

City of Mesa



Background

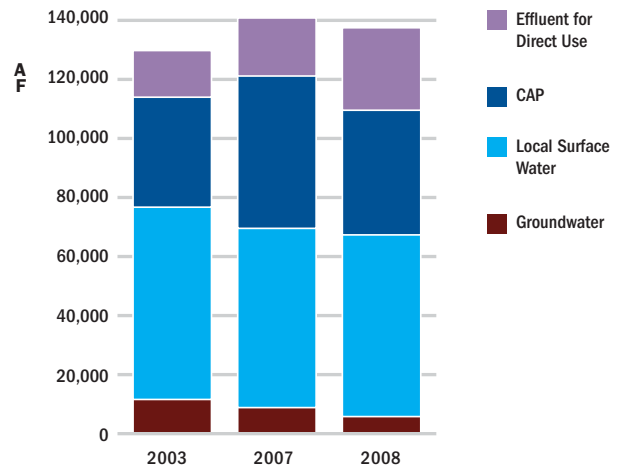
The city of Mesa is the third-largest city in the state of Arizona, with a population of approximately 461,100 residents.* The Salt River—flowing west towards Phoenix—traces the city’s northern corporate limits, placing Mesa in the middle of the Gila River Watershed.

Mesa has an annual average precipitation of 9.2 inches, an average summer high temperature of 100 degrees (°F), and an average winter low temperature of 40.5 degrees (°F).†

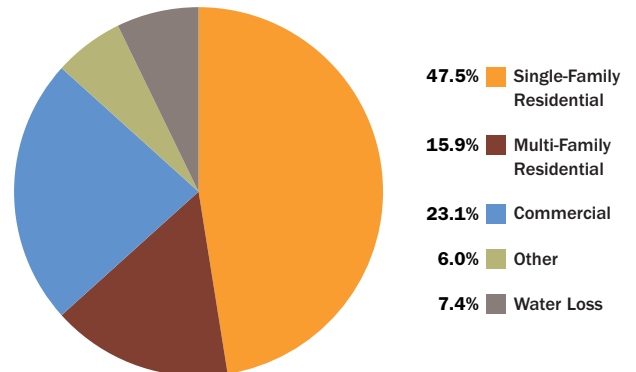
Water Supply and Deliveries

The city of Mesa maintains a diverse supply portfolio, with surface water from the Salt and Verde Rivers constituting 53% of the total water supplies for the city in 2008. A large portion of water is provided from the Colorado River, via the Central Arizona Project (CAP), and only 5% of Mesa’s water supply is sourced from groundwater. In 2008, single-family residential accounts received about 48% of the total treated deliveries, but commercial accounts represent a significant water user in the city as well, consuming 23% of all deliveries. It is important to note that turf and industrial users are included within the commercial water use sector.

SOURCES OF WATER FOR MESA



2008 WATER USE IN MESA



* Arizona Department of Commerce. 2009. *Arizona population estimates, 2009*. Available at: <http://www.azcommerce.com/econinfo/demographics/Population+Estimates.html> (accessed May 5, 2010).

† IDcide Local Information Data Server. Mesa, AZ weather. <http://www.idcide.com/weather/az/mesa.htm> (accessed April 12, 2010).



Per Capita

The city of Mesa reduced its gallons per capita per day (GPCD) water use from 2003-2008 across all metrics: single-family residential (-23.7% change), system-wide potable (-8.9% change), and system-wide total (-2.9% change). The reduction in single-family residential GPCD water use from 2003-2008 is significant.

Mesa GPCD

Per Capita Water Use	2003	2007	2008
Single-Family Residential ^a	170	140	130
System-Wide Potable ^b	183	180	167
System-Wide Total ^c	198	212	192

^a Treated water deliveries to single-family accounts ÷ single-family residential population

^b Total treated water delivered ÷ service area population

^c Total raw water from all supply sources + direct effluent use ÷ service area population

Rate Structure

The city of Mesa uses a three-tier inclining block rate for individual residential water accounts inside and outside the city limits.

Usage Per Dwelling Unit	Cost
0–12,000 gallons	\$2.30 per 1,000 gallons
12,001–24,000 gallons	\$3.45 per 1,000 gallons
Over 24,000 gallons	\$3.86 per 1,000 gallons

Residential accounts have a base service fee of \$11.48, comprising 33% of the average customer’s monthly bill for 10,000 gallons. The slope of Mesa’s average price curve is 0.0081, indicating that as consumption increases, the unit price of water remains relatively constant.

Conservation Measures

The city of Mesa is regulated in the Phoenix Active Management Area as a large municipal provider under the Total GPCD Program. According to the Arizona Department of Water Resources, Mesa is currently in compliance with the requirements of the Total GPCD Program.

