

# **Mount Rose Bowl Property Owners Water Company**

## **Water Conservation Plan**

**Updated February 2017**

**Prepared for:**

**Mount Rose Bowl Property Owners Water Company  
12065 Bums Gulch Road  
Reno, NV 89511  
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**Prepared by:**

**MRBPOWC**

**In cooperation with**

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## **Introduction**

The water supply in Nevada is a precious commodity and plays an important role in determining Nevada's future. Nevada is the one of the driest states in the nation as well as one of the fastest growing ones. Nevada's future, both from an economic and a quality of life view, depends heavily upon the wise management of the water supply.

Groundwater, in general, provides about 40 percent of the total water supply used in Nevada. In some areas, groundwater provides the entire water supply. Groundwater usage may vary considerably from year-to-year as it is sometimes pumped to supplement surface water sources.

Water use in Nevada can be classified as:

- Domestic (household, both indoor and outdoor) – Met by public supply or private supply (e.g. wells).
- Commercial (businesses) – Met by public supply or private supply (e.g. non-community systems).
- Industrial (manufacturing/construction) – Met by public supply or private supply (e.g. non-community systems).
- Thermoelectric (electric/fossil fuel/geothermal power generation) – Met by public supply in a minor fraction.
- Mining (mining processes) – Supply source varies widely from operation to operation and is dependent upon the mineral being recovered and the recovery process employed.
- Irrigation (land use) – Met by self-supplied or supplied by irrigation companies or districts.
- Livestock (farm needs) – Supply source varies.

While all classifications of water usage have shown an increase over the years, it has historically been irrigation water use, which has accounted for the majority of the water use in Nevada.

It has been estimated that the domestic water use accounts for less than 15 percent of the water used in Nevada, but this is expected to rise to nearly 25 percent as the population increases (based upon existing water use patterns and conservation measures). It is expected that Nevada's population will become increasingly concentrated in its primary urban areas of Las Vegas (Clark County), Reno/Sparks (Washoe County) and Carson City, with varied spillover effects on neighboring counties.

It is vitally important that all residents understand the fundamental science of water, how it is managed in the state, and the issues affecting its management. Water education must become a priority and must include education of children as they are our future.

Because Nevada does not have a comprehensive state-wide conservation program, it is reliant upon the individual water suppliers for developing their own conservation programs. In 1991, Nevada enacted a law requiring adoption of conservation plans by water suppliers. Minimum standards for plumbing fixtures were adopted in 1991 (Assembly Bill 359) by Nevada and in 1992 minimum flow standards for plumbing fixtures were adopted by the federal government (National Energy and Policy Conservation Act).

Conservation is an essential part of ensuring adequate water supply as it is no longer feasible to develop new sources. It has proven to be a cost-effective way to reduce demands and/or to extend a given water supply. It can easily be pursued by all water users regardless of the water system type. Key to evaluating the program's effectiveness is the water use measurement (through meters and other measurement devices). Various conservation measures can be put into place and the achievement of the goals set with these measures is vital to combating the expected increase in water usage.

## **Statutory Requirements**

This water conservation plan was prepared for the **Mount Rose Bowl Property Owners Water Company, Inc. (MRBPOWC)** in accordance with Nevada Revised Statute (NRS) 540. As outlined in NRS 540.141, the provisions of this plan must include:

- a. Public Education
- b. Conservation Measures
- c. Water Management
- d. Contingency Plan
- e. Schedule
- f. Evaluation Measurements
- g. Conservation Estimates

In addition to the provisions of the water conservation plan, listed above, NRS 540.141 also requires a rate analysis to be performed and included with the submittal.

This plan is being submitted to the Nevada Department of Conservation and Natural Resources (DCNR), Division of Water Resources (DWR) for review and approval prior to its adoption by **MRBPOWC**, as required by NRS 540.131.

This plan is available for inspection during normal business hours at 12065 Bums Gulch Road Reno, NV 89511. A copy will be provided to all shareholders of the **MRBPOWC**.

