

City of Orem

Water Conservation Plan



December 2017

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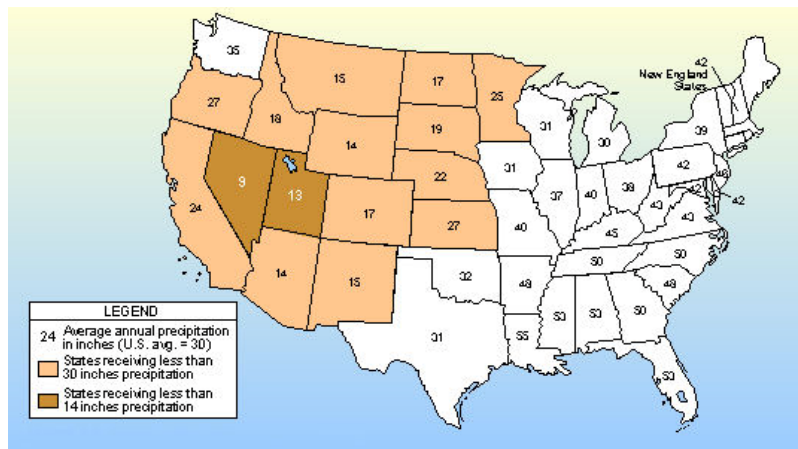
INTRODUCTION

In 1960, the City of Orem had a population of 18,394. The 2010 census reported Orem's population at 88,328. The 2016 population estimate was 97,499. From the 60s through the 90s, Orem experienced rapid growth. Population growth slowed from 2000 to 2010. Previous leaders and water managers planned well to meet the water needs for the residents. However, residents of Orem and leaders are becoming more aware of the future cost and availability of its water supply. The Utah State Legislature reemphasized its commitment to water conservation by modifying the Water Conservation Plan Act in the 2004 legislative session (Section 73-10-32 Utah Code Annotated) and again in 2016 approving SB 28 – Water System Conservation Pricing. The 2017 City of Orem Water Conservation Plan addresses the concerns of leaders and residents of the City of Orem as well as the state of Utah. It should be noted that prior to 2012, conservation plans were written utilizing projected population data from various sources. In both the 2012 and 2017 plans, the population data is adjusted to be in alignment with census data and projections. Previous sources estimated population figures higher than the actual census data. Obviously, lower population values result in a higher overall per-capita consumption. However, the per-capita consumption trend has continued to decrease steadily. This plan, in concert with previous plans, utilizes source meter data. Future plans will present metered delivery statistics.

DESCRIPTION OF OREM CITY AND ITS WATER SYSTEM

The City of Orem is located in central Utah County and in the second driest state in the nation. In Figure 1, the State of Utah receives an average of 13" of annual precipitation (source: US Weather Bureau, 1961 -1990 period of record). Nevada is the only state drier at 9" of precipitation annually. Encompassing 18.654 square miles, Orem has an estimated population of 97,499 through 2016. Providing water to meet the needs of its residents has always been a top priority of city leaders and water planners. As a result, a well-maintained and operated water system provides the residents of Orem with water whenever needed. In 2016, the water system provided water through 22,902 connections. In 2017, the water system provided water through a total of 23,155 connections with the breakdown as follows: 20,888 residential, 1,675 commercial, 54 industrial, and 538 institutional connections.