Customer Rebates

Mesa offers a grass-to-Xeriscape rebate in which residential property owners who replace at least 500 square feet of grass with desert landscaping can qualify for a \$500 rebate.*

Ordinances/Rules

Water Conservation Design Guidelines[†] – The following water conservation design guidelines apply to all proposed developments, all buildings, and uses of land, with the exception of single residences:

- Drought-resistant shrubs and trees are to be the predominant plants used in the landscape design.[‡]
- Plant materials for right-of-way landscaping must be compatible with low-water-use plant limitations.[§]
- Required irrigation systems shall be underground automatic watering systems, unless the lot is served by functioning flood irrigation.[¶]

Water Feature Policy^{}** – Water features (pools, ponds, fountains, streams, waterfalls, etc.), unless serviced with reclaimed water or part of a publicly oriented outdoor recreation facility, shall be sited only within small-scale, pedestrian-oriented places.

Potable Water Use Restrictions^{††} – Further filling of artificial lakes and watering turf-related facilities with potable water within the water service area of the city is contrary to the city’s water conservation policy. A permit is required to fill an artificial lake^{‡‡} or apply water for landscaping watering purposes on a turf-related facility that applies water to 10 or more acres of landscaping.

* City of Mesa, Arizona. Grass-to-Xeriscape landscape rebate. <http://www.mesaaz.gov/conservation/grass-to-xeriscape-rebate.aspx> (accessed June 9, 2010).

† MESA, ARIZ., CODE § 11-14-2(A) (2010).

‡ *Id.* § 11-14-3(C)(4).

§ *Id.* § 11-14-3(C)(6).

¶ *Id.* § 11-15-3(F)(6).

** CITY OF MESA WATER FEATURE POLICY (APPROVED BY THE CITY MANAGER’S OFFICE, 2000).

†† MESA, ARIZ., CODE § 4-5-2 (2010).

‡‡ An artificial lake is defined by the city code as a “man-made lake, pond, lagoon, or other body of water that has a surface area greater than twelve thousand three hundred twenty (12,320) square feet and that is used wholly or partly for landscape, scenic, or recreational purposes.” See *Id.* § 4-5-2(B).



Native Plant Preservation^{*} – For subdivisions within the Desert Uplands Area, a minimum of 50% of the plant material used for common-area, parkway, and median landscaping shall be selected from the Preferred Desert Uplands Plant List, and the remainder selected from the Acceptable Desert Uplands Plant List. Subdividers are encouraged to select at least 90% of the plant material used for common-area, parkway, and median landscaping from the Preferred Desert Uplands Plant List.

Water Waste Nuisance[†] – It is unlawful for any person to permit or cause the escape or flow of water into or upon a public street from any source in such quantity as to cause flooding, impede traffic, create a hazardous condition, cause damage to streets, or cause a condition that constitutes a public nuisance or a threat to the public health and safety.

Water Conservation Receptacle[‡] – At least one receptacle outlet shall be installed under-counter at the sink or lavatory most remote from the water heater for the purposes of installing a hot-water recirculation system.

Education

Email Subscriptions – A Landscape Watering Reminder email service is available through the city that advises subscribers on watering frequencies based on current weather conditions. There are currently over 1,200 subscribers.

Inventory of Water Conservation Materials – Mesa maintains an inventory of its water conservation materials to track distribution to nurseries and landscape companies, garden clubs, workshops, libraries and customer service centers, local and regional events, and general public requests.

Residential Audit Program – Mesa provides free self-audit kits for homeowners upon request, in addition to information that helps residents understand how to read their water bill, water meter, and determine where water might be wasted.

Water Budgeting Program – Mesa provides outreach to businesses and multifamily communities to show how saving water can help reduce costs. Staff works with managers and/or owners to review on-site water use,

identify water saving options, and construct a month-by-month outdoor water budget. City departments and the Arizona Department of Transportation also participate in this program.

Water Conservation Website – The city of Mesa hosts a robust water conservation website, with multiple categories of information and several additional links to outside resources.

Landscaping Workshops and Presentations – Mesa offers free water conservation and landscape classes for homeowners (12 per year) as part of its “Living Green Workshop Series: Earth Friendly Advice for Home and Garden.” Classes are advertised in the utility bill newsletter, in *The Arizona Republic*, and press releases.

AMWUA Membership – As a member of Arizona Municipal Water Users Association, Mesa participates in the “Water—Use It Wisely” messaging campaign, SmartScape training program, outreach at tradeshow and conferences, and distribution of AMWUA brochures, such as “Landscape Plants for the Arizona Desert” and “Watering by the Numbers.”

Water Curriculum – Staff has worked with Mesa public schools to develop a water curriculum helping students establish good water use habits and creating stewards of the future. The first-grade curriculum focuses on plants and animals and how they have adapted to the desert. The fourth-grade curriculum focuses on where water comes from, the treatment process, and water use decisions. These programs each reach approximately 4,000 students per year. The seventh-grade curriculum focuses on the science of water—the importance of keeping drinking water clean and the economics of water.

Xeriscape Demonstration Garden – The city partners with Mesa Community College’s main campus and Red Mountain campus to maintain a demonstration garden that includes interpretive signs and displays featuring low-water-use plants and desert landscape techniques.

