

City of Peoria

DRAFT Drought Management Plan

Prepared by

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Public Works - Utilities Department

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I. Introduction

The City of Peoria maintains a diverse water resource portfolio, acquired through decades of planning and foresight by City leaders. This diverse portfolio provides the City flexibility in utilizing alternate water resources that do not depend solely on precipitation in Arizona. This allows Peoria to maintain a secure, reliable water supply for its residents, businesses, parks and school yards during normal supply years as well as during times of reduced supplies. Through this proactive planning, Peoria is able to withstand the surface water shortages that periodically occur in the Southwest.

In 2003, the City Council adopted a Drought Contingency Plan. In 2007, the City Council adopted the “Principles of Sound Water Management,” which outline critical policy directions for water resources management. These policy directives keep Peoria on the cutting edge of water resources management.

The City of Peoria demonstrated its commitment to promoting a more sustainable future when the first Sustainability Action Plan was adopted in 2009. Recognizing water as one of the most precious resources in the arid southwest, Peoria’s action plan emphasizes how critical the management of water supplies and water demand is to maintain its diverse water resource portfolio maximizing renewable supplies for current and future residents.

The City’s renewable water supplies may be impacted by long-term drought or short-term catastrophic water distribution failures. Drought does not always result in a shortage of water.

This Drought Management Plan (Plan) provides procedures and strategies for when a drought condition has been declared, and is based on the following goals:

- a. To protect public health (safe drinking water) and safety.
- b. To provide sufficient water to meet the needs of City of Peoria water customers.
- c. To minimize disruption to the economy so that jobs are protected and regional economic stability is preserved.
- d. To equitably allocate the impacts and hardships caused by water shortages.
- e. To provide an implementation methodology of demand reduction measures in order to comply with City code.
- f. To provide options for updating or amending the Drought Management Plan by the City Manager.

This Plan conforms to the Arizona Revised Statutes § 45-342 and City of Peoria City Code (25-54), and aligns with the City of Peoria Principles of Sound Water Management, Policy 16 Drought Planning (City Council adoption 2007).

II. Water Supply Portfolio

Peoria's water resources portfolio is diversified and robust. Sources include the Salt River Project (SRP), Central Arizona Project (CAP), Gila River Indian Community lease, White Mountain Apache Tribe lease, reclaimed water from City reclamation facilities, and groundwater. Peoria has stored over 100,000 acre-feet of water underground over the last decade that is available to be recovered via wells, treated and delivered to its customers as needed. In recognition of the fact that these water supplies have been proven to be physically, continuously, and legally available for 100 years, Peoria was granted a renewed Designation of Assured Water Supply (Designation) by the Arizona Department of Water Resources (ADWR) in 2010. Appendix B depicts the Colorado and Salt River watersheds.

When Peoria was first issued a Designation in 1997, the City was very dependent upon groundwater. Over the years, Peoria has invested heavily in infrastructure and replenishable surface water supplies, reserving groundwater for times of need. Since 2009, Peoria's Annual Water Withdrawal and Use Report demonstrated overwhelmingly reliance on diverse replenishable supplies with zero usage of groundwater, and only a minimal amount of recovered water.

Salt River Project Water

One of the oldest sources of water in Peoria is the Salt River Project. SRP water comes from the Salt and Verde River systems, and flows down the Arizona Canal to the Greenway Water Treatment Plant. The water comes from precipitation in the higher elevations of northeastern Arizona, and is stored in a series of lakes of which the largest and oldest is Lake Roosevelt. In times of shortage, SRP supplements the surface water supply with groundwater from their wells. SRP water can only be served on lands that were originally irrigated with SRP water, which includes most of Peoria south of Skunk Creek. In the Designation, ADWR recognized Peoria as entitled to 25,201 acre-feet per year. Peoria does not yet use all of the SRP water to which the City is entitled, as the process of conversion from agricultural irrigation to municipal use is still underway.