Figure 1

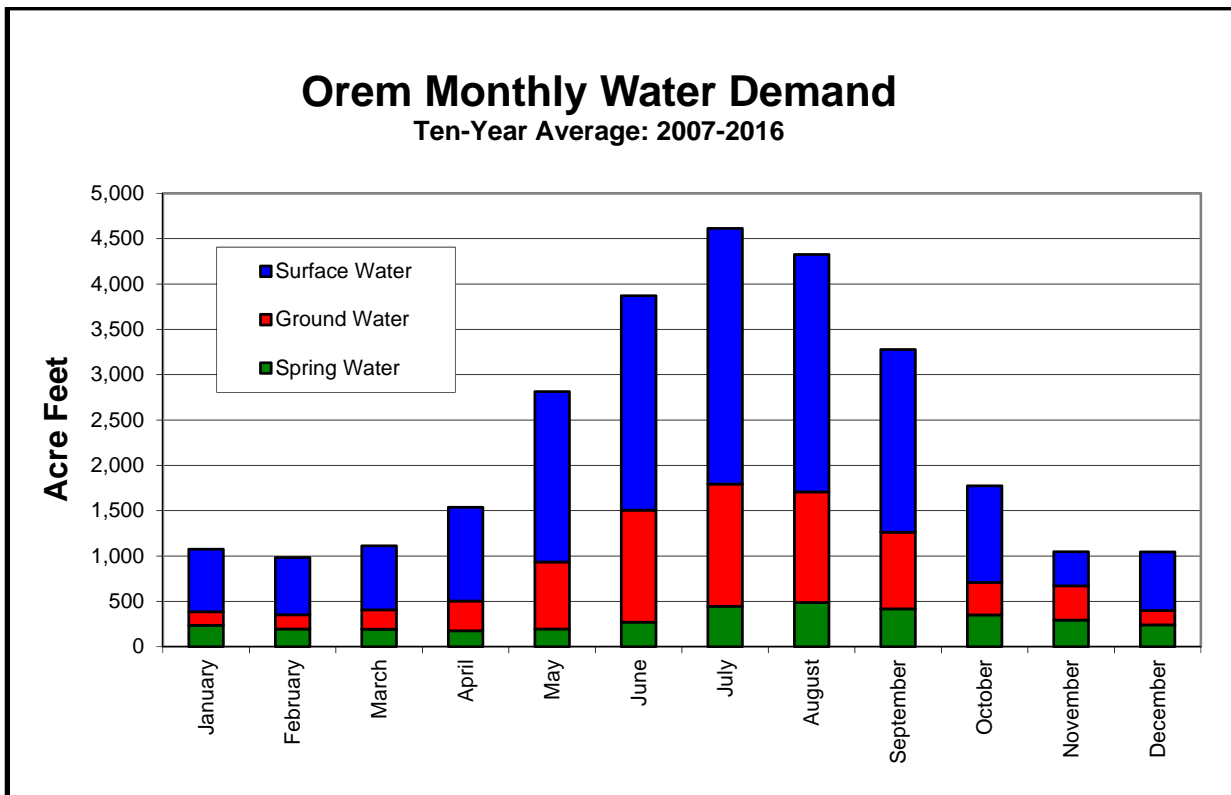


In addition, Orem’s leaders and residents place a high value on open space. In 2001, Orem City built Lakeside Sports Park, which is a 55-acre park with five softball fields, eight full-size soccer fields, and other landscaped play areas. In 2004, the Links at Sleepy Ridge 18-hole golf course was constructed in partnership with a private developer. Currently, the City maintains 252 irrigated turf acres and 6.5 irrigated flower bed acres of landscaping. Landscaped areas around schools, churches, and major industries occupy approximately another 521 acres. In 2015, the City annexed 245 acres the southwest area. As of December 2017, Orem still had more than 1,051 vacant acres. Moreover, Utah Valley University is a large water user in Orem. However, they primarily utilize secondary irrigation water through a private water company.

Inventory of Water Resources

The City of Orem and the Metropolitan Water District of Orem (MWDO) own the water rights used to supply water to the community. The MWDO is a representative board that manages and acquires Orem’s surface water rights, which include natural flow and storage water. This surface water is diverted out of the Provo River and treated at the Don A. Christiansen Regional Water Treatment Plant, which is owned and operated by the Central Utah Water Conservancy District (CUWCD). All spring and ground water rights are owned entirely by the City of Orem, which currently include nine deep wells and two mountain springs.

Figure 2



These sources combine to supply the residents of Orem with all its indoor and outdoor water demands throughout the year. Potable water for future residents will continue to come from these sources. The ten-year average of water produced through springs, wells, and surface water is 3,498 (13%), 7,133 (26%), and 16,844 (61%) acre feet (AF), respectively, for a total of 27,475 AF annually (see Figure 2). yield

The MWDO owns shares of stock in various entities as shown in Table 1. Water provided under these shares is, and will continue to be, converted to municipal and industrial (M&I) use for the various needs of the consumer.

Table 1
Summary of MWDO-Owned Irrigation Shares

Canal	Shares	AF
Provo Bench Canal and Irrigation Company	938.895	14,862.71
North Union Irrigation Company	230.445	1,887.34
Provo Reservoir Water Users Company	1,948.85	13,057.30
Provo River Water Users Association	2,254.00	2,254.00
Dixon Irrigation Company	300.00	495.00

Orem City exercises rights to remove water from underground aquifers through nine deep wells ranging from 500 to 1,000 feet in depth. These wells are located throughout Orem’s bench, which is an alluvial fan to the former Lake Bonneville. The water right associated with these wells allows for a maximum pumping rate of 33.487 cubic feet per second (cfs) but cannot exceed 18,306 AF on an annual basis. All of Orem City’s ground water rights are consolidated into one water right as shown in Table 2. The ground water provided under this right is also used for the various needs of the consumer.

Table 2
Summary of City-Owned Ground Water Rights (Wells)

Source	Water Right #	Maximum Pumping Rate (cfs)	Allowable Annual Removal (AF)
Ground Water Wells (Currently Nine)	55-290	33.487	18,306

Besides these wells, Orem City also owns and maintains two other ground water sources. Canyon Springs and Alta Springs are located approximately 1½ and 5 miles east of the mouth of Provo Canyon, respectively. Until 1979, approximately 60% of Orem’s culinary water came from Alta

Springs. This spring has its peak flow in late July or early August and contributes to 75% of total spring production. Table 3 describes these springs in further detail.

Table 3
Summary of City-Owned Ground Water Rights (Springs) 2007-2016*

Source	Water Right #	Associated Right (cfs)	Lowest Annual Yield (AF)	Average Annual Yield (AF)	Highest Annual Yield (AF)
Alta Springs	55-4160	13	1,915	2,950	4,365
Canyon Springs	55-3767 55-79	2.2	254	571	764

*Construction occurred in 2015 on Canyon Springs and Alta Springs.

In addition to these resources, MWDO has contracted with the Central Utah Water Conservancy District (CUWCD) for 7,520 AF of Central Utah Project (CUP) water. The contract with CUWCD requires MWDO to pay for the water whether or not it is put to beneficial use. MWDO reached its peak annual contract amount of 7,520 AF in 2017 and will continue to have access to this through 2047 when the agreement expires.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017+
Acre-Feet	3,020	3,520	4,020	4,520	5,020	5,520	6,020	6,520	7,020	7,520

Historic and Future Water Needs

Figure 3

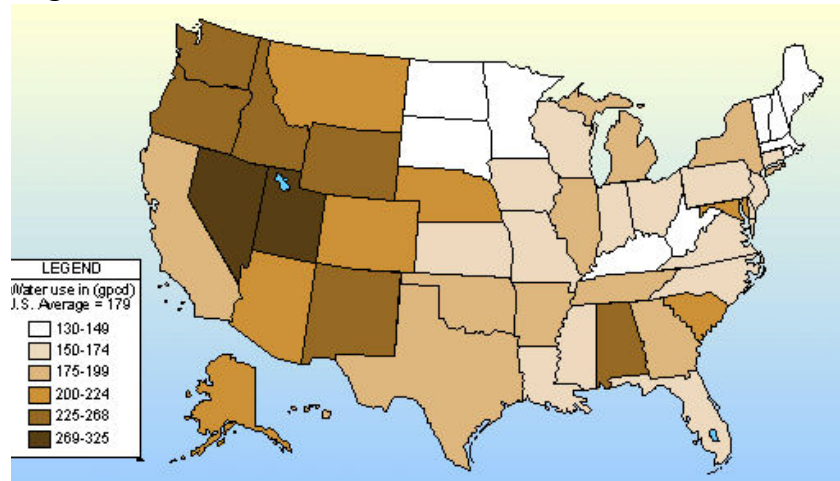


Figure 3 depicts the daily per capita water use per state in the United States (source: USGS, Estimated Use of Water in the United States in 1995). Orem has historically presented water use data from source meters and only began differentiating usage into residential, commercial, industrial, and institutional categories in 2017. Since 1960, and considering all

water from source meters, Orem’s water consumption has been steadily declining from 359 in 1960 to 254 gallons per capita per day (gpcpd) in 2016. 2016 data includes the Vineyard service area population shown in Figure 4. Over the past ten years, Orem’s use has averaged 261 gpcpd. In future plans and reports, the data will be presented in these four categories.

