

CULINARY WATER WATER CONSERVATION PLAN

for

North Ogden City Corporation



December 2014 Update

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SECTION I INTRODUCTION

In response to the rapid growth occurring throughout the state of Utah, North Ogden City citizens and leaders are becoming concerned for the future cost and availability of the water supply. A similar concern has been demonstrated by the state legislature in the Water Conservation Plan Act (House Bill 153) passed and revised in the 1999 legislative session (Section 73-10-32 Utah Code Annotated). This water conservation plan is written to address the concerns of leaders and citizens of both the North Ogden City and the state of Utah.

DESCRIPTION OF NORTH OGDEN CITY AND ITS WATER SYSTEM

North Ogden City currently provides culinary water to approximately 18,019 people within the corporate boundaries of the city through 5,823 connections. Currently, the water system provides water to approximately 5,697 residential, 104 commercial, and 22 institutional connections. North Ogden City water serves the current City boundaries and eventually will serve areas identified for future annexation.

PREVIOUS WATER CONSERVATION PROGRESS

This Water Conservation Plan was approved by the City Council and put into effect by ordinance. The City hopes the current conservation plan will continue to encourage water conservation practices among the City's residence. Even though it is difficult to measure the extent of the public's involvement, knowledge, and participation in water conservation, the city feels that outreach efforts have helped to move water conservation forward. Regardless of any past success, there may still be progress made by the public to conserve water

**SECTION II
WATER SUPPLY INVENTORY**

INVENTORY OF WATER RESOURCES

North Ogden City has withdrawn 1397 acre-feet (2013 annual use information Utah Division of Water Rights) of water from an underlying aquifer through wells and springs. This has supplied all the water required to meet the demands on the culinary water system which provides for indoor and outdoor water uses through the city. Potable water for future city residents will, for the most part come from new wells. Table 1 is a summary of North Ogden Cities water rights.

TABLE 1 - Summary of Water Rights

Well Supplies					
Name of Source	WR#	Priority	Status	Quantity/Flow	Period of Use
Lakeview Well	35-1171 (A31847)	Apr 1960	Approved	6 cfs	1/01 to 12/31
Wells 1, 2, 3	35-1047 (A30121)	Aug 1958	Cert #	5.0 cfs	1/01 to 12/31
	35-3475 (U17231)	1920		.007 cfs	1/01 to 12/31
	35-3622 (U19497)	1900		0.022 cfs	1/01 to 12/31
	35-3623 (U19498)	1900		0.22 cfs	1/01 to 12/31
	35-649 (A24272)	Oct 1952		0.221 cfs	1/01 to 12/31
	35-2152 (U1895)	Nov 1935		0.111 cfs	1/01 to 12/31
	35-2153 (U1896)	Nov 1924		0.111 cfs	1/01 to 12/31

Spring Supplies:					
Name of Source	WR#	Priority	Status	Quantity/Flow	Period of Use
Cold Water Spring	35-120 (A12225)	Jun 1936	Cert. # 2753	0.409 cfs	1/01 to 12/31
	35-5518	Jan 1850	Cert #	1.0 cfs or 697.55 ac ft	1/01 to 12/31
North Ogden Canyon (Ogden Hole Creek)	35-7059	1851		6.89 cfs	4/01 to 10/31
Rice Creek Springs	35-1217 (A32380)	Apr 2003	Approved	2.0 cfs	1/01 to 12/31
	35-7149 (A12224)	Jun 1936	Cert. # 2303	0.5 cfs	1/01 to 12/31
Other Supplies:					
Name of Source	WR#	Priority	Status	Quantity/Flow	Period of Use
Stump Well (artesian – Centennial Park)	35-3294 (U15086)	1930		0.223 cfs	1/01 to 12/31
Cold Water Creek	35-7134	Jan 1890		0.01 cfs	1/01 to 12/31

WATER PRODUCTION

The following table shows the water produced at each source.

TABLE 2 – Metered Inflow (AF)

Year	Ben Lomand Well	Cold Water Spring	N. O. Canyon Spring	Rice Creek Spring	Well 1	Well 2	Well 3	Total
2013	0	211.6	218.5	684.6	121.5	682.6	0	1918.8
2012	0	388.3	254.8	737.9	55.4	312	0	1748.4
2011	0	432.7	634.9	547.4	37.6	195.9	0	1848.5
2010	0	446.6	493.7	673.9	67.9	156.1	0	1838.2
2009	0	456.9	407.7	926.4	73.1	105.6	0	1969.7
2008	0	372.7	473.6	731.8	125.3	287.5	0	1990.9
2007	0	451.9	259.4	843.5	211.2	167.6	0	1933.6
2006	0	456.9	616.8	983.7	37.5	91.5	0	2186.4
2005	0	383.5	647.4	1128.3	46.1	106.5	0	2311.8
2004	0	411.1	145.7	1046.3	98.0	159	25.6	1885.7
2003	0	317.1	190.2	787.6	145.8	265.2	0	1705.9

The recorded meter totals from customers is summarized in the following table.

TABLE 3 – Outflow – Annual Use Data (AF)

Year	Domestic	Commercial	Industrial	Institutional	Other	Total
2013	1279.04	106.16	0	11.5	0	1396.7
2012	1219.82	111.29	0	36.77	0	1367.9
2011	1177.54	76.97	0	8.55	7	1270.1
2010	1125.84	46.84	0	21.25	0	1193.9
2009	1136.49	69.08	0	14.44	0	1220.0
2008	1177	62.17	0	9.08	0	1248.3
2007	1214	7.74	0	12.6	0	1234.3
2006	1144	0.07	0	0.01	0	1144.1
2005	1174.17	56.22	0	8.83	0	1239.2
2004	1182.84	66.87	0	0	0	1249.7
2003	66.87	79.83	0	0	0	1329.3

The following table is a comparison of the previous two tables. The difference between the total inflow and the recorded outflow (meter readings) is a reflection of the system efficiency.

TABLE 4 – Water System Summary

Year	Total Inflow	Total Outflow	% Difference
2013	1918.8	1396.7	27.2%
2012	1748.4	1367.9	21.8%
2011	1848.5	1270.1	31.3%
2010	1838.2	1193.9	35.0%
2009	1969.7	1220.0	38.1%
2008	1990.9	1248.3	37.3%
2007	1933.6	1234.3	36.2%
2006	2186.4	1144.1	47.7%
2005	2311.8	1239.2	46.4%
2004	1885.7	1249.7	33.7%
2003	1705.9	1329.3	22.1%

The differences shown above reflect system losses. Losses are a result of leaks, spills, meter reading errors and software reporting problems. The average yearly system loss from 2003 to 2013 is 34.3%. The majority of the losses are assumed to come from radio transmitters that are not reporting back to the data collector. When this happens the usage is logged at zero but the customer is billed for their average use. Currently the city has 1700 meters that are not being

read by the radio data collector. These radio transmitters are eventually replaced and the actual usage is manually reconciled. However, until the units are replaced the reporting software continues to register zero water usage.

Another unmeasurable loss occurs at the tank overflows. Spring flows are measured prior to being sent to the city’s tanks. However, tanks can spill unused water back into the drainage system after being measured. The spilled water is not measured. Fortunately, this is not a common occurrence. Tanks that are fed from springs include Rice Creek Reservoir (Rice Creek Spring and Coldwater Spring) and North Ogden Canyon Reservoir (North Ogden Canyon Spring and Coldwater Spring).

