

LOVELOCK MEADOWS WATER DISTRICT

WATER CONSERVATION PLAN

Revised January, 2015



OWNER:

Lovelock Meadows Water District
400 14th Street
Lovelock, Nevada 89419
(775) 273-2387

ENGINEER:

FARR WEST

ENGINEERING

5442 Longley Lane, Suite B.
Reno, Nevada 89511
(775) 851-4788

Contents

1 CONSERVATION GOALS.....	1
1.1 REDUCE WATER USAGE.....	1
1.2 ENCOURAGE THE USE OF COMPATIBLE LANDSCAPING	1
1.3 ENCOURAGE THE CITY TO INCREASE THE USE OF WASTEWATER EFFLUENT.....	1
1.4 IDENTIFY AND REDUCE WATER LOSS	1
1.5 INCREASE COMMUNITY PARTICIPATION IN CONSERVATION	1
1.6 MAINTAINING AN ADEQUATE SUPPLY OF WATER	1
1.7 CONSERVATION PLAN IMPLEMENTATION SCHEDULE	1
2 WATER USE PROFILE AND FORECAST	2
2.1 EXISTING DISTRIBUTION AND SUPPLY SOURCES.....	2
2.2 WATER USE FORECAST BASED ON HISTORICAL AND CURRENT USE	5
2.3 WATER USE PROFILE.....	6
2.4 UNACCOUNTED-FOR WATER	7
2.5 ESTIMATED AMOUNT OF WATER CONSERVED DUE TO MEASURES.....	8
2.6 IMPACT OF PRIOR CONSERVATION EFFORTS REQUIREMENTS	9
3 BASE CASE WATER CONSERVATION INCENTIVES AND MEASURES	10
3.1 BASE CASE CONSERVATION INCENTIVES.....	10
3.2 BASE CASE CONSERVATION MEASURES.....	12
4 COMPREHENSIVE CONSERVATION MEASURES.....	13
4.1 GENERAL CONSERVATION MEASURES.....	13
5 COMPREHENSIVE CONSERVATION INCENTIVES.....	21
5.1 EDUCATIONAL INCENTIVES.....	21
5.2 FINANCIAL INCENTIVES.....	24

5.3 REGULATORY INCENTIVES.....	24
6 WATER CONSERVATION INITIATIVES AND RECOMMENDATIONS.....	27
6.1 LOVELOCK MEADOWS WATER DISTRICT CONSERVATION MEASURES	27
6.2 FINANCIAL MEASURES	27
6.3 EDUCATIONAL INCENTIVES.....	27
6.4 SYSTEM WIDE HARDWARE MEASURES.....	27
APPENDIX A – CONSERVATION MEASURES	29
APPENDIX B – LANDSCAPE GUIDES	43
APPENDIX C – WATER WEBSITES.....	50
APPENDIX D – METER INSTRUCTIONS	51
APPENDIX E – LANDSCAPE CODE	53
APPENDIX F – WATER ORDINANCE	54
APPENDIX G – EPA RESIDENTIAL BENCHMARKS	55

1 CONSERVATION GOALS

This section includes the water conservation goals for the Lovelock Meadows Water District water system.

Lovelock Meadows Water District does not have the authority to establish ordinances or codes. Because of this many of the conservation measures and incentives included in this plan are for reference purposes and can be utilized by regulating entities in the creation of such ordinances.

This plan is compliant with Nevada Revised Statutes (NRS) sections 540.121 through 540.151 and is available for public inspection at the following location:

**Lovelock Meadows Water District
400 14th Street
Lovelock, Nevada 89419
(775) 273-2387**

Public comments about this plan are encouraged. Written comments may be sent to the address above.

1.1 REDUCE WATER USAGE

The primary objective of the conservation plan is to help Lovelock Meadows Water District and its customers meet and possibly exceed the conservation goals stated in this section. The primary goal of this plan is to reduce consumption by 10% by the year 2018.

An audit comparing water production with metered amounts will be performed prior to implementing incentives or measures. Additional audits will then be done every year thereafter. Results from the initial audit will be compared with those of subsequent audits in order to determine the effectiveness of measures and/or incentives.

Usage amounts measured will include summer use, average use per connection and per capita use. If there is a decrease in usage as a result of a particular measure or incentive, that incentive or measure can be expanded if possible to maximize efficiency. If it is discovered that a particular measure or incentive is ineffective, it will be discontinued and a new one will then be implemented to take its place.

1.2 ENCOURAGE THE USE OF COMPATIBLE LANDSCAPING

This plan should include public education to encourage reduction in the size of lawns and encourage the use of plants that are adapted to arid and semiarid climates. Educational information for both residences and businesses can be in the form of mailers, guides, and websites.

1.3 ENCOURAGE THE CITY TO INCREASE THE USE OF WASTEWATER EFFLUENT

This plan should encourage good management practices for the reuse of effluent by those holding authority for its use. Note that the City of Lovelock currently has primary storage rights to effluent water from the Lovelock wastewater treatment facility.

1.4 IDENTIFY AND REDUCE WATER LOSS

The District should strive to reduce the amount of water extracted from the various sources vs. the water actually delivered (billed) to customers through a system of identifying and reducing leaks in water distribution systems, instituting a meter maintenance/replacement program, and connecting unmetered and multiple users.

1.5 INCREASE COMMUNITY PARTICIPATION IN CONSERVATION

A key objective of this plan is to increase public awareness of the limited supply of water in Nevada and the need to conserve water. A successful educational program provides information to the public that helps and motivates water users in their efforts to conserve. Educational materials and resources can include home & landscape guides and mailers. Regardless of the type of educational resources that are used, the most important consideration is their content and if the information is disseminated successfully.

1.6 MAINTAINING AN ADEQUATE SUPPLY OF WATER

This plan includes a contingency plan for drought conditions that ensures a supply of potable of water. The primary goal of water conservation is to insure that there is sufficient water for essential public health and safety needs at all times. The climate in Northern Nevada is arid and subject to periodic droughts that can vary in duration. It is important therefore to have a reserve on hand for such events. Conserving water during times of plenty will insure that such reserves are available for drought and emergency conditions.

1.7 CONSERVATION PLAN IMPLEMENTATION SCHEDULE

The conservation measures and incentives in this plan will be implemented according to the following schedule (see section 6 for detailed descriptions of incentives and measures included in the schedule):

Table 1.1

Plan Implementation Schedule

	2016	2017	2018
<i>Incentives</i>			
Conservation Education	Implement	Ongoing	Ongoing
<i>Measures</i>			
Meter Testing Program	Implement	Ongoing	Ongoing

The annual production audit will help determine if the schedule needs to be adjusted to accommodate the implementation of new measures or incentives or the discontinuation of old ones.

END OF SECTION

This chapter provides a description of the Lovelock Meadows Water District system. Section 2.1 identifies distribution system and supply sources with their individual capacities. Section 3.2 addresses the water use forecast. Sections 3.3, 3.4, and 3.5 discuss system water profiles, unaccounted for water respectively and the impact of past conservation efforts and regulatory requirements.

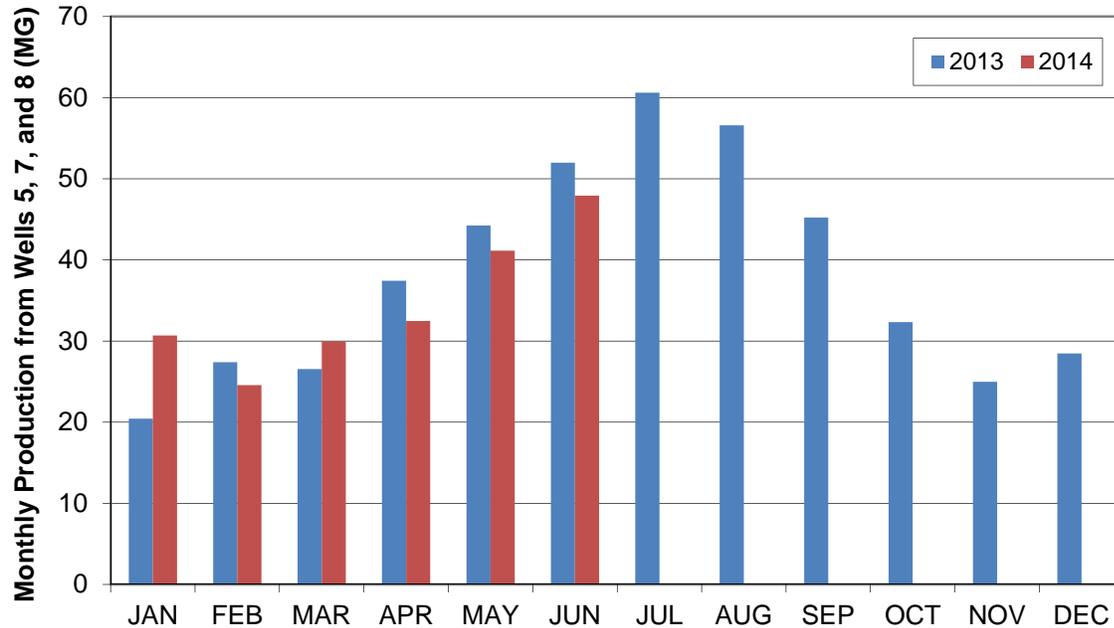
2.1 EXISTING DISTRIBUTION AND SUPPLY SOURCES

The Lovelock Meadows General Improvement District was formed in April 1979 as a result of a regional water system consolidation of the City of Lovelock, the Big Meadow Water Association, and the Valley Water Association. The Lovelock Meadows Water District service area is very large by rural Nevada standards, serving over 115 square miles. Approximately 43,500 linear feet of the distribution system, consisting of various diameters of vitrified clay and cast iron piping, lies within the city limits. The former Big Meadow Water Association portion of the distribution system extends south of the city limits (i.e., the Lower Valley), and consists of approximately 25 miles of various diameter ACP and PVC piping. Currently funding is being sought for the replacement of approximately 16 miles of existing 4-inch to 16-inch diameter pipeline. This proposed project could reduce the amount of unaccounted-for water due to leaks.

Groundwater in the Lovelock area contains high concentrations of sulfate, nitrate, fluoride, and dissolved salts and is generally not suitable for potable consumption. Lovelock obtains its municipal water supply from three groundwater wells (Wells #5, #7, and #8), located approximately 15 miles northeast at Oreana, Nevada. The wells are separated by 1,300 to 1,500 feet and pump from essentially the same aquifer depth. There are no other sources currently being used for municipal purposes. Figure 2.1 shows the combined monthly production during 2013 and 2014 for Wells #5, #7, and #8. The peak monthly demand is consistently in July, with 60.6 million gallons pumped in 2013.

FIGURE 2.1

Combined Production for Wells #5, #7, and #8 in 2013 and 2014



Water is conveyed from the wells via 53,500 linear feet of 16-inch ACP pipe to two steel water storage tanks. The two storage tanks provide a capacity of 1.5 million gallons and 2.5 million gallons, for a total capacity of 4.0 million gallons. From the storage tanks, water is conveyed to the distribution system at different points by two 12-inch steel pipes that parallel Reservoir Road and Irish American Road.

2.1.1 Water Rights

Lovelock Meadows Water District holds title to several underground water rights in the Oreana sub-basin, with of a total combined duty up to 3,099.78 acre-feet or 1.010 billion gallons annually. The duty originates at Wells #5, #7, and #8.

Lovelock Meadows Water District also holds title to 464.45 acre-feet of underground water rights in the Lovelock Valley basin for use on a proposed golf course. The table below summarizes the underground water rights.

TABLE 2.1
Summary of Ground Water Rights

<u>Source</u>	<u>Owner</u>	<u>Permit Numbers</u>	<u>Max Rate of Diversion (CFS)</u>	<u>Max Annual Use (AFA)</u>	<u>Max Annual Use (MGA)</u>
Well 05	LOVELOCK MEADOWS WATER DISTRICT	37989	1.34	1.98	0.65
		37991	1.00	1.99	0.65
		39712	1.00	1.99	0.65
		39714	2.72	841.15	274.09
		45578	2.00	804.26	262.07
		60215	1.50	455.10	148.29
			9.56	2106.47	686.40
Well 07	LOVELOCK MEADOWS WATER DISTRICT	37987	0.02	10.86	3.54
		37990	0.23	167.25	54.50
		37992	1.00	635.30	207.01
		39713	1.43	635.30	207.01
		45577	2.00	804.26	262.07
			4.68	2252.97	734.13
Well 08	LOVELOCK MEADOWS WATER DISTRICT	77715	0.50	361.98	117.95
Golf Course Well	LOVELOCK MEADOWS WATER DISTRICT	59252	3.00	64.45	21.00
		60684	3.00	400.00	130.34
			6.00	464.45	151.34

See Permit **77715**- The total combined duty of water under permits 37987, 37989, 37990, 37991, 37992, 39712, 39713, 39714, 45577, 45578, 60215, and 77715 shall not exceed 3099.78 acre feet or 1,010,000,000 gallons annually.

