

Chandler Water Resources & Drought Preparedness



Public Works & Utilities | Water Resources
City Council Work Session – April 10, 2023



Strategic Framework Direction



Sustainability and Technology

Embrace sustainable and global technology advancements by leading in the sustainability of water infrastructure and conservation.

Chandler's high-tech industries, businesses and talented workforce drive the local economy. We recognize the importance of infrastructure, water and streamlined city services that support key industries engaged in the development of current and future technologies.



Agenda

- Chandler's Water Supplies
- Salt & Verde Update
- Colorado River Update
- Challenges Ahead
- Chandler's Unique Preparations
- Current actions
- Next Steps

Where Does Our Water Come From?



Surface Water

- Salt & Verde Rivers (SRP)
- Colorado River (CAP)
- Roosevelt Water Conservation District (RWCD)



Groundwater

(Underground Aquifer)



Reclaimed Water

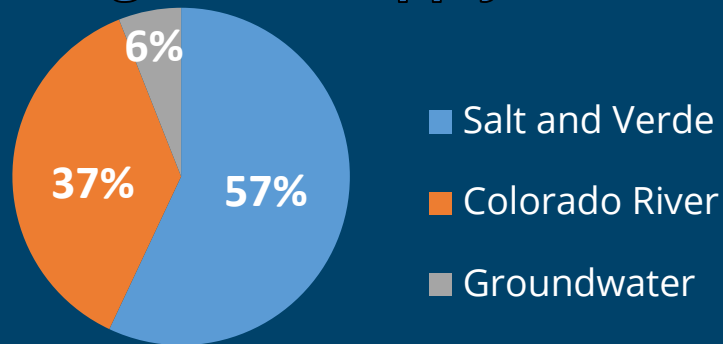
(Treated Wastewater)

Chandler's Water Supplies

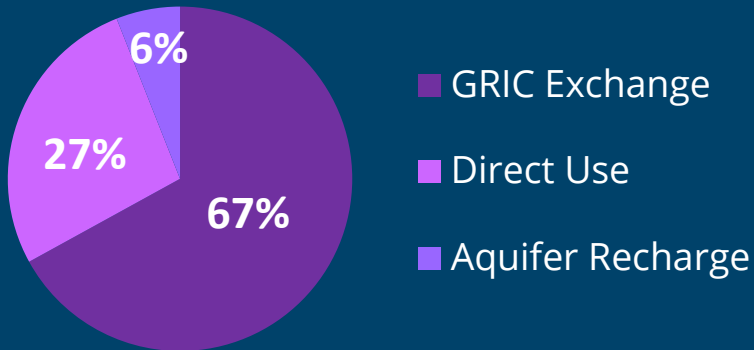
Projected Build-out Supply

Annual Supply (AF)	Water Source
59,530	Salt and Verde Water (SRP)
38,755	Colorado River Water (CAP)
6,346	Groundwater
104,631	Annual Drinking Water Supply
29,936	Annual Reclaimed Water Supply

Drinking Water Supply

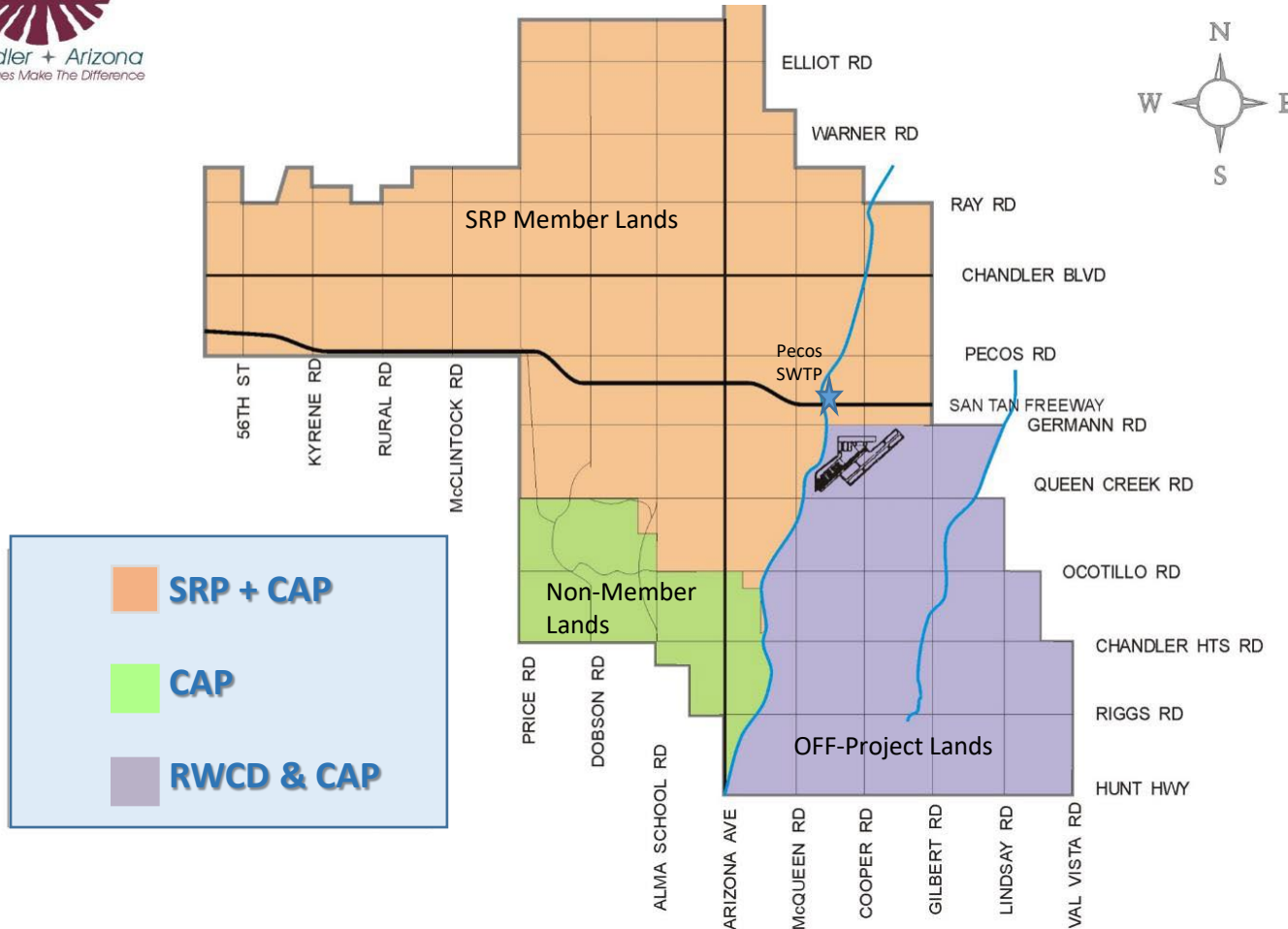


Reclaimed Water Supply



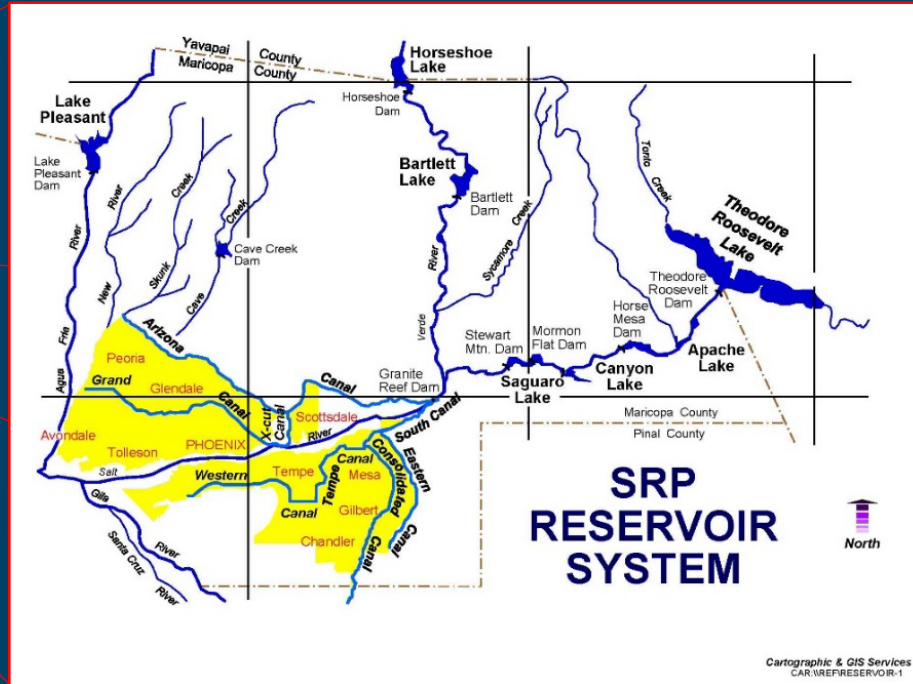
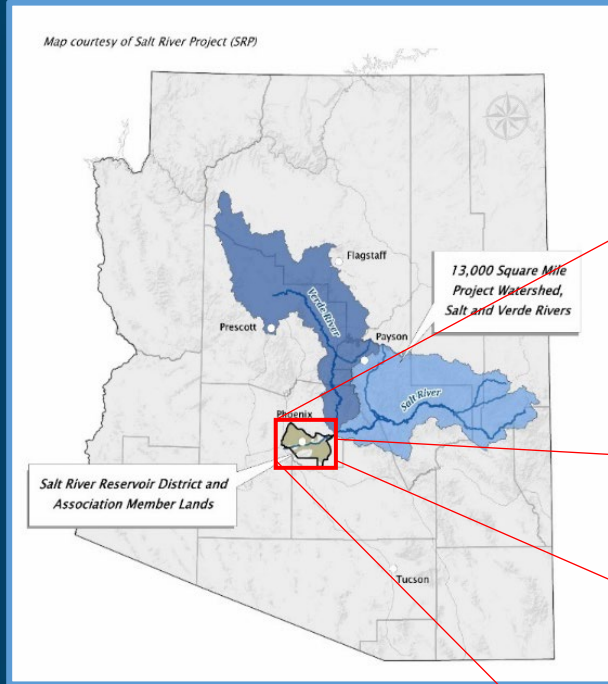


Chandler Water Delivery Map



Salt and Verde River Watersheds

Chandler's primary water supply comes from the Salt & Verde Rivers, stored in SRP reservoirs.

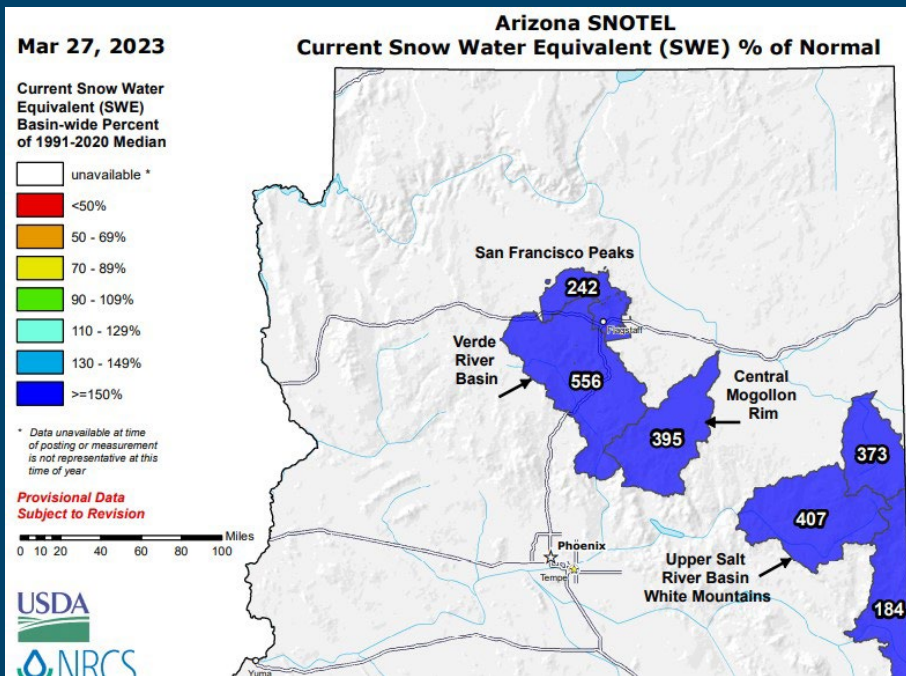


SRP reservoirs are currently 100% full

Salt and Verde Snowpack

Historic year: 2023 second deepest snowpack in 30 years!

Reservoirs 100% full as of 3/22. Verde system spills as spring runoff increases.



SRP Spill Operations

Salt/Verde spill releases began March 2nd and continue through April.



SRP reservoirs are 100% full - "spill water" is released into the normally dry Salt River



Horseshoe Dam – Verde River



Bartlett Dam – Verde River

Colorado River System

The Colorado River supplies approximately 37% of Chandler's average annual drinking water



Colorado River Allocations

- Upper Basin: Colorado, New Mexico, Utah, Wyoming
- Lower Basin: Arizona, California, Nevada

Basin	Amount
Upper Basin	7.5 maf
Lower Basin	7.5 maf
Subtotal	15.0 maf
Mexico	1.5 maf
Total	16.5 maf

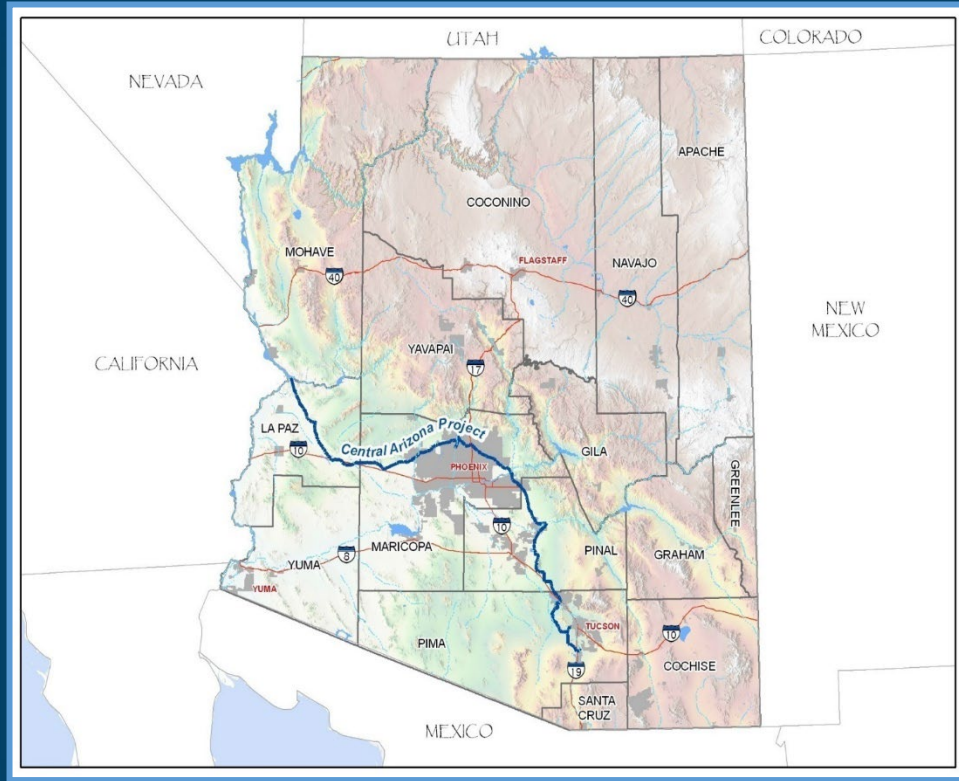
Lower Basin allocations:

AZ (2.8 MAF)

CA (4.4 MAF)

NV (0.3 MAF)





Colorado River is pumped 800 vertical ft. into a 7-mile tunnel near **Lake Havasu**

CAP Engineering: 14 pumps lift 3,000 ft. total

CAP Storage: Lake Pleasant

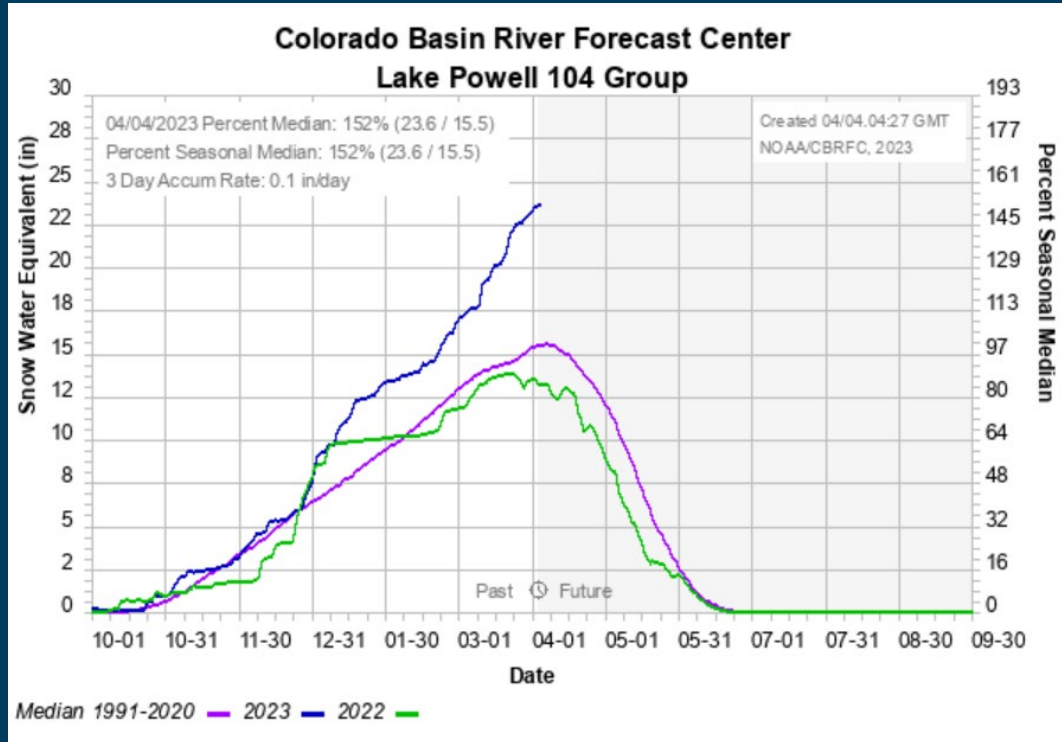
CAP Canal: 336 miles

Delivery Supply: 1.5 million acre-feet

Central Arizona Project Canal

Colorado River Conditions

Snow Water Equivalent (SWE) for 2023 is 152% of the 30-yr average.



Groundwater Supplies

- Chandler will access groundwater and stored water during surface water shortages
- 35 wells provide redundancy (73 MGD)
 - 32 active wells
 - 3 new wells (in-progress)
 - 2 future well sites reserved
- Decades of well maintenance and careful planning



Chandler Reclaimed Water

- Infrastructure planning started in the 1980's
- Reclaimed system offers a new water supply, reducing demand for drinking water supplies
- Distribution system delivers to over 360 direct use customers (~30,000 AF per year)
 - HOA's, Golf Courses, Parks & Schools
 - Commercial and industrial users
 - Gila River Indian Community – agricultural users
 - Aquifer Recharge Facilities

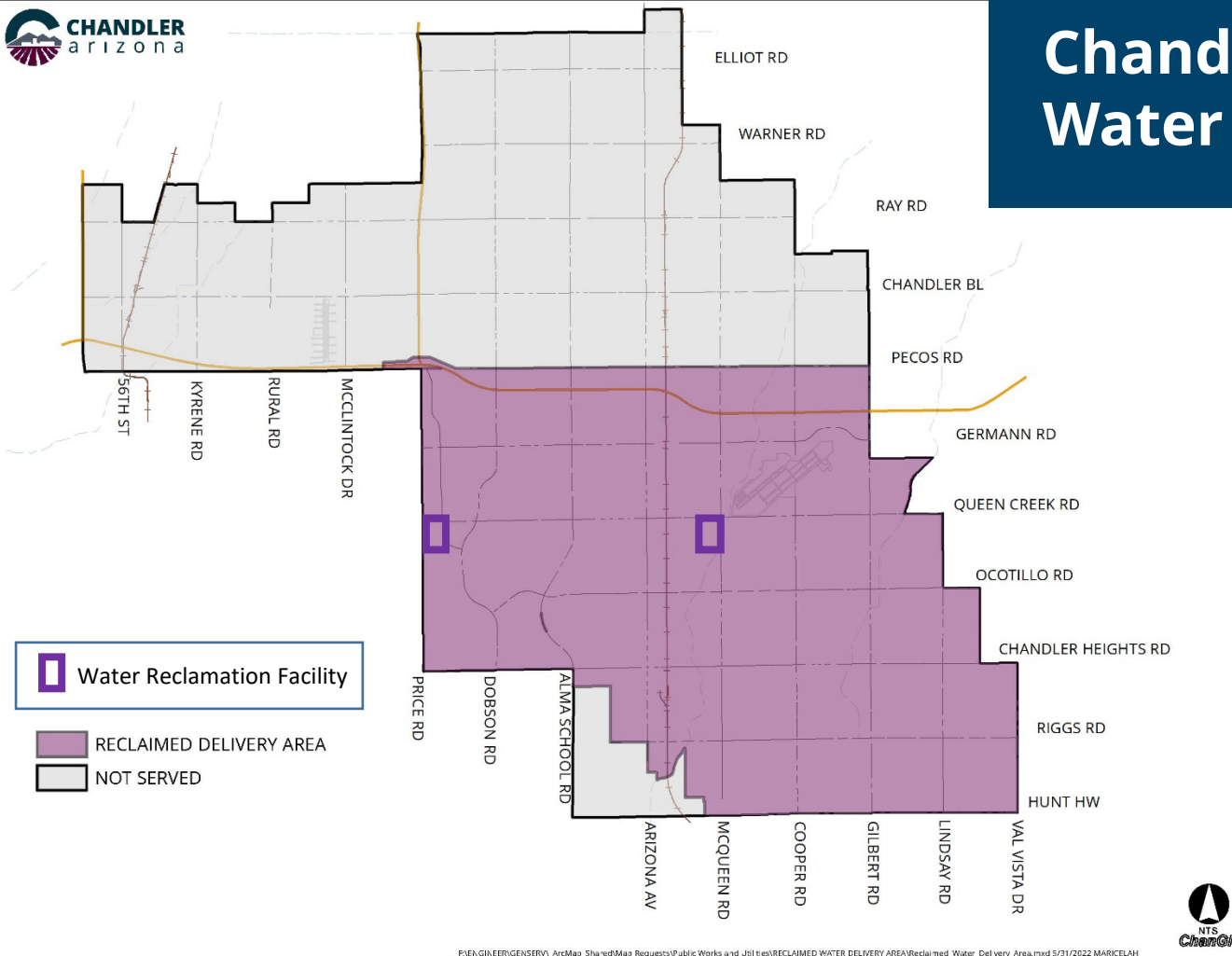


Veterans Oasis Park – Recharge Facility



Airport Water Reclamation Facility

Chandler Reclaimed Water Delivery Area



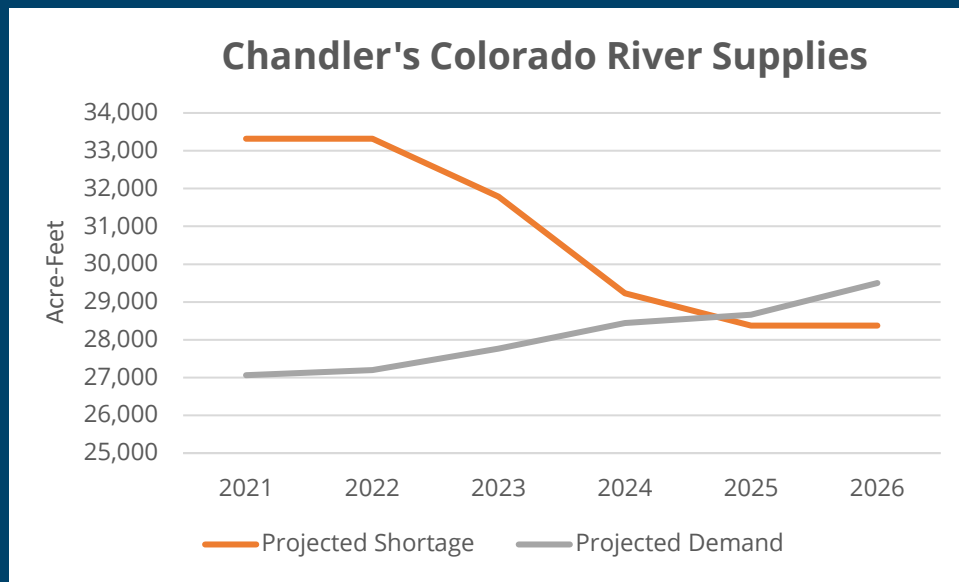
Future Challenges

The frequency and magnitude of shortages may be greater than previously anticipated

- ✓ **Colorado River Shortage** - Adapting to a future with less Colorado River water.
- ✓ **Regional Partnerships** – Provide infrastructure flexibility to access to new water supplies.
- ✓ **Sustainable Aquifer Management** – Increased regional groundwater pumping.
- ✓ **Cost of Service** – Increased raw water costs and decreased revenue (impacts to rate model).
- ✓ **Demand Management** – Shifting away from water intensive landscapes, demand may become less responsive to incentive programs.
- ✓ **Water Quality** – Adapting to shortage may require new treatment technologies.



Shortage: it's not a matter of if...it's a matter of when!

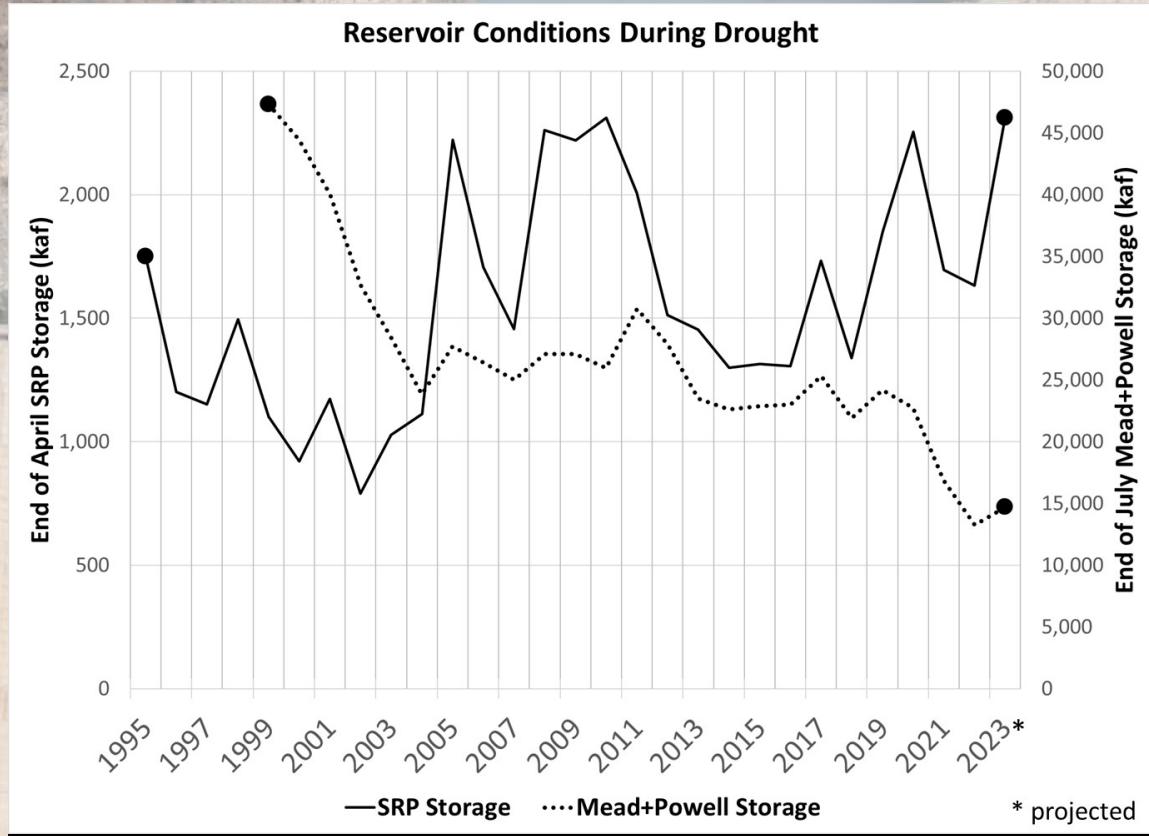


- 2022 – First ever Colorado River shortage declared. Tier 1 Shortage (no reduction)
- 2023 – Tier 2 Shortage (3% reduction)
- 2024 – Tier 3 Shortage (18% reduction)

Surface Water Shortages

System Conditions and Reliability

- Salt and Verde reservoirs recover quickly after dry years. Total system storage is highly variable year-to-year, but very reliable long-term.
- Colorado River storage has been declining over the past 25 years and is less reliable long-term.



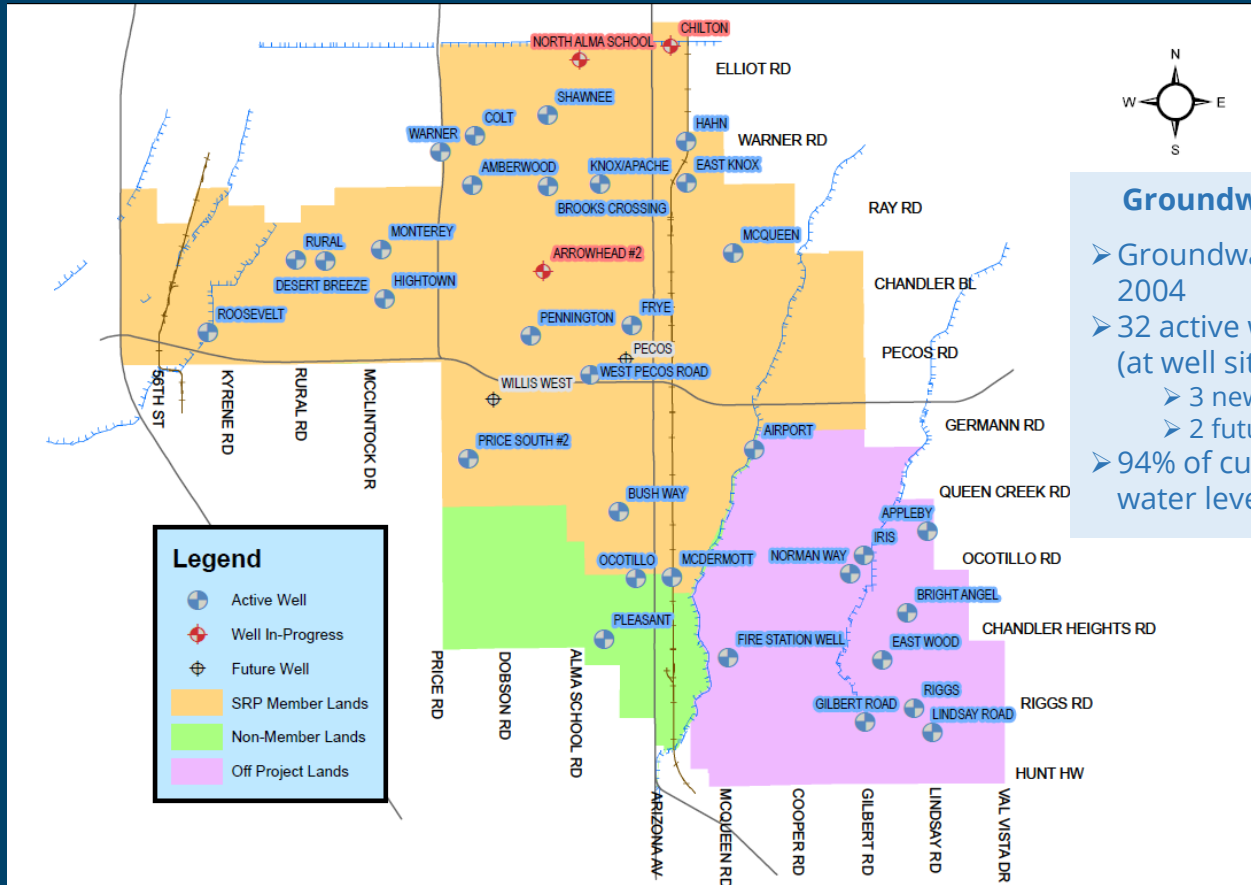
What makes Chandler unique?

Chandler is uniquely positioned to adapt to changes in water resource availability

- ✓ Diverse Supplies – Chandler has secured multiple sources of water
- ✓ Water Recycling & Reuse – 100% of reclaimed water is exchanged, used directly, reducing demand on drinking water supplies
- ✓ Decades of infrastructure investments
 - **1** Interconnected water distribution system, with flexibility to deliver multiple water sources to anywhere in Chandler
 - **2** Surface water treatment plants (access to SRP and CAP canals)
 - **35** City drinking water wells provide 100% back-up supply
 - **3** Water Reclamation Facilities – Every drop is treated and reused!
 - **6** Recharge facilities to store water in underground aquifers

Learn more> Chandleraz.gov/drought

35 City Wells – 73 MGD Capacity (13.3 MGD used in 2022)



Groundwater Levels in Chandler

- Groundwater monitoring began in 2004
- 32 active wells with monitor stations (at well sites)
 - 3 new wells in-progress
 - 2 future well sites secured
- 94% of current well sites show rising water levels (or no change)

Historic Water Rights Acquisition

City Council approved an innovative partnership agreement with the Gila River Indian Community (GRIC) to lease and exchange water

- ✓ **2016 - Water Rights Acquisition**
\$43 million to acquire long-term rights to additional Colorado River water
- ✓ **Four interrelated agreements**
 1. 100-Yr Reclaimed water exchange for CAP water
 2. 100-Yr Lease for CAP water
 3. Long-term Storage Credit (LTSC) Purchase
 4. Contributed funds (well development)
- ✓ **Gila River Indian Community Goals**
 - ✓ Expand GRIC agricultural development with Chandler's reclaimed water.
 - ✓ Generate revenue to address rising CAP costs



Gila River Indian Community farm

Planned for Growth

Careful long-term planning has positioned Chandler well for economic growth

- ✓ General Plan - lays out a vision for future growth
- ✓ Utility Master Plan - ensures adequate infrastructure to meet the demands of future growth
- ✓ Water Supply Acquisition – planned for water supply & demand during normal years, and shortage years
- ✓ Water Policy - Staff continues to monitor water policy discussions with potential impacts to Chandler's water

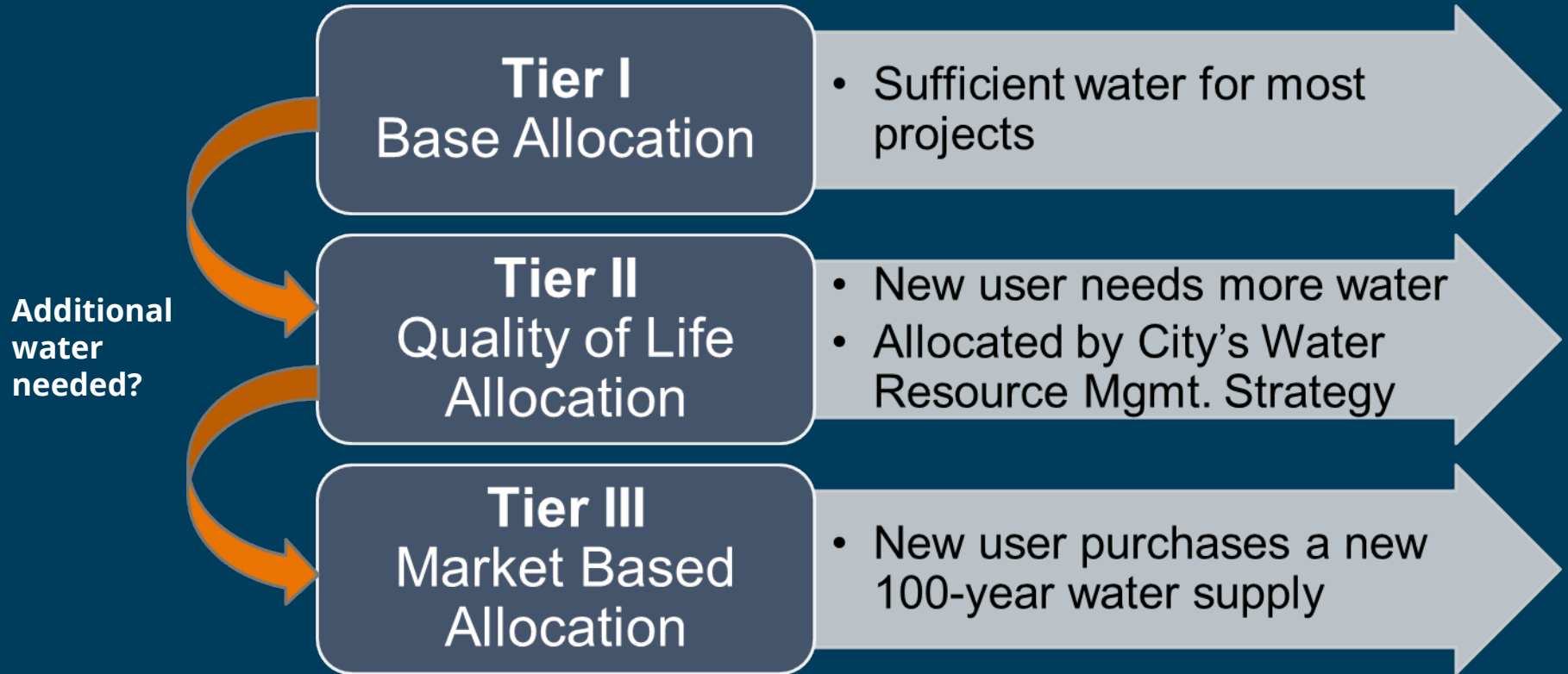


Allocation Policy Purpose

- Links Water Resource Planning to City's Strategic Goals
- Provides better coordination among city departments



Allocation Policy - Impact



What are we already doing?

Chandler has been preparing for surface water shortages for decades

- ✓ Chandler Drought Plan & Team
- ✓ Conservation education and rebate programs
- ✓ Stormwater management and drywells
- ