use of organic soil amendments or additives, such as aged compost, are encouraged. See the "Salt Lake City Landscape BMPs For Water Resource Efficiency And Protection" for more information.
7. Mulch: Where mulch is required or allowed in a landscape plan by this section, it shall be installed and maintained at a minimum depth of three inches to four inches (3" - 4"). Fiber barriers and plastic sheeting that are not porous to air and water are prohibited.
8. Preservation Of Existing Specimen Trees: All specimen trees located within a landscape plan area shall be protected as provided in section 21A.48.135, "Private Lands Tree Preservation", of this chapter.
9. Water Features: Unless it is a natural water body or stream, recirculating systems shall be used for all water features such as fountains, ponds, reflecting pools, and other similar water features.
10. Irrigation Systems: Irrigation systems shall be designed, installed, and maintained to work efficiently, as defined in the "Salt Lake City Landscape BMPs For Water Resource Efficiency And Protection".
11. Backflow Prevention: Backflow prevention assemblies shall be designed and installed according to the standards as outlined in the "Salt Lake City Landscape BMPs For Water Resource Efficiency And Protection". (Ord. 16-16, 2016)

H. Public Utility Advisory Committee Minutes/Water Conservation Plan Discussion

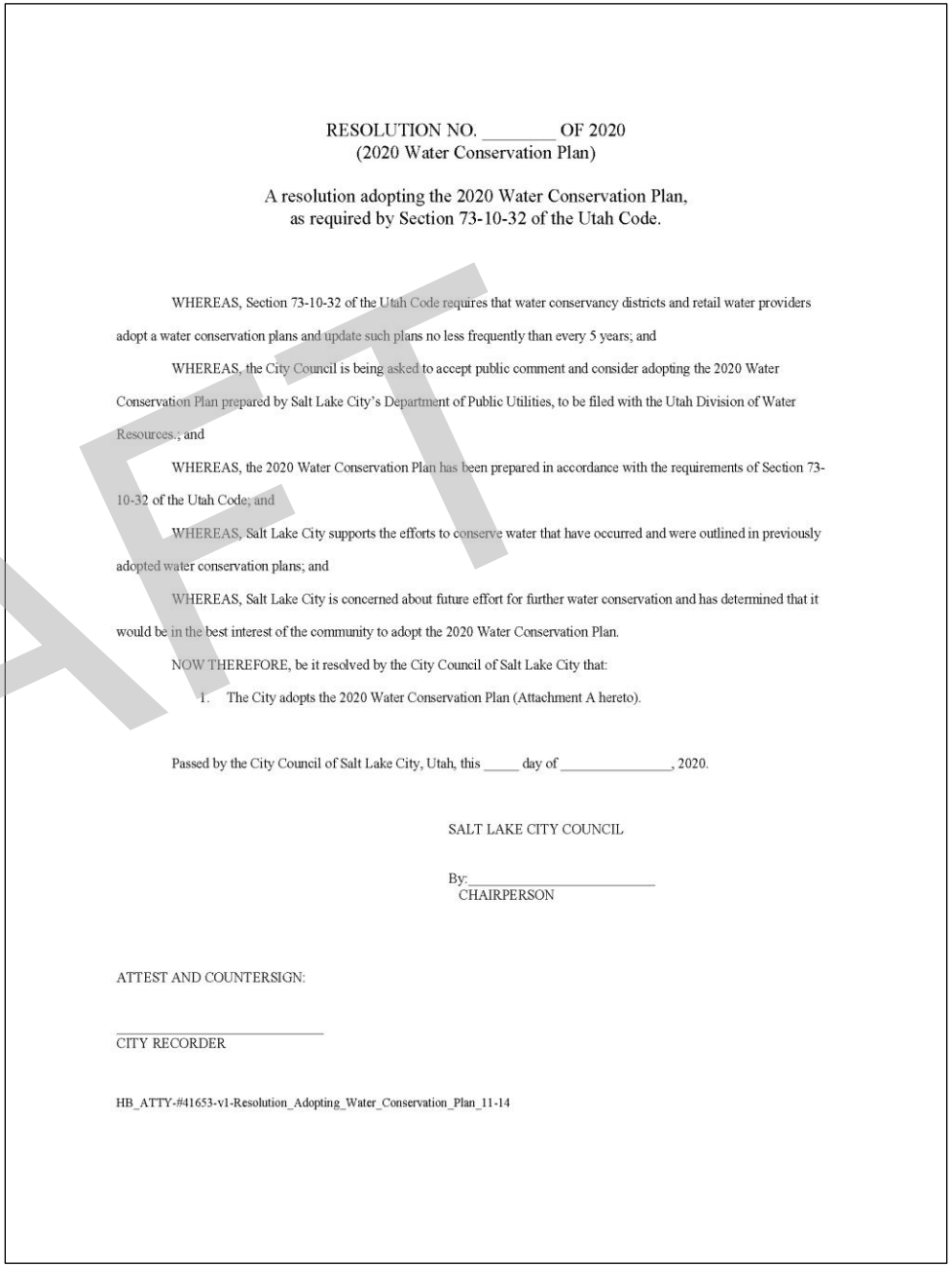
<This section has not been included as part of this draft but will be added after review and discussion with the Public Utility Advisory Committee.>

