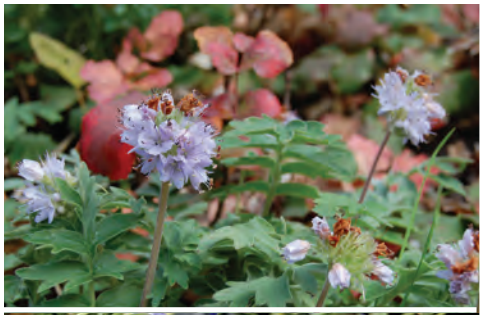


2014 SALT LAKE CITY WATER CONSERVATION MASTER PLAN

INTRODUCTION

INTRODUCTION

Living along the Wasatch Front provides us the opportunity to experience the wonderful juxtaposition of both the urban and natural environments with an ease not afforded many communities. The Wasatch Range is right over our shoulder, with its fir and aspen forests, the rocky crags, and of course, the pristine snow that falls and then melts and flows through its canyon streams. It is the water that flows from the watershed that constitutes the bulk of the water that is collected, treated, and delivered to our homes, businesses, industries, schools, and hospitals—sustaining our community and economy. It is the availability of this same water that ensures that we have trees to shade our streets, vegetables to eat, and lawns to play on. This water that flows from the watershed makes our life here not only endurable but bountiful.

Each time we use water is an opportunity make a deliberate choice to use this precious resource responsibly. Whether running a business, a manufacturing plant, an office, or a home, every day each one of us has an opportunity to affect our current and future water story.

The State of Utah requires water providers with connections exceeding 500 in number develop a water conservation master plan. However, long before this legislature came to pass, Salt Lake City Department of Public Utilities (Public Utilities) was committed to protecting the water resources put in its care. From watershed protection and management, to the delivery of high quality drinking water, Public Utilities has a history of ensuring that the community we serve has the water it needs to prosper.

However, we recognize that water is not an endless or consistent supply, and we are not the same community that we first served when Public Utilities was created over 125 years ago. Our population has grown, and we have grown our water supply in a manner both economically and environmentally sound. But our climate, now too, is changing, and we need to be even more innovative and thoughtful as we embark on planning for the next hundred years.

New dams, reservoirs, or miles of pipes from distant places are unlikely solutions to meet our future water challenges. Thoughtful planning and implementation over the history of Public Utilities has brought nearly every new source of water that is economically feasible and environmentally sustainable to our community. But there is another source—there is conservation. And that is why we write this plan. To help us carefully and thoughtfully identify the problems we face now and to guide us as a water provider and you as our customer to better, more sustainable solutions. This plan is our earnest attempt to identify the issues and answers to optimizing the opportunities connected to water conservation and water use reduction. We know that this is an iterative process and have designed this plan to reflect, even capitalize, on the fluid nature of our relationship to water. We also know, for all our planning, in the end, it is the water user who is our most important partner and asset in achieving our goals of maintaining a resilient, sustainable water supply, now and into the future.

HOW TO USE THE 2014 WATER CONSERVATION MASTER PLAN

The 2014 Water Conservation Master Plan (WCMP-14) is comprised of two main chapters and sixteen appendices. Chapter 1: Supply and Demand contains information relating to water supply and demand projections, primarily drawn from the Major Conveyance Study. Also provided is historic water demand as reported in the Annual Utah Lake System Report submitted by Metropolitan Water District of Salt Lake & Sandy (MWDSLS) to the Central Utah Water Conservancy District (CUWCD). This chapter also provides some data related to water supply, water demand, and climate change provided in "Planning for an Uncertain Future: Climate change Sensitivity Assessment Toward Adaptation Planning for Water Supply, " and other relevant references.

Chapter 2: Water Conservation Objectives, Initiatives, and Practices contains the discussion of determining the objectives of the water conservation program and criteria for program initiative and practice implementation. Also in this chapter is the list of newly identified conservation practices; the complete table of conservation practices; and the annotated index of conservation practices.
The appendices contain relevant ordinances, the water shortage contingency plan and its supporting documents, glossary, and service area map.

ACKNOWLEDGMENTS

Public Utilities wishes to thank the Mayor's Office, City Council, and the Public Utilities Advisory Committee for their continued support in helping to achieve our goals relating to water conservation and water use reduction. In addition, we would also like to thank the community for its efforts thus far in achieving our water conservation goals. If we have become a leader in Utah in water conservation, it is due to your efforts and the hard work of our department staff. It is only though our working together that we will accomplish what we set out to do—ensure a continued supply of high quality culinary water and a meaningful quality of life now and into the future.

[1]Salt Lake City Department of Public Utilities and Bowen, Collins & Associates. *Major Conveyance Study*. Salt Lake City, UT. 2007

[2]Metropolitan Water District of Salt Lake & Sandy. *Annual Report of Per Capita Water Use for the Calendar Year 2013*. Cottonwood Heights, UT

[3]Bardsley, Tim, et al. "*Planning for an Uncertain Future: Climate Change Sensitivity Assessment Toward Adaptation Planning for Public Water Supply*". Earth Interactions. Volume 17 (2013).

A critical aspect of conservation planning is supply and demand forecasting. It is through the forecasting of near and future projected supplies, analysis of current and future demand patterns, and an understanding of water users that we can identify and articulate the issues and solutions to achieving meaningful conservation goals. One of the tools used in the development of this document is the Major Conveyance Study, completed in 2007, with the purpose being to "plan and prepare for future growth in the service area" (2007 Major Conveyance Study-Executive Summary).

The Major Conveyance Study provides a report on existing and future supplies; major conveyances and storage facilities; and demand projections. Much of the data in this chapter, including that contained in some of the charts and graphs are from that plan. The analyses presented drawn from the Major Conveyance Study were not updated as a part of the development of the 2014 Water Conservation Master Plan.

Seven years have passed since the data provided relating to supply and demand as forecasted in the Major Conveyance Study was gathered and analyzed, and it is still valid. It would, however, be valuable to revisit the assumptions and assessments made in the Major Conveyance Study given the following current conditions:

- The state-wide goal of 25% reduction by the year 2050 has been modified by Governor Herbert to be met by the year 2025 and this affects the City's goal as stated in the Major Conveyance Study;
- Conservation reductions have exceeded expectations;
- The growing body of information gained since the study was completed on the impacts of climate change on both supply and demand;
- Alternative sources of water—such as secondary water—were not fully addressed; and
- The proposed North West Quadrant development identified in the Major Conveyance Study is still undergoing review and is currently unresolved, delaying impacts to demand projections articulated in the Major Conveyance Study.

1.1 SYSTEM DEMAND PROJECTIONS

The Major Conveyance Study developed demand projections by looking at four different factors that contribute to water demand: population, employment, industrial development, and irrigated acreage. Growth for each of these factors was estimated based on projections prepared by the Wasatch Front Regional Council and planning and zoning data provided by the City. These factors were then converted to system water demand based on their historic contributions. The results of this analysis are summarized in Table 1-1.

Table 1-1[2]
Estimated Service Area Demand (Based on 2000 Per Capita Use)

Year	Annual Demand (acre-ft)	Winter Day Demand (mgd)	Peak Day Demand (mgd)
2010	117,100	49.8	235.6
2015	124,400	53.8	248.1
2020	132,800	57.4	263.2
2025	143,400	62.0	282.9
2030	152,900	66.6	300.5

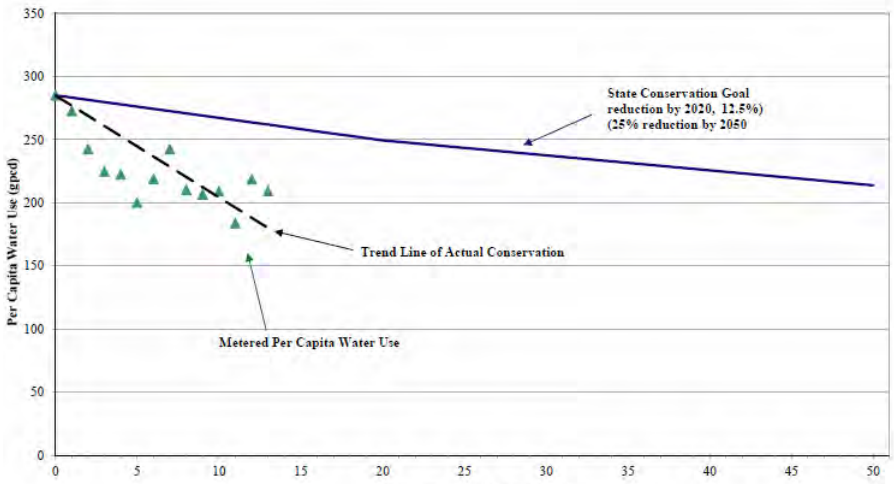
The demand projections summarized in Table 1-1 represent demand if customers continue to use water at the same level as they did in 2000. Through conservation programs, the City established a goal of reducing per capita water use 25 percent by the year 2050 (a reflection of the state-wide goal as set by the Governor's Office and the Division of Water Resources at the time of the Major Conveyance Study). If the City successfully reduces water use in accordance with their conservation goal, projected demand will be reduced to the levels shown in Table1-2.

Table 1-2[3]
Estimated Service Area Demand (With Conservation)

Year	Annual Demand (acre-ft)	Winter Day Demand (mgd)	Peak Day Demand (mgd)
2010	110,500	49.8	222.4
2015	113,800	53.8	227.3
2020	117,700	57.4	233.7
2025	124,400	62.0	249.9
2030	129,700	66.6	264.0

As of 2013, Public Utilities customers have met or exceeded this reduction goal for several years (see Chart 1-1). According to the Utah Lake System Report submitted by the Metropolitan Water District of Salt Lake & Sandy to the Central Utah Water Conservancy District, water demand in Public Utilities' service area has remained below the goals established by the State of Utah, whether set to be achieved in 2050 or 2025.

Chart 1-1[4]
Salt Lake Public Utilities Service Area Conservation Trend



1.2 ANNUAL WATER SUPPLY

Public Utilities' water supply reflects a portfolio that efficiently utilizes water from spring run-off while developing opportunities to maximize diversification to enhance supply stability. Water is obtained from spring run-off, stored in reservoirs, pumped from wells, and purchased from partnering water agencies. Within the Major Conveyance Study, annual water supply was identified as coming from a number of different sources:

- **Surface Water Sources –** Public Utilities holds water rights in several stream systems emanating from the Wasatch Mountains, and treats this surface water at its own treatment plants in Big Cottonwood, Parleys, and City Creek Canyons. It also treats water it holds rights to in Little Cottonwood Creek at a treatment plant owned by Metropolitan Water District of Salt Lake & Sandy (MWDSLS) in which Public Utilities is a member agency.

- **Ground Water Sources –** SLC holds water rights for a number of ground water sources. Some of these sources are artesian wells and springs that require little or no pumping and are used year round. The other ground water sources are pumped wells that are generally used only during the summer months to meet peak demands.

- **Preferred Rights in MWDSLS –** This category of supply consists of water received by Public Utilities through its membership in MWDSLS. Prior to 2005, this only included water stored in Deer Creek Reservoir. Since 2005, additional water has been added incrementally from storage in Jordanelle Reservoir.

In addition to existing supplies, the Major Conveyance Study anticipates the following sources to meet future demands:

- **New Wells –** Public Utilities has planned for the development of additional wells at various locations throughout its system. The City estimates development of current City rights could yield up to 12,000 acre-ft additional ground water.

- **Additional Surface Water Development –** A potential new surface water supply from Millcreek Canyon or from other surface water sources. Estimated production from new surface water sources is 3,300 acre-ft during dry years and 3,967 acre-ft during average water years.

- **Wastewater Reuse –** Public Utilities is actively pursuing opportunities for wastewater reuse.

- Probable reuse opportunities currently being studied include irrigation of two large golf courses and a park area near the wastewater treatment plant.

- **Utah Lake System Water –** Public Utilities has petitioned Central Utah Water Conservancy District (CUWCD) through MWDSLS for Central Utah Project (CUP) water in the planned Utah Lake System (ULS). The total volume of water MWDSLS has petitioned for is 8,600 acre-ft, to be divided between Public Utilities and Sandy City. For this analysis, it has been estimated that Public Utilities' portion of this water will be 4,750 acre-ft.

For planning purposes, Public Utilities utilizes supply projections from dry years to ensure that even during times of drought or water shortage, we can meet the needs of our community. Table 1-3 describes the projected reliable, dry year production of each category of supply described above.

Table 1-3[5]
Projected Dry Year Production for Public Utilities Service Area
Existing and Future Sources

Supply Category	Projected Dry Year Production – 2004 (acre-ft)	Projected Dry Year Production – 2030 (acre-ft)
Surface Water Sources	42,473	43,277
Base Wells and Springs	7,353	7,353
Peaking Wells	10,547	10,547
Preferred Rights in MWDSLS	22,910	42,910
New Wells	0	12,000
Additional Surface Water Development	0	3,300
Wastewater Reuse	0	5,000
Utah Lake System Water	0	4,750
Total	83,283	128,763

Water supplies not included in the Major Conveyance Study were water from alternative sources such as secondary water. The potential water quantity from these sources is not fully known, and also unknown is the water quality; costs of collection, treatment, and distribution; energy demands; or potential environmental impacts of these alternative sources. Further study of these alternative sources would facilitate a better understanding of their role in our water portfolio.

Water supply and demand are two sides of a coin, and water planning requires that both are considered. Chart 1-2 graphically compares the dry year annual supply discussed above against projected demands through 2030. Several observations can be made from this figure:

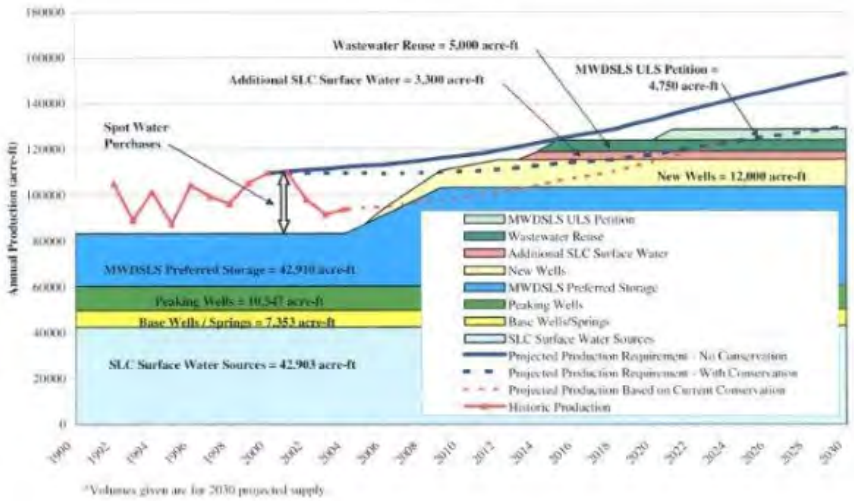
- Without water conservation, estimated demand is greater than estimated supply from 2015 through 2030; current conservation trends are anticipated to keep demand in line with anticipated supplies to 2030, though these projections do not account for changes in water supply or demand due to climate change.

- Historic dry year water supply has resulted in the occasional need to purchase spot water from other sources to meet that demand.

- Conservation during the past several years has been ahead of Public Utilities' conservation goal and has resulted in annual demands much less than historic averages.

- Current plans for additional surface and groundwater development, along with petitioned water from the ULS system and wastewater reuse are not quite adequate to meet projected 2030 demands without conservation. Additional sources, improved utilization of existing sources, or increased conservation will be needed to avoid a shortfall in dry year supply by the year 2030.

Chart 1-2[4]
Projected Production Requirements vs. Supply (Dry Year) for the Public Utilities Service Area



Not considered as part of the Major Conveyance Study in this dry year annual supply scenario is the impact of climate change on future supply and demand. Research and observations in the Western Region of the United States, as well as locally along the Wasatch Front, indicate that climate change is affecting water resources. The impacts include decreasing snowpack, extreme weather events, including prolonged drought and intense storms, shifts in the timing of runoff, changes in the type of precipitation (more rain/less snow), water quality degradation, and overall increase in demand due to warmer temperatures and a longer irrigation season. , Water conservation has a significant role in climate adaptation and mitigation. The Utility is conducting research on climate impacts and adaptation with academic institutions and a growing network of municipalities, federal agencies, and others. The research includes integrating climate models with water supply and system models. A major recommendation of this Plan is to conduct similar research and modeling specific to water demand to refine water conservation programming in the context of climate change impacts.

Chart 1-3[9]
Schematic of potential climate impacts to Public Utilities Service Area water supply and demand

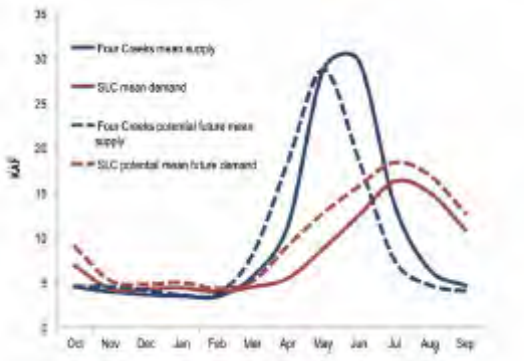


Chart 1-3 illustrates potential impacts to water supply with shifting supply and demand caused by climate change. The solid blue and red lines represent the 30 year mean of Public Utilities' water resources emanating from the four Wasatch streams, and total water demand, respectively. The dashed blue line shows the change in water supply from the Wasatch streams if temperatures increase 5° F, and the dashed red line is a hypothetical future demand scenario. Under current conditions, storage and groundwater are needed to make up the volume difference between late summer (~July–October) supply and demand (the solid lines). Under possible future conditions, additional storage and groundwater may be needed to make up for the larger late-summer volume difference between future supply and demand (the dashed lines).

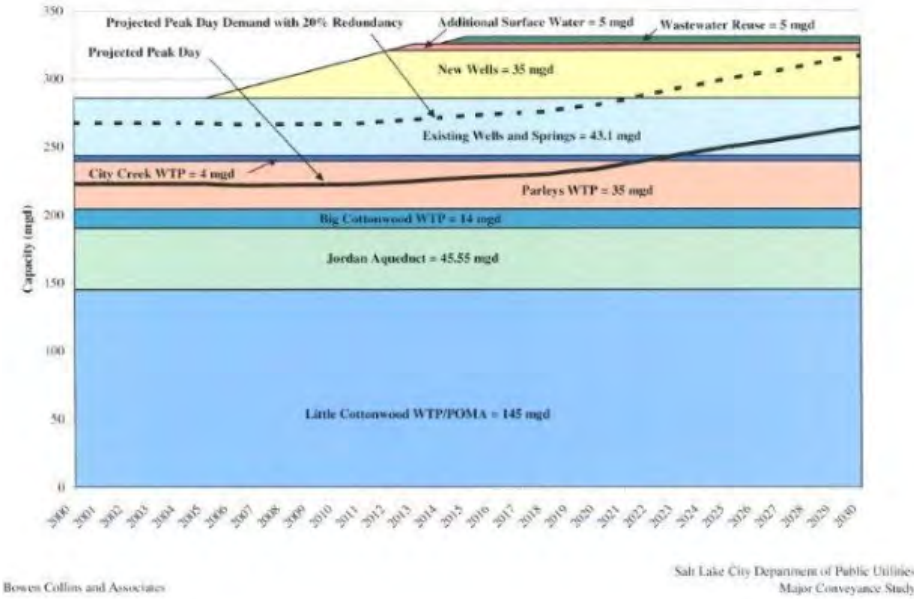
1.3 SYSTEM PRODUCTION CAPACITY

In additional to annual supply, it is important to consider the maximum production capacity of Public Utilities' water supplies. The existing production capacities are summarized in Table 1-4. Included in the table are two capacities for each source. "Peak Capacity" is the maximum capacity of the source without consideration of when or how the source is used. "Peak Day/Dry Year Capacity" is the maximum capacity of the source available to meet peak day demands. It is this latter capacity that should be used for planning as it considers the availability of each source during the late summer with dry year conditions.

Table 1-4[11]
Existing Source Capacities for Public Utilities Service Area

Source	Peak Capacity (mgd)	Peak Day/ Dry Year Capacity (mgd)
Little Cottonwood WTP	117.8	101.25 – 118[1]
Point of the Mtn WTP via POMA*	43.75	27 – 43.75[1]
Jordan Valley WTP via Jordan Aqueduct	45.55	45.55
Big Cottonwood WTP	38	14
Parleys WTP	35	35
City Creek WTP	13	4
Wells and Springs	52.6	43.1[2]
Total	345.7	286.65

Chart 1-4
Projected Public Utilities Service Area Peak Day Demand vs. Capacity (Late Summer)



1 Combined capacity of LCWTP and POMWTP via *POMA (Point of the Mtn Aquaduct) cannot exceed 145 mgd. Actual contribution from each source may vary from the amounts shown.
2 For planning purposes, peak day well capacity is reduced to account for wells usually used to satisfy secondary water demands (Sugar House and Dyers Inn Wells).
WTP: Water Treatment Plant

For planning purposes, it is recommended that redundancies be built into the system and that reliable source capacity be based on something less than 100 percent of peak capacity to account for potential source failure. To account for these possible reductions in source capacity, it is recommended that peak source capacity be at least 20 percent greater than projected peak day demands. A comparison of peak source production against projected demands is shown in

This figure shows water sources are adequate to satisfy projected peak demands through the year 2020, but that by 2030, peak demands will grow to require over 30 mgd of additional source capacity to maintain redundancy. It is projected that this additional need for capacity will be satisfied through the development of new wells, additional surface water sources, and waste water recycling.

