

# **Arizona Statewide Water Conservation Strategy**

**DRAFT**



**Prepared for:**

**Governor Janet Napolitano**

**Governor's Drought Task Force**

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**Executive Summary**

Arizona's desert climate directly affects our economy and quality of life. All economic activity occurs where water supplies are available. As a result, Arizona places a high priority on managing its water to ensure that secure water supplies are available now and well into the future.

Although Arizona is known for its dry climate, recent drought conditions have had the greatest impact in the state's rural areas. Governor Janet Napolitano signed an Executive Order# 2003-12, on March 20, 2003, establishing the Governor's Drought Task Force. The Governor directed the Department of Water Resources (ADWR) to provide leadership in this effort with an emphasis on providing assistance to rural communities with potable water supply needs.

Among the provisions of the Executive Order are two requirements that pertain directly to conservation: 1) the development and implementation of a statewide water conservation strategy and 2) the establishment of a Conservation Education Task Force Group.

The statewide effort, focused on rural communities, will create guidelines for more efficient use of water, strive to expand the reach of existing programs, create new conservation tools for rural communities, promote water education throughout the state, and provide suggestions for funding and implementing conservation programs.

The overall goal of this strategy is to achieve greater water use efficiency for the state resulting in measurable water savings. Water use efficiency can be evaluated by establishing benchmarks to serve as voluntary guidelines for water use reductions. The proposed efficiency benchmarks can be achieved

through the implementation of five categories of strategies or types of tools: 1) planning, 2) programming, 3) education, 4) funding and 5) policy. These five strategies contain the basis for continuing existing programs and the creation and implementation of new programs statewide.

The development of efficiency benchmarks for the State of Arizona will involve input from stakeholders statewide and will require a review of existing water use data, climate divisions tied to the Arizona Drought Preparedness Plan, and should be based on good science. The implementation of new programs and expansion of existing water conservation programs will serve as the means or tools to reach greater water use efficiencies for the state, but these efforts to measure and report water use savings should be managed at a local level.

**Summary of Key Recommendations:**

1. Develop water use efficiency benchmarks as guidelines for reducing statewide water use.
2. Adopt Conservation “ABC’s” for top water use savings and use of best available technologies.
3. Create a statewide conservation office to implement new programs.
4. Create a state sponsored conservation web site.
5. Develop a clear mandate for teaching water education statewide.
6. Expand the reach of existing education and conservation programs to rural areas.
7. Strengthen conservation media messaging efforts
8. Secure dedicated funding for statewide water conservation programs.

Initial review of the Statewide Water Conservation Strategy as a whole will be discussed through a series of public forums during the summer of 2004; however, implementation of the strategy, if approved by the Governor’s Drought Task Force and the Governor will take time. This strategy provides a real opportunity for the state of Arizona to go beyond creating a better water

conservation ethic for the state, but it also provides the means to reaching the ultimate goal: saving water for Arizona.

## **INTRODUCTION**

Arizona's desert climate directly affects our economy and quality of life. All economic activity, including mining, irrigated agriculture, and municipal development occurs only where water supplies are available. As a result, Arizona places a high priority on managing its water to ensure that secure water supplies are available now and well into the future. This document is being written to serve as the guideline for statewide water conservation planning in Arizona.

The term "conservation" has multiple meanings related to the use of resources, but in the context of water conservation, the following definitions are often used:

- 1) Any beneficial reduction in water loss, waste or use,
- 2) Reduction in water use accomplished by implementation of water conservation or water-efficiency measures,
- 3) Improved water management practices that reduce or enhance the beneficial use of water. (Vickers, 2001)

The State of Arizona is second fastest growing state in the nation (US Census Bureau) and is one state that does not have a comprehensive water conservation strategy in place. Sustainable growth is dependent upon reliable and adequate supplies of water. Precipitation in six of the last seven years has been significantly below normal, and in 2002, surface waters flows and reservoir storage levels were the lowest ever recorded in many areas. (USGS). This situation has raised the awareness of the need for drought planning and the need for enhanced conservation statewide.

Recent drought conditions have had the greatest impact in the state's rural areas. In response, Governor Janet Napolitano signed Executive Order # 2003-12, on March 20, 2003, establishing the Arizona Drought Task Force. The Governor directed the Department of Water of Water Resources to provide leadership in this effort with an emphasis on providing assistance to rural communities with potable water supply needs. The Task Force is comprised of state agencies, and elected officials; however, representatives of Arizona Counties, cities, towns, Indian Tribes, water and power utilities and the public are stakeholders in the process and have been invited to participate.

## **Developing A Statewide Conservation Education Strategy**

Among the provisions of the Executive Order are two requirements pertaining directly to conservation: the development and implementation of a statewide water conservation education strategy (1(G.)), and the establishment of a Conservation Education Task Force Group (3(A)).

### **Objectives Of A Statewide Water Conservation Strategy**

The purpose of this strategy is to encourage voluntary reductions in use and assist local jurisdictions and water providers in implementing appropriate long-term and drought related conservation programs. In this sense, the goal for this statewide conservation strategy goes beyond the expressed requirements for the effort as outlined by the Executive Order. Measurable outcomes in terms of quantifiable water savings are the basis for the voluntary guidelines presented in this strategy. Water savings can be achieved by developing a set of water efficiency benchmarks. Water Efficiency Benchmarks for determining reasonable and efficient use can be used by local communities and residents to gauge how much water they are using and how much potential there exists for reductions in use. In order to reduce water use, tools and programs must be available to assist in efforts to reach the benchmark guidelines. This document sets out to do both: provide the basis for developing water efficiency benchmarks as a means to guide communities and residents to using water more efficiently and also providing the necessary educational tools and technical assistance to achieve reductions in use.

Due to the limited availability of alternative supplies, many of the state's rural areas have been the hardest hit by drought. The conservation effort will reach statewide but seek a focus on rural communities. It will strive to expand existing conservation education programs by: building on existing expertise, creating guidelines for more efficient water use, developing new conservation tools for rural communities, promoting water conservation education throughout the state, providing recommendations for funding and implementation of conservation programs. The overriding message for this effort is stewardship of the resource.

### **Statewide Need For Water Conservation**

- Stewardship of our water resources is key to a sustainable quality of life in Arizona
- State population growth is one of the fastest in the nation
- Long-term drought conditions currently exist in the State and are likely to recur in the future
- Arizona reservoir levels are below 50% of capacity (Climas -April 2004 – See Attachment 1)

- Even in the absence of drought, some communities do not have a sustainable water supply.

### **Long-Term Conservation Ethic Vs. Drought Planning**

This Conservation Strategy is being developed in association with Arizona's first drought plan. There is a need to distinguish between conservation measures that are focused on increased efficiency of water use as part of a greater long-term conservation ethic for the state and those measures which are specifically tied to drought response (See Appendix A).

The American Water Works Association's (AWWA) white paper, "Water Conservation and Water Utility Programs," emphasizes that water utilities with on-going conservation programs are better able to manage droughts:

"...water conservation programs emphasize lasting day-to-day improvements in water use efficiency...In the event of water shortages, agencies with broad-based water conservation programs are able to mitigate short-term and long-term effects better than those without a conservation program."

There are two categories of water conservation measures: technology-based (hardware) and behavior-based (practices):

- *Technology-based* measures, such as equipment retrofits and the installation of water-efficient appliances, achieve long-term savings that will last as long as the efficiency device remains installed. They are usually expensive compared to behavior-based practices and often require incentives (e.g., rebates, ordinances) to entice water users to adopt them. Hardware measures require one step – installation – to achieve lasting water savings.
- *Behavior-based* practices such as turning off faucets while washing dishes and not hosing sidewalks typically result in only short-term water reductions because they require ongoing reminders (e.g., public messaging) about the need to change personal behavior in order to save water. Water managers often promote behavior-based water efficiency practices during drought because a) they need only temporary reductions in water use until the drought has passed, b) behavior changes can quickly result in water reductions (e.g., ban on lawn watering); and c) water savings from behavioral changes are largely free as drought response is considered a news item compared to long-term public education campaigns which

involve paid advertisements. Behavior-oriented measures require repeated actions on the part of water utilities and water users to remember to change water habits. What is desired for Arizona is adoption of a water conservation and efficiency ethic, which will extend well beyond a cycle of drought.

### **Current State Conservation Mandates**

Currently, state conservation requirements affect only those who reside within the State's five Active Management Areas (AMAs). Approximately 80% of Arizona's population resides within AMAs, and they account for about 75% of the state's water consumption. Conservation requirements are currently in place for all users of water, including municipal water companies, farmers and industries through Management Plans mandated by Arizona's Groundwater Code. (For more information on these requirements, check the Arizona Department of Water Resources website at [www.water.az.gov](http://www.water.az.gov) and click on Water Management).

### **Introduction To Benchmarking**

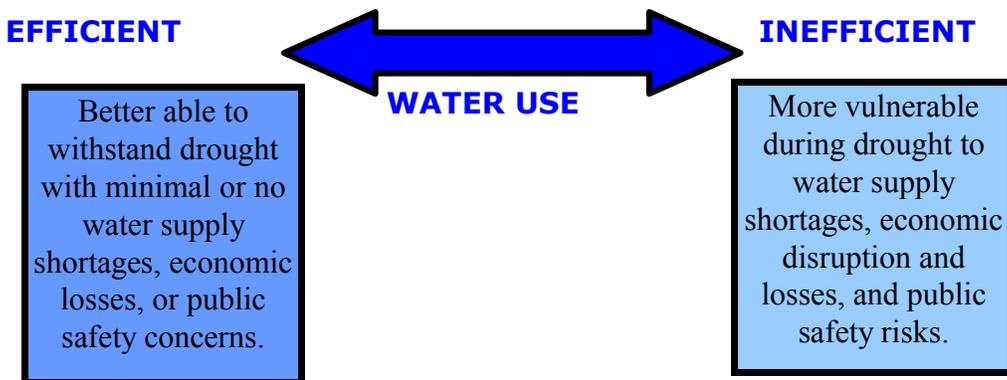
While the establishment of voluntary conservation benchmarks will require a review and assessment of existing information to determine additional data needs, this approach offers the best opportunity to measure the success of our conservation efforts long-term. Benchmarks will provide a necessary tool for many communities who have no specific water use goals and may provide needed leverage for the establishment of new conservation programs at local levels. Early indications suggest that benchmarking may lay the groundwork for healthy water conservation competitions between communities and counties in various parts of the state. Such voluntary responses encourage cooperative community efforts and increase local water resources stewardship. Benchmarking may be the basis to guide available financial resources when communities are planning for the development of new water conservation programs.

Currently, there is no established statewide water use baseline, largely because outside of the AMAs, many water uses are not metered. Enhanced data collection will be required to establish conservation benchmarks and measure the progress of our statewide conservation efforts. The last statewide information on water use, the *Statewide Water Resources Assessment*, was prepared by the ADWR in 1994 and conditions have changed dramatically within the state in the last 10 years.

One of the most important things for water users and water suppliers to understand about water conservation is difference between *efficient*

*and reasonable water use and non-efficient water use.* Water consumption for human and animal use is an indisputable need. Use beyond a level to sustain life is discretionary. In order to support local and statewide economic activity, additional water is needed. Because water in our state is relatively inexpensive compared to its actual value, most of us have developed water-using habits that are not entirely efficient. It is almost always possible to reduce water use through improved management practices. For example, more than 50 % of the residents of the Navajo and Hopi Reservations haul water on a regular basis to serve their needs, and they generally use less than 50 gallons per capita per day. This municipal rate is much lower than water use in areas that have water delivery systems, which range from over 100 gallons per day compared to much higher rates in areas with significant outdoor landscaping. (Jacobs, 2004) Other factors include low rainfall in combination with hot dry desert conditions.

Efficient water systems that practice water conservation on an ongoing basis can be expected to have more robust and greater water supply capacities compared to inefficient systems in the same circumstances, and they are not as subject to the roller coaster peak demand patterns of non-conserving water systems. When drought occurs, efficient water systems already have in place reduced demands and thus are not as vulnerable to the dramatic reductions in reservoir and aquifer levels often faced by non-conserving systems during times of reduced precipitation. Some would argue that efficient systems are more vulnerable to drought if there are no "back-up" water supplies with no waste in the system to be eliminated during drought conditions. Others would see this as "demand hardening."



It is estimated that many urban water systems have the "capacity" to reduce total system demands from at least 10 to 30 percent (and probably more) by maximizing the efficiency of water use. Agricultural (irrigation) water use has been estimated to have a water use efficiency of about 70 percent, meaning that 30 percent of agricultural irrigation water may be lost to inefficiency. While it may be unlikely that most users will approach 100% efficiency, this urban and agricultural water use is a source of untapped additional water supply. The extent to which this use can be

reduced is debatable, however, any reduction in use can be helpful in accommodating reduced precipitation during drought.

Water use can be described in three categories: efficient, average, and inefficient. By knowing the efficiency of a particular region's water supply system, as well as having drought contingency plans for increased conservation or alternative supplies, local officials can assess the types of appropriate action (implementation of conservation actions) during a drought or other water shortage situation.

### **Water Efficiency Benchmarks for Major End Users**

A practical understanding of wise water use, compared to wasteful water use is possible only if there are established water efficiency benchmarks. Benchmarks and performance standards abound in our culture, water managers need them, too, if they are to realize water conservation goals. Not unlike the BMI–body mass index–benchmark for human body weight, few may want to get on the water efficiency scale, but doing so clarifies how efficiently (or not) water is being used. Information can lead to action and implementation.

The water industry, government, and some manufacturers have already established some benchmarks for efficient water use. For example, the American Water Works established a maximum 10 percent unaccounted-for water guideline for water systems (July 1996). Similarly, the Arizona Department of Water Resources has a 10% UFW standard for large water systems and a 15% UFW standard for small systems.