I. Metropolitan Water District of Salt Lake & Sandy Board Minutes/Water Conservation Plan Discussion

<This section has not been included as part of this draft but will be added after review and discussion with the Board of the Metropolitan Water District of Salt Lake and Sandy .>

J. Salt Lake City Council Transmittal, Minutes, and Resolution

<This section has not been completed as part of this draft. A template of the expected resolution is shown but will be replaced with the actual resolution and meeting minutes will be added after review and discussion with the Salt Lake City Council .>



RESOLUTION NO. _____ OF 2020
(2020 Water Conservation Plan)

A resolution adopting the 2020 Water Conservation Plan,
as required by Section 73-10-32 of the Utah Code.

WHEREAS, Section 73-10-32 of the Utah Code requires that water conservancy districts and retail water providers adopt a water conservation plans and update such plans no less frequently than every 5 years; and

WHEREAS, the City Council is being asked to accept public comment and consider adopting the 2020 Water Conservation Plan prepared by Salt Lake City's Department of Public Utilities, to be filed with the Utah Division of Water Resources.; and

WHEREAS, the 2020 Water Conservation Plan has been prepared in accordance with the requirements of Section 73-10-32 of the Utah Code; and

WHEREAS, Salt Lake City supports the efforts to conserve water that have occurred and were outlined in previously adopted water conservation plans; and

WHEREAS, Salt Lake City is concerned about future effort for further water conservation and has determined that it would be in the best interest of the community to adopt the 2020 Water Conservation Plan.

NOW THEREFORE, be it resolved by the City Council of Salt Lake City that:

1. The City adopts the 2020 Water Conservation Plan (Attachment A hereto).

Passed by the City Council of Salt Lake City, Utah, this _____ day of _____, 2020.

SALT LAKE CITY COUNCIL

By:_____
CHAIRPERSON

ATTEST AND COUNTERSIGN:

_____
CITY RECORDER

HB_ATTY-#41653-v1-Resolution_Adopting_Water_Conservation_Plan_11-14

K. LINKS AND REFERENCES

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L. GLOSSARY OF TERMS, ABBREVIATIONS, AND ACRONYMS

Acre Feet (af): A measurement to describe a volume of water; One acre-foot is the amount of water which would cover one acre of land to a depth of one foot; 325,851 gallons.

Action Plan: A more detailed, analytical course of action to implement programs, initiatives, or measures outlined in the Master Plan to achieve specific objectives, typically including information relating to time-lines for implementation, evaluative measures, and costs relating to staffing and/or materials; a component of the Annual Report.

Annual Report: This report will provide an evaluative update on existing programs, as well as outlining new conservation initiatives for the coming year, providing initiative timelines, estimated costs, participating groups, and responsible parties.