1.4 Watershed Protection

Historically Salt Lake City has understood the importance of protecting its watersheds. Living on the edge of the Great Basin Desert and relying on limited water resources, city officials have taken action to protect its watershed and water rights as early as the 1880's. Watershed protection maintains the reliability of Public Utilities' water supplies, and is critical to the system's resilience. Public Utilities' watershed protection and water conservation programs are key partners, working together to serve and protect our water resources.

As the population along the Wasatch Front continues to grow and drinking water standards become ever more stringent, the one-hundred twenty-one year old practice of managing watershed land to protect drinking water quality seems as prudent as ever. That practice continues today through policy, operations, and the Watershed Lands Acquisition fund program.

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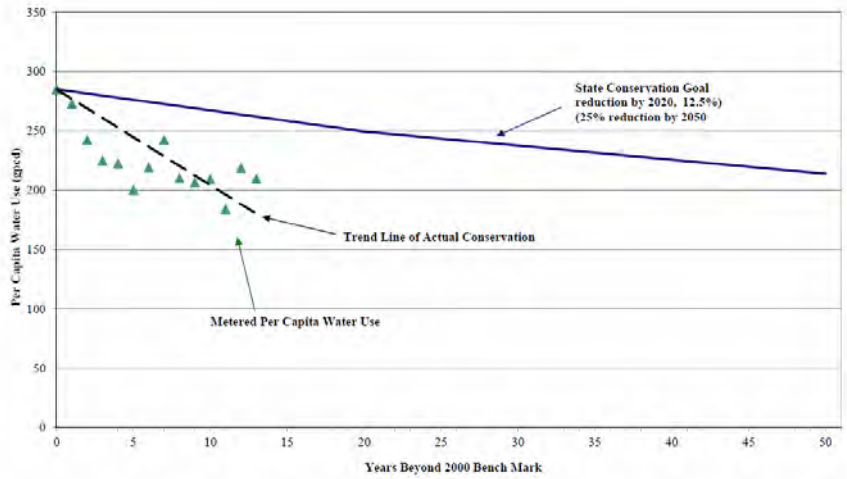
1 *Major Conveyance Study.* Salt Lake City Department of Public Utilities. 2007. Salt Lake City, UT.
2 ——*Major Conveyance Study*.
3 ——*Major Conveyance Study.*
4 Metropolitan Water District of Salt Lake & Sandy. *Annual Report of Per Capita Water Use for the Calendar Year 2013*. Cottonwood Heights, UT.
5 ——*Major Conveyance Study*.
6 ——*Major Conveyance Study*.
7 Bardsley, Tim, Andrew Wood, Mike Hobbins, Tracie Kirkham, Laura Briefer, Jeff Niermeyer, and Steve Burian. *"Planning for an Uncertain Future: Climate Change Sensitivity Assessment Toward Adaptation Planning for Public Water Supply"*. Earth Interactions. Volume 17 (2013).
2014 Water Conservation Master Plan
8 Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., "2014: Climate Change Impacts in the United States: The Third National Climate Assessment". U.S. Global Change Research Program, 841 pp. doi:10.7930/J0Z31WJ2.
9 ——"Planning for an Uncertain Future: Climate Change Sensitivity Assessment Toward Adaptation Planning for Public Water Supply".
10 ——"Planning for an Uncertain Future: Climate Change Sensitivity Assessment Toward Adaptation Planning for Public Water Supply".
11 ——"Planning for an Uncertain Future: Climate Change Sensitivity Assessment Toward Adaptation Planning for Public Water Supply".
12 ——*Major Conveyance Study.*

Water conservation planning and implementation is one of the critical strategies employed by Public Utilities to sustain our water supply in light of an ever growing population, increasing demand, and potential changes in short and long-term supplies due to weather and climate change impacts.

2.1 WATER CONSERVATION GOAL

Our current water conservation program goal reflects the state-wide goal of reducing consumption 25 percent by the year 2025 from the baseline year of 2000, as measured by gallons per capita daily consumption (gcpd). As reported in the 2014 Annual Report submitted by the Metropolitan Water District of Salt Lake & Sandy to the Central Utah Water Conservancy District, Public Utilities' service area water consumption for the year 2000 was 285 gcpd, and 2013 consumption is recorded to be 210 gcpd—a reduction of 26 percent. Consumption levels fluctuate from year to year, with some years experiencing greater or lesser reductions; however, the overall trend is towards a reduction in water use throughout our service area (Chart 2-1)

Chart 2-1[2]
Public Utilities Service Area Water Conservation Trend



Even with conservation trending in the appropriate direction, there is more opportunity to utilize our water resources responsibly and effectively. Examining current practices and identifying new ideas, methodologies, and technologies will ensure that we continue to reduce water waste and water use. In researching program plans and measures for the development of the 2004 Water Conservation Plan, the Utility recognized the value of implementing a conservation program that approached conservation on a variety of fronts, an approach still valued as we developed the 2014 plan. Implementing a three-pronged approach—education, policy, and pricing—Public Utilities has successfully led the community in a fifteen-year trend of water-use reduction. The goal of the 2014 plan is to continue to implement program measures for each customer class, in each of these three approaches. It is this targeted methodology that has created the balance of tools, incentives, and policies that have helped our community to continue, and improve, on their conservation record.

While the goals of the water conservation program remain generally unchanged since the program began—to facilitate water-use reductions, increased water savings, improve water-use efficiencies, and help to sustain our water supply—the conservation program has expanded and the methods by which we accomplish these goals have become more varied. Our understanding of our customers' relationship to water has grown, as has their expectation of what our program provides and what we can together accomplish.

Education, pricing, and policy are still cornerstones in an effective water conservation program, but we also look to research and analytics to help inform, guide, and re-frame program practices. We want to know what works here, in our service area, and why, so that we continue to achieve our conservation goals even as we grow as a community and we face uncertainties relating to climate change.

2.1.1 Definitions

Throughout this document and in particular, within this chapter, are a collection of terms and labels used to describe the conservation program. Though these terms can be found in the glossary, here is a quick reference to increase the utility of this chapter.

- **Water Conservation Program** refers to the entirety of water conservation actions undertaken by the Utility;

- **Water Conservation Master Plan** is the description of the key components of the conservation program, including program goals, objectives, initiatives and practices, sustainability matrix, water shortage contingency plan, plant lists, summaries or linkages to other key Utility plans; and other supporting materials;

- **Initiatives** describe the broad categories that unite program actions, or practices, by commonalities such as practice focus, goals, or methodologies; and

- **Practices** are the discreet, individual program actions intended as the mechanisms by which we attain our water conservation goals.

2.2 PROGRAM OBJECTIVES

During the 2009 WCMP Update process, a subcommittee of the Public Utility Advisory Committee (PUAC) met with the Public Utility staff and identified objectives to assist in the selection and implementation of program practices; objectives still adhered to in the 2014 plan:

- Ensure adequate supply of high quality drinking water for our current and future customers;
- Improve the mechanisms by which water usage by customer category may be benchmarked, monitored, and evaluated;
- Promote an awareness that water conservation, use reduction, and waste reduction are the responsibilities of all water consumers;
- Strive for equity among customer categories for meeting water use goals;
- Continue to maximize opportunities for partnerships between Public Utilities and other institutions, organizations, agencies, and interested groups;
- Utilize funds and labor hours wisely, protecting and honoring our responsibilities to the community we serve;
- Plan for scarcity to ensure minimal disruption and a smooth transition to reduced consumption;
- Implement pricing practices that strive to maintain financial stability while delivering a strong conservation message; and
- Defer expansion of existing facilities and the acquisition of new water sources through the wise and selective use of existing water supplies.

It is the desire of Public Utilities that water conservation practices meet not only the goals expressed in this plan, but also that they are consistent with other goals of the utility, the City, and community relating to resource management. Another stated goal is that this plan be considered in the drafting and implementation of other Public Utilities and City plans. With this in mind, secondary objectives were identified and continue in use as guides in the2014 plan development and implementation process:

- Promote awareness that Salt Lake City, while situated near the Wasatch watershed, is also at the edge of the Great Basin Desert and receives on the average only 15 inches of precipitation annually;
- Protect our watershed and water sources;
  Preserve habitat and recreational opportunities when those opportunities are synergistic with the goals of resource protection and conservation;
- Demonstrate Public Utilities' commitment to responsible, environmentally sound, and efficient use of all natural resources;
- Establish Public Utilities as a role model within our community and to other communities in implementing, practicing, and achieving water conservation ; and
- Select solutions which do not result in the waste of other limited resources or lead to decreases in environmental quality.

2.2.1 Practice Selection Criteria

The variety of water conservation practices is extensive, and while each practice provides an opportunity for reducing demand, it is important that we select those that optimize demand-reduction potential within the framework of limited program resources. It is also important that within the body of program practices there is fairness and equity in implementation and that there are no legal impediments to implementation.

Criteria were identified in order to facilitate practice selection, identification of benchmarks, and evaluation of practice effectiveness. The criteria were then organized into the following categories: Legal and Institutional; Natural Resource and Environment; Equity and Fairness; Fiscal; and Ease of Implementation.

Legal and Institutional
- Ensure compliance with
  - Federal legislation
  - State statutes and administrative procedures for regulation of water supply and water use, including water rights laws, administrative regulations and procedures, environmental permits, water and energy programs, building and plumbing codes, and state legislation
  - Interstate compacts, court decrees, and local water agreements
  - City ordinances, resolutions, agreements, and programs, including current programs; rate structures and policies; land use and planning; and building and plumbing codes
  - Verify Utility/Municipality jurisdiction and/or the existence of supporting ordinances

Natural Resources and Environment
- Extends water supply
- Protects drinking and stormwater quality
- Reduces energy usage and carbon footprint
- Complements Watershed Management Plan and Major Conveyance Study, and other Utility/City plans
- Minimizes or avoids unintended negative impacts to the environment Provides for sustainable water savings

Equity and Fairness
- Creates equity for responsibility of water use reduction and conservation among customer categories
- Considers equity and fairness in program costs, benefits, and burdens
- Water users within and between customer classifications have a perception of program fairness

Fiscal
- Defers or delays capital improvement projects relating to increased demand
- Defers or delays the need to purchase new water or delay development of new water source (other than conserved water)
- Short and/or long-term Implementation costs are fiscally responsible and/or sustainable
- Opportunities exist for outside funding or to leverage funding sources

Ease of Implementation
- Measurable, positive outcomes can be achieved and documented
- Achievable with existing staff
- Opportunities for partnership enhance feasibility of implementation and success
- Political and public support are either available or achievable

2.3 WATER CONSERVATION PRACTICES

The 2014 Water Conservation Master Plan Initiatives represent broad approaches, such as education, economics, and policy. Within those initiatives are specific program actions—or practices—intended to assist the utility, customers, and the community in reducing water demand and eliminating water waste. Many of these practices, such as universal metering and commercial leak notifications, have been utilized for decades and predate a formal conservation program. Others are new and reflect the evolution of the conservation program, the expectations of the community, and improved technologies; SLC Gardenwise and the Irrigation Interventions Study are two such examples.

To facilitate review and discussion, the Water Conservation Initiatives and Practices are presented in three sections and two formats. Table 2.1 is a listing of program practices not included in the 2009 Water Conservation Master Plan; Table 2.2 is a listing of all program practices, both those currently being implemented and those proposed for further evaluation; and Table 2.3 which provides an annotated listing of all practices in Table 2.2, with expanded explanations. The inclusion of practices is guided by criteria established in earlier master planning processes and relies on the experiences of other relevant conservation programs.

Program practices are divided into seven initiatives that reflect practice commonalities such as outreach or research. The seven program initiatives follow:

- **Outreach:** practices that aim to motivate or inspire behavior change; those that provide direct information on what changes to make and techniques to utilize for change; and classroom measures. These practices are frequently referred to as "soft measures" as they are not tied to pricing, regulations, capital improvements, or tangible outcomes;

- **Economic:** practices that provide financial or economic motivators either through avoided costs or through rebates;
- **Utility:** practices aimed at infrastructure improvements, leak detection, or actions taken by the City;
- **Law and Policy:** practices that either provide incentive to change or mandate change by either allowing or prohibiting a behavior;
- **Research:** practices that, while not providing direct conservation, inform our knowledge base and in so doing enhance the opportunity for the success of other practices; and
- **Metrics:** practices that formalize the process for evaluating the effectiveness, efficacy, or popularity of a practice or set of practices.

Within each initiative, practices are numbered and named. Table 2.2 provides a brief description, while the annotated index provides greater detail (Table 2.3). Within the table, customer classification(s) indicate to which customer group a particular practice is applied. Practices may be applied to Single-Family Residences (SFR); Multi-Family Residences (MFR); Commercial & Industrial (C&I); or Government and Institutions (Gov), or a combination. For example, brochures can be developed for issues pertaining to single-family households, public institutions, and industry, while water conservation certification may only apply to accounts in the Commercial & Industrial classification.

The 2014 Master Plan adds two columns: Practice Timeline and Funding/ Partnerships; the former providing a chronology of a practice, and the latter identifying practice budget, funding sources, and partnering organizations. .

2.3.1 Changes in Labeling

The 2009 WCMP included initiatives under the heading of "Education," "Finance," "Institutional," and "New Customers." In the 2014 plan, "Education" was changed to "Outreach," a title more accurately reflecting the broad scope of this initiative. "Finance" was changed to "Economic" so as to lessen confusion with Finance Section policies and to reflect the broad nature of this initiative. "Institutional" was changed to "Utility" to reduce confusion with the institutional category of water users and to more accurately reflect the focus of these practices, which are centered on the Public Utility as either the water provider or a water user. A review of the practices in the "New Customers" category determined that they were well suited to the Outreach or Law/Policy Initiatives, and so were moved into the appropriate category.

2.3.2 New Conservation Practices

Since the 2009 Water Conservation Master Plan, new practices have been identified that meet the criteria of the program objectives and so have been added to the Practices Index (see Table 2.2 and 2.3). O-24 Volunteers in the Gardens; R-7 Irrigation Interventions Study; and R-8 Water MAPSTM Study are currently being implemented.

Of special note is the expansion of practices in the "Research" initiative, reflecting growing partnerships with academic institutions and a need for deepening our understanding of water supply, demand, and forecasting. A new initiative has been added—Metrics. This initiative is intended to enhance our evaluation of program practices, enabling us to better assess the effectiveness and efficacy of our conservation program.

Table 2-1
New 2014 WCMP Conservation Practices

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Funding/ Partnerships
		SFR	MFR	C&I	Gov		Current	Consider	Dates Implemented	
Outreach Initiative										
O-24	Volunteers in the Gardens	√	√	√	√	Organize volunteer events in the Demonstration Gardens to create learning opportunities and to assist in maintenance	√		Spring 2012	The volunteer coordination of this practice is funded through the Mayor's Office as *Service in the City*
Economic Initiative										
E-6	Tiered Base Rate	√	√	√	√	Rate structuring technique that encourages use reductions while providing revenue stability.		√	Rate structure study planned for 2014/15	
Utility Initiative										
U-11	Ready-read Meter Technologies				√	Research new technologies that allow for instant reading of meters		√		
Law and Policy Initiative										
LP-11	Alternative Water Sources				√	Establish policy that guides discussion and		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Funding/ Partnerships
		SFR	MFR	C&I	Gov		Current	Consider	Dates Implemented	
	Use Policy					implementation pertaining to alternative water sources, including secondary water use, reuse, etc.				
Research Initiative										
R-7	Irrigation Interventions Study	√				Investigate impediments and barriers for homeowners in correcting irrigation system defects	√		To be completed 5/2015	funded in FY2013-14 cons. budget; matched by USU
R-8	WaterMAPS	√			√	Utilize technology developed by USU to analyze potential water-use savings in landscape settings	√		Study began August 2014	Funded in FY2014-15 cons. budget; matched by USU
R-9	Conservation and Major Conveyance				√	Analyze the impacts of conservation on the assumptions of the Major Conveyance Study		√		
R-10	Conservation, Climate Change, and Resiliency	√	√	√	√	Review research on climate change; evaluate impacts of conservation on risk reduction and mitigation		√		
R-11	Alternative Water Sources Study	√	√	√	√	Study the impacts of alternative water sources		√		
R-12	Commercial and			√		Evaluate C&I was use		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Funding/ Partnerships
		SFR	MFR	C&I	Gov		Current	Consider	Dates Implemented	
	Industrial Water Demand Study					patterns and water-use reduction innovations				
R-13	Behavior and Policy Study	√				Conduct a study linking consumer behavior and policy development		√		
R-14	Large Water User Intervention Study				√	Identify and implement irrigation interventions to maximize irrigation efficiencies and reduce water waste	√		Begun Sept 2014	Initial partners include USU and SL School District. Additional funding being sought.
Metrics Initiative										
M-1	Customer Communication	√	√	√	√	Develop methods for determining practice reach		√		
M-2	Program Effectiveness	√	√	√	√	Where appropriate, develop methodology to measure practice impact		√		
M-3	Projected Demand	√	√	√	√	Develop baseline and projected customer-class demand projections		√		
M-4	Capacity/ Distribution Impacts	√	√	√	√	Study impacts of conservation on current and future infrastructure		√		

2.3.3 2014 Water Conservation Initiatives and Practices Table

Follow is a table (Table 2.2) of all water conservation initiatives and practices either currently implemented or to be considered for implementation. The list is intended as a quick reference and provides the practice reference number, practice title, and a brief description. For more information and discussion of these practices, please refer to the Annotated Index Table 2.3.

Table 2-2
Water Conservation Office Program Initiatives and Practices Table

Note: Account Classifications Abbreviations SFR: Single Family Residential
MFR: Multifamily Residential
C&I: Commercial and Industrial
Gov: Institutional (some GOV measures are specific to only SLCDPU; please refer to measure description)

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
Outreach Initiative										
O-1	Brochures	√	√	√	√	Develop and distribute brochures relating to water conservation	√		ongoing	$10,000 to mail
O-2	Commercial and Industrial Certification			√		Develop and implement a water-wise certification program for commercial and institutional water customers		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
O-3	Commercial Industrial Conservation Plans			√		Encourage and publish water conservation plans from commercial, institutional, and non-profit customers		√		
O-4	Classroom Programs	√	√			Develop package programs and activities to facilitate classroom learning focused on water conservation		√		
O-5	Demonstration Gardens	√	√	√	√	Design and construct demonstration gardens throughout service area	√		6/2001 9/2006 7/2014	Assorted
O-6	*SLCTV 17 GardenWise*	√	√	√	√	Develop and distribute water conservation-focused programming for SLC TV17	√			With SLC-IMS
O-7	*It's a No Drainer* Campaign	√	√	√	√	Program educates consumers of the importance of controlling what does into a sink drain or into a garbage disposal unit	√			Funds for brochures provided through pretreatment division
O-8	Landscape and Irrigation Style Guide	√	√	√	√	Develop and distribute a guide for enhancing water-use efficiencies in landscapes and for irrigation systems	√		Oct 2011 (see E-16)	in-kind for Bureau of Reclamation Grant (see O-15)

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
O-9	Landscape Assessment and Check-ups	√				Program partners with Master Gardeners to provide residential landscape assessments to enhance water efficiencies		√		
O-10	Landscape Plant List	√	√	√	√	Develop and distribute a water-wise plant list specific to local weather and soil conditions	√		Updated 1/2014	Part of in-kind contribution for Bureau of Reclamation Grant (see O-15
O-11	Landscape Templates	√	√	√	√	Develop and distribute quick-guide references for commercial, residential, and parkstrip landscapes		√		Part of in-kind contribution for Bureau of Reclamation Grant (see O-15
O-12	Lawn Sprinkler Check-ups (Sprinkler Audits)	√	√	√	√	Promote and conduct lawn sprinkler check-ups for residential, commercial, and institutional properties	√		(S) 1988; Partnered with USU 2007	Metro $50,000
O-13	Outdoor/Indoor Water-use Counter	√	√	√	√	Develop a web-site water use counter to encourage customers to monitor their water use daily/weekly		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
O-14	Parkstrip Plant List	√	√	√	√	Develop and distribute a water-wise plant list for park strip areas	√		Updated 1/2014	Part of in-kind contribution for Bureau of Reclamation Grant (see O-15)
O-15	Plant list database (*SLC GardenWise*)	√	√	√	√	Convert landscape and parkstrip plant list to database format.	√		Summer 2014 (SLC *GardenWise*)	Funded through BoR grant
O-16	Planting and Maintenance Guide (SLC Landscape BMPs)	√	√	√	√	Develop and distribute a maintenance guide for non-traditional landscapes, and for water-wise lawns	√		10/2011 (see E-8)	Part of in-kind contribution for Bureau of Reclamation Grant (see O-15)
O-17	Private Garden Project	√	√	√	√	Promote institutional, commercial, and residential properties to be water-wise demonstrations		√		
O-18	Residential Leak Detection and Repair	√	√			Provide low or no-cost leak detection and repair to qualifying households		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
O-19	Specialized Garden Guides and Plant Lists	√	√	√	√	Develop and distribute plants lists and guides for bio-swales, rain gardens, roof-top gardens, and riparian corridors	√		Summer 2014	Part of in-kind contribution for Bureau of Reclamation Grant (see O-15)
O-20	Virtual Water Conservation Garden	√	√	√	√	Develop virtual garden tours on web site and link with plant data base	√		6/2014 (*SLC Gardenwise*)	Funded through BoR grant (see O-15)
O-21	Water Savings Virtual Meter	√	√	√	√	Develop a web-based virtual water reservoir to tally water savings for individual accounts and service-area wide		√		
O-22	*Waterpedia*	√	√	√	√	Develop a web site pertaining to water which could be used in classroom and by water customers; pilot project to focus on water conservation with the intent of linking all utility public outreach learning		√		
O-23	Workshops and Classes	√	√	√	√	Workshops on water conservation techniques and strategies	√			