The U.S. Energy Policy Act of 1992 established water efficiency standards for toilets, urinals, showerheads and faucets that are lowering indoor home water use and related domestic demands in industrial, commercial and institutional (ICI) settings. Manufacturers of clothes washers and dishwashers now have lines of high-efficiency models that use less water and energy than conventional machines. In a similar vein, the U.S. Green Building Council has and continues to revise its standards for sustainable building projects, including water use factors.

**Recommendation:** The following voluntary guidelines for water use efficiency benchmarks are recommended for beginning discussions with stakeholders in Arizona as a basis for establishment of reasonable water use goals by category:

System (utility) water water use efficiency:

- Unaccounted-for water (UFW) shall not exceed 10% for large systems and 15% for small systems

**Rationale:** AWWA's 10% UFW guideline (1996) for all water systems

Single family (indoor) water use efficiency, maximum average daily use:

- Inefficient: exceeds 70 gpcd
- Average: 70 gpcd
- Efficient: 50 to 70 gpcd
- Most efficient: less than 50 gpcd

**Rationale:** The landmark AWWA Research Foundation water use study of 1,200 homes in North America, *Residential End Uses of Water* (Denver, CO: AWWA Research Foundation and American Water Works Association, 1999), found that average indoor water use in homes studied was 69 gpcd. Rounding that up to 70 gpcd and considering it the average, indoor residential use above that level is considered "inefficient." Most efficient use – less than 50 gpcd – is based on the fact that there exists commonly available, on-the-shelf high-efficiency fixtures and appliances that will reduce indoor home water use to 40-45 gpcd.

Multi-family (indoor) water use efficiency, maximum average daily use:

- Inefficient: exceeds 70 gpcd
- Average: 60 to 70 gpcd
- Efficient: 50 to 60 gpcd
- Most efficient: less than 50 gpcd

**Rationale:** Per capita residential water use in multi-family dwellings tends to be lower than single-family homes because they are less likely to have washers, other water-using appliances, and lifestyles that are less water-consumptive. Hence, the benchmarks for water use efficiency for multi-family dwelling users is recommended to be lower than for single family users, with the "most efficient" standard the same.

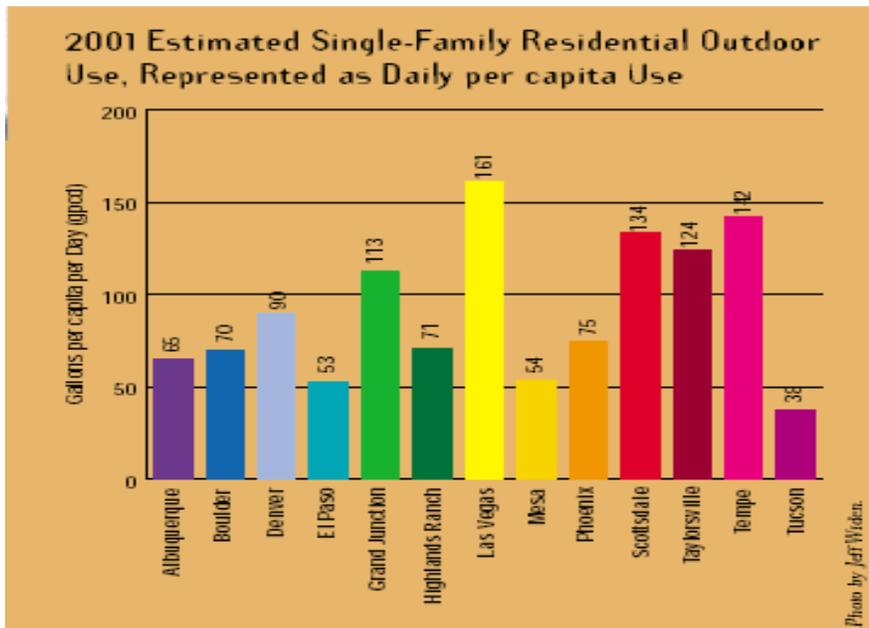
Residential and Commercial Outdoor Watering (residential lawn irrigation)

This guideline in particular will need further study and evaluation to determine the effects of an arid climate on outdoor water use. Based on Nationwide studies the following guidelines are offered as a starting point for Arizona discussion.

- Inefficient: exceeds 30 gpcd
- Average: 30 gpcd (based on USGS/AWWRF research)
- Efficient: 15 gpcd
- Most efficient: e.g., native, desert landscape; may include rainwater irrigation only with rainwater harvesting system

**Rationale:** Based on U.S. Geological Studies of domestic water use, it is estimated that on average, Americans use about 30 gpcd for outdoor use. Based on that national average, an outdoor use above 30 gpcd average is labeled as "inefficient" and that use below the average is considered "efficient." Climate factors for most Western States exceed the norms for national averages due to high evapotranspiration rates. However, it could also be maintained that outdoor water use in the west is excessive given its desert climate. It is generally recognized that outdoor water use is the primary focal point and best opportunity to achieve major water use reduction.

**Note:** The Department of Water Resources will review reasonable goals for outdoor benchmarks based on the climate divisions defined within the Arizona Drought Plan in coordination with Arizona stakeholders. The *Comparative Study of Urban Water Use Efficiency Across the Southwest* conducted by Western Resource Advocates contends that: "water use efficiency, as measured through per capita use, varies substantially in southwestern cities and is not correlated with climate conditions...cities in the hottest, driest areas do not necessarily use more water." (Figure 1, Smart Water, 2003) Variations in outdoor water use between Phoenix valley cities may be due to differences in rate structures, landscape type, conservation programs, landscaping ordinances, etc.



**Figure 1. Residential Outdoor Water Use  
"Smart Water" - Western Resources Advocates 2003**

#### Industrial, Commercial and Public/Institutional (ICI) Water Users

- Benchmarks recommended to be established within two (2) years.

**Rationale:** Water use by commercial, industrial, and institutional water users is hard to compare, but there are some benchmarks—and new ones can be established in Arizona through surveys. For example, there are data on plumbing fixture use by employees that can be developed into benchmarks for the ICI sector. Further, in a recent water use survey of over 57 public facilities in the United Kingdom, a database of use and potential efficiency measures was developed. The outcome of this study was a set of benchmarks and provided targets for improvement. Benchmarks have been set for 17 building categories that account for approximately 80% of the public sector estate. One of the points here is that while there are not many benchmarks for ICI water efficiency, there are some and they can be developed. The UK study and the benchmarks can be accessed on the Internet :  
[http://www.watermark.gov.uk/w\\_benchmarks.asp](http://www.watermark.gov.uk/w_benchmarks.asp) and  
[http://www.watermark.gov.uk/Downloads/Final%20Report\\_version%202\\_short.pdf](http://www.watermark.gov.uk/Downloads/Final%20Report_version%202_short.pdf)

#### **Conservation ABCs for Water Users**

There are about as many water efficiency measures that can be implemented as there are cities and towns in Arizona. At the same time, the 80/20 rule often applies to water conservation: that the greatest volume of savings may be achieved by the broad implementation of a few selected measures. Below follows a recommended list of the top three water efficiency measures that typically will yield the highest water savings within each customer group. Simplification of the many possible conservation measures to the top three for each user sector, educates and reinforces the concept that water conservation starts by learning and putting into practice one's ABC's:

#### Water Systems (Medium-Large) ABCs

- A. Reduce unaccounted-for water to a maximum of 10% within 3 years
  - B. Conduct annual system audits that include ongoing leak detection and repair
  - C. Implement conservation-oriented pricing structures, including surcharges for excess water use (e.g., lawn watering)
- Incentives to support ABCs: water waste prohibition

#### Rural and Small Water Systems ABCs

- A. Reduce unaccounted-for water to a maximum of 10-15% within 3 years
  - B. Universal metering, including source metering within 5 years
  - C. Implement conservation-oriented pricing structures, including surcharges for excess water use (e.g., lawn watering) within 3 years
- Incentives to support ABCs: state funding support for rural systems' conservation programs, state fine for failure to meet 10-15% UFW

#### Residential Indoor ABCs

- A. Household water audits and retrofits, including leak repair every 3 years or as needed
  - B. Rebates for high-efficiency clothes washers, dishwashers, and toilets
  - C. Bi-annual water service line leak detection and repair
- Incentives to support ABCs: local water waste ordinances, requirement for installation of water-efficient fixtures, appliances, and leak repair at point of property sale or lease.

#### Residential Outdoor ABCs

- A. Voluntary watering schedule, allowing for a maximum 1-2 day/week–maximum 15-minute irrigation cycle; avoid watering between 10 AM and 6 PM to avoid evaporation losses.
  - B. Localized audit and leak detection programs for home use. Training for this type of program would be established and supported through statewide efforts and local municipality endeavors.
  - C. Rebates for removal of irrigated turf that is replaced by non-irrigated ground cover
- Incentives to support ABCs: local authority to establish water waste ordinances, prohibition on irrigation run-off, irrigation shut-off authority for water suppliers (users who violate irrigation guidelines), surcharge for use of irrigation system (low=manual, high=automatic), pool cover rebates, bill credit for properties with native/adaptive-only landscapes. (See Appendix B for sample ordinances.)

#### Irrigation Water Users (Golf Courses and Playing Fields) ABCs

- A. Voluntary watering schedule based on customized water budget (standards to be determined)
  - B. Rebates for removal of irrigated turf that is replaced by non-irrigated ground cover, efficient irrigation systems, ET controllers, and the like
  - C. Highest rebate for establishment of non- or minimally-irrigated native/adaptive landscape
- Incentives to support ABCs: local authority to establish water waste ordinances, prohibitions on irrigation run-off, irrigation shut-off authority for water suppliers (users who violate irrigation guidelines), bill credit for properties with native/adaptive-only landscapes, awards programs

#### Industrial, Commercial and Public/Institutional (ICI) ABCs

- A. Water audits of all state and municipal buildings and implementation of efficiency measures within 3 years
  - B. ICI audits and on-site leak repair
  - C. Rebates for installation of re-circulated cooling and heating systems, process water reuse, and other top water-using activities; Restaurant pre-rinse valve program [*California Urban Water Conservation Council model*]
- Incentives to support ABCs: prohibition on once-through cooling systems, warning notice (& possible fine from local jurisdiction) for neglected leaks, surcharge for non-efficient irrigation systems, loans and rebates for ICI water efficiency projects, demonstration projects, technical seminars, awards programs

#### Agricultural Irrigation ABCs

- A. Use of Best Management Practices
  - B. Use of existing mobile irrigation labs to conduct on-farm water audits
  - C. Low-interest loans and rebates for installation of efficient irrigation equipment
- Incentives to support ABCs: equipment loans, assistance to maintain on-farm 80% irrigation efficiency goal

### **Assistance with Conservation ABC's**

Support for water suppliers to enact Conservation ABC's, involves extensive management and coordination among groups of many diverse users. Some of the supports envisioned by the Conservation stakeholder group consulted during this process are:

- Workshops for water suppliers on how to plan and implement water conservation programs
- Workshops for *rural* water suppliers on how to plan and implement water conservation programs, with specific emphasis on small system program planning, leakage reduction, and rate design
- Technical seminars targeted at large users, i.e., irrigators, industries, public institutions
- Web-based content and downloads (conservation planning guidance documents, information about water conservation measures and practices, etc.)

### **STRATEGIES FOR WATER CONSERVATION IN ARIZONA**

If Arizona is to achieve substantial water use reductions comprehensive strategies need to be designed and implemented to achieve the goals and implement the recommendations set forth in this plan. Issuance of a Drought Plan and Water Conservation Strategy may signify the start of strategic intention. But strategies evolve or adapt on the basis of experience during implementation. Similarly, strategies must be integrated to achieve success. The framework for strategies articulated in this document serve as tools to achieve the efficiency benchmarks once established. They include the following:

- ❑ **PLANNING**
- ❑ **PROGRAMS**
- ❑ **PUBLIC EDUCATION**
- ❑ **SCHOOL EDUCATION**
- ❑ **FUNDING**
- ❑ **POLICY**

The following sections of the document serve to outline the different programs that already exist within the state but may not have

significant reach at the present time in addition to the need to establish for new programs as tools for communities and/or individuals to use water more efficiently.

## **PLANNING STRATEGIES**

Continued oversight of conservation efforts is needed to achieve measurable outcomes and maintain the commitments established through this initial effort. A successful effort will go beyond just the initial strategic planning phase. Implementation of programs, education, funding and policy decisions will take place over several years and there will be a need for monitoring, oversight and continued funding of this effort. Ensuring the efforts continue in the right direction involves continued planning, guidance and program structure. With that in mind the following planning strategies are offered for consideration and comment.

- **Create an Office of Water Conservation Management**

An AWWA Survey of State Water Conservation Programs concluded that one indicator of a state's commitment to conservation is whether there is an office responsible for implementing or coordinating the state's conservation programs. The survey, conducted in 1997, showed at the time 39% of the states had an Office of Water Conservation or an equivalent, (which may have increased given the elapsed time and national drought impacts). Additionally, the survey recommended the Office of Water Conservation be integrated with water planning functions of the responsible state agency. The survey's author, Joseph Miri, PhD of the NJ Department of Environmental Resources, focused on state government as the "preeminent authority" for the water conservation. His rationale cites that the state's role in hydrologic planning and management powers helps focus conservation where it can yield the most resource management benefit – "and where conservation will be most likely to succeed."

- Establishment of an **Arizona Water Resources Council**.

This Council's purpose is to guide and offer recommendations to the Governor and Legislature for the content and scope of water resources within the state. The concept for a Council is modeled on the state of Georgia where water providers and state agencies pursued area and statewide Drought and Conservation efforts in the past few years. Their work culminated in a Comprehensive Water Resources Management Plan. The Council, comprised of experts in their fields and members from the departments of Environmental Protection, Natural Resources, Community Affairs, Soil and Water Conservation, Georgia Environmental Facilities Authority (financing of state revolving

funds), Human Resources, Agriculture and Georgia Senate and House representatives could be adapted to include the major water providers and water affiliated agencies within Arizona. The Georgia Council's initial agenda items involved implementation of their Drought Management Plan adopted in the spring of 2003; and development of agency-specific water conservation programs.