A review of the records of the State Engineer shows that the City of Lovelock is the owner of record for several surface water rights associated with Little Rocky Canyon (Pole Creek), East Horse Canyon (Wild Horse Creek), and Wright’s Canyon Creek. Certificates were issued for the entire flow diverted from these surface water sources under permits 4304, 4305, 4307, and 26828. These permits changed decreed rights 01430 and 01431. Lovelock Meadows Water District currently does not use any surface water for municipal purposes.

Proofs of Beneficial Use were also submitted for permits 3772, 3773, and 3774. Certificates were never issued for these Permits, and it is unlikely that they will ever be issued as these sources are not currently being used.

The City also is the owner of record to primary storage rights (Permit 40258) on the effluent from the city sewage treatment plant. In order to place this water to beneficial use, secondary

permits must be filed on this storage right describing the manner and place of use. Table 2.2 is a summary of the surface water rights.

TABLE 2.2

Summary of Surface Water Rights

<u>Source</u>	<u>Permit Numbers</u>	<u>Owner</u>	<u>Max Rate of Diversion (CFS)</u>	<u>Max Annual Use (AFA)</u>	<u>Max Annual Use (MGA)</u>
Little Rocky Creek (Pole Creek)	3772	City of Lovelock	1.10	616.26	200.81
	4307	City of Lovelock	0.25	0.00	0.00
			1.35	616.26	200.81
East Horse Canyon Creek (Wild Horse Creek)	3773	City of Lovelock	1.10	616.26	200.81
	4305	City of Lovelock	0.25	0.00	0.00
			1.35	616.26	200.81
Wright's Canyon Creek	3774	LOVELOCK MEADOWS WATER DISTRICT	2.00	0.00	0.00
	4304	City of Lovelock	0.50	0.00	0.00
	26828	LOVELOCK MEADOWS WATER DISTRICT	3.00	368	119.91
			5.50	368	119.91
Effluent	40258	City of Lovelock	0.77	557.3	181.60

A review of the records of the State Engineer indicates that all underground rights are currently in good standing. Water rights associated with surface water are regulated differently than groundwater sources. Although certified groundwater rights can be forfeited for non-use, surface water rights are held to a different standard. Surface water rights can only be lost through abandonment by the owner of these rights, which requires the owner of record or the agent for the owner to request their withdrawal. Even though these rights are no longer being used, ownership will be maintained by the City of Lovelock until the City petitions to withdraw them for whatever reason deemed necessary.

2.2 WATER USE FORECAST BASED ON HISTORICAL AND CURRENT USE

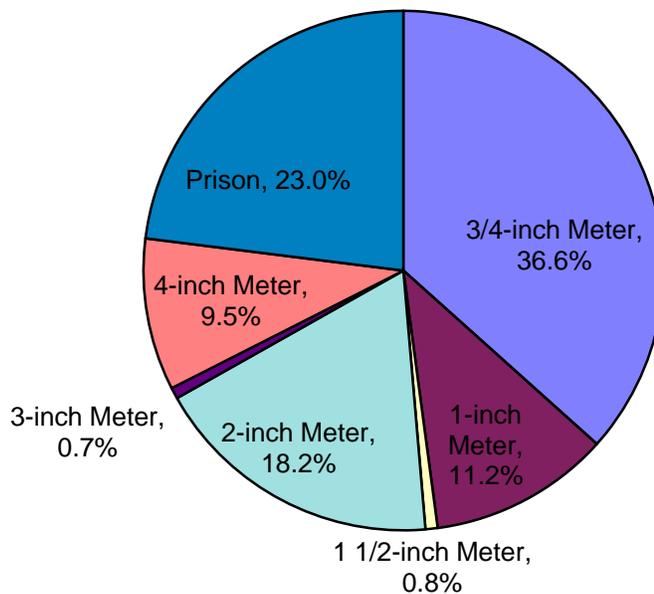
Current customer connections total 1,256, which is an increase of 135 over the 1,121 connections reported in 2006. However, the pumping records from 2006 show a year-end total of 478.7 million gallons while total pumping in 2013 was 456.3 million gallons or a decrease of 22.4 million gallons. It is anticipated that Lovelock Meadows Water District will continue to experience water savings as system improvements and new conservation measures are implemented.

2.3 WATER USE PROFILE

New service rates were presented to the public and eventually adopted by the Lovelock Meadows Water District Board in January 2005. The most recent rates went into effect in June of 2007. See Table 3.2 for the rate schedule. Figure 2.2 shows the percentage of billable water usage for 2013 based on connection type. Assuming that residential and small commercial uses fall under $\frac{3}{4}$ " and 1" meter categories, water use for these categories is approximately 50% of the total.

FIGURE 2.2

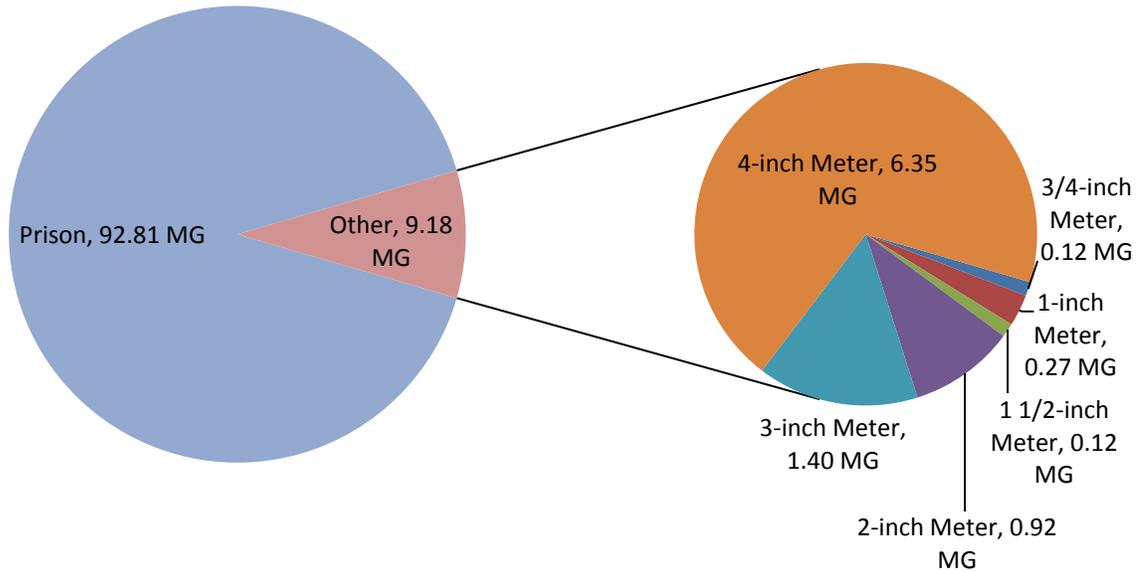
Connection Classification Use Percentages for 2013



The average annual use per connection for each meter size category is shown in Figure 2.3. Residential and small commercial, although making up the majority of the total water usage, accounts for the smallest water use per connection. Water use by the Prison is by far the greatest water user, at 92.8 million gallons for its single connection.

FIGURE 2.3

Average Annual Use per Connection for each of the meter categories for 2013



2.4 UNACCOUNTED-FOR WATER

The amount of unaccounted-for water was determined by comparing the total water production from Wells #5, #7, and #8 with customer billing records for years 2004, 2005, and 2013. Refer to the table below regarding the percent of unaccounted-for water.

TABLE 2.3

Unaccounted-for Water

Year	Total Production Wells #5, #7, #8 (MG)	Total Billed (MG)	Unaccounted-for Water (MG)	% Unaccounted-for
2013	456.3	403.1	53.2	12.0
2006	478.7	384.5	94.2	19.7
2005	470.7	376.5	94.3	20.0
2004	471.8	409.1	62.7	13.3

Causes for water being unaccounted for are numerous. Leaking mains, dead meters, under-registering meters, record keeping practices, un-metered uses, and multiple users on meters all contribute to the problem. Regardless of the cause, a water loss of 20.0% indicates that the water system is not operating efficiently. Reducing this loss will improve the conservation efforts of Lovelock Meadows Water District. The Lovelock Meadows Water District distribution system has benefitted from several improvement projects since 2006. This may be part of the reason that unaccounted-for losses have decreased since

that time. However the water loss calculations presented above may be understated: source meters have not been tested in the past 10 years; there have been as many as 150 non-functioning meters in the past; under-registering meters have not been identified and reservoir levels have not been recorded prior or after meter readings.

Currently, the District does not have a distribution leak detection program. Leaks in the system are detected through meter readings and customer reports.

2.5 ESTIMATED AMOUNT OF WATER CONSERVED DUE TO MEASURES

Table 2.4 (See Appendix G) shows the range of residential use per person per day using the U.S. Census 2010 population estimate (1,894) for Lovelock. For estimating purposes ¾” connection amounts from 2013 were assumed to be all residential.

TABLE 2.4

Range of Residential Water Use in Gallons per Day (EPA Estimates)

Use	Per Person (Low)	Per Person (High)
Toilets	6.4	48.00
Showers	7.50	75.00
Baths	6.00	10.00
Washing Machine	9.00	25.00
Dish Washer	1.00	4.50
Kitchen Faucet	1.00	15.00
Bathroom Faucet	1.00	9.00
Landscape	12.2	162.6
Total	44.1	349.1

Currently the average per person per day use in Lovelock is 213.7 gallons which is approximately equal to the State average. The application of residential conservation measures and incentives encouraged through education (see Section 6.3) could reduce this average. The per person usage of 44.1 gal/day (gpd) shown in Table 2.4 is unrealistic in such a dry state but 150 gpd may be reasonable. Table 2.5 shows new averages that can be achieved with such a reduction in individual use.

TABLE 2.5

Residential Conservation Resulting from Education

% of Population Consuming 150 gallons/day	New gpcd Average (gal)	Amount Conserved Annually (MG)
25	197.8	11.0
50	181.8	22.0
75	165.9	33.0

*Table assumes level population number

The amounts in Table 2.5 are what will be expected as a result of conservation education. A range is provided because it is difficult to determine the exact response to conservation education.

Lovelock Meadows Water District has recently made system improvements including pipe replacement. It is anticipated that these improvements will reduce water losses due to leaks. Because these improvements are relatively new, it is difficult to estimate at this time how much water will be

conserved due to these improvements. However, meter records kept over the next five years will indicate how much water has been conserved. It is anticipated that the improvement will be significant.

2.6 IMPACT OF PRIOR CONSERVATION EFFORTS REQUIREMENTS

There is not currently enough information to determine the impact of previous conservation efforts. It is expected that data collected over the next several years will show a significant improvement due to better system operation relating to the new SCADA and a further decrease in the unaccounted-for-water percentage associated with the replacement of the old distribution piping.

END OF SECTION

3.1 BASE CASE CONSERVATION INCENTIVES

A conservation incentive by definition is something that raises awareness about saving water. There are three classes of conservation incentives: (1) educational, (2) financial, and (3) regulatory. The following conservation incentives are included here for reference. The incentive classification for each of these is in parentheses.

3.1.1 Water Shortage and Waste of Water Ordinance (Regulatory)

The County and/or City are responsible for enacting ordinances. The intent of water ordinances is to limit water use during a water shortage and drought conditions, or to restrict use if it is found that water is being wasted. Ordinances should define “water shortage” and “waste of water” and include sections on enforcement through the use of citations, fines, and discontinuation of service. A landscape code should be considered by the county or city as well.

3.1.2 Landscape Use Education (Educational)

Educational information for both residences and businesses can be in the form of mailers, guides, and websites. This conservation plan is also a resource that can be employed. Appendix B gives a list of compatible shrubs, trees, and plant for Pershing County.

3.1.3 Conservation Literature (Educational)

The District will consider utilizing education tools and resources for the water system users through the use of:

- Home and Landscape guides
- Mailers
- Websites
- Lawn Watering Schedules
- Plumbing Fixture Retrofit Kits provided by the utility
- Video Instruction
- Water Watcher personnel
- Home Water Audits
- Water Hotlines
- The Water Conservation Plan

3.1.4 Watering Schedule (Regulatory)

Odd/Even watering schedules to include residences and businesses should be considered. Such a schedule could be implemented during periods of drought.