Figure 4



Figure 4 indicates Orem's service area which includes all services found within the Orem City boundary as well as the Town of Vineyard south of Orem's 400 North.

Figure 5

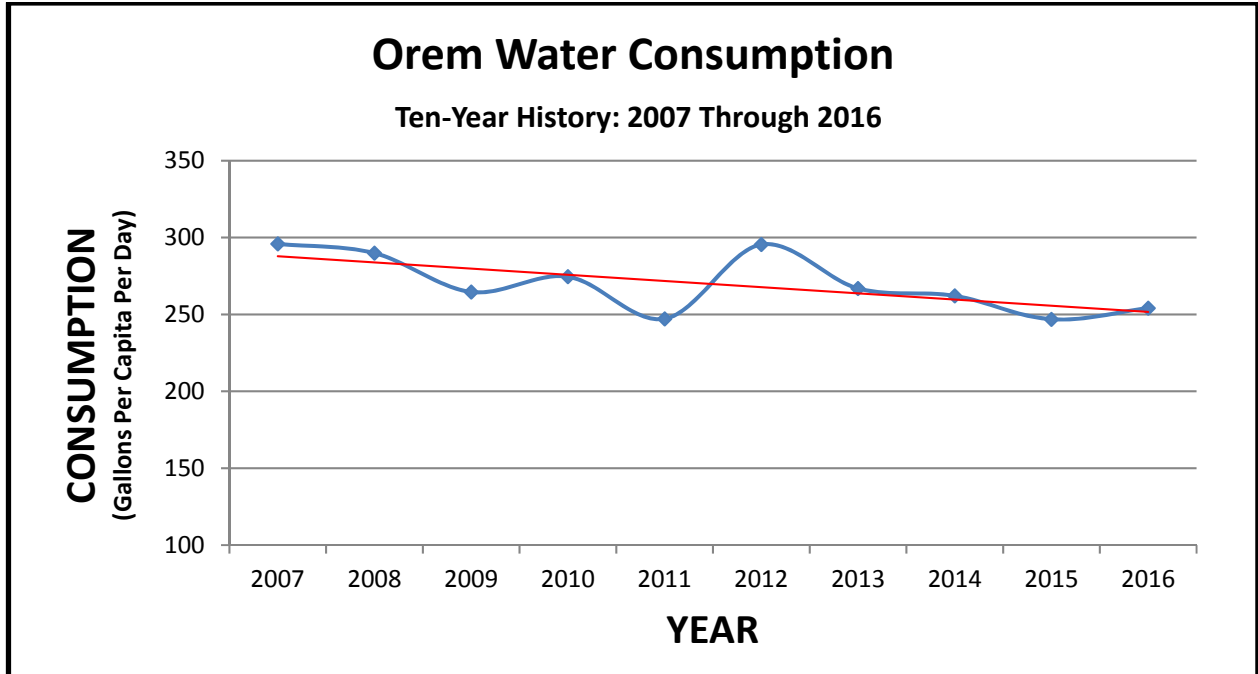


Figure 5 graphically represents Orem's water consumption over the past ten years.