<http://www.gadnr.org/gwrc/gwrc.html>

- **Create A Water Conservation Advisory Task Group**

Conceived as a working advisory group on implementation of conservation programs, a Water Conservation Task Group would monitor the progress, continually enhance and guide implementation of conservation efforts within the state. Planning efforts for this strategy required bringing together various stakeholders groups. An initial brainstorming session with conservation stakeholders throughout the state was held to obtain feedback on what measurable outcomes should result from this process.

The stakeholder group consisted of conservation staff from municipalities and agency representatives, (Department of Water Resources, Bureau of Reclamation) watershed groups, water educators, etc. This process revitalized interest in developing conservation programs among local, state and federal agencies. Representatives from several agencies also assist in efforts and have taken the lead for the state in working with the U.S. E.P.A. in their water efficient product labeling discussions to establish water conservation devices similar to the "Energy Star" label program. The conservation stakeholder group should form the basis of an long-term Advisory Group (incorporating stakeholders from all water use sectors, business leaders, public media representatives, rural watershed managers, etc.) to help gauge the success of conservation efforts and aid in the implementation of new programs.

Consideration is being given to how best to structure the group (e.g. municipalities, water providers, individual stakeholders and rural communities, etc.) that would meet to identify best practices, communicate needs and further the adoption of conservation measures across the state.

There is also interest in state conservation circles to establish a **Youth Advisory Council**. Such an effort would offer opportunities to junior high and high school students to assist in planning water conservation projects in their local communities, as students will likely be the decisions makers of the future. A conservation merit badge or patch could be earned by groups such as the boy and girl scouts, and other youth organizations by completing a water conservation project for their school or community. Each successful patch recipient would have

to follow certain project criteria and provide an estimate of water savings. Both the U.S. E.P.A. and the San Diego County Water Authority have established similar programs to engage youth organizations in conservation efforts.

### **Focus On Partnerships With An Emphasis On Rural Areas**

Creation of a statewide conservation strategy requires the involvement of stakeholders and working with federal, state and local agencies to achieve a consistent water conservation message and acceptance of a new conservation ethic for the state. Thus far, stakeholders throughout the state have been invited to participate in this effort, but the input from smaller communities of the state has been limited. Efforts to reach rural and outlying areas and evaluate the needs of the rural areas in terms of conservation efforts and basic information needs should be stepped up.

The Rural Watershed questionnaire conducted by the ADWR in 2003 revealed that many smaller communities had very limited conservation resources. At a very basic level, there was a need for conservation printed materials, access to information about rebate programs and ordinance development, and also the need for program development and educational materials for teachers and students.

Existing efforts have been successful in large degree to the development of cooperative conservation partnerships and citizen participation. Local communities have worked with their water providers/municipal water conservation offices to develop community based conservation efforts. Water conservation plans should be drafted with buy-in from the communities and implemented to the extent that resources are available. There may be great differences in each community's ability to carry out programs. Developing a symbiotic relationship at the local level may foster a greater acceptance of voluntary reductions and any changes to rates, if necessary.

A statewide conservation program can be successful if local approaches are considered and communities have the flexibility to adopt programs or measures that best meet their needs. There is a need for real time conservation information and water savings based on "good science". The following is a list of groups that have an established framework for disseminating information. These groups can act as education liaisons in local communities and provide needed resource materials.

- **Arizona WET Facilitator Network:** Arizona has trained 101 facilitators to provide Project WET workshops throughout the State of Arizona. The Facilitator network is comprised of educators,

water resource managers, conservation specialists and watershed representatives. Three networks (northern, central & southern) were formed with the intent of extending the reach of area specific Project WET workshops on a statewide basis. This network assists with community related water projects, water festivals, educational fairs and potentially could be used to support a statewide audit training program.

- **Master Watershed Steward (MWS) Program:** The University of Arizona Cooperative Extension in cooperation with the Arizona Department of Environmental Quality is in the process of developing an MWS program. Pilot programs have been operating in two Arizona counties. The goal of the MWS program is to “educate, and train citizens across the state of Arizona to serve as volunteers in the monitoring, restoration, conservation, and protection of their water and watersheds.” (Emanuel, 2004) This program could serve as the vehicle through which needed water conservation information is distributed to the 17 watershed groups in the State.
- **University of Arizona Cooperative Extension Offices:** County Cooperative Extension Offices currently provide educational information on a variety of topics. Strengthening the water conservation component of their outreach to residents would be very worthwhile. Cooperative Extension Offices would be a logical repository for water resource and conservation information. The Cooperative Extension Offices offer “**Water Wise Services**” which are available free of charge. Water Wise Bulletins on a variety of topics and include low cost suggestions for reducing water usage.
- **Rural Watershed Alliance** The ADWR is responsible for, and committed to, non-regulatory water resource planning statewide. The ADWR has assisted citizen organizations and local governments by providing technical information and analysis, administrative support and advice on water issues

## **PROGRAM STRATEGIES**

The concept of water conservation is not new, however, there are differences between conservation programs and conservation measures. Successful conservation efforts consist of both. Measures either actually save water or help us to use water more efficiently. Incentives encourage water users to adopt specific conservation measures. (Vickers, 2001) Evaluating the merit of the existing

measures and programs is not the intent of this document although studies in this regard have been conducted. The selection of the following program strategies is based on industry perspectives and state specific needs.

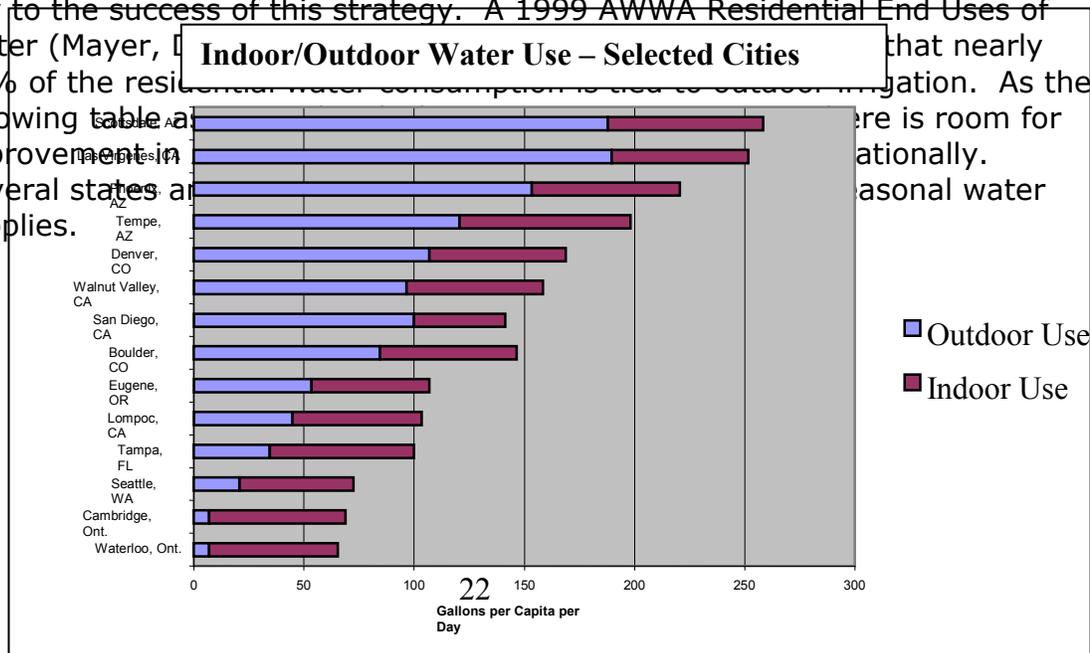
• **Achieving Outdoor Water Use Efficiency**

As previously detailed in the benchmark and Conservation ABC's, the greatest potential for water use savings in Arizona are to be gained through reductions in outdoor water use. Several states have adopted various types of outdoor watering schedules including odd/even day watering to time of day restrictions.

**Recommendation:** Focus our statewide efforts on reducing outdoor water use. The implementation of benchmarks should begin for summer 2004:

- Efforts for the summer of 2004 should focus on voluntary reductions in discretionary outdoor water uses up to a 50 % reduction for residential users
- All state agencies to reduce total water use by 5%
- Reduction or eliminate non-essential water use (fountains, misting systems, car washing, sidewalk washing, etc.)
- Encourage public and private water utilities in the State of Arizona to: Minimize waste of all water supplies by improving distribution system efficiencies, immediately repairing leaks, and reducing unaccounted for water (lost water) to 10%
- It should be noted that some regions of the state have already implemented voluntary, mandatory or both types of measures and may not be able to achieve this degree of reduction, should this be the case, these communities should voluntarily implement other measures based on local conditions and available supplies.

**Rationale:** Achieving measurable water savings for the state of Arizona is key to the success of this strategy. A 1999 AWWA Residential End Uses of Water (Mayer, [redacted]) that nearly 60% of the residential water consumption is used for outdoor irrigation. As the following table and chart show, there is room for improvement nationally. Several states are conserving water seasonally.



Source: Mayer 1999

**Figure 2. Comparison of Cities Indoor/Outdoor Water Use**

- **Audits, Leak Detection and Repair Program**

**Recommendation:** Establish a statewide audit training program provided free to rural communities and investigate needs for leak detection equipment. Identifying leaks/inefficient uses and remedying these problems will provide water savings to meet benchmarks for unaccounted for water (UFW).

**Rationale:** Audit programs provide a means to detect leaks, metering problems and lost and unaccounted for water (UFW). This is a key area where home owners and water providers can become more efficient. UFW generally falls into three separate categories: Real losses due to leaks or theft, apparent losses tied to metering or accounting errors and beneficial uses like un-metered uses for fire fighting and construction. A state audit program should focus on losses due to leaks and apparent losses tied to metering difficulties.

Leak noise correlation equipment and radar detection devices are newer technologies for pinpointing leaks in buried pipe and confirming locations audibly prior to often expensive excavation and repair. Rural water providers and towns are hard pressed to procure equipment for audits performed only periodically. If funding were available to pool use of equipment by trained technicians or establish a mechanism to cost share on a regional basis, significant savings in UFW could be realized.

- **Local Retrofit or Rebate Programs Based Upon Sector Need**

**Recommendation:** While various communities in the state have yielded savings through retrofit/rebate programs of predominately

interior fixtures, these savings are ultimately achieved over time through aging and replacement. Arizona Revised Statutes, Article 12, §45-312 and §45-313 outline the water saving performance standards for plumbing fixtures in residential, commercial, industrial and public construction. The focus of our conservation efforts should encourage the use of the best available technology for irrigation of residential landscapes and large industrial turf facilities.

Retrofit programs and rebate programs for new technologies should be considered based on available funding and community needs. Some communities may benefit from organized rebate/retrofit programs. Particular communities or industry sectors may have substantial potential for water savings.

The City of Payson completed a toilet replacement program through a cost share with the U. S. Bureau of Reclamation. Payson replaced 700 pre-1991 toilets with 1.6 gallon Toto toilets.

One of the latest technologies for the food service industry is a pre-rinse spray nozzle that saves both water and energy. Pre-rinse spray nozzles are used to remove significant amounts of food on plates prior to being thoroughly cleaned in restaurant dishwashers. Retrofit programs of this type are successfully being carried out in the states of California and Washington. In Arizona, it is possible that this type of program could be tied to our restaurant table tent program as an additional measure that restaurants could have in place to save water.

**Rationale:** Some manufacturers of the above systems have partnered with utility companies to promote their water and energy savings and in some cases have even offered discounts to utility customers that purchase the systems.

- **Metering and Billing**

**Recommendation:** Encourage universal metering of systems.

**Rationale:** The implementation of rate structures is not as effective of a conservation measure if the sources are not adequately metered. The water provider responses (by County) to the Rural Watershed Questionnaire (Jacobs, 2003) showed that 70% of respondents metered their pumps, 67% metered their delivery connections and only 19% metered their domestic connections. It should be noted that both Phoenix and Tucson numbers are not reflected here but both have metering programs.

The need for localized conservation programs is tied to giving each community the flexibility to select programs that best meet their needs. Responses from water providers in rural Arizona to questions posed in the Rural Watershed Questionnaire showed "there is a high degree of interest in conservation as a water management tool". (Jacobs, 2003) However, many providers do not have the resources on their own to establish programs and need both technical and financial assistance to offer incentives for deployment of new technologies.

The following lists available and newer technologies for indoor and outdoor water use reduction and may serve as candidates for rebate, retrofit and/ or local building or construction ordinances:

### **Best Available Technologies For Outdoor Water Use:**

#### Evapotranspiration (ET) based irrigation controllers

Significant outdoor water use reductions can be achieved through the use of new and emerging technologies such as ET controllers. Potentially from 10-50% of landscape water currently being applied could be saved using this technology in coordination with site audits and water budgeting programs. (Ash, 2002) In regions of the state where the predominant landscape type is turf, the target for reduction should be irrigation efficiency improvements.

The use of weather-based irrigation scheduling through the use of ET (evapotranspiration) irrigation controllers, can reduce the use of residential use and the water use at large turf facilities (golf courses, schools, parks and cemeteries). This technology uses information from a local weather station or satellite signal to create an irrigation schedule based upon real-time changes in the local weather. The cost associated with this technology may be better suited for commercial application (Irvine study, Hunt & Lessick). However, many new products are currently coming to market that are more cost-effective in the residential setting. This study also found that this type of technology not only yielded water savings but also reduced intervention from the resident.

