



**Arizona Department
of Water Resources**

System Water Plan Guidance Document

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Introduction

Drought conditions have affected Arizona during most of the last decade. The economic and environmental impacts of drought continue to increase as the population of the state increases. Although Arizona has a reliable water supply by comparison to several of its neighboring states, drought conditions in the rural parts of Arizona have had devastating personal and economic impacts. There is a need for further preparedness in case conditions worsen.

On March 20, 2003, Governor Janet Napolitano issued an executive order and established the Governor's Drought Task Force to address the drought issues facing all Arizonans. The Task Force made several recommendations, documented in the *Arizona Drought Preparedness Plan*, including that the Governor seek legislative authority for the Arizona Department of Water Resources (ADWR) to require water systems to develop a drought plan. Based on the group's recommendation, the drought plan would include mitigation strategies, including a water conservation plan to reduce vulnerability to drought and plan for drought response actions. In addition, the Governor's Drought Task Force recommended legislative authorization for ADWR to require all water systems to provide consistent and coordinated water supply information to ADWR.

Recognizing the need for adequate water planning, the Arizona Legislature passed House Bill 2277 during the 2005 legislative session. House Bill 2277, now established in the Arizona Revised Statutes, created a requirement for community water systems to develop and submit a System Water Plan to ADWR. The development of these plans is an important step toward improving water resource management planning at both the state and local levels. They will enable the state to identify data gaps and gather much needed information. In addition, these plans will allow the state to increase public awareness regarding water supplies, local drought preparedness and response measures, and to promote appropriate statewide conservation practices.

Definitions

“**Community Water System**” means a public water system that serves at least 15 service *connections* used by year-round residents of the area served by the system, or that regularly serves at least 25 year-round *residents* of the area served by the system. A person is a year-round resident of the area served by a system if the person’s primary residence is served water by that system.

“**ADWR**” means the Arizona Department of Water Resources.

“**A.R.S.**” means Arizona Revised Statutes.

“**Large Community Water System**” means a community water system that serves water to more than 1,850 persons.

“**Public Water System**” means an entity that distributes or sells water and that qualifies as a public water system under Arizona Revised Statutes (A.R.S.) §49-352, Subsection B (a water system that provides water for human consumption through pipes or other constructed conveyances and has at least 15 service connections or regularly serves an average of at least 25 persons daily for at least 60 days per year).

“**Small Community Water System**” means a community water system that does not qualify as a large community water system (small systems serve up to 1,850 people).

System Water Plan Overview

Applicability

All community water systems are required to submit a System Water Plan. Community water systems serve at least 15 service *connections* used by year-round residents of the area served by the system, or regularly serve at least 25 year-round *residents* of the area served by the system. A person is a year-round resident of the area served by a system if the person's primary residence is served water by that system.

If a water system's population is at or near the minimum number of connections (15) or residents (25) necessary to qualify as a community water system, the system should consider carefully the number of residents *regularly* served. Because the number of residents served can vary from year to year, systems should examine more than one year to determine whether the number of residents *regularly* served is at or above 25 people. A system's status should not change from one year to the next.

System Water Plan Components

The System Water Plan must include the following three components (note that certain exemptions may apply; see **Exemptions** on p. 18):

1. *Water Supply Plan* – The Water Supply Plan must evaluate system water supply needs in the service area and propose a strategy to meet identified needs. In order to determine the potential impact of drought, the plan should include an inventory of the water supplies currently available, and infrastructure necessary to deliver the water to customers. The plan should consider both most probable and worst-case scenarios for surface water and groundwater supplies. These evaluations can then be used to determine a water system's ability to meet water demands during both average and peak periods.
2. *Drought Preparedness Plan* – Once present and future water supply and demand have been evaluated in the Water Supply Plan, the Drought Preparedness Plan should evaluate water demand *reductions* that can be implemented in response to drought conditions. Water systems should define specific measures to reduce water demands when deemed necessary to meet available supplies.
3. *Water Conservation Plan* - The Water Conservation Plan must be designed to increase the community water system's efficiency, reduce waste, and encourage consumer conservation efforts. A good conservation plan is one that encourages a low water use lifestyle and prevents water shortages from occurring. The plan should include both demand and supply management measures, an educational component, and an evaluation component.

Assistance and Contact Information

The Statewide Drought Program and Statewide Conservation Office are available to provide assistance in the development of a System Water Plan. Please note the checklist provided in **Appendix B** for assistance in submitting a System Water Plan that meets all of the submission requirements.

ADWR has developed an alternative means for community water systems to comply with the System Water Plan requirements. The form titled *Small Community System Water Plan Form (Appendix C)* may be completed and submitted to meet the requirements of a System Water Plan. This form *is not required*; it is simply provided as an option for those systems that wish to use it. Systems may also choose to use the form as a guideline and develop a different format of their own. Either way, the form was developed so that by answering each of the questions, water systems will meet the System Water Plan requirements. This form is intended to assist smaller systems in preparing their plans, but can be used by larger systems as well. The form can also be obtained on ADWR's website as a Word document that can be completed electronically: <http://www.azwater.gov/dwr/drought/CWS.html>.

For questions on this guidance document, the Water Supply Plan or Drought Preparedness Plan, contact:

Melanie Ford, Drought Planner
Statewide Drought Program
3550 N. Central Ave.
Phoenix, Arizona 85012
Phone: (602) 771-8442
Fax: (602) 771-8681
mlford@azwater.gov

For questions on the Water Conservation Plan, contact:

Marjie Risk, Statewide Conservation Coordinator
Statewide Water Conservation Office
3550 N. Central Ave.
Phoenix, Arizona 85012
Phone: (602) 771-8422
Fax: (602) 771-8681
mlrisk@azwater.gov

Water Supply Plan

The Water Supply Plan must evaluate the water supply needs in the service area and propose a strategy to meet identified needs. In order to determine the potential impact of drought, the Water Supply Plan should include an inventory of the water supplies currently available and infrastructure necessary to deliver the water to customers. Therefore, the Water Supply Plan will provide a good foundation for developing the Drought Preparedness Plan and the Water Conservation Plan.

Exemption: *Systems with an Assured Water Supply Designation are not required to submit a Water Supply Plan.*

Table 1 below lists the statutory requirements of the Water Supply Plan, suggestions for information that can be submitted to meet the requirements, and any exemptions that apply:

Table 1. Water Supply Plan requirements

	Statutory Requirements	Comments/Suggestions Note these are <u>not</u> requirements	Exemptions
List and describe:			
1.	Service area lands	<i>GIS maps, legal description of township, range and section information</i>	---
2.	Sources of supply, including emergency sources	<i>Water source information such as groundwater, surface water, CAP, Colorado River, effluent or other Backup supplies may be identified by water source and conveyance mechanisms, such as backup wells, water hauling agreements or connections with other water systems.</i>	---
3.	Well registration numbers, water levels at well sites (if known)	<i>If current water levels are not known, last measured water level and date for each well may be indicated (if known).</i>	---
4.	Storage and treatment facilities	<i>Indicate number and type of facilities, including capacity and water source for each facility.</i>	---
Provide map and description:			
5.	Existing transmission and distribution facilities	---	Not required if previously provided pursuant to A.R.S. § 45-498 (cities, towns, private water companies and irrigation districts within an Active Management Area must maintain current maps clearly delineating service areas and

	Statutory Requirements	Comments/Suggestions Note these are <u>not</u> requirements	Exemptions
			distribution systems). <u>Map</u> is not required for small community water systems but could be submitted to meet the requirement (only a description is required).
6.	Existing interconnections	<ul style="list-style-type: none"> • <i>Capacity of interconnect</i> • <i>Volume of water purchased or delivered through interconnect each year (if applicable), and reasons this water was purchased (lack of supplies, failure of one or more supplies, etc.)</i> • <i>Description of how the interconnection agreement can be used to offset loss of, or reductions in, water supplies</i> • <i>Limitations of such interconnection (e.g. mutual use, one-way use, emergency use only, peak capacity, etc.)</i> 	<p>Not required if previously provided pursuant to A.R.S. § 45-498 (cities, towns, private water companies and irrigation districts within an Active Management Area must maintain current maps clearly delineating service areas and distribution systems).</p> <p><u>Map</u> is not required for small community water systems but could be submitted to meet the requirement (only a description is required).</p>
Provide data:			
7.	Monthly system production data categorized by the system's sources of supply	<i>Monthly system production data may be provided in millions of gallons or acre-feet. Production data should be based on previous year's data.</i>	---
8.	<p>For systems that use meters to measure withdrawals and diversions, indicate for the past five years:</p> <p>a) A summary of system average daily demands</p> <p>b) Maximum monthly demands</p> <p>c) An estimate of peak day demands</p>	<p>a) <i>Average daily demand may be indicated on a yearly basis for the past five years. Or, seasonal averages may be useful in providing a more detailed picture of system demands. The days and output should be indicated.</i></p> <p>b) <i>Maximum monthly demands would be the total output during the months of highest demand. Indicate the months and the output.</i></p> <p>c) <i>Peak day demands would be the day of each year with the highest total demand. Indicate days and output.</i></p> <p><i>Peak <u>hour</u> demands are important to consider as well. See Discussion below.</i></p>	Not required for systems that are not metered.
9.	Quantities of water sold to or purchased from other water systems during the	<i>Water bills may be useful for estimation</i>	Not required if previously provided pursuant to A.R.S. § 45-632 (each person required to file an annual report must

	Statutory Requirements	Comments/Suggestions <i>Note these are <u>not</u> requirements</i>	Exemptions
	previous five years		maintain current accurate records of withdrawals, transportation, deliveries and use of groundwater).
Analysis:			
10.	An analysis of present and future water supply demands for the next five, ten and twenty years	<ul style="list-style-type: none"> • <i>Current demand can be based on either current or previous year.</i> • <i>Projection calculations may be based on:</i> <ul style="list-style-type: none"> - <i>Gallons per capita per day (GPCD)</i> - <i>Gallons per housing unit per day (GPHUD)</i> - <i>Number of connections and population</i> - <i>Historic or expected demands</i> - <i>Land use planning/classification</i> 	---

Discussion

The Water Supply Plan should consider both most probable and worst-case scenarios for surface water and groundwater supplies. Consider what would happen if all or a portion of well supplies became unreliable, and how such situations could be mitigated. Assessments of vulnerability to water supply shortages resulting from potential well failures, reductions in surface water supplies, or reductions in well capacities resulting from drought conditions should be evaluated.

These evaluations can then be used to determine a water system's ability to meet water demands during both average and peak periods. If a sufficient storage system is in place, it is possible that a water system can supply average day demand, even without all of its wells. However, peak day and peak hour demands may drain storage tanks faster than wells can refill them. Consider what might happen if three-quarters of the customers took a shower at the same time. Are the systems' supplies and infrastructure sufficient to meet demand as the population grows over the next 20 years?

When assessing water supplies, it is a good idea to consider unique local conditions that may affect the ability of a water system to obtain reliable quantities of water. For example, environmental laws such as the Endangered Species Act are increasingly affecting surface streams throughout the state. Endangered species needs may compete with the needs of human water users utilizing the same supply. Water systems should consider this potential conflict during the planning process to avoid legal issues during times of shortage.

Another limitation on supply availability in Arizona is the ban on transferring groundwater supplies between groundwater basins. These transfers are allowed only in certain limited cases. Water systems located on the edge of a groundwater basin

boundary may not be able to construct a new well in another basin and transport the additional water. Groundwater basin maps are available at ADWR's Phoenix office. For more information on the statutory requirements pertaining to Transportation of Groundwater, review A.R.S. §§ 45-541 to 45-547.

Drought Preparedness Plan

Once present and future water supply and demand have been evaluated in the Water Supply Plan, the Drought Preparedness Plan should evaluate water demand *reductions* that can be implemented in response to drought conditions. ADWR encourages water systems to share ideas and information; however, each Plan should be specific to the *water supplies, water demand and infrastructure* of each individual system. See the **Discussion** following the table below.

All community water systems must submit a Drought Preparedness Plan; there are no exemptions.

Table 2 below lists the statutory requirements of the Drought Preparedness Plan along with suggestions for information that can be submitted to meet the requirements:

Table 2. Drought Preparedness Plan requirements

	Statutory Requirements	Comments/Suggestions <i>Note these are <u>not</u> requirements</i>
1.	The name, address and telephone number of the community water system and the names of persons responsible for directing operations during a water shortage emergency	<i>Identification of person(s) authorized or responsible for initiating and terminating drought stages, and for implementing drought management measures would be important to include as well.</i>
2.	Drought or emergency response stages that provide for implementation of measures in response to a reduction in available water supply resulting from drought or infrastructure failure	<i>Drought stages should be specific to <u>water supply availability</u>. These drought stages will provide the basis for development of management measures under 3(c) below. Indicators and triggers for each stage should be developed. See Discussion below.</i>
3.	A plan of action that the community water system will take to respond to drought or water shortage conditions, including:	
	a) Provisions to actively inform the public of the water supply shortage and a program for continued education and information regarding implementation of the Drought Preparedness Plan	<i>The public should be made aware of the drought stages that the water system has developed and should understand what management measures will take place at each stage (see 3(c) below).</i>
	b) Development of emergency supplies, which may include identification of emergency or redundant facilities to withdraw, divert or transport substitute supplies of the same or other types of water	---
	c) Specific water supply or water demand management measures for each stage of drought or water shortage conditions	<i>For each stage of drought identified under #2 above, management measures should be listed that will respond to and/or mitigate drought conditions (e.g. when "Drought Stage 3" is triggered, measures Y and Z will be implemented).</i>
	Note - • Management measures are subject to	

	Statutory Requirements	Comments/Suggestions <i>Note these are <u>not</u> requirements</i>
	<p>approval by the Arizona Corporation Commission (ACC) if the community water system is a public service corporation.</p> <ul style="list-style-type: none"> This requirement may be met by providing a curtailment tariff on file with the Arizona Corporation Commission (ACC). 	

Discussion

The Drought Preparedness Plan is *not* an emergency response plan, although emergency response should be *one component* of the plan. The purpose of the Drought Preparedness Plan is to prevent a drought/water shortage emergency.

Water systems should define specific measures to reduce water demands when deemed necessary to meet available supplies. Some typical examples include reducing landscape irrigation by both residential and non-residential users, and offering water use audits to customers. It is important to develop a plan that considers peak period, peak day, and peak hour use, and not just average demand scenarios.

Water systems have a significant amount of flexibility in developing the Drought Preparedness Plan and associated drought stages. The drought stages that each water system develops should be specific to the system and based on water supply availability. As an example, consider a scenario where precipitation deficiencies in a particular region of the state indicate “severe” short-term drought status, as determined in Arizona’s monthly Drought Monitor Report. This severe status is based on weather conditions only.

Because water systems need to determine drought stages based on water supplies, a system in this severe area may likely declare a different drought stage – either better or worse than “severe.” It is also likely two systems adjacent to each other in this “severe” area may declare drought stages different from each other. Consider the example systems below:

- Water System A is a large system using both ground water and surface water sources. This system has a large storage capacity and a system of back-up wells that ensure a constant supply, even if a number of primary wells are out of service or unable to meet demand during peak periods. This water system has declared a “moderate” drought stage for its service area, based on water supply availability.***
- Water System B lies immediately adjacent to Water System A. It is a small system completely dependent on ground water supplies and has experienced an explosion in population growth over the past couple of years. This system is struggling to keep pace with new infrastructure and expansion of current facilities. It has declared an “extreme” drought stage for its service area, based on water supply availability.***

Water System A may be experiencing “moderate” drought conditions due to a combination of many factors: good storage capacity, back-up water supplies, and slower population growth. Additionally, the below-average precipitation levels may not have persisted long enough to start impacting water supplies. Water System B, on the other hand, has progressed to “extreme” drought because supplies were already stressed.

Thus, there are two likely reasons for the differences in drought stages:

- 1. A decrease in groundwater and surface water supplies (“hydrological drought”) is usually delayed in time behind a period of below-average precipitation levels (“meteorological drought”). Although drought status based on precipitation levels may be severe, supplies may not be so severely impacted until a couple of years down the road.*
- 2. Effects on water supply depend on a complex set of variables that vary from one water system to the next, including population growth, amount of supply in relationship to demand, infrastructure of the system, and water management and conservation practices.*

Drought stages and management measures should be developed based on an analysis of system-specific vulnerabilities. Are supplies already stretched to the limit? Is population growing rapidly? How quickly will drought impact supplies?

ADWR recommends developing indicators and triggers for each drought stage. *Indicators* would be the variables that describe the specific drought conditions that will cause stress to the system’s water supplies (e.g. precipitation, streamflow, ground water levels, reservoir levels, soil moisture, palmer indices, etc.). *Triggers* would be the specific values of the indicators that initiate and terminate each level or stage of a drought plan and any associated management responses (e.g. when reservoir levels drop to level X, “Drought Stage 3” is triggered).

The two example water systems will probably have very different indicators, or at least very different trigger levels for moving from one drought stage to the next. Water System A’s storage system and back-up wells provide a type of “buffer” against any immediate impacts of weather, whereas Water System B is more directly vulnerable. Once the drought stages and associated indicators and triggers are developed, management measures must be determined for each stage. These will also vary by water system. Building new infrastructure and increasing storage capacity may be a major portion of Water System B’s plan. Water System A may focus solely on conservation practices in order to maintain its reserves.

Note that there are no requirements as to how many stages a system should develop or what the indicators should be. ADWR recommends that systems take a regional planning approach to drought response and coordinate with other area water providers in creating a Drought Preparedness Plan, especially if systems may need to rely on each other for emergency supplies. Example drought stages and management measures are provided in **Appendix A**.

Because drought and its effects on water supplies can be quite complex, it is vital that water systems communicate clearly and openly with their customers to ensure success of the Drought Preparedness Plan. If customers are being asked to implement conservation practices and see that a neighboring system is not, this may lead to confusion and inaction. Water systems should include customers as key stakeholders in the plan development process to facilitate understanding and involvement.

Water Conservation Plan

The Water Conservation Plan must be designed to increase the community water system's efficiency, reduce waste, and encourage consumer conservation efforts. A good conservation plan is one that encourages water use efficiency, reduces water waste, encourages a low water use lifestyle and prevents water shortages from occurring.

Exemption: *Large municipal providers in an Active Management Area (those that supply more than 250 acre-feet of water for non-irrigation use during a calendar year pursuant to A.R.S. Title 45, Chapter 2, Article 9) are not required to submit a Water Conservation Plan.*

A small municipal provider in an Active Management Area that demonstrates, under reasonable growth projections, that it will be regulated as a large municipal provider (pursuant to A.R.S. Title 45, Chapter 2, Article 9) prior to January 1, 2012, may petition ADWR for an exemption by January 1, 2007.

Table 3 below lists the statutory requirements of the plan along with suggestions for information that can be submitted to meet the requirements:

Table 3. Water Conservation Plan requirements

	Statutory Requirements	Comments/Suggestions <i>Note these are not requirements</i>
1.	Feasible measures that may be implemented to determine and control lost and unaccounted for water	<i>Install or replace meters, repair leaking pipes</i>
2.	Consideration of water rate structures that encourage efficient use of water, as set by the community water system's governing body Note – Rate changes are subject to approval by the Arizona Corporation Commission (ACC) if the community water system is a public service corporation.	<i>Information that may be provided:</i> <ul style="list-style-type: none"> • Existing rate structure information • Plans to institute conservation incentive rate structures if they are not already in use (e.g. increasing block rates, seasonal rates, target billing, excessive use rates, etc.) • Any education/outreach efforts tied to acceptance of incentive rates (e.g. workshops, etc.)
3.	A continuing conservation education program that contains provisions to actively inform the public of drought conditions and provide information on conservation measures that reduce vulnerability from drought conditions, including: <ol style="list-style-type: none"> a) Curtailment of nonessential water uses b) Affordable efficiency technologies for indoor and outdoor use c) Rebate and retrofit programs for indoor and outdoor uses d) Reuse and recycling programs 	<i>Provide descriptions of any existing and proposed conservation efforts (see examples under Discussion below).</i>

Discussion

A good Water Conservation Plan can be the key to reducing a water system's vulnerability to drought and water shortages. A well-designed plan should include a balance of both demand- and supply-side measures. Supply-side programs, such as leak detection and repair, increase the water supply, while demand-side programs, such as higher seasonal rates, tend to reduce the demand for water. A long-term conservation program can result in significant cost savings to the water system; it can extend the life of existing infrastructure and delay the costs associated with building new facilities or retrofitting old facilities to handle larger capacities.

Community awareness and support is vital to the success of any conservation program. The most successful conservation programs are ones that are designed specifically for the local community; what works in one community may not work in another area where lifestyles and water use habits are different. A water system designing a conservation program for the first time should begin with programs that are affordable, easy to implement, and have a proven or high rate of success for water savings (see examples below).

Once conservation measures have been chosen, a public education component is vital to the success of the programs. Customers should be educated on the purpose of the conservation measures and the benefits they will provide. Incentives for changing water use behaviors should be considered whenever possible, as customers are more likely to participate if they can see a clear and direct benefit for themselves. Higher seasonal rates, for example, should provide a financial incentive for customers to conserve water during periods of higher demand.

In order to set conservation goals, the water system first needs a good understanding of its baseline water use. The water system characteristics determined in the Water Supply Plan and the Drought Preparedness Plan should provide much of the needed information. From the baseline water use, a percent reduction in water use can be targeted and tracked. Based on the size of the system, the most feasible measures to help reach that goal should be selected, in terms of initial cost, payback and ease of implementation. Appropriate conservation measures will vary based on the size of the community water system. Following are suggestions to consider:

For small community water systems, consider:

- Universal metering
- Measures to reduce lost and unaccounted for water
- Conservation incentive rates
- General education and outreach efforts (pamphlets, workshops, etc.) that focus on standard conservation measures

For large community water systems, consider:

- Interior and exterior water use audits
- Excessive use or seasonal rates
- Retrofit programs

- Fixture replacement and promotional efforts
- Water use regulations and/or integrated resource management (water conservation achieved with conservation of other resources such as energy)
- System pressure management evaluations and/or efficiency requirements for landscape water use
- Education and outreach programs for teachers, students, and the community as a whole
- Acceptable levels of discretionary use reduction to include time of day, day of week recommendations, water waste ordinances, landscape water restrictions, etc.
- Existing or planned programs that encourage or require the reuse or recycling of water (e.g. rainwater harvesting, gray water use) - description should include any incentives provided

An evaluation component is a crucial consideration in any conservation plan. How will the water system determine which measures have been successful, and which have not? The plan should be a living document that changes based on evaluation of the conservation measures implemented, as well as changes in service area characteristics.

Important note - Upon written notification from ADWR that the plan is in compliance with the requirements of A.R.S. § 45-342, a community water system must start implementing the Water Conservation Plan within 12 months after receipt of that notice. If a system receives notice that the plan is not in compliance, the system must start implementing the plan within 12 months after the date by which the system is required to make any revisions or additions to the plan to bring it into compliance.

Exemption Summary

- 1) **Assured Water Supply** (pursuant to A.R.S. § 45-576) – Systems with this designation are exempt from the requirement to submit the Water Supply Plan component of the System Water Plan.
- 2) **Large municipal provider** (pursuant to A.R.S. Title 45, Chapter 2, Article 9) – Large municipal providers (those in an Active Management Area that supply more than 250 acre-feet of water for non-irrigation use during a calendar year) are exempt from the requirement to submit the Water Conservation Plan component of the System Water Plan.
- 3) **Small municipal provider** (pursuant to A.R.S. Title 45, Chapter 2, Article 9) **that will be a large provider by 2012** - Small municipal providers (those in an Active Management Area that supply 250 acre-feet or less of water for non-irrigation use during a calendar year) are exempt from submitting the Water Conservation Plan component, if the system:
 - a) Petitions ADWR for an exemption prior to January 1, 2007, and
 - b) Demonstrates, under reasonable growth projections, that it will be regulated as a Large Municipal Provider under A.R.S. Title 45, Chapter 2, Article 9, (a municipal provider that supplies more than 250 acre-feet of water for non-irrigation use during a calendar year) prior to January 1, 2012.
- 4) **Other exemptions** - A system may make a written request to ADWR to be exempted from submitting any information required in the System Water Plan that has already been submitted to ADWR. ADWR will grant the exemption upon determination that the information is already on file at ADWR and meets the requirements of A.R.S. § 45-342.

Table 4. Requirement/exemption look-up table

Entity Type		Water Supply Plan	Drought Preparedness Plan	Water Conservation Plan
Inside an AMA				
Small Municipal Water Provider	<i>with designated Assured Water Supply</i>	exempt	X	X
	<i>with petition to ADWR prior to January 1, 2007 that demonstrates it will be regulated as a Large Municipal Provider prior to Jan. 2012</i>	X	X	exempt
	<i>without an Assured Water Supply or petition</i>	X	X	X
Large Municipal Water Provider	<i>with designated Assured Water Supply</i>	exempt	X	exempt
	<i>without designated Assured Water Supply</i>	X	X	exempt
Outside an AMA				
All Community Water Systems*		X	X	X

X – indicates those entities are responsible for submitting the noted plans.

* Note that a designated **Adequate Water Supply** may meet the requirements of the **Water Supply Plan** and qualify a water system for an exemption from this requirement. Please submit a written exemption request to ADWR (see Exemption 4 above).

Example – A community water system that is a **large municipal provider** (exempt from submitting a Water Conservation Plan) and has an **assured water supply designation** (exempt from submitting a Water Supply Plan) only needs to submit a **Drought Preparedness Plan**.

Keep in mind that **all community water systems must submit a Drought Preparedness Plan**.

Submission and Deadlines

Mail or deliver the completed System Water Plan to:
Melanie Ford, Drought Planner
Arizona Department of Water Resources
3550 N. Central Ave.
Phoenix, AZ 85012

Large Community Water Systems (serving more than 1,850 people):

The first System Water Plan must be submitted to ADWR no later than January 1, 2007, unless filing jointly with another community water system as identified below. An updated plan must be submitted prior to January 1st of every fifth calendar year thereafter (Jan. 1st of 2012, 2017, 2022).

Small Community Water Systems (serving 1,850 people or fewer):

The first System Water Plan must be submitted to ADWR no later than January 1, 2008. An updated plan must be submitted prior to January 1st of every fifth calendar year thereafter (Jan. 1st of 2013, 2018, 2023). Note that a small system may request an extension for submitting only the *first* System Water Plan (due in 2008), as long as the request is submitted at least 90 days prior to the January due date (Oct. 3, 2007). ADWR will notify the system in writing that the request has been received and granted.

Joint Community Water System Plans and Filings:

Two or more water systems may coordinate efforts and submit a joint System Water Plan if they serve water to residents in the same city or town. The first joint System Water Plan must be submitted to ADWR no later than January 1, 2008. An updated plan must be submitted prior to January 1st of every fifth calendar year thereafter (Jan. 1st of 2013, 2018, 2023).

Note - If a large community water system provider plans to submit a joint System Water Plan to ADWR, please provide written notice to ADWR prior to January 1, 2007 (due date for large community water systems to submit System Water Plans), indicating that a joint System Water Plan will be submitted. In the written notification, please specify the other partnering entity/entities. Providing written notice to ADWR prior to January 1, 2007, will prevent the water system provider from receiving a non-compliance determination letter from ADWR.

Revisions:

If a community water system revises its System Water Plan after submittal to ADWR, the revised plan must be submitted to ADWR within 60 days from the date of revision.

ADWR Plan Review

ADWR must review all System Water Plans and any subsequent revised plans. In addition, ADWR must provide written notice to community water systems of its determination on whether or not the System Water Plan meets the statutory requirements:

- a) **If the System Water Plan meets all of the requirements**, ADWR will give written notice that the plan is in compliance. ADWR may determine that the plan meets all of the requirements but may also recommend changes to improve the plan. In this case, ADWR will provide written notice of the recommended changes; however, the community water system provider is not required to make the changes.
- b) **If the System Water Plan does not meet all of the requirements**, ADWR will provide written notice of that determination to the community water system. The community water system will have at least 120 days to make any necessary revisions or additions to bring the plan into compliance. If the community water system does not bring the plan into compliance by the date specified in the notice, ADWR will provide notice of the noncompliance to the governing bodies of the cities, towns and counties located within the community water system's service area.

Note – Community water system providers are in compliance by supplying the required information. These planning requirements are designed to improve water resource management planning at both the state and local levels.

Appendix A
Drought Stage and Water Management Examples

Table A-1 below illustrates potential drought stages and names. **Table A-2** provides some examples of management measures that could be implemented at different drought stages (this table is modified from a table found in the *Arizona Drought Preparedness Plan*). These tables are intended as examples only; water systems can develop any number of drought stages and should develop management measures that make sense for their particular system.

Table A-1. *Example* drought stages

Water System #1	Water System #2	Water System #3
Stage 0 – Normal (Reduce Vulnerability)	Stage 1 – Drought Alert	Stage 1 – Mild Drought Conditions
Stage 1 – Abnormally Dry (Raise Consciousness)	Stage 2 – Drought Warning	Stage 2 – Moderate Drought Conditions
Stage 2 – Moderate (Voluntary Reductions)	Stage 3 – Drought Emergency	Stage 3 – Severe Drought Conditions
Stage 3 – Severe (Curtailment)	Stage 4 – Drought Crisis	Stage 4 – Extreme Drought Conditions
Stage 4 – Extreme (Eliminate Non-essential Water Use)	---	---

Table A-2. *Example* drought stage management measures

Drought Stage	Management Measures	
	Water system will:	Water system will encourage customers to:
Stage 0 – Normal (Reduce Vulnerability)	<ul style="list-style-type: none"> ▪ Discourage developers from requiring turf in residential developments ▪ Improve infrastructure and storage facilities, if necessary 	<ul style="list-style-type: none"> ▪ Install low-water use landscaping ▪ Repair leaks in irrigation systems
Stage 1 – Abnormally Dry (Raise Consciousness)	<ul style="list-style-type: none"> ▪ Communicate conditions, increase outreach and provide conservation tips ▪ Increase use of reclaimed effluent for commercial landscaping to reduce potable water supply shortages 	<ul style="list-style-type: none"> ▪ Fix leaking faucets and replace faulty fixtures ▪ Avoid outdoor watering during hottest part of the day
Stage 2 – Moderate (Voluntary Reductions)	<ul style="list-style-type: none"> ▪ Provide incentives for water conservation for residences and businesses installing efficient alternative outdoor irrigation ▪ Implement water waste ordinances 	<ul style="list-style-type: none"> ▪ Voluntarily reduce discretionary outdoor water uses ▪ Comply with water wasting ordinances
Stage 3 – Severe (Curtailment)	<ul style="list-style-type: none"> ▪ Implement time of day/day of week schedules ▪ Impose restrictions on fire and fireworks 	<ul style="list-style-type: none"> ▪ Comply with time of day/day of week outdoor watering restrictions ▪ Use covers to reduce evaporation from pools
Stage 4 – Extreme (Eliminate Non-Essential Water Use)	<ul style="list-style-type: none"> ▪ Eliminate outdoor watering ▪ Prohibit all public water uses not required for health or safety and publicize enforcement activities to customers 	<ul style="list-style-type: none"> ▪ Eliminate outdoor watering ▪ Reuse water (dishwater, shower water, pool back-wash)

Appendix B
Checklist for System Water Plan Submission

Table B-1. Checklist for submission

WATER SUPPLY PLAN REQUIREMENTS		
<input type="checkbox"/>	1.	Service area lands
<input type="checkbox"/>	2.	Sources of supply, including emergency sources
<input type="checkbox"/>	3.	Well registration numbers, water levels at the well sites (if known)
<input type="checkbox"/>	4.	Storage and treatment facilities
<input type="checkbox"/>	5.	Map and description of existing transmission and distribution facilities*
<input type="checkbox"/>	6.	Map and description of existing interconnections*
<input type="checkbox"/>	7.	Monthly system production data categorized by the system's sources of supply
<input type="checkbox"/>	8.	a) A summary of system average daily demands**
<input type="checkbox"/>		b) Maximum monthly demands**
<input type="checkbox"/>		c) An estimate of peak day demands for the past five years**
<input type="checkbox"/>	9.	Quantities of water sold to or purchased from other water systems during the previous five years
<input type="checkbox"/>	10.	An analysis of present and future water supply demands for the next five, ten and twenty years
DROUGHT PREPAREDNESS PLAN REQUIREMENTS		
<input type="checkbox"/>	1.	The name, address and telephone number of the community water system and the names of persons responsible for directing operations during a water shortage emergency
<input type="checkbox"/>	2.	Drought or emergency response stages that provide for implementation of measures in response to a reduction in available water supply resulting from drought or infrastructure failure
	3.	A plan of action that the community water system will take to respond to drought or water shortage conditions, including:
<input type="checkbox"/>		a) Provisions to actively inform the public of the water supply shortage and a program for continued education and information regarding implementation of the Drought Preparedness Plan
<input type="checkbox"/>		b) Development of emergency supplies, which may include identification of emergency or redundant facilities to withdraw, divert or transport substitute supplies of the same or other types of water
<input type="checkbox"/>		c) Specific water supply or water demand management measures for each stage of drought or water shortage conditions
WATER CONSERVATION PLAN REQUIREMENTS		
<input type="checkbox"/>	1.	Feasible measures that may be implemented to determine and control lost and unaccounted for water
<input type="checkbox"/>	2.	Consideration of water rate structures that encourage efficient use of water, as set by the community water system's governing body
	3.	A continuing conservation education program that contains provisions to actively inform the public of drought conditions and provide information on conservation measures that reduce vulnerability from drought conditions, including:
<input type="checkbox"/>		a) Curtailment of nonessential water uses
<input type="checkbox"/>		b) Affordable efficiency technologies for indoor and outdoor use
<input type="checkbox"/>		c) Rebate and retrofit programs for indoor and outdoor uses
<input type="checkbox"/>		d) Reuse and recycling programs

* Map is not required for small systems (serving $\leq 1,850$ people); only a description is required. A map may be submitted to meet the requirements.

**Not required for non-metered systems

Appendix C
System Water Plan Form
for Small Community Water Systems

System Water Plan Form

ADWR has developed a form, beginning on the next page, which *may* be filled out and submitted as the System Water Plan. The form may also be used as a guideline and systems may develop the plan in a different format. Either way, the form was developed so that by answering each of the questions, water systems will meet the System Water Plan requirements. This form is intended to assist smaller systems in preparing their plans, but can be used by larger systems as well.

Please note that *water systems are not required to follow this format or submit this form*. It is simply provided as an option. ADWR encourages systems to be creative in developing a plan that is useful and practical for their own planning purposes.

The System Water Plan form can also be found on ADWR's website as a separate Word document that can be downloaded and completed electronically:
<http://www.azwater.gov/dwr/drought/CWS.html>.

System Water Plan Form

WATER SUPPLY PLAN

1. List and describe service area lands:

2. List and describe sources of supply, including emergency sources:

3. List and describe well registration numbers and water levels at the well sites (if known):
Note: If current water levels are not known, please provide water levels and dates of last measurement, if known.

4. List and describe storage and treatment facilities:
Note - Please describe capacities and water sources/types for each facility.

5. Describe existing transmission and distribution facilities:
Note – A map is not required for small systems but could be submitted to meet the description requirement.

6. List and describe existing interconnections:
Note – A map is not required for small systems but could be submitted to meet the description requirement.

SYSTEM WATER PLAN FORM

WATER SUPPLY PLAN (cont.)

7. Describe monthly system production data categorized by the system's sources of supply:

8. For systems that use meters to measure withdrawals and diversions please provide:

Note – For systems that are not metered, estimate or leave blank.

a. Summary of system average daily demands:

b. Maximum monthly demands:

c. Estimated peak day demands for the past five years:

9. List and describe the quantities of water sold to or purchased from other water systems during the previous five years:

10. Provide an analysis of present and future water supply demands for the next five, ten and twenty years:

SYSTEM WATER PLAN FORM

DROUGHT PREPAREDNESS PLAN

1. Name, address and telephone number of the community water system and the names of Officers or other persons responsible for directing operations during a water shortage emergency:

2. Identify drought or emergency response stages that provide for implementation of measures in response to a reduction in available water supply resulting from drought or infrastructure failure:

3. A plan of action that the community water system will take to respond to drought or water shortage conditions, including:
 - a. Provisions to actively inform the public of the water supply shortage and a program for continued education and information regarding implementation of the Drought Preparedness Plan:

 - b. Development of emergency supplies, which may include identification of emergency or redundant facilities to withdraw, divert or transport substitute supplies of the same or other types of water:

 - c. Specific water supply or water demand management measures for each stage of drought or water shortage conditions [measures are subject to approval by the Arizona Corporation Commission (ACC) if the community water system is a public service corporation]:

2008 ARIZONA DROUGHT PREPAREDNESS ANNUAL REPORT

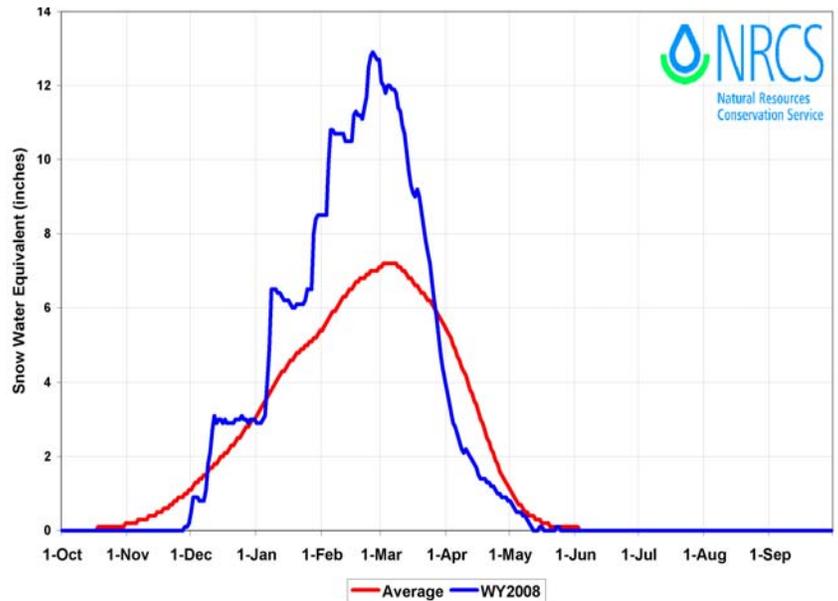
Drought Status Summary

Winter Precipitation

Winter of 2007-2008 was wetter than average everywhere except in the southeast watersheds, from the end of November through January and February, increasing Arizona reservoir storage for the first time since 2005. December was exceptionally wet statewide. Arizona’s southwest deserts began to green up through the early spring, followed by the forested highlands into the drier late spring. Overall temperatures were cooler than average in the northeast, due to the pattern of winter storms, and warmer than average in the southern counties which were by-passed by the storm systems.