Figure 6

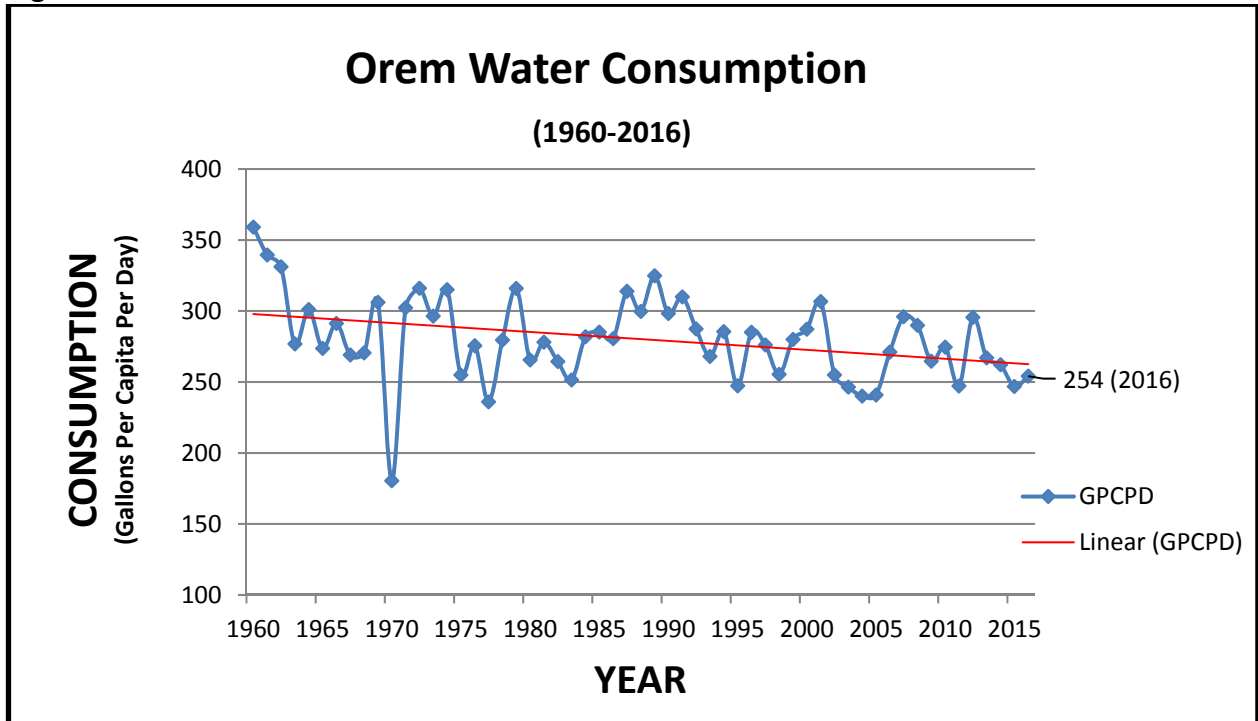
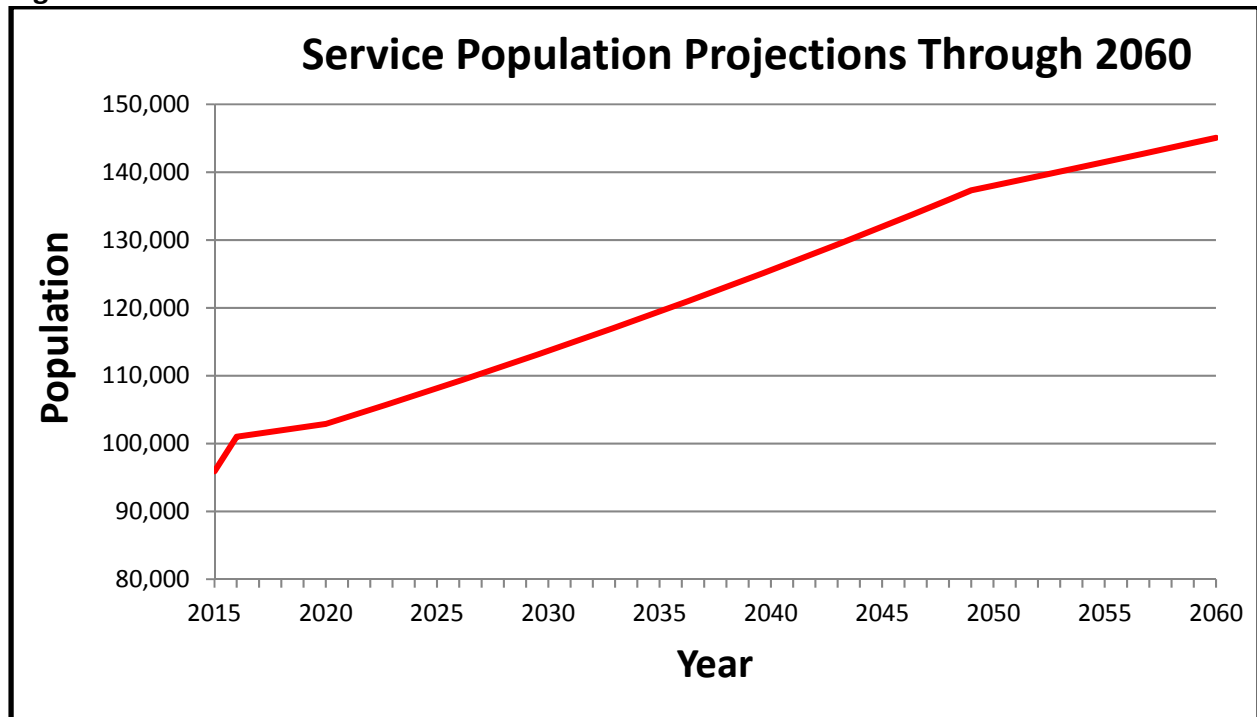


Figure 6 graphically represents Orem's water consumption from 1960 through 2016 with a trend line added.

During the 80s and 90s, the City of Orem experienced a growth rate of 2.0 - 2.5%. From 2000 to 2010, the growth rate was 0.5%. Since 2010, the growth rate was 1.5 - 2.0%. As growth occurs, demands on City resources increase. For example, traffic congestion increases and must therefore be mitigated. More storm water is generated and must be aggressively managed. Space that is more open is created for parks and recreation. Likewise, the overall demand on the City's water resources also increases. By 2060, the Orem service boundary, which includes a portion of the Town of Vineyard, is expected to grow to a near build-out population of approximately 145,000 residents (see Figure 7).

Figure 7



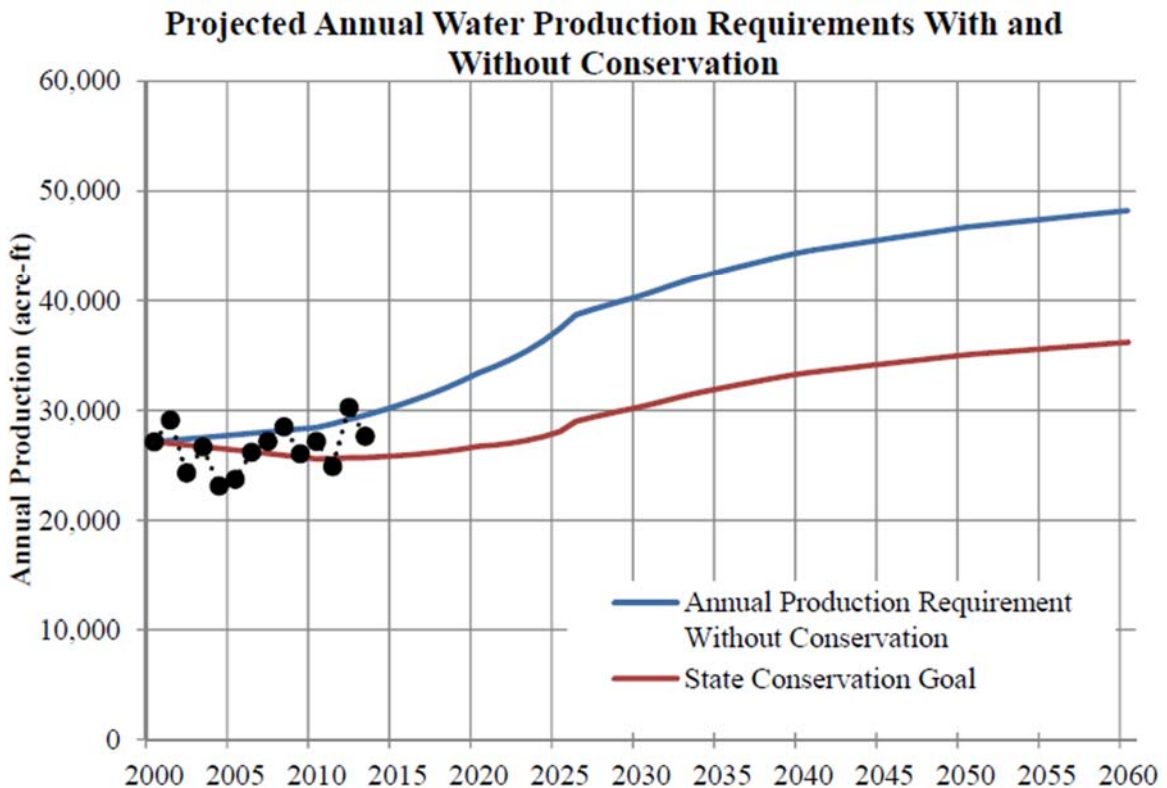
Although Orem City is a mature city, many opportunities for change are on the horizon. In fact, new legislation passed over the past few years now allows for higher densities, which, in turn, requires more efficient urban design with respect to utilities, traffic, open space, etc. Even though the growth has caused changes in the way the land is developed, the average per capita water demand over the same footprint may decrease with these developments.