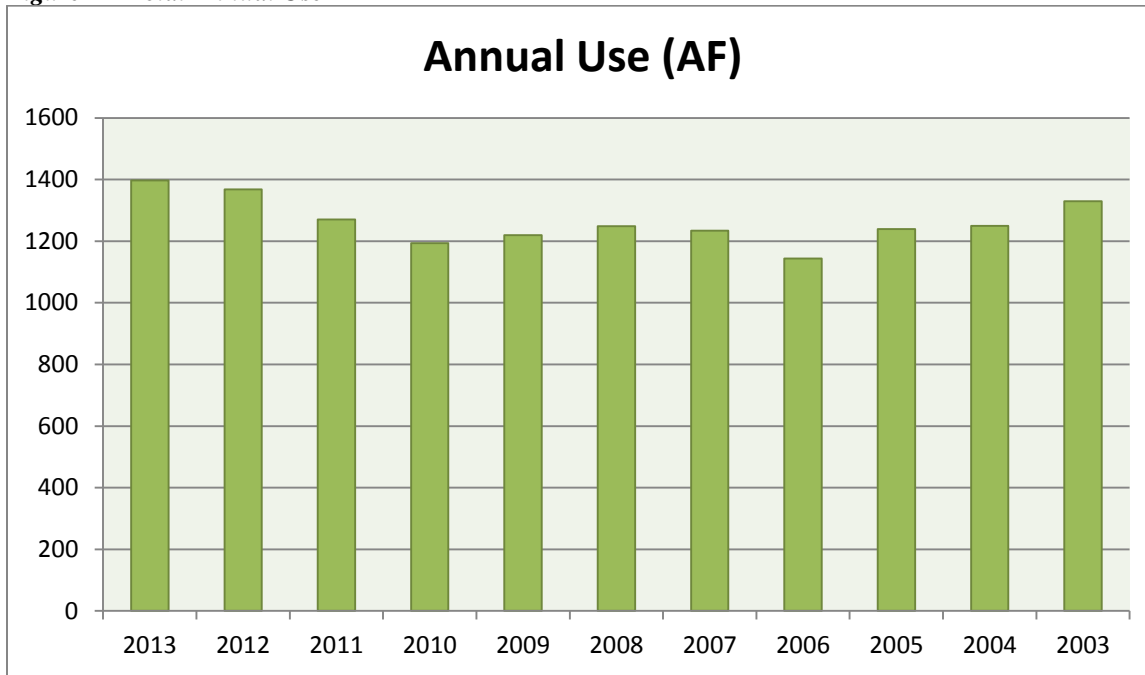
PRESENT WATER USE AND FUTURE WATER NEEDS

Table 5 shows the Culinary Water System’s connections. The average growth since 1984 is 2.8% and the average growth in the last decade is 1.8%. The past growth will help provide an estimation of future water usage requirements. The total Annual Use from table 3 is shown graphically in Figure 1.

TABLE 5 – Culinary Water Annual Connection Data

Year	Domestic	Commercial	Industrial	Institutional	Other/ Unmetered	Total
2013	5697	104	0	22	0	5823
2012	5589	104	0	21	0	5714
2011	5588	103	0	21	9	5721
2010	5557	59	0	44	0	5660
2009	5478	92	0	29	0	5599
2008	5431	67	0	19	0	5517
2007	5355	85	0	26	0	5466
2006	5213	85	0	18	0	5316
2005	5099	68	0	18	0	5185
2004	4947	81	0	0	0	5028
2003	4807	80	0	0	0	4887

Figure 1 – Total Annual Use

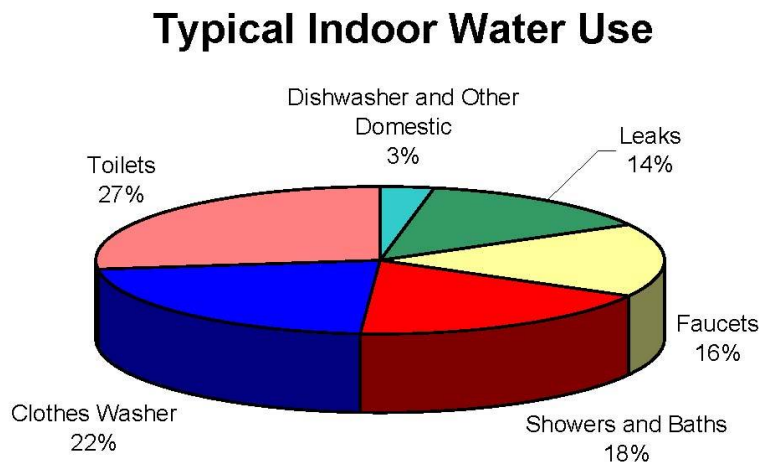


The usage shown does not directly correlate with the increase in the number of connections as expected. Usage seems to fluctuate dramatically from year to year. Fluctuations may be a result of climate conditions or changes in water usage habits by even a small group of residences.