3.1.5 Water Conservation Plan (Educational)

3 BASE CASE WATER CONSERVATION INCENTIVES AND MEASURES

The information in this water conservation plan can be used for educational purposes. It must be available for inspection by members of the public during office hours at the offices of the supplier of water.

3.1.6 Water Rates (Financial)

Water rates, as a conservation incentive, work to increase awareness about the value of reducing water use and can motivate water users to implement water conservation measures.

The current Lovelock Meadows Water District rates were adopted by the Lovelock Meadows Water District Board in January 2005. The first phase of the new rates went into effect in April of 2005 with the second phase being implemented in June of 2007 (see Table 3.1). As a measure of the success of the first rate increase, billed use-per-connection remained nearly constant from 2004 through 2006. This would indicate that the first rate adjustment had no impact on customer use of water. However, the use-per-connection decreased between 2006 and 2013 for all but two connection classes (4-inch, and prison). See Table 3.1 for comparison.

TABLE 3.1

2006 and 2013 Comparison of Use-Per-Connection

Connection	2006	2013	Decrease in Use (MG)
3/4-inch Meter	0.14	0.12	0.02
1-inch Meter	0.31	0.27	0.04
1 1/2-inch Meter	0.32	0.12	0.2
2-inch Meter	1.04	0.92	0.12
3-inch Meter	1.91	1.4	0.51
4-inch Meter	5.01	6.35	-1.34
Prison	73.58	92.81	-19.23

Although the current rate structure does not include multiple tiers, the rates have been designed to encourage conservation as well as generate sufficient revenue for the Districts operational requirements. The rates are also at a level where the average monthly bill will be at or above one percent of the median household income. This amount is generally considered affordable but still sufficiently high to encourage conservation.

TABLE 3.2

Lovelock Meadows Water District Water Rates (as of 2014)

Meter Size	Base Rate \$ Charge	Base Rate Allotment (gal)	\$ Charge Per 1000 Gallons Over Base Allotment
≤ 3/4"	30.00	7,000	2.00
1"	36.00	7,000	2.00
1 1/2"	51.00	7,000	2.00
2"	69.00	7,000	2.00
3"	126.00	7,000	2.00
4"	210.00	7,000	2.00
Prison	4,200.00	1,200,000	2.00

3.1.7 Water Meters (Financial)

Although water meters are a device, they don't actually save any water according to the definition of a conservation measure. Because of this they are considered a conservation incentive.

In recent years, the list of inactive (not functioning) meters in the District has been as high as 150 meters, although Lovelock Meadows Water District continues to make progress and reports no non-functioning or dead meters. Non-functioning meters are reported at the end of each month and are replaced at that time.

The District reports no unmetered users in the system. There are some multiple users on single meters and the District will consider connecting these users to single meters in order to better evaluate water use and losses.

All of the wells in the Lovelock Meadows Water District except well #6 have been fitted with new meters and have been integrated into a SCADA system (well #6 is non-potable). The SCADA and meters that have been added to the system allow Lovelock Meadows Water District to more effectively operate the water system.

3.2 BASE CASE CONSERVATION MEASURES

There are two classifications of conservation measures: (1) Hardware or equipment and (2) behavior or management practices. The following conservation measures being currently used or proposed to be used in the Lovelock Meadows Water District conservation program. The measure classification is in parentheses.

3.2.1 Effluent Use (Behavior/Management)

Treated effluent can be used to irrigate landscapes on public property and cemeteries and can also be used for construction purposes and agriculture. Because the amount of effluent currently generated is relative small, agricultural use is not practical. Currently the City of Lovelock, Not Lovelock Meadows Water District, controls the available effluent. Also Lovelock Meadows Water District does not have the financial capability to implement an effluent use system. For these reasons water reuse is not practical at this time.

3.2.2 Leak Detection

Lovelock Meadows Water District currently detects leaks through meter readings and customer reports. Whenever a meter shows unusually high use Lovelock Meadows Water District personnel are sent to investigate. If a leak is discovered the customer is notified. Presently Lovelock Meadows Water District does not have a distribution level leak detection program in place. Appendix I has residential meter reading and leak detection instructions.

END OF SECTION

4 COMPREHENSIVE CONSERVATION MEASURES

The following are comprehensive conservation measures that can be employed by the District to supplement the base case measure itemized in section 3. As stated in section 3, conservation measures are divided into two types: (1) Hardware/Equipment measures and (2) Behavioral/Managerial measures. Conservation measures can also be classified into five categories of application: (1) Residences, (2) Landscape, (3) Industrial, Commercial, and Institutional (ICI) (4) Agricultural, and (5) Water Utilities. In addition to measures in this section, Appendix A includes specific conservation measures for residential, commercial/industrial, and institutional water users. The following conservation measures are included here for reference and are classified first by application and then by type.

4.1 GENERAL CONSERVATION MEASURES

4.1.1 Plumbing Standards

The most recent federal plumbing standards (table 4.1) are included here since these standards are applicable to the DCU service area. It is valuable to include California’s standards for reference since in most cases California’s requirements are more stringent. The comparison infers that there are plumbing fixtures available that exceed federal efficiency requirements and offer consumers alternatives that further improve conservation efforts.

TABLE 4.1

Federal and California Plumbing Standards

Device	FEDERAL ENERGY POLICY ACT (FEPA)		CALIFORNIA	
	Manufacture	Effective Date	Sale and Installation	Effective Date
Shower Heads	2.5 gpm*	1/1/94	2.5 gpm	3/20/92
Lavatory Faucets	2.5 gpm	1/1/94	2.2 gpm	3/20/92
Sink Faucets	2.5 gpm	1/1/94	2.2 gpm	3/20/92
Metering Faucets	*	1/1/94	†	7/1/92
Tub Spout Diverters	Not included in FEPA		0.1 to 0.3‡	3/20/92
Residential Toilets	1.6 gpf	1/1/94	1.6gpf	3/20/92
Flushometer Valves	1.6 gpf§	1/1/97	1.6 gpf	1/1/92
Commercial Toilets	1.6 gpf	1/1/97	1.6 gpf	1/1/94
Urinals	1.0 gpf	1/1/94	1.0 gpf	1/1/92

* Gallons per minute.

** 0.25 gal/cycle (pertains to maximum water delivery per cycle).

† Hot water maximum flow rate range from 0.25 to 0.75 gal/cycle and/or from 0.5 gpm to 2.5 gpm, depending on controls and hot water system.

‡ 0.1 (new), to 0.3 gpm (after 15,000 cycles of diverting).

§ Gallons per flush.

4.1.2 Drought Conservation Measures

All water supplied by Lovelock Meadows Water District comes from groundwater sources. Because of this it is difficult to determine the effect of a drought year on the groundwater system and the consequences of a drought may not be detected in the water table until several years after the drought. For this reason it is important that Lovelock Meadows Water District monitor precipitation, surface water levels, and water table levels over the long term. An annual review of water supplies should be done to determine the availability of water for the current year and the following year. This analysis should be done in the spring before the high use season.

In order to determine when it is necessary to impose special drought conservation measures, parameters or limits must be established for groundwater levels and groundwater levels should relate to measures. For instance, if groundwater drops to a certain level, a corresponding stage of drought measures are then required. Lovelock Meadows Water District will determine how groundwater levels relate to the different stages of drought.

This plan uses a drought assessment system similar to the one used by the Southern Nevada Water Authority (SNWA) that includes the following levels of drought observation:

- No Drought
- Drought Watch
- Drought Alert
- Drought Emergency

There are specific measures associated with each stage of drought that apply to water customers and Lovelock Meadows Water District. Table 4.5 summarizes Lovelock Meadows Water District responsibilities.

TABLE 4.5

LOVELOCK MEADOWS WATER DISTRICT Drought Conservation Measures

Stage	Reduction Goal	Information Measures	LOVELOCK MEADOWS WATER DISTRICT Measures
No Drought	10%	Encourage conservation through educational efforts	Institute intensive leak reduction program, Reduce % of unaccounted for water. Increase enforcement.
Drought Watch	15-18%	Use media to communicate drought information, warn of potential for more stringent measures associated with succeeding stages. 1 st stage measures.	Reduce water use for flushing, public fountains, and public facility landscape irrigation. 1 st stage measures.
Drought Alert	25-30%	Public officials appeal for water use reductions. Explain details of emergency. 1 st and 2 nd stage measures.	Prohibit all public water uses not required for health or safety. 1 st and 2 nd stage measures.
Drought Emergency	50% or more	1 st , 2 nd , and 3 rd stage measures.	Prohibit all outdoor water use and selected commercial/industrial use. 1 st , 2 nd , and 3 rd stage measures.

Drought conservation measures implemented by customers can save more water than those measures applied by Lovelock Meadows Water District (Table 4.5). For this reason water customers must also be expected to employ special conservation measures during times of drought. Special drought conservation measures for water users have been divided into the following categories:

1. Fountains and Water Features
3. Government Facilities
4. Landscape Irrigation
5. Mist Systems
6. Parks and Community Use Areas
7. Pools
8. Surface, Equipment, and Building Washing
9. Turf Installation
10. Vehicle Washing

4.1.2.1 Fountains and Water Features

Drought measures are summarized in table 4.6.

TABLE 4.6

Drought Measures for Fountains and Features

Stage	Residential	Common Areas	Commercial
Watch	Fountains and features with a surface area of 200 ft ² or less allowed.	Same as residential but feature cannot be incorporated into an entry way of streetscape, as defined by local government and only one fountain or water feature may be operated.	May maintain a re-circulating water pool to sustain pumps, pond liners, surface coatings and ancillary equipment. The feature of fountain may run only between 1 a.m. and 4 a.m. or whenever freezing conditions require system preservation.
Alert	Fountains and features with a surface area of 25 ft ² or less allowed.	Same as Watch	Same as Watch
Emergency	Fountains and features not allowed.	Fountains and features not allowed.	Fountains and features not allowed.

4.1.2.2 Government Facilities

Drought measures are summarized in table 4.8.

TABLE 4.8

Drought Measures for Government Facilities

Stage	Government Facilities
Watch	To be determined by LOVELOCK MEADOWS WATER DISTRICT after government facility needs have been established.
Alert	
Emergency	

4.1.2.3 Landscape Watering

Drought measures are summarized in table 4.9.

TABLE 4.9

Drought Measures for Landscape Watering

Stage	Winter (Oct – Mar)	Spring, Summer, Fall (Apr – Sept)
Watch	No Watering	2 assigned days per week
Alert	No Watering	2 assigned days per week
Emergency	No Watering	To be determined

4.1.2.4 Mist Systems

Drought measures are summarized in table 4.10.

TABLE 4.10

Drought Measures for Misting Systems

Stage	Residential	Commercial
Watch	Allowed, No restrictions	Use only for human comfort in June, July, and August and only between the hours of noon and 6 p.m.
Alert	Allowed, No restrictions	Use only for human comfort in June, July, and August and only between the hours of noon and 6 p.m.
Emergency	Not allowed	Not allowed

4.1.2.5 Parks and Community Use Areas

Drought measures are summarized in table 4.11.

TABLE 4.11

Drought Measures for Parks and Community Use Areas

Stage	Parks and Community Use Areas
Watch	To be determined by LOVELOCK MEADOWS WATER DISTRICT after parks needs have been established.
Alert	
Emergency	

4.1.2.6 Swimming Pools

Drought measures are summarized in table 4.12.

TABLE 4.12

Drought Measures for Swimming Pools

Stage	Swimming Pools
Watch	No restrictions. Pools should be drained into the sewer system so the water can be recycled.
Alert	
Emergency	Not to be filled during drought emergency

4.1.2.7 Surface Equipment and Building Washing

Drought measures are summarized in table 4.13.

TABLE 4.13

Drought Measures for Surface Equipment and Building Washing

Stage	Surface Equipment and Building Washing
Watch	Prohibited unless water is discharged into the sanitary sewer through approved methods or contained onsite.
Alert	
Emergency	

4.1.2.8 Vehicle Washing

Drought measures are summarized in table 4.14.

TABLE 4.14

Drought Measures for Vehicle Washing

Stage	Personal Vehicle Washing	Commercial Vehicle Washing
Watch	Once a week per vehicle using a hose with an automatic shut-off nozzle.	Only at a facility where water is discharged into the sanitary sewer through approve methods. Also with high-pressure, low-volume sprayer using less than 10 gallons per vehicle.
Alert		
Emergency	Not allowed	Not allowed

4.1.2.9 Turf Installation

Drought measures are summarized in table 4.15.