Other areas that may increase overall water demands include the Town of Vineyard, which lies directly west of Orem and east of Utah Lake and unincorporated Utah County, which is south and west of Orem. Although outside of Orem's municipal boundary, the Town of Vineyard requested the City of Orem and MWDO to supply up to 3,500 AF of water annually, thus the increased population trend. In June 2011, a formal agreement between these three entities was officially executed. As of November 2017, 2,285 units have been reported to Orem. Because Vineyard's current population has been relatively small, their population was not included in the per capita calculations for previous plans. However, the 2017 Water Conservation Plan includes a Vineyard

population of 3,508 served by Orem. Additionally, in 2015, Orem annexed approximately 245 acres (0.382 square miles) in the southwest part of Orem. Currently, no new units are completed, but several are under construction.

According to the 2016 Water Master Plan, by 2060, the supply requirement is expected to reach 48,000 AF if no conservation efforts are observed. With conservation efforts, the supply requirement is expected to reach 38,000 AF as shown in Figure 8.

Figure 8



THE FOLLOWING TWO SECTIONS ARE INCLUDED AS THEY APPEARED IN THE 2012 WATER CONSERVATION PLAN. UPDATES FOLLOW EACH SECTION.

WATER CHALLENGES AND CONSERVATION GOALS

Water Challenges Identified

The following list identifies four water challenges currently facing Orem: pricing, education, water meters, and water loss. Overcoming these challenges will not only increase water conservation but will also reduce peak demands and the need for expensive water system upgrades. The potential to establish a new generation of wise water users exists, which will lead to a long-lasting positive conservation effort. Each challenge represents an opportunity for the City to reduce water consumption and use this renewable resource efficiently, more wisely, and without waste.

1. Pricing. The current water pricing structure, while adequate to cover expenses in the water enterprise account, lacks incentives and sufficient information for residents and businesses to use water more efficiently. Additionally, funds are currently insufficient to include additional Education, Water Meter Replacement, and Water Loss Elimination. Water conservation-oriented pricing structures should be implemented to extend and conserve water supply, promote equity, supply funds for conservation efforts, and meet minimum flow levels.

2017 UPDATE: In 2016, the City completed a comprehensive Water Master Plan with a 10-year CIP and Financial Plan. The Financial Plan included conservation pricing with a four-tier system where customers pay more according to the increased block of volume utilized. The pricing will fund conservation projects including leaky pipe replacement, meter replacement, and educational materials.

2. Education. Residents, young and old, need more information and understanding of landscaping water requirements and efficient water-use habits and practices. Very few residents know how much water is required to maintain a healthy landscape and how to use water efficiently inside the home.

2017 UPDATE: Since 1990 and continuing through the present, the City of Orem has partnered with Alpine School District schools in Orem to provide elementary and junior high school students an educational experience about their water system and conservation practices.

3. Water Meters. Most of Orem's water meters are more than fifteen years old and should be replaced. As the meters age, they deteriorate, and the level of accuracy diminishes.

2017 UPDATE: The City now has a budgeted plan to replace all meters five years and older with Automated Metering Infrastructure (AMI) technology in the next five years.

4. **Water Loss.** There are many reasons why water produced in each day, month, or year does not match the actual water metered. Perhaps a service area is being flushed through hydrants, the meters are inaccurate, illegal connections exist, pipes are leaking, a fire was extinguished, water used for construction work was not reported, data collection methods are not accurate, billing errors exist, etc. To understand the extent of real water losses, a professional study must be performed to develop and implement loss reduction strategies.

2017 UPDATE: In 2016, the City partnered with the AWWA Intermountain Section and State of Utah and hired a professional consultant to perform a detailed water loss study. The study was very comprehensive and eye opening as the City combed through the various portions of the system to determine where the non-revenue water was lost.

5. **Increased Operating Expenses.** The cost for goods has dramatically increased over the past 10 years. Metals, plastics, fuels, chemicals, power, transportation, and labor costs increase each year. The water fund has seen some increases in revenues but not at the same rates. Because operating expense and capital project expenses have increased, remaining funds for programs and the quantity of capital projects have decreased.

2017 UPDATE: Expenses continue to increase however, with the 2016 Water Master Plan and Financial Plan, the City will be able to fund water capital improvement projects in addition to increased operational expenses.

Water Conservation Goals

In pursuit of solutions to the challenges identified, the following goals have been identified:

- **GOAL #1**
Reduce the City's 10-year per capita water use rate by at least 5% percent in five years and 15% in ten years. The 10-year water use rate is currently 268 gallons per capita per day. Reduce this rate to 254 gpcpd by 2017 and 227 gpcpd by 2022.

2017 UPDATE: The City's 2016 rate was 254, right on the desired rate. Additionally, the 10-year average decreased somewhat from 268 to 261. The 2012 rate was 296 gpcpd which affected the average significantly. This will remain a goal for the next 5 years.