When all uses of culinary water are compared with the number of people living in North Ogden City in 2010, residents use approximately 94 gallons of water per capita per day (gpcd). The statewide average is 185 gpcd and 127 gpcd nationally. The daily water use for North Ogden City is below the state and national average.

Figure 2 shows the breakdown of typical water use inside the home for Utah residents

Figure 2 - Typical Water Use

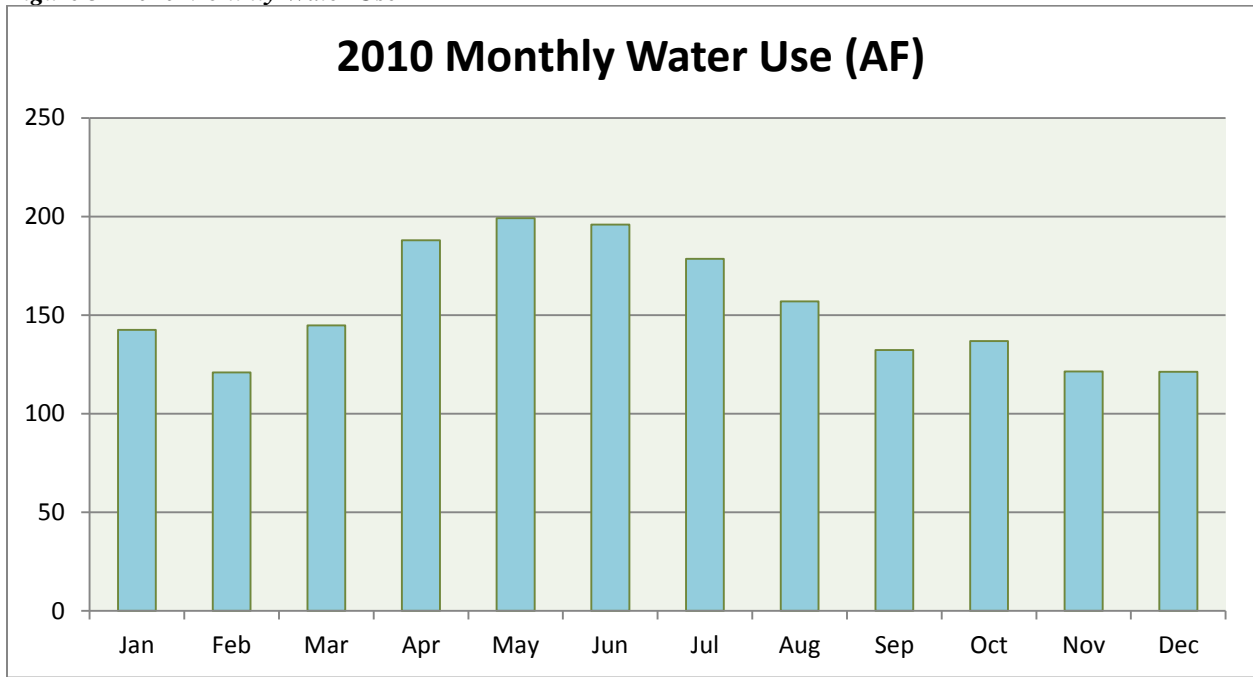


[From Mayer, Peter W. et. al., Residential End Uses of Water, [AWWA Research Foundation,1999]

This breakdown is probably very similar to the actual indoor water use for residents in the City of North Ogden.

Figure 3 shows the monthly water use for North Ogden City for 2010.