This is the original Water Conservation Plan for **MRBPOWC** and was updated in **February 2017**

In accordance with NRS 540.131, this plan will be reviewed from time-to-time to reflect changes and must be updated every five (5) years to comply with NRS 540.131 and NRS 540.141. The next update of this plan is to be on, or before, **January 2022**.

## **System Description**

**Mt. Rose Bowl Property Owners Water Company (MRBPOWC)** is a publicly-owned residential & commercial community water system and has a current water operation permit, NV 0000732. **MRBPOWC** serves water to 15 metered flat-rate connection customers in its service area in southwestern Reno up on Mount Rose, which is located in Washoe County. Thirteen (13) service connections are residential and two (2) are commercial to Mountain Top Sports and Nevada Department of Transportation. The service area boundaries are along Bums Gulch Road,

down Old Mt. Rose Highway to Mt. Rose Highway (SR-431) and covers approximately 1 square mile. The service area's terrain is mountainous.

The estimated population served in 2017 was 50. **MRBPOWC** estimates that its customer base will increase by 0% on a yearly basis through 2022. The system is closed and no more connections are approved. The State of Nevada, through its State Water Plan, estimates the population growth for Washoe County through 2020 to be 1.79% annually.

The water supply is from groundwater in the form of a spring which is located within the Truckee River Basin (Hydrographic Basin #6) in the Pleasant Valley Groundwater Basin (Administrative Groundwater Basin #88). There is a total of one well (which is currently not utilized but serves as a backup water supply in case of emergency) and one spring supplying the system and a total of one (1) 10,000-gallon storage tank. Each of these is identified in the tables below (Table 1 and Table 2).

**Table 1 – Source of Supply**

<b>Well No.</b>	<b>Depth (feet)</b>	<b>Production (gpm)</b>
<b>W01</b>	<b>400</b>	<b>10</b>
<b>Spring</b>	<b>0.0</b>	<b>20</b>

**Table 2 – Storage Tanks**

<b>Tank No.</b>	<b>Volume (gallons)</b>
<b>1</b>	<b>10,000</b>

**MRBPOWC** has been granted water rights in the total amount of approximately 4 MGA. The current water rights are listed in the table below (Table 3).

**Table 3 – Water Rights**

<b>Certificate No.</b>	<b>Application No.</b>	<b>Well No. &amp; Name</b>	<b>Rate of Diversion (max, CFS)</b>	<b>Annual Use (MGA)</b>	<b>Well Log No:</b>	<b>Comments</b>
10706	30434		0.016	2.62	20590	See note 1
15275	57008	732-01	0.04	6.63	NA	See note 2
4684	12565	Spring 732-02	0.017	NA	NA	

Notes: 1. This well was never put into use. 2. This well is for emergency use only.

Water is diverted from the spring to a 10,000-gallon redwood storage tank and to the distribution system via gravity. No pumping is needed to operate the system. The spring serves as the primary water source for **MRBPOWC**. The spring is classified as a groundwater source and was rehabilitated in 1997. The distribution system is composed of 5500 feet of buried 6-inch and 4-inch PVC pipe including valves, service connections and hydrants.

The well is solely used as backup should the spring system fall short of providing sufficient water or during times of system rehabilitation such as in 1994 when the pipeline system was replaced.

The well utilizes a submersible pump, and controls for the well pump are maintained in an underground vault. The well is not intended for daily use.

**MRBPOWC** requires, Read and repair meters and inspect system and fire hydrants for leaks.

**MRBPOWC** charges a flat rate of \$150/month. It does not have a tiered rate usage fee, however it important to document that each shareholder is financially responsible for supporting all aspects of the water system. Higher usage ultimately results in increased costs of sodium hypochlorite, liability insurance, maintenance and repairs which shareholders directly pay if costs exceed the monthly rate of \$150 or may result in a rate increase. A breakdown of the customer type, number, and charge is found in the tables below. Residential customers and usage fees are shown below in Table 4.