Central Arizona Project Water

Water from the highly regulated Colorado River flows uphill to central and southern Arizona via the Central Arizona Project (CAP) canal. Lake Pleasant, a reservoir along the canal, fills in the winter when less water is needed and releases water into the CAP canal in the summer when demands are higher. The Colorado River drains the highlands of much the western United States, including the Colorado Rockies, where the snowfall provides the largest portion of flow. CAP water is the largest source of replenishable surface water in the City's inventory. Peoria holds a Municipal and Industrial (M&I) subcontract for 25,236 acre-feet per year. Most of the water is taken off the canal at the Pyramid Peak Water Treatment Plant, and then pumped across most of north Peoria. There are no legal restrictions on where this water can be used. Not all of this Municipal & Industrial (M&I) water is yet utilized; the City will grow into this supply.

Gila River Indian Community Water

Peoria leases 7,000 acre-feet of water each year from the Gila River Indian Community. This water is also taken off the CAP canal and treated at the Pyramid Peak plant. The lease extends into the next century, and this water is also considered replenishable as it too is supplied by the Colorado River.

White Mountain Apache Tribe Water

As a result of settlement negotiations with the White Mountain Apache Tribe, Peoria will lease water from the Tribe for 100 years. Peoria will receive a total of 1,249 acre-feet per year of Colorado River water via the CAP canal. However, the larger portion of this water has a lower priority than M&I water, and could be reduced in any declared shortage on the Colorado River.

Reclaimed Water

City wastewater reclamation facilities produce Class A+ reclaimed water on a daily basis. Peoria is credited with 33,369 acre-feet per year of reclaimed water under the Designation. This water is the only supply that the City actually owns. Reclaimed water is delivered directly to golf courses, homeowners associations, parks, and other facilities that need water for landscaping and other non-potable uses. Most of the reclaimed water is stored through infiltration basins that recharge into the underground aquifer for use many years in the future.

Recovered Water

Peoria long ago recognized that storage of extra water underground eliminated losses through evaporation. As early as 1992, Peoria obtained a permit for a trial recharge program. Peoria has invested considerable resources into a series of underground storage facilities, primarily infiltration basins and vadose zone recharge wells, and is currently pursuing another facility based on deep injection technology. Peoria recharges both reclaimed water and CAP water, and can recover this water via wells. All wells in Peoria are permitted by ADWR as both groundwater withdrawal and recovery wells. In recent years, only recovered water has been pumped from the City's wells.

Groundwater

ADWR has determined that Peoria has 399,463 acre-feet of groundwater that can be withdrawn over 100 years without being "mined" or depleted. The City regards groundwater as the ultimate hedge against shortages of replenishable supplies. Hence, the City is not pumping groundwater, but saving it for the future. The City has over 40 wells that can pump groundwater (or recover water previously stored underground), most of them located south of Happy Valley Road.

III. Regional Challenges

Water resources challenges face Peoria across a regional scale. Many of these stem from the ongoing drought that began around 2000. While challenges differ between surface water and groundwater, many involve the same factor: too many people attempting to utilize the same limited or declining resource.

Colorado River Shortage Possibilities

In the Colorado River Basin, Lake Powell lies at the bottom of the drainage of the Upper Basin, while Lake Mead sits at the top of the Lower Basin and is the primary reservoir for California, Nevada, and Arizona. Ongoing drought has highlighted the situation in which releases from Lake Powell have been insufficient to cover demands on Lake Mead. This “structural deficit” results in an ongoing annual decline in water level elevations in Lake Mead. When specific trigger elevations are reached, water deliveries are curtailed pursuant to a 2007 water sharing law. Due to its junior priority status and agreements associated with the original authorization for the Central Arizona Project (CAP) canal in 1968, Arizona will take the vast majority of the cuts and CAP will take the majority of cuts for Arizona.

While it is impossible to predict what allocation decisions will be made, it is unlikely that major cities such as Phoenix, Tucson, and Las Vegas would be totally deprived of water. However, reductions may be substantial.

Because of Peoria’s growing reliance on CAP water, this challenge is perhaps the most critical one facing the city. Peoria is working collaboratively with other cities to meet this regional challenge.