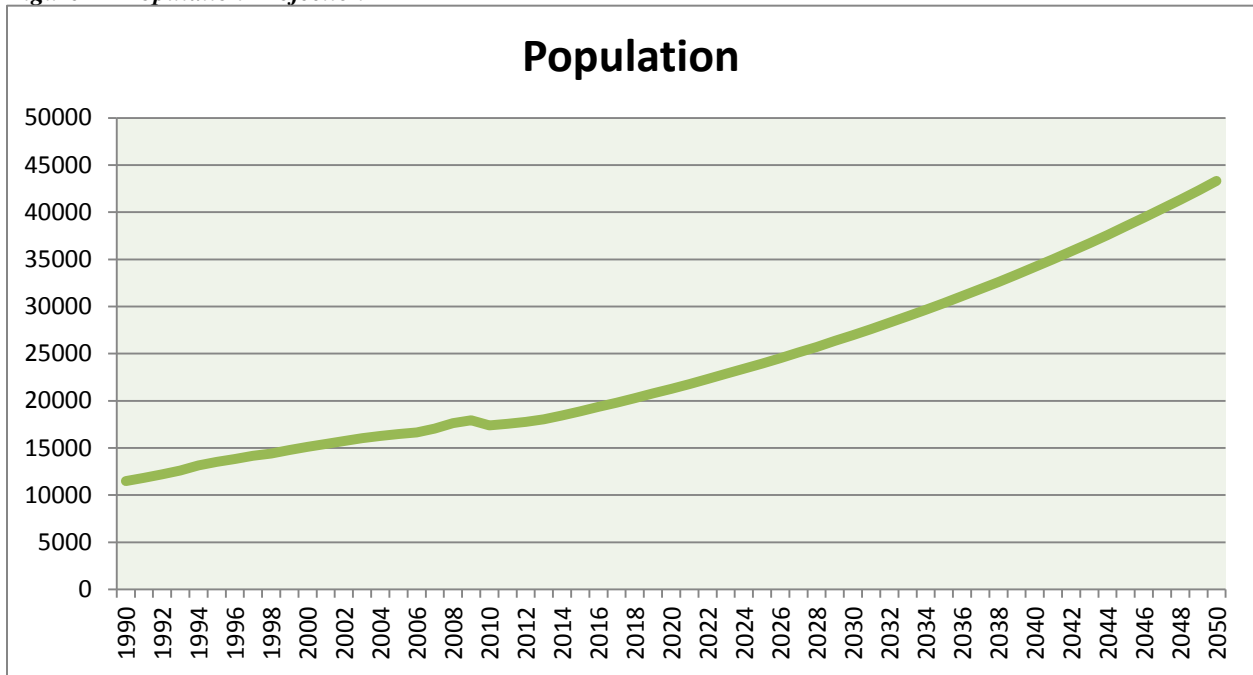
Figure 3 - 2010 Monthly Water Use



As can be seen usage peaked during spring and summer. Winter use was the lowest.

The extent of the city's expected future population growth is shown in Figure 4. The City will reach build-out in the year 2046. Many factors influence this projection, and the estimates shown may vary substantially from the actual population experienced.

Figure 4 - Population Projection



If population projections are correct and the current water consumption rate of 94 gpcd continues North Ogden City will need approximately 5,259 acre-feet per year at build-out (2046). Assuming the current wells and springs are used to their fullest capacity, the current water supply is 2,200 acre-feet. This shows that without implementing any water conservation measures the city will need to find additional water supply to serve the city's water needs.

SECTION III WATER PROBLEMS, CONSERVATION MEASURES AND GOALS

PROBLEMS IDENTIFIED

The following is a list of problems in the current water system. Each of these problems represents an opportunity to make changes and refine conservation measures

1. Some citizens lack understanding of efficient water-use habits and practices. Residents need to know how to consistently use water efficiently indoors. Most citizens' indoor practices are based on convenience rather than water supply considerations.
2. North Ogden's water pricing provides some incentive for water conservation because of high overage rates. Additional restructuring of the water rates as well as incentives in place may inspire additional consumers to conserve.
3. The city has a few connections that are unmetered. The actual use amount of water use for these are unknown.
4. Unused spring water can spill at some of the reservoirs. This water is being reported as a system loss even though it is not needed.
5. Data collection for the radio read equipment records a usage of zero even though the customer is using water and being billed (for their average use).