**Table 4 – Residential Customers and Usage Charges**

<b>Main Size</b>	<b>Number</b>	<b>Monthly Fee</b>
<b>Residential</b>		
6-inch	11	\$150
4-inch	2	\$150

Commercial customers are billed a \$150/month. The fees are detailed in the table below in Table 5.

**Table 5 – Commercial Customers and Usage Charges**

<b>Main Size</b>	<b>Number</b>	<b>Monthly Fee</b>
<b>Commercial</b>		
6-inch	2	\$150

Current water rates were established October 2016 and were effective in October 2016. Water rates are reviewed every year or as needed.

## **Plan Provisions**

In accordance with NRS 540.131, this plan will be reviewed from time-to-time to reflect changes and must be updated every five (5) years to comply with NRS 540.131 and NRS 540.141. The next update of this plan is to be on, or before, **January 2022**.

**MRBPOWCs Board will** oversee the conservation efforts and will be responsible for implementation of conservation programs, monitoring of water use, and will review /revise the conservation plan when needed.

In an effort to promote voluntary conservation and aid in Nevada’s future, **MRBPOWC** will enact the voluntary conservation measures found in the *Conservation Measures* section. When more

stringent measures are needed, **MRBPOWC** will enact the measures found in the *Contingency Measures* section. All measures can be found in Appendix A.

As required by NRS 540.141, the water conservation plan must include the following provisions:

- a. Public Education
- b. Conservation Measures
- c. Water Management
- d. Contingency Plan
- e. Schedule
- f. Evaluation Measures
- g. Conservation Estimates

Each provision is discussed below.

### ***Public Education***

MRBPOWC works with NvRWA to provide public education is a key for cooperation with conservation efforts.

It is the goal of **MRBPOWC** to increase public awareness to conserve water, encourage reduction in lawn sizes, encourage the use of climate-appropriate plants, encourage the use of drip irrigation, and encourage conscious decisions for water use.

### ***Conservation Measures***

In an effort to promote conservation and voluntarily conserve water, **MRBPOWC** is adopting water-use regulations to promote water conservation during non-emergency situations. These regulations include the following non-essential water use:

- 1) Use of water through any connection when **MRBPOWC** has notified the customer to repair a broken or defective plumbing, sprinkler, watering or irrigation system and the customer has failed to make such repairs within 5 days after receipt of such notice.
- 2) Use of water, which results in flooding or run-off in gutters, waterways, patios, driveway, or streets.
- 3) Use of water for washing, cars, boats, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose. Exceptions include washing vehicles at commercial or fleet vehicle washing facilities operated at fixed locations where equipment using water is properly maintained to avoid wasteful use.
- 4) Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, parking lots, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
- 5) Use of water for watering streets with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.
- 6) Use of water for more than minimal landscaping in connection with any new construction.

- 7) Use of water for outside plants, lawn, landscape, and turf areas shall be limited to Tuesday and Saturday. Watering of plants, lawn, landscape, and turf areas are prohibited between the hours of 10am and 8pm.
- 8) Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
- 9) Use of water for decorative fountains or the filling or topping off of decorative lakes or ponds. Exceptions are made for those decorative fountains, lakes, or ponds which utilize recycled water.
- 10) Use of water for the filling or refilling of swimming pools.

In the event these conservation measures are insufficient to control the water shortage, **MRBPOWC** may wish to implement the mandatory measures discussed in the *Contingency Plan* section below.

**MRBPOWC** Shareholders are encouraged to consult with the local nursery or perform an internet search on the availability of water conservation plants and how to renovate existing landscapes. Customers are also encouraged to evaluate irrigation management systems using metering, timing, and water sensing devices.

At present, it is not viable for **MRBPOWC** to offer any water conservation incentives.