#### Rainwater Harvesting Systems

Water harvesting is the capture, diversion, and storage of rainwater for plant irrigation and other uses. It is appropriate for large-scale landscapes such as parks, schools, commercial sites, parking lots, and apartment complexes, as well as small-scale residential landscapes. A rainwater harvesting system has three components 1) the supply (rainfall), 2) the demand (landscape water requirement), and 3) the system that moves the water to the plants. Storage is an additional element that is optional. Systems can be simple or complex, using

gutters and swales to channel rainfall to plants or can incorporate storage such as rain barrels or cisterns. More detailed information on how to build a rainwater harvesting system can be found in *Water Harvesting for Landscape Use, a University of Arizona and ADWR publication, second edition 2004.*

Metropolitan Water Improvement District in Tucson, Arizona currently offers a \$50 rebate to customers installing rainwater harvesting systems and a \$50 rebate for graywater reuse systems.

#### Graywater reuse systems

In 2001, the Arizona Department of Environmental Quality (ADEQ) issued new regulations for the use of residential graywater. It is now legal to use graywater from your clothes washers, bathtubs, showers and bathroom sinks without applying for a permit if the household generates less than 400 gallons of graywater per day (20-25 gallons per day per resident is a good estimate). For more detail on ADEQ regulations and how to build a graywater system refer to *Graywater Guidelines*, The Water Conservation Alliance of Southern Arizona (Water CASA) or visit: [www.watercasa.org](http://www.watercasa.org).

Rebate programs can be initiated by water providers or local jurisdictions in an effort to encourage installation of graywater systems. Local jurisdictions could require installation of graywater plumbing in new residential construction in order to receive a building permit.

### **Best Available Technology For Indoor Water Use**

#### Re-circulating Hot Water Systems

Significant water savings can be realized through the installation of re-circulating hot water systems in homes, apartment complexes and commercial buildings. Especially, when hot water has to travel a significant distance to the farthest fixture. According to manufacturers estimates the average home wastes between 11,000 and 15,000 gallons of water every year as people wait for hot water.

These systems consist of a loop from the water heater to the farthest fixture, often with a pump installed between the hot and cold water lines at the faucet farthest from the water heater. The pump pulls the hot water down the hot water line while at the same time returning the cold water in the line to the hot water heater. By re-circulating the cold water, rather than letting the water run down the drain while waiting for the water to heat up, all the water in the pipes that would otherwise be wasted is saved. Systems can be designed-in, as a

component in new construction or added to existing homes and buildings later.

Local jurisdictions or water providers could require these systems be installed in all new construction, as a condition of new service, or could provide rebate programs for retrofits of existing homes and buildings. Some manufacturers of these systems have partnered with utility companies to promote their water and energy savings and in some cases have even offered discounts to utility customers that purchase the systems.

#### Tankless/Instantaneous Water Heaters

This type of water heater does not have a storage tank, and gas models often don't have standing pilot lights, thereby saving energy. These units provide unlimited instantaneous hot water and can be located at the point of use (e.g. under the sink or next to a bath or shower). However, they do require a minimum flow rate to turn on and the higher the flow rate the lower the temperature. Therefore, using large amounts of water simultaneously such as running a washer and showering is not recommended.

#### H-axis (front loading) Washing Machines

The h-axis "tumble action" washer requires the washer tub to be only partially filled with water for proper cleaning action unlike the typical vertical axis washer (standard top loading) that has a central agitator post and must have its wash tub filled with water to cover the laundry items. The partial filling of the h-axis washer's tub results in less water use, resulting in less energy needed to heat the water.

Replacement of only 300 standard washers with h-axis washers would equate to a savings of approximately 6 acre feet per year (1,918,800 gallons). That's enough water to meet the requirements of 48 persons per year @ 111 gallons per capita per day (gpcd). The estimated reduction per household (2.4 persons per housing unit) is 7 gpcd on an annual basis.

#### Laundromats and Common Area Laundry Rooms

Tax credits could be given to Laundromats and Common Area Laundry rooms in multi-family housing that replace older high water using washers with low-water-using models. Although these machines cost about a third more than other models they save money and water over time. Front loading models save about 40% of the water over the less efficient agitator models. Each machine can average 8-10 washes per day, which can result in significant water savings. Common Area Laundry rooms save 3.3 times the water over in-unit washers for more information go to: [www.laundrywise.com](http://www.laundrywise.com)

### Water Conserving Dishwashers

High performance dishwashers can save up to 1,000 gallons of water per year. (Source Oregon Office of Energy)

### **Rate Restructure**

Much is written about increasing water rates to stimulate conservation. Stallworth, an economist for the Environmental Protection Agency (EPA) finds "Water and wastewater demand can be manipulated by price to some degree. Water for necessities (sanitation, cleaning, and cooking) is far less responsive to price than water for more discretionary uses (lawn watering, car washing, and swimming pools)." Vickers in her text Handbook of Water Use and Conservation indicates "low and middle income residential users tend to be sensitive to the price of water.... affluent homeowners are sometimes indifferent to the cost of water and may curb waste only if they are required to do so by law..." or by education. Beecher's review of over 100 studies of the price elasticity of demand with the following conclusions (Beecher 1994):

- The most likely range for elasticity of residential water demand is -0.20 to -0.40, meaning a 10 percent increase in price lowers demand by 2 to 4 percent; and
- The most likely range for elasticity of industrial demand is -0.50 to -0.80, meaning a 10 percent increase in price lowers demand by 5 to 8 percent.

The American Water Works Association Manual, an authoritative source for ratemaking throughout the United States, classifies the most common types of drinking water rate structures as including:

**Declining Block Rates** – Rates applicable to increasing usage where usage for each succeeding block is charged a lower unit rate than in the previous blocks. Successive block rates apply to a greater volume of water delivery than the preceding block.

**Uniform Volume Rates** – a single charge per unit of volume for all water used. Rates are the same for all users or class of user regardless of level of consumption.

**Inverted or Increasing Block Rates** – Rates applicable to blocks of increasing usage where use in each succeeding block is charged at a higher unit rate. Generally, each successive block rate may be applicable to a greater volume of water delivery than the preceding block.

**Seasonal Rates or Off-Peak Rates** – Rates based on the cost of service variations due to system seasonal requirements. For example, higher rates may be charged during the summer months when a system peak occurs (e.g. outdoor lawn watering), requiring facilities not needed to meet lower winter loads.

The AWWA’s 1998 survey of the residential rate structures of 827 utilities shows approximately 22 percent employing increasing block rates and only 2 percent employing seasonal rates.

<http://www.awwa.org/bookstore/product.cfm?id=30001>

Recent trends among other states developing and implementing Drought and /or Conservation Plans show accelerating adoption of conservation pricing strategies. For example:

- Utah’s Drought Plan implemented in 2000 charged water providers and municipalities to develop conservation plans and review conservation pricing strategies. By 2002, Utah stated that over 25% of providers use conservation based pricing.
- Georgia in a 1989 report showed that 87.5% of the state’s systems used a declining rate structure and only 6.4% an increasing rate. By 1996, only 20% used a declining structure with 59% using a uniform rate, and 8% used an increasing structure with the remainders flat rate.
- The **Denver Water Board** approved in May of 2004 a drought surcharge for residential customers citing “because of the recent drought and the continuing below normal reservoir levels... one way to ensure that everyone saves water is to charge more for water until the drought is over and reservoirs fill to normal levels.” Within the city an inverted block rate structure details the following rates:

Inside City Rates*	
Block 1	\$1.63 Block 1 = 0-22,000 gallons
Block 2	\$1.96 Block 2 = 23,000-60,000 gallons
Block 3	\$2.45 Block 3 = Over 60,000 gallons
Service Charge	\$4.91

- A portion of the surcharge will be allocated to fund a customer rebate program for high efficiency washers, soil amendments, large landscape audits and pressure-assisted toilets ranging potentially from \$15 - \$1000 for a 2 month summer period if approved by the Water Conservation Authority. Source: [www.denverwater.org](http://www.denverwater.org)

**Recommendation:** Encourage inverted block and seasonally adjusted rate structures and review of rates for Arizona municipalities and water providers as a conservation incentive to reduce water use. Conduct Conservation Rate Pricing Workshops for Municipalities and Water Providers via Technical Assistance Grants with a focus of support for rural areas.

**Rationale:** Increasing the cost of water acts as a disincentive to use. The use of rate structures as an incentive to save water is not new. While several larger cities in Arizona do have seasonally adjusted or inverted block rate structures in place, data suggests that rate structures in Arizona have a wide variability in pricing range and opportunity for rate restructure. A comprehensive study commissioned by the Arizona Water Infrastructure Finance Authority (WIFA) provides a Rate Structure Survey Summary for 2003 of 400 water providers in the state. (See Attachments 3-4). The average monthly charge by Arizona water providers for a standardized study use of 7,750 gallons/month is \$30.16 with a range of \$5.61 to a high of \$99.60. A median of \$28.01 suggests that 50% of the water providers' rates are from \$5.61 to \$28 per month for the study volume standard and 50% of the rates range from \$28 to \$99.60.

A summary of the Rural Watershed questionnaire showed that of the water providers that responded to the question about conservation rate structures only 28% had implemented an inclining rate structure (incentive to conservation) and 76% had declining, flat or no rate structures.

While the focus of this document on a Conservation Strategy for Arizona is to invite public comment on conservation measures and programs, an equally important reason to consider applying conservation-based rate structures now is to safeguard the future. In a report issued by the EPA's Office of Water, capital infrastructure needs, supplied nationally by Clean Water and Drinking Water State Revolving Funds (CW/DWSRF), for water and wastewater systems were projected for the next two decades. In present value terms, funds needed for both water and wastewater systems over the next 20 years approach a half trillion dollars nationally (EPA, *The Clean Water and Drinking Water Gap Analysis*, 2002). Conservation rate strategies serve as incentives to reduce water use, and self fund additional conservation measures which, in turn, could serve to cost-avoid or extend capital and maintenance improvements for infrastructure.

A more critical need for rate restructure may very well be revenue generation to offset future costs for water providers faced with economic and population growth, aging plants and pipes, and tighter environmental regulations (e.g. new arsenic water quality standards). In Arizona for 2003, WIFA had 52 grant/loan requests for capital infrastructure improvements of \$149M and funded \$36M under the CWSRF. The DWSRF requests totaled 55 applications totaling \$101.8M of which 11 were funded for \$14.6M. Clearly with less than 25% of annual requests for infrastructure improvements met through CW/DWSRF sources, the cost burden falls to municipalities and water providers to go to bond markets for money, develop user fees and/or restructure water rates. While conservation based rate restructure is desired to promote water use reduction, it is not the sole driver prompting restructure of water rates.

## **Benefits / Challenges Associated with Conservation-Based Pricing**

Conservation based pricing has a fairly well defined set of benefits and challenges that require a listing in lieu of discussion in this report.

The benefits can be summarized as:

- Preserving water resources
- Promoting efficient use of water
- Reducing seasonal peaks
- Surcharging techniques for excessive users or to meet seasonal demands
- Reinforces additional conservation measures
- Reinforces other conservation customer behavior
- Revenues self-fund other conservation measures (i.e. metering, improved water accounting, leak detection, water-use audits, retrofits, reuse and recycling, and landscape improvements)

The challenges or objections can be characterized as:

- Negative impacts on customers – (particularly lower income)
- Difficulty on application of rates across all user classes – Residential, Commercial, Industrial, Agricultural
- Difficulties in predicting customer demand
- Challenges to rate structure methodologies – for urban, rural and regulatory impacts e.g. Arizona Corporate Commission regulation.
- Possible instability of revenues
- Impacts on existing billing and administrative procedures

Discussion of these items are addressed in

[http://www.epa.gov/water/infrastructure/pricing/PDF/waterpricing\\_fin al2.pdf](http://www.epa.gov/water/infrastructure/pricing/PDF/waterpricing_fin al2.pdf)

## **Private Water Companies and the Arizona Corporation Commission (ACC)**

Some municipal providers in AMAs regulated under ADWR's Municipal Conservation Program are privately owned companies separate from the city, town or county in which they are located. While local plumbing and landscape ordinances may apply within the private water company service area, the water company itself lacks the authority to enact ordinances regulating water use by its customers. In addition to being regulated by the ADWR, private water companies are regulated by the Arizona Corporation Commission (ACC). The ACC monitors the operations of approximately 350 private water utility companies throughout Arizona, reviewing company financial records and recommending revenue requirements and rate and charges to be

collected. The regulatory responsibilities of the ACC are fully defined in Article XV of the Arizona Constitution and §§40-201, *et seq.*, Arizona Revised Statutes (including A.R.S. §40-250 requiring that all public service corporations obtain ACC approval before establishing or changing any rate).

There are numerous opportunities for the ACC to have a prominent role in the new statewide conservation strategy, and the ACC staff have indicated a willingness to assist on multiple fronts.

## **EDUCATION STRATEGIES**

“Education programs are by far the most common demand-side water use efficiency measure in the Southwest”. (Western Resource Advocates, Smart Water, 2003).

Education about the need for and methods to employ water conservation measures will be provided to school districts, water suppliers and the public alike. Water education is key to reducing the demand for water and providing a sound basis for water management decisions. While education should not be the only component of a water conservation program, it should certainly be a cornerstone. Education programs can be relatively inexpensive to initiate compared to the cost of many demand side measures. Some of the benefits to developing an education program include providing a necessary foundation for creation of other programs, raising water supply awareness, creating the basis for water use behavioral changes, and enhancing stewardship of a valuable resource. Education Programs will be separated into Public Education and Awareness and Teacher/Student School Education Programs.

### **Public Education & Awareness:**

- **Creation of a State Sponsored Conservation Web Page**

**Recommendation:** Development of a state sponsored web page to disseminate real-time water conservation information to the public.

**Rationale:** The Internet has become a primary source of information for people of all ages. There is a need for a central source of conservation information. A state sponsored website should be created and dedicated to providing up to date information on existing programs, technology advances and sources of funding. Several states have developed websites tied to the conservation programs developed within their states or various locales. The Utah site

<http://www.utahwater.gov> is an example of the type of informational site that Arizona should develop.