At nearly all USDA-Natural Resources Conservation Service (NRCS) automated snow telemetry (SNOTEL) sites, precipitation catch was well above normal during the “peak” snow season from December 1 through March 1 (Figure 1). However, mountain precipitation during March and April proved to be well below average, with only marginal snow accumulations in the basins. Warm temperatures caused the snowpack to melt out by the end of April.

Figure 1. Snow water equivalent at high-elevation gages compared to long-term average.



Statewide at the end of April, short-term drought status had improved to “no drought” for ten watersheds, as calculated by Arizona’s State Drought Monitoring Technical Committee, leaving only four southeastern watersheds in the lowest two categories of drought: abnormally dry and moderate.

Summer Precipitation

Whereas winter precipitation largely missed southeastern Arizona, the 2008 monsoon season produced nearly a mirror image of winter, with wetter than average conditions in southern Arizona, and drier than average conditions in northeastern Arizona. The thunderstorm activity improved rangeland conditions and vegetation health in the southeast. The Little Colorado River watershed in the northeast is still very dry for the water year. Temperatures during the summer were warmer than average everywhere except the southeast, where continual thunderstorm activity kept temperatures

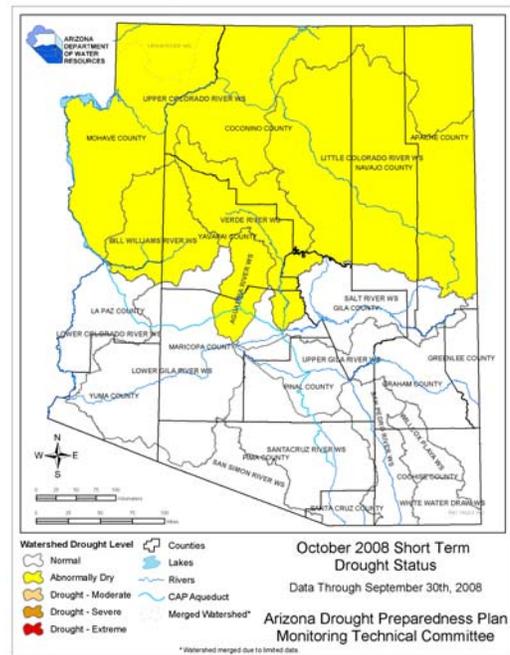


Figure 2. Short-term drought status as of September 30, 2008 shows the southern half of the state at “normal” based on precipitation gage data.

relatively low. Precipitation dropped off significantly in September, and Phoenix tied the record for the driest September since 1895.

Short-term drought status improved significantly in the southern half of the state due to the summer monsoon (Figure 2). The northern half of the state remains abnormally dry, as of the end of September 2008.

Water Year Summary

At SNOTEL and other mountain gauges, cumulative precipitation for the water year ending September 30 was at or above average in all basins (Table 1).

River Basin	Percent of 30-yr. average Precipitation at NRCS high elevation gauges
Salt River Basin	121%
Verde River Basin	109%
Little Colorado River Basin	124%
San Francisco- Upper Gila River Basin	104%

Table 1. Mountain precipitation for water year 2008.

Considering drought status as indicated by streamflow, average drought values based on USGS streamflow measurements for the 2008 water year show minimal improvement from 2007 (Figure 3). Eleven sites show no change from last year and eleven show improving drought conditions. Drought severity worsened at four sites in the southeast portion of the state, with the largest degradation in the watershed measured at Leslie Creek near McNeal (“no drought” to “severe drought”). The other three sites worsened by only one drought level.

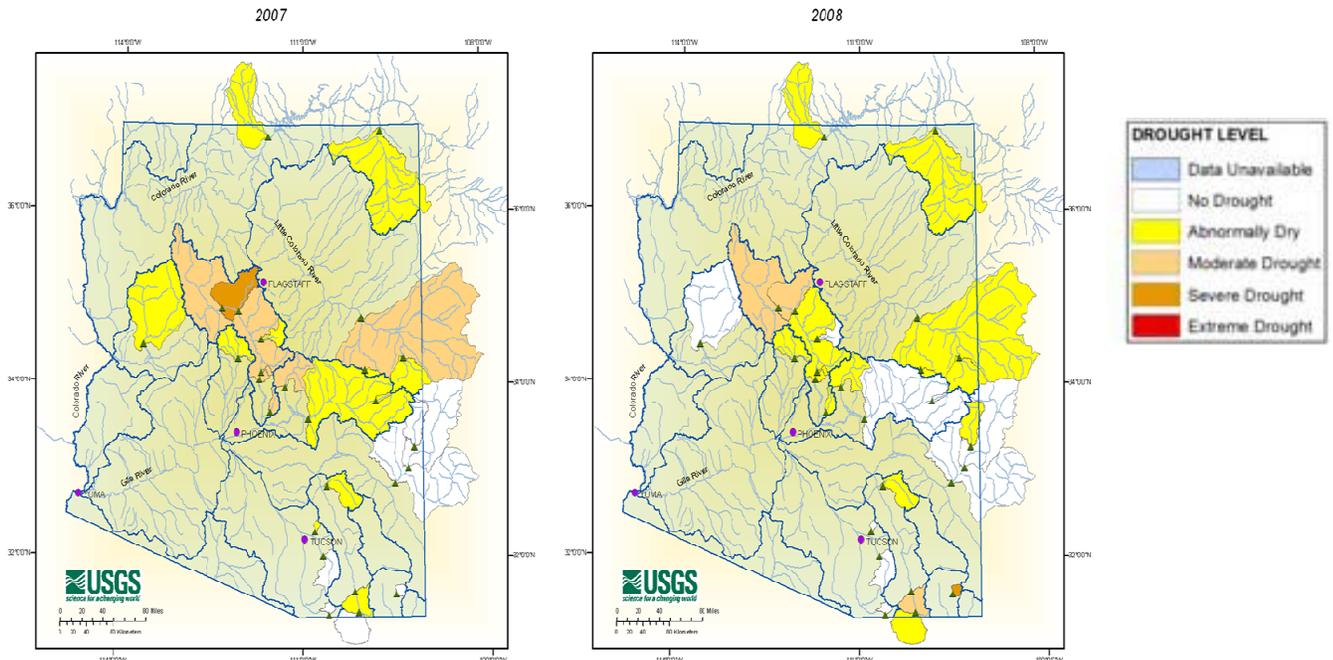


Figure 3. Drought conditions as determined by USGS stream gages show moderate improvement from 2007 to 2008.

The above-average precipitation in the White Mountains, Salt River, Phoenix area, and the south central deserts filled the state's reservoirs this year. Since October 2007, total storage in the large in-state reservoirs in the Salt, Verde, and Gila River basins increased by almost 74 percent. Total storage in lakes Mead and Powell, which provide more than 90 percent of the storage on the Colorado River, increased by 2.2 million acre-feet during water year 2008.

Long-term drought conditions, on the other hand, remain a concern (Figure 4). It is important to note that precipitation was near or below average over a large portion of the state (Figure 5) in 2008, and it will take at least a couple of above-average years statewide to bring long-term improvements to wildlife habitat, forest health, groundwater recharge, and agriculture.

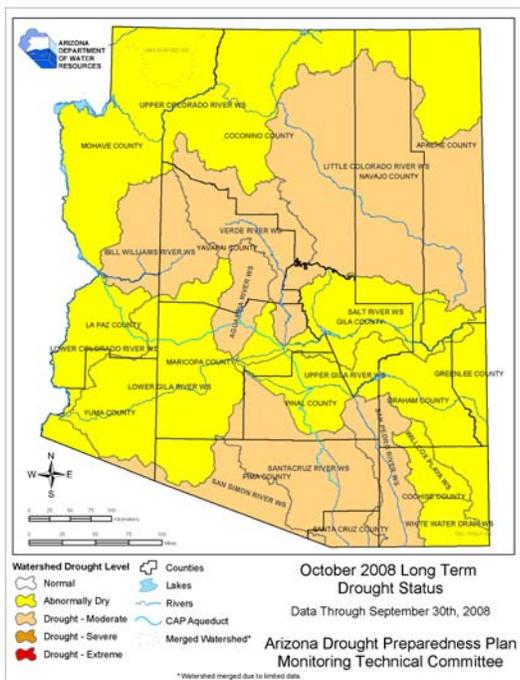


Figure 4. Long-term drought status as of September 30, 2008, as determined by Arizona's State Drought Monitoring Technical Committee.

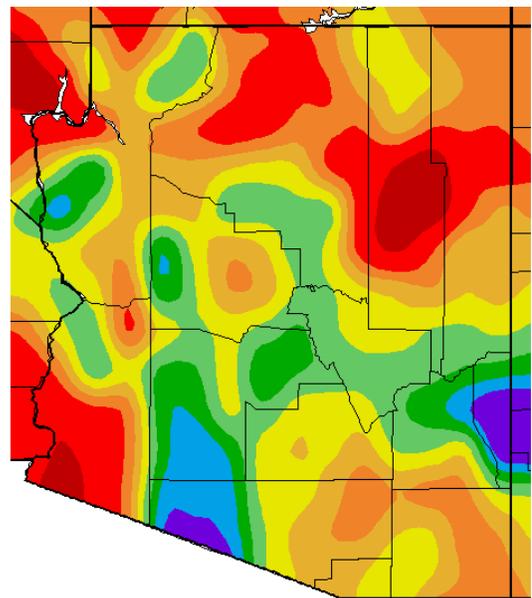


Figure 5. Percent of average precipitation for water year 2008.

Outlook for 2009

The National Weather Service's Climate Prediction Center (CPC) projections for this winter's weather across the Southwest indicate some confidence **precipitation will be below average** during the wetter winter months. The CPC models do not show a strong signal with respect to winter temperatures, hence there is an equal chance for above average, average, or below average temperatures. However, CPC has a moderately high confidence **temperatures will be above average** next spring. It seems reasonable to assume those areas already experiencing drought conditions will see these conditions worsen somewhat during the winter of 2008-09.

Drought Preparedness Plan Implementation Highlights

Drought Planning for Community Water Systems

The Community Water Planning – Drought and Water Conservation Programs worked this year to implement drought planning and water use reporting regulations established by the state legislature in 2005 and to provide assistance to water providers in meeting these requirements.

System Water Plans - ADWR completed its reviews of approximately 400 system water plans. Of those small systems that submitted plans, approximately 68% met the statutory requirements. Providers that did not meet requirements must submit a revised plan by the end of November 2008.

In general, many small water providers lack the training and/or resources necessary to develop a good water planning document. ADWR will continue to seek out sources of assistance for these providers. It is also clear from ADWR's review that smaller water providers need assistance in securing emergency supplies and preparing for potential water shortage conditions, and this will be a primary focus for ADWR in 2009.

Annual Water Use Reports - Staff focused their efforts this year on improving the online water use reporting tool as well as the paper report forms with the goal of gathering more accurate data and improving the compliance rate. ADWR continues to encourage water providers to use the online reporting option to reduce department costs and increase program efficiency. From reporting year 2006 to 2007, the number of online reporters increased by 18%. ADWR anticipates this number will continue to increase.

The biggest challenge to overcome with regard to water use reporting is the lack of water meters among the state's small water providers. These providers are still required to report their water use, but must indicate that it is estimated. Many did not have any good method of estimating, and were forced to use a very general, and potentially inaccurate, average per capita use. Of those water providers that reported, approximately 27% were not metered. However, approximately 120 providers did not file a report, so the total number of un-metered systems is unknown. (Note: annual reporting information is limited to water providers *outside* the state's active management areas.)