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
O-24	Volunteers in the Gardens	√	√	√	√	Organize volunteer events in the Demonstration Gardens to create learning opportunities and to assist in maintenance	√		Spring 2012	The volunteer coordination of this practice is funded through the Mayor's Office as *Service in the City*
Economic Initiative										
E-1	Incentives	√	√	√	√	Promote incentive programs as available; investigate opportunities for new programs		√		
E-2	Irrigation Meters and Targets	√	√	√	√	Establish targets for accounts with dedicated irrigation-only meters	√			
E-3	Rate Structuring	√	√	√	√	Utilize a rate structure to encourage responsible use of water	√		2003	
E-4	Rebates	√	√	√	√	Promote rebate programs as available; investigate opportunities for new programs	√			periodically available through the CUWCD

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
E-5	Volumetric and loading Sewer Charge	√	√	√	√	Base sewer rates on metered winter water usage	√		2000	
E-6	Tiered Base Rate	√	√	√	√	Rate structuring technique that encourages water use reductions while providing revenue stability		√		
Utility Initiative										
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	
U-2	Landscape Upgrades				√	Inventory and assess Utility properties for water efficiencies and make necessary upgrades		√		
U-3	Loss Prevention				√	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	
U-4	Monthly meter reading and billing	√	√	√	√	Provide timely and accurate information to customer to increase awareness of water use	√		1930s	

WATER CONSERVATION OBJECTIVES, INITIATIVES, and PRACTICES

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
U-5	Public Utility Advisory Committee				√	Standing citizen committee to advise in conservation policy and programming	√		1928	
U-6	SLC Dept/Div Conservation Plans				√	Encourage and publish water conservation plans from City Departments and Divisions		√		
U-7	Universal metering and meter replacement	√	√	√	√	Each account is metered and each residential meter is replaced every fifteen years	√		1980s	
U-8	Water Loss Audit				√	Complete loss audit based on new AWWA standards and implement findings	√		2000s	
U-9	Water Re-use Pilot				√	Implement a water re-use pilot project		√		
U-10	Conservation/Sustainability Matrix Update				√	Update the conservation/ sustainability matrix developed in the 2009 WCMP		√		
U-11	Ready-read Meter Technologies				√	Research new technologies that allow for instant reading of meters		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
Law and Policy Initiative										
LP-1	Graywater	√	√	√	√	Research issues regarding Graywater use and establish appropriate policy		√		
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	
LP-3	Irrigation Efficiency Standards		√	√	√	Develop and adopt Irrigation Efficiency Standards for all commercial and institutional properties	√		7/2014 Landscape Ord/new construction	
LP-4	Landscape Ordinance	√	√	√	√	Amend existing landscape code to accommodate and encourage water-wise landscaping in front yards	√		2014	
LP-5	Parkstrip Code	√	√	√	√	Develop and adopt ordinance to accommodate and encourage non-traditional, lower water plantings	√		2004 (currently in review)	

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
LP-6	Rainwater Harvesting				√	Research issues relating to rainwater harvesting and support appropriate legislation	√		Adopted by State 2010 (SB 32)	
LP-7	Rain Sensor Ordinance and Policy			√	√	Require all properties with automated outdoor sprinkler systems to be fitted with rain sensors	√		A component of 2014 water efficient landscape code	
LP-8	Squandered Water Ordinance	√	√	√	√	Develop and adopt ordinance prohibit-ing the squandering of water		√		
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		√		
LP-10	Water Shortage Contingency Plan	√	√	√	√	Identify specific calls for action during water shortages and emergencies	√		2003	
LP-11	Cool-Season Turf Limit			√	√	Limit amount of cool-season turf as a percentage of total landscapeable area		√		
LP-12	Irrigation-only Meters		√	√	√	Review existing policy and make recommendations		√		
LP-13	Sub-metering on New Multi-Family Dwelling Units		√			Require all new multi-family dwelling units to be sub-metered		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
LP-14	Alternative Water Sources Use Policy				√	Establish a policy that guides discussion and implementation pertaining to alternative water sources, including secondary water		√		
Research Initiative										
R-1	EPA Residential Study	√				Measure and evaluate water efficiency in newly constructed homes	√		Completed 2011[iii]	Funded thru EPA grant, 8 other cities and Aquacraft Inc.
R-2	Irrigation Controller Study		√		√	Test and evaluate weather based irrigation controllers	√		On-going (USU)	
R-3	Landscape Inventory	√	√	√	√	Inventory alternative landscapes and quantify savings		√		
R-4	Plumbing Fixtures Inventory	√	√		√	Inventory upgrades in plumbing fixtures and calculate quantity of remaining, older fixtures		√		
R-5	Technical Water Savings Study	√	√	√	√	Calculate maximum technical water savings potential		√		
R-6	Water Softener Study	√	√	√	√	Research effects on water softener use on waste stream		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
						quality and impacts on water re-use water quality				
R-7	Irrigation Interventions Study	√				Investigate impediments and barriers for homeowners in correcting irrigation system defects	√		To be completed 5/2015	funded in FY2013-14 cons. budget; matched by USU
R-8	WaterMAPS	√			√	Utilize technology developed by USU to analyze potential water-use savings in landscape settings	√		Study began August 2014	Funded through 2014-15 cons. budget and USU
R-9	Conservation and Major Conveyance				√	Analyze the impacts of conservation on the assumptions of the Major Conveyance Study		√		
R-10	Conservation, Climate Change, and Resiliency	√	√	√	√	Review existing research on climate change; evaluate impacts of conservation on risk reduction and mitigation		√		
R-11	Alternative Water Sources Study	√	√	√	√	Study the impacts of alternative water sources		√		
R-12	Commercial and Industrial Water Demand Study			√		Evaluate C&I was use patterns and water-use reduction innovations		√		

No.	Practice	Account Classifications				Brief Description	Practice Timeline			Cost/ Funding
		SFR	MFR	C&I	Gov		Adopt	Evaluate	Dates Implemented	
R-13	Behavior and Policy Study	√				Conduct a study linking consumer behavior and policy development		√		
R-14	Large Water User Intervention Study				√	Identify and implement irrigation interventions to maximize irrigation efficiencies and reduce water waste	√		Begun Sept 2014	Initial partners include USU and SL School District. Additional funding being sought.
Metrics Initiative										
M-1	Practice Reach	√	√	√	√	Develop methods for determining practice reach		√		
M-2	Program Effectiveness	√	√	√	√	Where appropriate, develop methodology to measure practice impact		√		
M-3	Projected Demand	√	√	√	√	Develop baseline and projected customer-class demand projections		√		
M-4	Capacity/ Distribution Impacts	√	√	√	√	Study impacts of conservation on current and future infrastructure		√		

2.3.4 Program Initiatives and Practices Annotated Index

This section provides greater detail of the program initiatives and practices contained in the conservation master plan. It is organized in the same manner as the Program Initiatives and Practices Table, with each conservation practice within a Program Initiative. To facilitate the locating of a specific practice from Table #.#, each practice has been assigned a number that corresponds to both the table and the following discussion text.

Note: an asterisk (*) indicates a current practice.

OUTREACH INITIATIVE

O-1 Brochures *
Currently we have produced three brochures (see appendix for samples). In order to address the needs of a diverse customer base, the brochure inventory should be expanded to include the topics listed below, though other topics ought to be considered as new needs are identified.

- Indoor Water Conservation
- Revised Landscape Ordinance
- Water-wise Commercial Landscaping
- GardenWise
- Demonstration Garden Guides

O-2 Commercial and Industrial Certification

Develop and implement a voluntary water-wise certification program for commercial and institutional water customers. The certification process may include: indoor and outdoor audits; identification and adoption of general or industry-specific Best Management Practices; adoption and implementation of a Conservation Plan; and support and promotion of water conservation measures. Certified businesses would be identified on www.slcgov.com/waterconservation.com and receive certificate or decal for display.

This measure features opportunities to expand into other Department interests, such as stormwater and waste water discharge, or watershed and river stewardship. Similar certification processes could be established within these areas, creating layers of certification and recognition for participating businesses. Criteria for certification should support and encourage LEED and other similar standards for C&I construction so long as health, safety, and water protection standards established by the Department are met.

This measure has potential linkages with the e2 Business Program currently being supported by the Division of Sustainability and coordination between these programs could enhance both.

O-3 Commercial and Industrial Conservation Plans

Invite businesses to develop and implement Water Conservation Plans. Program details may include: plan templates; Best Management Practices; conservation goals; monitoring, reporting; publication or plans; water-use reductions tabulated on website. Program intent is to demonstrate to the public the commitment of the business community to act as partner in achieving our long-term conservation goals.

O-4 Classroom Programs

Currently, SLCDPU and Utah educators depend on the Utah State Division of Water Resources Office of Conservation to offer classroom programming to expand our children's understanding of what it means to live in an arid climate, how water is delivered to their homes, and how to use this previous resource wisely. Through the State's WET Program and the Living Planet Van, the Division of Water Resources provides classroom experiences to school aged children with a program focus of the water cycle and the regional water profile. Lessons and strategies for water conservation are included within these programs but are not the programs' primary focus. Because WET and the Living Plan Vans are statewide programs, they are not specific to the Salt Lake Valley or SLCDPU's service area water supply and demand issues.

Increasing demands on the State's resources for expanding these existing programs, and increasing water usage and demand along the populated Wasatch Front, has created a need to develop an educational program focused on the Wasatch Front, and specifically SLCDPU's service area. To that end, SLCDPU, the Division of Water Resources, and local educators are working together to explore opportunities regarding the development of a local water conservation education program for school-aged children.
Proposed program objectives include a heavy emphasis on water conservation techniques and strategies, with the underlying goals of educating students

and teachers on the value of our water resources, the need to protect our water sources; and the process for delivering water to SLCDPU service area. Program elements could include the development of an educational website, curriculum planning for use in Salt Lake classrooms, and specific classroom and field events.

The aim of this program measure is four fold:

1. To forge a partnership between SLCDPU and local educators, to ensure students and educators develop or deepen their understanding of water use characteristics and issues specific to Salt Lake City, and how that use affects water availability, rates, and policy implementation. An agency/ educator partnership would allow the opportunity to take broad, general concepts relating to water that is found in texts and other sources and apply those concepts to the specific experiences here within our watershed and drainage basin. It would also allow for the development of classroom programming linking water conservation to other curriculum areas, such as history and the development of water in Salt Lake City; community service learning and working on neighborhood water conservation landscape projects; and the relationship between science and policy development
2. To ensure SLCDPU provides enhanced opportunities for our customers, including youth, for deeper understanding of our water supply, demand patterns, and the role of the consumer in achieving conservation goals. It is through this understanding and mutual effort that our community will be successful in achieving its long term water conservation goals. And more directly, such a partnership will increase the awareness of our youth and the role they will play now and in the future of ensuring a continuing supply of high quality drinking water.
3. To design a program specific to SLCDPU water supply and demand issues, such as the role of non-traditional sources of water; the consumer's role in minimizing the impacts of drought; the relationship between water use and other environmental issues such as energy.
4. To relieve some demands on the State's resources and allow it to focus its educational programs to a broader, statewide audience.

O-5 Demonstration Gardens *

As a means of inspiring property owners to alter landscapes, it is hard to imagine any measure as effective as the opportunity of a hands-on, living garden. Since the last WCMP, both Weber Basin and Central Utah water conservancy districts have designed and installed water conservation gardens, and Jordan Valley WCD and Sandy City have expanded and upgraded their gardens, respectively. Based on data collected by Jordan Valley WCD, 40 to 45 percent of visitors to both the garden and the garden faire events are from the Utility service area.

To meet the local demand for these garden experiences, the Utility proposes to support the creation a series of moderate sized neighborhood water conservation demonstration gardens (WCDG) throughout its service area. As a minimum, it would be ideal to have one in each city council district and in each of the communities to which we provide water. Developing a demonstration garden in each of the community council neighborhoods is a long term goal.

A value in having many moderate sized gardens is the versatility and diversity in design and plant palette that this garden-development methodology would allow. Demonstrating that water-wise gardens need not all look alike and showing various garden styles might encourage and inspire those who might think that these gardens are typified by cactus, rock, and sparseness. To ensure that these varied gardens facilitate both behavioral and technical changes in landscape design, installation, and maintenance, criteria needs to be developed to guide in the decision-making process of garden development. While each garden may appear different, all will be built on the premises of best management practices for water-wise gardens.

These gardens can be linked through shared elements such as interpretive sign boards, brochures, and plant labeling. Additionally, the department website could play host to a virtual garden tour feature; the garden sites could also be linked to the plant database, a proposed program measure. The garden sites could be utilized for teaching opportunities, or to host other community events. As the number of these gardens grows, docent-led garden tours would create opportunities for guided comparisons in style and plant palette.

While well-designed demonstration gardens can facilitate the learning experiences of a community, creating opportunities for direct participation would enhance the experience and increase the likelihood of achieving the goals of this program measure – reducing water use in the landscape. Towards that end, a public aspect of the demonstration garden program could be developed which would encourage property owners, whether commercial or private, to build their own demonstration garden. A mechanism could be devise utilizing the web site whereby property owners could register their landscapes, submit photos and plant lists, and calculate and record water savings. The level of

involvement could be flexible, with some properties choosing to be open to public visits or inclusion in garden tours, while others may choose to limit their participation to photos on-line. These sites could also be linked to the plant data base. To ensure quality and program integrity, sites would have to apply and there would need to be a review and screening process before inclusion into the garden program.

This program measure incorporates aspects of community-based social marketing, including 1) uncovering barriers; 2) creating opportunities for commitment; 3) building community support; and 4) effective communication. Another component of social marketing is an emphasis on pilot tests; completion of the Greater Avenues WCDG can provide opportunities to implement components of this measure. Web page development may also take place to test the participant-aspect of the garden program at minimal cost, presuming the pilot-phase of the site can be constructed in-house.

Since the conservation program was created in 2001, the program has overseen the construction, maintenance, and utilization of three water conservation gardens: Washington Square, Greater Avenues, and the 900 South Wetland and Conservation Gardens.

O-6 SLCTV 17 GardenWise*

Salt Lake City Corporation hosts a locally broadcast television station with the call letters of SLCTV 17. During the last administration, a request was made through the Mayor's Office to develop content for SLCTV 17, as the only programs being aired were city council and planning commission hearings. Working with the city's Information Management Services division, GardenWise was conceptualized and developed, and a number of segments were taped. These episodes currently air on the television station and are also available through streaming video on both the conservation website and the city's SLCTV 17 site.

The first segments focused on the parkstrip, and included information on the rules, design, plant selection, installation, and watering. More segments are planned, including a series on irrigation (design, retrofitting, and maintenance); lawn care and watering; container gardening; and vegetable gardening. As conservation demonstration gardens are developed, segments could be filmed providing virtual tours.

Currently, viewership is limited to those with cable access or a computer with internet access. Measure expansions may include duplication of program segments onto DVD for distribution at fairs, garden centers, and city events. Additional marketing and outreach strategies will be explored to increase visibility and viewership.

O-7 It's a No Drainer Campaign *

This program was developed nearly eight years ago and was intended to promote improved waste-stream water quality, thus reducing waste-stream load, and reducing costs associated with wastewater treatment. The program has been underutilized and supporting materials are currently being reviewed and updated for re-distribution.

Program links to pre-treatment and wastewater quality are evident; connections to water conservation are less obvious but this program has links to the re-use water project. Our communities' ability to utilize re-use water is dependent on several variables, including affordability, public acceptance, and water quality of end product.

Linking this program measure with water conservation could serve three purposes. First, it has the potential of improving waste-stream quality and therefore wastewater quality, enhancing the product quality available for re-use. Second, this measure, in improving water quality, could reduce operating and/or maintenance costs associated with wastewater treatment, thus freeing assets which could then be applied to the re-use pilot project. Lastly, the community might find it easier to relate to a program measure linked with water conservation than with wastewater quality, thereby increasing measure acceptance and participation.

O-8 Landscape and Irrigation Style Guide*

It is much easier to maintain a landscape in a manner supportive of a conservation ethic when that landscape was from its conception, designed, constructed, and commissioned with water conservation in mind. A Landscape and Irrigation Style Guide would provide landscapers, contractors, and homeowners with basic, step-by-step recommendations and standards which would assist in the design and construction of attractive and water-efficient landscapes.

The purpose of the guide would be to provide standards and guidelines for increasing water efficiency and reducing water waste through better irrigation design; appropriate plant selection and placement; turf placement and type; and other techniques.

Preparing these standards and guidelines as a style guide allows for flexibility in adopting and updating the guide as new technologies and practices come to light; a code or ordinance would be more cumbersome to update. To enhance the effectiveness of the Style Guide in achieving water conservation savings and reductions in water waste, the guide could be referenced in code or contracts with either recommendations or requirements for adherence to the standards outlined within the guide.

It is recommended that the Style Guide be crafted with input from the City's Golf and Parks Divisions, and irrigation and landscape professionals.

O-9 Landscape Assessment and Check-ups

The Utility has been offering free lawn sprinkler check-ups for over a decade, and the program is well received for both its positive consumer response, and for achieving long-term water savings. Lawn isn't our only landscape, however, and more property owners are looking at the rest of the landscape and wondering what other improvements could be made to improve efficiency and reduce waste.

A landscape assessment program would provide access to knowledgeable, trained landscape and plant experts proving site-specific advice on techniques to improve water efficiencies through irrigation modifications, to plant selection and placement. This measure could be designed in conjunction with a number of existing organizations, including the local County Extension Office, professional design and landscape organizations, and Master Gardeners.

As with Lawn Sprinkler Check-ups, this could be offered for free as a service to our community. Landscape Assessment could also offer opportunities for data collection and research into behavioral and technical aspects of landscape preferences and practices; information which could assist in the understanding of those practices and beliefs, allowing for the identification of needs and the development of more meaningful programming in the future.

O-10 Landscape Plant List *

1n 1997, Salt Lake City crafted the Water-Wise Plants for Salt Lake City plant list; this list was updated and expanded in 2004 as part of that year's WCMP. While the list provides a great deal of very useable, local information on plants, the list format is cumbersome and costly to distribute. As a result, it is an asset that is underutilized. To address these issues, once again Water-Wise Plants is undergoing a review, though this time the resulting list will be available in data-base format on the utility's web site.

Utilizing files made available from the Utah Division of Water Resources, which maintains a state-wide plant list, this project is proceeding well. Local plant experts (several of whom participated in creation of the original list) are reviewing the current City list. Modifications to the files provided by the state will take place this fall, with the data base going "live" before the beginning of the landscape season.

To enhance consumer experience, the data base will include links to city and other public sites where plants may be viewed in landscapes. Should the Garden Project be launched, there would be additional opportunities for plant locations, and the data base could be used to promote those sites. Another program link would be in the Commercial and Industrial Certification Measure as local plant nurseries apply for and are granted certification, the plant database could also then provide information on source.

Converting the plant list into an electronic format increases access, enhances a "user-friendly" experience, facilitates cross-program linkages, and creates opportunities for measure expansion, such as design templates and site-specific water guides and calculators.

O-11 Landscape Templates

Information gathered from surveys, classes, and the Lawn Sprinkler Check-ups make it clear that while many people would very much like to have a water-efficient landscape, most homeowners, and even property management professionals, do not always know how to begin.

Providing simple templates for parkstrips, parking islands, and commercial and residential landscapes may be that added bit of guidance that is needed for a property owner to take that extra step to create a water-efficient landscape.

Having the template might demonstrate in a meaningful way that landscapes can be attractive, useable, maintainable, and water-efficient.

O-12 Lawn Sprinkler Check-ups *

Salt Lake City was the first community to sponsor the irrigation audit program conducted by the USU Extension Services, contracting with USU Extension to conduct irrigation audits at no cost to customers. In 1998, the City encouraged other communities and districts to participate, enabling an expansion of the Extension program with greater community participation. Besides receiving lawn water scheduling advice, auditors also provide each homeowner with a checklist for irrigation repairs and improvements.

O-13 Outdoor/Indoor Water Use Counter

This measure involves the development of a web page that allows homeowners and businesses to estimate water use through a variety of water-use reduction strategies. The site would show how much potential savings could be gained through implementation of said strategies, and calculate potential savings over a period of time.

An Additional aspect could be a calculator that assisted the user to estimate pay-back on fixture and landscape upgrades.

O-14 Parkstrip Plant List *

A companion document to the Water-Wise Plant List, the parkstrip list focuses on those plants most suited for parkstrip and median areas. Plants are divided into four height categories, and characteristics are provided, including an area-value which assists the user in determining the number of plants needed to fill in the minimum area required by code.

As with the Water-Wise Plant List, user experience would be enhanced, and access improved if this document were converted to a database format from the current Word format.

O-15 Plant List Database*

The intent of this measure is to convert the Water-Wise and Parkstrip Plant Lists to database format, improving accessibility and enhancing the user experience.

O-16 Planting and Maintenance Guide*

Develop and distribute a planting and maintenance guide for non-traditional landscapes, and for water-wise lawns. The guide would provide detailed instructions on site preparation, planting methods, establishment watering, and maintenance planning and scheduling. This measure could parallel a companion series on GardenWise.

O-17 Private Demonstration Garden Project

Outdoor water use is a large percentage of demand within the Department's service area; summer water use requires that delivery and facility systems are constructed to such a size as to accommodate peak demand, a period lasting only a few weeks. Reducing summer water use would go a long way to easing future construction and replacement costs. The Department's service area is large, and while the desire to establish moderate sized water conservation gardens throughout its delivery area is commendable, that is a very long term, and expensive goal. To facilitate the development of water conservation demonstration gardens (WCDG) throughout its service area, the Department proposes that we invite institutional, commercial, and even residential property owners to "be part of the demonstration."

Recognizing that increasing broad-based community involvement will enhance efforts to promote attractive and water water-efficient landscapes, and acknowledging public perception that government and business need to lead by example, a joint public-private demonstration garden project would achieve the layered goals of improving public image, creating public-private partnerships, increasing access to educational garden sites, increasing buy-in of water-efficient landscapes by increasing direct participation, and increasing summer peak demand reduction.

Garden sites could be selected based on established criteria through an on-going application process. Sites could be linked visually via the web and on site through interpretive materials with common, iconic features connecting the gardens together. Future program measures could include garden tours, hands-on workshops, and other events.
This measure would have natural connectivity to existing programs such as the Salt Lake City e2 Business program, and could be linked to the proposed commercial and industrial certification program. Participating businesses could receive recognition on property via plaques or other markers, and on the

Department's web site.

O-18 Residential Leak Detection and Repair

According to an AWWARF study, water leaks account for over 13 percent of residential water use. Given that our average indoor use for single and multifamily residential usage is 3,202,925 ccf, the potential savings is approximately 416,380 ccf or $562,113 to $761,975 based on current Tier Two water rates. Reducing residential water leaks even by half would result in a savings adequate to provide nearly 600 single family homes with water.

Many homeowners are unaware of the impact of leaks on water use and subsequently, on their bill. Additionally, many do not know how to locate or repair water leaks. This measure could have several layers, including web-based, passive information; do-it-yourself audit kits; or professional leak detection services and repairs.
Initially, a pilot study could be implemented, focusing on publicly-owned low income housing, and for those who qualify for the Water Assist Program. This would provide an opportunity to identify measure barriers and benefits without the undue burden of applying the program service-area wide. Audit kits could be provided on a pilot basis also, with participates receiving some reward for returning surveys of value of program measure.

This program measure would have commonalities with existing Department programs (Water Assist) and provide added financial and social benefit to existing city housing programs. Partnering opportunities exist with the Red Cross, local realty boards, and plumbing associations.

O-19 Specialized Garden Guides and Plant Lists*

As awareness grows around issues of sustainability, food security, energy, and water quality, the role of the landscape in a communities' ability to achieve both short and long term goals linked to sustainability is undisputable. Rain gardens, stormwater catchments, roof top gardens, and even food gardens can play a role in making communities not only livable but thriving. These and other types of specialized gardens also have their place in a water conservation landscape strategy. Guides and plant lists can provide the needed tools to ensure that these types of specialized gardens not only achieve the desired results in cleaning stormwater run-off or cooling a building, but also reduce landscape water demand.

O-20 Virtual Water Conservation Garden*

Develop virtual garden tours on web site showcasing both Department Demonstration gardens and those accepted through the Private Demonstration Garden Project. Measure has linkages with the Plant Database, GardenWise, and other measures.

O-21 Water Savings Virtual Meter

Develop a web-based virtual water reservoir to tally water savings for individual accounts and service-area wide. Link to Indoor/Outdoor water use counter, Private Demonstration Garden Project, and Leak Detection and Repair measures. Such a site could provide information on the dollar value of our water, and the cost of developing a comparable volume of water so that customers could see the value of their actions.

O-22 Waterpedia

Develop a web site pertaining to water use for classroom instruction and public education. This site could eventually represent all facets of the Department's public education and outreach programs, with the pilot project to focus on water conservation.

Such a site could help create and draw synergies between all facets of Department operations to enhance public understanding of the connections from watershed protection to wastewater discharge, and everything in between.

O-23 Workshops and Classes*

Provide regular and on-going opportunities for homeowners and others to expand their knowledge of water conservation techniques and behaviors. Workshops could utilize a variety of teaching methods including lecture, examples, demonstrations, and hands-on experiences. Subject matter would include both indoor and outdoor strategies, and be targeted to a variety of audiences. Subject experts could be utilized to help expand perspective and subject content.
A fixed location with access to high-quality media technologies, garden area, and easy access and parking would facilitate the implementation of this measure.

O-24 Volunteers in the Gardens*

Demonstration gardens are an important method of inspiring and education people about water-wise landscaping techniques and plants. Gardens offer unique opportunities to illustrate and demonstrate that water conservation is neither onerous nor depriving. Budget constraints dictate that our gardens provide a "self-directed" experience, meaning that it is up to individuals to enter the garden, observe the design and plants, take a brochure, and glean what they can from the space, unaided by docents or teachers.

As a program practice, we do not know how many people benefit from the gardens or how the experience in the garden transforms their behavior and relationship to their landscapes.

With the creation of the Service in the City Program, we have been able to create opportunities with the community in ways that are a benefit to both garden visitors and to the conservation program. Volunteer events create opportunities for learning and camaraderie, enhancing an understanding of the need use our water resources wisely, coupled with the pleasure of learning how to accomplish that task beautifully.

ECONOMIC INITIATIVE

E-1 Incentives

Incentives can be defined as a reward or benefit for a specific action. Currently the Utility offers customers no direct incentives for taking any prescribed action towards water conservation. The tier-rate structure offers the indirect incentive of creating an avoided cost, and the 2008 Rate Subcommittee recommended the addition of a fourth tier to increase the impact of that incentive.

There are a variety of incentives that the Utility might consider for review, including but not limited to streamed line plan approval, reduction in meter cost for irrigation meters, and incentives for sub-metering.

With increased media attention on such programs, public interest has also increased and examining such programs, whether implemented or not, will demonstrate an openness on the part of the Utility to examining all possible strategies to achieve water conservation goals.

E-2 Irrigation Maters and Targets*

Irrigation meters are the most direct method of determining how much water is used in a landscape; targets provide guidelines to property owners of what constitutes reasonable use. Together, these tactics provide the measurement and communications tool to facilitate water-use reduction in landscapes.

E-3 Rate Structuring *

The Utility currently utilizes a seasonal three-tiered structure to encourage water conservation. In 2008, a citizen sub-committee of the Public Utilities Advisory Committee (PUAC), working with an independent consultant, reviewed the water utility's financial and capital needs and submitted recommendations to the PUAC for review.

It was determined that further review needed to take place and the PUAC recommended to the Mayor and City Council that no changes be made at this time; the recommendation was accepted.

E-4 Rebates *

Rebates are typically financial incentives for buying a particular product. The most common rebates in conservation programming are for fixtures—such as toilets, washing machines, or irrigation controllers; or for actions—removing lawn or planting certain types of plants.

As a participant in the Central Utah Project, our customers are entitled to participate in an irrigation component rebate program currently being offered. Though funding varies from year to year, as long as the program is available, more outreach should be done to inform our customers of the program offerings.

As with incentives, there is growing interest in the community for these types of program measures, and it is important that the Utility continue to examine all possible conservation strategies.

E-5 Volumetric Sewer Charge *

In 1982, the Utility implemented sewer rates based on metered winter water usage. This measure resulted in a significant reduction in water waste as customers repaired leaking plumbing fixtures. During the next five years the

Utility observed a 10 percent reduction in flows to the Waste Water Treatment Plant, including a 12.5 percent reduction in indoor residential use.

In 2000, the Utility launched a measure targeted to commercial, industrial, and institutional customers to reduce the BOD loading. This was accomplished through both an educational campaign, and by the enactment of an ordinance affixing additional sewer charges based on the strength of the waste discharge. This measure motivated customers to develop and implement more efficient water use and waste management practices. Ordinance No. 17.72.030, pertaining to sewer rates and load strength may be viewed on the City's web page at www.slcgov.com, or at the Public Utility Administration Office at 1530 South West Temple.

In 2001, the Utility launched a public education campaign, "It's a No Drainer," to discourage the use of garbage disposals amongst residential customers. Brochures mailed in utility bills inform customers that by not disposing of waste in the sink they can save money by reducing their water and energy bills. The brochure goes on to explain that those savings are also shared by the waste treatment facility and that by extending current capacity, we can all save even more.

E-6 Tiered Base Rates

It is no surprise that water-use reduction and revenue stability can seem like contradictory goals. The precarious tension between these two seemingly opposite ends can make it difficult to strike a balance that meets our broader goals of ensuring a sustainable water supply by living within our water "budget." Through the proper implementation of water rate structures, the balance can be found and held, but it takes adaptiveness and creativity, as much as it does sound fiscal policy.

One strategy that could help find that balance is the use of tiered base rates. We already utilize a tiered rate structure, though the block rates only apply to volumetric use. Tiered base rates use a similar strategy, and when applied to the base rate, create a level of revenue stability difficult to obtain with volumetric conservation rates.

UTILITY INITIATIVE

U-1 Customer Use Change Notification *

This program was developed to assist water customers in identifying and repairing leaks. Winter demand levels are monitored and usage in excess of 20 percent of average winter usage triggers notification of the customer, providing for timely repair of the system. Measure review might include an evaluation of the notification trigger level; different notification trigger levels for different customer classifications; and opportunities for summer notification.

U-2 Landscape Upgrades

In keeping with the Utility's desire to be a leader in water conservation implementation, and in recognizing the role of outdoor water use in peak demand reduction, an inventory and assessment of all Department properties and landscapes would be a step towards meeting both water conservation and sustainability goals.

Properties could be evaluated for a variety of factors including Area Landscaped Ratios, water use per area of landscape, and plant types. Recommendation could be made for upgrades.

U-3 Loss Prevention *

Maintaining distribution lines is critical to reducing water loss due to leakage and breakage. Through a combined strategy of prioritizing capital improvements, aggressive pipe replacement programs, highly trained personnel, and utilizing the latest technologies, the Utility maintains an average number of breaks per mile of pipe less than the national average, despite having one of the oldest distribution systems in the West. Since 2000, the Utility has replaced 48,443 linear feet of pipe at an average annual cost of $6,435,000.

In September of 2005 the department went through an extensive Water Audit Study by Fanner & Associates. The report details the first water audit undertaken by the city using the International Water Association (IWA) water loss management methodologies which are now the AWWA recommended methodologies for use in North America utilities. Salt Lake City was one of the first in the United States to complete a study using the new methods.

The result of the study stated that Salt Lake City Public Utilities was managing their real and apparent water losses well, when compared with both international and North America utility performance. In fact when compared with the other 12 agencies who had implemented a similar calculation of an infrastructure leakage index or (ILI), Salt Lake City's rating of 3 was the best out of the 12 agencies in North America with actual tested results.

Study conclusions identified the following areas for improvement, which the Department is currently working on:

- Install insertion meter tapping point in the 69" Salt Lake Aqueduct mid-way between the existing multi-point ultrasonic meter and the Little Willow vault.
- Install an insertion meter tapping point on the 36" line running east from the Metropolitan Water Treatment Plant to the Little Cottonwood Conduit.
- Install new metering devices at Big Cottonwood Treatment Plant and the Parleys Treatment Plant.
- Install a new permanent meters, correctly sized for current operating duty ranges, on the two effluent mains leaving City Creek plant.
- Install an insertion meter tapping point on the Jordan Aqueduct upstream of the CUP connection on the south side of the highway.
- Install a meter tapping point on the Downtown main at suitable location.
- Install insertion meter tapping points at suitable locations downstream of the 82nd South, North Fortuna and South Fortuna meters.

U-4 Monthly Meter Reading and Billing *

Though not always viewed as such, monthly reading and billing can be used as a conservation measure when the information is delivered in a timely and meaningful manner. Providing property owners with the necessary data to assess not only their recent usage but comparative information can be an important strategy for achieving desired behavioral changes.

Currently, the Utility reads and bills all meters on a monthly basis; a review of the bill layout and data provided would assess if this strategy is being used to its fullness.

U-5 Public Utility Advisory Committee *

The earliest use of a public advisory committee was in 1928 to address the need for water development. The Public Utility Advisory Committee (PUAC) continues this vital role of providing public involvement in the planning process. Its voluntary members, appointed by the City Council, have been instrumental in the creation of a number of water conservation programs including the recently adopted Rate Restructuring, the Water Shortage Contingency Plan, and this Plan.

This committee periodically reviews existing conservation programs, and will be involved in the selection and review of new programs. Dedication of a portion of one meeting annually to the topic of water conservation would serve to meet a requirement identified within Utah Code 73.10.32; the review of the CAR would serve this function.

U-6 Salt Lake City Department and Division Conservation Plans

Recognizing that it is only through our combined efforts that we will succeed in achieving our long term water conservation goals, we are inviting each city department and its' divisions to work with us in drafting the 2009 WCMP. It is our goal that each city department will develop a water conservation goal that includes both short and long term programs for achieving the goals, and plans for implementation.

U-7 Universal Metering and Meter Replacement *

The City began a universal metering program in the 1920's that was completed by the early 1950's. It was recognized that the best way to ensure financial stability for the water department and to address consumer demand, and hence be able to change it, lay in the City's ability to accurately determine the actual volume of water being used by individual customers.

The department is currently in the third year of a five year meter replacement program. Over the last two years the utility has replaced 45,920 meters which were more than 10 years old to reduce the amount of unbilled water usage. It is the intent of the department to continue the program over the next two years, replacing an additional 17,000 residential meters. By reducing water loss 1 to 2 percent, this program is expected to recover the $6 million program cost through additional revenue gained over the life of the five-year program. A one percent reduction in total use acquired through these measures provides enough water to service 1355 households.

U-8 Water Loss Audit *

During 2005 the department completed a water audit based on the new International Water Association and American Water Works Association standard. Salt Lake City Public Utilities is one of a very small group of utilities that have completed a water audit based on the new standard. The study stated that our agency has a good performance record in controlling real and apparent losses. The study was undertaken for the following reasons:

- To determine the economic value of reducing the department's unaccountable water
- To implement the new standard recognized as the current best practice in the industry
- Identify real and apparent losses in our system
- Evaluate the possible methods of managing those losses

The result of the audit indicates that Public Utilities is managing their real and apparent water losses well compared with both International and North American utility performance. Based on the preliminary report, Salt Lake City ranked third in the United States in the effective water loss management and about the middle of cities internationally. However, the 95 percent confidence limits on this analysis are currently very wide. This is because the system input metering from the City's surface water sources is poor and few of the key system input meters can be readily tested. Before Public Utilities invest any funds to find real losses, it is recommended that the following actions to taken:

- Upgrade numerous meters that measure flows from water treatment plants and turnouts from the aqueducts
- Improve the management of the large and medium customer meters and thereby reduce the level of apparent losses and increase revenue
- Improve the performance of multi register large and medium meters

Another component of the Leak Detection Program is conducted through the Geographic Information Systems (GIS) group of the Utility. Using geophones leaking pipes are discovered quickly, reducing the volume of water lost and the cost of repair.

U-9 Water Re-use Pilot Project

The Department has completed a Water Re-use Feasibility Study to determine opportunities and costs associated with a 5-million gallon per day pilot plant. Construction of a small-scale facility would allow the Department to increase understanding of utilized technologies, subsequent operation and maintenance, and gauge public acceptance of this water supply. Intended target customers include schools, parks, golf courses, and several commercial customers.

U-10 Water Conservation/Sustainability Matrix*

The 2009 Water Conservation Master Plan introduced a matrix that identified nexuses connecting eleven sustainability topics. This matrix has been useful in facilitating dialogue within various City departments and has demonstrated the connectiveness between water conservation and other sustainability topics. Public Utilities has initiated a number or projects to address broader environmental issues, and other studies are being conducted as this document is being developed. Revisiting the matrix will enhance our understanding of the relationships between these issues and will create an opportunity to document our progress in addressing environmental issues parallel to those directly related to water.

U-11 Ready-read Technologies

Meter reading is considered a key tool in conveying to customers how much water is used. Historically for Public Utilities, this process has occurred monthly with the meter reading group reading a meter, sending the data to billing, which generates a bill, which the consumer receives and reads. Though this process provides an opportunity to convey critical messages to the consumer—how much water was used, in which block, at what price—all of this information pertains to past actions, something the consumer may consider in the future but still, action which cannot be undone.

New technologies offer a more instantaneous reporting of data to consumers; an examination of these technologies and how they might be applicable to our circumstances would be informative. It will be important to consider cost, ease of use, reliability, adaptability to existing systems, as well as other factors.

Law and Policy Initiative

LP-1 Graywater

Graywater is defined as untreated used water that comes from sinks, bathtubs, cooling towers or other plumbing fixtures, but not from toilets or, in some cases, kitchen sinks. Currently, the Utility does not have a policy or formal position on graywater, but with increasing interest in this as a source of water, particularly for landscapes, it would be valuable to determine a position and then to promote that within the community.

LP-2 Irrigation Audit Policy

Develop and adopt an ordinance requiring Irrigation Audits on all new commercial and institutional properties, and for accounts which exceed target or set CCF. This measure would be consistent with the findings of the code review conducted by the SLC Department of Sustainability.

LP-3 Irrigation Efficiency Standards*

Develop and adopt Irrigation Efficiency Standards for all commercial and institutional properties. These standards would address design, construction, and maintenance of all irrigation systems, including drip systems. Irrigation components, controller devices, and rain sensors could also be addressed. The Utah Irrigation Professionals, a division of the Utah Nursery and Landscape Association, is interested in seeing such standards created and adopted.

LP-4 Landscape Ordinance*

In 1995, Salt Lake City amended its landscape ordinances to encourage water conservation through the use of water-wise plants. However, the ordinance did not require use of these plants and still defined landscapes as being "a planted area that contains continuous turf or groundcover." In 2000, the parkstrip code was amended to remove the requirement of turf, and to not require more than one-third of the area to be planted.

After five years of effort, the Utility was successful in having the landscape definition changed, deleting the clause relating to continuous turf and groundcover. Additionally, language similar to the parkstrip code was added, requiring that only one-third of a front yard need contain plants, with the reminder needing to be covered in mulch. This code change was necessary in order to fully utilize landscape design strategies which can result in long term water savings.

With the modifications in effect, an educational campaign needs to be developed and implemented to ensure that the community understands the current code and how these changes might benefit them and their water use.

Salt Lake City's Landscape Code is long and complex, and further review and update should be continuous. Some areas of particular interest are street medians and parking lot islands.

LP-5 Parkstrip Code*

The Parkstrip Code was modified in 2000, removing the requirement for turf and allowing that only one-third of the parkstrip area need be planted.

To enhance public understanding of the code change, a brochure and video series were developed. The brochure is distributed through the community councils and at other venues, such as the Department's Administrative Office, City Hall, and on the web. The video series, produced in GardenWise, is available on Cable Channel SLC TV 17, or as streamed video on the city's and department's websites. Additionally, a Parkstrip Plant List was developed, providing information on the code, plant selection, and design strategies.

More could be done to distribute these materials and improve access, including providing DVDs at local nurseries. The Parkstrip Plant List is only available on the Department's website, and creation of the plant database will improve access and increase usability.

LP-6 Rainwater Harvesting*

The State of Utah now allows for the collection of rainwater under limited conditions. Rainwater may be collected for residential landscape use utilizing above-ground barrels, not to exceed 100 gallons per barrel and no more than two barrels per property. Residential and commercial properties may utilize below-ground cisterns up to 2500 gallons, with the limit of one cistern per property. All rain water collect must be reported to the State Engineers Office; this may be done through the Utah.gov website.

LP-7 Rain Sensor Ordinance and Policy*

An important aspect of water conservation in a landscape is managing water supplied to a landscape as a function of weather and climate. To maximize water use reductions in the landscape, it is important to modify watering application schedules annually, for instance watering less frequently in the spring and the fall; and modifying that schedule with the weather, such as in response to rain events.

Rain sensors assist in that strategy in that once installed, no further action on the part of the user is necessary. There are irrigation controllers that include rain sensor devices, and there are rain sensors that can be installed retroactively to the irrigation controller. Cost for these devices is typically less than $50.00 retail.

The ordinance component of this measure might require that all new customers and all building construction projects requiring a permit would be required to install a rain sensor. This avoids issues arising from imposing such a retrofit post construction. The policy component might be that all city properties with irrigation systems be retrofitted with a rain sensor within a given period of time. This policy would be consistent with both the Department's and the City's long term sustainability goals.

While it is unclear what volume of water use reduction could be achieved through the implementation of a rain sensor ordinance and policy, what is clear is the impact such an action would have on public perception. Rain events in our valley are sporadic and frequently of little volume and may not be adequate to replacing a water cycle within an irrigation schedule. Public perception, though, is weighted without such consideration, and the practice of watering during or immediately after a rain event is perceived as wasteful. Implementing a retrofit program for city sites would enable us to avoid watering in proximity to a rain event, and therefore, avoid public ire.

LP-8 Squandered Water Ordinance

Salt Lake City has mostly depended on voluntary compliance and cooperation in achieving its water conservation goals. And, for the most part, we are and continue to meet those goals. As more people become aware of the need to conserve water and implement conservation practices in their daily routine, they also become witnesses and advocates for those practices. They see other property owners over watering, watering during rain events, operating systems with broken sprinkler heads, and these observers want something done.

The good news is that our efforts to education the public in what constitutes an efficient sprinkler system and good watering habits is to some degree successful. Those who call and complain are, for the most part, specific in their observations and objections. And in many cases there are concerns of public safety or property damage. Reporting is not enough and they want to see some level of remediation; in short, they want to know that everyone is doing their part to save water.

We take all calls and emails of complaints seriously, and make every attempt to correctly identify a property in question, locate and contact the property owner, and discuss better management practices. Most of those we call were unaware of an issue and are eager, or at least willing, to have repairs made or correct schedules. There are a percentage of those receiving calls where we are dealing with a property that answers to an absentee landowner or franchise and decisions are not made locally. Another percentage of calls are met with indifference or a flagrant disregard of the value of the resource.

It is in these latter cases that we have no recourse and our calls are ineffectual. An anti-squandering ordinance would allow steps to be taken to compel these most egregious wasters to remedy the squandering of water. Precedent exists within the Water shortage Contingency Plan, and the Department has been given authority to establish other policies and regulations around other water use.

An important premise in any effective water conservation plan is the concept of fairness. With no way to compel action when other methods fail, it is difficult to maintain a position of equity, and that erodes public faith in our efforts and eventually, our desired outcomes.

LP-9 Sub-surface or Low-impact Irrigation for Small Areas *

Irrigation professionals, including the Irrigation Association and the Utah Irrigation Professionals acknowledge that it is difficult to achieve reasonable levels of efficiency in small spaces. Most irrigation sprinkler heads are designed to cover large areas and attempts to design and manufacture spray and rotation heads with a spray diameter of less than ten feet have been met with mixed results.

And ordinance that requires sub-surface or low-impact irrigation on medians, parkstrips, and in parking lots would address this issue directly, and avoid problems such as overspray.

This ordinance might initially be applied to new commercial and institutional properties as a pilot phase to determine effectiveness and acceptance.

LP-10 Water Shortage Contingency Plan*

In the fall of 2002, the Utility began the process of drafting a water shortage contingency plan (WSCP). The purpose of the plan is to identify specific calls for action during water shortages, such as the current drought and other water shortage emergencies by anticipating the impacts of such shortages. By determining the actions and procedures for responding to a water shortage in advance of an actual emergency, the Utility and community can be better prepared and experience less disruption.

The water shortage contingency plan was written with the assistance of the PUAC, as well as a number of professional associations, including the Intermountain Turf Producers, Utah Irrigation Association, Utah Carwash Association, Tree Utah, and representatives of the hotel and lodging industry. After a review by the Administration, the WSCP was adopted by the City Council in June of 2003, and the text is included in the appendix of this document.

LP-11 Cool-Season Turf Limit

Many communities in the arid West are looking to limit cool-season turf under certain uses. Acknowledging that the use of cool-season turf is not in itself the problem, our insistence that it remain crisply green during the hottest summer months is the core issue, because to do that, it needs more water than some other types of landscapes.

2014 Update: Thanks in large part to research being conducted at Utah State University, Texas A&M, University Nebraska-Lincoln, and other land grant colleges, there has been a great deal of research resulting in the development of new and improved blue-grass cultivars. A review of current research hand field tests would provide insight and inform this discussion.

LP-12 Irrigation-only Meters*

The department's current policy on irrigation meters allows the installation of irrigation-only meters on properties with a total lot size of one-half acre or larger. Irrigation-only meters on smaller properties are not allowed.

Irrigation-only meter accounts receive a water budget utilizing a formula provided by Utah State University and based on the Penman-Montieth Evapotranspiration Model. These accounts are billed in Tier Two for water used within the budget, and in Tier Three for water in excess of the budget.

It is unknown how much potential water savings might be achieved were more properties fitted with irrigation-only meters, and a study to determine that might be of value. Additionally, a policy review in conjunction with a collection and analysis of the data would be valuable, in that it would either confirm the effectiveness of our current policy, or provide insight into possible modifications. Very large new developments (for example the NW Quadrant) might be designed with higher level of planting requirements. These large new developments could also be designed to use secondary water for irrigation, which would require a secondary system of water delivery, and a separate meter. Secondary water could be supplied a re-use water or from a waste water "scalping" plant could be the source water for a secondary pipe (purple pipe) system. Designing systems for 40,000 – 60,000 new residents may make these types of projects feasible from a cost point of view.

The disincentives affecting the use of irrigation-only meters include the initial meter hardware and installation costs. Minimum monthly bills also skew a cost analysis against additional metering. To be accepted, these barriers would need to be addressed.

LP-13 Sub-metering on New Multi-Family Dwelling Units

Knowing how much water is used is the critical first step in knowing how much less water can be used. It has already been established that monthly meter reading and billing provides customers with vital and timely report which can then be used to make informed choices about how to use water.

Not all of our customers, though, receive a bill, or even know how much water they use. Most of those who live in apartments, condos, and other multifamily dwellings, do not have a meter, so subsequently, cannot receive a bill or be informed of their water use behaviors.

A review of the policies and codes relating to metering and sub-metering would provide insight into this issue. Department policy has been to master meter and have a single party responsible for account and bills. Requiring sub-metering could overwhelm our current process to require all renters to enter into agreements with us, and affect meter reading schedules.

LP-14 Alternative Water Sources Use Polic

est in reducing culinary water demand, primarily for landscape applications as a way to reduce water-user costs, has caused an increased interest in exploring secondary water sources. It is important that we understand all the ramifications of converting from culinary to secondary water sources for landscape irrigation. Some implications are related to water quantity, water quality, water rights, impacts to landscape health, stormwater impacts, costs of treatment and distribution, and energy costs.

There may also be a tendency to think of secondary water as a separate supply of water from our culinary sources, and therefore somehow more bountiful and less expensive. In fact, in many instances it is derived from the same sources as our culinary water. Due to quality and distribution issues, it may be more expensive than culinary water. Having a policy to facilitate the utilization of this resource in a manner consistent with the management of other water sources and consistent with the water conservation program and goals will be critical to the sustainability of this resource.

RESEARCH INITIATIVE

R-1 EPA Residential Study*

In January of 2011, Public Utilities, in partnership with nearly a dozen partners submitted an Analysis of Water Use in New Residential Homes to the US- EPA. This five-year study was funded by the participating cities and the US-EPA. Study outcomes demonstrated that homes built since federally mandated appliance efficiencies went into effect in 1999 had water use decreases over older homes. Additionally, homes designed to be highly efficient proved to have water use saving greater than those homes built since the 1999 efficiency standards went into effect.

Overall, this study shows a highly encouraging set of results. It demonstrates that by use of the current (as of 2010) best available technologies for toilets, clothes washers, showers and faucets real reductions in indoor water use can be achieved. The indoor use results showed a steady reduction in household and per capita use going from the 1999 REUWS homes to the Standard New Homes and then to the High Efficiency New Homes. This last group represents the current benchmark for high efficiency indoor use in single family homes. It seems highly possible for homes with average number of residents to use less than 100 gpd for indoor purposes if better ways could be found to control high volume leaks resulting from long duration leak events.

The results also show that significant savings in outdoor use can be achieved by reducing the percent of customers who are over-irrigating, switching to lower water demand plant material and modest reductions in irrigated areas.
All of these efforts, both indoor and outdoor, would be enhanced with better real time data on water use reported to the occupants through easily accessible in-home reader. Such a device, when combined with reasonable water budgets would provide the customers with the information they need to be partners in the overall water management effort.

The full study is available for review on slcgov.com/waterconservation.

R-2 Irrigation Controller Study*

This study intended to evaluate the efficiency and ease of use of innovative stand-alone and add-on irrigation control devices through site observation and water use records

The purpose of the study was to test and identify affordable irrigation controller products for homeowners or small-site managers in order to reduce landscape irrigation, minimize water waste, and reduce maintenance costs associated with irrigation controller management. Project outcomes will include product information, site considerations relating to product selection, installation instructions, and cost savings associated with water use reduction and reduced maintenance costs. This study met the goals and objectives as outlined in the 2003 Water Conservation Master Plan as adopted by the Salt Lake City Council.

Within the study proposal, a variety of limitations were identified, but one critical aspect was overlooked. The sites selected are owned and operated by different city agencies and in a variety of partnerships. As a result, dedication to adherence to study methodologies was mixed, and in some cases ignored. Without a consistent commitment from the agencies, another barrier was

exposed—frequent changes in ground personnel and inconsistent skill levels. A final barrier to completion was the reorganization of the management of these properties, and in some cases, the selling of these properties.

As a result, the study has been temporarily suspended. The study purpose and methodology has merit, and several sites experienced a decrease in water use with no measurable decrease in aesthetics or plant health. These findings would support a re-activation of this study but with other subjects.

R-3 Landscape Inventory and Analysis

The intent of this study would be to create an assessment of landscapes within the service area to determine potential water savings. Study framework would include, but not be limited to, the development of landscape classifications, through landscape identification and assignment, analysis of water use records, and the development of water use estimates. Through a variety of methods—including aerial photo analysis, surveys, reporting, and visual inspections—landscapes could be inventoried, assessed, and catalogued, with study outcomes being: 1) an understanding of landscape preferences and selection; and 2) water use as a function of landscape type; and 3) water savings potential.

An additional outcome could be an identification of modifiable landscapes for purposes of direct marketing of conservation practices.

This study would be ideally suited for a college project. It could be broken down into user classifications, such as institutional, commercial, industrial, and residential.

R-4 Plumbing Fixtures Inventory and Analysis

The intent of this study would be to inventory and assess indoor plumbing fixtures throughout the service area. The inventory could be conducted a variety of ways, including through surveys and inspections. The purpose of the study would be to identify water savings potential through the identification of inefficient plumbing fixtures.

This study is well suited for a college project and could be broken down into water user classifications.

R-5 Technical Water Savings Study

This study would look at the potential savings resulting from the installation of efficient plumbing fixtures combined with those gained by implementing the recommendations of the Water Loss Audit Report conducted by the Department in 2004 and the from the maintenance of the water system infrastructure.

R-6 Water Softener Impact Study

Conduct meta-study on waste-stream water quality effects from water softener additive products. The intent of the study would be to determine if residential or commercially used water softener appliances and their related products affect waste-stream water quality such that use of such appliances and/or related products could negatively affect water re-use opportunities.

R-7 Irrigation Interventions Study*

Investigate impediments and barriers for homeowners in correcting irrigation system defects. Working with USU, the study experimentally tests conservation gains achieved through the implementation of specific irrigation system improvements and water use behavior modifications relating to landscape irrigation (saving), and measure efficiencies before and after program interventions to quantify savings.

R-8 WaterMAPS*

Utilize technology developed by USU to analyze potential water-use savings in landscape settings. WaterMAPSTM, a software application developed at USU, to analyze water use patterns in the study area to identify (sighting) specific residential properties with high capacity to conserve landscape water applied to landscapes. The study will demonstrate how much water applied to landscapes can result in future water savings and the best way to achieve the future water savings.

R-9 Conservation and Major Conveyance

Analyze the impacts of conservation on the assumptions of the Major Conveyance Study.

R-10 Conservation, Climate Change, and Resiliency
Public Utilities has partnered with a number of agencies and academic institutions to assess the impacts of climate change on our water supply. The purpose of this study would be to further evaluate the role of conservation in reducing and mitigating climate impacts. Water conservation will be a critical component of our strategy to maintain a resilient and sustainable water supply.

R-11 Alternative Water Sources Study

Increased water costs and pressure to reduce culinary water use for landscape applications has lead to an increased interest in secondary water as an alternative source. However, it may not be as simple as simply "switching the tap" from culinary to secondary water. Many factors need to be considered including (but not limited to) availability, impact on culinary supplies, water quality, costs of treatment and distribution, cost of service, energy demands, and equity. (See LP-14 as well).

As we consider these alternative supplies, it is important that we examine these resources in the broader context of the impacts to our entire water portfolio and to the environment.

R-12 Commercial and Industrial Water Use Study

A great deal of research is occurring examining the role of water conservation in broader, regional water planning scenarios. However, initial evaluation of this research indicates that it is focused on the residential water-user generally, and the landscape in particular. Though this is an important user classification to study, in the case of our service area, it represents only one-half of our water use demand. A deeper understanding of our commercial and industrial users could facilitate improved water use reductions in those classifications, and lessen the feelings of burden that many residential customers are beginning to sense due to this current focus on the residential water user.

R-13 Behavior and Policy Study

The intent of this study would be to explore the interconnectedness of consumer behavior to policy as it relates to water use in order to create better and more effective policy. There is a growing body of study focused on predicting water demand in residential customers, and this focus of study is deepen our understanding of why people are using water and is a valuable first step. However, this line of study does not necessarily address how to change that behavior, once it is predicted or manifested in actual water use. This proposed line of inquiry will explore the connection between policy and behavior in order to identify barriers to change and the means of overcoming those barriers.

R-14 Large Water User Interventions Study*

Work with USU and a representative large water user to identify potential water savings and to develop and implement a strategic plan to reduce water waste, increase use efficiencies, and optimize both water and financial savings. Structure of plan should be such that it provides implementation strategies across varies customer profiles.

METRICS INITIATIVE

M-1 Practice Reach

Establish and utilize methodology for determining both the reach and impact of the various program initiatives and practices. The measure of practice reach might range from counting the number of pamphlets mailed compared to those read; volunteers in a garden; or changes in water consumption. Identifying the reach and impact of the program practices will assist maximizing staff and other resource.

M-2 Customer Communication

Where appropriate, develop methodology to measure practice impact. Conservation programs frequently rely on practices that offer no measurable outcomes to determine effectiveness. For example, a lawn watering brochure informs the reader of a collection of best practices to maintain turf health, reduce water use, and eliminate water waste pertaining to lawn watering, but it is difficult to determine if the brochure meets its intended goal of leading the property owner to use less water. Conversely, irrigation-only meters with assigned water budgets can be read and the volume of water used determined. Given the preponderance of outreach practices in the conservation program, it becomes critical to determine the perceived relevance of these practices and their effectiveness.

M-3 Demand Projection

Develop baseline and projected customer-class demand projections. Conservation is an integral component of the Department's water supply portfolio. And while water saved is not necessarily water in a reservoir, it is, potentially, water not used or demanded. Determining to what extent demand is effected by a single or collection of conservation practices may inform future Department capital expenses, both the development of new supplies and the rebuilding of existing infrastructure. Quantifying water "saved" through conservation may facilitate the reduction or delaying of other capital expenditures.

M-4 Capacity/Distribution/Financial Impacts

Study impacts of conservation on current and future infrastructure. Understanding the impacts of conservation, water use pattern changes, and other conservation program goals will help to exploit successes in other Utility and City programs, and to avoid or minimize unexpected or unintended consequences as a result of changes in water-use behavior. Understanding the impacts of conservation system efficiency and functionality will provide insight into how conservation can be utilize to optimize system functions.

IMPLEMENTATION PLAN

The 2014 Water Conservation Master Plan was developed and reviewed by Public Utility staff, in conjunction with the Public Utility Advisory Committee (PUAC). It was submitted in its entirety to the PUAC on September 19th, 2014 and discussed during the scheduled September 25th meeting.

The plan will then be submitted to the Mayor's Office and City Council for review and adoption, with a public hearing. The adoption of the plan will be followed by a press release to inform the public.

The plan will then be made available on the internet at www.slcgov.com/water-conservation. During the spring months, the water conservation staff will attend community council meetings to share the content of the plan, and discuss the goals with community members.

GLOSSARY OF TERMS, ACRONYMS, AND ABBREVIATIONS

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.

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.

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.

Initiative: A collection of related practices designed to meet specific program objectives or goals.

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.

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.

Objectives: Specific aims quantified in an action plan; statements must be specific as to who will do precisely what, by when, and at what cost, and provide measurable outcomes.

Parleys WTP Parleys Water Treatment Plant

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

Practice: A single action or collection of related actions designed to reduce demand, increase efficiency, enhance understanding, or otherwise facilitate the achievement of a water conservation goal.

Program: An ongoing effort to achieve a goal, sometimes involving several projects; e.g., a conservation program may include a metering project, a retrofit project, and a landscape project.
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 Utilties

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.

Sustainability: 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.

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.

er Conservation Demonstration Garden

WCMP: Water Conservation Master Plan

Xeriscape: A trade-marked term developed by Denver Water in 1981 to describe a seven-step process of improving water efficiency in the landscape; the seven steps include:

- Design
- Soil analysis
- Appropriate plant selection
- Practical turf areas
- Efficient irrigation
- Use of mulch
- Appropriate maintenance

TITLE 73 CHAPTER 10 SECTION 32

Title 73 **Water and Irrigation**
Chapter 10 **Board of Water Resources – Division of Water Resources**
Section 32 **Definitions – Water conservation plan required.**

73-10-32. DEFINITIONS – WATER CONSERVATION PLAN REQUIRED.

(1) As used in this section:
- (a) "Board" means the Board of Water Resources created under Section73-10-1.5.
- (b) "Division" means the Division of Water Resources created under Section73-10-18.
- (c) "Retail" means the level of distribution of culinary water that supplies culinary water directly to the end user.
- (d) "Retail water provider" means an entity which:
  - (i) supplies culinary water to end users; and
  - (ii) has more than 500 service connections.
- (e) "Water conservancy district" means an entity formed under Title 17B, Chapter 2a, Part 10, Water Conservancy District Act.
- (f) "Water conservation plan" means a written document that contains existing and proposed water conservation measures describing what will be done by retail water providers, water conservancy districts, and the end user of culinary water to help conserve water and limit or reduce its use in the state in terms of per capita consumption so that adequate supplies of water are available for future needs.

(2) (a) Each water conservation plan shall contain:
- (i) a clearly stated overall water use reduction goal and an implementation plan for each of the water conservation measures it chooses to use, including a timeline for action and an evaluation process to measure progress;
- (ii) a requirement that each water conservancy district and retail water provider devote part of at least one regular meeting every five years of its governing body to a discussion and formal adoption of the water conservation plan, and allow public comment on it;
- (iii) a requirement that a notification procedure be implemented that includes the delivery of the water conservation plan to the media and to the governing body of each municipality and county served by the water conservancy district or retail water provider; and
- (iv) a copy of the minutes of the meeting and the notification procedure required in Subsections (2)(a)(ii) and (iii) which shall be added as an appendix to the plan.

(b) A water conservation plan may include information regarding:
- (i) the installation and use of water efficient fixtures and appliances, including toilets, shower fixtures, and faucets;
- (ii) residential and commercial landscapes and irrigation that require less water to maintain;
- (iii) more water efficient industrial and commercial processes involving the use of water;
- (iv) water reuse systems, both potable and not potable;
- (v) distribution system leak repair;
- (vi) dissemination of public information regarding more efficient use of water, including public education programs, customer water use audits, and water saving demonstrations;
- (vii) water rate structures designed to encourage more efficient use of water;
- (viii) statutes, ordinances, codes, or regulations designed to encourage more efficient use of water by means such as water efficient fixtures and landscapes;
- (ix) incentives to implement water efficient techniques, including rebates to water users to encourage the implementation of more water efficient measures; and
- (x) other measures designed to conserve water.

(c) The Division of Water Resources may be contacted for information and technical resources regarding measures listed in Subsections (2)(b)(i) through (2)(b)(x).

(3) (a) Before April 1, 1999, each water conservancy district and each retail water provider shall:
- (i) (A) prepare and adopt a water conservation plan if one has not already been adopted; or
  (B) if the district or provider has already adopted a water conservation plan, review the existing water conservation plan to determine if it should be amended and, if so, amend the water conservation plan; and
- (ii) file a copy of the water conservation plan or amended water conservation plan with the division.

(b) Before adopting or amending a water conservation plan, each water conservancy district or retail water provider shall hold a public hearing with reasonable, advance public notice.

(4) (a) The board shall:
  (i) provide guidelines and technical resources to retail water providers and water conservancy districts to prepare and implement water conservation plans;
  (ii) investigate alternative measures designed to conserve water; and
  (iii) report regarding its compliance with the act and impressions of the overall quality of the plans submitted to the Natural Resources, Agriculture, and Environment Interim Committee of the Legislature at its meeting in November 2004.

(b) The board shall publish an annual report in a paper of state-wide distribution specifying the retail water providers and water conservancy districts that do not have a current water conservation plan on file with the board at the end of the calendar year.

(5) A water conservancy district or retail water provider may only receive state funds for water development if they comply with the requirements of this act.

(6) Each water conservancy district and retail water provider specified under Subsection (3)(a) shall:
(a) update its water conservation plan no less frequently than every five years; and
(b) follow the procedures required under Subsection (3) when updating the water conservation plan.

(7) It is the intent of the Legislature that the water conservation plans, amendments to existing water conservation plans, and the studies and report by the board be handled within the existing budgets of the respective entities or agencies.

Amended by Chapter 329, 2007 General Session

Minutes

DEPARTMENT *of* PUBLIC UTILITIES
ADMINISTRATION

Salt Lake City
Public Utilities Advisory Committee
Minutes
September 25, 2014

The Public Utilities Advisory Committee meeting was held at 7:00 a.m. August 28, 2014 at 1530 South West Temple, Salt Lake City, Utah. Committee members present: Dixie Huefner, Dwight Butler, Roger Player and Kent Moore. Committee members Larry Myers, Allen Orr and Jani Iwamoto were absent. Salt Lake City Public Utilities employees present were Jeff Niermeyer, Tom Ward, Jim Lewis, Jesse Stewart, Chuck Call, Jason Brown, Brad Stewart, Stephanie Duer, Mark Stanley, Dave Pearson, Nick Kryger and Zee Smith. Also in attendance were Rusty Vetter, SLC Attorney's Office; Holly Hilton, SLC Mayor's Office; Mike Wilson, MWDSLS; Mike Collins and Keith Larson, Bowen Collins & Associates; Jim Olson, Waterworks Eng; Mark Haik; Tim Bardsley, Western Water Assessment; Alan Domonoske, Carollo Engineering. ??????????????

Approve Minutes of August 28, 2014 Meeting

Committee member Roger Player moved and committee member Dixie Huefner seconded the motion to approve the minutes of the August 28, 2014 meeting as amended. All members present voted aye.

Financial Report – Jim Lewis

Mountain Accord Update – Laura Briefer

Water Conservation Master Plan – Stephanie Duer

Committee member Dixie Huefner made a motion and Committee member Roger Player seconded the motion to approve the Water Conservation Master Plan with minor edits, and changes as identified, and highlighting an educational approach of voluntary action by consumers of water. All members present voted aye.

Pretreatment Local Limits Revisions – Dave Koltz

Committee member Kent Moore made a motion and Committee member Larry Myers seconded the motion to approve and accept the proposed local limit changes and forward the report to the Mayor and City Council. All members present voted aye.

Adjourn 8:2 a.m.

SALT LAKE CITY ORDINANCE
No. _____ of 2003
(Enacting new Sections 17.16.092 and 17.16.792, relating to a Water Shortage Contingency Plan, and related civil fines.)
AN ORDINANCE ENACTING NEW SECTIONS 17.16.092 AND 17.16.792, RELATING TO THE PREPARATION AND IMPLEMENTATION OF A WATER SHORTAGE CONTINGENCY PLAN AND RELATED CIVIL FINES.
Be it ordained by the City Council of Salt Lake City, Utah:

SECTION 1. Section 17.16.092 of the Salt Lake City Code is hereby enacted, to read as follows:

17.16.092 Water Shortage Management

A. Declaration of Policy. Given the prevailing semi-arid 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 78-10-32, Utah Code Annotated, and shall be revised from time to time as conditions and circumstances warrant. The Plan shall, among other things (i) establish graduated stages of water shortage severity, and (ii) 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 (i) the projected water supply from all sources is sixty (60) percent or less of the average annual water supply, or (ii) 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 Code. Any customer who fails to promptly pay any civil fine imposed by the Director shall be subject to having the water supply to the premises of such customer shutoff. Water service shall be restored only upon full payment of the civil fine imposed, any penalty provided for in Section 17.16.790, and the turn-on fee provided in Section 17.16.660. In addition, the Director may install flow restrictors in appropriate circumstances.

E. Plan Non-Exclusive. 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.

SECTION 2. Section 17.16.792 of the Salt Lake City Code is hereby enacted, to read as follows:

17.16.792 Water Shortage Contingency Plan-Civil Fines

A. Any customer of the City's municipal and industrial water system found to be in violation of any mandatory water use restriction in effect from time to

time under the Water Shortage Contingency Plan established under Section 17.16.092, shall be subject to the following maximum civil fines, and to water service shut-off, as follows:

First violation:	$100
Second violation:	$250
Third violation:	$500
Fourth violation:	$1,000
Fifth violation and thereafter:	$1,000 and water service shut-off

The violation level shall be based on violation history for the preceding 12 months. A civil fine for a customer's first violation shall be imposed only after the issuance of a written warning to such customer. Any civil fine based on a violation susceptible to corrective action shall be imposed only after failure by the customer to take such corrective action within a reasonable period of time, as determined by the Director, taking into account the nature of the action needed and the anticipated cost. "Customer" for purposes of this Section 17.16.792 and Section 17.16.092 of the Salt lake City Code, shall mean and include any person responsible, whether by ordinance or by contract between the city and such person, to pay the water charges on any account for use of water from the city's municipal and industrial water treatment and distribution system, whether the location at which such water is used is situated within or outside of the corporate limits of the city. It is the intent of the city that compliance with the provisions of Section 17.16.092, as enforced pursuant to this Section, by customers situated outside of the corporate limits of the city shall be a contractual condition of continued water service.

B. Any customer subject to a civil fine under this Section shall be notified by the Director, in writing, of the date, nature, and circumstances of the violation, which notification shall be delivered by posting such notice at a conspicuous location on the property, and by mailing notice, by certified mail, no more than 15 calendar days after the date of occurrence of the violation. The notice shall advise the customer of his/her right to protest the fine to a hearing officer, which shall be the Director or his or her designee, within ten business days after receipt of the notice. The hearing officer shall have the authority to adjust the fine to take into account any extenuating circumstances. Any determination by the hearing officer may be appealed to a three (3) member Water Shortage Appeals Panel. The City Council shall designate three (3) members of the Public Utilities Advisory Committee to serve on

the Panel, provided, however, that the Director may designate other members of the PUAC to serve as alternates as needed. All decisions of the Water Shortage Appeals Panel shall be final.

C. All fines collected pursuant to this Section shall be set aside in a segregated fund within the Public Utilities Enterprise Fund, and used exclusively for paying all or a portion of the costs and expenses incurred by the City in connection with the implementation and administration of the Plan and other elements of the City's water conservation program.

SECTION 4. This ordinance shall take effect immediately upon the date of its first publication.

ATTEST:

Passed by the City Council of Salt Lake City, Utah

this _____ day of _____, 2003.

_____ CHIEF DEPUTY CITY RECORDER

Transmitted to Mayor on _____.

Mayor's Action: _____Approved. _____Vetoed.

_____ CHIEF DEPUTY CITY RECORDER

(SEAL)

_____ CHAIRPERSON

_____ MAYOR

Bill No. _____ of 2003. Published: _____.

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WATER SHORTAGE CONTINGENCY PLAN

Salt Lake City Department of Public Utilities
Last Modified June 2003

SECTION I: DECLARATION OF POLICY, PURPOSE, AND INTENT

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety, and at the same time minimize the adverse impacts of water supply shortages or other water supply emergency conditions, the Salt Lake City Department of Public Utilities (Public Utilities) hereby adopts the following Plan to address water shortages brought about by drought, service interruption, or other emergency or event.

This Plan is intended as a supplement to the Water Conservation Master Plan. For information pertaining to Public Utilities long-term water conservation plans and measures, as well as support information on water conservation, consult the appropriate section of the Water Conservation Master Plan.

SECTION II: LEGAL AUTHORITY

This Plan is adopted by Public Utilities pursuant to the direction of the City Council contained in Section 17.16.092, Salt Lake City Code (hereafter referred to as the Ordinance).

SECTION III: APPLICATION

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by Public Utilities.

SECTION IV: DEFINITIONS

For the purposes of this Plan, the following definitions shall apply:

Acre feet (AF): A quantity of volume of water that covers one acre to a depth of one foot; equal to 43,560 cubic feet or 325,851 gallons.

Average Annual Demand: 105,000 AF as measured from supply to conduit.

Average Annual Supply: 126,900 AF, as of January 1, 2003. In 2005, Salt Lake City's average annual supply will increase by 4000 AF per year for five years as a result of additional Central Utah Project water, increasing the average annual supply by 20,000 AF in 2008.

Best Management Practices (BMPs): Applicable Best Management Practices for a particular industry (see Appendices for examples).

Conservation: Those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve efficiency in the use of water, or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Culinary Water: See Municipal and Industrial Water.

Customer: Any person, company, corporation, partnership, association, organization, or other legal entity using water supplied by Public Utilities through system connections, or legal or contractual agreement.

Director: Shall mean the Director of Salt Lake City Department of Public Utilities, or his or her designee.

Even number address: Street addresses ending in 0, 2, 4, 6, or 8 and locations without addresses.

Hearing Officer: Shall mean the Director of Salt Lake City Department of Public Utilities or such other employee of Public Utilities as the Director shall designate from time to time.

Hearing Review Panel: A panel designated by the Salt Lake City Council and comprised of three (3) current members of the Public Utilities Advisory Committee.

Industrial Water Use: The use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape Irrigation Use: Water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including lawns, gardens, golf courses, parks, rights-of-way, medians, and park strips.

Municipal and Industrial Water (M&I): Water treated by Public Utilities specifically to meet Safe Drinking Water Standards as defined by the Safe Drinking **Water Act.** For the purpose of this Plan, M&I water is divided into the following

categories: 1) domestic use is that water which is used in private residences, apartment houses, etc., for drinking, bathing, cleaning, landscape sprinkling, sanitary, and other purposes; 2) commercial and industrial use is that water used by commercial establishments and industries; and 3) public use includes water required for use in parks, public golf courses, civic buildings, schools, hospitals, and churches.

Odd numbered address: Street addresses ending in 1, 3, 5, 7, or 9.

Ordinance: Ordinance adopted by Salt Lake City Council, enacting Section 17.16.092 of the Salt Lake City Code, authorizing the adoption of the Plan.

Positive Pressure Nozzle: A spring-loaded nozzle attached to the end of a hose that requires positive pressure to maintain water flow.

Projected Demand: The estimated water demand at any given point in time (stated as a percentage of the average annual demand or as total gallons per day).

Projected Supply: The anticipated supply at any given point in time (stated as a percentage of the average annual supply or as total gallons per day).

Public Utilities: Salt Lake City Department of Public Utilities

Reclaimed Water: Wastewater treated by Public Utilities to levels appropriate for irrigation and industrial uses

Response Plan: Shall mean the Water Shortage Response Summary, an attachment to the Plan which identifies each Water Shortage Stage and the specific calls to action, both voluntary and restricted. This Response Summary is to be updated as the Plan is updated.

SECTION V: CRITERIA FOR INITIATION AND TERMINATION OF WATER SHORTAGE STAGES

Monitoring

All relevant components of the Salt Lake City water system will be monitored to ensure timely response to water situations by the Director. Public Utilities will monitor supply, treatment and distribution system, demand trends, and potential constraints, for the purpose of identifying potential shortages. The Director shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when specified triggers are reached.

Initiation of Water Shortage Stage

Meeting or exceeding one or more trigger conditions will be sufficient cause to initiate a corresponding Water Shortage Stage. However, the Director can decide that a stage not be initiated under these circumstances. The decision may be influenced by factors that include, but are not limited to, the time of year, weather conditions, anticipation of replenished water supplies, or anticipation that facilities will be placed on-line to meet water demand. The Director shall make a recommendation to initiate a stage or a stage change to the Mayor, who will make the final determination in accordance with the Ordinance.

It is not incumbent on the Director to implement lower steps before higher ones. If the Director judges the situation to warrant it, he can declare a higher stage of water shortage response at any time. All measures contained in the Plan for lower levels of response automatically come into action at that point.

Termination of Water Shortage Stage

Termination of the Plan stage will be announced when the trigger conditions that initiated the drought measures have subsided and the shortage no longer exists, by the determination of the Director.

Upon terminating a stage, it is not incumbent on the Director to implement the stage immediately lower. If the Director does not designate a Plan stage, then the next lower stage becomes active.

SECTION VI: NOTIFICATION AND EDUCATION

The Director shall notify the public of the initiation of the applicable Plan stage and corresponding conservation measures, or the termination of a Plan stage and corresponding conservation measures, by one or more of the following means:

- Publication of notices in a newspaper of general circulation
- Direct mail to each customer on the utility bill, as a bill insert, and/or as a special mailing
- Public service announcements
- Signs posted in public places
- Take-home fliers at schools
- Public meetings/community council meetings
- Public Utilities Water Conservation website
- Salt Lake City municipal website

Customer Agency Notification:
The Director shall endeavor to notify directly the following individuals and entities:

- Salt Lake City Council
- Public Utilities Advisory Committee
- Fire Chief(s)
- City and/or County Emergency Management Coordinator(s)
- Salt Lake City Department of Public Services
- State Disaster District / Department of Public Safety
- Critical water users, i.e. hospitals

Additionally, Public Utilities will periodically provide customers and customer agencies with information about the Plan, including information about water conditions under which each stage of the Plan is to be initiated or terminated, the response measures to be implemented in each stage, as well as any Plan updates.

The success of any water conservation program in achieving short term and immediate water conservation targets as might be required under a water shortage is dependant on Public Utilities' ability to convey to the community the water-supply situation, the expected response actions, and clear and measurable targets. The Response Summary and Appendices have been developed to enhance public understanding of water supply levels, response actions, and restrictions.

SECTION VII: STAGES AND RESPONSES

This Plan provides for five Water Shortage stages and responses of increasing severity, as progressively more serious conditions warrant. The triggering criteria described are based on the projected percentage of water available from a number of sources, including, but not limited to snow pack, soil moisture, surface water, ground water, stored water, and spot market water. Degrees of flexibility have been built into this Plan to allow for timely adjustments at all levels of planning and implementation.

Key elements of a successful demand management program are that the resources and hardships are shared as equitably as possible, and that customers are kept informed about the status of the shortage.

The five stages are characterized as follows:

- **STAGE 1—ADVISORY Stage:** the public is informed as early as meaningful data are available that a possible shortage may occur.
- **STAGE 2—MILD Stage:** this stage is initiated if supply conditions worsen and relies on voluntary cooperation and support of water customers to meet target consumption goals. During this stage, specific voluntary actions are suggested for all customers, and specific mandatory actions are identified for municipal customers, including parks, golf courses, schools, and other government facilities.
- **STAGE 3—MODERATE Stage:** this stage is to be initiated if the Mild Stage does not result in the reduction needed, or circumstances warrant its initiation as specified in Section V: Initiation. This stage increases the prohibition or limitation of certain actions and relies on both voluntary and mandatory actions.
- **STAGE 4—SEVERE Stage:** this stage is to be initiated if the Moderate Stage does not result in the reduction needed, or circumstances warrant its initiation as specified in Section V: Initiation. The Severe Stage has increasingly stringent prohibitions and limits on certain actions, including certain mandatory actions for residential and commercial customers.
- **STAGE 5—CRITICAL Stage:** this stage addresses the most critical need for demand reduction and increases the number of restricted water uses and mandatory actions. This could be used as a stage of a progressive situation, such as a drought of increasing severity, or to address an immediate crisis, such as a facility failure.

STAGE 1—ADVISORY
The ADVISORY STAGE is intended to increase the community's awareness of the potential for future water shortages. Under this stage, conservation efforts which are on-going will receive additional emphasis, and measures not pursued during normal water supply times because they are not cost-effective will be re-evaluated.

The ADVISORY STAGE triggers an increase in public education and information to assist all customers impacted by the shortage in order that those customers better understand the state of the water shortage condition and the need for voluntary action.

Trigger
- Total reservoir storage is not projected to be at standard operating capacity on or near April 1, due to exceptionally low snow pack, precipitation and/or lack or carryover storage from the previous year
- Total reservoir storage and predicted inflows are significantly below historical normal for the current time of year, and supply modeling indicates that expected demands may not be met if current trend continues or worsens
- Other water supplies are protected to be below standard operating capacity or historic levels

Objectives
- To prepare Public Utilities, the City, relevant agencies, and water customers for a potential water shortage thereby allowing all parties adequate time for planning and coordination
- To undertake supply management actions that forestall or minimize the need for later, more stringent supply or demand management actions
- To minimize the waste of water through carelessness, either intentional or accidental

STAGE 2—MILD
The conservation measures in this stage are focused on specific voluntary actions. However, some prohibitions on water waste are enforced with fines and/or flow restrictors or disconnection.

Trigger
- Supply levels identified in the ADVISORY STAGE have not improved
- Demand levels indicate the need for a more systematic response to manage the situation
- Water supply levels are projected to be eighty (80) percent of the Average Annual Supply.

Response
As outlined in the Response Summary.

Target:
- Achieve a five (5) percent reduction in total daily water use or Average Annual Demand.

Objectives:
- To maintain or reduce demand to meet target consumption levels by customer voluntary actions
- To forestall or minimize the need for later, more stringent actions
- To minimize disruption to customers' lives and businesses while meeting target consumption goals
- To maintain the highest water quality standards throughout the shortage

Termination of Stage
- The Director may rescinded STAGE 2 of the Plan when the conditions listed as triggering events have ceased to exist for such a period as deemed appropriate and reasonable. Upon termination of Stage 2, the ADVISORY STAGE becomes active unless otherwise stated.

STAGE 3—MODERATE
Demand reduction responses are voluntary, with the exception of Park, Golf, and other Government facilities, having some mandatory response actions.

Trigger
The Director would approve progression to this stage if the goals established in the preceding stage have not been met and additional action is needed. The specific voluntary restrictions imposed during the MODERATE STAGE would be determined based on the season of year, targeted demand levels, and other considerations.

- Projected water supply is seventy (70) percent of the Average Annual Supply
- Supply levels identified in the MILD STAGE have not improved
- Demand levels indicate the need for a more systematic response to manage the situation

Response
- As outlined in the Response Summary.

Target
- Achieve a fifteen (15) percent reduction in total daily demand or Average Annual Demand.

Objectives
- To achieve targeted consumption reduction goals by restricting defined water uses
- To ensure that adequate water supply will be available for the duration of the situation to protect public health and safety and to balance the need for stream flows
- To minimize the disruption to customers' lives and businesses while meeting target consumption goals
- To maintain the highest water quality standards throughout the shortage
- To promote equity amongst water customers by establishing clear restrictions that affect all customers

Termination of Stage
- The Director may rescinded STAGE 3 of the Plan when the conditions listed as triggering events have ceased to exist for such a period as deemed appropriate and reasonable.

STAGE 4—SEVERE
- Some elements of STAGE 4 will become mandatory and be enforced, in addition to elements under previous stages. Such elements may include mandatory curtailments of water for certain types of non-essential use.

Trigger
The Director would approve progression to this stage if the goals established in the MODERATE STAGE have not been met and additional action is needed. Increasingly stringent water restrictions may be established and enforced.

- Projected water supply is sixty (60) percent of the Average Annual Supply.
- Supply levels identified in the MODERATE STAGE have not improved
- Demand levels indicate the need for a more systematic response to manage the situation, including restricted or prohibited water uses

Response
- As outlined in the Response Summary.

Target
- Achieve a twenty-five (25) percent reduction in total daily water use or Average Annual Demand.

Objectives
- To achieve targeted consumption reduction goals by restricting defined water uses
- To ensure that adequate water supply will be available for the duration of the situation to protect public health and safety and to balance the need for stream flows
- To minimize the disruption to customers' lives and businesses while meeting target consumption goals
- To maintain the highest water quality standards throughout the shortage
- To promote equity amongst water customers by establishing clear restrictions that affect all customers

Termination of Stage
The Director may rescinded STAGE 4 of the Plan when the conditions listed as triggering events have ceased to exist for such a period as deemed appropriate and reasonable.

STAGE 5—CRITICAL
- Elements under STAGE 5 are mandatory, unless otherwise stated.

Trigger
- The Director would approve progression to this stage if the goals established in the SEVERE STAGE have not been met and additional action is needed. Increasingly stringent water restrictions may be established and enforced.
- Major water line breaks, or pump or system failures, which cause unprecedented loss of capability to provide water service
- Natural or man-made contamination of the water supply source(s)
- Supply levels identified in the SEVERE STAGE have not improved
- A projected water supply of fifty (50) percent of the Average Annual Supply

Response
- As outlined in the Response Summary.

Target
- Achieve a thirty-five (35) percent reduction in total daily water use.

Objectives
- To achieve targeted consumption reduction goals by restricting defined water uses
- To ensure that adequate water supply will be available for the duration of the situation to protect public health and safety and to balance the need for stream flows
- To minimize the disruption to customers' lives and businesses while meeting target consumption goals
- To maintain the highest water quality standards throughout the shortage
- To promote equity amongst water customers by establishing clear restrictions that affect all customers

Termination of Stage
- The Director or his or her designee may rescinded STAGE 4 of the Plan when the conditions listed as triggering events have ceased to exist for such a period as deemed appropriate and reasonable by the Director.

SECTION VIII: ENFORCEMENT

Provisions of the Plan and Response Summary shall be enforced as indicated in the Ordinance.

Penalties for violation of any portion of the Plan are defined in the Ordinance. A civil fine for a customer's first violation shall be imposed only after the issuance of a written warning to such customer. Any civil fine based on a violation susceptible to corrective action shall be imposed only after failure by the customer to take such corrective action within a reasonable period of time, as determined by the Director, taking into account the nature of the action needed and the anticipated cost. The time allowed will vary with the nature of the violation; for instance, corrective measures can be taken more quickly for a violation of time-of-day restrictions than can be taken for a system repair or a pump retrofit for a fountain.

Subsequent violations will result in a formal violation notice, a fine, and/or water service shut off. Notification of a violation shall be as set forth in the Ordinance.

Customers violating any portion of the Plan as defined by Public Utilities shall be assessed a fine according to the following schedule. The violation level shall be based upon violation history for the preceding twelve (12) months.

The fines for a violation and each subsequent violation are as follows:

1st Violation	$ 100
2nd Violation	$ 250
3rd Violation	$ 500
4th Violation	$ 1000
5th Violation	Flow restrictor or interruption of service until corrective action is taken and previous fines paid in full

If a service is disconnected, Public Utilities may assess and collect a fee before service is restored. That fee is in addition to other fines or charges imposed under a particular water shortage response measure.

Any customer subject to a civil fine shall be notified by the Director, in writing, of the date, nature, and circumstances of the violation, which notification shall be delivered by certified mail no more than 15 calendar days after the date of

occurrence of the violation. The notice shall advise the customer of his/her right to protest the fine to the Director, or his or her designee, within ten business days after receipt of the notice. Any determination by the Director or designee may be appealed to the Water Shortage Appeals Panel, as established in the Ordinance. All decisions of the Water Shortage Appeals Panel shall be final.

The Director may grant written variances to persons who apply, on forms supplied by Public Utilities, for usage of water not in compliance with the Plan or for relief from a fine. Variances may be granted if it is found that such water use is necessary to prevent an emergency condition relating to health or safety, extreme economic hardship, or essential government services such as police, fire, and similar emergency services. Variances may also be considered for customers under irrigation targets who have already made every reasonable effort to reduce water use.

Monies collected from fines are not considered rates for the production of water revenue. Those monies will be placed in a special fund, to be administered by Public Utilities, and will be used for, but not limited to, meeting the expenses of enforcement of restrictions under this Plan, producing educational materials relating to water conservation, promoting information related to the Plan, or augmenting water supplies.

SECTION IX: LIMITED EXEMPTION FOR RECLAIMED WATER

The Director may exempt certain uses and users of Reclaimed Water from any or all of the water use restriction requirements contained in this Plan. Users must apply for exemption on forms supplied by Public Utilities. Only the use of Reclaimed Water may be exempted from the provisions of the Plan. Users of both Reclaimed Water and M&I Water will not be exempt from restrictions on the use of M&I Water, and must comply with restrictions in effect during all stages of the Plan.

The Director, in the interest of equity and community acceptance of such exemption on the use of Reclaimed Water during a declared drought, water shortage, or other water emergency, may require exempt users to clearly post notices to the effect that the water being used is not from the public drinking water supply, and that the use conforms to restrictions in force at the time. Failure to make such posting in a timely fashion may, at the discretion of the Director, result in loss of exemption from the provisions of this Plan.

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LeRoy W. Hooton, *Director, Department Public Utilities*

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Date

Advisory Stage		
Follow guidelines for water conservation as presented in Water Conservation Master Plan		
Mild Stage: Reduction Goal 5 to 14 Percent		
General Information: Water Waste may be subject to fines and/or delivery restriction or disconnection		
Single Family, Duplex, and Triplex Residential		
Lawn Watering	Recommended	Voluntarily follow schedule (see Appendix A); Irrigation accounts follow Appendix C
Trees, shrubs, perennials, annuals, and vegetables	Recommended	It is encouraged that non-turf areas are watered separately and less frequently from lawn areas; use of hand-held hoses, hand-held buckets, drip irrigation, or subterranean irrigation recommended
Time of Day (applies to over-head sprays only)	Recommended	Avoid watering between 10 AM and 6 PM
Irrigation Systems	Recommended	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters
New Landscape	Recommended	No restrictions; spring and fall planting recommended
Pools, Jacuzzis, and Hot tubs	Recommended	No restrictions; utilize Best Management Practices (see Appendix I)
Fountains, Waterfalls, and Ponds	Recommended	No restrictions; the use of recirculation pumps is recommended
Hard-surface Washing	Recommended	No restrictions; the use of brooms is encouraged

Personal Vehicle Washing	Recommended	No restrictions; the use of hand held buckets or positive pressure nozzles encouraged
Commercial, Industrial, Business, Multi-family Apartments, and Home Owners Associations		
All Businesses, Industries, and Commercial Users	Recommended	Develop, adopt, and implement Best Management Practices for Water Conservation; reduce consumption 5 to 14 percent
Lawn Watering	Recommended	Voluntarily follow schedule (see Appendix A) if lawn not metered; Irrigation Accounts follow Appendix C.
Trees, shrubs, perennials, annuals, and vegetables	Recommended	It is recommended that non-turf areas are watered separately from lawn areas; use of hand-held hoses, hand-held buckets, drip irrigation, or subterranean irrigation recommended
Time of Day (applies to overhead or spray irrigation)	Recommended	Avoid watering between 10 AM and 6 PM
Irrigation Systems	Recommended	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters
New Landscape	Recommended	No restrictions; spring and fall planting recommended
Pools, Jacuzzis, and Hot tubs	Recommended	Utilize Best Management Practices (see Appendix I)
Fountains, Waterfalls, and Ponds	Recommended	No restrictions; the use of recirculation pumps is encouraged
Hard-surface Washing	Recommended	No restrictions; brooms are recommended
Commercial Car Washes	Recommended	No restrictions; implement Best Management Practices (see Appendix E)
Commercial and Fleet Vehicle Washing	Recommended	No restrictions; use Best Management Practices (see Appendix E)

Commercial Plant Nurseries	Recommended	No restrictions; utilize Best Management Practices; Voluntarily reduce all non-essential water use (see Appendix F)
Hotels/Lodging	Recommended	No restrictions; utilize Best Management Practices (see Appendix D)
Restaurants	Recommended	No restrictions; voluntarily do not serve water except upon request; utilize Best Management Practices (see Appendix H)
Parks, Golf, Schools, and other Government Facilities		
Lawn Watering	Mandatory	Follow established water target (See Appendix C); for sites without separate meters, follow Appendix A
Trees, shrubs, perennials, annuals, and vegetables	Recommended	Water separately and less frequently from lawn areas; use of hand-held hoses, hand-held buckets, drip irrigation, or subterranean irrigation recommended
Time of Day (applies to over-head sprays only)	Mandatory	No watering between 10 AM and 6 PM
Irrigation Systems	Mandatory	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters
New Landscape	Recommended	No restrictions; recommend installing in spring or fall
Fleet vehicles	Recommended	No more than once per week (emergency vehicles exempted)
Pools, Jacuzzis, and Hot tubs	Recommended	No restrictions; utilize Best Management Practices (see Appendix I)
Fountains, Waterfalls, and Ponds	Recommended	No restrictions; use of recirculation pumps is encouraged
Hard-surface washing	Recommended	No restrictions; use of brooms is encouraged
Moderate Stage: Reduction Goal 15 to 24 Percent		

General Information: Water Waste may be subject to fines and or delivery restriction or disconnection		
Single Family, Duplex, and Triplex Residential		
Lawn Watering	Recommended	Voluntarily follow schedule (see Appendix A); Irrigation accounts follow Appendix C
Trees, shrubs, perennials, annuals, and vegetables	Recommended	It is recommended that non-turf areas are watered separately and less frequently from lawn areas; use of hand-held hoses, hand-held buckets, drip irrigation, or subterranean irrigation recommended
Time of Day (applies to over-head sprays only)	Recommended	Avoid watering between 10 AM and 6 PM
Irrigation Systems	Recommended	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters
New Landscape	Recommended	No restrictions; recommend installing in spring or fall
Pools, Jacuzzis, and Hot tubs	Recommended	No restrictions; utilize Best Management Practices (see Appendix I)
Fountains, Waterfalls, and Ponds	Recommended	No restrictions; installation of recirculation pumps encouraged
Hard-surface Washing	Recommended	No restrictions; the use of brooms is encouraged
Personal Vehicle Washing	Recommended	No restrictions; the use of positive pressure nozzles and hand held buckets recommended
Commercial, Industrial, Business, Multi-family Apartments, and Home Owners Associations		
All Businesses, Industries, and Commercial Users	Recommended	Reduce consumption by 15 to 24 percent; Develop, adopt, and implement Best Management Practices for Water Conservation
Lawn Watering	Recommended	Voluntarily follow schedule (see Appendix A); Irrigation Accounts follow Appendix C

Trees, shrubs, perennials, annuals, and vegetables	Recommended	It is recommended that non-turf areas are watered separately and less frequently from lawn areas; use of hand-held hoses, hand-held buckets, drip irrigation, or subterranean irrigation recommended
Time of Day (applies to over-head sprays only)	Recommended	Avoid watering between hours of 10 AM and 6 PM
Irrigation Systems	Recommended	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters
New Landscape	Recommended	No restrictions; recommend installing in spring or fall
Pools, Jacuzzis, and Hot tubs	Recommended	No restrictions; utilize Best Management Practices (see Appendix I)
Fountains, Waterfalls, and Ponds	Recommended	May be filled; use of recirculation pump recommended
Hard-surface Washing	Recommended	No restrictions: the use of brooms are encouraged; use water only in cases of public health or safety
Commercial Car Washes	Recommended	Implement Best Management Practices (see Appendix E)
Commercial and Fleet Vehicle Washing	Recommended	May be washed no more often than once per week (see Appendix E) or with change in ownership or rental
Commercial Plant Nurseries	Recommended	Utilize Best Management Practices; Container and B&B stock exempted from designated watering restrictions (see Appendix F)
Hotels/Lodging	Recommended	Voluntarily do not change sheets or linens for multiple night stays; utilize Appendix D
Restaurants	Recommended	Serve water to customer only upon request; display table tents or public notice (see Appendix D)
Parks, Golf, Schools, and other Government Facilities		
Lawn Watering	Mandatory	Water target less 15 percent (see Appendix C)

Trees, shrubs, perennials, annuals, and vegetables	Recommended	Water separately and less frequently from lawn areas; use of hand-held hoses, hand-held buckets, drip irrigation, or subterranean irrigation recommended
Time of Day (applies to over-head sprays only)	Mandatory	No watering between 10 am and 6 pm
Irrigation Systems	Mandatory	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters
New Landscape	Recommended	No restrictions; recommend installing in Spring or Fall
Golf Courses	Mandatory	Water target less 15 percent
Pools, Jacuzzis, and Hot tubs	Recommended	No restrictions; the use of pool covers is encouraged; lower water level by four (4) inches to minimize loss due to splashing
Fountains, Waterfalls, and Ponds	Recommended	May be filled; use of recirculation pump recommended
Hard-surface Washing	Recommended	No washing of walks, drives, patios, gutters except for health or safety
Fleet vehicle washing	Recommended	No more than once per week with equipment or at certified car wash (emergency vehicles excepted); utilize Best Management Practices (see appendix E)
Severe Stage: Reduction Goal 25 to 34 Percent		
General Information: Violation of restrictions and/or water waste may be subject to fines and or delivery restriction or disconnection		
Single Family, Duplex, and Triplex Residential		
Lawn Watering	Mandatory	Permitted two days per week (see Appendix B)
Trees, shrubs, perennials, annuals, and vegetables	Mandatory	Water with hand-held hoses, hand-held buckets, or drip irrigation only

Time of Day (applies to over-head sprays only)	Mandatory	No watering between hours of 10 AM and 6 PM
Irrigation Systems	Mandatory	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters
New Landscapes	Recommended	Recommend installing in spring or fall; must follow mandatory watering practices (new lawns up to 42 days after installation may be watered more frequently but must comply with the time of day rule)
Pools, Jacuzzis, and Hot tubs	Recommended	No restrictions; the use of pool covers is encouraged; lower water level by four (4) inches to minimize loss due to splashing
Fountains, Waterfalls, and Ponds	Mandatory	Outdoor features may not be operated if water sprays or shoots into air; must have recirculation pump
Hard-surface Washing	Mandatory	No washing of walks, drives, patios, gutters
Personal Vehicle Washing	Mandatory	Only with bucket or hand-held hose with positive pressure nozzle
Commercial, Industrial, Business, Multi-family Apartments, and Home Owners Associations		
All Businesses, Industries, and Commercial Users	Recommended	Reduce consumption by 25 to 34 percent; Develop, adopt, and implement Best Management Practices for Water Conservation
Lawn Watering	Mandatory	Permitted two days per week (see Appendix B)
Trees, shrubs, perennials, annuals, and vegetables	Mandatory	Water with hand-held hoses, hand-held buckets, drip irrigation, or subterranean irrigation
Time of Day (applies to over-head sprays only)	Mandatory	No watering between hours of 10 AM and 6 PM
Irrigation Systems	Mandatory	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters

New Landscapes	Recommended	Recommended installing in spring or fall; must follow mandatory watering practices (new lawns up to 42 days after installation may be watered more frequently but must comply with the time of day rule)
Pools and Jacuzzis	Mandatory	May be filled if utilizing Best Management Practices (see Appendix I)
Fountains, Waterfalls, and Ponds	Mandatory	Outdoor features may not be operated if water sprays or shoots into air; must have recirculation pump
Hard-surface Washing	Mandatory	No washing of walks, drives, patios, gutters except for health or safety
Commercial Car Washes	Mandatory	Utilize Best Management Practices (see Appendix E)
Commercial and Fleet Vehicles	Mandatory	No more than once per week unless car changes ownership; utilize Best Management Practices (see Appendix E)
Commercial Plant Nurseries	Mandatory	Utilize Best Management Practices (see Appendix F)
Hotels/Lodging	Mandatory	Utilize Best Management Practices (see Appendix D)
Restaurants	Mandatory	Required to not serve water except upon request; utilize Best Management Practices (see Appendix D)
Parks, Golf, Schools, and other Government Facilities		
Lawn Watering	Mandatory	Water target less 25 percent (see Appendix C)
Time of Day (applies to over-head sprays only)	Mandatory	No watering between 10 am and 6 pm
Irrigation Systems	Mandatory	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads; minimize spray on walks, drives, and gutters
New Landscapes	Mandatory	No new landscapes unless already under contract at time of stage implementation or if irrigated by drip system
Golf courses	Mandatory	Water Target less 25 percent

Fleet vehicle washing	Mandatory	No more than once per week (emergency vehicles excepted)
Pools, Jacuzzis, and Hot tubs	Mandatory	Utilize Best Management Practices (see Appendix I)
Fountains, Waterfalls, and Ponds	Mandatory	Outdoor features may not be operated if water sprays or shoots into air; must have recirculation pump
Hard-surface washing	Mandatory	No washing except for health or safety
Critical Stage: Reduction Goal 35 Percent or more		
General Information: Violation of restrictions and/or water waste may be subject to fines and or delivery restriction or disconnection		
Single Family, Duplex, and Triplex Residential		
Lawn watering	Mandatory	Prohibited
Trees, shrubs, perennials, and vegetables	Mandatory	On permitted day (see Appendix B) using hand-held hoses, hand-held buckets, or drip irrigation only
Time of Day (applies to over-head sprays only)	Mandatory	Prohibited between the hours of 10 AM and 6 PM
New Landscape	Mandatory	No new landscapes without permit (see Appendix G)
Pools, Jacuzzis, and Hot tubs	Mandatory	May not be filled
Fountains, Waterfalls, and Ponds	Mandatory	May not be filled
Hard-surface washing	Mandatory	No washing of walks, drives, patios, gutters
Personal vehicle washing	Mandatory	Prohibited unless at a certified carwash
Commercial, Industrial, Business, Multi-family Apartments, and Home Owners Associations		
All Businesses, Industries, and Commercial Users	Mandatory	Develop a plan to reduce consumption by at least 35 percent; Develop and/or adopt, and implement Best Management Practices for Water Conservation

Lawn watering	Mandatory	Prohibited
Trees, shrubs, perennials, and vegetables	Mandatory	On permitted day (see Appendix B) using hand-held hoses, hand-held buckets, or drip irrigation only
Time of Day (applies to over-head sprays only)	Mandatory	Prohibited between the hours of 10 AM and 6 PM
Irrigation System	Mandatory	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads
New Landscape	Mandatory	No new landscapes without permit (see Appendix G)
Pools and Jacuzzis	Mandatory	May be filled if utilizing Best Management Practices (see Appendix I); no sprays or fountains
Fountains, Waterfalls, and Ponds	Mandatory	May not be filled
Hard-surface washing	Mandatory	No washing of walks, drives, patios, gutters except for health or safety
Commercial Car Washes	Mandatory	Implement Best Management Practices (see Appendix E)
Commercial and Fleet Vehicles	Mandatory	Washing of cars is prohibited (emergency vehicles and instances of public safety are excluded)
Commercial Plant Nurseries	Mandatory	Utilize Best Management Practices (see Appendix F)
Hotels/Lodging	Mandatory	Utilize Best Management Practices; request that laundry not be washed daily unless requested by guest; display table tents or public notice
Restaurants	Mandatory	Will not serve water except upon request; Utilize Best Management Practices
Parks, Golf, Schools, and other Public Facilities		
Lawn Watering	Mandatory	Not allowed without permit (see Appendix G)
Trees, shrubs, perennials, and vegetables	Mandatory	Hand-held hoses, hand-held buckets, drip irrigation, or water trucks only
Time of Day (applies to over-head sprays only)	Mandatory	No watering between 10 am and 6 pm

New Landscapes	Mandatory	Prohibited except by permit (see Appendix G)
Golf Courses	Mandatory	Watering greens and tees allowed by permit (see Appendix G); no watering of roughs and fairways unless from non-culinary source
Irrigation System	Mandatory	Maintain irrigation systems in good working order with no damaged, misaligned, or missing sprinkler heads
Fleet vehicle washing	Mandatory	Not allowed; emergency vehicles excepted
Pools, Jacuzzis, and Hot tubs	Mandatory	May be filled if utilizing Best Management Practices (see Appendix I); no sprays or fountains
Fountains, Waterfalls, and Ponds	Mandatory	Not allowed
Hard surface washing	Mandatory	Prohibited except for public safety and health

Lawn Watering Schedule

Salt Lake City Department of Public Utilities, in conjunction with Utah State University, developed this watering schedule based on historic ET data provided by USU. For more information on lawn and landscape maintenance, including irrigation consult the SLC BMPs for the Conservation and Protection of Water Resources, available online at www.slcgov.com/waterconservation.

It is recommended that ½ inch of water be applied to the lawn during each interval. With average water pressure and fixed pop-up heads, this would take approximately 21 minutes. It is best that the water be applied in cycles in order to maximize penetration of water into the soil and to the root zone. For example, set the automatic timer to run for seven minutes, repeated three times, with one hour between each cycle to achieve 21 minutes or ½ inch of water per interval. But keep in mind this schedule is based on averages, and your lawn may require a different cycle time and you may need to water less frequently.

Lawn Watering Schedule	
Month	Interval (1/2 inch of water per interval)
Startup until April 30	Once every 7-14 days as necessary; no watering if there is rain
May	Once every 4 to 7 days
June, July, and August	Once every 3-4 days
September	Once every 7-10 days
October to shutdown	Once every 7 to 14 days as necessary; no watering if there is rain

Watering less frequently and more deeply will save water, money, and time by reducing water consumption, decreasing the need for frequent fertilizer applications, lessening the likelihood of disease, reducing the presence of weeds, and making your lawn stronger and healthier.

It is also recommended that mowing heights be set to 2-1/2 to 3 inches. Longer grass blades mean deeper roots and shaded soil, thus reducing water demand. An added benefit to mowing higher is that weed seeds are less likely to germinate, and that translates to fewer weeds.

Regularly check your irrigation system for misaligned, broken, or missing sprinkler heads. Ideally, systems should be visually inspected after each mowing; but at the least, conduct monthly inspections. Annual irrigation audits can help you in identifying system inefficiencies and fine tuning your irrigation schedule.

Appendix B:

Limited Lawn Watering Schedule

This watering schedule is to be followed when a STAGE 4—SEVERE water shortage has been declared.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Even Addresses Single-family residential	No Watering Public Utilities approved exceptions only	-Home Owners Associations -Apartments -Multi-family (Duplex, 3plex, etc) -Government -Parks	Odd Addresses Single-family residential	Even Addresses Single-family residential -Parks	-Home Owners Associations -Apartments -Multi-family (Duplex, 3plex, etc) -Government	Odd Addresses Single-family residential

Even or Odd Addresses
Determined by the last digit of the home address

Watering Hours
6 PM to Midnight on your assigned watering day
Midnight to 10 AM on your assigned watering day

Irrigation-Only Meter Targets

Meters that are read only during non-winter months and that service only landscape or other outdoor features are referred to as irrigation-only accounts. Under the Department of Public Utilities rate structure, irrigation-only accounts receive a water-use target based on a number of factors, including, but not limited to the total area being irrigated, historical evapotranspiration data (ET), landscape coefficients, and demand levels, with each account receiving a unique target. The formula used to calculate each water-use target was developed by the Utah State University, utilizing local ET data.

Water used within the target will be billed, per unit, in Tier 2; water consumption exceeding the target will be billed, per unit, in Tier 3 or Tier 4, as appropriate.

