

Imlay Water System Water Conservation Plan

Reviewed & Updated May 2014 by C.J. Safford (In House)



Imlay Water Storage Tanks

Prepared for:

**Imlay Town Board
&
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INTRODUCTION

Imlay, NV is located on the southern banks of the Humboldt River, approximately 42 miles east of Lovelock on US Interstate 80. Prior to being formed as a town water system in 1989, under the Nevada Revised Statutes, Chapter 268, the Town of Imlay Water System was under private ownership. As a Town water system, the Imlay Town Board serves in an advisory capacity to the Pershing County Commission. The Pershing County Commission serves as the Town's legal purveyor of potable water.

The Imlay water system is small. The total number of connection to the water system has remained steady at around 90 since December 2003, with the number of active connections increasing from 49 in December 2003 to 73 in April 2007. As of April 2007, 16 connections were on stand-by mode, with only the minimum stand-by fee charged to those customers.

Despite the increase in number of active connections, comparison of billing data from the months of October 2004 – April 2005 to the same months in 2006-2007 shows that, on average, there was a decrease in the total water usage of the town.

The current metering rate schedule was adopted in November 1998 and modified in February 2003. The structure is a typical inclining block rate structure, which promotes conservation by charging customers more money for each unit of water they use above a base amount.

This conservation plan has been created with the above mentioned in mind, and includes the following:

- Conservation Goals
- Existing and planned conservation measures and incentives
- Imlay Water System use profile
- Educational Materials

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

Pershing County Assessor's Office
398 Main St.
Lovelock, NV 89419
(775) 273-2401

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

SECTION 1 – CONSERVATION GOALS

The following goals have been selected to begin building a conservation conscious community in Imlay. As the residents become more conservation minded and adopt conservation practices, these goals will be increased in scope, and new ones will be added through periodic revision of the Conservation Plan.

1.1 Establishment of a Conservation Budget

Currently Imlay does not have money set aside for conservation purposes. Funding will be needed to implement conservation incentives and/or measures. Budget money will be set aside to pay for the purchase and distribution of conservation education materials and to pay for the administrative costs associated with the creation of programs, procedures and codes. Since the Imlay Water System revenue is limited, the budget will not be substantial.

1.2 Creation of a Conservation Education Program

The creation of an education program will be done in stages. The first stage will be to distribute educational materials (see Section 3). Conservation materials may be made available at the water system office and distributed by mail. The next stage may be periodic visits to local schools. After evaluating the success of these initial stages the program will be fine tuned in order to maximize efforts and expense.

1.3 Creation of Water Watcher Procedures

The Town of Imlay does not have personnel or procedures in place to monitor water waste full time and with the small number of customers it serves, it is not necessary at this time. However, there is a value in training existing personnel in conservation management practices and techniques so that waste can be prevented and managed.

1.4 Drafting and Implementation of a Landscape Code

Water usage is much higher in the summer than the winter due to landscape's watering needs. For this reason, a landscaping code is a fundamental part of an effective water conservation plan. A landscape code will regulate both new landscapes and the replacement of existing landscapes. The intent of the code is not to limit landscape options, but to help customers optimize the efficiency of landscape water use.

1.5 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

	2015	2016	2017
<i>Incentives</i>			
Conservation Education Program	Implement		
Landscape Code		Implement	
<i>Measures</i>			
Establish a Conservation Budget	Implement		
Creation of Water Watchers Procedures		Implement	

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.

1.6 Plan Metrics

In order to verify the conservation effect of the incentives and measures included in this plan, periodic (at least annually) system audits will be performed. Pumping and meter records will be compared to see if the amount of unaccounted-for water has decreased. Gallons used per capita per day will also be audited and compared with past records to determine if efforts have yielded a reduction in usage.

1.7 Conservation Plan Review

This plan will be reviewed and revised every five (5) years. Plan adoption and revision will conform to NRS 540.131 (2) and (4). Per these sections any interested person shall have the opportunity, “including, but not limited to, any private or public entity that supplies water for municipal, industrial or domestic purposes, to submit written views and recommendations in the plan.” Every revision will be made available for inspection by these persons or entities.

SECTION 2 – WATER USE PROFILE AND FORECAST

This section details the production and usage rates of the Imlay Water System, including:

- Water Rights
- Existing Supply Sources
- Water use profile
- Water use forecast using projected population growth

2.1 Water Rights

Table 2.1 is a summary of the current water rights permits and certificates held by the Imlay Water System. The Town currently holds two active water right permits for underground water.

**Table 2.1
Imlay Water Rights**

Application Number & Name	Permit & Certificate Number	Date Filed	Point of Diversion	Diversion Rate (CFS)
64063 Amended	Permit #145 Certificate #568	4/24/1998	NE ¼, SE ¼, Section 8, Township 32N, Range 34E	1.2
64064 Amended	Permit #53276	4/24/1998	NE ¼, SE ¼, Section 8, Township 32N, Range 34E	2.5
			Total	3.7

These permits allow the Town to utilize 3.7 cubic feet per second, but not to exceed 182.48 million gallons annually.