### ***Water Management***

**MRBPOWC** monitors and records water usage from the spring to the storage tank. The storage tank is equipped with an overflow. Water is allowed to overflow from the tank and the junction box to consistently maintain the storage tank at full capacity to meet demand of the shareholders. Unused water returns to the local ecosystem and flows to Brown's Creek. The water level in the storage tank is monitored bi-weekly. If a leak is detected the leak is isolated and repaired immediately.

**MRBPOWC** does actively monitor unaccounted for water losses. Because the system functions using gravity, leaks are quickly apparent due to the low water level in the storage tank. Current-to-historical comparisons are not currently available but **MRBPOWC** intends to implement record keeping practices promptly to allow for future comparisons. Although **MRBPOWC** uses a flat-rate system, meters are installed and readings will be recorded at scheduled intervals.

### ***Contingency Plan***

The objective of the contingency plan would be to manage the available resources to ensure continued supply of potable water during periods of drought or extended drought.

It is envisioned that voluntary conservation will be sufficient to ensure an adequate supply of water and reduce water usage. However, if a sustained drought (lack of precipitation) is encountered, it may be necessary to implement mandatory restrictions in order to ensure an adequate supply of water to meet essential needs.



**MRBPOWC** plans for drought response would be three (3) stages of drought response: (1) warning stage, (2) alert stage, and (3) emergency stage. This is based upon the State of Nevada Drought Response. The stages are describes as follows:

In Stage 1, the warning stage, **MRBPOWC** would increase monitoring of its water supplies and would begin creating public awareness of the water supply situation and the need to conserve. Conservation measures at this stage would be voluntary. Retrofit kits (low-flow faucet aerators, low-flow showerheads, leak detection tables, and replacement flapper valves) can be made available at cost if needed.

In Stage 2, the alert stage, **MRBPOWC** would call for wide-based community support to achieve conservation, limit the use of fire hydrants to fire protection uses (by requiring effluent for construction and dust control purposes), implement water use restrictions, and impose penalties for ignoring the restrictions. Conservation measures at this stage would be mandatory.

In Stage 3, the emergency stage, **MRBPOWC** would declare a drought and water shortage emergency, would enforce water use restrictions, and implement allocation of water (rationing). Conservation measures at this stage would be mandatory, rationing would be imposed, and violations would incur fines.

When a drought is declared over, voluntary conservation measures (see *Conservation Measures* section) will be reinstated and water supplies would continue to be monitored.

### ***Schedule***

The water conversation plan was adopted in 2011.

### ***Evaluation Measurements***

Individual customers are metered however historical data is not available and monthly readings at this time are not viable due to inaccessibility to water meters during winter months. Annual readings are currently being reviewed by the Board. However, **MRBPOWC** can evaluate the effectiveness of each plan element from the perspective of the whole system. In that regard, as a plan element is activated (e.g. mailing literature or declaring a drought stage), production figures will be compared to same-month historical data to estimate the plan element's effectiveness. This information will be utilized as a basis for any future water conservation plan revision and plan elements.

If there is a decrease in production as a result of a particular measure/incentive, that measure/incentive can be expanded or improved upon, if possible. If it is discovered that a particular measure/incentive is ineffective, it will be discontinued and a new one can then be implemented to take its place.

Because **MRBPOWC** can record meter reading annually an audit comparing water production with metered amounts can be performed prior to the implementation of measures/incentives. Additional audits will then be done every year thereafter. Results from the initial audit will be compared with those of the subsequent annual audits in order to determine the effectiveness of the

measures/incentives. It is to be noted that occupancy significantly varies seasonally and this is reflected in water use. This should be taken into consideration when conducting annual audits.

In addition to changes resulting from audits, updates, and modifications to conservation measures/incentives there will be changes made to meet changing conditions (e.g. customer growth and demand, changing use, new technologies, etc.).

### ***Conservation Estimates***

It is estimated that metering alone will be the major driver of conservation, by raising awareness of individual account use. Metering alone, without a rate structure change, but with the public education elements, can be expected to provide a 5 % reduction in water use.

During the Stage 1 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 5-10 % reduction in water use.

During the Stage 2 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 10-15 % reduction in water use.

During the Stage 3 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 15-30 % reduction in water use.

The estimated water savings for various end-user efforts can be found in Appendix C.

### **Rate Analysis**

We charge a flat rate of \$150.00.

At this time **MRBPOWC** does not anticipate any further water conservation savings due to a change in rate structure. **MRBPOWC** will continue to monitor the water usage and will re-visit this issue each time rates are reviewed. If so warranted, a change in rates will occur and this conservation plan will be updated to reflect the new rates.

## Measures

### Stage 1 – Warning Stage

1. **MRBPOWC** would increase monitoring of water supplies.
2. **MRBPOWC** would begin creating public awareness of the water supply situation and the need to conserve.
3. **MRBPOWC** would inform customers of voluntary conservation measures (non-essential water uses, listed below).
4. **MRBPOWC** would provide customers with retrofit kits at cost.

Non-essential water uses are:

- 1) Use of water through any connection when **MRBPOWC** has notified the customer in writing to repair a broken or defective plumbing, sprinkler, watering or irrigation system and the customer has failed to make such repairs within 5 days after receipt of such notice.
- 2) Use of water, which results in flooding or run-off in gutters, waterways, patios, driveway, or streets.
- 3) Use of water for washing, cars, boats, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose. Exceptions include washing vehicles at commercial or fleet vehicle washing facilities operated at fixed locations where equipment using water is properly maintained to avoid wasteful use.
- 4) Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, parking lots, tennis courts, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
- 5) Use of water for watering streets with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.
- 6) Use of water for more than minimal landscaping in connection with any new construction.
- 7) Use of water for outside plants, lawn, landscape, and turf areas shall be limited to Tuesday and Saturday. Watering of plants, lawn, landscape, and turf areas are prohibited between the hours of 10am and 8pm.
- 8) Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
- 9) Use of water for decorative fountains or the filling or topping off of decorative lakes or ponds. Exceptions are made for those decorative fountains, lakes, or ponds which utilize recycled water.
- 10) Use of water for the filling or refilling of swimming pools.

### Stage 2 – Alert Stage

1. **MRBPOWC** would set conservation goals and call for wide-based community support to achieve those goals.

2. **MRBPOWC** would inform customers of mandatory conservation measures (non-essential water uses, listed in Stage 1 are now mandatory).
3. **MRBPOWC** would inform customers of penalties if mandatory conservation measures are not observed (penalties are listed below).
4. **MRBPOWC** would inform customers of mandatory conservation water fees.
5. **MRBPOWC** limit the use of fire hydrants to fire protection uses only.
6. **MRBPOWC** would provide customers with retrofit kits at cost.

Penalties for violation of mandatory conservation measures are:

- 1<sup>st</sup> violation – written warning.
- 2<sup>nd</sup> violation – turn-off of water services

Offenses for separate water use restriction violations will each start at the warning stage (1<sup>st</sup> violation).

### **Stage 3 – Emergency Stage**

1. **MRBPOWC** would declare a drought and water shortage emergency.
2. **MRBPOWC** would set rationing benchmarks for each customer.
3. **MRBPOWC** would inform customers of prohibited water uses (non-essential water uses, listed in Stage 1 are now prohibited).
4. **MRBPOWC** would inform customers of penalties if prohibited measures are not observed (penalties are listed below).
5. **MRBPOWC** would inform customers of rationing water fees.
6. **MRBPOWC** would limit the use of fire hydrants to fire protection uses only.
7. **MRBPOWC** would seek monetary assistance in an effort to mitigate the drought (e.g. federal funding).

Penalties for violation of prohibited water use measures are:

- 1<sup>st</sup> violation – written warning.
- 2<sup>nd</sup> violation – turn-off of water services

Offenses for separate water use restriction violations will each start at the warning stage (1<sup>st</sup> violation) and the penalties for the offenses are in addition to the regular rate schedule charges.

Stage 3 water rates would include an additional monthly water usage fee associated with trucking water in, or other such fee as deemed necessary.