- **Media Program-Water Conservation Messaging**

We need to provide a consistent water conservation message to the public. Water resource education is critical to the future of Arizona. It is important to create an awareness of water use for all ages. Water conservation should be a practice, not just an ethic we promote. We have formed the basis for a sound media-messaging program through creation and continuation of the Water, Use It Wisely Program and the Arizona Restaurant Association Table Tent Program.

**Water, Use It Wisely (WUIW):**

The Water Use It Wisely Program is a water conservation advertising campaign. Valley water providers consistently heard from their customers, "Stop telling us to save water, show us how." In response to this request, the City of Mesa in coordination with Park & Co., a Phoenix based advertising firm created the WUIW program. The State, BOR, CAP, SRP and many valley water providers support this program. The campaign ads promote simple, but tried and true water conservation messages provided in an appealing & contemporary package. Primarily a television campaign, the messages better define the amount of potential water savings for each measure.

The value of television advertising versus the value of other communication mediums has been debated. To date, media dollars have been spent on television because of its strength relative to other media and the cost efficiency it affords because of its broad geographic range. Television signals span a larger geographic area per station than signals of radio stations, allowing advertisers to reach wider audiences over greater distances. The Phoenix TV market encompasses over ten counties in the state. Station signals from Phoenix reach the northernmost sections of the state as well as counties to the south, east and west to Riverside County in California. In contrast, if we were to use radio and or/newspaper to reach these outer areas, we would need to purchase airtime and ad space on numerous local stations and papers to equate to the reach of television. (Park & Co, 2003)

Qualitative Media Research is conducted each year to evaluate the effectiveness and recall of the campaign messages. Television is the most widely used medium – the average adult spends more time on a weekly basis than other media: 31.5 hours vs. 18.9 for radio listeners. In comparative studies, respondents scored television the most persuasive of all media (Veronis, Suhler & Stevenson, 2001)

## **Arizona Restaurant & Hospitality Association (ARHA) Table Tent Program**

A spin-off to the WUIW program is an effort supported by the ARHA, the SRP, ADWR and others to provide table tents to restaurants statewide. The message is clear, more water is used to clean each glass of water than serve to each customer. The notion of only providing water upon request may not be new for some states, however, this program has created and greater awareness for owners and patrons.

There is also a need to work with local media personalities, specifically meteorologists to encourage the communication of a consistent water conservation message to the public, as it pertains to changes in weather and irrigation scheduling.

**Recommendation #1:** Create partnerships with meteorologists, state climatologists and other willing parties to establish water conservation efforts in the public interest.

**Recommendation #2:** Continue efforts to focus existing messages on specific conservation measures, create a greater call to action.

**Recommendation #3:** Pursue additional public interest and paid media opportunities (television, print, outdoor and radio); Develop partnerships with regional businesses for cost sharing and promotion of water conservation campaigns.

## **Teachers/Student Education Programs**

- **Develop a State Water School Education Program for Arizona with a clear mandate for Water Education**

At the present time State school districts incorporate limited water education components into individual teacher lesson plans. There has not been a clear mandate to teach about water resources with the AIMS test focus on reading and mathematics. The opportunity to publicly review the draft Arizona State science standards provided an opportunity to propose an appropriate education program as part of this statewide strategy that would provide teachers with tools to meet the new standards. The new science standards were adopted March 24, 2004 and Arizona testing is due to come "on-line" in 2006.

- **Provide every 4<sup>th</sup> grade teacher with a copy of the National Project WET Curriculum & Activity Guide**

Given a mandate for water education and incorporating the topic into the State Education Standards, teachers will need the proper tools to meet this challenge. The National Project WET curriculum and Activity Guide Sampler will introduce teachers to sound water education

principles and illustrate how this can become a companion piece to existing curricula. Fourth grade is being proposed as a starting point for this effort. It is generally held that once students reach fourth grade they are able to understand more complex topics and make logical ties between concepts learned in earlier grades. (Kaufmann, 2004)

- **Provide every 4<sup>th</sup> grade student with a copy of the student booklet "Waters of Arizona" (currently being developed).**

There is no definitive source of Arizona specific water resources printed material for school children that provides an overview of the sources of supply. Educating residents about the state's water supply and its ability to sustain future generations is greatly needed.

- **Expansion of Project WET (Water Education for Teachers) Curriculum**

This curriculum is the core of the Phoenix water education program following the review of more than 50 local, state & nationwide water curriculums. At a state level, the ADWR adopted Project WET in the year 2000 as its K-12 water education program, and helping to sponsor this program statewide through free teacher workshops. While the reach of Project WET, is growing throughout the state, there still remains no clear mandate for water education. Available Project WET Materials include: *Project WET Curriculum and Activity Guide*, *Conserve Water Educators Guide*, *Wow, the Wonder of Wetlands*, *Healthy Water, Healthy People Activity Guide*, *Colorado River Watershed Guide (in production)*, *Kids in Discovery Book Series*

- **Student Outreach Efforts:**

- Water Festivals

In cooperation with many local, state and federal agencies the annual "Make A Splash with Project WET" Water Festivals are hosted for fourth grade students in coordination with National Water Education Day. Fourth grade students learn about the water cycle, water conservation, watersheds/surface water supplies and groundwater.

- Arizona Science Center Exhibit

The University of Arizona Water Resources Research Center/Project WET and the ADWR are actively working with the Arizona Science Center to create an interactive water conservation exhibit. The Science Center has more than 300 interactive exhibits and receives thousands of visitors each year. The newly created display will be designed to teach students about the history of water use in Arizona and the need for water conservation.

- Central Arizona Project (CAP) Education Program

The Central Arizona Project has developed "H2O for Kids" (grades K-3). This program consists of the teacher's guide and lesson plans

focusing on the history of water in Arizona and water conservation. The program, "Arizona Water Story" (grades 4-8), consists of a teacher's guide, lesson plans and a 3-part video.

- Salt River Project (SRP) Educational Materials

Salt River Project provides teacher and student materials and posters detailing the Salt River system of reservoirs that provide water to the valley for irrigation and power generation.

- Arizona Water Map

Produced by the University of Arizona Water Resources Research Center in coordination with the Bureau of Reclamation, the Arizona Water Map provides an overview of Arizona's water resources, uses by sector and a water resources timeline.

**Rationale:** Water education for all Arizona's schoolchildren is key. There is a clear need for Arizona residents to understand the extent of their water resources. Arizona is in the sixth year of a long-term drought. A water conservation ethic and implementation of sound practices is long overdue. The first step in instituting change is raising awareness. Heightened awareness should be followed by targeted education and a long-term commitment to improve water efficiency.

## **FUNDING STRATEGIES**

The objective of this section is to list "best alternatives" for funding sources to affect positive outcomes for water conservation in Arizona. Some of these alternatives such as establishment of a Water Conservation Trust Fund, Tax Incentives and Tax Credits will require further assessment for feasibility that will continue beyond this initial report. Public comment is invited on the alternatives detailed at the end of this section and other constructive ideas on funding support. An accompanying Appendix (Appendix C) offers some strategies and structures considered by other states to fund and provide ongoing support for their conservation actions and programs.

While ADWR and municipalities share a commitment to address and respond to drought emergencies, adoption of strong conservation measures by municipalities, industries and the public is a function of a few key factors:

- successful programs targeted to educate and reduce water use,
- voluntary and mandatory reduction goals and measurements
- and most importantly, the necessary funding.

Future success of water conservation efforts in Arizona is largely dependent on incenting municipalities, water providers and the public to adopt a "water conservation ethic." Public awareness and education, advertising, deployment of new technologies for water efficiency, rebate programs, audit and leak correction, to cite just a few of the programs detailed in this report, encourage the behavioral changes necessary to affect positive and measurable outcomes to conserve water. State government should evidence leadership and levels of appropriate financial support to enact results. But programs cost money.

An AWWA Survey of State Water Conservation Programs (Miri 1997), cited the highest reported state funding total for conservation was \$13M in California followed by \$6M in Montana; \$1.3M in Arizona, with the median of \$.490M for the states reporting. "the most common sources of funding for the {conservation} office was the state general fund followed by a combination of state general funds and bond funds or fees."

ADWR's budget for water conservation is largely secured through groundwater pumping fees established via the Groundwater Management Act of 1980. In Arizona municipalities, sometimes in concert with ADWR and federal agencies such as the Bureau of Reclamation and often pool monies and provide their own limited, funding resources to promote public water conservation efforts. While the efforts of the municipalities and ADWR are noteworthy in that collaboration and partnering allows sustainability of the key programs, the effort is ad-hoc and funds are limited. Currently, the municipalities involved in the Water Use It Wisely ads share funding, input and redirection for the program with the advertising agency in a collegial manner. It is with this method of mutual benefit that future programs and conservation goals should be addressed.

One might question whether water conservation and reduction programs should be funded at a state or local level – the answer is both. Local municipalities fund, implement and promote many successful conservation efforts with limited financial resources. However, ADWR envisions that any monies appropriated for conservation would be administered via a state water conservation fund and returned to the communities to further measurable gains in conservation. Similar to other state's use of grants to assist municipalities with water conservation and drought programs, water savings goals tied to grant monies would encourage a return on investment for Arizona. In addition by centralizing procurement of educational materials, equipment (e.g. leak detection), brochures, and website for key instructional information (e.g. outdoor watering etc.) economies of scale are afforded. If water conservation and efficiency is

to become a priority in Arizona as is the premise of this report, clearly additional sources of funding must be found or made available.

### **Alternatives for Funding**

The following list for ideas on potential funding sources for water conservation could be considered to be in the percolating stage. It was gained from the input of the Long Term Conservation Strategy committee members, existing or similar programs in Arizona or options for funding developed by other states.

### **Establishment of a State Trust Fund for Conservation of Water for Arizona**

The state shall establish a five-year Arizona Water Conservation Trust Fund (AWCTF), to be administered by the State Water Conservation Office through the Department of Water Resources, to commence in 2004 and sunset in 2009, that will finance statewide conservation efforts to support local, regional and state conservation programs that are designed to meet statewide water reduction goals.

Details for such a fund, its sources of revenues, consideration for direct funding vs. matching grants for conservation initiatives, criteria for use and management are only in the planning stages. While more detailed study of the feasibility and structure of funding for water conservation, in addition to a cost assessment, is required the following parameters are receiving some initial consensus:

- Consideration for a Conserve AZ Water Fund should be a non-profit
- Consideration for a Conserve AZ Water Fund could come from more than one source
- A Fund would be state -wide with special provisions for rural communities
- Proceeds of the Fund would be returned to the municipalities, towns as "grants" administered by ADWR Conservation
- A Fund would specifically target initiatives of water conservation and water efficiency inclusive of, but not limited to:
  - Technical Assistance and Training workshops
  - Retrofits and rebates
  - Leak detection
  - Establishment of a water efficiency equipment sharing bank for water efficient technologies
  - Media Advertising
  - Public Educational Materials
  - School Related Educational
  - Conservation Plan Modeling

- Rate Restructure Support
- Criteria for funding distribution would include a measure of objectives/ benefit associated with the initiative funded
- Existing state water conservation programs would be consolidated into one office, allowing more efficient use of conservation program funds and resources.

Potential methods of AWCTF program funding:

- **Revenues from local and regional water suppliers through an annual water conservation program incentive fee** on active customer accounts based on meter size. For example, single-family residential accounts could be assessed \$10 annually for five years; commercial accounts shall be assessed \$25 annual for five years. Notice of this annual assessment fee shall be embedded in a report sent to all water customers that includes a description of the state’s water supply status, goals, descriptions of conservation measures to save water, and information about how water users can access programs and services for saving water that are provided by the Arizona WCTF.
- **Revenues from the Arizona State Lottery.** Percent of funds used to establish the program and annual installments thereafter. This method of funding would be similar to the Heritage Fund that receives a portion of Lottery revenues and supports the Arizona Game & Fish and Parks Departments. Annually revenue from one set of lottery scratch tickets could be allocated to the AWCTF (similar to the lottery scratch tickets currently used for the economic development fund). The tickets could have a water theme, and be sold during the summer when water conservation issues are foremost in the public’s mind.
- **State Appropriation through the General Fund.** Similar to the establishment of a water conservation trust fund which would require legislative action, the state could appropriate monies to be used solely for the purpose of conservation programs. Funding allocated for the General Fund from the Arizona Water Banking Authority could be returned to the ADWR through a General Fund Appropriation as “seed money”.
- **Revenues from increases in water use permit fees** for new and renewed drinking water, groundwater and surface water permits. A portion of the funds collected will be returned to the local communities in the form of technical assistance grants.
- **Income Tax Voluntary Contributions check off item** on the Arizona State Tax form <http://www.revenue.state.az.us/volgifts.htm>. Voluntary Gift contributions currently include: Aid to Education (entire refund only); Child Abuse Prevention; Special Olympics; Arizona Wildlife; Domestic Violence Shelter; Citizens Clean Elections; and Neighbors Helping Neighbors. Potential for checkoff for an AWCTF could be assessed for potential revenues and mechanism

- **Establish a Cooperative Dialogue with the Arizona Water Infrastructure Authority (WIFA)** to discuss Drinking Water State Revolving Fund (DWSRF) set asides and capabilities with the Arizona for support of conservation initiatives. The Environmental Protection Agency (EPA) outlined mechanisms for use of Drinking Water State Revolving Fund (DWSRF) Program Funds for Water Efficiency Measures in a memorandum dated July 23, 2003. These mechanisms would support programs on water conservation (e.g., water audits, leak detection, and rate structure consultation); development and implementation of ordinances or regulations to conserve water; drought monitoring; and implementation of incentive programs or programs on conservation. (Attachment 2).
- **Partnerships.** There is a need to develop agency partnerships and citizen participation at the local levels. Grass root conservation efforts through communities, watershed groups, youth programs, environmental organizations, etc. can be successful and help defray expenses by activating volunteers and involving them directly in conservation programs. Such local partnerships can develop a better sense of community and build a vested interest in saving water. Existing partnerships between local, state and federal agencies should continue and expand. The Department of Water Resources will specifically explore:
  - The USDA's *Cooperative State Educational Extension Program* (CREES) and the Rural Utilities Service (RUS) Water and Environmental Program (WEP). Both provide programs and some limited funding for technical assistance grants related to water conservation.
  - Much of the public is familiar with the CREES program for Master Gardeners. CREES also supports the *Master Watershed Steward Program and Wastewater Technical training*.
  - *Circuit Rider Technical Assistance Program* Circuit riders work alongside the rural system officials and operators to show them how to solve water related problems.