Implementation of Conservation Measures

The city of Mesa provided 107 Xeriscape rebates between 2007 and 2009. Preliminary data from the homes suggest an average savings of approximately 19,000 gallons per home per year, a 13% reduction in household water use. Extrapolating to all homes in the program and the

^{*} *Id.* § 9-6-5(A), (G).

[†] *Id.* § 8-6-3(P).

[‡] *Id.* § 4-3-1(PP).



113,420 square feet of turf removed, Mesa estimates this program saves 2,039,000 gallons of water annually.

The city's Code Compliance Division opened 10 cases of water waste violations this year; however no fines have been issued thus far.

Mesa's water conservation staff provides 5-10 homeowner association water audits each year. In one example, an HOA with 19 acres of turf reduced consumption post-audit by 21 million gallons, generating a savings of \$100,000 in water costs for the association. During the audits, HOAs are also encouraged to not over-seed their common areas during the winter. Using conservative assumptions, the city estimates this specific measure to save more than 30,000,000 gallons annually, and has cumulatively saved more than 242,000,000 gallons since program inception.

Funding for Conservation

In 2008, Mesa had a conservation budget of \$265,081, approximately 0.4% of the total water utility's budget. This does not take into account capital conservation projects, such as replacing water lines, installing permaloggers, and upgrading treatment plant processes, which, if included, would boost funding to about 10% of the water utility's budget. The city has four full-time equivalent employees working in water conservation, and spends about \$0.56 per customer on water conservation programs—again, not including capital projects.

Goals for Conservation Savings

The city of Mesa has a conservation savings goal to reduce GPCD and maintain compliance with state requirements.

Water Loss

In 2008, the city recorded 6,981 AF (2.27 billion gallons) of water loss, representing 7.4% of total supplies. This is lower than system losses in 2007 (at 10.3%), but slightly higher than 2003 (at 6.6%).

Supply-Side Efficiency Measures

Mesa uses over 400 noise loggers deployed throughout the system to provide continuous leak detection monitoring of the system. When a potential leak is detected, the logger goes into leak mode and transmits a radio signal for the patrol unit to pick up. The alert is investigated and leak is repaired, if necessary.

Using a carefully designed statistical sample of water meters, Mesa gained enhanced understanding of manufacturer performance, changes in meter performance over time, and unmetered water losses. This information was used to understand the typical meter functional and economic life, which has allowed optimization of the meter management program. Meters are removed from service when the lifecycle cost of the meter management program is minimized. Over the last 18 months, Mesa replaced nearly 35,000 underperforming meters through the program, and distribution system losses have fallen to less than 3%.

Mesa maintains an aggressive program for replacing old service lines by identifying neighborhoods that have old pipes with a history of breaks and leaks, and targeting them for wholesale replacement. Mesa projects that it will spend on the order of \$12 million a year over the next five years to replace old waterlines.



Effluent Use

The city generated 23,807 AF of effluent in 2008, and delivered 26% of this total (6,243 AF) for direct use and 23% (5,456 AF) for recharge. Mesa sends a significant portion of its wastewater to the 91st Avenue regional wastewater treatment plant, which is subsequently used for wildlife habitat mitigation, agricultural purposes, and cooling at the Palo Verde nuclear power plant. This additional amount of reuse is not accounted for in Mesa's figures above, but it would have the effect of increasing Mesa's direct effluent use on the order of 20,000-25,000 AF per year. Despite not including these amounts, Mesa reported a 700% increase in effluent delivered for direct use between 2003 and 2008.

Mesa has also entered into a reclaimed water management program through the comprehensive Arizona Water Rights Settlement Act of 2005. Ultimately, Mesa will deliver 29,400 AF per year of reclaimed water to the Gila River Indian Community for agricultural use. In exchange, Mesa will receive 23,530 AF per year of Central Arizona Project water that can be used for potable purposes.

Additional Information

As one of the first cities to displace reliance on fossil aquifers for Colorado River water, Mesa is an outspoken critic of the region's current paradigm of aquifer use that allows groundwater pumping to occur as much as 100 miles away from recharge or replenishment of that pumping. Through regional efforts such as the East Valley Water Forum, Mesa pushes for more sustainable management of regional aquifers so that water supplies can be saved as a contingency for surface water drought rather than being depleted as a base supply.

The city of Mesa understands that the use of power, chemicals, and raw water supplies are all interrelated. Efforts are made to optimize operations between these three factors by scheduling supplies based on minimization of raw water costs, treatment costs, and power costs. Mesa is also undertaking a comprehensive audit to refine where savings in these three areas can be achieved, and all capital projects are analyzed to include power and chemical costs as a factor in design decisions.

For example, at Mesa's Northwest Water Reclamation Plant, the city has installed generators that run off of the biogas produced by the digestion of solids at the plant (cogeneration). The city also uses goats for weed control purposes at the plant.