If any customer seeks a variance from the provisions of Stage 3, then that customer shall notify **MRBPOWC** in writing, explaining in detail the reason for such a variation. **MRBPOWC** shall respond to each request.

## **Education Materials**

There are several publications available for use at U.S. EPA website for general distribution (currently located at <http://epa.gov/watersense/pubs/index.htm#ideas>). These publications include such topics as:

- Simple Steps to Save Water,
- Ideas for Residences,
- Ideas for Commercial,
- Using Water Wisely In the Home,
- Outdoor Water Use in the US,
- Toilet Flush Facts,
- Watering Can Be Efficient,
- Irrigation Timers for the Homeowner, and
- Water Efficient Landscaping,

There are also numerous website that provide tips for conserving water. One of these is: <http://www.wateruseitwisely.com/100-ways-to-conserve/index.php>. Customers can be directed to this website for tips to conserve water.

Specific tips for landscaping that can be provided to the customers are listed below. During drought conditions outdoor watering restrictions may be imposed, and therefore some of the following tips will not apply.

### **Tips for Landscaping**

#### **Watering:**

- Detect and repair all leaks in irrigation systems.
- Use properly treated wastewater for irrigation where available.
- Water the lawn or garden during the coolest part of the day (early morning is best). Do not water on windy days.
- Water trees and shrubs, which have deep root systems, longer and less frequently than shallow-rooted plants which require smaller amounts of water more often. Check with the local nursery for advice on the amount and frequency of watering needed in your area.
- Set sprinklers to water the lawn or garden only—not the street or sidewalk.
- Use soaker hoses and trickle irrigation systems.
- Install moisture sensors on sprinkler systems.

#### **Planting:**

- Have your soil tested for nutrient content and add organic matter if needed. Good soil absorbs and retains water better.
- Minimize turf areas and use native grasses.
- Use native plants in your landscape—they require less care and water than ornamental varieties.

- Add compost or peat moss to soil to improve its water-holding capacity.

#### Maintaining:

- Use mulch around shrubs and garden plants to reduce evaporation from the soil surface and cut down on weed growth.
- Remove thatch and aerate turf to encourage movement of water to the root zone.
- Raise your lawn mower cutting height to cut grass no shorter than three inches—longer grass blades encourages deeper roots, help shade soil, cut down on evaporation, and inhibit weed growth.
- Minimize or eliminate fertilizing which requires additional watering, and promotes new growth which will also need additional watering.

#### Ornamental Water Features:

- Do not install or use ornamental water features unless they recycle the water. Use signs to indicate that water is recycled. Do not operate during a drought.

## Water Savings

Here are just a few of the end-user water savings that could be realized:

### Leaky Faucets

**Issue:** Leaky faucets that drip at the rate of one drip per second can waste more than 3,000 gallons of water each year.

**Fix:** If you're unsure whether you have a leak, read your water meter before and after a two-hour period when no water is being used. If the meter does not read exactly the same, you probably have a leak.

### Leaky Toilets

**Issue:** A leaky toilet can waste about 200 gallons of water every day.

**Fix:** To tell if your toilet has a leak, place a drop of food coloring in the tank; if the color shows in the bowl without flushing, you have a leak.

### Showering

**Issue:** A full bath tub requires about 70 gallons of water, while taking a five-minute shower uses 10 to 25 gallons.

**Fix:** If you take a bath, stopper the drain immediately and adjust the temperature as you fill the tub.

### Brushing Teeth Wisely

**Issue:** The average bathroom faucet flows at a rate of two gallons per minute.

**Fix:** Turning off the tap while brushing your teeth in the morning and at bedtime can save up to 8 gallons of water per day, which equals 240 gallons a month!

### Watering Wisely

**Issue:** The typical single-family suburban household uses at least 30 percent of their water outdoors for irrigation. Some experts estimate that more than 50 percent of landscape water use goes to waste due to evaporation or runoff caused by overwatering.