The above programs for rural communities may serve as models for training, implementation and expansion of the proposed statewide Audit and Leak Detection Program. In addition, ADWR needs to collaborate with the Arizona's Department of Education contacts on school programs, materials and curriculum endeavors.

## **Water Conservation Tax Incentives**

As stated earlier in this report, the possible purchase of new technologies, equipment such as ET controllers, leak detection, water metering equipment and rebate/retrofit programs were discussed. To enable methods of incenting or defraying the costs associated with water efficiency "hardware" a review of potential tax incentive programs is being researched and will

continue to be explored for funding alternatives. The following programs of other states are for consideration in Arizona.

- **Residential Tax Credit Program** The State could develop a residential tax credit program that provides a tax credit for clothes washers, dishwashers and other water saving devices and technologies. The State of Oregon established such a program in 1977 for energy tax credits and since 1998 has tax credits for water saving appliances that could serve as a model for Arizona. Since the addition of the water conserving appliance program in 1997, tax credits (energy and water) have been given for 20,459 clothes washers and 10,025 dishwashers. The total water savings for clothes washers and dishwashers between 2001-2003 was 276,146,780 gallons annually.  
To qualify for a tax credit, you must have an Oregon income tax liability and the appliance must be located in an Oregon dwelling that is a primary or secondary residence. The tax credit is based on the amount on the list of qualifying appliances or 25% of the net purchase price of the appliance, whichever is less. The Oregon program is a broader energy tax credit and has a list of eligible appliances by manufacturer that is certified energy-efficient by the Oregon Office of Energy. Lists of eligible appliances by manufacturer and model are updated regularly.
- **Business Tax Credit Program** In Oregon the tax credit programs are also offered to businesses to encourage them to invest in energy conservation, renewable resources, recycling and alternative fuels. Credits have been given to farmers for installing energy and water-saving irrigation systems. The tax credit is 35 percent of the cost of the investment. The tax credit may be taken in one year for projects under \$20,000. For projects over \$20,000, 10 percent of the credit is taken the first and second years and 5 percent thereafter. The energy/water savings of the conservation measures must pay back the investment in one to 15 years.
- **School District Tax Credit Program** Oregon has a program focused on schools with high energy bills. Oregon's office of Energy staff provides assistance by recommending energy system changes and advises how to maintain and operate them properly. Of the measures put in place energy costs are typically cut by 10%, but savings of 25% could be achieved if all measures were adopted. This type of effort could be made with a primary focus on water savings rather than energy savings.  
In Arizona, there is little incentive for school districts to reduce water and energy use as excess utility costs (i.e. heating, cooling, water and electricity, telephone, etc.) are picked up by the State. If the school district receives a refund of utility expenditures or a rebate on energy saving devices or services, the refund or rebate is applied against utility expenditures for the current year as a reduction of the expenditures, ... (Education- General Provisions for Budgets § 15-910)  
Arizona could develop a program to assist schools in reducing water use through replacement of newer more efficient plumbing and equipment and

better management (e.g. waterless urinals, pre-rinse nozzles for dishwashing, increased cycles of concentration in cooling towers, leak detection and repair, irrigation improvements, etc.). Tax credits could be given to schools that comply. Students, teachers and administrators could also couple this program with conservation education to encourage behaviors to save water.

In 2001 the state of Washington through special legislative initiatives and analyses of their Office of Financial Management adopted a tax-incentive program for water utilities designed to create water use efficiency and promote use of reclaimed water. The legislative initiatives involved:

- **Establishment of a public utility tax deduction** of 75% of funds spent to improve water- use efficiency. Measures such as low-flow showerheads or toilets were allowed to subtract 75% of the cost of the programs from the utility gross incomes when it calculates its public utility tax. Results indicated that a tax incentive savings of \$41,000 was realized for a total of \$822,000 since inception in claimed deductions for water spent on conservation. But only 18 of the 481 water providers had claimed the deduction.
- **Water reclamation exemptions** allowed a utility that reclaims water and sells it to an entity, such as a golf course or park to pay utility tax on only 25% of the receipts (i.e. 75% incentive). While there were 16 reclaimed water facilities in the state none had generated enough revenue the following year to claim the credit.

A study was conducted that sought to ascertain why participation in the tax incentive was so low and if the water utilities had implemented conservation measures that saved water use. Two utilities said they implemented water meters installation at a faster schedule due to the incentive. Some said the incentive was not great enough to warrant a claim for deduction. Most said they were unaware of the incentive program or their budget cycles of two years planning did not allow for timely use of the tax incentive.

## **POLICY STRATEGIES**

At a state level, establishment of a dedicated funding source through an appropriation from the General Fund or through Lottery monies as well as an office to implement conservation programs statewide might require legislation. Creation of new programs to include incentives for use of new technologies may require legislation or policy changes at a state or local level. Developing a clear mandate for water education in our school districts may require development of policies through the Department of Education. These are specific examples of policy strategies that might be involved with the implementation of recommendations found within this statewide conservation strategy.

The establishment of efficiency benchmarks and implementation of new conservation programs throughout the state is entirely voluntary. Actual water conservation policy decisions (which programs to implement) should be left to local jurisdictions. At a minimum, communities should encourage voluntary water conservation measures to mirror mandatory measures instituted by cities and towns around the state. Implementation of voluntary measures selected by local communities to assist in reducing use and closing the gap between current and benchmark water uses is recommended.

## **Conclusions**

Arizonans have been planning sustainable water resources for many years. Active Management Areas of the State have benefited from over 20 years of wise water management and conservation programs through regulations contained in the 1980 Groundwater Management Act. This Act formalized regulations that had their beginnings as a result of concern over groundwater pumping as early as the 1950's. Securing Arizona's 2.8 million acre-feet per year of Colorado River water, construction of the Central Arizona Project, and the Salt and Verde River reservoir systems have all insulated the large population centers of the state from concerns of shortage.

Today's Arizona is faced with lingering drought conditions and potential shortage on the Colorado River. Our years of water resource planning have served us well and have reduced reliance upon our groundwater supplies. However, with surface water supplies diminished due to below normal precipitation levels over several years groundwater pumping will likely increase. Conservation is a tool that should be used to maintain adequate supplies and offset interim increases in groundwater pumping.

Patience and persistence are needed to see Arizona through the lingering drought but these traits also play a role in creating a long-term conservation ethic for the state. Some parts of the state face availability problems due to single sources of supply and aging infrastructure. Other parts of the state lack the resources to develop conservation programs and materials. Creating and sustaining a long-term conservation ethic for the state will require time, education and a fair degree of problem solving.

Saving water for the state will also require time, dedication of staff, resources and a commitment by Arizonans to see the effort through. Creation of water efficiency benchmarks as a guideline for reduction of use statewide takes the next step beyond our previous efforts at the state and local level. Arizona has practiced "tried and true"

conservation measures (both voluntary and regulatory) for years with varying degrees of success.

Benchmarking provides the opportunity for local communities and residents to “reduce their use” and perhaps provide leverage for the creation of new conservation programs. Providing the necessary tools (education, technical assistance and funding) to meet benchmark goals is a responsible course of action. At a minimum, the Arizona Statewide Conservation Strategy serves to meet the framework of the Governor’s Executive Order but is written to provide the state of Arizona with a means to achieve measurable water savings for the use of current and future generations.

### **Attachment 1. Arizona Reservoir Levels (through 4/30/04)**

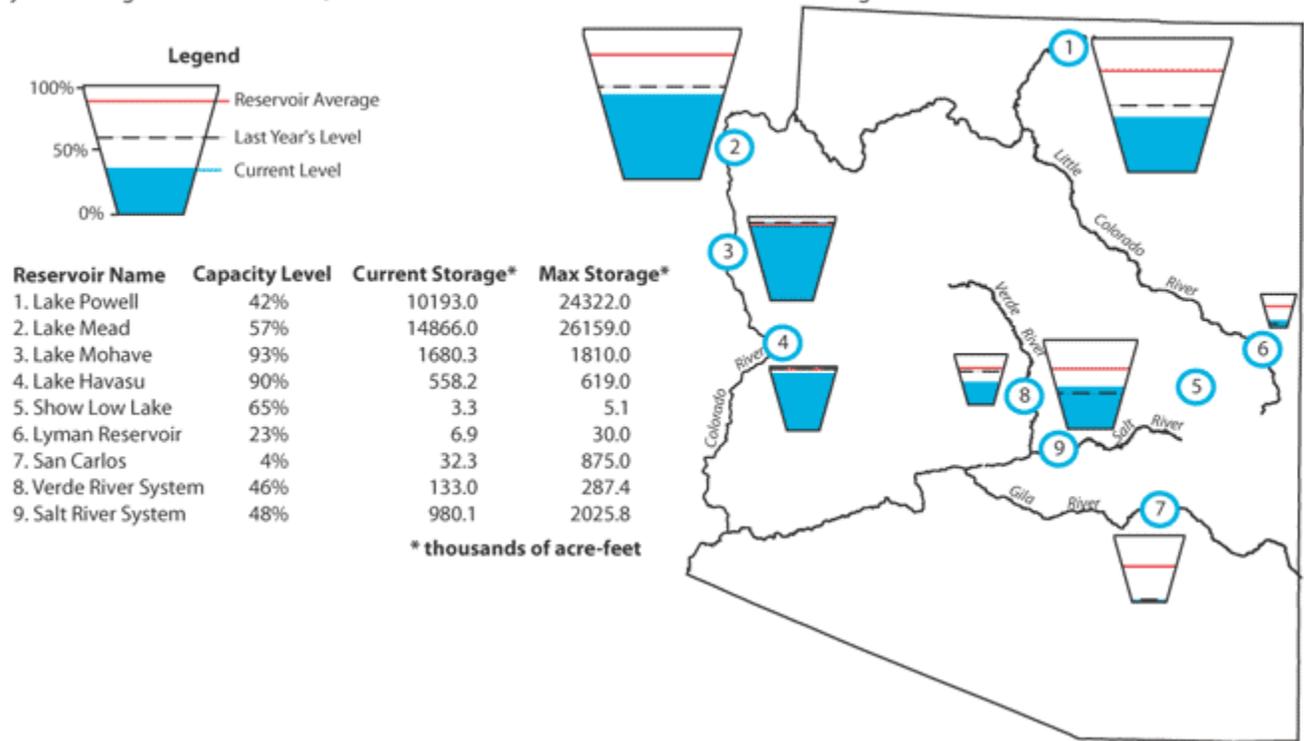
**Source: National Water and Climate Center**

[http://www.ispe.arizona.edu/climas/forecasts/may2004figs/05\\_az\\_resvr.html](http://www.ispe.arizona.edu/climas/forecasts/may2004figs/05_az_resvr.html)

This month, we debut a new graphic to show Arizona reservoir levels (Figure 5) that we hope is a better representation of the state of the water storage system. All the same information is contained in our new “cup” diagrams that replace the bar graphs from previous packets—see the notes for details and feel free to send us your comments and suggestions.

The continuing story for Arizona reservoirs is the lack of water for Lake Powell and Lake Mead. In general, Arizona reservoirs stayed near the same level as last month with Lake Mead showing a slight loss. The state of the Colorado River system has gained nationwide prominence in the news. The *New York Times* (May 2, 2004) reports that the U.S. Geological Survey has declared the period since 1999 officially to be the driest in the 98 years of recorded monitoring on the Colorado River. With the system now in a multiple-year drought, less than half of the normal inflow to Lake Powell is projected to occur. As a result, Lake Powell is at its lowest levels since being filled in 1970, which suggests significant water shortage may be in our future. W. Bennett Raley, the Bush administration’s top water official, is quoted in the *Tucson Citizen* (May 3, 2004) as saying, “If current trends continue...the secretary [of the Interior] would be forced to take action certainly within three years and potentially within two.” Raley continued, stating that the Bush administration’s preference is for the states who use the Colorado River water to work out solutions that are acceptable to the government. According to the *Arizona Republic* (April 30, 2004), the Colorado River provides water to more than 25 million people in seven states. Stay tuned—this story will continue to develop.

**Figure 5.** Arizona reservoir levels for April 2004 as a percent of capacity; the map also depicts the average level and last year's storage for each reservoir, while the table also lists current and maximum storage levels.



## Attachment 2

### UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Washington, D.C, 20460

July 25, 2003

DWSRF 03-03 – Office Of Water

**MEMORANDUM** SUBJECT: Use of Drinking Water State Revolving Fund (DWSRF) Program Funds for Water Efficiency Measures

FROM: G. Tracy Mehan, III /s/ -Assistant Administrator

TO: Water Division Directors Regions

In September 2000, the Clean Water State Revolving Fund (CWSRF) program released a memorandum entitled “Policy on Using the CWSRF on Water Efficiency/ Conservation Measures” (CWSRF 00-13). The purpose of this memorandum is to clarify the use of Drinking Water State Revolving Fund (DWSRF) funds by states and water systems to implement water efficiency measures.

### Background

Recent water shortages across the United States have served to remind states and public water systems that implementing water efficiency measures can play an important role in supplying safe drinking water to customers. As a result, we have received questions from stakeholders on what types of water efficiency projects and activities are eligible for funding under the DWSRF program. The DWSRF program can be an important tool in providing financial assistance to help states and systems initiate a variety of water efficiency measures.

### Eligibilities Under the Loan Fund

The DWSRF program can make loans to public water systems for the following types of water efficiency projects, provided that certain conditions are met (as described below): < Installation of meters; < Installation or retrofit of water efficient devices such as plumbing fixtures and appliances; < Implementation of incentive programs to conserve water (e.g., rebates, tax breaks, vouchers, and conservation rate structures); and < Installation of dual pipe distribution systems as a means of lowering costs of treating water to potable standards.