Salt River Project Water Challenges

The Salt and Verde River systems also face drought challenges, but these take a somewhat different form. Storage in the SRP lake system has declined over several years. The rate at which water is delivered to SRP member lands is normally set at three acre-feet per acre, of which two are surface water and one is groundwater. As less surface water is available for delivery to cities, the proportion of groundwater utilized by SRP goes up. In 2003-2004, the actual allocation was reduced to two acre-feet per acre. While such a reduction is not envisioned by SRP in the immediate future, shortage is possible.

A broader regional challenge is posed by catastrophic fires on the SRP watershed. Forests are important to maintaining a water supply of high quality. Within the last decade, over 20% of Arizona’s Ponderosa pine forests have burned in uncharacteristically severe fires, all occurring within the SRP watershed. This reduces the water supply as the burnt soils become impervious to water, which does not percolate into the ground to be slowly released later to maintain stream flows and reservoir levels. In addition, catastrophic fires cause degradation of water quality, primarily through increased turbidity, which becomes an expensive problem for cities when the polluted water reaches their treatment plants.

Ground Water

Peoria has over 40 wells available to pump groundwater and recover water that was stored underground. However, many wells are very old and must be replaced or rehabilitated. Peoria also is constructing new wells in new locations to pump water from underground for the needs of the community. Well construction or rehabilitation is expensive and time-consuming. Peoria plans to address this challenge.

One challenge for the city is the lack of geologically suitable sites for new wells close to areas of growth. Another challenge faced by Peoria and many other cities is the number of wells pumping water from the aquifer. Many private wells are “exempt” from the Groundwater Management Act. Industrial wells can be constructed and pumped within the city based on leased water rights, and such wells can withdraw major volumes of water, even water previously stored underground by Peoria.

IV. Drought Preparedness

Drought

The term drought is used to describe “an abnormally dry time period for a specific geographic area”. Arizona naturally receives less precipitation than other regions, and meteorological variations are more frequent and pronounced. It is a naturally occurring condition in the Sonoran Desert region in which we live. Arizona’s desert cities have adapted to periods of diminished precipitation. Peoria stores water underground as a buffer against drought, and imports surface water long distances so that precious groundwater can be saved. ***Note that drought is not the same as a water shortage.*** To date Peoria has never experienced a water shortage, even in the midst of drought. This is largely due to the numerous water resource efforts that reduce the city’s drought susceptibility.

Drought Susceptibility

Drought susceptibility is the extent to which an area may be subject to the negative impacts of a drought. High susceptibility means that an area is sensitive or vulnerable to the negative impact of a drought. From a municipal water provider’s perspective, drought susceptibility is the potential inability to provide normal water service to its residents, businesses and visitors.

Different cities may have different drought susceptibility levels even when they appear to be similar in other ways, such as size, climate, precipitation pattern, and growth. Three factors that most often affect drought susceptibility are (1) surface water reservoir storage capacity, (2) availability of alternative water resources to replace drought affected supplies, and (3) water system infrastructure capability.

Drought Protection Strategy

In addition to maintaining a diverse water portfolio Peoria is preparing for the possibility of more prolonged and persistent drought scenarios by pursuing a strategy of storing enough water underground to carry the City through potential water shortages. The probability of such a worst-case scenario ever occurring is extremely low. It is considered very unlikely that all sources of replenishable water would disappear simultaneously. While it is possible that drought may adversely impact replenishable surface water sources, Peoria will have substantive amounts of underground water—further reducing the City’s drought susceptibility.

Water Resources Master Plan

The City periodically updates its water-related master plans, and in May 2015 completed its Integrated Water Utilities Master Plan, which includes water system infrastructure, wastewater system infrastructure, reclaimed water system infrastructure, and water resources.

Water Conservation

The City of Peoria provides a robust array of water conservation programs including more than ten best management programs recommended by the Arizona Department of Water Resources. These programs include numerous educational outreach and direct services as well as rebate and incentive programs. The programs are designed to promote ongoing water use efficiencies that result in long term water use reductions.

Water Shortage

This plan is designed to manage reductions in demand necessitated by drought or structural shortfall such that available, but declining, supplies are not exceeded and the system capacity and output remains functional.

Specific response plans need to evaluate the exact nature of the water shortage, the projected length of the shortage, the time of day of the projected shortage, the regions (zones) affected by the shortage, resulting in an actionable policy to maintain adequate water supply and service.

The City will ensure that any options adopted in response to a water shortage alert will be implemented in a manner to minimize disruptions to the community. All uses essential for public health and safety (hospitals, sanitation trucks, food processing facilities and fire or sanitation hazards) will be exempt from restrictions. Any use to maintain the health and safety of the water customers of the City of Peoria are also exempted.

VI. Drought Alert Stages

Mirroring the State of Arizona's *Operational Drought Plan (2004)*, four stages of alert levels have been adopted and the triggering mechanisms identified. Water deficiency declarations shall be made by the City Manager or designee, and continue until the declaration is rescinded by the City Manager or designee.

Specific response plans need to evaluate the nature of the water shortage, the projected length of the shortage, the time of day of the projected shortage and the area of impact. Because the impacts of water shortage potentially affect and require input from several City Departments, the City has established a Drought Demand Management Team comprised of the following Departments:

- Public Works-Utilities
- City Manager
- Community Services
- Customer Service
- Budget
- Communications
- Engineering
- Economic Development
- Planning & Zoning
- Sustainability
- Facilities

Prior to declaring a drought alert, the Drought Demand Management Team will convene and evaluate all options to identify water savings, and identify water voluntary or mandatory restrictions as may be necessary to cope with escalating and/or extreme situations. This Team prepares recommendations to the City Manager at all four stages, from which the City Manager will proceed as deemed appropriate.

Based on the Team's analyses, the demand reduction goals will be related to the predicted or actual supply reduction. The Team may define the demand reduction goals appropriate to the circumstance.

Stage 1 – Water Watch: This watch alert is invoked when the **possibility** exists that the City of Peoria will not be able to meet all of the water demands of its customers. This possibility includes predicted reductions in water delivery from either the Central Arizona Project or the Salt River Project, specifically if the August Bureau of Reclamation report predicts a declared shortage from the Central Arizona Project with probability >70% and/or if Salt River Project reduces the total allocations per acre below 2 acre feet per acre.

Stage 1 is intended to raise consciousness and invokes voluntary reduction measures, with the City of Peoria municipal departments leading by example. The triggered water watch requires all City Departments to formally evaluate operations to identify and implement any additional water saving measures. The City will increase water awareness public outreach messaging to ensure all City customers understand the nature of the deficiency and the need for voluntary compliance.

Stage 2– Water Alert: Stage 2 is declared during periods when deliveries to either Pyramid Peak Water Treatment Plant (CAP water) or Greenway Water Treatment Plant (SRP water) are reduced by 10% **and** the **probability** exists that the City of Peoria PW-UT Department will not be able to meet all of the water demands of its customers.

The PW-UT Department will monitor water supply availability on a daily basis during Stage 2 and recommend to the City Manager the extent of supply augmentation or demand reduction that may be required should conditions escalate.

The City's Drought Demand Management Team will meet and identify demand reduction strategies applicable to their operations for implementation should a Stage 3 alert be declared.

Examples of potential supply augmentation and demand reduction strategies are included in Appendix C.

The City will increase monitoring to locate and enforce water waste codes, currently in Peoria Municipal Code, Sections 13-36 and 25-53.

Stage 3 – Water Warning: Stage 3 is declared during periods when deliveries to either PPWTP (CAP water) or Greenway WTP (SRP water) continue declining beyond 10% and the City of Peoria PW-UT Department **will not be able to meet all of the water demands** of its customers.

Supply augmentation and demand reduction strategies, identified in Stage 2, will be implemented.

Demand reduction measures will only apply to projects that are not necessary to maintain the health and safety of the public. Appeals can be made on a case-by-case basis to City Manager or designee.

The City will further increase educational outreach to the public. The implementation of Stage 3 may require reallocation of staff to monitor use and for drought code enforcement, currently in Peoria Municipal Code, Section 25-54.