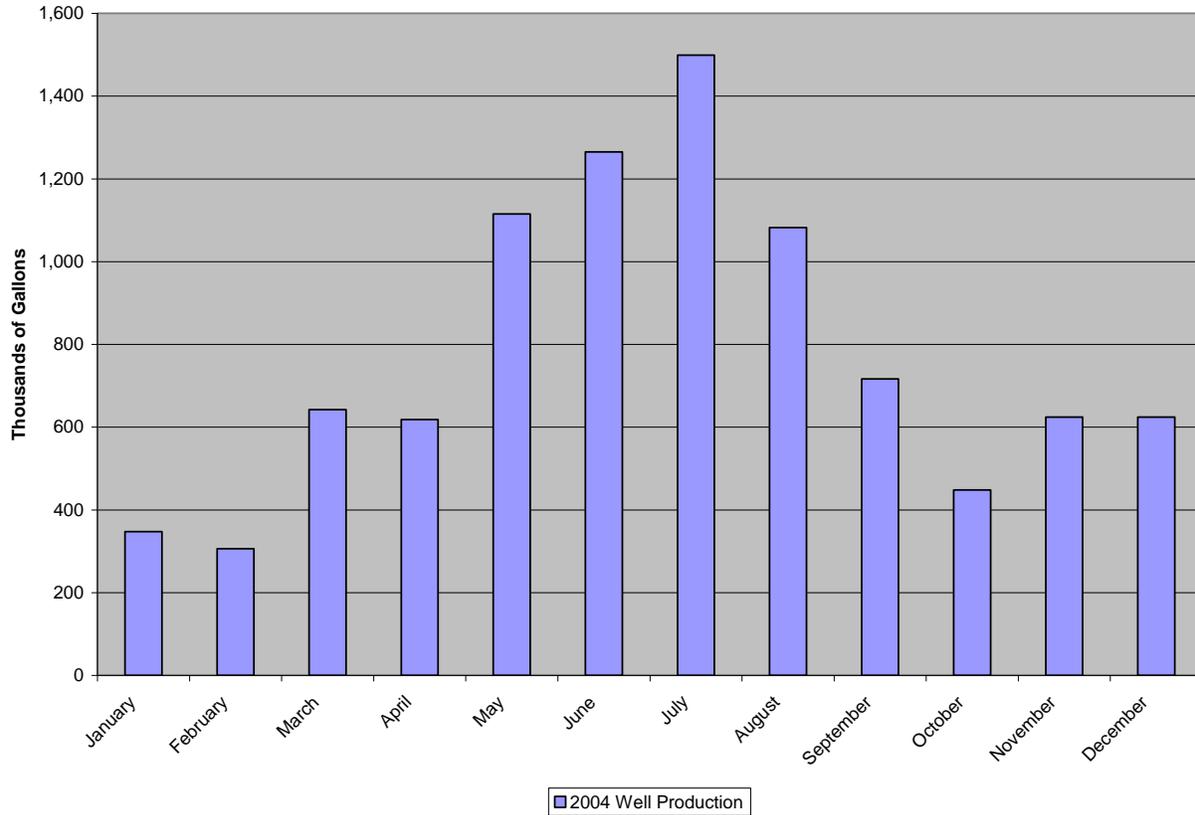
2.2 Supply Sources and Production

Production

The Imlay Water System has one primary production well, which can produce 500 gpm, and a second back-up well which can produce 200 gpm. Monthly records of groundwater usage are kept and additional entries are recorded when the contract operator visits the well site. Average groundwater pumping is 615,560 gallons per month. Peak monthly usage was recorded in July of 2004 at 1,499,000 gallons. Average daily pumpage is approximately 20,000 gallons, while peak daily pumping (July 2004) was 48,400 gallons. Figure 2.1 details the well production for

2004. This period was chosen because it is the only one in recent history with complete records of both well production and customer use.

Figure 2.1: Well Production



Storage

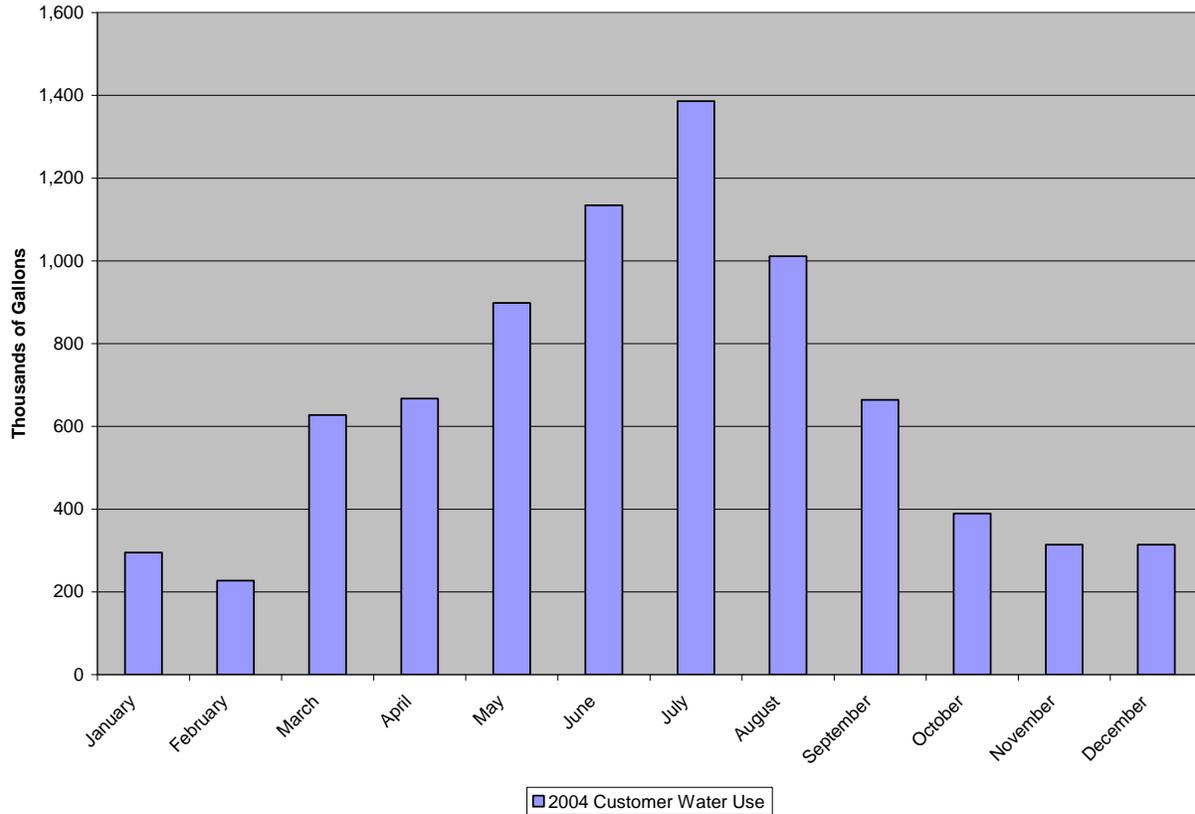
There were three storage tanks located on the hillside south of the Town site. In 2008 these tanks were replaced with one 132,000 gallon tank engineered by Farr West.

2.3 Water Use Profile

The Town of Imlay water users consist primarily of residential customers, with a few businesses, as well as the School District, Teaherage, County Facilities and the Fire Department. There are no agricultural customers, and customers follow the same rate structure except customers over 62 years of age receive a 50% discount.

The water system has been fully metered since 1990. The number of active customers fluctuates monthly, but is currently around 75 customers. The Town serves 92 residential accounts, but 16 of these are consistently inactive and on stand-by status. Historical usage data reflects metered usage. Meters are read on the 10th of each month. Customer usage data is shown in Figure 2.2 for 2004. This year's usage was chosen because it had the most complete data of any recent year.

Figure 2.2: Customer Usage:



The average amount of gallons used per household per day in Imlay is 402 gallons. Based on census data, the average household size in Imlay is 2.2 persons, which makes the average per person per day water usage approximately 180 gallons, slightly lower than the state average of 190 gallons per person per day (USGS Circular 1344). Unaccounted for water for the system is currently about 14 percent.

2.4 Water Demand Forecast

The total number of customers in the Imlay Water System has stayed fairly constant, with only the number of active connections rising. The number of active connections also fluctuates monthly, without much growth over the span of the data. Comparison of the metering data also shows that the water usage has reduced despite the increase in active connections. With the current customer base, and population trends, it would take a significant amount of time for the Imlay Water System to have even all 92 connections active, so a water demand forecast is unnecessary at this time.

2.5 Estimated Amount of Water Conserved Due to Measures and Incentives

Table 2.2 (See Appendix G) shows the range of residential use per person per day using the population estimate for Imlay shown in Section 2.3.

TABLE 2.2
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	13.67	186.3
Total	45.57	372.8

Currently (2007), the average per person per day use in Imlay is approximately 180 gallons which is just lower than the State average. The application of residential conservation measures and incentives encouraged through education (see Section 3.2) could reduce this average. The per person usage of 45.9gal/day (gpcd) shown in Table 2.2 is unrealistic in such a dry state but 150 gpd may be reasonable. Table 2.3 shows new averages that can be achieved with such a reduction in individual use.

TABLE 2.3
Residential Conservation Resulting from Education

% of Population Consuming 150 gallons/day	New gpcd Average (gal)	Amount Conserved Annually (MG)
25	172.5	.45
50	165.0	.90
75	113.0	4.0

*Table assumes level population number

The amounts in Table 2.3 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 educational efforts.

SECTION 3 – CONSERVATION INCENTIVES

3.1 Financial Conservation Incentives

3.1.1 Water Rates

The Imlay Water System currently uses an inclining block rate structure. This type of rate structure promotes conservation because rates increase with consumption. The current water rate schedule was adopted in November 1998 and modified in February 2003. The following table summarizes the Town's water rate schedules: (seniors receive a 50% discount)

Table 3.1
Town of Imlay Water Rate Schedule

Billing Tier	Base Rate	Rate for Each 1000 Gallons Used	Gallons of usage included in each billing tier
Base Rate	\$27.50	-	0-10,000
Tier 2	-	\$3.25	10,001-20,000
Tier 3	-	\$3.60	20,001-30,000
Tier 4	-	\$4.00	30,001-40,000
Tier 5	-	\$4.00	40,001-50,000

Figure 3.1 shows the marginal price curves for Las Vegas Valley Water District (LVVWD), Truckee Meadows Water Authority (TMWA), Imlay and Tucson, Arizona. The curves are shown together to illustrate the different approaches to rate-related conservation. Note that the Tucson curve starts lower than the others but increases substantially in the second tier and remains higher than the others from that point forward. Also note that the rate structure for Imlay is higher than either of the other Nevada systems from start to finish.

Although the marginal rates in Figure 3.1 show the price of water increasing with use, it is actually the average price per unit that has the greatest impact on conservation. Figure 3.2 shows the average price per thousand gallons for each system. Tucson's average price per thousand gallons increases sharply at high consumption levels. Although Imlay's average rate does not increase as much as Tucson's, it does increase. In fact, it theoretically should encourage more conservation than the two other systems shown. Rates used for both figures were taken from the websites of the included systems.

Figure 3.1: Marginal Price Curves for Imlay, TMWA, LVVWD and Tucson

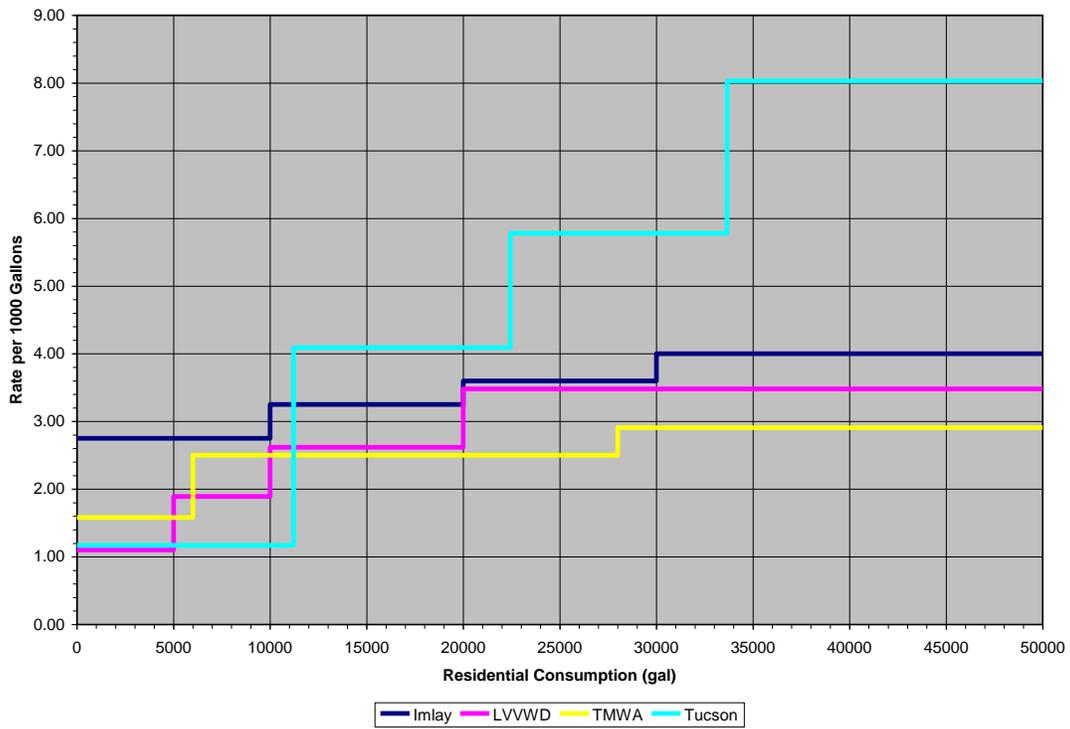
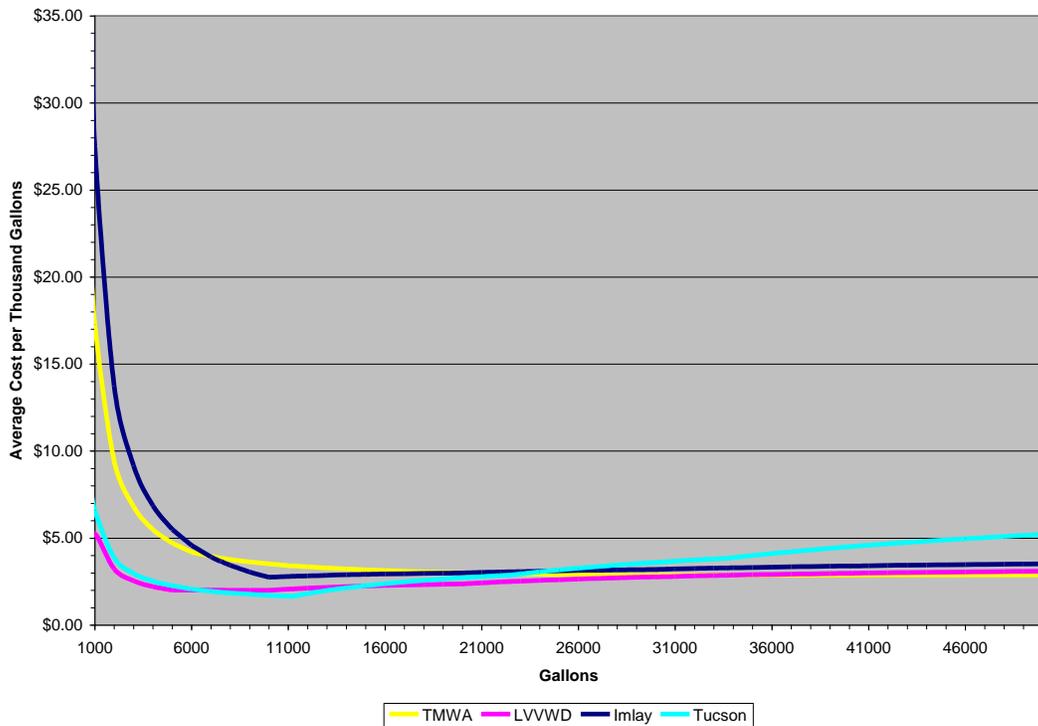


Figure 3.2: Average Price per Thousand Gallons for Imlay, TMWA, LVVWD and Tucson



3.2 Educational Conservation Incentives

3.2.1 Literature

The American Water Works Association (AWWA) and the University of Nevada Reno Cooperative Extension Service publish a number of water conservation related pamphlets that will be distributed by the water system. Some of these pamphlets will be selected by the water system to be distributed to customers and made available at the water system office. Appendix F includes summaries of these pamphlets.

3.3 Regulatory Conservation Incentives

3.3.1 Landscape Code

Inlay does not currently have a landscape code. Since one of the goals of this plan is to draft such a code, some basic guidelines are included here to be used in the creation of the code.

Purpose

The purpose of the landscape code will include aesthetic improvement, noise, dust and erosion reduction, as well as water conservation. All of these elements should be considered.

Definitions

All terms in the plan must be specifically defined and examples should be given. For example, mulch is a commonly used landscaping term, but the list of materials that can be considered mulch is broad. Acceptable materials must be defined to maintain a standard.

Applicability and Exceptions

The code should clearly specify which projects, existing and/or new it applies to. These projects will include new developments, both commercial/industrial and residential.

Landscape Plan Filing

This should include items to be included on the project plans that will be submitted for approval. Examples of these items include plant lists, irrigation plans, property lines, existing structures, landscape calculations and so forth.

Specific Standards

Standards mandated by the code should be clear and concise. These standards will include:

- The percentage of landscaping expected in relation to the overall property plan
- Turf limitations
- Number and type of trees and plants
- Irrigation installation

Bonding Requirements

Bonds, cash, cashier's checks or letters of credit may be required to insure that the landscape is installed per the submitted landscape plan.

Maintenance

A section on maintenance should be included to insure the landscapes continue to function as originally planned. Plant health, repair of damage, and penalties for non-compliance should be included.

Plant List

A list of water efficient plants that can thrive in the Imlay area has been included in Appendix B.

3.3.2 Watering Schedule Regulations

A popular conservation practice is to implement a watering schedule for customers to follow. This method is usually based on addresses, with even numbered addresses watering on certain days, such as Sunday and Thursday, and odd numbered addresses watering on other days, such as Wednesday and Saturday. A watering schedule typically prohibits watering between the hours of 1:00 and 5:00 p.m. when the temperatures are hotter, and evaporation is more of an issue.

This method of regulation does require enforcement to be effective, and may not be feasible for the Imlay Water System at this time due to budget and staffing constraints.

SECTION 4 – CONSERVATION MEASURES

4.1 Plumbing Standards

The most recent federal plumbing standards are included in Table 4.1. These standards are applicable to all water utility service areas. California's standards are included for reference since California's standards are more stringent in many cases. These standards also show that there are plumbing fixtures available that exceed the federal standards, and offer consumers alternatives that maximize 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*	1/1/1994	2.5 gpm	3/20/1992
Lavatory Faucets	2.5gpm	1/1/1994	2.2 gpm	3/20/1992
Sink Faucets	2.5gpm	1/1/1994	2.2 gpm	3/20/1992
Metering Faucets	**	1/1/1994	†	7/1/1992
Tub Spout Diverters	Not Included in FEPA		0.1 to 0.3‡	3/20/1992
Residential Toilets	1.6 gpf	1/1/1994	1.6 gpf	3/20/1992
Flushometer Valves	1.6 gpf	1/1/1997	1.6 gpf	1/1/1992
Commercial Toilets	1.6gpf	1/1/1997	1.6 gpf	1/1/1994
Urinals	1.0 gpf	1/1/1994	1.0 gpf	1/1/1992

* 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)

4.2 Imlay Water System Conservation Measures

Conservation measures implemented by the Imlay Water System will consist of management measures only, as the size of the utility and small population growth. Measures such as water reuse or automation are not economically feasible at this time.

4.2.1 Establishment of a Conservation Budget: All materials and labor associated with conservation will require funding. Because of the small size of the system, funding will be limited, so the budget will be conservative. Cost estimates will be made prior to the start of any program and nothing will be implemented prior to the completion of the budget.

4.2.2 Water Watcher Procedures: Large water utilities employ full-time personnel who specialize in water waste detection and enforcement. Their duties include patrolling neighborhoods searching for water waste problems, levying fines and providing educational materials to customers. It is not feasible for the Imlay Water System to hire personnel for this purpose; however, existing field personnel should be trained in waste recognition and enforcement procedures. These procedures include the following:

- Definitions of water restrictions and any exceptions. This might include provisions for new sod or seed and differences between residential, commercial, industrial and institutional watering schedules.
- Instructions on how to turn on/off a valve in the event of a broken pipe.
- Hydrant use
- Water stealing
- Distribution of educational materials
- Customer service/relations
- Waste warnings
- Waste complaint system, (Appendix E has an example waste complaint form)
- Issuance of fee assessments

Warning notices designed to hang on doorknobs will be considered as part of the procedures. The intent of these procedures is to increase the effectiveness of the water ordinance.

4.3 Water Users Conservation Measures

4.3.1 Drought Measures

All water supplied by Imlay 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 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.

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 Pershing County Commissioners and the Imlay Town Board.

TABLE 4.2
County Commissioners/Town Board Drought Conservation Measures

Stage	Reduction Goal	Information Measures	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 Pershing County Commissioners/Inlay Town Board (Table 4.2). 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
2. Government Facilities
3. Landscape Irrigation
4. Mist Systems
5. Surface, Equipment, and Building Washing
6. Turf Installation
7. Vehicle Washing

Fountains and Water Features

Drought measures are summarized in table 4.3.

TABLE 4.3
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 not 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.

Government Facilities

Drought measures are summarized in table 4.4.

TABLE 4.4
Drought Measures for Government Facilities

Stage	Government Facilities
Watch	To be determined by PERSHING COUNTY COMMISSIONERS/IMLAY TOWN BOARD after government facility needs have been established.
Alert	
Emergency	

Landscape Watering

Drought measures are summarized in table 4.5.

TABLE 4.5
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

Mist Systems

Drought measures are summarized in table 4.6.

TABLE 4.6
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

Parks and Community Use Areas

Drought measures are summarized in table 4.7.

TABLE 4.7
Drought Measures for Parks and Community Use Areas

Stage	Parks and Community Use Areas
Watch	To be determined by PERSHING COUNTY COMMISSIONERS/IMLAY TOWN BOARD after parks needs have been established.
Alert	
Emergency	

Surface Equipment and Building Washing

Drought measures are summarized in table 4.8.

TABLE 4.8
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	

Vehicle Washing

Drought measures are summarized in table 4.9.

TABLE 4.9
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 approved methods. Also with high-pressure, low-volume sprayer using less than 10 gallons per vehicle.
Alert		
Emergency	Not allowed	Not allowed

Turf Installation

Drought measures are summarized in table 4.10.

TABLE 4.10
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

General Water User Measures

Drought measures are summarized in table 4.11.

TABLE 4.11
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.

Appendix A contains a list of conservation measures that can be implemented by water consumers. The list includes measures for residential, commercial, industrial and institutional applications.

APPENDIX A – CONSERVATION MEASURES

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 (ICLI), (4) Agricultural, and (5) Purveyor. The following conservation measures will be classified first by application then by type.

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 of the audit
- Estimation of use for all fixtures and appliances
- Check for repairs and leaks
- Evaluation of landscape (See “Landscape Conservation Measures”)
- Evaluation of outdoor water use
- Evaluate efficiency measures
- Educate customers using available fliers

A residential water 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
Bathroom/Kitchen Fixtures	
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 at 80 psi
Showerhead retrofit devices	Includes temporary cutoff valves and restrictors
Low-volume faucets	2.5 gallons per minute at 80 psi
Faucet retrofit devices	Includes aerators, activation sensors, self-closing meter valves
Faucet maintenance	Includes washer replacement, repacking, tightening and cleaning aerators
Water pressure reduction	Only needed if house pressure exceeds what's required
High Efficiency Appliances	
Clothes washers	27 gallons per load
Dish washer	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.

The following elements should be part of an effective audit:

- Purpose of the audit
- Estimation of outdoor use based on meter records
- Check for repairs and 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 fliers

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.2.1.3 Additional Measures

The sample pamphlets in Appendix A 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. The following is a list of landscape materials and irrigation equipment and how they should be used to support water conservation principles.

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, 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 bio-solids 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 directs to where it is needed

A.3 General Residential Behavioral Measures

This list of conservation measures 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 rising. 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 drink so no water goes down the drain.
6. Check your water meter and bill to track water usage.
7. Wash produce in the sink or a pan that is partially filled with water instead of using the tap.
8. Use a broom instead of a hose to clean your driveway or sidewalk to save 80 gallons of water each time.
9. If your shower can fill a one gallon bucket in less than 20 seconds, replace it with a more efficient showerhead.
10. Collect the water you use for rinsing produce and reuse it to water houseplants.
11. Check outdoor faucets and fixtures for leaks.
12. When purchasing a new appliance, look for one with adjustable cycle and load sizes.
13. Keep showers to less than 5 minutes to save up to 1000 gallons a month.
14. Install low-volume toilets.
15. Reuse water from a fish tank to water plants, as the water is rich in nitrogen and phosphorous, making it a free and effective fertilizer.
16. Put food coloring in your toilet tank and if it seeps into the toilet bowl there is a leak. It is easy to fix and can save up to 600 gallons a month.
17. Plug the bathtub before turning the water on, and adjust the temperature as the tub fills.
18. Only use one glass for drinking each day to reduce the need for washing dishes.
19. Don't use running water to thaw food.
20. Fix a leaky faucet to save 140 gallons of water a week.
21. Match the water level to the size of the load when doing laundry.
22. Turn faucets off tightly after use.
23. Soak pots and pans instead of running water over them.

24. Locate your master water shutoff valve to save water and prevent water damage in case of a broken pipe.
25. Turn off water while brushing your teeth.
26. Make sure your toilet flapper doesn't stick open after flushing.
27. Make sure there are aerators on all your faucets.
28. Install an instant water heat on your kitchen sink so you don't have to run the water until it gets hot.
29. Cut back on rinsing if you have a new dishwasher as they clean more efficiently than older models.
30. Bathe your young children together.
31. Winterize outdoor spigots to prevent pipes from bursting or freezing.
32. Insulate hot water pipes to reduce the amount of water you have to run to reach the desired temperature.
33. Drop tissues in the trash instead of flushing them.
34. Place a toilet dam or bottle of water in the toilet tank on toilets made prior to 1980 to reduce the amount of water required for each flush.
35. Install water softening systems only when necessary.
36. Wait until you have a full load to do laundry.
37. Cook food in the minimum amount of water required.
38. Turn off water while you shampoo and condition to save more than 50 gallons a week.

Landscape Behaviors

1. Adjust your sprinkler system to keep water on your landscaping and off of the driveway, sidewalk, house, and the street.
2. Avoid planting turf on inclines, and in isolated areas that are difficult to water.
3. Plant during the spring or fall when the watering requirements are lower.
4. Water early in the morning or late in the evening when temperatures are lower to minimize evaporation.
5. Use a layer of organic mulch around plants to reduce evaporation and save hundreds of gallons of water a year.
6. Use more frequent, shorter watering intervals to reduce runoff and allow for better absorption every time you water.
7. Only water your lawn when needed. If you walk across the grass and leave footprints, it is time to water.
8. Leave grass longer when you mow, as longer grass shades root systems and holds soil moisture better than a closely clipped lawn.
9. Use a sprinkler for large areas of grass and water by hand elsewhere to eliminate unnecessary watering.
10. Install a rain shut-off device on your automatic sprinklers to eliminate unnecessary watering.
11. Periodically check your sprinkler system for leaks and keep the heads in good shape.
12. Don't water your lawn on windy days.
13. Group plants by watering needs to maximize the benefits of your watering time.
14. Regularly weed your lawn and garden, as weed compete with desirable plants for nutrients, light and water.

15. Apply the minimum amount of fertilizer as it increases water consumption requirements.
16. Aerate your lawn so water will reach the roots instead of running off the surface.

Community Behaviors

1. Encourage your school system and local government to develop and promote a water conservation ethic among children and adults.
2. Make suggestions to your employer to save water 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. Report broken pipes, open hydrants and errant sprinklers to property owners or your water management district.

Miscellaneous Behaviors

1. Install covers on pools and spas and check for leaks around pumps.
2. 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. Bathe pets outdoors in areas in need of water.
6. Reuse towels to reduce laundering requirements.
7. Reuse water from backwashing your pool on your landscaping.

APPENDIX B – PLANTS FOR THE IMLAY AREA

The following list of plants is from the Truckee Meadows Water Authority (TMWA) Website. These plants thrive in Northern Nevada, and more information can be found at www.tmwalandscapguide.com

PERENNIAL FLOWERS

Eriogonum umbellatum/Sulfur Flowered Buckwheat (Perennial)--water use: Very Low

Achillea species/Yarrow (Perennial)--water use: Low

Agastache cana/Bubblegum Mint (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 -- Add to

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

Ceratoides 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 coggygia/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

APPENDIX C – METER READING INSTRUCTIONS

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

The current meters installed are SENSUS and are read using the Water wand which reads in 1000 gallon increments. Sometimes the wand cannot receive the information from the meter and you may have to manually remove the top of the box and visually read the gauge.

Measuring Water 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 is turned off. This includes all faucets (indoor and outdoor), appliances, swamp coolers and 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 to determine the amount of water used for the activity in cubic feet. Multiply the resulting amount by 7.48 to determine the amount of gallons of water used. Divide this number by the time elapsed during the activity to obtain the activities water requirements in gallons per minute.

Detecting Leaks

1. Make sure all water is turned off. This includes all faucets (indoor and outdoor), appliances, swamp coolers and icemakers.
2. Write down the meter reading to two decimal places and the 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 have a leak or a meter malfunction.

4. At the end of the activity, read the meter again. Subtract the first meter reading from the second to determine the amount of water used for the activity in cubic feet. Multiply the resulting amount by 7.48 to determine the amount of gallons of water passed through the meter during the test period.
5. Divide the amount of water by the time elapsed during the test to obtain the amount of water that went through the meter in gallons per minute.
6. To measure the 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 valve at a time at the wall. Go to the meter to check to see if the flow indicator is still moving. If the triangle has stopped moving, you have discovered the leak. If not, go on the next valve and repeat Step 7.
8. Check your sprinkler system. Shut off the 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.

WATER

- www.amsa-cleanwater.org
- www.energystar.gov
- www.awwa.org

DROUGHT

- DroughtMonitor@ndmc.unlv.edu

LANDSCAPE

- www.usda.gov/news/garden.htm
- www.tmwlandscapeguide.com/landscape_guide/interactive/index.php

EDUCATION

- www.wateruseitwisely.com
- www.washoeet.dri.edu

INSTITUTIONAL

- www.lvvwd.com
- www.snwa.com
- www.co.washoe.nv.us/water_dept/rwpc/regionalplm
- www.tmh20.com
- www.cabq.gov
- www.ci.phoenix.az.us/WATER/wtrteach.html
- www.owue.water.ca.gov/leak/faq/faq.cfm

LEAK DETECTION

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

IMLAY WATER SYSTEM WATER WASTE REPORT FORM

Please use this form to report water waste. Our investigators must witness the waste in progress to issue a violation form. Please provide as much information as possible to help us identify the problem.

TIME OBSERVED:

DATE OBSERVED (M/D/Y):

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ADDRESS OR LOCATION OF WASTE:

Street:	City:
---------	-------

MAJOR CROSS STREETS:

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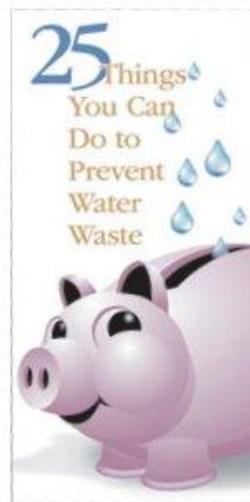
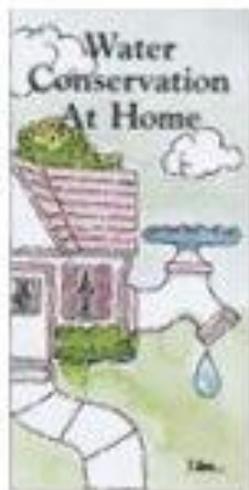
- | | |
|---|---|
| <input type="checkbox"/> Over-Watering | <input type="checkbox"/> Fountain/Water Feature Violation |
| <input type="checkbox"/> Broken Sprinkler | <input type="checkbox"/> Broken Pipe/Onsite Leak |
| <input type="checkbox"/> Time-of-Day Violation | <input type="checkbox"/> Misting System Violation |
| <input type="checkbox"/> Assigned Day Violation | <input type="checkbox"/> Other |

DESCRIPTION:

APPENDIX F – AWWA CONSERVATION PAMPHLETS

The following pamphlets are available on the AWWA website at: www.awwa.org/bookstore

Figures 1.1, 1.2, 1.3

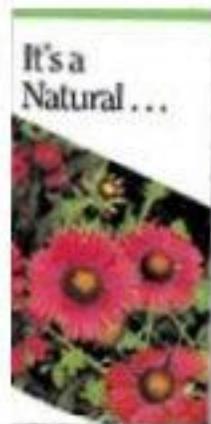


Water Conservation at Home discusses in-home conservation practices for bathroom, kitchen and outdoor water use (see Figure 1.1).

Landscaping to Save Water explains the seven principles in the Xeriscape(tm) concept that promotes attractive landscapes, conserves water, and protects the environment (see Figure 1.2).

25 Things You Can Do to Prevent Water Waste has 25 easy things people can do to conserve water inside and outside their homes (see Figure 1.3).

Figures 1.4, 1.5, 1.6

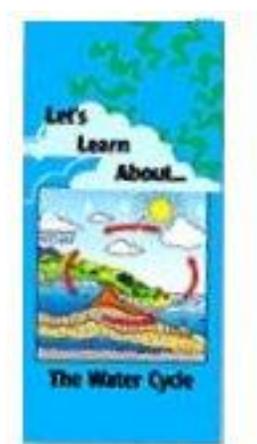


5 Basic Ways to Conserve Water provides 5 things people can do to cut water use by 25% (see Figure 1.4)

It's a Natural is an introduction to planning a water-conserving home landscape (see Figure 1.5)

55 Facts, Figure and Follies of Water Conservation is a list of 55 items that promote water conservation (see Figure 1.6).

Figures 1.7, 1.8, 1.9



Let's Learn About...The Water Cycle diagrams the seven stages of the water cycle (see Figure 1.7)

A Consumer's Guide to Water Conservation the Inside Story gives eight ways to reduce water waste inside the home (see Figure 1.8).

A Consumer's Guide to Water Conservation the Outside Story gives eight ways to reduce water waste in landscaping (see Figure 1.9).

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