ADWR will send a notice at the end of the year to local governing bodies of those providers that have still not submitted a system water plan (33% currently) and/or annual water use report (32% currently). ADWR will continue making efforts to assist these systems.

Local Drought Impact Group Efforts

To date, Community Water Planning – Drought Program staff, in cooperation with county extension agents, county emergency managers, and other local coordinators, have established or begun planning efforts for ten local drought impact groups in Arizona. These local stakeholder groups were created to address drought preparedness and response at the regional level.

The *Arizona Drought Preparedness Plan* established three objectives for local drought impact groups:

- Drought impact monitoring
- Drought education and outreach
- Drought mitigation and response

After two challenging years, county coordinators and ADWR staff agreed that drought impact monitoring, or the collection of information on drought impacts, should be the main focus for local

drought impact groups. Once impacts are better understood, it will be clearer where county vulnerabilities lie, how they may be addressed, and who needs to be involved in a regional drought planning process. Therefore, drought outreach activities and the development of county drought preparedness and response measures will be longer-term goals for the groups.

To facilitate the collection of drought impact information, Arizona Cooperative Extension, in partnership with the Department of Water Resources and the Natural Resources Conservation Service, has developed AZ DroughtWatch (<http://azdroughtwatch.org/>), an interactive web reporting tool, designed to collect and display qualitative reports of drought impacts across Arizona. The web tool includes a mapping interface for specifying impact locations, common drought impact descriptions for users to choose from, as well as fields to enter unique impact reports, comments, and upload supporting photos. The system will ultimately reside within the Arizona Hydrologic Information System, which will enable data sharing and access across other hydro-climate and drought related decision support tools.

During water year 2008, the University of Arizona Climate Extension specialist, with ADWR in attendance, has conducted DroughtWatch training workshops in Yavapai and Pima Counties. Workshops for Mohave and Cochise Counties are scheduled in October and November 2008.

Once the web reporting tool is finalized and a good network of reporters is established, ADWR will assist county groups by compiling monthly summaries of impacts in their region. Impact information will be used in conjunction with meteorological and hydrological data to characterize drought conditions, and perhaps more importantly, to help determine the environmental, social and economic impacts of drought on our state. This information will also go to the Monitoring Technical Committee to consider when updating the monthly drought status maps. On an annual basis, ADWR will provide impact summaries in future annual reports to the Interagency Coordinating Group and the Governor, as well as local coordinators and county boards of supervisors to aid in planning education, mitigation and response.

Five counties provided 2008 highlights, which are included in Appendix A. As the reports indicate, the counties are still suffering from long-term precipitation deficits that affect vegetation health, wildlife and livestock, as well as local springs, surface water flows and well production. It is clear that drought remains a concern and that the coordinators are ready to focus on drought impact monitoring and the upcoming AZ DroughtWatch training workshops.

State Drought Monitoring Technical Committee Efforts

The Monitoring Technical Committee is responsible for gathering drought, climate, and weather data and disseminating that information to land managers, policy-makers, and the public. This past year, Nancy Selover, State Climatologist, was named as new co-chair of the Committee. Tony Haffer of the National Weather Service continues to serve as the group's other co-chair.

Throughout 2008, the Monitoring Technical Committee met monthly to monitor and assess drought conditions. Each month, drought status is calculated for each watershed in the state using precipitation and streamflow data. Drought status maps are developed to display statewide drought status – both short term and long term. To provide a “reality check” for the calculated drought status, the Committee also consults vegetation indices, snowpack, temperature, reservoir levels, and drought impacts information before approving the final drought status map. The Community Water Planning – Drought Program compiles this information and a weather outlook to produce a monthly Drought Monitor Report. These reports serve as an information resource for the public and as a planning tool for resource managers developing mitigation and response strategies.

Thanks to a grant from the Arizona Water Institute, the Monitoring Technical Committee is currently working on a sensitivity analysis of the current methodology for determining drought status and creating the monthly drought status maps. After the project is finished, the Committee anticipates moving to a higher resolution precipitation dataset with a longer period of record to compare current with historic conditions.

The Committee has identified the following two funding and resource needs, as stated in last year's annual report:

1. *Strategic plan to identify data gaps and monitoring needs*

Arizona's current network of meteorological and hydrological observations for drought monitoring lacks sufficient spatial resolution to accurately characterize drought status at the local level requested by stakeholders throughout the state. Improving the spatial, temporal and altitudinal resolution of Arizona's drought monitoring network will improve the Committee's ability to serve the needs of Arizona stakeholders, including the local drought impact groups. In particular, Arizona faces the following conspicuous data gaps:

- complete lack of soil moisture monitoring
- few high elevation meteorological monitoring stations
- a constantly decreasing network of streamflow gauges

Although the Committee has identified these data gaps in general terms, it is imperative to conduct a systematic evaluation in order to characterize and prioritize these numerous data and observation gaps. A strategic plan, with carefully considered criteria for prioritization, is essential for making state funding requests and for taking advantage of federal funding opportunities. The Committee recommends funding to develop a strategic plan, conduct data and observation gap analyses, and document priority locations using geographic information system technology.

Total cost: \$9,000

2. *Incorporation of groundwater data for drought status determination*

ADWR staff has evaluated groundwater level changes around the state. However, further analysis is needed to determine what role drought plays in these observed changes. Incorporating groundwater level trend data will be critical in determining drought conditions and impacts on water supply. When the state budget allows, the Committee recommends funding for ADWR staff salaries to conduct groundwater analyses.

Total cost: \$38,000 per year

Interagency Coordinating Group Efforts

The Interagency Coordinating Group met two times during the past year to review and consider statewide monitoring efforts and drought status, water supply updates, rangeland conditions, forest health and wildlife. As a result, the group recommended to the Governor that both the state's Drought Emergency Declaration (PCA 99006) and the Drought Declaration for the State of Arizona issued May 2007 (Executive Order 2007-10) be continued.

Conservation Program Highlights

ADWR Conservation Program 2008-09 Plan

Using water more efficiently is a critical element in Arizona's long-range plan for securing a sufficient water supply. This year, ADWR Conservation Program staff developed the *ADWR Conservation Program 2008-09 Plan*, which identifies the following goals:

- Work with communities to provide them with the tools and resources necessary to implement strong, effective conservation programs;
- Develop a water conservation toolkit for communities, including resources to reduce exterior water use in landscaped areas;
- Develop a best management practices matrix for water providers based on service area characteristics.

The completion of the plan represents two major accomplishments for ADWR and the state:

1. It is the first comprehensive plan that includes voluntary programs of the Community Water Planning – Water Conservation staff (Statewide Water Conservation Office) and the regulatory programs administered by the five active management areas of the state.
2. It sets agency-wide conservation priorities that will enable the Department to create a culture of conservation and respond proactively to conservation needs around the state.

Work With Communities

Throughout the year, ADWR Conservation Program staff designed a base program or components required for each community (see Appendix B). ADWR worked to provide information on each of the following components to help communities in Arizona build strong, effective conservation programs:

- Community Assessment
- EPA WaterSense Partnership
- Conservation Measures
- Conservation Incentives
- Water Rate Structures
- Water-use Audits
- Metering and Sub-metering
- Conservation Plan

This year, staff worked with the communities of Show Low, Cottonwood, Nogales and Kingman to assist them in the development of their conservation programs. In 2009, staff plans to work with Eloy, Ehrenberg, Safford, Clarkdale and Pinetop/Lakeside.

Water Conservation Toolkit

In 2008, an assembly of tools was developed to assist communities and water providers in the design and implementation of comprehensive, customized and proven conservation strategies. These tools provide residents, businesses and the agricultural community with information on sector-specific water-efficient measures.

To date, a lot of work has been accomplished on the toolkit, including: establishing the major categories; prioritizing existing tools; developing additional tools; and identifying tools to be created in the next phase.

The following are the major categories of the toolkit:

- Water Planners & Providers
- Residential
- Commercial, Industrial & Institutional
- Agriculture
- Education & Outreach
- Landscape Professionals
- Water-efficient Technologies & New Studies

In addition, the ADWR Conservation Program web site was reorganized to reflect the toolkit categories (see Appendix C) and each section was expanded to include sector-specific tools. Tools have been created and/or information has been posted to the web site for the following:

- Fact Sheets on available programs and technologies to improve water use efficiency
- Information on creating conservation plans and system profiles
- Guidelines for developing ordinances to prohibit fugitive irrigation water
- BMPs for the agriculture community
- Information on conservation-based rate structures
- Publications and information on water-efficient landscaping
- Descriptions of workshops, classes and certification programs
- Information on water metering
- Links to conservation offices throughout Arizona
- Links to major water conservation publications and organizations

Lastly, the Conservation Program identified the need to develop additional tools. The following tools are currently being created to expand the reach of the toolkit and support outreach to targeted communities:

- Audit booklets for business and industry
- Xeriscape principles
- Guidelines for establishing regional low-water use plant lists
- Descriptions and locations of Xeriscape gardens throughout Arizona
- Water wise landscape design CD

Best Management Practices Matrix

A matrix of recommended best management practices based on service area characteristics was developed (see Appendix D). The matrix was developed to support water providers participating in the Active Management Area Modified Non-Per Capita Conservation Program; however, the information contained in the matrix is beneficial to all water providers and its use will be encouraged statewide. The matrix links specific service area characteristics with relevant best management practices. In addition, it will assist providers in their planning and decision making processes and help ADWR Active Management Area staff reduce time spent on review and approval. The matrix will serve as a tool to help water providers across the state evaluate the specific water uses in their water service areas and design their water conservation programs to be comprehensive in scope and to achieve maximum effectiveness. Conservation Program staff anticipate that the collection and display of this information will encourage implementation of best management practices statewide and will help ADWR to publicize the growing number of water providers with successful water conservation programs.

Water Awareness Month

The Conservation Program developed an Executive Order designating April as water awareness month. Executive Order 2008-19 was issued by the Governor in April 2008 and reminds all

Arizonans of the fragile nature of our arid environment and the importance of creating a culture of conservation. The order directs the Arizona Department of Water Resources to work directly with cities and towns to provide assistance in developing programs, develop a water conservation “toolkit” for citizens and communities, and create a new “water wise” community certification program to celebrate good water conservation and promote awareness. It also calls upon Arizonans, businesses and all levels of government to become more aware of water use habits and increase water conservation awareness programs.

APPENDIX A – LOCAL DROUGHT IMPACT GROUP UPDATES

(as submitted by group coordinators with minor edits)

Cochise County

The increased precipitation this last summer appears to have lessened the urgency for action for many. However, it is just as critical now as it was two years ago to continue drought preparedness efforts. Key personnel from Cochise County met with others from around the state to discuss priorities. The major priority most people agreed on was drought monitoring and reporting. The monitoring group continues to develop strategies for recruiting reporters across the county, especially in rural areas. An AZ DroughtWatch workshop will be held November 17th to train reporters on use of the site. We anticipate increased reporting once participants are familiar with the reporting tool. minor

Mohave County

Establishment of the LDIG. The Mohave County LDIG was established by action of the county Board of Supervisors on April 7, 2008. The LDIG is open to the all interested parties for membership and has a Board appointed Steering Committee to provide direction and approve recommendations to the Board. In July, 2008, seven members were appointed to the Steering Committee by the Board, one member from each Supervisor's District (3) and incorporated city (4). The first two quarterly meetings of the LDIG and Steering Committee were held in July and October. Presentations by the University of Arizona and Arizona Department of Water Resources on drought monitoring, drought conservation, and the state drought monitoring system were made at the two meetings, which were well attended by representatives from government agencies, water providers, and citizens' groups.

Status of Drought. Drought conditions continue throughout the county. In the monsoon season, precipitation was above average in July and August for the north and east areas of the county with the south and west below average. Below average precipitation was reported in September throughout the county. While some local areas received significant precipitation amounts during the monsoon, the typical irregular and spotty pattern of rainfall has left many areas throughout the county very dry.

Drought Impacts. The LDIG has not had the time since its establishment to develop an extensive drought impact monitoring system. The first priority for the LDIG will be the development and implementation of such a system. A number of LDIG members have signed up to participate in the LDIG's Drought Monitoring Working Group and the AZ DroughtWatch reporting system. Current reporting from ranchers and others has indicated adverse impacts on vegetation in areas that did not receive significant rainfall during the monsoon. Although water tanks currently have substantial levels of water, this will rapidly change in the coming dry months with consequent impacts on wildlife and livestock. Some local springs and surface water flows in Colorado River tributaries have been drying up, but Lake Mead's elevation has remained largely unchanged throughout 2008.