- **GOAL #2**
Develop an effective conservation-oriented water pricing structure within one year. The water pricing system should encourage customers to reduce use without creating a revenue shortfall. This will extend the water supply, promote equity, maintain the minimum flow levels, and fund conservation efforts.

2017 UPDATE: This goal was met with the 2016 Water Master Plan and Financial Plan. The approved Financial Plan recommends increased pricing for seven years to reach a replacement

schedule appropriate for the utility size. This goal will remain and is modified to read: **Goal #2 Follow the 2016 Water Master Plan and Financial Plan published rates.**

- **GOAL #3**

Replace all old meters with new meters within five years. Any meter older than 15 years of age should be replaced as soon as possible. The new meters should incorporate radio-read technology. Not only will the meters be more accurate, but the amount of manhours required to read the meters will dramatically reduce and revenues will increase.

2017 UPDATE: This goal will continue to be in place. This goal should be met in the next five years. A plan is in place to fund and replace aging meters.

- **GOAL #4**

Perform a professional water loss study within two years. To understand the extent of real water losses, a professional study must be performed. Recommendations for reducing the losses should be implemented as quickly as possible to minimize waste and revenue losses.

2017 UPDATE: This goal, although not completed within two years, was met through the collaborative efforts mentioned above. The new goal reads: **Goal #4 Perform a water loss study every other year.**

- **GOAL #5**

Develop and implement an effective water reuse plan. The completion of the water reuse plan is a priority. The plan includes the implementation of a new tertiary treatment system at the Orem Water Reclamation Facility and water delivery system. The plan should initially target the connection to the Links at Sleepy Ridge, Lake Side Sports Park, unincorporated Utah County areas, portions of the Town of Vineyard, and potential local industrial users.

2017 UPDATE: The 2016 Water Master Plan evaluated the water reuse as a future project. The initial phases will be implemented in 2018 and funding is in place. Lakeside Sports Park and the Links at Sleepy Ridge will be part of the first phase. The goal is to execute the existing plan.

- **GOAL #6**

Increase the education to the public regarding water conservation. Educate all ages of the public regarding wise water use. Improved irrigation practices and water efficient landscapes can enhance the beauty of the City while minimizing waste. Develop ways to educate through the utility billing process, visiting schools, and teaming with CUWCD, the Utah Division of Drinking Water (DDW), and other key players. Investigate implementing changes to the Orem City Code that will promote water conservation in all zones.

2017 UPDATE: The efforts by City staff reaching out to residents increased dramatically. With the education efforts at the elementary schools, mailers, and social media, the City reaches out and provides conservation reminders, videos, and printed material with updates regarding utility rates, lawn watering, indoor water use, environmental stewardship, conservation rebates, and general wise water use techniques. With the water meter replacement plan and increasing water rates, the City will have more opportunities to educate residents. This goal will remain in place.

CURRENT CONSERVATION PRACTICES

To overcome the water challenges identified and take advantage of the associated opportunities, specific water conservation measures must be identified and evaluated. Orem City has already implemented several water conservation measures. These, along with additional measures, will improve Orem's water conservation efforts and help overcome these challenges. Orem City's current water conservation program is directed at managing water shortages, replacing old water meters, detecting leaks, replacing old water mains and service lines, increasing irrigation efficiency of parks and open spaces, and educating the public.

Water Shortage Management Plan

Orem City has a Water Shortage Management Plan that may be initiated at the recommendation of the Water Management Team. This team is responsible to manage the water supply resources of the City and to report significant reductions in water supply to City management and the City Council. This plan contains water conservation measures that may be implemented during water supply emergencies, such as:

- A prolonged drought that is evidenced by significant decreases in ground water levels, decreased spring flows, etc.,
- Loss of one or both of the Orem City's mountain springs,
- Loss of one or more primary wells, or
- Loss of the Don A. Christiansen Regional Water Treatment Plant.

Rationing will become necessary when demands upon the system exceed the supply of available water. As the City moves from normal operations to full rationing efforts, the following phases will be evaluated and implemented when necessary:

Phase 1

Request select large users to modify their water use to reduce demand in the water distribution system. These large users include parks, golf courses, churches, schools, etc.

Phase 2

Although the City continually promotes wise water use for all residents, all water users will be strongly encouraged to follow wise water use practices. Some examples of wise water use include sweeping driveways rather than washing with water hose, outside

irrigation during non-daylight hours, storing drinking water in the refrigerator, repairing water leaks, etc.

Phase 3

Request odd-even watering days, based upon street address.

Phase 4

Request voluntary reduction of water usage.

Phase 5

Mandate a reduction of water usage.

Phase 6

Mandate a reduction of water usage with enforcement.

The Orem City Manager, or appointed designee, will implement this Water Shortage Management Plan. The City will continue public education on a periodic basis through the duration of the rationing effort. Public education efforts may consist of public announcements using radio, television, newspaper, flyers, the Orem City web site (www.orem.org), various forms of social media, etc.

The above phases are not intended to limit or restrict the ability of the City to meet the demands of the customer. Rather, it provides a guideline from which management decisions can be made. The City reserves the right to select the appropriate rationing phase based upon the specific circumstances regarding the anticipated duration of rationing, existing supply reserves, and the availability of alternate water sources.

Meter Replacement Program

Over time, all meters become less accurate in recording actual flows, which ultimately leads to lost revenue. Orem currently has a meter testing program to improve the efficiency of its meters that provide water to large users. Six-inch and larger meters are tested and calibrated annually. Three- and four-inch meters are tested and calibrated every three years. The City has testing equipment and certified testers to implement this program. Small meters in the system are replaced as needed. The plan is in place to replace all meters five years and older.

Leak Detection Program

The leak detection is based on audio and visual indications of a leak in a specific area of the system. The City has contracted with a service to assist with leak detection. The efforts are successful, and several leaking lines have been identified and replaced because of this increased effort.

Water Main and Galvanized Service Line Replacement Program

As water mains and service lines age, they fatigue, corrode, develop leaks, and eventually fail and must be replaced. Water mains in corrosive soils and undersized lines must be replaced more frequently due to pipe coating deterioration and scouring resulting from higher velocities.