TABLE 4.15

Drought Measures for New Turf Installation

Stage	Residential Single and Multi-family	Non-Residential
Watch	Allowed	Allowed within limits of Landscape Code.
Alert	Allowed	Allowed within limits of Landscape Code.
Emergency	Not allowed	Not allowed

4.1.2.10 General Water User Measures

Drought measures are summarized in table 4.16.

TABLE 4.16

General Drought Measures

Stage	General Water User Measures
Watch	Mandatory restrictions on all outside uses by residential users, except landscape irrigation. Unnecessary outdoor uses by any commercial users prohibited.
Alert	All outdoor water use severely restricted. Serve water in restaurants only upon request.
Emergency	All outdoor water use and selected commercial and industrial use prohibited.

4.1.3 Emergency Conservation Measures

4.1.3.1 Definition

Currently Lovelock Meadows Water District has a sufficient storage capacity to meet the needs of its service area. However, during the peak daily demand of the summer months, the run times for both wells #5 and #7 is almost continuous at 24 hours a day. Lovelock Meadows Water District will need to monitor system capacity to determine at what point an emergency should be declared. Conditions other inadequate pump capacity that might require a declaration of emergency include major water line breaks, pump or system failures, or contamination of water supply sources. Regardless of the reason, the goal of emergency measures would be to restrict water usage to allow the water system to recover from the emergency condition. The following sections discuss additional measures that may be implemented during an emergency.

4.1.3.2 Lovelock Meadows Water District Operational Measures

The following are operation measures that should be implemented for a water emergency:

- Continue all actions from watch and alert stages (drought conservation measures), as appropriate.
- All emergency measures should be applied with any additional measures that Lovelock Meadows Water District considers to be necessary.
- The problem should be defined as an emergency by Lovelock Meadows Water District.
- Water use reduction goals should be established by Lovelock Meadows Water District. Single-family residences may be set as a per house allotment or as a percentage from previous years consumption. Commercial, multi-family, and industrial should be asked to reduce use by a percentage of the average of the previous year's consumption.
- Penalties or excess use charges should be established for customers that exceed their allotment.
- Lovelock Meadows Water District billing system could be adjusted to implement penalty or use charges.
- Enforcement actions should be increased.
- Inform local law enforcement of the need for assistance.
- Increase aquifer level monitoring actions.

4.1.3.3 *Communication Measures*

The following are the communication measures that should be implemented for a water emergency:

- Lovelock Meadows Water District will increase the frequency of reports to the board. The initial report will include the suggested nature and scope of proposed conservation measures. Subsequent reports should provide details on measure implementation and customer response to those measures.
- Provide status reports to entities with special interests, public agencies including the City of Lovelock, school districts, fire departments, and law enforcement agencies.
- Through a media campaign and direct mail announce to Lovelock Meadows Water District customers the:
 - Scope and nature of the measures.
 - Reasons for imposing the measures.
 - Water use reduction goals.
 - Enforcement mechanisms and fines.
 - Projections for how long the measures will be in place.
 - Penalty or excess use charges.
- Clearly identify any exemptions from the conservation measures.
- Inform customers about possible pressure reductions and any problems this may cause.
- Provide landscape firms with conservation measure information.
- Provide contractors and landscape firm's information on locations to obtain reclaimed water (effluent) for street cleaning, construction projects, irrigation, dust control, etc.
- Post updated status reports on Lovelock Meadows Water District website.
- Post signs where possible that note major conservation measures.
- Continue to enhance communication measures. This includes increasing education and establishing a hotline for emergency updates.
- Keep fire departments informed on the status of the emergency and require that they discontinue the use of water in training exercises until the emergency is over.

4.1.3.4 *Emergency Conservation Summary*

Advance preparation is necessary for the successful implementation of emergency conservation measures. Public education prior to an emergency is essential. It is also important that communication systems (hotlines, websites, etc.) have been set-up in advance. Enforcement procedures including personnel assignments should also be outlined ahead of time.

END OF SECTION

5 COMPREHENSIVE CONSERVATION INCENTIVES

The following are comprehensive conservation incentives that can be employed by the District to supplement the base case incentives itemized in section 3. A conservation incentive is something that increases awareness about the value of reducing water use. Incentives can help motivate water users to implement water conservation measures. As stated in section 3, conservation measures are divided into 3 categories: Educational, Financial, and Regulatory. This chapter discusses each of these categories and provides examples of incentives.

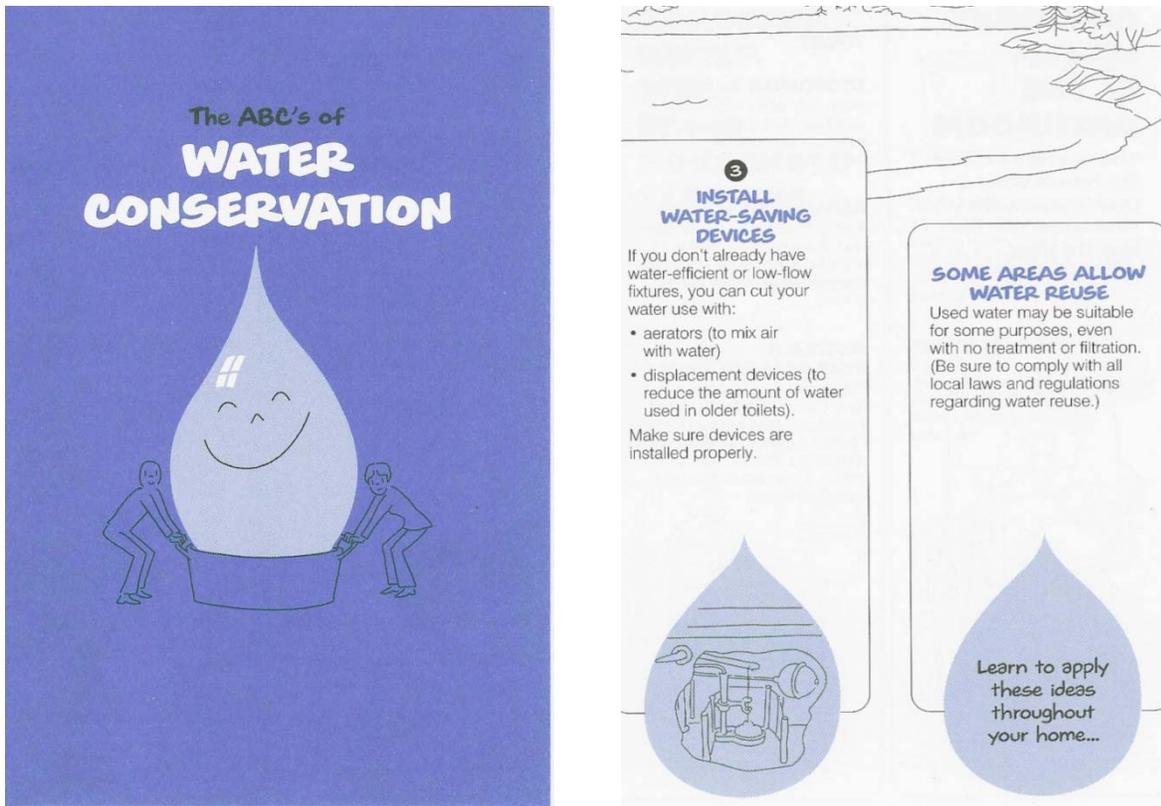
5.1 EDUCATIONAL INCENTIVES

5.1.1 Literature

Examples of conservation literature include water saving guides, direct mailers, or possibly even redesigned bills that include historical use information. The following are examples of conservation literature.

FIGURE 5.1

Pershing County Water Conservation Guide and Sample Page



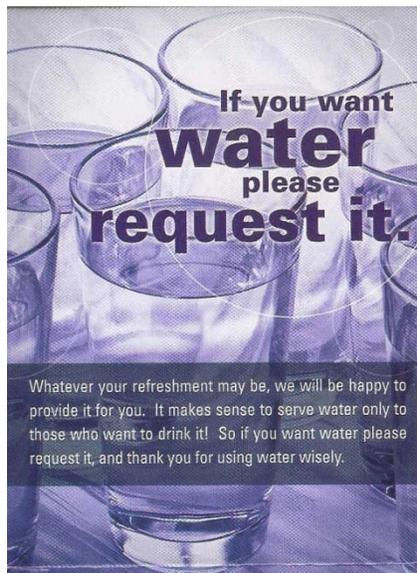
A guide like the one in figure 5.1 can be distributed by Lovelock Meadows Water District to new customers when they start their water service and contains suggestions for indoor and outdoor residential water conservation. The guide also provides instructions on basic leak repair and encourages the installation of water saving devices.

Another conservation education resource is landscape guides that contain detailed how-to information. These landscape guides may give advice on landscape design including plant layout, how to properly install an automated irrigation system, and which plants are best suited for the specific region. Lawn care guides that include the utilities summer watering schedule can be helpful. Refrigerator magnets that have the watering schedule are also a possibility. Appendix B includes a list of plants that grow well in the Lovelock area.

Table signs can be used in restaurants to inform patrons that if they want water they must request it. These signs can be obtained from the AWWA. Figure 5.2 is an example of such a sign.

FIGURE 5.2

Table Tent for use in restaurants



Internet websites are also a good way to distribute water conservation information and can be less expensive than published materials. Many existing websites contain instructional information on the following subjects:

- Xeriscaping
- Irrigation
- Rebates
- Watering Schedules
- Water Rates
- Lawn Care
- Water Saving Appliances
- Meter Reading Instructions
- Leak Detection Tips
- Water Conservation Tips
- Water Audit Forms
- Water Waste Report Forms
- Water Use Exemptions
- Water Conservation Plan

Appendix C contains a list of websites that contain water conservation information.

Unless otherwise indicated, the educational literature included in this conservation plan is not currently being used by Lovelock Meadows Water District and is for reference purposes only. The additional included literature is intended to be a resource for ideas that can be implemented if more conservation incentives become necessary and if the Lovelock Meadows Water District budget can support such incentives.

5.1.2 Conservation Workshops

Conservation workshops can be conducted by utilities to promote water conservation. Workshop subject matter can include but is not limited to xeriscaping, irrigation, home water audits, etc. Lovelock Meadows Water District currently does not conduct water conservation workshops or training.

A possible approach to workshops may be to train persons in industries that are affected by conservation (landscapers, nurseries, appliance vendors, etc.). They in turn may be encouraged to offer clinics promoting conservation.

5.1.3 School Curriculums

There are a number of school curriculums available on-line from other cities. Utilities can also sponsor special visits to schools where students can be instructed by members of water related industries or government entities. Some of these visits have taken place in Nevada schools where visitors included employees from the Nevada Department of Environmental Protection, the U.S. Forest Service, members of the local Indian Tribes, and the River Wranglers. Lovelock Meadows Water District currently does not have a school visiting program in place.

5.2 FINANCIAL INCENTIVES

Financial incentives include rebates, inclining rate schedules, savings and so forth. Lovelock Meadows Water District does not have the financial capability to institute a rebate program at this time. However, the current rate schedule does encourage conservation.

5.3 REGULATORY INCENTIVES

Regulatory incentives include but are not limited to conservation policies and ordinances, laws and plumbing codes, and irrigation schedules. It is important to have a means of enforcing regulatory incentives or they will not be as effective. For this reason enforcement information is included in this section. Note that Lovelock Meadows Water District does not have the authority to draft or enact ordinances or codes. It is the responsibility of the County and/or City to do so.