Stage 4 – Water Emergency: Stage 4 involves a **major failure** of any supply, treatment or distribution infrastructure, whether temporary or permanent, in the water distribution system of the Salt River Project, Central Arizona Project, or the City of Peoria. The *Water System Emergency Response Plan, August 2013* is the guiding document for managing failures of City of Peoria systems; this is an internal operational plan that is for City use only, its confidentiality protected by Homeland Security.

Upon a Stage 4 declaration by the City Manager, the City Council and the public shall be given notice as described in the Peoria Municipal Code.

VII. Conclusion

The City of Peoria's investment in education, incentives and infrastructure over the past decade dramatically reduces the probability of a worse case water shortage scenario occurring. The City Utilities Division operates a complex water delivery system with two primary treatment plants delivering water from diverse sources to serve customers in six different zones. Redundancies in the system allow for water to be re-directed throughout its distribution system, further minimizing the impacts of water shortages.

Appendix A: Definitions

Conservation

Conservation programs are voluntary and driven by a desire of the City of Peoria to extend the existing water supply, reduce the costs of finding and delivering additional water, and minimize the damage to the natural ecosystem caused by removing groundwater. For both the utility and customers, conservation activities are exercises in responsible behavior. Conservation, by its very nature, is a normal component of a well-run water utility which seeks to maintain a reliable water resource. A number of water conservation measures may be implemented or accelerated during a drought declaration.

Demand Reductions

Demand reductions are measures taken by a water utility to reduce the use of potable water in response to drought or supply insufficiency conditions. Demand reduction measures restrict water usage further than a normal conservation programs. Water demand reduction during a drought may incorporate both voluntary measures and mandatory ones, such as curtailment of irrigation water use and, in extreme cases, rationing of available supplies. Generally, responses to a systemic failure will be more rapid and may omit intermediate steps normally associated with an incremental drought response plan.

Drought

Drought is a long period of abnormally low precipitation (rain or snow), especially one that adversely affects growing or living conditions. Drought can be caused by seasonal or multi-year weather conditions. From areas which have experienced drought, it is evident that drought is not a constant or totally predictable condition in occurrence or duration. Rather, there are levels of drought and levels of drought impact, and therefore: levels of demand reduction response.

Supply Insufficiency

Supply insufficiency occurs when water available in an area is not sufficient to meet immediate unrestricted demand. While drought is usually systemic and regional in nature and of indeterminable length, a supply insufficiency may be system-wide or very localized, can be of relatively short duration, and may be caused by unforeseen increases in water demand or failure of a localized part of the storage or delivery system to provide a sufficient unrestricted supply of water.