ASR: Aquifer Storage and Recovery

BCWTP Big Cottonwood Water Treatment Plant

Best Management Practice (BMP): For the purposes of Salt Lake City, a BMP is defined as a policy, program, practice, rule, regulation, or ordinance, or the use of devices, equipment, or facilities that meets either of the following criteria:

- An established and generally accepted practice among water suppliers that results in the more efficient use of water; or
- A practice for which sufficient data are available to indicate that significant conservation or conservation related benefits can be achieved; that the practice is technically and economically reasonable and not environmentally or socially unacceptable; and that the practice is not otherwise unreasonable for most water suppliers to carry out

CAP: Water Conservation Action Plan; these are plans submitted by City Divisions and community stakeholders and reflect commitments of actions and goals towards achieving further water conservation.

CCF: one hundred cubic feet; a unit of volume equivalent to 748 gallons of water and is the standard of measure used by the Department for billing purposes.

CCWTP City Creek Water Treatment Plant

Conservation: A set of strategies to solve the dilemma of providing water to people, both through supply and demand management; wise, efficient use of water by suppliers and customers.

CUP: Central Utah Project

CUWCD: Central Utah Water Conservancy District

Demand Management: Methods to encourage customers to reduce water demand, whether through a change in behavior, the implementation of water-saving technologies, or through the reduction or elimination of waste.

Evaluation: An overall determination of a conservation program or measure's effectiveness in achieving an articulated objective.

GPCD Gallons per capita per day; a unit of measure typically used to express the average number of gallons of water used by the average person each day in a water system. The calculation is made by dividing the total gallons of water used each day within a water system by the total number of people identified as residing within that water system. This calculation does not account for nor describe the industrial or commercial base within a community, nor does it account for individuals using water within the system, but not counted as residing within the system delivery area, such as commuters.

Goals: General statements of purpose for a measure or program; goals should compliment and reinforce other community and Utility goals.

Gray Water: wastewater generated in the household or at a place of work, excluding toilet wastes (black water), and including wastewater from bathroom sinks, baths, showers, laundry facilities, dishwashers, assuming there is no fecal material present.

JVWTP via Jordan Aqueduct Jordan Valley Water Treatment Plant via Jordan Aqueduct

LCWTP Little Cottonwood Water Treatment Plant

LEED Leadership in Energy and Environmental Design

Major Conveyance Study: A study conducted by Salt Lake City Department of Public Utilities to provide a report on existing and future supplies; major conveyances and storage facilities; and demand projections.

Master Plan: A conceptual framework to show direction of intent.

Measure: A device, incentive, or technology targeted at a particular type of end user or water use that, when implemented, will save water

Metrics: a systematic method of measurement or comparison; in relationship to the Water conservation Master Plan, a method to assess program need and effectiveness

mg Million gallons

mgd Million gallons a day

Monitoring: An ongoing process to assess results of an effort; steps in the process might include identifying what will be measured, what assumptions will be held, what estimates are agreed on, and what measuring tools will be used.

Multi-family Residential: A planning term used to describe a building where two or more families live in separate units under one common roof; for example, duplexes, apartments houses, townhouses, and condominiums.

Parleys WTP Parleys Water Treatment Plant

POMWTP via POMA Point of the Mountain Water Treatment Plant via Point of the Mountain Aqueduct

Practice: An action or system that is beneficial, empirically proven, cost-effective, and widely accepted in the professional community.

Program: A set of conservation practices and measures planned to be implemented together and intended to support water conservation efforts.

Project: Systemized efforts to achieve an objective.

Projected savings: An estimate of the amount of water which will be conserved because suppliers and/or customers are implementing certain practices.

Public Utilities: Refers to the Salt Lake City Department of Public Utilities

Retrofit: An umbrella term that refers to the modification of something; in the case of water conservation, retrofit refers to modifications to plumping fixtures or processes to increase efficiencies.

Supply Management: Methods by which a utility maximizes the use of available untreated water.

S**ustainability**: A decision-making concept describing development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

ULS: Utah Lake system

Unaccounted-for water: A term used to describe the various ways water is difficult or impossible to measure due to such issues as the evaporation of water in canals and reservoirs, under-registering of water through aging meters, leaks, fire suppression, and hydrant flushing.

Watershed: The major canyons of the Wasatch Mountain Range (the Wasatch Canyons), and their drainages that are a critical source of water for the communities served by the Salt Lake City Department of Public Utilities.

WCMP: Water Conservation Master Plan