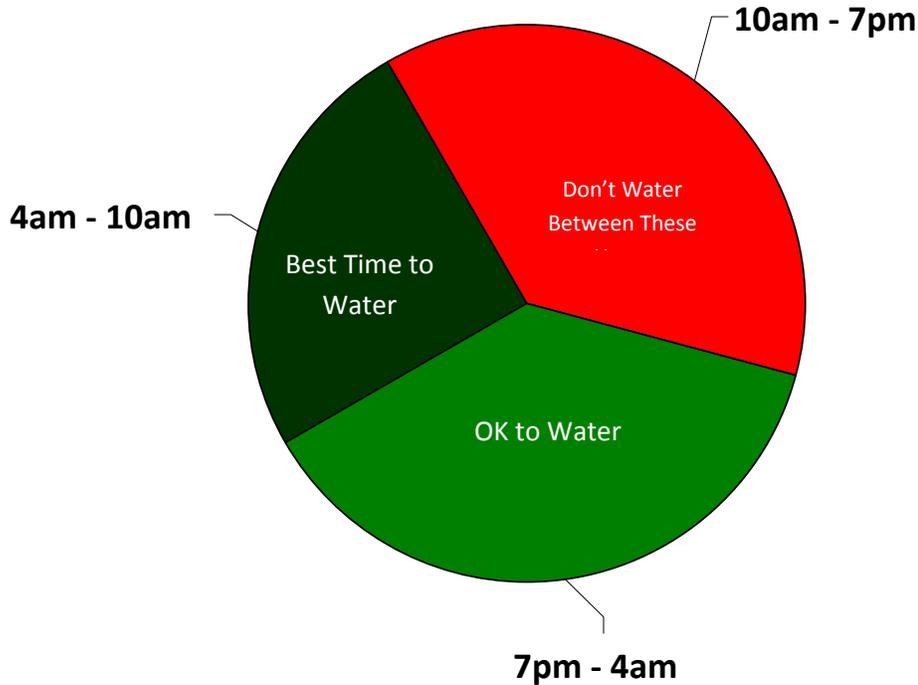
5.3.1 Watering Schedules

Lovelock Meadows Water District currently does not use a watering schedule. An example of a typical schedule would be one in which an odd/even watering schedule becomes effective from May 10th through October 1st. This schedule requires that all water customers with even-numbered addresses water on even numbered calendar days and odd-numbered addresses water on odd-numbered calendar days. No watering is allowed on the 31st of the month. Watering is only to be done between the hours of 7:00 p.m. and 10:00 a.m. For this schedule to be effective it should be part of a City or County enacted water ordinance, which should include provisions for enforcement.

Another effective watering program that could be implemented if more restrictive watering becomes necessary is the “Water Twice a Week” plan. It allows for watering of lawns on say Sunday and Thursday for odd numbered addresses and Wednesday and Saturday for even numbered addresses. Businesses water on Tuesday and Friday. No one is allowed to water on Monday which becomes a day off for the watering system. Watering is allowed at any time except between 1:00 p.m. and 5:00 p.m. which is the time off highest daytime temperatures. Figure 5.3 shows the ideal watering times.

FIGURE 5.3

Ideal Watering Times in LOVELOCK MEADOWS WATER DISTRICT Service Area



It is also important that irrigation timers are timed properly to match seasonal temperatures and that watering is not done when it is raining. Additionally, individual irrigation stations should only need to run for about 10 to 15 minutes before puddles form and runoff occurs.

5.3.2 Landscape Standards

Lovelock Meadows Water District currently does not have a district wide Landscape Code. The following summarizes potential code provision that provide guidelines for both residential and commercial/industrial landscape applications. Landscape Codes should include all the critical elements for the installation of a water efficient landscape. Note that Lovelock Meadows Water District does not have the authority to draft or enact ordinances or codes. It is the responsibility of the County and/or City to do so.

5.3.2.1 Landscape Size

Size of landscapes is defined in the code for all building zones in the Lovelock Meadows Water District service area. Landscape sizes vary from 6 to 20 percent depending upon zoning.

5.3.2.2 Landscape Materials

Minimum sizes and quantities of trees and shrubs are defined in the code. Trees not to be planted are identified. A list of trees that thrive in arid climates is also included in Appendix B of this plan.

The minimum and maximum areas allowed for turf installation in multi-family and commercial/industrial developments are defined. The turf section also encourages the use of effluent on these properties as it becomes available. The maximum slope of the turf is also limited at 4 to 1. Ground cover types are specified as shrubs, turf, vines, meadow grass, and wild flowers, or any other living ground covers. Minimum amounts of unplanted, non-living materials are identified in the code. These materials include wood chips, bark, decorative rock or other non-living materials.

The code also specifies that soils in planted areas are to be loosened and amended with organic materials. Mulch depths are also defined to reduce evaporation.

5.3.2.3 Landscape Irrigation

Water conserving irrigation is encouraged. The following items are included in the regulations regarding irrigation:

- Use of drip irrigation where appropriate.
- Use of irrigation timers.
- Use of storm water harvesting systems.
- Water conserving sprinkler heads.
- Use of reduced pressure PVB's.
- Depth of water line (to avoid freezing)
- Schedule 40 PVC required.

5.3.3 Water Ordinance

Lovelock Meadows Water District currently does not have the authority to establish ordinances or codes. The City of Lovelock and Pershing County should be encouraged to have an ordinance that defines "water shortage" and "waste of water." Lovelock Meadows Water District could add the definitions to their Rules and Regulations. If these ordinances are enacted they will be included in Appendix F once it is completed.

END OF SECTION

6 WATER CONSERVATION INITIATIVES AND RECOMMENDATIONS

Conservation measures and incentives included in this plan may not all be implemented immediately due to the financial limitations of the Lovelock Meadows Water District. However they are included in the plan as a reference so that they can be quickly put in place when funding becomes available. This section discusses conservation incentives and measures that are currently in place as well as those that can be improved upon as technology and funding allow.

6.1 LOVELOCK MEADOWS WATER DISTRICT CONSERVATION MEASURES

6.1.1 Conservation Management

The manager of the Lovelock Meadows Water District is responsible for the conservation budget, organizing educational programs and overseeing Lovelock Meadows Water District conservation efforts (leak detection, public awareness, water loss accountability, etc.). He also will review and update the conservation plan every five years and will evaluate the effectiveness of existing conservation measures and incentives.

6.1.2 Meter Testing Program

The District will implement an annual meter testing program to locate and replace inoperative and under registering meters, particularly those over 2 inches.

6.2 FINANCIAL MEASURES

6.2.1 Water Conservation Budget

Since the original version of this Plan Lovelock Meadows Water District has created a water conservation budget. The conservation budget will be used primarily for the distribution of conservation education materials.

6.3 EDUCATIONAL INCENTIVES

6.3.1 Distribution of Educational Materials

Lovelock Meadows Water District will distribute educational materials similar to those discussed in Section 5.1.1. Distribution consists of materials being available at the Lovelock Meadows Water District office and including them with monthly water bills.

6.4 SYSTEM WIDE HARDWARE MEASURES

Two significant changes have taken place in the Lovelock Meadows Water District since the Water Conservation Plan was first written. The changes include the installation of a SCADA system and the replacement of a significant amount of distribution piping. Since these changes were relatively recent, the effect that they have on the system has not yet been completely quantified. However, the reduction in unaccounted for water has been significant and is expected to drop even further.

6 WATER CONSERVATION INITIATIVES AND RECOMMENDATIONS

The benefits of SCADA include quick response to system emergencies including leaks, which can save valuable water. Additionally, SCADA can help track water usage trends over time. This data can be used to calculate optimal water requirements, identify existing and potential weaknesses in a system and develop optimal responses to water resource challenges. Additionally, efficiency associated with SCADA helps to reduce operational costs. Money saved as a result of SCADA could be used for other system upgrades that could conserve even more water.

END OF SECTION

Conservation measures are divided into two types: (1) Hardware/Equipment and (2) Behavioral/Managerial. Each of these is subdivided into five categories of application: (1) Residential, (2) Landscape, (3) Industrial, Commercial, and Institutional (ICI) (4) Agricultural, and (5) Purveyor. The following conservation measures will be classified first by application and then by type. These measures are suggestions and can only be enforced if included as part of an ordinance.

A.1 RESIDENTIAL CONSERVATION MEASURES

A.1.1 Behavioral Measures

A.1.1.1 Residential Water Audits. Water audits could target high use customers first and then be offered to all customers. The following elements should be part of an effective audit.

- Purpose for the audit.
- Estimation of use for all fixtures and appliances.
- Check for and repair leaks.
- Evaluation of Landscape (See “Landscape Conservation Measures)
- Evaluation of outdoor water use.
- Evaluate efficiency measures.
- Educate customers using available flyers

An audit should take no more than 30 to 45 minutes.

A.1.1.2 Additional Measures. The sample pamphlets in Appendix A include additional behavioral conservation measures.

A.1.2 Hardware/Equipment Measures

The following is a list of devices/practices that will reduce water consumption in the home.

Measure	Description
<i>Bathroom/Kitchen Fixtures</i>	
Low-flow toilets	1.6 gallons per flush
Toilet retrofit devices	Bladders (bags), dams, early close flappers, other hardware and adjustments
Toilet leak repairs	Includes detection (dye tabs) and replacement of worn parts.
Low-volume shower heads	2.5 gallons per minute @ 80 psi
Showerhead retrofit devices	Includes temporary cutoff valves and restrictors.
Low-volume faucets	2.5 gallons per minute @ 80 psi
Faucet retrofit devices	Includes aerators, activation sensors, self closing and metered valves
Faucet maintenance	Includes washer replacement, repacking, tightening, and cleaning aerators
Water pressure reduction	Only needed if house pressure exceeds what's required
<i>High Efficiency Appliances</i>	
Clothes washers	27 gallons per load
Dish washers	4.5 gallons per load

A.2 LANDSCAPE CONSERVATION MEASURES

A.2.1 Behavioral Measures

A.2.1.1 Landscape Water Audits. Landscape water audits should be conducted on park and golf course irrigation systems and could be considered an option on residential irrigation systems, targeting high-volume users.

- Purpose for the audit.
- Estimation of outdoor use based on meter records.
- Check for and repair leaks.
- Evaluation of Landscape (size, soil, amount of turf, types of plants)
- Evaluation of irrigation system (Timers, Use of drip, Precipitation amounts).
- Efficiency recommendations.
- Educate customers using available flyers

A residential landscape audit should take no more than an hour. Parks and golf courses could take substantially longer.

A.2.1.2 Xeriscape™. Xeriscape is a method of landscaping that employs low-water use plants, turf, ground covers, shrubs and trees. It includes careful planning, soil analysis, and irrigation system design.

A.1.1.3 Additional Measures. The sample pamphlets in Section 5.1 include additional behavioral conservation measures.

A.2.2 Hardware/Equipment Measures

Landscape hardware measures consist of two basic groups: (1) Landscape materials and (2) irrigation equipment.

Measure	Description
Landscape Materials	
Trees, plants, and grass	Should be well suited to climate and altitude and be drought tolerant
Organic mulch	Grass clippings, leaves, wood chips, bark, and pine needles. Organic mulches help to retain soil moisture and keep ground cool around plants.
Inorganic mulch	Boulders, gravel, pavers, decomposed granite, and stepping stones. Inorganic mulches are generally more for decorative purposes but they reduce the amount of trees, plants, and turf thereby conserving water.
Compost	Made of manure or biosolids and wood, straw, grass, and leaves. Helps plants stay healthy and retains moisture in the soil.
Irrigation Equipment	
Valves	Should be sized to meet requirements and checked periodically for leaks
Sprinkler Heads	Should match water volume requirements of area being irrigated.
Sprinkler Nozzles	Should have proper arc of coverage and proper trajectory.
Irrigation Controllers	Should have required number of stations, programs, and starts. Also rain delays and sensor terminals.
Drip irrigation	Insures water is directed to where it’s needed.

A.3 INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL (ICI) CONSERVATION MEASURES

A.3.1 Behavioral and Hardware/Equipment Measures

A.3.1.1 ICI Water Audits. Since ICI water audits can require a substantial amount of time (4 hours or more), it may be necessary to have a private engineering firm hired by the water user conduct the audit. There is incentive for ICI customers to pay for audits since the results of an audit could translate into substantial savings. An ICI water audit should include the following elements:

- Support from ICI owners, managers, and employees
- Survey/Estimation of facility use based on meter records.
- Calculation of water-related costs.
- Evaluation of efficiency measures.
- Evaluation of payback periods for measures.
- Efficiency recommendations and implementation.
- Tracking and reporting system.

A.3.1.2 Manual Washing. Manual washing is cleaning done on surfaces with hoses and cloths.

MANUAL WASHING	
Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Surfaces should be swept or brushed off before using water to clean. 	<ul style="list-style-type: none"> • High pressure low-volume hoses with automatic shut-off nozzles • High-pressure pumps, steam cleaners.

A.3.1.3 Vehicle Washing. Vehicle washing includes manual washing and automated car washes or a combination of both.

VEHICLE WASHING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Limit number of spray nozzles and set flow rates at lowest volume and pressure required. • Adjust nozzles in automated systems so that they take full advantage of gravity and position. Also make sure water shuts off after vehicles have passed. • Increase conveyor speeds or reduce rinse cycle time. • Sweep wash area before using water to clean. • Establish a regular maintenance schedule that includes checking for leaks and making repairs. 	<ul style="list-style-type: none"> • Recycling systems. These would include filters and storage tanks. • High pressure pumping systems.