Moreover, the Water Section and the Streets Section work closely together planning for water main replacement projects, galvanized service line replacement projects, and street resurfacing projects. By coordinating together closely, personnel work to prevent undue excavating of newly surfaced roads and improving the integrity and efficiency of the water system. As the City continues the capital improvements program, water is recaptured.

Improve Irrigation Efficiency at Parks and Open Spaces

The City of Orem Parks Section has a program to improve the efficiency of irrigating. Elements of this program include:

- Replacing old inefficient heads with new efficient ones;
- Replacing old leaking galvanized systems with new PVC;
 - Funding to replace the sprinkler systems at the Orem City Cemetery, City Center Park, and Scera Park has been secured.
- Connecting as many of the sprinkler systems as possible to the City's multi-site irrigation central control system (intelligent sprinkler timers interconnected to weather data and operated remotely);
- Redesigning park systems to water more efficiently; and
- Performing water audits on every park.

Additionally, drip irrigation systems managed with smart irrigation sprinkler controllers have been designed into the landscaping plans for the Provo Orem TRIP (Transportation Improvement Project). This road, transit, bicycle and pedestrian improvement project is being constructed along University Parkway to meet growing transportation needs in Orem and Provo.

Public Education

Historically, the City has been very active in its efforts to promote water conservation through education. Beginning in 1990 and continuing for many years, the City developed a water education program that targeted elementary and junior high school students. A model was constructed that represents how residents of Orem obtain water from the mountains and receive it at individual homes. The four-foot by eight-foot model depicts the Deer Creek Reservoir, Provo River, Uintah Mountains, water treatment facilities, and a pipe network in City streets to homes with running water. The City continues to use the model which is still an effective tool today. Along with the presentation, the City offers small foam trinkets of the earth with the slogan "Use Water Wisely" printed on the surface.

CURRENT WATER RATES

In the 2016 Utah Legislative Session, a new law was passed that requires retail water providers, such as the City of Orem, to create pricing that promotes water conservation. The title of Senate Bill 28 is "Water System Conservation Pricing" and the language reads that retail water providers are required "*to establish an increasing rate structure for culinary water.*" As customers use more water, the cost per gallon of the water increases. In May of 2016, the Orem City Council, as required by state law, approved a plan to implement a tiered rate structure for the Orem Water Utility. To help ease into the new billing practice, the City Council adopted the tiered rates to begin November 1, 2016, after the hot and dry summer months. The new pricing structure includes four tiers with increasing unit costs. The following is an explanation of the creation of the tiered rates.

The purposes of the tiered rate structure are (1) to comply with Senate Bill 28, (2) meet the financial needs of the water utility operations, maintenance, and replacement, and (3) encourage wise water use through increasing block tiers. There are two components to Orem's water bill: the base rate and the consumption rate. As meter size increases, base rates increase following the American Water Works Association (AWWA) multiplier guidelines. Orem has four "blocks" of consumption pricing with the same unit price for all meter sizes. The "allowance" or block volumes are different for each meter size.

Not all water utilities bill the same way. Some (or most) water utilities create tier block volumes and all users, regardless of meter size or number of units, fall under the same tier plan. As one could imagine, the larger meters and multi-unit accounts were in the 2nd, 3rd, and 4th tiers almost immediately. Orem studied many different methods to determine what would be best for its utility. Orem does not utilize secondary irrigation (or untreated) water. All of Orem's water is treated culinary water.

By calculating the 90th percentile volume of all ¾" meter accounts in the winter months, Orem set the first block volume to include up to 11,000 gallons. This means that 90% of the ¾" meter accounts will not exceed the 11,000 gallons. In Orem, 78% of the 22,000 accounts are associated with ¾" meters.

To create the second block volume (11,001 - 34,000 gallons) for ¾" meter accounts, the 90th percentile of the shoulder months of May, June, and October was calculated. It was determined that 90% of the ¾" meter accounts will not exceed 34,000 gallons during these months.

The third block volume (34,001 - 65,000 gallons) used the 90th percentile of the peak months of July, August, and September. Likewise, it was determined that 90% of the ¾" meter accounts will not exceed 65,000 gallons during these months.

The fourth block volume (> 65,000 gallons) is anything over the 90th percentile for the summer months for the ¾" meter accounts.

In Table 5, the monthly base rates for each water meter size are shown. In Orem Fiscal Year 2018, the consumptive rate for Tier 1 is \$0.79, Tier 2 is \$0.99, Tier 3 is \$1.18, and Tier 4 is \$1.58 per 1,000 gallons. The flow allotments for each meter size are shown in Table 6.

Table 5
2017 Water Rates

Meter Size	¾"	1"	1½"	2"	3"	4"	6"	8"	10"
Monthly Fee	\$17.16	\$39.22	\$110.42	\$181.64	\$276.59	\$466.48	\$1,178.58	\$1,574.21	\$2,361.32

Table 6 Monthly Flow Allotment

Meter Size	Tier 1	Tier 2	Tier 3	Tier 4
¾"	11	34	65	> 65
1"	18	57	109	> 109
1½"	37	113	216	> 216
2"	59	181	346	> 346
3"	110	340	650	> 650
4"	220	680	1,300	> 1,300
6"	458	1,417	2,709	> 2,709
8"	587	1,813	3,466	> 3,466
10"	1,063	3,287	6,284	> 6,284

CONSERVATION MEASURES

To effectively meet Orem City’s future water needs and overcome the water challenges identified, continued commitment to water conservation measures will be required. The programs and plans are in place and now, execution and follow-through are important. These measures address Water Conservation-Oriented Rates, Meter Replacement, Water Loss Investigation, Water Reuse Implementation, Public Education, Plumbing Fixture Replacement, Improving Efficiency of Irrigating Parks and Open Spaces, and Water Conservation Ordinances.

Water Conservation-Oriented Rates

The City adopted the four-tier water rate structure and will need to stay committed to the recommendations in the Water Master Plan. The consumption rates will continue to gradually increase until FY2023 and from there will follow inflationary adjustments. The tiered rates will

accomplish two objectives: (1) encourage individual conservation and (2) fund water conservation infrastructure improvements.

Meter Replacement

Over time, all meters become less accurate in recording actual flows. This leads to lost revenue to the City and inaccurate data. As part of the Master Plan and evaluation process the City, on two separate occasions, tested meters according to AWWA standards. The results indicated an immediate need to replace meters because some meters read high and some read low. Not only will the City's water revenue increase, but the sewer revenues will also increase since they are tied directly to water consumption during the winter months.

In addition to accurate reads, the City will implement Automated Metering Infrastructure (AMI) technology. AMI will give customers daily information about their individual water use, alert for potential leaks, and can remind customers of tier levels and water conservation tips.

Water Loss Investigation

The Water Management Team performed an AWWA water loss audit in 2017 and will continue to perform audits, evaluate the results, and act on the findings.

Water Reuse Implementation

In July of 2003, the Utah State Engineer approved 9,634 AF of Orem's sewer effluent for diversion for water reuse purposes. Components of a reuse water system, which will provide lower quality water to the Links at Sleepy Ridge and the Lakeside Sports Park, have been installed from the Orem Water Reclamation Facility to those sites. Funding is currently in place to design and install infrastructure to begin reusing water.

Public Education

Educating residents and businesses to use water more efficiently will enhance the likelihood that water use goals will be met. Although the benefits and costs of a strong education program are difficult to enumerate, the Water Management Team is committed to increase education to the public well into the future. The following information on efficient outdoor and indoor water use will continue to be made available to the residents of Orem through the Orem City Library, Orem City Web Site, and flyers disseminated with the water bill. Additionally, clever social media posts will continue to be part of the education process.

Outdoor Water Use

- Water landscape only as much as required by the type of landscape, and the specific weather patterns of your area, including cutting back on watering times in the spring and fall.

- Do not water on hot, sunny, or windy days. You may end up doing more harm than good to your landscape, as well as wasting a significant amount of water.
- Sweep sidewalks and driveways instead of using the hose.
- Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscape so that all the water running off goes to beneficial use instead of running down the gutter.
- Check for and repair leaks in all pipes, hoses, faucets, couplings, valves, etc. Verify there are no leaks by turning everything off and checking your water meter to see if it is still running. Some underground leaks may not be visible due to draining off into storm drains, ditches, or traveling outside your property.
- Use mulch around trees and shrubs, as well as in your garden to retain as much moisture as possible. Areas with drip systems will use much less water, particularly during hot, dry, and windy conditions.
- Keep your lawn well trimmed and all other landscaped areas free of weeds to reduce overall water needs of your yard.

Indoor Water Use

About two-thirds of the total water used in a household is used in the bathroom. Concentrate on reducing your bathroom use. Following are suggestions for this specific area:

- Do not use your toilet as a wastebasket. Put all tissues, wrappers, diapers, cigarette butts, etc. in the trashcan.
- Check the toilet for leaks. Is the water level too high? Put a few drops of food coloring in the tank. If the bowl water becomes colored without flushing, there is a leak.
- If you do not have a low volume flush toilet, put a plastic bottle full of sand in your toilet tank to reduce the amount of water used per flush. However, be careful not to over conserve to the point of having to flush twice to make the toilet work. Also, be sure the containers used do not interfere with the flushing mechanism.
- Take short showers with the water turned up only as much as necessary. Turn the shower off while soaping up or shampooing. Install low-flow showerheads and other flow restriction devices.
- Do not let the water run while shaving or brushing your teeth. Fill the sink or a glass instead.
- When doing laundry, make sure you always wash a full load or adjust the water level appropriately if your machine will do that. Most machines use 40 gallons or more for each load, whether it is two socks or a week's worth of clothes. Some new, more efficient machines can reduce usage to 25 gallons per load.
- Repair any leak within the household. Even a minor slow drip can waste up to 15 to 20 gallons of water a day.
- Know where your main shutoff valve is and make sure that it works. Shutting the water off yourself when a pipe breaks or a leak occurs will not only save water, but also eliminate or minimize damage to your personal property.

- Keep a jar of water in the refrigerator for a cold drink instead of running water from the tap until it gets cold. You are putting several glasses of water down the drain for one cold drink.
- Plug the sink when rinsing vegetables, dishes, or anything else. Use only a sink full of water instead of continually running water down the drain.

Plumbing Fixture Replacement

Many of the City's homes and businesses were built after 1992, when plumbing codes were revised to require low water-use toilets and low-flow showerheads in new construction. While it is difficult to calculate meaningful estimates of the benefits and costs of such programs on the water use rate, there is ample evidence that such programs are effective. The City of Orem will continue to support up to date plumbing codes and encourage the use of low-flow plumbing fixtures.

Improving Irrigation Efficiency at Parks and Open Spaces

Orem City presently has 263 mowed acres in cemetery, parks, and sports fields. Orem's Park Section has been installing the "Maxi Com" computerized watering system. Approximately 40% of the mowed acres utilize the smart irrigation controls. The current plan shows that, on average, six systems per year will be updated to smart irrigation controls with the "Maxi Com" capabilities. This system monitors rainfall and controls the sprinkler systems in the parks to water according to rainfall.

Water Conservation Ordinance Adoption

The City has adjusted the definition of "Landscaping" in its site plan requirements to include various types of ground plantings and gives green credit for the canopy of shrubs and trees and does not specifically require turf grass. Orem is presently creating a specific xeriscaping ordinance to be included in future code updates.

CONCLUSION

The City of Orem is committed to water conservation and using water wisely. Orem will continue to support the programs outlined in this 2017 City of Orem Water Conservation Plan and thereby maximize water conservation, minimize water waste, and use water more efficiently. By achieving the goal to reduce the ten-year average per capita water use rate by an additional 5% over the next five years from 254 to 241 gpcpd, 1,445 AF of water can be saved on an annual basis. Furthermore, reducing this rate by an additional 10% over the next five to ten years from 254 to 229 gpcpd would likewise save an additional 1,200 AF of water, totaling 2,645 AF of water savings per annum.

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