Drought Related Actions. In the coming months, the LDIG will be communicating with water suppliers in the county to determine the status of their drought response plans and any response or remedial actions being undertaken. The three cities have drought response plans with designated drought stages; currently, none of the cities have implemented any of their drought plan stages. The cities, NRCS and BLM offices, State Forestry, Game and Fish, and other agencies will be contacted regularly for drought impact reports, drought stage implementation, and actual or proposed mitigation measures. This information will be utilized in the work of the Public Education and Outreach Working Group and the Mitigation Working Group when they are formed, including

the development of a countywide drought stage level template. Currently all work is being focused on establishing the Drought Monitoring Working Group and its reporting procedures, as well as the recruitment of more volunteer monitors.

Pima

Introduction. This report summarizes the Local Drought Impact Group Activities conducted in Pima County during 2008. Pima County’s LDIG includes representatives from the major water providers and local, state and federal agencies. During the year, the Pima County LDIG met regularly to monitor local drought conditions, conduct regional coordination on drought declaration and to begin establishing a drought impact reporting system.

Status of Drought. Drought conditions in Pima County persist. Although winter rains were generous, there was no indication the drought has subsided. Summer rains were also plentiful; however, intensity varied throughout Pima County. The long term drought status ranges from abnormally dry to severe drought. For most of Eastern Pima County the long term drought status is moderate.

Drought Impacts. The impacts of the sustained drought can be seen in several sectors. One irrigation company observed that groundwater wells had to be turned on earlier in the season. Low valley areas did not receive as much precipitation as higher elevations. Stream gauges near the Sabino/Pantano area indicated drought conditions. This year’s storms tended to be fast-moving, resulting in shorter duration rainfall events with smaller stream flows.

Drought-Related Actions. Water providers in Pima County have drought response plans in place and have declared drought stage levels. As of September 2008 the following is the status of regional drought declarations:

Entity	Drought Declaration
Pima County	Stage One Alert
City of Tucson	Stage One
Town of Oro Valley	Stage One
Town of Marana	Stage One Alert
Metropolitan DWID	Stage One Alert
Community Water of Green Valley	Stage One Alert

The response action for these declarations is voluntary water reductions. Increased public awareness was promoted through summer conservation programs, education materials and community activities. Pima County LDIG is also implementing a drought reporting system using AZ DroughtWatch to report on observed drought impacts on various sectors. This information will be used to supplement data used by the Statewide Monitoring Technical Committee and to assess the regional drought status. Participation from the Tohono O’odham Nation has been most welcome and valuable. The Pima County LDIG could benefit from increased communication with and participation from stakeholders in Western Pima County and rural interests.

Pinal

- During the year, the Pinal County LDIG coordinators met regularly to discuss direction and mission, conduct regional coordination on drought concerns and to begin establishing a drought impact reporting system.

Current Status

- The baseline measurements are inconclusive to compare and deliberate.

- The steering committee determined that more affective measurement tools are necessary to establish baselines, track trends and develop analysis.
- Water providers in Pinal County are participating in the LDIG process.
- Legal issues will require research in determining extent and limitations regarding more specific local actions.

Projected Direction:

- Plans are currently underway to solicit drought and weather spotters to add valid information into the database throughout Pinal County (http://www.zwire.com/site/news.cfm?newsid=20154243&BRD=1817&PAG=461&dept_id=68561&rfi=8). Pinal County LDIG desires to implement a drought reporting system using AZ DroughtWatch to report on observed drought impacts on various sectors. This information will be used to supplement data used by the Statewide Monitoring Technical Committee and to assess the regional drought status. Weather spotter information will enhance validation between AZ DroughtWatch and Weather Service data.
- It is hopeful that the data collection will assist in the development of drought response plans and establishing drought stage levels.
- Increased public awareness continues to require promotion through summer conservation programs, education materials and community activities.

Yavapai

The structure of the Yavapai County LDIG is a steering committee that provides leadership and direction for the working groups. The steering committee works under the oversight of the Yavapai County Water Advisory Committee (a large group with representation from Yavapai County government, ADWR, all cities, towns, and tribes). The Yavapai County LDIG has been meeting since September 2006.

The LDIG steering committee consists of the following individuals:

Nick Angiolillo, Co-chair, Yavapai County Emergency Management
 Jeff Schalau, Co-chair, University of Arizona Cooperative Extension, Yavapai County
 Tom Thurman, Yavapai County Supervisor, District 2
 Crystal Frost, Arizona Department of Water Resources, Prescott Active Management Area
 John Rasmussen, Yavapai County Water Advisory Committee Coordinator
 Bob Adams, Natural Resources Conservation Service
 Kresta Faaborg, Natural Resources Conservation Service
 Bob Arambula, Cocopai Resource Conservation and Development

Mitigation and Response Participant Group Activities

Draft Drought Mitigation and Preparedness Guidelines have been drafted and are being reviewed by members of this participant group. Nick Angiolillo is chairing this effort and 19 people are collaborating to create the draft guidelines.

Monitoring Participant Group

Monitoring efforts have been underway for almost two years and additional reporters are being recruited on an on-going basis. Rainlog.org has been a focal point but other drought impacts are being reported by some members. Approximately 300 rain gauges have been distributed as part of these efforts. The Yavapai County LDIG has provided comments to Dr. Michael Crimmins on the development of DroughtWatch.org. Two meetings were held in 2008, one on March 19 in Prescott and the other on May 14 in Cottonwood (co-chaired by Bob Adams and Jeff Schalau). To date, 42 people have become members of this participant group.

It is anticipated that within a couple of months, the Steering Committee will receive hands-on training on DroughtWatch.org, identifying drought impacts and drought messaging so that Committee members will be qualified to train others in the region. Yavapai County intends to focus the initial formal round of training on regional natural resources staff.

Outreach/Education Participant Group

Two meetings were held in 2008, one on March 19 in Prescott and the other on May 14 in Cottonwood (chaired by Jeff Schalaus). To date, 22 people have become members of this participant group.

Challenges

It has been difficult to maintain momentum due to staff changes within ADWR, lack of financial support, other ongoing commitments of LDIG members, and the lack of drought impacts to report.

APPENDIX B – CONSERVATION BASE PROGRAM COMPONENTS

Steps ADWR is taking to assist communities in developing strong, effective conservation programs:

1. **Community Assessment**

Complete an assessment form that includes information on community contacts, water providers, schools, demographics, general characteristics, energy and water supplies, septic, sewer, effluent and current conservation measures.

2. **EPA WaterSense Partnership**

Provide information to the community and encourage participation in the program.

WaterSense (<http://www.epa.gov/watersense/>) represents a label for quality, water-efficient products that make it easy for consumers to save water and protect the environment.

3. **Conservation Measures**

Assist with both technological and behavioral conservation measures for:

A. Residences

B. Landscapes

C. Commercial, Industrial & Institutional (note that Rinse Smart is mandatory)

D. Agriculture

E. Water Utilities (note that the Patch the Pipe program meets the technological requirement)

4. **Conservation Incentives**

Provide information and encourage implementation of the following types of conservation incentives:

A. Educational (note that Project WET is Mandatory)

B. Financial

C. Regulatory

5. **Water Rate Structures**

Identify rate structures currently in place and educate the community and/or provider on types and benefits of conservation rate structures. Recommend appropriate water rate structures.

6. **Water-use Audits**

Identify need for water-use audits and educate the community and/or provider on types and benefits of water-use audits. Recommend needed audits.

7. **Metering and Sub-metering**

Identify the metering practices in place; educate the community and/or provider on types and benefits of meters for various applications and recommend suitable metering options.

8. **Conservation Plan**

Recommend changes or enhancements to the community's conservation plan. Note that most community water systems are required to submit a conservation plan to ADWR's Community Water Planning – Drought Program.

APPENDIX C – ADWR CONSERVATION PROGRAM WEB SITE

The ADWR Conservation Program web site (www.azwater.gov/conservation) is the predominant method used to distribute tools created for the Water Conservation Toolkit. Each category of the toolkit has its own section of the web site that includes information on sector-specific water-efficient practices and, when applicable, technologies. The major categories are reflected by individual buttons on the homepage and top-menu tabs across every page.



The major categories of the toolkit and examples of information included in each are listed below:

Water Planners & Providers: Planning Guidelines, System Profiles, Ordinance Templates, System Improvements, Customer Education

Residential: Conservation Tips, Xeriscape Principles, Plant Lists, Rainwater Harvesting, Audits

Commercial, Industrial & Institutional: Industry-specific Information, Technologies, Audits

Agriculture: Planning, System Design, Technologies, BMPs

Education & Outreach: Project WET, Scout Patch Program, Cooperative Extension Programs

Landscape Professionals: System Design, Efficient Watering Techniques, Maintenance, Plant Lists, Training Opportunities, Technologies

Technology & Research: New Studies, Testing, Products, Reports, Water-Energy Nexus

APPENDIX D – BEST MANAGEMENT PRACTICES MATRIX

(EXAMPLE - matrix not shown in its entirety)

~Modified NPCCP ~ Suggestions for Matching Service Area Characteristics with Best Management Practices (10.6.08 Draft)	Messaging program Events/presentations Market surveys			Adult education and training Youth conservation education New homeowner education Xeriscape demonstration Distribution of landscape info.				Residential audit program Landscape consultations Water budgeting program Residential interior retrofits Non-residential interior retrofits High water use inquiry retrofits High water use inquiry resolution Water use notification Water waste investigations Leak detection program Meter repair/replacement program							Water system audit Low water use landscaping Water tampering/water waste Plumbing code requirements Limit water intensive landscaping Model home landscaping Gray water / water harvesting Car wash water harvesting Landscape watering restrictions Hot water recirculation devices Retrofit on resale Irrigation standards Conservation tariff (PWC) Water use plans Toilet																				
	BMP Category	1. Public Awareness/PR			2. Education/Training				3. Outreach Services							4. Physical System			5. Ordinances/Conditions of Service/Tariffs																
BMP Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
Service Area Characteristics																																			
Rapidly growing non-residential sector.										X	X									X		X	X			X		X		X		X		X	
Rapidly growing residential sector.	X	X		X		X	X	X		X										X		X	X	X		X		X						X	
Large number/%* (or high % of demand) of industrial/commercial users.										X	X											X													X
Large number/percentage of residential users.	X	X	X	X			X	X	X	X							X													X					
Contains mature development (a large % / number of structures built < 1990).									X	X		X	X				X	X											X					X	
Serves active adult community.	X	X		X			X		X	X																									
Serves a large number or high % of demand of large landscaped areas.**										X	X																			X					
Largely undeveloped; most of the water served will be for new growth.						X	X	X		X										X		X	X	X	X	X		X		X		X		X	
New residential development is largely oriented toward families.				X																															

Appendix Drought-C

Summary of Drought Indicators and Response Measures for Stages 1 through 4

City of Tucson Drought Preparedness and Response Plan

- **Stage 1**

1. A Stage 1 drought response will be declared by the City Manager, on the advice of the Water Director, based on either one or both regional indicators. The regional indicators include a severe and sustained drought on the Colorado River or a declaration of drought within Tucson's watershed (Santa Cruz Watershed) posted on the Arizona Department of Water Resources website. During Stage 1, local system indicators will primarily be monitored for implementation of specific response actions.
2. The focus of Stage 1 response actions will include:
 - Public notification and education on drought issues;
 - Changes in system operations (such as expedited well maintenance) and/or system modifications (such as well drilling and well maintenance and other system maintenance programs to reduce system losses such as meter replacement and leak detection) deemed necessary by the Water Director; and
 - Self-administered water audits by City departments to identify water-saving and water efficiency measures for City buildings, City-maintained landscapes and City-owned water-cooled equipment.
 - Possible additional measures may include voluntary self-audit programs for commercial, multi-family and industrial users.