WATER CONSERVATION GOALS

In pursuit of solutions to the problems identified previously, and in light of the variety of conservation measures available to solve these problems, the following goals have been identified in order of priority:

- **GOAL #1 –Education.** Continue to provide information and education regularly in newsletters. Participate in educational programs provided through school district.
- **GOAL #2 – Add Meters to Unmetered Connections.** The city has added a meter to Green Acres park this last spring. The city will continue to plan for and install meters at the Oaklawn Park and the shop building connections.
- **GOAL #3 – Meter Reading System Update.** The city is in the process of updating the radio read meter system to a fixed base monitoring system over the next few years. This will correct the zero usage errors currently plaguing the system. Additionally the fixed base monitoring system will allow for instantaneous meter reading and data collection. Currently meter usage data is collected monthly. The new system will make it possible to see up to the minute usage. It will also give the city the ability to detect continuous flow

meters which are indicative of leaks. These can even be reported to city personnel by notification/alarm so the city can follow up with residents to detect leaks earlier and conserve water.

- **GOAL #4 – Weekly Meter Reading Audit.** Perform weekly read audits to compare water use and check for leaks. This will be possible once the fixed base monitoring system is installed.

SECTION IV WATER CONSERVATION PLAN

CURRENT CONSERVATION PRACTICES

Regular meter reading and water audits.

Mandatory connection to the secondary water system. The City supports the irrigation watering restrictions set by secondary water supplier, no watering between 10:00 am and 6:00 pm

CURRENT WATER RATES

The following table outlines the current water rate schedule associated with the City’s various connections.

TABLE 6 – Water Rate Schedule

Use Type	Base Rate up to 20,000			Overage Rate	
	Base Fee	Standard Rate	Per Gallons	Overage Rate	Per Gallons
Residential	\$8.65	\$1.62	1,000	\$2.16	1,000

CONSERVATION MEASURES / EDUCATION PROGRAM

In order for the City to accomplish the goals listed previously, specific water conservation measures must be taken. Compliance with emergency measures would be mandatory when deemed appropriate and could be enforced by the implementation of fines or physically restricting the use of water through connections. Compliance with non emergency measures would not be mandatory but could be influenced by adjusting billing rates or increasing awareness and community involvement. The water conservation measures and programs the city wishes to implement/continue at this time are summarized below.

Metering

- Install/update meters to the fixed base station monitoring system on all water connections. Meters will be read and a water audit be performed on a regular basis.

System Water Audits, Leak Detection and Repair

- Supervisor Control and Data Acquisition (SCADA) system allows for monthly monitoring for accuracy in equipment operations
- Set specific goals to reduce unaccounted water to an acceptable level.

Education Programs

- Support state and local water education programs for the elementary school students.
- Send newsletters periodically in utility bills.

The following measures on water use is available to the citizens of our City through the city and county libraries and is occasionally disseminated with the water bills and on occasion with door hangers as needed.

Emergency Measures:

- Educate the public on the water supply situation.
- No outside watering with culinary water except areas where secondary water is not available and is restricted to a limited watering schedule if water is available to every 2 or 3 days from 6 p.m. to 10 a.m. and No watering in cases of severe shortages.
- Eliminate watering of city property in cases of severe shortages.
- Instigate emergency conservation measures by:
 1. Strictly enforcing all conservation policies with significant fines for non compliance.
 2. Physically restricting water supplies to (in order of priority):
 - a. All outdoor irrigation systems.
 - b. Park properties and other non essential support facilities.
 - c. Commercial businesses, restricting largest users first.
 - d. Residential areas.
 - e. Any other “non life support” areas, insuring water supplies to hospitals, hospices, all other health care facilities, and controlled designated area water supply facilities.

Non Emergency Measures:

Outside 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. We encourage our customers to utilize the weekly lawn watering guide located at www.conservewater.utah.gov.
- Group plants in terms of water need, and zone sprinkler systems accordingly.
- Encourage customers to alter parking strips by allowing more water-wise plantings.
- Do not water on hot, sunny, and/or windy days. You may actually 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 to clean them off.
- Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscaping so that all the water running off goes to beneficial use instead of running down the gutter to waste.
- Check for and repair all 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.