The DWSRF program can provide loans for the installation of water meters to encourage the efficient use of water. Similarly, the DWSRF can provide loans for the installation or retrofit of water efficient devices, such as plumbing fixtures and appliances.

Incentives such as rebates, tax breaks, vouchers, and conservation rate structures can encourage water users to install water efficient equipment, appliances, or plumbing fixtures, repair water leaks, or implement sound landscape practices. The DWSRF program can provide loans for the cost of administering incentive programs, as well as the costs of the incentives themselves if the costs are included as part of a larger project (similar to planning and design costs included as part of a loan). The DWSRF can provide loans for the installation of dual pipe distribution systems (potable and non-potable) as a cost-effective means of treating water to potable standards. If the primary purpose of the project is for water conservation, then, to the maximum extent practicable, reclaimed water must be used for the second pipe (instead of raw water). As with all loans, the project must be sized only to accommodate a reasonable amount of population growth expected to occur over the useful life of the facility. The primary purpose of the project cannot be to serve future population growth.

Eligibilities Under the Set-asides In addition to providing loans to water systems for water efficiency measures, states can use their DWSRF set-aside funds to promote water efficiency through activities such as:

< Development of water conservation plans;  
< Technical assistance to systems on how to conserve water (e.g., water audits, leak detection, and rate structure consultation); < Development and implementation of ordinances or regulations to conserve water; < Drought monitoring; and < Development and implementation of incentive programs or public education programs on conservation.

Water Conservation Plans Finally, the Safe Drinking Water Act (SDWA) gives states the option of requiring a system to submit a water conservation plan as a condition of receiving DWSRF assistance (SDWA §1455). States may also choose to award bonus points in their priority ranking to systems that have water conservation plans or that implement water efficiency measures. EPA guidelines for developing a water conservation plan can be found on the EPA website at <http://www.epa.gov/owm/water-efficiency/webguid.html>. The guidelines include a variety of planning steps and recommendations for water conservation measures, each geared to different system sizes and different water conservation needs and goals.

I hope this memo helps clarify the appropriate use of DWSRF funds for implementing water efficiency projects and activities. If you have any further questions, please feel free to contact Bill Diamond, Director, Drinking Water Protection Division, at (202) 564-3751.

lcc: Cynthia Dougherty, Director, Office of Ground Water and Drinking Water Jim Hanlon, Director, Office of Wastewater Management

Source: <http://www.epa.gov/owm/water-efficiency/pdf/dwsrf-waterefficiency.pdf>

See also: [http://www.epa.gov/owm/water-efficiency/wef\\_final.pdf](http://www.epa.gov/owm/water-efficiency/wef_final.pdf)

### **Attachment 3 – WIFA 2003 Residential Rate Survey Average Water Rates by State, Ownership and Revenue**

**EXHIBIT A**

**2003 RESIDENTIAL RATE SURVEY  
STATISTICAL SUMMARY**



**ARIZONA DRINKING WATER SYSTEMS**

	<b>Average Monthly Charge</b>	<b>Median Monthly Charge</b>	<b>Lowest</b>	<b>Highest</b>
<b>SURVEY TOTAL</b>				
<b>Total Arizona</b>	<b>\$ 30.16</b>	<b>\$ 28.01</b>	<b>\$ 5.61</b>	<b>\$ 99.60</b>
<b>BY OWNERSHIP TYPE</b>				
Municipal	\$ 21.99	\$ 21.44	\$ 7.63	\$ 40.66
District / County	37.70	34.13	11.75	74.00
Association	34.39	36.31	7.50	99.60
Investor-Owned	30.77	29.77	5.61	92.70
<b>BY ANNUAL REVENUE</b>				
Over \$5,000,000	\$ 21.06	\$ 18.87	\$ 10.66	\$ 29.76
\$1,000,000 -- \$5,000,000	27.20	22.75	7.63	63.98
\$250,000 -- \$1,000,000	29.26	26.83	8.37	57.85
\$50,000 -- \$250,000	35.39	32.56	6.38	99.60
Under \$50,000	29.59	30.00	5.61	81.58
Total Gallons Per Month = 7,750				

**Attachment 4 – WIFA 2003 Residential Rate Survey  
Connection and County Data**

**EXHIBIT B**

**2003 RESIDENTIAL RATE SURVEY  
STATISTICAL SUMMARY**



**ARIZONA DRINKING WATER SYSTEMS**

	Average Monthly Charge	Median Monthly Charge	Lowest	Highest
<b>BY NUMBER OF CONNECTIONS</b>				
Over 50,000	\$ 22.04	\$ 18.18	\$ 10.66	\$ 54.35
10,000 -- 50,000	24.76	26.64	16.74	29.76
5,000 -- 10,000	19.86	36.99	11.91	37.23
1,000 -- 5,000	27.40	25.07	7.63	63.96
500 -- 1,000	29.48	29.38	8.37	46.58
Under 500	33.10	31.16	5.61	99.60
<b>BY COUNTY</b>				
Apache	\$ 31.38	\$ 29.79	\$ 16.69	\$ 56.35
Cochise	27.39	24.94	5.96	67.40
Cocconino	40.91	42.34	7.50	66.45
Gila	36.73	35.77	7.13	74.00
Graham	28.95	28.05	19.88	36.68
Greenlee	30.54	32.90	19.22	37.12
La Paz	30.71	26.85	18.87	68.75
Maricopa	25.88	22.65	5.61	92.70
Mohave	31.77	28.70	17.75	72.85
Navajo	31.80	34.25	7.63	34.00
Pima	29.64	26.54	7.19	99.60
Pinal	27.55	25.00	6.38	55.79
Santa Cruz	24.52	20.53	8.56	42.55
Yavapai	36.13	33.50	12.90	89.88
Yuma	20.21	21.44	11.31	33.36
Total Gallons Per Month = 7,750				

**WHITE PAPER**

**The Differences Between  
Drought Response and Long-Term Water Conservation**

**Draft prepared by Amy Vickers, Amy Vickers & Associates, Inc.**

“Droughts are caused by nature, water shortages are caused by people.”

–Janice A. Beecher and Ann P. Laubach,  
*Compendium on Water Supply, Drought and Conservation*

**The Role of Water Conservation**

Drought response and long-term water conservation programs share a primary goal: saving water. The key difference between the two approaches is timing. *Drought management* responds to conditions of nature (reduced precipitation), seeks temporary water savings to maintain adequate supply levels, occurs over the short-term (weeks to months, less frequently–years), and is response- and/or crisis-oriented. In contrast, *long-term conservation programs* seek permanent water demand reductions and are planned with multi-year goals to mitigate existing infrastructure constraints or projected water supply shortfalls due to increased water demands from growth in population and development.

The American Water Works Association’s (AWWA) white paper, “Water Conservation and Water Utility Programs,” emphasizes that water utilities with ongoing conservation programs are better able to manage droughts:

“Water conservation is often equated with temporary restrictions on customer water use. Although water restrictions can be a useful emergency tool for drought management or service disruptions, water conservation programs emphasize lasting day-to-day improvements in water use efficiency.....In the event of water shortages, agencies with broad-based water conservation programs are able to mitigate short-term and long-term effects better than those without a conservation program.”

**Water Savings from Conservation**

The water savings achieved from conservation actions during drought are typically short-lived compared to the permanent savings achieved by long-term conservation programs. This difference is due to the types of measures that are emphasized and the goals for each approach. There are two categories of water conservation measures: technology-based (hardware) and behavior-based (practices):

- *Technology-based* measures, such as equipment retrofits and the installation of water-efficient appliances, achieve long-term savings that will last as long as the efficiency device remains installed. They are usually expensive compared to behavior-based practices and often require incentives (e.g., rebates, ordinances) to entice water users to adopt them. Hardware measures require one step – installation – to achieve lasting water savings.
- *Behavior-based* practices such as turning off faucets while washing dishes and not hosing sidewalks typically result in only short-term water reductions because they require ongoing reminders (e.g., public messaging) about the need to change personal behavior in order to save water. Water managers often promote behavior-based water efficiency practices during drought because a) they need only temporary reductions in water use until the drought has passed, b) behavior changes can quickly result in water reductions (e.g., ban on lawn watering), and c) water savings from behavioral changes are largely free (drought response is considered a news item compared to long-term public education campaigns which involve paid advertisements). Behavior-oriented measures require repeated actions on the part of water utilities and water users to remember to change water habits. Utility experience has shown that these types of water-saving actions are quickly abandoned by the public once a drought ends; similar results are indicated by public education (only) campaigns that are tied to long-term water supply issues.

### Effective Strategies For Water Supply Shortages

**“Much can be learned about the values placed on the uses of water by studying the response different types of communities make to water shortage and fear of shortage.”**

–Robert W. Harrison, “Water Supply and Water Quality Studies,” in Crews and Tang, eds., *Selected Works in Water Supply*.

**The historical role of drought response as a short-term task and ongoing conservation programs as a long-term strategy are blurring in today’s world. The growing reality of increasing populations dependent on limited water supplies are effectively rendering certain regions, such as the Southwest, in chronic drought status. Whether caused by nature or pressures from people and development, water shortages—no matter their origin—increasingly require both short-term and long-term demand management strategies, strategies that target behavior as well as hardware and that are adjusted to current (and often problematic) precipitation conditions.**

A summary of the objectives, strategies, incentives, and public and institutional cooperation required for drought response compared to long-term conservation programs is shown in Table 1.

**TABLE 1: SIMILARITIES AND DIFFERENCES BETWEEN DROUGHT & LONG-TERM WATER SAVING PROGRAMS**

<b>PLANNING COMPONENT</b>	<b>DROUGHT</b>	<b>LONG-TERM WATER CONSERVATION</b>
<b>Objectives</b>	immediate, short-term actions to realize temporary water demand reductions in response to shortages from drought; preservation of adequate water supplies to meet minimum sanitary, safety, and fire-fighting needs	ongoing, long-term actions taken to realize permanent water savings due to resource and/or infrastructure limitations
<b>Strategy</b>	immediate implementation, "low hanging fruit," drastic and possibly sacrificial actions, expedited conservation program goals; emphasis on behavior measures that result in rapid demand reductions	ongoing multi-year strategy involving the implementation of multiple conservation program components focusing on both hardware and behavioral changes
<b>Incentives</b>	public education and regulatory	public education, financial, and regulatory
<b>Affected</b>	residential outdoor and other nondiscretionary water uses; more customer sectors and end uses targeted according to drought trigger response levels	all customer sectors: residential, commercial, industrial, institutional, agricultural, water systems (leaks and losses)
<b>Cooperation</b>	field and emergency response agencies, e.g., police, fire, FEMA; official drought task force	non-emergency agencies, e.g., environment, agriculture, health; stakeholder and citizens advisory committees
<b>Messaging</b>	urgent, short-term need for response actions	water ethic for long-term; program campaigns

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**APPENDIX B - UTAH CONSERVATION PLAN**

Model Water Rates Ordinance

Model Time-of-Day Watering Ordinance

Model Water Waste Ordinance

# Water Rates Ordinance

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**A Municipal Corporation** \_\_\_\_\_ **City**

ORDINANCE NO. \_\_\_\_\_

AN ORDINANCE AMENDING PROVISION OF THE \_\_\_\_\_ CITY MUNICIPAL CODE PERTAINING TO THE SERVICE RATES FOR THE CULINARY WATER SYSTEM.

## **Section 1. Preamble**

- A. WHEREAS, (the City) operates a culinary water system; and
- B. WHEREAS, the city council understands that current water rates are not sufficient for present and future increases in costs of providing water to residents; and
- C. WHEREAS, the city council desires to amend the provisions of the \_\_\_\_\_  
\_\_\_\_\_ city municipal code pertaining the fee for culinary water service: and
- D. WHEREAS, the city council understands the pressing need to use water in a more efficient manner to allow for future sustained growth of the community.

## **Section 2. Ordaining Clause**

NOW, THEREFORE, IT IS ORDAINED BY THE CITY COUNCIL OF \_\_\_\_\_  
\_\_\_\_\_ CITY, UTAH:

Section \_\_\_\_\_ Subsection \_\_\_\_\_ of the \_\_\_\_\_ City Municipal Code is hereby repealed and reenacted to read as follows:

## **Section 3. Culinary Water Rates**

The City Manager or his / her designee shall read meters monthly. Each account will be assessed a monthly fee using a daily rate as set forth below. Water service charges shall be collected monthly for each water connection. Service charges will be composed of the following parts:

- A. A basic daily service charge, based upon the size of the meter connection calculated to cover major fixed costs associated with paying debt service, salaries, and other costs of operating and maintaining the water system, which do not vary with the amount of water delivered, is set according to the following schedule:

Meter Size	Daily Service Charge (\$)	Monthly Service Charge (\$)
.75	.33	9.90
1.0	.83	24.90
1.5	1.16	34.80
2.0	1.66	49.80
3.0	4.98	149.40
4.0	10.62	318.60

(Numbers used in this table are hypothetical and are used only to illustrate one methodology)

- B. A charge for all water delivered through the meter, calculated to cover the variable costs of operating and maintaining the water system, which do vary according to the amount of water delivered, is set according to the following schedule:

**OPTION 1: INCREASING BLOCK RATE STRUCTURE**

(Numbers used in this table are hypothetical and are used only to illustrate one methodology)

Gallons Used	Monthly Service Charge (\$)	Metered Water Rates (\$ / Kgal)
0 – 4,200	9.90	1.00
4,201 - 19,200	9.90	1.50
19,201 - 28,200	9.90	2.00
28,201 - 33,000	9.90	2.50
33,001 – 39,000	9.90	3.00
39,001 – 49,000	9.90	3.50
Over 49,000	9.90	4.00

**OPTION 2: SEASONAL BLOCK RATE STRUCTURE**

(Numbers used in this table are hypothetical and are used only to illustrate one methodology)

Monthly Service Charge (\$)	Metered Water Rate (\$ / Kgal)	
	Oct – May	Jun – Sep
9.90	1.00	1.50

### OPTION 3: ASCENDING BLOCK RATE STRUCTURE

(Numbers used in this table are hypothetical and are used only to illustrate one methodology)

Tier Name	Usage (% of Target)	Metered Water Rates (\$ / Kgal)
Low-Volume	0 – 50%	.75
Conservation	51 – 100%	1.00
Inefficient	101 – 150%	2.00
Excessive	151 – 200%	4.00
Wasteful	Over 200%	8.00

Each customer has a water budget or target, which is based on:

- Lot size
- Number of occupants
  - Daily evapotranspiration, totaled for the billing period, as measured at the nearest weather station.