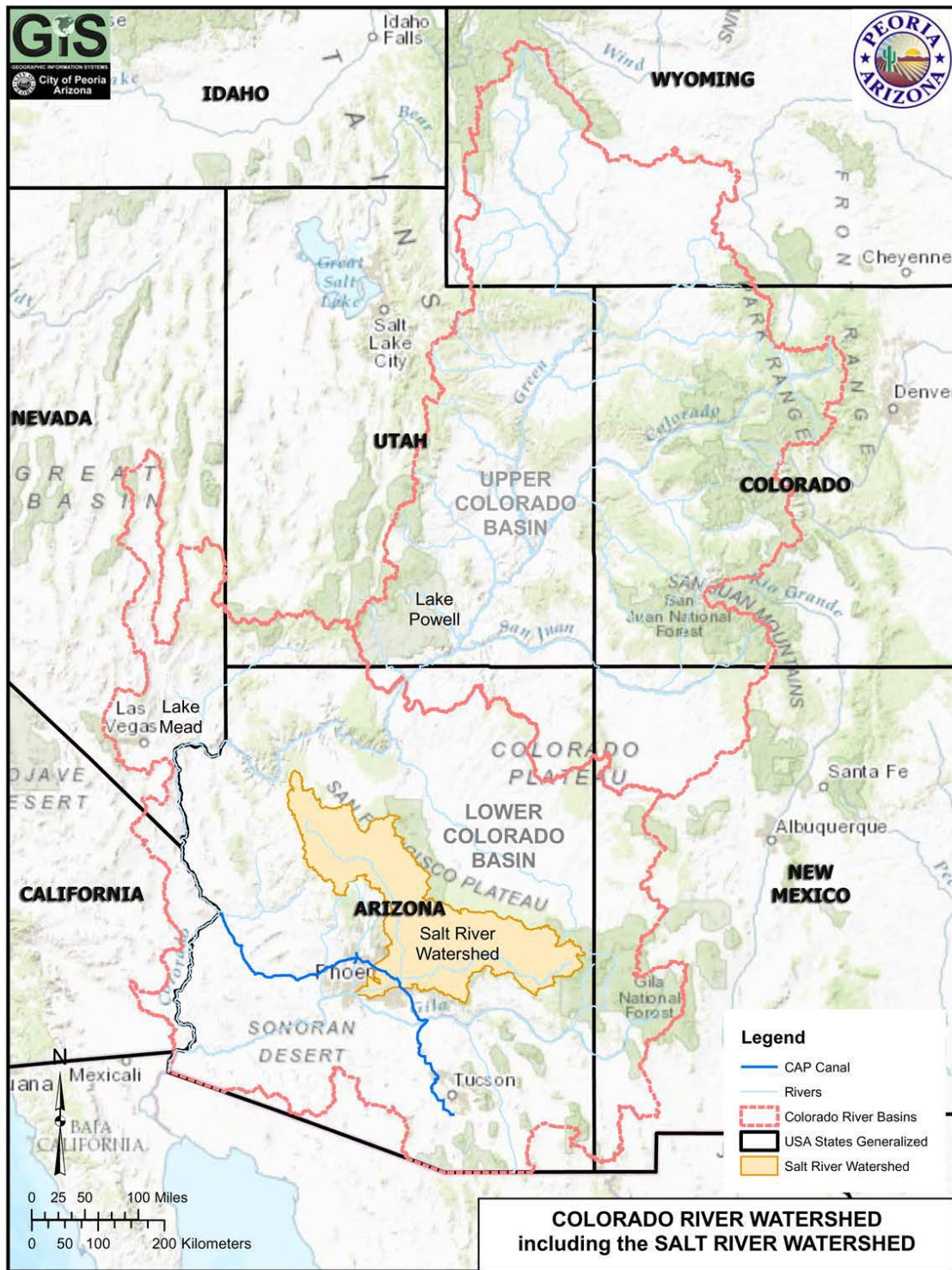
Ornamental Fountain

An ornamental fountain is any fountain that is solely or partially used for decorative purposes.

Potable Water

Potable water is water suitable or safe for drinking. Water is considered safe to drink if it meets or exceeds all of the federal, state, and provincial standards that are legally enforceable.

Appendix B: Watersheds Map



Appendix C: Water Supply Augmentation and Demand Reduction Options

Water Supply Augmentation Options:

Increase use of non-potable water: Reclaimed water could be redirected from current landscape uses and be utilized for maintenance operations and other non-potable uses. Re-use of water, such as capturing grey water to wash vehicles, could provide additional resources to help alleviate shortages.

Temporary use of wells: Currently the City has wells that are not in use due to borderline quality concerns associated with levels of arsenic, nitrate, and iron. Additional wells have been discontinued and some are in 'stand-by' mode.

Purchase supplemental water: Investigate opportunities to purchase water from other sources.

Water Demand Reduction Options:

Physical programs are generally patterned after one of two basic allocation plans: percentage reduction or specific use bans. A percentage reduction assigns customers a consumption reduction goal, depending on water use, as a percentage of the consumption level used in a similar billing period during a normal season. Specific use bans, such as prohibition on car washing, swimming pool filling, and use of water features can be effective. Bans generate awareness and prioritizing of water use and they establish a sense of equity in the community.

Depending upon the specific nature and severity of the water shortage, the following options should be considered by the Drought Demand Management Team:

Eliminate non-essential use of water:

Non-essential water use means water uses that are neither essential nor required for the protection of public health and safety. Table 1 includes many options to evaluate.