- Send any leak letters to residences for noticed leaks from water meter readings.
- 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:

Over half of the total water used in a household is used in the bathroom. Concentrate on reducing bathroom water use. Following are suggestions for this specific area:

- Do not use your toilet as a waste basket. Put all tissues, wrappers, cigarette butts, etc. in the trash can.
- 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. For those who do not have a low volume flush toilet, put a plastic bottle full of sand and water in the 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. The goal is to reduce water used for toilets by 25%.
- Take short showers with the water turned up only as much as is necessary. Turn the shower off while soaping up or shampooing. Install low flow shower heads and/or other flow restriction devices. Our goal is a 10% reduction in water used for showers and baths. This means instead of taking a 20 minute shower you only take 18 minutes.
- Do not let the water run while shaving or brushing our 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 weeks worth of clothes. Our goal is to reduce water used for clothes washers by 10%. This can easily be accomplished by washing a full load of laundry.
- Repair any leak within the household. Even a minor slow drip can waste up to 15 to 20 gallons of water a day. Our goal is to reduce water wasted by leaks by 30%.
- 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 pitcher of water in the refrigerator for a cold drink instead of running the water until it gets cold from the tap. You are putting several glasses of water down the drain for the one cold drink.
- When rinsing vegetables, dishes, or anything else, put the stopper in the sink and use only a sink full of water instead of continually running water down the drain

COST ANALYSIS

At this time it is difficult to estimate the amount of water that would be conserved if all four goals are accomplished. The following is a preliminary estimate.

Goal #1 (Public Awareness)

Capital Costs - \$500 to develop fliers and literature.

Annual Costs - \$100 to print and distribute literature.

Avoided Costs - None.

Goal #2 (Add Meters to Unmetered Connections)

Capital Costs - \$7,500 to install the new meters (these are large meters).

Annual Costs - None.

Avoided Costs – None unless a leak is detected.

Goal #3 (Meters and Base Station)

Capital Costs - \$1,900,000 to install/update complete city wide water system.

Annual Costs - None

Avoided Costs – Savings in water production through early leak detection. Actual cost unknown.

Goal #4 (Weekly Water Audits)

Capital Costs – Part of Goal #3.

Annual Costs - \$5,000 leak detection and repair program.

Avoided Costs - \$183,292.50 per year of lost water. Assuming to reduced water loss to 18%, equaling about 375 acre-feet, and a calculated water rate of \$488.78 per ac-ft.

Because of the capital cost for the new metering system. The City would not see a positive balance for the system for 10.7 years after the system is completely installed/updated and a program for leak detection and repair program in place. The estimated time to get the entire system converted over to the new reading equipment is 6 years.

SECTION V IMPLEMENTING AND UPDATING THE CONSERVATION PLAN

To ensure the goals outlined above are reached, appropriate tasks must be determined, responsibility fixed with the logical person or department, and a time line set for completion of each task. In order to do this a committee must be assembled This committee will most likely be made up of current district staff members, although others may be selected as well. The purpose of the committee will be to investigate current water usage/misusage and future water needs. The committee will meet at least quarterly and have the ability to implement programs that will adequately reduce excess water usage. This committee is also responsible for coming up with enforcement methods. This committee must update the water conservation plan no less than every five years. The members of this committee will be selected by and work closely with the city council.

IMPLEMENTING

The following are items that must be coordinated and a plan established in order to accomplish the goals stated above. It will be the committees responsibility to carry out these goals.

Goal #1: Education

1. Develop letters to insert into statement and flyers to educate the public on conserving water.
2. Distribute material regularly.

Goal #2: Additional Meters

1. Plan and budget for these projects as part of the culinary water capital facilities plan.

Goal #3: Fixed Base Meter Equipment

1. Plan and budget for this project as part of the culinary water capital facilities plan.

Goal #4: Weekly Water Audit

1. Implement a leak detection and weekly water audit program to determine system losses and reduce them.

UPDATING

As the implementation of this water conservation plan begins there will be some measures that will work well and others that won't. One person from the water conservation committee, that is to be created, will have the assignment of evaluating the success and effectiveness of all measures taken and keep a record of all activities. When the time comes to update the water conservation plan the committee will meet and assess the result of water conservation measures taken. This will be done every five years and a new up-dated water conservation plan will be created. The next update will be due in December of 2019.