A.3.1.4 Kitchens and Restaurants. Kitchen and restaurant conservation is divided into four areas of application; 1. Food and drink preparation, 2. Dishwashing, 3. Garbage disposal and scraping trough, and 4. Ice making.

FOOD AND DRINK PREPARATION

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Presoak and wash food service articles in basins instead of running water. • Reduce thawing of food with hot water unless required by law. If required use lower flow. • Avoid running water to melt ice in sinks. • Use full loads in dishwashers and other automated equipment. • Serve water only when requested by customers. 	<ul style="list-style-type: none"> • Low-volume faucets • Hands-free foot pedal valves for faucets • On demand hot water dispensers

DISHWASHING

Behavioral Measures	Hardware/Equipment Measures
---------------------	-----------------------------

<ul style="list-style-type: none"> • Presoak utensils, dishes, and pots and pans in basins of water instead of using running water prior to loading dishwashing machines. • Scrape food off of plates rather than use running water. • Operate scraping troughs only while dishes are actually being washed. • Assess the water efficiency of the current dishwashing system to determine where improvements might be made. • Always wash full loads in automated machines. • Operate conveyor type dishwashers only when dishes are actually passing through the machine. • Verify that the dishwashing equipment is using the minimum amount of flow recommended by the manufacturer. • Since many older automated dishwashing systems are neither energy nor water efficient, evaluate the cost of retrofitting or replacing existing equipment. • Turn dishwashers off when not in use. • Routinely check all dishwashing equipment to ensure there are no leaks. • Post signs requesting that personnel minimize their use of utensils, dishes, and pots and pans to save water. 	<ul style="list-style-type: none"> • Manual pre-wash sprayers with “dead man” shut off controls. • Low-flow spray heads on all sprayers. • New water efficient dishwashing equipment. • Electronic eye sensors that shut off conveyor type systems when dishes are not passing through the machine.
--	---

GARBAGE DISPOSER AND SCRAPING TROUGH

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Eliminate disposers and troughs. • Use the minimum acceptable flow rate on all machines. • Reuse wastewater in the mixing chamber of the disposer. 	<ul style="list-style-type: none"> • Garbage strainers (instead of disposers) • Sensors that detect the amount of flow in a disposer and regulate flow accordingly. • Solenoid valves that turn water off when the disposer is off. • Flow regulators for disposer supply lines.

ICE MAKERS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Use the minimum flow rate recommended by the manufacturer on water cooled icemakers. • Adjust machines to produce ice only when it’s needed. <p>Collect spent cooling water and reuse it for non-potable purposes.</p>	<ul style="list-style-type: none"> • Air-cooled icemakers. • Re-circulating systems for water-cooled icemakers. • Ice flake machines that use less bleed off than cube machines.

A.3.1.5 Laundries and Laundromats. This section includes measures that are applicable in hotels, motels, hospitals, nursing homes, diaper services, restaurants, and coin operated Laundromats.

LAUNDRIES AND LAUNDROMATS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Operate equipment with full loads only. • Reduce water levels for partial loads. • Back flush filters or softeners only when necessary. 	<ul style="list-style-type: none"> • Computer controlled rinse water reclamation systems. • Wash and rinse water treatment and reclamation systems. • Continuous batch washers. • Ozone laundry systems. Horizontal axis washers.

A.3.1.6 Swimming Pools. The measures in this section can be applied to commercial and residential swimming pools.

SWIMMING POOLS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Limit the frequency of pool refilling. • Cover the pool with an insulated cover when not in use to reduce losses due to heat and evaporation. • Reduce the level of the pool to avoid losses due to splashing. • Lower the pool temperature. • Back wash filters only when necessary. If backwash is timed, verify that frequency is efficient. • Regularly check pool for leaks and cracks. Keep pool and filter clean to avoid unnecessary backwashing. 	<p>There are no special equipment measures that would help conserve water in pools. It is important however that available equipment is efficient and used properly.</p>

A.3.1.7 Cooling Systems. This section includes measures for three types of cooling systems: 1. Single-pass, 2. Evaporative, and 3. Equipment. Single-pass cooling uses fresh water to cool without re-circulating any of the water used in the first pass. Evaporative coolers are used for cooling in commercial and residential applications and are commonly known as swamp coolers. Equipment cooling includes both single-pass and re-circulating systems that are used to cool equipment and machinery.

SINGLE-PASS COOLING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Reuse water for landscaping, vehicle washing, or another cooling application that allows for water to be at a higher temperature. • Eliminate single-pass systems. 	<ul style="list-style-type: none"> • Air-cooled equipment (i.e. compressors, pumps, icemakers, etc...) • Automatic controls that insure coolers only operate when needed.

EVAPORATIVE COOLING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Regularly check for leaks in hoses and pan. • Replace pads at least annually. • Shut cooler off when building is unoccupied. • Annually service the equipment by oiling moving parts and cleaning off accumulated scale or corrosion. 	<p>There are currently no equipment measures for evaporative coolers. The design of the coolers is relatively simple.</p>

EQUIPMENT COOLING

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Reuse water in single pass systems for other cooling purposes. Examples of reuse include cooling molten materials, landscape, of boiler make-up water. • Replace al single pass cooling systems with closed-loop systems or replace water-cooled equipment with air-cooled. 	

A.3.1.8 Heating Systems. This section deals with conservation measures for boilers and steam generators which are used to heat large buildings and multiple-building facilities.

HEATING SYSTEMS

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Regularly inspect systems for leaks and make repairs. • Insulate all piping. • Limit boiler bleed-off to a level that satisfies water quality requirements. • Discharge blow-down into an expansion tank instead of using cold water to cool it. 	<ul style="list-style-type: none"> • Flow meters for make-up and blow-down valves. • Automatic controls to discharge blow-down.

A.3.1.9 Leaks and Water Losses. This section covers water conservation measures relating to leaks and losses.

LEAKS AND WATER LOSSES

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> • Regularly check for leaks at all water connections. Keep in mind that higher pressure applications have more incidence of leakage. • Regularly check all vessels that contain water for cracks or bad seals. • Regularly check all heating and cooling systems. • Repair any leaks that are discovered. 	<ul style="list-style-type: none"> • Leak detection equipment. This could include sonic or probe type equipment. • Any equipment used to stop a leak. This would depend on the material of the pipe or vessel that has a leak.

A.3.1.10 ICI Maintenance Practices. This section reemphasizes maintenance conservation measures for ICI facilities that have been mentioned in previous sections. These measures should become standard procedure at all ICI facilities.

- Create a maintenance schedule that includes schedules for leak detection inspections and meter reading, and repair procedures.
- Monitor water-use records keeping track of any increases or decreases in use.
- Conduct water audits every one to three years.
- Shut off supply lines to areas that are not being used.
- Install pressure reducers where feasible.
- Keep a maintenance schedule to clean cooling and heating equipment regularly.
- Recycle and reuse water when feasible.
- Insulate all hot water pipes.
- Replace old equipment with water saving equipment.
- Install timers wherever possible.
- Educate employees on water saving techniques.

A.4 GENERAL CONSERVATION MEASURES

This list of conservation behaviors and is divided into four parts: Home, Landscaping, Community, and Miscellaneous.

HOME BEHAVIORS

1. When washing dishes by hand, don't let the water run while rinsing. Fill one sink with wash water and the other with rinse water.
2. Evaporative coolers require a seasonal maintenance checkup. For more efficient cooling, check your evaporative cooler annually.
3. Run your washing machine and dishwasher only when they are full and you could save 1000 gallons a month.

4. Use the garbage disposal sparingly. Compost instead and save gallons every time.
5. Keep a pitcher of water in the refrigerator instead of running the tap for cold drinks, so that every drop goes down you not the drain.
6. Check your water meter and bill to track your water usage.
7. Wash your produce in the sink or a pan that is partially filled with water instead of running water from the tap.
8. Use a broom instead of a hose to clean your driveway or sidewalk and save 80 gallons of water every time.
9. If your shower can fill a one-gallon bucket in less than 20 seconds, then replace it with a water efficient showerhead.
10. Collect the water you use for rinsing produce and reuse it to water houseplants.
11. We're more likely to notice leaky faucets indoors, but don't forget to check outdoor faucets, pipes, and hoses for leaks.
12. When you shop for a new appliance, consider one offering cycle and load size adjustments. They are more water and energy-efficient than older appliances.
13. Time your shower to keep it under 5 minutes. You'll save up to 1000 gallons a month.
14. Install low-volume toilets.
15. When you clean your fish tank, use the water you've drained on your plants. The water is rich in nitrogen and phosphorus, providing you with a free and effective fertilizer.
16. Put food coloring in your toilet tank. If it seeps into the toilet bowl, you have a leak. It's easy to fix, and you can save more than 600 gallons a month.
17. Plug the bathtub before turning the water on, and then adjust the temperature as the tub fills up.
18. Designate one glass for your drinking water each day. This will cut down on the number of times you run your dishwasher.
19. Don't use running water to thaw food.
20. Grab a wrench and fix that leaky faucet. It's simple, inexpensive, and can save 140 gallons a week.
21. When doing laundry, match the water level to the size of the load.
22. Teach your children to turn the faucets off tightly after each use.

- 23.** Before you lather up, install a low-flow showerhead. They're inexpensive, easy to install, and can save your family more than 500 gallons a week.
- 24.** Soak your pots and pans instead of letting the water run while you scrape them clean.
- 25.** Make sure you know where your master water shut-off valve is located. This could save gallons of water and damage to your home if a pipe were to burst.
- 26.** Turn off the water while you brush your teeth and save 4 gallons a minute. That's 200 gallons a week for a family of four.
- 27.** Make sure your toilet flapper doesn't stick open after flushing.
- 28.** Make sure there are aerators on all of your faucets.
- 29.** Install an instant water heater on your kitchen sink so you don't have to let the water run while it heats up. This will also reduce heating costs for your household.
- 30.** Cut back on rinsing if your dishwasher is new. Newer models clean more thoroughly than older ones.
- 31.** Bathe your young children together.
- 32.** Winterize outdoor spigots when temps dip to 20 degrees F to prevent pipes from bursting or freezing.
- 33.** Insulate hot water pipes so you don't have to run as much water to get hot water to the faucet.
- 34.** Drop that tissue in the trash instead of flushing it and save gallons every time.
- 35.** If your toilet was installed prior to 1980, place a toilet dam or bottle filled with water in your toilet tank to cut down on the amount of water used for each flush. Be sure these devices do not interfere with operating parts.
- 36.** Install water softening systems only when necessary. Save water and salt by running the minimum number of regenerations necessary to maintain water softness.
- 37.** Wash clothes only when you have a full load and save up to 600 gallons each month.
- 38.** Listen for dripping faucets and toilets that flush themselves. Fixing a leak can save 500 gallons each month.
- 39.** Cook food in as little water as possible. This will also retain more of the nutrients.
- 40.** Turn the water off while you shampoo and condition your hair and you can save more than 50 gallons a week.
- 41.** Choose new water-saving appliances, like washing machines that save up to 20 gallons per load.

42. Select the proper size pans for cooking. Large pans require more cooking water than may be necessary.
43. Turn off the water while you shave and you can save more than 100 gallons a week.
44. To save water and time, consider washing your face or brushing your teeth while in the shower.
45. For hanging baskets, planters and pots, place ice cubes under the moss or dirt to give your plants a cool drink of water and help eliminate water overflow.
46. Throw trimmings and peelings from fruits and vegetables into your yard compost to prevent from using the garbage disposal.
47. Keep a bucket in the shower to catch water as it warms up or runs. Use this water to flush toilets or water plants.
48. When you are washing your hands, don't let the water run while you lather.
49. Pre-treat stains before washing clothes to avoid re-washing.
50. Use the shortest wash cycle for lightly soil cloths.
51. Check washing machine hoses regularly for leaks.
52. Do not pre-rinse dishes except in cases of sticky or burn-on food.
53. Scrape off food with a utensil or used paper napkin when pre-cleaning for dishwasher.

LANDSCAPE BEHAVIORS

1. Check your sprinkler system frequently and adjust sprinklers so only your lawn is watered and not the house, sidewalk, or street.
2. Avoid planting turf in areas that are hard to water such as steep inclines and isolated strips along sidewalks and driveways.
3. Plant during the spring or fall when the watering requirements are lower.
4. Minimize evaporation by watering during the early morning hours, when temperatures are cooler and winds are lighter.
5. Use a layer of organic mulch around plants to reduce evaporation and save hundreds of gallons of water a year.
6. Divide your watering cycle into shorter periods to reduce runoff and allow for better absorption every time you water.

7. Only water your lawn when needed. You can tell this by simply walking across your lawn. If you leave footprints, it's time to water.
8. Adjust your lawn mower to a higher setting. Longer grass shades root systems and holds soil moisture better than a closely clipped lawn.
9. Use the sprinkler for larger areas of grass. Water small patches by hand to avoid waste.
10. Use porous materials for walkways and patios to keep water in your yard and prevent wasteful runoff.
11. Direct downspouts and other runoff towards shrubs and trees, or collect and use for your garden.
12. Install a rain shut-off device on your automatic sprinklers to eliminate unnecessary watering.
13. Choose a water-efficient drip irrigation system for trees, shrubs and flowers. Watering at the roots is very effective, be careful not to over water.
14. Reduce the amount of grass in your yard by planting shrubs and ground cover with rock and granite mulching.
15. Remember to check your sprinkler system valves periodically for leaks and keep the heads in good shape.
16. Don't water your lawn on windy days. After all, sidewalks and driveways don't need water.
17. Water your plants deeply but less frequently to create healthier and stronger landscapes.
18. When watering grass on steep slopes, use a soaker hose to prevent wasteful runoff.
19. Group plants with the same watering needs together to get the most out of your watering time.
20. Remember to weed your lawn and garden regularly. Weeds compete with other plants for nutrients, light, and water.
21. While fertilizers promote plant growth, they also increase water consumption. Apply the minimum amount of fertilizer needed.
22. Avoid installing ornamental water features and fountains that spray water into the air. Trickling or cascading fountains lose less water to evaporation.
23. Buy a rain gauge to track how much rain or irrigation your yard receives. Check with your local water agency to see how much rain is needed to skip an irrigation cycle.
24. Teach your family how to shut off your automatic watering systems. Turn sprinklers off if the system is malfunctioning or when a storm is approaching.
25. Set a kitchen timer when watering your lawn or garden with a hose.

26. Next time you add or replace a flower or shrub, choose a low water use plant for year-round landscape color and save up to 550 gallons each year.
27. Use a screwdriver as a soil probe to test soil moisture. If it goes in easily, don't water. Proper lawn watering can save thousands of gallons of water annually.
28. Avoid over-seeding your lawn with winter grass. Once established, ryegrass needs water every three to five days, whereas dormant Bermuda grass needs water only once a month.
29. Landscape with Xeriscape trees, plants and groundcovers. Call your local conservation office for more information about these water thrifty plants.
30. If you have an evaporative cooler, direct the water drain to a flowerbed, tree, or your lawn.
31. Leave lower branches on trees and shrubs and allow leaf litter to accumulate on top of the soil. This keeps the soil cooler and reduces evaporation.
32. Start a compost pile. Using compost when you plant adds water-holding organic matter to the soil.
33. Use sprinklers that throw big drops of water close to the ground. Smaller drops of water and mist often evaporate before they hit the ground.
34. More plants die from over-watering than from under-watering. Be sure only to water plants when necessary.
35. Water only as rapidly as the soil can absorb the water.
36. Aerate your lawn. Punch holes in your lawn about six inches apart so water will reach the roots rather than run off the surface.

COMMUNITY BEHAVIORS

1. Encourage your school system and local government to help develop and promote a water conservation ethic among children and adults.
2. Make suggestions to your employer to save water (and dollars) at work.
3. Support projects that use reclaimed wastewater for irrigation and other uses.
4. Encourage your friends and neighbors to be part of a water-conscious community.
5. Pick-up the phone and report significant water losses from broken pipes, open hydrants and errant sprinklers to the property owner or your water management district.

MISCELLANEOUS BEHAVIORS

1. Install covers on pools and spas and check for leaks around your pumps.

2. Periodically check your pool for leaks if you have an automatic refilling device.
3. Use a commercial car wash that recycles water.
4. Don't buy recreational water toys that require a constant flow of water.
5. Use a grease pencil to mark the water level of your pool at the skimmer. Check the mark 24 hours later. Your pool should lose no more than ¼ inch each day.
6. When the kids want to cool off, use the sprinkler in an area where your lawn needs it the most.
7. Make sure your swimming pools, fountains, and ponds are equipped with re-circulating pumps.
8. Bathe your pets outdoors in an area in need of water.
9. While staying in a hotel or even at home, consider reusing your towels.
10. When backwashing your pool, consider using the water on your landscaping

The following list is taken from the Truckee Meadows Water Authority (TMWA) website. More information on these plants, including color photos can be found at www.tmwalandscapguide.com.

PERENNIAL FLOWERS

[Artemisia species](#)/Sage or Wormwood (Perennial)—water use: Very Low

[Eriogonum umbellatum](#)/Sulfur Flowered Buckwheat (Perennial)—water use: Very Low

[Achillea species](#)/Yarrow (Perennial)—water use: Low

[Agastache cana](#)/Bubblemint (Perennial)—water use: Low

[Aurinia saxatilis](#)/Basket-of-Gold (Perennial)—water use: Low

[Coreopsis species](#)/Tickseed (Perennial)—water use: Low

[Crocus species](#)/Spring Crocus (Perennial)—water use: Low

[Dianthus species](#)/Pinks (Perennial)—water use: Low

[Eschscholzia californica](#)/California poppy (Perennial)—water use: Low

[Gaillardia grandiflora](#)/Blanket Flower (Perennial)—water use: Low

[Iris germanica](#)/Iris germanica (Perennial)—water use: Low

[Linum species](#)/Flax (Perennial)—water use: Low

[Narcissus species](#)/Daffodil or Narcissus (Perennial)—water use: Low

[Nepeta racemosa](#)/Catmint (Perennial)—water use: Low

[Oenothera species](#)/Evening Primrose (Perennial)—water use: Low

[Perovskia atriplicifolia](#)/Russian Sage (Perennial)—water use: Low

[Sedum species](#)/Stonecrop (Perennial)—water use: Low

[Senecio Cineraria](#)/Dusty Miller (Perennial)—water use: Low

[Stachys byzantina](#)/Lamb's Ears (Perennial)—water use: Low

[Thermopsis montana](#)/No Lupine (Perennial)—water use: Low

[Tulbaghia violacea](#)/Society Garlic (Perennial)—water use: Low

[Alcea rosea](#)/Hollyhock (Perennial)—water use: Moderate

[Antirrhinum majus](#)/Snapdragon (Perennial)—water use: Moderate

[Armeria maritima](#)/Sea Pinks (Perennial)—water use: Moderate

[Aster species](#)/Aster (Perennial)—water use: Moderate

[Echinacea purpurea](#)/Coneflower (Perennial)—water use: Moderate

[Gaura lindheimeri](#)/Gaura (Perennial)—water use: Moderate

[Geranium species](#)/Handy Geranium (Perennial)—water use: Moderate

[Gypsophila species](#)/Baby's Breath (Perennial)—water use: Moderate

[Hemerocallis hybrids](#)/Daylily (Perennial)—water use: Moderate

[Heuchera sanguinea](#)/Coral Bells (Perennial)—water use: Moderate

[Iberis sempervirens](#)/Candytuft (Perennial)—water use: Moderate

[Kniphofia uvaria](#)/Red Hot Poker (Perennial)—water use: Moderate

[Lavandula angustifolia](#)/Lavender (Perennial)—water use: Moderate

[Lilium species](#)/Lily (Perennial)—water use: Moderate

[N/A](#)/Pussy toes (Perennial)—water use: moderate

[Papaver species](#)/Poppy (Perennial)—water use: Moderate

[Penstemon species](#)/Beard Tongue (Perennial)—water use: Moderate

[Platycodon grandiflorus](#)/Balloon Flower (Perennial)—water use: Moderate

[Rudbeckia fulgida](#)/Black-Eyed Susan (Perennial)—water use: Moderate

[Salvia Species](#)/Sage or Salvia (Perennial)—water use: Moderate

[Saponaria species](#)/Soapwort (Perennial)—water use: Moderate

[Tanacetum species](#)/Painted or Michaelmas Daisy (Perennial)—water use: Moderate

[Tulipa species](#)/Tulip (Perennial)—water use: Moderate

[Veronica spicata](#)/Spike Speedwell (Perennial)—water use: Moderate

[Viola species](#)/Violet or Pansy (Perennial)—water use: Moderate

GROUNDCOVERS, VINES, AND GRASSES

[Opuntia polyacantha](#)/Prickly Pear Cactus (Groundcovers)—water use: Very Low

[Clematis species](#)/Clematis (Groundcovers)—water use: Low

[Euphorbia species](#)/Spurge (Groundcovers)—water use: Low

[Helictorichon sempervirens](#)/Blue Oat Grass (Groundcovers)—water use: Low

[Hypericum calycinum](#)/Jacob's Ladder or Aaron's Beard (Groundcovers)—water use: Low

[Juniperus horizontalis](#)/Groundcover Junipers (Groundcovers)—water use: Low

[Lathyrus latifolius](#)/Perennial Sweet Pea (Groundcovers)—water use: Low

[Lonicera species](#)/Honeysuckle (Groundcovers)—water use: Low

[Panicum virgatum](#)/Switch Grass (Groundcovers)—water use: Low

[Polygonum species](#)/Polygonum (Groundcovers)—water use: Low

[Santolina species](#)/Lavender Cotton (Groundcovers)—water use: Low

[Vinca minor](#)/Dwarf Periwinkle (Groundcovers)—water use: Low

[Wisteria sinensis](#)/Chinese Wisteria (Groundcovers)—water use: Low

[Zauschneria californica](#)/California Fuschia (Groundcovers)—water use: Low

[Calmagrostis x acutiflora](#)/Feather Reed Grass (Groundcovers)—water use: Moderate

[Campsis radicans](#)/Red Trumpet Creeper (Groundcovers)—water use: Moderate

[Cerastium tomentosum](#)/Snow in Summer (Groundcovers)—water use: Moderate

[Delosperma cooperi](#)/Hardy Purple Ice Plant (Groundcovers)—water use: Moderate

[Hedera helix](#)/Ivy (Groundcovers)—water use: Moderate

[Helianthemum nummularium](#)/Sunrose (Groundcovers)—water use: Moderate

[Mahonia repens](#)/Creeping Mahonia (Groundcovers)—water use: Moderate

[N/A](#)/Northern seacats (Groundcovers)—water use: moderate

[Phlox subulata](#)/Moss Pink (Groundcovers)—water use: Moderate

[Potentilla neumanniana](#)/Cinquefoil (Groundcovers)—water use: Moderate

[Sedum species](#)/Stonecrop (Groundcovers)—water use: Moderate

[Thymus species](#)/Thyme (Groundcovers)—water use: Moderate

SHRUBS

[Artemisia tridentata var. tridentata](#)/Big Sagebrush (Shrubs)—water use: Very Low

[Atriplex canescens](#)/Four Wing Saltbrush (Shrubs)—water use: Very Low

[Chrysothamnus nauseosus](#)/Rubber Rabbitbrush (Shrubs)—water use: Very Low

[Amelanchier species](#)/Serviceberry or Juneberry (Shrubs)—water use: Low

[Aronia species](#)/Chokeberry (Shrubs)—water use: Low

[Berberis species](#)/Barberry (Shrubs)—water use: Low

[Caragana species](#)/Peashrub (Shrubs)—water use: Low

[Caryopteris x clandonensis](#)/Blue Mist Spiraea (Shrubs)—water use: Low

[Chaenomeles speciosa](#)/Flowering Quince (Shrubs)—water use: Low

[Cytisus species](#)/Broom (Shrubs)—water use: Low

[Elaeagnus commutata](#)/Silverberry (Shrubs)—water use: Low

[Euonymus species](#)/Euonymus (Shrubs)—water use: Low

[Forestiera neomexicana](#)/New Mexico Privet (Shrubs)—water use: Low

[Genista species](#)/Dwarf Broom (Shrubs)—water use: Low

[Hibiscus syriacus](#)/Rose of Sharon (Shrubs)—water use: Low

[Ligustrum species](#)/Privet (Shrubs)—water use: Low

[Lonicera tatarica](#)/Tatarian Honeysuckle (Shrubs)—water use: Low

[Mahonia aquifolium](#)/Oregon Grape (Shrubs)—water use: Low

[Pinus mugo](#)/Mugo Pine (Shrubs)—water use: Low

[Prunus species](#)/Bush Cherry (Shrubs)—water use: Low

[Pyracantha coccinea](#)/Firethorn or Pyracantha (Shrubs)—water use: Low

[Rhus species](#)/Sumac (Shrubs)—water use: Low

[Ribes aureum](#)/Golden Currant (Shrubs)—water use: Low

[Shepherdia argentea](#)/Silver Buffaloberry (Shrubs)—water use: Low

[Symphoricarpos albus](#)/Snowberry (Shrubs)—water use: Low

[Syringa vulgaris](#)/Common Lilac (Shrubs)—water use: Low

[Yucca species](#)/Yucca (Shrubs)—water use: Low

[Acer circinatum](#)/Vine Maple (Shrubs)—water use: moderate

- [Amorpha canescens](#)/Leadplant (Shrubs)—water use: moderate
- [Buddleia species](#)/Butterfly Bush (Shrubs)—water use: Moderate
- [Catalpa x Chilopsis](#)/Chitalpa (Shrubs)—water use: moderate
- [Ceratooides lanata](#)/Winterfat (Shrubs)—water use: moderate
- [Cercocarpus ledifolius](#)/Mt. Mahogany (Shrubs)—water use: moderate
- [Chamaebatiaria millifolium](#)/Fernbush (Shrubs)—water use: moderate
- [Chilopsis linearis](#)/Desert or Flowering Willow (Shrubs)—water use: moderate
- [Cotoneaster species](#)/Cotoneaster (Shrubs)—water use: Moderate
- [Cowania mexicana](#)/Cliffrose (Shrubs)—water use: moderate
- [Fallugia paradoxa](#)/Apache Plume (Shrubs)—water use: moderate
- [Forsythia species](#)/Forsythia (Shrubs)—water use: Moderate
- [Hamamelis x intermedia](#)/Witch Hazel (Shrubs)—water use: Moderate
- [Hesperaloe parviflora](#)/Red Yucca (Shrubs)—water use: moderate
- [Juniperus chinensis](#)/Sea Green Juniper (Shrubs)—water use: Moderate
- [Kerria japonica](#)/Kerria (Shrubs)—water use: Moderate
- [Kolkwitzia amabilis](#)/Beautybush (Shrubs)—water use: moderate
- [Philadelphus virginialis](#)/Mock Orange (Shrubs)—water use: Moderate
- [Picea glauca var. albertiana 'Conica'](#)/Dwarf Alberta Spruce (Shrubs)—water use: Moderate
- [Pinus contorta 'Latifolia'](#)/Lodgepole Pine (Shrubs)—water use: moderate
- [Potentilla fruticosa](#)/Shrubby Potentilla (Shrubs)—water use: Moderate
- [Purshia tridentata](#)/Bitterbrush (Shrubs)—water use: moderate
- [R. frangula 'Asplenifolia'](#)/Fernleafed buckthorn (Shrubs)—water use: Moderate
- [R. frangula 'Columnaris'](#)/Tall Hedge Buckthorn (Shrubs)—water use: Moderate
- [Rhamnus frangulia](#)/Sea buckthorn (Shrubs)—water use: Moderate
- [Rosa species](#)/Hardy Shrub Roses (Shrubs)—water use: Moderate
- [Spiraea species](#)/Spiraea (Shrubs)—water use: Moderate
- [Symphoricarpa x chenaultii](#)/Coralberry 'Hancock' (Shrubs)—water use: Moderate
- [Thuja occidentalis](#)/American Arborvitae (Shrubs)—water use: Moderate
- [Viburnum species](#)/Viburnum (Shrubs)—water use: Moderate

TREES

[Acer ginnala](#)/Amur Maple (Trees)—water use: Deep Water 10-14 days

[Ailanthus altissima](#)/Tree of Heaven (Trees)—water use: Deep Water 10-14 days

[Calocedrus decurrens](#)/Incense Cedar (Trees)—water use: Deep Water 10-14 days

[Catalpa species](#)/Catalpa (Trees)—water use: Deep Water 10-14 days

[Cedrus atlantica glauca](#)/Blue Atlas Cedar (Trees)—water use: Deep Water 10-14 days

[Celtis occidentalis](#)/Hackberry (Trees)—water use: Deep Water 10-14 days

[Crataegus species](#)/Hawthorn (Trees)—water use: Deep Water 10-14 days

[Elaeagnus angustifolia](#)/Russian Olive (Trees)—water use: Deep Water 10-14 days

[Gleditsia triacanthos inermis](#)/Honeylocust (Trees)—water use: Deep Water 10-14 days

[Juniperus species](#)/Tree Juniper (Trees)—water use: Deep Water 10-14 days

[Maackia amurensis](#)/Maackia (Trees)—water use: Deep Water 10-14 days

[Maclura pomifera](#)/Osage Orange (Trees)—water use: Deep Water 10-14 days

[Malus hybrids](#)/Crabapple (Trees)—water use: Deep Water 10-14 days

[Pinus species](#)/Pine (Trees)—water use: Deep Water 10-14 days

[Platanus acerifolia](#)/Sycamore (Trees)—water use: Deep Water 10-14 days

[Quercus species](#)/Oak (Trees)—water use: Deep Water 10-14 days

[Robinia species](#)/Locust (Trees)—water use: Deep Water 10-14 days

[Sequoiadendron giganteum](#)/Giant Redwood (Trees)—water use: Deep Water 10-14 days

[Ulmus parvifolia](#)/Chinese elm (Trees)—water use: Deep Water 10-14 days

[Zelkova serrata](#)/Zelkova (Trees)—water use: Deep Water 10-14 days

[Aesculus hippocastanum](#)/Common Horsechestnut (Trees)—water use: Deep Water 7-10 days

[Carpinus betulus](#)/Hornbeam (Trees)—water use: Deep Water 7-10 days

[Cotinus coggygria](#)/Smoke Tree (Trees)—water use: Deep Water 7-10 days

[Cupressus glabra](#)/Arizona Cypress (Trees)—water use: Deep Water 7-10 days

[Fraxinus species](#)/Ash (Trees)—water use: Deep Water 7-10 days

[Ginkgo biloba](#)/Maidenhair Tree (Trees)—water use: Deep Water 7-10 days

[Koelreuteria paniculata](#)/Golden Rain Tree (Trees)—water use: Deep Water 7-10 days

[Laburnum watereri](#)/Golden Chain Tree (Trees)—water use: Deep Water 7-10 days

[Liquidambar styraciflua](#)/Sweetgum (Trees)—water use: Deep Water 7-10 days

[Liriodendron tulipifera](#)/Tulip Tree (Trees)—water use: Deep Water 7-10 days

[Malus domestica](#)/Fruiting Apple Tree (Trees)—water use: Deep Water 7-10 days

[Morus alba](#)/Mulberry (Trees)—water use: Deep Water 7-10 days

[Phellodendron amurense](#)/Amur Cork Tree (Trees)—water use: Deep Water 7-10 days

[Picea species](#)/Spruce (Trees)—water use: Deep Water 7-10 days

[Pistacia chinensis](#)/Chinese Pistache (Trees)—water use: Deep Water 7-10 days

[Prunus species](#)/Plum or Cherry (Trees)—water use: Deep Water 7-10 days

[Pyrus Species](#)/Pear (Trees)—water use: Deep Water 7-10 days

[Sophora japonica](#)/Japanese Pagoda Tree (Trees)—water use: Deep Water 7-10 days

[Sorbus species](#)/Mountain Ash (Trees)—water use: Deep Water 7-10 days

[Thuja occidentalis](#)/Arborvitae (Trees)—water use: Deep Water 7-10 days

[Tilia species](#)/Linden (Trees)—water use: Deep Water 7-10 days

[Gymnocladus dioica](#)/Kentucky Coffee Tree (Trees)—water use: Moderate

[Juniperus monosperma](#)/Singleseed Juniper (Trees)—water use: moderate

[Pinus edulis](#)/Pinon Pine (Trees)—water use: moderate

WATER

- www.energystar.gov

DROUGHT

- <http://droughtmonitor.unl.edu/>

LANDSCAPE

- www.tmwlandscapeguide.com/landscape_guide/interactive/index.php

EDUCATION

- www.wateruseitwisely.com
- www.washoet.dri.edu/

INSTITUTIONAL

- www.lvwd.com
- www.snwa.com
- www.tmh20.com
- www.cabq.gov

LEAK DETECTION

- www.who.int/docstore/water_sanitation_health/leakage/begin.html

HOW TO READ YOUR WATER METER

Locate Your Meter

Most water meters will be located outside in front of your house next to the curb on the street under a steel or concrete lid.

Reading Your Meter

There are two basic types of meters; a dial with a needle that measures in tenths of a cubic foot and a digital meter that measures from 100,000 down to 1 cubic foot. Most meters also have a small triangle on the face called a flow indicator. It will move when there is water passing through it. Read your meter from left to right.

Measuring Water Use Activities

It is possible to measure the water use of certain activities. These activities include but are not limited to the following:

- Shower or bath use.
- Watering the lawn.
- Washing clothes or dishes.
- Flushing a toilet
- Washing a car

To measure the water use of an activity, do the following (in order):

1. Make sure all water off. This includes all faucets (inside and out), appliances, swamp coolers, or icemakers.
2. Write down the meter reading to two decimal places.
3. Perform the activity. Be sure to measure the amount of time in minutes that the activity required.
4. At the end of the activity read the meter again. Subtract the first meter reading from the second one. The result is the amount of water used for the activity in cubic feet. To convert to gallons multiply the result by 7.48. To determine how many gallons per minute were used divide the gallon amount by the number of minutes the activity required. You should now have the water used amount in *gallons per minute*.

Detecting Leaks

1. Make sure all water off. This includes all faucets (inside and out), appliances, swamp coolers, or icemakers.
2. Write down the meter reading and time of day to the minute.
3. Wait at least an hour before reading the meter a second time. Make sure no water is used during the test. Read the meter at the end of the test and record the time to the minute. If the flow indicator is moving during the test you either have a leak or a meter malfunction.
4. Subtract the first meter reading from the second. Multiply the remainder by 7.48. The result is the amount of water in gallons that passed through the meter during the test period. Also record the time duration of the test.
5. Divide the amount of water by the number of minutes in the test. The result is the amount of water that went through the meter in *gallons per minute*.
6. To measure amount lost over time multiply the gallons per minute by the following:
 - 1,440 for gallons per day.
 - 43,920 for gallons per month.
 - 527,040 for gallons per year.
7. Locating a leak is a process of elimination. Shut off one toilet at a time at the wall. Go to the meter and check to see if the flow indicator (triangle) is still moving. If the triangle has stopped you have discovered the leak. If not go on to the next one and repeat the above steps.
8. Check your sprinkler system. Shut off the system at the anti siphon valve and check the meter.
9. Check your main service line. You will need to shut off the valve between your house and the meter. If the meter stops the leak is between the meter and the valve.
10. These steps can be repeated for every fixture and fitting in your home. In the event you cannot locate the leak, you should call a professional plumber to find and fix it.

LOVELOCK MEADOWS WATER DISTRICT currently does not have a landscape code. It will be included here once it is created.

Revisions are currently being made to the Water Ordinance. Once it is completed it will be included here.

APPENDIX G – EPA RESIDENTIAL BENCHMARKS

Type of Use	Likely Range of Values
<i>INDOOR USES</i>	
Average household size	2.0 – 3.0 persons
Frequency of toilet flushing	4.0 – 6.0 flushes per person per day
Flushing volumes	1.6 – 8.0 gallons per flush
Fraction of leaking toilets	0 – 30 percent
Showering frequency	0 – 1.0 showers per person per day
Duration of average shower	5 – 15 minutes
Shower flow rates	1.5 – 5.0 gallons per minute
Bathing frequency	0 – 0.2 baths per person per day
Volume of water	30 – 50 gallons per cycle
Washing machine use	0.2 – 0.5 loads per person per day
Volume of water	45 – 50 Gallons per cycle
Dishwasher use	0.1 – 0.3 Loads per person per day
Volume of water	10 – 15 gallons per cycle
Kitchen faucet use	0.5 – 5.0 Minutes per person per day
Faucet flow rates	2.0 – 3.0 gallons per minute
<i>OUTDOOR USES</i>	
Average lot size	5000 – 8000 square feet
Average house size	1200 – 2500 square feet
Landscape area	4000 – 5000 square feet
Fraction of lot size in turf	30 – 50 percent
Water application rates	1 – 5 feet per year
Homes with pools	10 – 25 percent
Pools evaporation losses	3 – 7 feet per year
Frequency of refilling pool	1 – 2 times per year