Moratorium on New Connections: Curtailing water demand by curtailing growth is a controversial option, but one that must be considered should the drought situation require extreme measures. If water supply status deteriorates and existing customers become impacted, it is inequitable to expect existing customers to make painful cuts in water use while new users are being added.

Pricing Policies: Charges for water consumption have significant influence on the amount of water consumed. Increasing the amount currently charged under the tiered rate structure should encourage a corresponding reduction in water consumption. The customer is offered flexibility in quality of life issues and there is less impact on the revenue stream than mandatory reductions in consumption.

If the drought condition continues to the point that there are insufficient revenues to operate the water utility systems, the City may need to implement water deficiency rate surcharges in accordance with Section 25-54 (h).

The establishment of financial systems to allow for fines, surcharges, or other measures to support programs such as increasing public education and the acquisition or development of new water supplies should be considered.

Water Theft Prevention: An aggressive theft prevention program should be implemented to assist in curtailing all un-permitted uses of fire hydrants and other water sources.

Water Use Restrictions Plan: Key elements of a successful program include (1) the resources and the hardships are shared as equitably as possible, and (2) that customers are kept informed about the status of the shortage. Pertinent information regarding water use and supply must be published and disseminated regularly to continually reaffirm customer commitment.

Table 1 Demand Reduction Options Menu

Listed in order of effectiveness: x = option to consider; text = suggested action level if option adopted

Customer	Response Options		Stage 1	Stage 2	Stage 3	Stage 4
Municipal	A	Public information/awareness campaign.	Initiate	Expand	Intensify	Intensify
	B	Educate staff on indoor/outdoor water saving techniques.	x	x	x	x
	C	Reduce/eliminate irrigation for parks and landscaping.	Reduce	Reduce	Reduce	Eliminate
	D	Turn off ornamental fountains .	x	x	x	x
	E	Conduct indoor water audits.			x	x
	F	Limit/prohibit washing of fleet vehicles.		Limit	Prohibit	Prohibit
	G	Limit hydrant flushing for non-water quality issues.		Limit	Limit	NA (see I)
	H	Limit use of water for fire training.		Limit	Limit	NA (see I)
	I	Eliminate all fire hydrant uses except those required for public safety.				x
Residential	A	Educate customers on indoor/outdoor water saving techniques.	Initiate	Expand	Intensify	Intensify
	B	Promote conservation with respect to operation and maintenance of swimming pools (cover, leak repair).	x	x	x	x
	C	Turn off ornamental fountains.		x	x	x
	D	Enforce restrictions on spraying of impervious surfaces.		x	x	x
	E	Limit/prohibit overseeding for winter lawn.		Limit	Prohibit	Prohibit
	F	Limit maximum number of watering days per week and the duration of watering.		3 days/week	2 days/week	Prohibit
	G	Enforce landscape watering restrictions.		x	x	x
	H	Limit/prohibit installation of new sod, seeding, and/or other landscaping.			Limit	Prohibit
	I	Prohibit vehicle washing.			Prohibit	Prohibit
Non-Residential	A	Educate customers on indoor/outdoor water saving techniques.	Initiate	Expand	Intensify	Intensify
	B	Turn off indoor and outdoor ornamental fountains.		x	x	x
	C	Promote indoor and outdoor water audits.		Promote	Promote	Promote
	D	Promote conservation with respect to operation and maintenance of swimming pools (cover, leak repair).		x	x	x
	E	Promote/enforce service of water in restaurants only upon request.		x	x	x
	F	Promote/enforce reduction in frequency of linen and towel washing in hotels.		x	x	x
	G	Limit/prohibit overseeding for winter lawn.		Limit	Prohibit	Prohibit
	H	Establish policy guidelines/limitations for installation of new sod.		x	x	x
	I	Limit maximum number of watering days per week and the duration of watering.		3 days/week	2 days/week	No turf irrigation
	J	Enforce landscape watering restrictions.		x	x	x
	K	Limit/prohibit dealership washing of		x	Limit	Prohibit
	L	Limit/prohibit commercial car washes.		No waste	Limit	Prohibit
	M	Enforce/prohibit use of construction water.		Enforce Permits	Enforce Permits	Prohibit