All water customers receiving a water target should strive to maintain their irrigation system in optimum operating standards to maximize efficiencies and minimize water waste. During periods of declared water shortages, irrigation-only accounts may be called upon to make measurable reductions in outdoor water consumption so as to help in reducing overall water demand.

For information on how to save water in the landscape, refer to Appendix F: Best Management Practices for the Green Industry, or consult SLC BMPs for the Conservation and Protection of Water Resources at www.slcgov.com/waterconservation.

Hotel and Lodging Water Conservation Best Management Practices

Water conservation needs to be a part of our daily activities. The hotel and lodging industry offers many opportunities to save water without compromising the quality of the visit or public health and safety. The average-sized hotel, with 150 rooms, can save about $30,000 a year if 65 percent of their guests participate in a linen-reuse program. Every employee needs to understand the importance of conservation and be educated on water saving practices and how their job affects water use. Make conservation part of their job and part of the day to day work environment.

Consider using this simple three step process

- Educate and involve all employees on water conservation
- Locate all water-using sources (dishwashing machines, wash sinks, cooling
- water, HVAC, etc in your facility) and examine for leaks, check for inefficiencies, and conduct repairs
- Identify and implement water conservation practices

Icemakers

- Replace old icemakers with new air-cooled, water efficient model. The useful life of an icemaker is about five years
- Use ice flake machines rather than ice cube machines
- Use softened water in ice cube machines to minimize bleed-off
- Collect spent cooling water from water-cooled icemakers and use it for non-potable purposes such as mopping floors

Laundry

- Operate laundry equipment with full loads only
- Reduce water levels, if possible, for partial loads
- Replace or modify existing conventional laundry equipment (e.g., washer-
- extractors) to reduce water use
- Install a computer-controlled rinse water reclamation system
- Install a wash and rinse water treatment and reclamation system
- Install a continuous-batch washer
- Install an electrically generated ozone laundry system
- Adjust chemicals or washer program to reduce the number of wash and rinse steps
- Avoid excessive backflushing of filters or softeners; backflush only when necessary
- Place “save water” notices in guest rooms
- Encourage your guests to forego daily linen changes for multiple night visits
- Replace conventional washers with high-efficiency, horizontal axis machines

Building Maintenance

- Replace water-cooled refrigeration units with air-cooled units
- Repair leaks and malfunctioning equipment promptly
- Install on-demand, point-of-use hot water dispensers where feasible, eliminating the need to run faucets to produce hot water
- Replace worn-out fixtures with water-conserving models
- Install low flow toilets and faucet aerators in restrooms

Exterior Areas

- In the Landscape
- Water landscapes only as needed, following the recommended guidelines in Appendix A
- Remove turf from hard to water areas such as islands in parking lots
- Install rainfall sensors on automatic irrigation systems
- Mulch around plants to reduce evaporation and discourage weeds
- Do not water on windy or rainy days
- Use low angle nozzles when feasible
- Avoid using overhead sprinklers or sprays in narrow areas, islands, and medians to eliminate overspray onto hardscape surfaces
- Set watering times to reflect plant type
- Install pressure reduction valves where pressure exceeds optimum operating levels (30 psi for spray heads and 60 psi for rotor heads)

In General

- Utilize pressure compensating and reducing equipment when appropriate
- Sweep loading docks, sidewalks, and driveways rather than hosing them off

Suggested Best Management Practices for Commercial Carwash Facilities

The amount of water used by carwash facilities varies with the type of facility, the cleaning system used, and the utilization of water reclamation and recycling processes. And while recycling can greatly reduce the volume of M&I water used, there are many other ways in which carwash facilities can save water.

Commercial carwash facilities also include carwashes at service stations, carwash facilities at automobile dealerships and automobile rental outlets, fleet carwashes, mobile washes, and other commercial operations where automobile, truck, trailer, boat, airplane, or other type of equipment washing occurs as part of a normal business.

All Carwash Facilities

- Maintain all water devices and equipment to original or improved specifications at all times
- Modify existing carwashes to recycle as much water as possible
- Replace all nozzles annually
- Replace all nozzles annually
- Install automatic shutoff valves or preset timers on faucets and hoses
- Minimize dripping by replacing or maintaining positive-cutoff or solenoid valves at all control points for prewash, wash, hot wax, and rinse
- Conduct regular checks for leakage and maintenance of all water-using equipment
- Install positive shut-off valves on all wringer sinks
- Fit all hoses with positive pressure nozzles or automatic timer shut-offs; never leave open hoses unattended
- Sweep out bays before washing them; use high-pressure wands instead of hoses
- •Avoid using water to wash impervious surfaces
- Install water-efficient faucets and toilets

In addition to implementing the above practices, utilize the following for specific facilities

Self-serve

- Set a maximum flow of 3.5 gallons per nozzle
- Turn off spot-free rinse or recycle reject water
- Install a weep management system
- Install automatic shutoff valves on hoses or preset timers for self-serve car wash systems
- Do not utilize unlimited-timed cycles

In-Bay Automatic

- Ensure that the direction, arch, and timing of sprays on automatic car washes are properly set and that they shut off when no longer in contact with the vehicle
- Set timers to create a minimum 5-second dwell time for water to run off into the bay before exiting
- Calibrate spray bars to use no more than 55 gallons per basic wash
- Reduce rinse cycles to no more than 40 seconds per vehicle

Conveyor Systems

- Install automatic high-level water cut-offs in all towel and chamois washing machines
- Take advantage of gravity; place bigger nozzles on top and smaller nozzles on the sides
- Increase conveyor speed to reduce rinse cycles to no more than 40 seconds per vehicle
- Reduce prepping; turn off prep guns where possible
- Utilize high pressure prep guns or brushes to pre-wash or prep vehicles; avoid using hoses
- Reduce tip size and operating pressure in detail prep guns

Mobile Washes

- Spray nozzles and pressure settings will be maintained to deliver no more than 3 gpm
- Wastewater will be captured and disposed of at a properly licensed disposal facility as approved by the SLC Department of Public Utilities

Charity Carwash Program

- It is encouraged that all charity carwash events partner with commercial carwash facilities which have implemented these BMPs. During water shortages, charity carwash events may be prohibited. For information on current water supply conditions, or for a listing of participating commercial carwashes, contact the Water Conservation Office at 801.483.6860.

Suggested Best Management Practices for the Green Industry

Of the water we use per person, it has been estimated that half of that water goes to the landscape, and of that, as much as half is wasted, or in other words, as much as 25 percent of the total volume of water used for domestic purposes. Summer water usage increases to a peak that is nearly 5 to 6 times more than the typical daily winter consumption and it is that peak which drives our need for more water. By utilizing Best Management Practices in the landscape, whether as a professional or a home or business owner, we can sustain our landscape, reduce dependence on supplemental water and chemicals, and extend the life of existing infrastructure and delay the need for new water supplies. For more information, consult SLC BMPs for the Conservation and Preservation of Water Resources available online at slcgov.com/waterconservation.

All Green Industries

- Educate employees on water quality and conservation practices
- Model and teach water conservation and pollution prevention to customers, the general public, and the industry
- Utilize brooms to clean walks, drives, decks, and other impervious areas
- Avoid watering, whenever practicable, between the hours of 8 am and 8 pm
- Water flowers, shrubs, and trees separately from lawns
- Utilize positive pressure nozzles on all hoses
- If utilizing an irrigation-only meter, stay within irrigation target (see Appendix C)
- If not utilizing an irrigation-only meter, follow the recommended watering schedule
- Conduct regularly scheduled audits of both indoor and outdoor water appliances, features, plumping, and water-use behaviors

Landscape and Irrigation Design

- Make wise choices in the design process to reduce or eliminate water waste and to increase water use efficiency
- Select those plants best suited to a particular site, taking into account such things as soil and microclimates
- Group plants together with similar water and light requirements
- Design and install irrigation to deliver the appropriate amount of water to each plant group (i.e., "hydrozoning"); water turf areas separately from other landscaped areas
- Design, install, and maintain irrigation systems to ensure uniform distribution of water, striving for an irrigation efficiency of 80 percent
- Limit turf to functional areas, and select the appropriate turf species; use alternative groundcovers where appropriate
- Operate sprinkler heads with the appropriate water pressure to avoid misting; if pressure is too high, install a pressure regulator or pressure regulated heads
- Evaluate soil and improve, when necessary, to promote plant health and maximize water efficiency
- Install a rain shut-off device
- Establish and follow a site-specific water budget

Landscape and Irrigation Maintenance

- Examine irrigation systems on a regularly scheduled basis to ensure that those systems do not leak and are operating efficiently; make needed repairs or adjustments; strive to maintain an irrigation efficiency of 80 percent
- Adjust or replace sprinkler heads to eliminate over-spray on hardscape, fences, and buildings
- Turn off irrigation systems when wind or rain is forecast; install rain sensor devices where possible
- Hand water brown or dry spots; don't over-water the entire lawn
- Mulch flowers, shrubs, and trees to reduce moisture loss due to evaporation, reduce soil loss, suppress weeds, and provide a more uniform soil temperature; avoid using plastic or fiber barriers; keep mulch three inches away from tree trunks
- Minimize erosion and control sediment
- Use pesticides, fertilizers, and herbicides responsibly; dispose of unused products properly
- Practice regular maintenance such as weeding and appropriate pruning to maximize plant health; healthy plants are more likely to withstand periods of drought than are plants under stress

Lawn Maintenance

- Inspect sprinkler heads after each mowing for damaged or misaligned heads
- Mow lawns to the proper height to maintain turf health, thereby minimizing the need for fertilizer and pesticide application and reducing water usage
- Aerate lawns to reduce compaction and improve nutrient uptake and minimize runoff
- Leave turf clippings on the lawn to increase organic material and to reduce soil temperature and loss to evaporation; recycle and compost when ever possible, disposing of waste so as to minimize negative environmental impacts
- Nurseries, Greenhouses and Growers
- Properly irrigate crops with the minimum amount of water waste
- Utilize positive pressure nozzles to hoses and faucets; never leave operating hoses unattended

Suggested Best Management Practices for Commercial Water Customers

It is strongly encouraged that each business, in adopting Best Management Practices (BMP), addresses water-use issues relating to that specific business, industry, or work place. The most effective BMPs result from employee involvement and provide for training and verification of implementation.

General

- Generally examine water use, both indoors and out of doors, to eliminate waste
- Educate employees, contractors, and any other facility user about the importance of water conservation; encourage contractors to implement conservation BMPs
- Conduct regularly scheduled water audits of both indoor and outdoor water appliances, features, plumping, and water-use behaviors
- Utilize positive pressure nozzles on all hoses, nozzles, or spray heads
- Avoid using water to wash or clean walks, drives, gutters, or other hard surfaces

Indoors

- Use washing machines and dish washers only when full, or adjust water levels accordingly
- When installing or replacing appliances, install water-efficient appliances
- Regularly inspect, maintain, and repair boiler systems. Consider installing a condensate return line, if it does not already have one
- Regularly inspect, maintain, and repair cooling towers systems. Increasing the cycles of concentration can significantly reduce water usage.
- Review historical water usage for your facility. Analyzing several years of consumption data will often identify undiscovered leaks or other process inefficiencies
- Identify all single-pass flows in the facility. These flows are often associated with such equipment as cooling for pumps, compressors, ice machines, air conditioners. Consider replacing these processes with ones that re-use or re-circulate process water where appropriate

Outdoors

- As new landscapes are developed or as established landscapes are renovated, consider how water will be used, and make choices regarding irrigation, plants, and design that use water efficiently and wisely
- Follow Appendix F: Landscapes for outdoor water where applicable
- If not utilizing an irrigation-only meter, follow the recommended watering schedule (see Appendix A) unless directed to follow Watering Schedule B
- If utilizing an irrigation-only meter, stay within irrigation target (see Appendix C)

Suggested Best Management Practices for Restaurant and Food Service

Commercial and institutional kitchens use water primarily for food and drink preparation, food warming, dishwashing, ice machines, ice cream and frozen yogurt machines, garbage disposers, and scrapping troughs. Additionally, water is used for washing, cleaning, and sanitizing processes (including laundry), plumbing fixtures in restrooms, cooling and heating systems, and landscapes.

General Practices

- Water conservation will be most successful when everyone participates and shares in the responsibility. Encourage employees, contractors, suppliers, and customers to utilize water conserving measures.
- Train employees to conserve water, and post signs in the kitchen and other work areas promoting water conservation
- Serve water to your customers only when requested; Place signs, either in central locations, on menus, or on tables, informing customers of your water conservation ethic
- When fixtures wear out, replace water and energy efficient models
- Recycle water whenever feasible and consistent with regulatory requirements
- Install on-demand, point-of-use hot water dispensers to reduce the need to run faucets that are slow to produce hot water

Water Audits

- Conduct regular audits on water-using fixtures, features, and behaviors, being certain to include the following:
- Record the number and type of water-using appliances or pieces of equipment, such as dishwashers, garbage disposers, ice makers, faucets, and food scrapping troughs
- Determine the average number of loads per day completed by each water-using appliance and piece of equipment
- Determine the average number of meals served per day
- Determine the amount of time faucets and other continuous-flow appliances are used each day
- Identify pipe sizes and estimate flow rates of incoming water supply lines
- Catalog dripping faucets, puddles, and leaks
- Promptly repair leaks and malfunctioning equipment
- Kitchen faucets should use a maximum of 2.5 gpm at 80 psi; if higher flows are needed for utility sinks install a fingertip control valve for aerated or full flow operations
- Reduce or eliminate using water to thaw food; if water must be used, reduce flows to minimum need
- Turn off continuous flows used to clean drains trays such as those utilized in beverage islands, unless required by law
- Install hands-free or foot activated valves and faucets
- Use the minimum amount of dishware, glasses, utensils, and cookware needed so as to reduce dishwashing loads
- Avoid using water to melt ice in strainers
- Wash vegetables and fruits in ponded water; avoid using running water
- Install automatic shutoff faucets for bar sinks
- Eliminate excess water flow by installing pressure reducers on the disposal's water supply lines per manufacturer's specifications

Ice Makers

- Replace old icemakers with an air-cooled, water efficient model
- Use ice flake machines rather than ice cube machines; ice flake production uses less water
- Use softened water in ice machines to minimize bleed-off
- Collect spent cooling water from water-cooled ice machines and use it for non-potable purposes such as mopping floors

Ice Cream and Frozen Yogurt Machines; Walk-in Coolers and Freezers

- Replace water-cooled units with air-cooled units, or install storage tanks and re-circulating systems to reuse waste water
- Connect water-cooled machines to existing chilled water systems, if possible
- Turn off the machines when not in use, if possible

Dishwashing

- Presoak and wash items in basins of water instead of under running water
- Fit hoses used to wash sinks and kitchen areas with throttling valves on the spigot to reduce water use; these valves should be checked regularly for leaks
- Use full loads in sanitizers, sterilizers, dishwashers, and washing machines consistent with sound sanitary practices and infection control requirements
- Scrape or brush dishes and cookware rather than using running water or pre-rinse sprayers, when possible
- Replace pre-rinse sprayers with water-saving 1.6 gpm sprayers

- Install pressure reducing valves on dishwasher supply lines when water pressure exceeds the pressure recommended by the manufacturer
- Operate scrapping troughs only during dish washing operations
- Wash full loads only in rack-type machines
- Turn dishwasher off when not in use
- Replace older dishwashers with new water and energy efficient equipment

Food Disposers

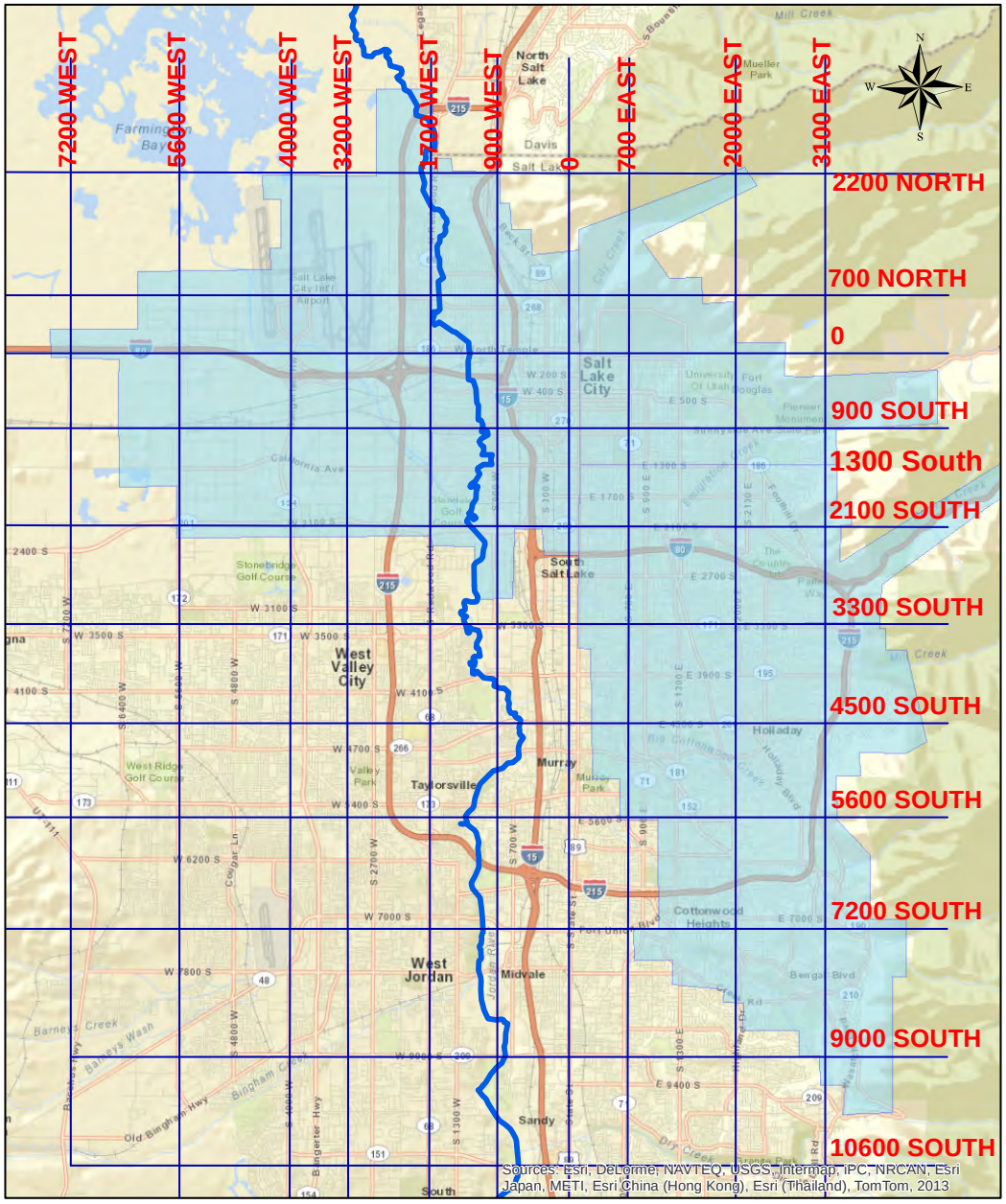
- Replace disposers with garbage strainers if possible
- Scrape food from dishes and cookware into trash receptacles when possible
- Use the minimum acceptable flow of water through the disposer by installing electronic sensors to detect food in the grinding chamber and by installing solenoid valves to stop the flow of water when the disposer is off
- Reuse water from the dishwasher in the mixing chamber of the disposer
- Eliminate excess water flow by installing pressure reducers on the disposer's water supply lines per manufacturer's specifications
- Replace older disposer models with a model with pre-set controls to reduce the amount of time the disposer is operated
- Investigate eliminating disposers, scraping troughs, and conveyors wherever possible

Appendix I:

Suggested Best Management Practices for Swimming Pools

In a desert, a pool may seem a necessity, but it really is a luxury when water is a finite resource. However, with proper management, pools can be a privilege that we may continue to enjoy. These recommended Best Management Practices are appropriate for both private, commercial, and public swimming pools and hot tubs.

- Cover the pool when not in use to control evaporation and save energy from heat loss. Up to 95 percent of water loss from evaporation can be saved through the use of a pool cover
- Reduce the temperature if possible, particularly when the pool isn't in use
- Limit the frequency of pool refilling; only fill the pool when required for water quality reasons
- Backwash pool filters only when necessary. If the backwash cycle is controlled by a timer, check and adjust the frequency of the cycle to ensure optimal efficiency. Use head loss to determine backwash frequency (8-10 psi loss)
- Where feasible, use filter backwash for irrigating lawns or plants and shrubs, or for cooling tower make-up
- Lower the pool's water level as much as possible to reduce the amount of water that can be splashed out
- Check the pool regularly for cracks and leaks, and make repairs promptly. If the pool drops more than one inch per day than investigate for problems
- Replace shower heads in the changing area to low flow fixtures and post signs to encourage pool users to limit the time spent in the shower
- Add a fence, trees, or shrubs to provide a wind break to reduce evaporation
- Utilize a pool vacuum that recycles water when cleaning the pool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Salt Lake City
West Valley City
Taylorsville
Murray
Holladay
Cottonwood Heights
West Jordan
Midvale
Sandy
South Salt Lake
Mueller Park
Mill Creek
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013