**Fix:** Drip irrigation systems use between 20 to 50 percent less water than conventional in-ground sprinkler systems. They are also much more efficient than conventional sprinklers because no water is lost to wind, runoff, and evaporation. If the in-ground system uses 100,000 gallons annually, you could potentially save more than 200,000 gallons over the lifetime of a drip irrigation system should you choose to install it. That adds up to savings of at least \$1,150!

### Washing Wisely

**Issue:** The average washing machine uses about 41 gallons of water per load.

**Fix:** High-efficiency washing machines use less than 28 gallons of water per load. To achieve even greater savings, wash only full loads of laundry or use the appropriate load size selection on the washing machine.

### **Flushing Wisely**

**Issue:** If your toilet is from 1992 or earlier, you probably have an inefficient model that uses at least 3.5 gallons per flush.

**Fix:** New and improved high-efficiency models use less than 1.3 gallons per flush—that's at least 60 percent less than their older, less efficient counterparts. Compared to a 3.5 gallons per flush toilet, a WaterSense labeled toilet could save a family of four more than \$90 annually on their water bill, and \$2,000 over the lifetime of the toilet.

### **Dish Washing Wisely**

**Issue:** Running dishwasher partial full and pre-rinsing dishes before loading the dishwasher.

**Fix:** Run the dishwasher only when it's full and use the rinse-and-hold dishwasher feature until you're ready to run a full load. Pre-rinsing dishes does not improve cleaning and skipping this step can save you as much as 20 gallons per load, or 6,500 gallons per year. New water-saver dishwashers use only about 4 gallons per wash.

Estimated water savings from EPA Water Conservation Guidelines 1998 (Appendix B, Table B-1):

Type	Estimated Usage (gpcpd)	Conservation Usage (gpcpd)	Savings (gpcpd)	Savings (%)
Toilet	18.3	10.4	7.9	43 %
Clothes Washers	14.9	10.5	4.4	30 %
Showers	12.2	10.0	2.2	18 %
Faucets	10.3	10.0	.3	3 %
Leaks	6.6	1.5	5.1	77 %



Benchmarks from selected conservation measures from EPA Water Conservation Guidelines 1998 (Appendix B, Table B-4):

<b>Category</b>	<b>Measure</b>	<b>Reduction of End Use (% or gpcpd)</b>
Universal metering	Connection metering	20 %
	Sub metering	20 – 40 %
Costing and pricing	10% increase in residential prices	2 – 4 %
	10% increase in non-residential prices	5 – 8 %
	Increasing-block rate	5 %
Information and education	Public education and behavior changes	2 – 5 %
End-use audits	General industrial water conservation	10 – 20 %
	Outdoor residential use	5 – 10 %
	Large landscape water audit	10 – 20 %
Retrofits	Toilet tank displacement devices (for toilets using > 3.5 gallons/flush)	2 – 3 gpcpd
	Toilet retrofit	8 – 14 gpcpd
	Showerhead retrofit (aerator)	4 gpcpd
	Faucet retrofit (aerator)	5 gpcpd
	Fixture leak repair	0.5 gpcpd
	Governmental building (indoors)	5 %
Pressure management	Pressure reduction, system	3 – 6 % of total production
	Pressure-reducing valves, residential	5 – 30%
Outdoor water use efficiency	Low water-use plants	7.5 %
	Lawn watering guides	15 – 20 %
	Large landscape management	10 – 25%
	Irrigation timer	10 gpcpd
Replacements and promotions	Toilet replacement, residential	16 – 20 gpcpd
	Toilet replacement, commercial	16 – 20 gpcpd
	Showerhead replacement	8.1 gpcpd
	Faucet replacement	6.4 gpcpd
	Clothes washers, residential	4 – 12 gpcpd
	Dishwashers, residential	1 gpcpd
	Hot water demand units	10 gpcpd
Water-use regulation	Landscape requirements for new developments	10 – 20 % in sector
	Greywater reuse, residential	20 – 30 gpcpd