- **Stage 2**

1. A Stage 2 drought response also will be declared by the City Manager, on the advice of the Water Director, primarily based on regional indicators. Specifically, if an initial shortage (i.e., a shortage affecting only excess or lower priority uses, not municipal uses) is declared on the Colorado River, the City will elevate to Stage 2 drought responses. In addition, local system indicators, in conjunction with a declaration of drought in the Santa Cruz Watershed posted on the ADWR website, could trigger elevation to Stage 2 or may trigger additional response actions.
2. The focus of Stage 2 response actions will include:
 - Continuation of all Stage 1 actions, with intensified public education and additional system or operational actions;
 - Mandatory implementation of water reductions or efficiencies identified during Stage 1 audits for all City uses of potable water;
 - All potable water users will be requested to make additional voluntary reductions;

- Mandatory self-audits will be required for multi-family users, and for commercial and industrial users at/or exceeding monthly usage of 325 cubic feet (Ccf); and
 - Irrigation restrictions will be required for multi-family, commercial, and industrial customers, with potential exemptions/variances available for sites demonstrating that minimum efficiency criteria are met and maintained.
- **Stage 3**
 1. A Stage 3 drought response will be declared by Mayor and Council, upon the recommendation of the City Manager, based on either one or both of the following drought indicators: reductions in CAP deliveries to the City or local system indicators in conjunction with a declared drought in the Santa Cruz Watershed posted on the ADWR website.
 2. The focus of Stage 3 response actions may include:
 - Continuation of all previous actions under Stages 1 and 2;
 - Prohibition on operation of fountains at multi-family, commercial, and industrial sites.
 - Mandatory water reductions by all potable water users (percentage to be determined by existing conditions); and
 - Plumbing retrofit on resale for residential, commercial, multi-family, and industrial users.
- **Stage 4**
 1. A Stage 4 drought response will be declared by Mayor and Council, upon the recommendation of the City Manager, based on one or both of the following drought indicators: additional reductions in CAP deliveries to the City or local system indicators in conjunction with a declared drought in the Santa Cruz Watershed posted on the ADWR website.
 2. The focus of response actions for Stage 4 may include:
 - Continuation of Stage 1, 2, and 3 response actions and implementation of appropriate provisions of the City's Emergency Water Conservation Ordinance No. 8461. These provisions include but may not be limited to:
 - No outdoor irrigation unless the City Manager designates a schedule of appropriate watering days;
 - No washing of sidewalks, driveways, parking areas, tennis courts, patios, or other impervious surface areas with water from an open hose, or a spray nozzle attached to an open hose, or under regular or system pressure, except when required to eliminate conditions that threaten public health, safety, or welfare;

- No outdoor use of any water-based play apparatus connected to a pressurized source;
- No operation of large commercial water-cooled space and equipment cooling systems below an operating efficiency level of two cycles of concentration (see Glossary);
- No serving water to customers of restaurants and other food service establishments unless water is specifically requested by the customer;
- No operation of outdoor misting systems in public areas;
- No filling of new swimming pools, fountains, spas or other exterior water features; including no draining and refilling of exterior water features; and
- No washing of autos, trucks, trailers, and other types of mobile equipment, except at facilities equipped with wash water recirculation systems, and for vehicles requiring frequent washing to protect public health, safety, and welfare.
- In addition, staff will develop additional response actions if warranted. For example, “demand offset programs” may be developed and implemented – meaning that new commercial and residential development may not be permitted unless the projected water demand of that development is “offset” through water demand reductions elsewhere, such as through retrofitting older facilities to reduce water consumption.



MEMORANDUM

Office of Conservation and Sustainable Development

DATE: February 4, 2009

TO: Mike Hein
City Manager

FROM: Leslie Liberti, Director *LL*
Conservation & Sustainable Development

SUBJECT: Recommendations for the Climate Change Committee

I would like to recommend the following individuals for appointment to the Climate Change Committee (CCC). This body will advise Mayor and Council on strategies to reduce community-wide greenhouse gas emissions and strategies to minimize the social and economic impacts of local temperature increases and precipitation changes. Primary and alternate members are nominated for each seat on the committee.

Committee Seat	Primary Member	Alternate Member
<i>Climate change</i>	Dr. Jonathan Overpeck, Institute for the Study of Planet Earth, University of Arizona	Dr. Gregg Garfin, Institute for the Study of Planet Earth, University of Arizona
<i>Sustainable land use/transportation</i>	Andy Laurenzi, Center for Desert Archeology	Dr. Curtis Lueck, Curtis Lueck & Associates
<i>Sustainable building</i>	Phil Swaim, Swaim Associates	Rich Michal, Adolfson and Peterson Construction
<i>Urban heat island/green space</i>	Dr. Paul Green, Tucson Audubon Society	Dr. Michael Rosenzweig, Center for Reconciliation Ecology, University of Arizona
<i>Community, grassroots efforts</i>	James McAdam, Sustainable Tucson	Neil Markowitz, Environmental Education Exchange
<i>Local economy</i>	Dr. Pat Patton, Eller School of Business, University of Arizona	Sofia G. Loomis, Realty Executives
<i>Workforce advocacy</i>	Kenneth Riley, AFSCME Local 449, AFL-CIO	Carld Rosborough, Fred G. Acosta Job Corps
<i>Small/local business</i>	Dr. Jane Poynter, Paragon Space Development Corporation	Jan Gordley, Gordley Design
<i>Low-income representation</i>	Dr. John Schwarz, Professor Emeritus, University of Arizona (retired)	Maiola Coleman, Community Programs, Grace Temple Missionary Baptist Church
<i>Neighborhood advocacy</i>	Joanie Sawyer, PRO Neighborhoods	Bryant Nodine, Tucson Unified School District
<i>Social services</i>	Tomas Leon, Community Foundation of Southern Arizona	Terry Galligan, Old Pueblo Community Foundation
<i>Human health</i>	Dr. Anna Marie Lopez, University of Arizona Medical School	Dr. Barbara Warren, University of Arizona Medical School (retired)
<i>Food security</i>	Varga Garland, Community Food Bank	Julie Evan, Native Seeds/SEARCH

cc: Roger Randolph, City Clerk

LL:lv

Appendix E

Summary of Drought Response Measures for Stages 1 through 4

Pima County Drought Response Plan

- **Stage 1-Water Alert**

During a Water Alert, the department shall issue one or more notifications to the public. The department shall ask all persons to implement voluntary reductions in water use, ask restaurants to provide water only upon request, urge hotels and motels to conserve water, and engage in a campaign to increase public education to promote awareness about water conservation issues.

- **Stage 2-Water Warning**

During a Water Warning, the following additional conservation measures will be implemented:

1. Persons may only irrigate landscaping between the hours of 7 p.m. and 7 a.m.
2. Persons working in or operating restaurant-type uses may provide water only upon request.
3. No person may operate outdoor misters;
4. No person may operate or use public fountains or water features;
5. No natural person may wash a car except with use of a bucket and a shut-off nozzle;
6. No charity car washes may occur except at commercial car washes that recycle water; and
7. No person may oversee turf areas.

- **Stage 3-Water Emergency**

During a Water Emergency, the following additional conservation measures will be implemented:

1. No person may fill a newly constructed residential pool. Pool permits will remain in active status for 3 months after Stage 3 is downgraded to Stage 2;
2. No person may operate a car wash unless it is equipped with a water recirculation system; and
3. A person may top off a pool only to maintain water level; no person may refill a pool.

- **Stage 4-Water Crisis**

During a Water Crisis, the following additional conservation measures will be implemented:

1. Landscape irrigation is restricted to only trees and shrubs; no person may irrigate turf or ground cover;
2. No person may fill a newly constructed pool. Pool permits will remain in active status for 3 months after Stage 4 is downgraded to Stage 2;
3. No person may use water to wash a car;
4. No person may use water to clean a parking lot or street; and
5. No person may use potable water in construction projects, either for dust control or toward the erection of new improvements or structures.

**PIMA COUNTY, AREA WATER PROVIDERS
DROUGHT RESPONSE PLAN COMPARISON**
(Compiled by Pima County with info from water providers, 2007)

STAGE ONE	PIMA COUNTY Not a Water Provider	MARANA -No Water Shortage -AWS designation	METRO WATER --No Water Shortage --AWS designation	ORO VALLEY --No Water Shortage --AWS designation	CITY OF TUCSON --No Water Shortage --AWS designation	COMMUNITY WATER GREEN VALLEY
	Declared by BOS on advice from Monitoring Committee	Declared by Mayor & Council	Declared by Board	Declared by Mayor/Town Mgr on advice from Water Comm	Declared by City Mgr on advice from Water Director	Declared by Board
	ALERT	MODERATE	ALERT	HEIGHTENED CONDITIONS	STAGE 1 RESPONSE	NORMAL
	Arizona Drought Monitor Report	CLIMAS Based [any 2]	CLIMAS Based [both]	CLIMAS Based [any 2]	Regional Indicators (either or both)	
	<ul style="list-style-type: none"> ▪ Abnormally Dry 	<ul style="list-style-type: none"> ▪ 70-90% Avg Precip ▪ >45 days +100° f ▪ 1'-2.4' Avg Annual Groundwater Decline') ▪ D2 Severe Drought 	<ul style="list-style-type: none"> ▪ 70-90% Ann. Precip ▪ 1' – 2.4' Annual Groundwater Decline 	<ul style="list-style-type: none"> ▪ 80-90% Avg Precip ▪ >60 days +100° f in any 3-mo period ▪ ≥4' Avg Ann Groundwater Decline ▪ D1 or greater 	<ul style="list-style-type: none"> ▪ Severe/Sustained Drought in CO River Water Shed ▪ ADWR Posts Drought status above normal for Santa Cruz Watershed on website 	<ul style="list-style-type: none"> ▪ Maintains 100% Water Storage ▪ No Known Problems w/Production/Storage ▪ Notification Not Required
PUBLIC EDUCATION (including but not limited to)	■	■	■	■	■	■ (slight to moderate)
▪ PubEd Team Co-Op	■	■	■	■	■	
▪ Residential users	■	■	■	■	■	■
▪ Commercial users				■	■	■
▪ Common Perspective Message	■	■	■	■	■	■
WATER MANAGEMENT/CONSERVATION EFFORTS (INCLUDING BUT NOT LIMITED TO)	■	■	■	■	■	■
▪ Emphasize need for visible leadership/good examples (Water Audits)	■	■	■	■	■	
▪ Reduce/Restrict Highly Visible, Nonessential Use	■	■	■	■	■	
▪ Work w/Neighboring Providers	■	■	■	■	Process outlined in Plan	
Develop Water Wasting and/or Drought Management Ordinance	■	■	■		■	
▪ No New Water Service Agmts						
▪ No Potable Water for Construction						
VOLUNTARY REDUCTIONS (including but not limited to)	■	■	■	■	■	■
▪ Landscape Limitations						
▪ Encourage Reductions (restaurants/hotels/motels etc)	■	■	■	■	■	
▪ Encourage Large Accounts to Reduce Water (including before drought stages)				■	■	
Encourage Reductions – Select Categories, Tiers, etc	■	■	■	■	■	■
▪ Reclaimed Users					■	

STAGE ONE (continued)	PIMA COUNTY	MARANA	METRO WATER	ORO VALLEY	CITY OF TUCSON	COMMUNITY WATER GREEN VALLEY
MANDATORY REDUCTIONS	CONTINUE WATER MANAGEMENT EFFORTS					
WATER EFFICIENCY MEASURES (including but not limited to)	■	■	■	■	■	■
▪ Avoid/Minimize Economic Impacts except under Extreme Conditions	■	■	■	■	■	
▪ Encourage large Commercial Accounts to Determine Operational Strategies to Reduce Water (incl before drought stages)				■	■	
▪ Ensure Health & Safety not Impacted	■	■	■	■	■	■
▪ Plumbing Retrofit on Resale						
ENFORCEMENT (including but not limited to)	NONE LIKELY SINCE PUBLIC EDUCATION IS THE FOCUS OF STAGE ONE; HOWEVER, MEASURES ARE IN PLACE					

STAGE TWO	PIMA COUNTY	MARANA	METRO WATER	ORO VALLEY	CITY OF TUCSON	COMMUNITY WATER GREEN VALLEY
	Declared by BOS on advice from Monitoring Committee	Declared by Mayor & Council	Declared by Board	Declared by Mayor/ Mgr (advice from Water Comm)	Declared by City Mgr on advice from Water Director	Declared by Board
	WARNING	ABNORMALLY DRY	WARNING	HEIGHTENED CONDITIONS	STAGE 2 RESPONSE	SEVERE
	Arizona Drought Monitor Report	CLIMAS Based [any 2]	CLIMAS Based [both]	CLIMAS Based [any 2]	Regional and/or Local System Indicators	and/or
	<ul style="list-style-type: none"> ▪ Moderate 	<ul style="list-style-type: none"> ▪ 50-70% Avg Precip ▪ >60 days of +100° f ▪ Average Annual Groundwater Decline (2.5' - 3.9') ▪ D3 Extreme 	<ul style="list-style-type: none"> ▪ 50-70% Ann. Precip ▪ 2.5' – 3.9' Annual Groundwater Decline 	<ul style="list-style-type: none"> ▪ 70-80% Avg Precip ▪ >70 days of ≥100° f in any 3-mo period ▪ ≥6' Avg Annual Groundwater Decline ▪ D2 or greater 	<ul style="list-style-type: none"> ▪ SOI declares Shortage on CO River w/ reduced CAP deliveries to non-M&I, excess & Ag Users ▪ Deterioration in Local System Indicator Values (LSIV) with ADWR drought status above normal for Santa Cruz Watershed.¹ 	<ul style="list-style-type: none"> ▪ Water Storage/Well Production <80% min 48 consecutive hours ▪ Belief Unable to meet Anticipated Demand on a Sustained Basis ▪ Steadily Declining Water Table, Increased Draw Down, Poor Water Production, etc)
PUBLIC EDUCATION (including but not limited to)	■	■	■	■	■	■
▪ PubEd Team Co-Op	■	■	■	■	■	■
▪ Residential users	■	■	■	■	■	■
▪ Commercial users				■	■	■
▪ Common Perspective Message	■			■	■	■
WATER MANAGEMENT/CONSERVATION EFFORTS (including but not limited to)	■	■	■	■	■	■
▪ Emphasize need for visible leadership/good examples (Water Audits)	■				■	
▪ Reduce/Restrict Highly Visible, Nonessential Use	■				■	
▪ Work w/Neighboring Providers	■	■	■		Process outlined in Plan	
Develop Water Wasting and/or Drought Management Ordinance	In place	■	■		In place	
▪ No New Water Service Agmts						
▪ No Potable Water for Construction						
VOLUNTARY REDUCTIONS (including but not limited to)	■	■	■		■	■
▪ Landscape Limitations					■	■
▪ Encourage Reductions (restaurants/hotels/motels etc)	■	■	■	■	■	■
▪ Encourage Large Accounts to Reduce Water (including before drought stages)		■		■	■	■
▪ Encourage Reductions - Select Categories, Tiers		■		■	■	■
▪ Reclaimed Users				■	■	