# Time-of-day Watering Ordinance

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\_\_\_\_\_ City  
A Municipal Corporation

ORDINANCE NO. \_\_\_\_\_

AN ORDINANCE AMENDING THE MUNICIPAL CODE TO PROMOTE WATER USE EFFICIENCY IN AMENITY LANDSCAPE IRRIGATION.

## Section 1. Preamble

- A. WHEREAS, [the City] desires to promote efficient sprinkler irrigation practices for all lawns and landscapes; and
- B. WHEREAS, research has shown that irrigating landscapes only during the hours of 6:00 p.m. to 10:00 a.m. significantly increases irrigation efficiency; and
- C. WHEREAS, conservation of water through more efficient use is in the public interest and enhances the community's economic, environmental, recreational and aesthetic resources; and
- D. WHEREAS, [the City] has the authority to adopt this ordinance pursuant to Utah Code Annotated 10-3-702, and hereby exercises its legislative powers in doing so;

## Section 2. Ordaining Clause

NOW THEREFORE, be it ordained by [the City] that the following ordinance be enacted.

## Section 3. Time-of-Day Water Parameters

Sprinkler irrigation of all lawns and landscapes is prohibited between the hours of 10:00 a.m. and 6:00 p.m.

## Section 4. Applicability of Time-of-Day Watering Ordinance

The provisions of this ordinance shall apply to all landscapes within the city. This ordinance does not apply in the following situations:

- a. New lawns that require frequent irrigation for establishment purposes within 90 days of planting.

- b. Short cycles required for testing, inspecting and maintaining irrigation systems.
- c. Other situations as permitted by the city.

**Section 6. Penalty**

[A section may be added to describe the penalty for violation of this ordinance.]

**Section 7. Effective Date**

This ordinance shall be effective as of \_\_\_\_\_ 20\_\_\_\_.

# Water Waste Ordinance

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\_\_\_\_\_ City  
**A Municipal Corporation**

ORDINANCE NO. \_\_\_\_\_

AN ORDINANCE AMENDING PROVISIONS OF THE \_\_\_\_\_ CITY MUNICIPAL CODE PERTAINING TO THE WASTE OF WATER IN THE CULINARY WATER SYSTEM.

## **Section 1. Preamble**

- A. WHEREAS, [the City] operates a culinary water system; and
- B. WHEREAS, the city council understands that water supplies are not going to continue to increase; and
- C. WHEREAS, the city council understands the pressing need to use water in a more efficient manner to allow for future sustained growth of the community;

## **Section 2. Ordaining Clause**

NOW, THEREFORE, IT IS ORDAINED BY THE CITY COUNCIL OF \_\_\_\_\_  
CITY, UTAH: \_\_\_\_\_

Section \_\_\_\_\_ Subsection \_\_\_\_\_ of the \_\_\_\_\_ City Municipal Code is hereby repealed and reenacted to read as follows:

## **Section 3. Culinary Water Waste**

### **Maintenance of Connected Facilities.**

All users of water service shall be required to keep their sprinklers, faucets, valves, hoses and all apparatus connected to the water system in good condition at their own expense and all waterways closed when not in use. When it shall be found that any fixture on the user's premises is broken or not in serviceable condition, the user shall be notified at one of the fact and should said user fail to remedy the defect within thirty (30) days, water service may be discontinued until such apparatus has been inspected by the Water Superintendent or his agent and determined to be in a serviceable condition. Any deposit or prepaid charges on the account of such user shall be forfeited to the City as an inspection and handling fee. After inspection and approval of any required repairs by the Public Works Department, service may be restored pursuant to conditions of this Chapter.

**Section 4. Penalty**

**Service Interruption.**

If the Water Superintendent shall determine that a user engages in practices which result in the needless waste of a significant amount of water, and continues to do so after reasonable notice to discontinue said wastefulness has been given, the Superintendent may interrupt water service for up to 24 hours per act of waste. Notice of an interruption made hereunder shall be given at least one day prior to the time at which the interruption occurs. It is a waste of water to permit water to run without making due efforts to conserve the water.

**City Council Action.**

When referred to the Council, the City Council may consider discontinuing permanently the water service to a wasteful user. If the City Council elects to consider this matter of discontinuance, it shall give notice to the water user of the intention to discontinue his or her water service at least seven (7) days prior to the meeting of the City Council at which such discontinuance is to be considered. The notice shall inform the user of the time and place of the meeting and of the charges that led to the consideration of discontinuance. Said water user shall have opportunity to appear with or without legal counsel and present his or her reasons why the water service should not be discontinued. Upon hearing, the City Council shall notify said user in writing of its determination and if the determination is to discontinue the user's water service, it shall notify said user of the period during which the service will remain discontinued.

**Section 5. Effective Date**

This ordinance shall be effective as of \_\_\_\_\_ 20\_\_\_\_.

## Appendix C - Other State Conservation and Funding Strategies

### **Georgia Initiatives**

Water providers and state agencies in Georgia actively pursued area and statewide Drought and Conservation efforts in the past few years. Their work culminated in a Comprehensive Water Resources Management Plan for the state. The following are a few of the initiatives related to water resources planning, conservation and funding:

- Establishment of a **Georgia Water Resources Council** by Executive Order of the Governor. The Council, established in late 2003, is to guide and offer recommendations to the Governor and General Assembly for the contents and scope of the Comprehensive Plan. The Council, comprised of experts in their fields and members from the departments of Environmental Protection, Natural Resources, Community Affairs, Soil and Water Conservation, Georgia Environmental Facilities Authority (financing of state revolving funds), Human Resources, Agriculture and Georgia Senate and House representatives. First agenda items involve implementation of the Drought Management Plan adopted by the Department of Natural Resources Board in the spring of 2003; and the second item pertained to development of agency-specific water conservation programs.
- Legislative initiatives to date involve amendments to the state code for inclusion of planning powers for the Comprehensive Water Resources Management Plan, an incentive program for agricultural conservation and prohibition of the sale of irrigation systems without rain shut offs after 2005 :
  - [HB 237 - Water resources; ground-water use; state-wide water management plan](#) - A bill to amend the Official Code of Georgia Annotated, relating to additional duties and powers of the State Soil and Water Conservation Commission ( and Department of Natural Resources), so as to provide for certain powers and duties related to water resources ( e.g. state-wide water management plan)
  - [SB 436 - Agricultural Water Conservation Incentive Program; create](#) A bill to amend Code Section 2-6-27 of the Official Code of Georgia Annotated, relating to additional duties and powers of the State Soil and Water Conservation Commission, so as to provide for certain powers and duties related to water resources;
  - [HB 1277 - Water resources; irrigation systems; certain shut-off switch](#) A bill to amend Article 1 of Chapter 5 of Title 12 of the Official Code of Georgia Annotated, relating to general provisions relative to water resources, so as to prohibit beginning in 2005 the installation of certain irrigation systems without rain sensor shut-off switches.

- Review of a funding concept for a **Georgia Water Conservation Trust Fund (WCTF)** - The fund to be administered by the State Water Conservation Group sees a 5-year program to finance state goals and conservation efforts. The WCTF outlines the following sources and provisions:
  - Revenues would be collected by local providers who would levy an annual conservation fee of \$10 annually for single family residential accounts and \$25 annually for commercial accounts for 5 years
  - The majority of the funds would be returned to the communities in the form of technical assistance grants
  - The fees would additionally support educational outreach programs on the state's water supply, web information, public service announcements and other related conservation efforts

### **Colorado Initiatives**

The **Colorado Water Conservation Board (CWCB)** list of responsibilities include:

Policy to address state water issues; Exercising the water rights to protect the environment; Mediating disputes between basins and water interests; Maintaining fiduciary responsibilities related to the management of state resources including the Construction Fund and the Severance Tax Trust Fund Representing citizens within individual basins; Identifying, prioritizing and recommending water development projects to the general assembly. The CWCB plans and will implement efforts for the **Statewide Water Supply Initiative (SSWI)**. The planning incorporates supply /demand scenario including, conservation, reuse, demands and capital needs in a priority model.

- Water conservation historically was funded under the **Water Conservation Act of 1991 (HB 1154)**. It established the **Office of Water Conservation** within the Colorado Water Conservation Board (CWCB) to promote water use efficiency. Provisions of the 1991 Act require water providers that annually supply over 2000 acre-feet of water to retail customers, to develop water conservation plans. Entities must have an approved water conservation plan prior to receiving any financial assistance from the CWCB or CWRPDA. Approximately \$1M in technical assistance grants since 1991 were delivered to communities solely for water conservation plans and projects. These include:
  - Leak detection and audit training
  - Education Projects
  - Efficiency Programs
  - Conservation simulation models

- **A 2004 amendment to the Water Conservation Act (HB 04-1365)**  
Proposed by the CWCB, the amendment seeks legislative appropriation of \$585,000 in incentives for communities to create and implement conservation plans. The CWCB characterizes the amendment as creating: “a grant mechanism from an existing funding source (CWCB severance tax operational account) that will allow water entities to apply for grants to assist them with water conservation and drought planning activities. The new provisions will establish water savings goals and provide a better indication to the overall effectiveness of the entities water conservation plan.
- **The Colorado Watershed Protection Fund** Citizens of Colorado can check off on their state income tax forms voluntary designation of monies to the Watershed Protection Fund or 9 other funds ranging from the Special Olympics to Domestic Abuse. In Colorado public service announcements in the media was coordinated for all funds. According to a contact on the CWCB the Watershed Protection Fund garnered approximately \$86,000 for watersheds in the state.  
<http://www.checkoffcolorado.org/>
  - Proceeds from the lottery are apportioned by a percentage of each county to the total population and correspondingly to each municipality's. Municipalities must deposit moneys received from the state in a separate conservation trust fund, which can be expended only for the acquisition or maintenance of new conservation sites; for capital improvements; or maintenance for recreational purposes. Towns may cooperate or contract conservation trust funds for joint expenditures.
  - This department manages an Office of Smart Growth. Its mission is to provide direct technical and financial assistance to local governments in the areas of land use, planning and growth management. Some of this Office’s programs pay for state conservation brochures (e.g. [Water Efficient Landscape Design Model Ordinance](#); WaterWise Best Practices Landscape and other water conservation related materials.  
Source: <http://www.dola.state.co.us/LGS/FA/ctf.htm>  
<http://www.dola.state.co.us/SmartGrowth/index.htm>
- The **Denver Water Board** approved in May of 2004 a drought surcharge for residential customers. They cite “because of the recent drought and the continuing below normal reservoir levels... one way to ensure that everyone saves water is to charge more for water until the drought is over and reservoirs fill to normal levels.” Source: [www.denverwater.org](http://www.denverwater.org)
- Within the city an inverted block rate structure details the following rates:

### Inside City Rates\*

Block 1	\$1.63	Block 1 = 0-22,000 gallons
Block 2	\$1.96	Block 2 = 23,000-60,000 gallons
Block 3	\$2.45	Block 3 = Over 60,000 gallons
Service Charge	\$4.91	

- A portion of the surcharge will be allocated to fund a customer rebate program for high efficiency washers, soil amendments, large landscape audits and pressure-assisted toilets ranging potentially from \$15 - \$1000 for a 2 month summer period.
- Additionally, citing Denver is in stage 2 Drought Plan water use restrictions are in effect for the spring and summer of 2004. Watering is only allowed 2 days a week for 15 minutes with no watering between 10AM and 6PM.

- **Utah Initiatives**

- Utah's 2004 General Legislative Session recently passed a new law mandating conformance to Water Conservation Plans by municipalities or no funding for programs – according to Eric Stoltz the plans are coming in and they re working – positive impact H.B. 71 – **WATER CONSERVATION PLANS** which were originally required to be filed by the 2002 Utah Conservation and every 5 years thereafter, by towns and cities above only received 65% compliance by 2004. a tougher measure, which called for:
  - suspension of certain public funds under certain circumstances by the state auditor for noncompliance of water providers;
  - requires that water conservation plans contain a description of the extent to which a retail provider will use certain measures to achieve its conservation goals;
  - requires that water conservation plans contain a clearly stated water use reduction goal and implementation plan for each conservation measure, including a timeline for action and an evaluation process to measure progress; and
  - requires that the Board of Water Resources' report be presented to the interim committee at its November 2004 meeting.
- <http://www.conservewater.utah.gov/agency/plans/wcp/wcpsearch.htm>

- **North Carolina's Clean Water Management Trust Fund (CWMTF)**

The CWMTF was [established](#) by the General Assembly in 1996 (Article 13A; Chapter 113 of the North Carolina General Statutes). At the end of each fiscal year, 6.5% of the unreserved credit balance in North Carolina's General Fund (or a minimum of \$30 million) will go into the CWMTF. Revenues from the CWMTF will then be allocated in the form of grants to local governments, state agencies and conservation non-profits to help finance projects that specifically address water pollution problems. The 18 member, independent, CWMTF Board of Trustees has

full responsibility over the allocation of moneys from the Fund. CWMTF will fund projects that (1) enhance or restore degraded waters, (2) protect unpolluted waters, and/or (3) contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational benefits.

<http://www.cwmtf.net/welcome.html>