STAGE TWO (continued)	PIMA COUNTY	MARANA	METRO WATER	ORO VALLEY	CITY OF TUCSON	COMMUNITY WATER GREEN VALLEY
MANDATORY REDUCTIONS (including but not limited to)	■		■	■	■	
▪ Continue Water Mgmt Efforts					■	
▪ Landscape Limitations	■		■	■	■	
▪ Avoid/No Outdoor Water Use (ex: hosing walkways/drives, outdoor fountains/misters, etc.)	■		■	■	■ (e.g., no public fountains)	
▪ No Car Washes w/o Recirculation System	■					
▪ No Filling New Pools (final pool permit withheld)						
▪ Potable Water Restrictions (no potable water for construction)						
▪ Encourage Reductions - Select Categories, Tiers					■	
▪ Reclaimed Users					■	
WATER EFFICIENCY MEASURES (including but not limited to)	■	■	■	■	■	■
▪ Avoid/Minimize Economic Impacts except under Extreme Conditions	■	■		■	■	
▪ Encourage large Commercial Accounts to Determine Operational Strategies to Reduce Water (incl before drought stages)					■	■
▪ Ensure Health & Safety not Impacted	■	■	■	■	■	■
▪ Plumbing Retrofit on Resale						
ENFORCEMENT (including but not limited to)				■	■	■
▪ Notices/Warnings/Fines				■	■	■
▪ Residential					■	
▪ Multi-Family					■	
▪ Commercial					■	
▪ Rate Structure/Surcharge					■	
▪ Reclaimed Users					■	
▪ Revise Plan on Regular Basis					■	

STAGE THREE	PIMA COUNTY	MARANA	METRO WATER	ORO VALLEY	CITY OF TUCSON	COMMUNITY WATER GREEN VALLEY
	Declared by BOS on advice from Monitoring Committee	Declared by Mayor & Council	Declared by Board	Declared by Mayor/ Mgr (advice from Water Comm)	Declared by M&C on advice of City Mgr	Declared by Board
	EMERGENCY	EXTREME	EMERGENCY	HEIGHTENED CONDITIONS	STAGE 3 RESPONSE	EXTREME
	Arizona Drought Monitor Report	CLIMAS Based [any 2]	CLIMAS Based [both]	CLIMAS Based [any 2]	Regional and/or Local System Indicators	and/or
	<ul style="list-style-type: none"> ▪ Severe 	<ul style="list-style-type: none"> ▪ 25-50% Avg Precip ▪ >75 days of +100° f ▪ Average Annual Groundwater Decline (4'-4.9') ▪ D4 Exceptional 	<ul style="list-style-type: none"> ▪ 25-50% Ann. Precip ▪ 4' - 4.9' Annual Groundwater Decline 	<ul style="list-style-type: none"> ▪ < 70% Avg Precip ▪ ≥ 80 days of ≥100° f in any 3-mo period ▪ ≥ 7' Avg Ann Groundwater Decline ▪ -D3 or greater 	<ul style="list-style-type: none"> ▪ Continued Shortage w/ reduced CAP deliveries to M&I users ▪ Further deterioration of LSIV in conjunction w/ADMTC Drought status above normal for the Santa Cruz Watershed as posted on ADWR Website 	<ul style="list-style-type: none"> ▪ Water Storage/Well Production <50% minimum 24 consecutive hours ▪ Belief Unable to meet Anticipated Demand on a Sustained Basis (steadily declining water table, increased draw down, poor water production, etc)
PUBLIC EDUCATION (including but not limited to)	■	■	■	■	■	■
▪ PubEd Team Co-Op	■	■	■	■	■	■
▪ Residential users	■	■	■	■	■	■
▪ Commercial users	■			■	■	■
▪ Common Perspective Message	■			■	■	■
WATER MANAGEMENT/CONSERVATION EFFORTS (including but not limited to)	■	■	■	■	■	■
▪ Emphasize need for visible leadership/good examples (Water Audits)	■			■	■	
▪ Reduce/Restrict Highly Visible, Nonessential Use	■	■		■	■	■
▪ Work w/Neighboring Providers	■	■	■	■	Process in Plan	
▪ Develop Water Wasting and/or Drought Management Ordinance	■	■	■		In Place	■
▪ No New Water Service Agmts – Temporary Moratorium					M&C can consider temporary moratorium	
▪ No Potable Water for Construction		■				
VOLUNTARY REDUCTIONS (including but not limited to)	■	■	■	■	■	■
▪ Landscape Limitations	■				■	■
▪ Encourage Reductions (restaurants/hotels/motels etc)	■	■	■	■	■	■
▪ Encourage Large Accounts to Reduce Water (including before drought stages)	■	■		■	■	■
▪ Encourage Reductions - Select Categories, Tiers		■		■	■	■
▪ Reclaimed Users				■	■	

STAGE THREE (continued)	PIMA COUNTY	MARANA	METRO WATER	ORO VALLEY	CITY OF TUCSON	COMMUNITY WATER GREEN VALLEY
MANDATORY REDUCTIONS (including but not limited to)	■	■	■	■	■	
▪ Continue Water Mgmt Efforts	■				■	
▪ Landscape Limitations	■	■	■	■	■	
▪ Avoid/No Outdoor Water Use (ex: hosing walkways/drives, outdoor fountains/misters, etc.)	■	■		■	■	
▪ No Car Washes w/o Recirculation Sys	■			■	■	
▪ No Filling New Pools (final pool permit withheld)	■	■	■			
▪ Potable Water Restrictions (no potable water for construction)		■	■	■		
▪ Encourage Reductions - Select Categories, Tiers		■		■	■	
▪ Reclaimed Users				■	■	
WATER EFFICIENCY MEASURES (including but not limited to)	■	■		■	■	■
▪ Avoid/Minimize Economic Impacts except under Extreme Conditions	■			■	■	■
▪ Encourage large Commercial Accounts to Determine Operational Strategies to Reduce Water (incl before drought stages)	■	■		■	■	■
▪ Ensure Health & Safety not Impacted	■	■		■	■	■
▪ Plumbing Retrofit on Resale					■	
ENFORCEMENT (including but not limited to)	■	■	■	■	■	■
▪ Notices/Warnings/Fines	■			■	■	■
▪ Residential	■			■	■	■
▪ Multi-Family	■			■	■	■
▪ Commercial	■			■	■	■
▪ Rate Structure/Surcharge		■	■		■	■
▪ Reclaimed Users				■	■	
▪ Revise Plan on Regular Basis					■	

STAGE FOUR	PIMA COUNTY	MARANA	METRO WATER	ORO VALLEY	CITY OF TUCSON	COMMUNITY WATER GREEN VALLEY
	Declared by BOS on advice from Monitoring Committee	Declared by Mayor & Council	Declared by Board	Declared by Mayor/ Mgr (advice from Water Comm)	Declared by M&C on advice of City Mgr	Declared by Board
	CRISIS	SEVERE	CRISIS	HEIGHTENED CONDITIONS	STAGE 4 RESPONSE	EXCEPTIONAL
	Arizona Drought Monitor Report	CLIMAS Based [any 2]	CLIMAS Based [both]	CLIMAS Based [any 2]	Regional and/or Local System Indicators	and/or
	<ul style="list-style-type: none"> ▪ Extreme 	<ul style="list-style-type: none"> ▪ <25% Avg Precip ▪ >90 days of +100° f ▪ Average Annual Groundwater Decline (5'+) ▪ D4 Exceptional 	<ul style="list-style-type: none"> ▪ <25% Ann. Precip ▪ > 5' Annual Groundwater Decline 	IF <ul style="list-style-type: none"> ▪ < 70% Avg Precip ▪ ≥ 80 days of ≥100° f ▪ ≥ 7' Avg Ann Groundwater Decline ▪ -D3 or greater CONTINUES 1 YR	<ul style="list-style-type: none"> ▪ Continued Shortage w/additional reductions in CAP M&I deliveries ▪ Further deterioration of LSIV w ADWR posted drought above normal in Santa Cruz Watershed and/or failure to significantly reduce water demand in Stage 3. 	<ul style="list-style-type: none"> ▪ Water Storage/Well Production <25% minimum 12 consecutive hours ▪ Belief Unable to meet Anticipated Demand on a Sustained Basis (steadily declining water table, increased draw down, poor water production, etc)
PUBLIC EDUCATION (including but not limited to)	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Pub Ed Team Co-Op 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Residential users 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Commercial users 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Common Perspective Message 	■	■	■	■	■	■
WATER MANAGEMENT/CONSERVATION EFFORTS (including but not limited to)	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Emphasize need for visible leadership/good examples (Water Audits) 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Reduce/Restrict Highly Visible, Nonessential Use 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Work w/Neighboring Providers 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Develop Water Wasting and/or Drought Management Ordinance 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ No New Water Service Agmts 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ No Potable Water for Construction 	■	■	■	■	■	■
VOLUNTARY REDUCTIONS	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Landscape Limitations 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Encourage Reductions (restaurants/hotels/motels etc) 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Encourage large Commercial Accounts to Determine Operational Strategies to Reduce Water (incl before drought stages) 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Encourage Reductions - Select Categories, Tiers 	■	■	■	■	■	■
<ul style="list-style-type: none"> ▪ Reclaimed Users 	■	■	■	■	■	■

STAGE FOUR (continued)	PIMA COUNTY	MARANA	METRO WATER	ORO VALLEY	CITY OF TUCSON	COMMUNITY WATER GREEN VALLEY
MANDATORY REDUCTIONS (including but not limited to)	■	■	■	■	■	■
▪ Continue Water Mgmt Efforts	■	■		■	■	■
▪ Landscape Limitations	■	■	■	■	■	■
▪ Avoid/No Outdoor Water Use (ex: hosing walkways/drives, outdoor fountains/misters, etc.)	■	■		■	■	■
▪ No Car Washes w/o Recirculation Sys	■	■		■	■	■
▪ No Filling New Pools (final pool permit withheld)	■	■		■	■	■
▪ Potable Water Restrictions (no potable water for construction)	■	■	■	■	■ (construction not specified)	■
▪ Encourage Reductions - Select Categories, Tiers		■		■	■	■
▪ Reclaimed Users				■	dependent on LSIV: RPCI	
WATER EFFICIENCY MEASURES (including but not limited to)	■	■		■	■	
▪ Avoid/Minimize Economic Impacts except under Extreme Conditions	■			■	■	■
▪ Encourage Large Accounts to Reduce Water (including before drought stages)	■	■		■	■	■
▪ Ensure Health & Safety not Impacted	■	■		■	■	■
▪ Plumbing Retrofit on Resale					■	
ENFORCEMENT (including but not limited to)	■	■	■	■	■	■
▪ Notices/Warnings/Fines	■			■	■	■
▪ Residential	■			■	■	■
▪ Multi-Family	■			■	■	■
▪ Commercial	■			■	■	■
▪ Rate Structure/Surcharge		■	■		■	■
▪ Reclaimed Users				■	■	
▪ Revise Plan on Regular Basis					■	

¹Tucson Water Local System Indicator Values (LSIV)

Potable Production Capacity Index – ratio of Production Capacity divided by Average Demand

Aquifer Storage Index – groundwater levels in aquifer as measured at selected wells & compared to groundwater levels in an index year

Reclaimed Production Capacity Index – can operational requirements be met?

Response Monitoring Tool – GPCD, and Tucson Water Isolated Systems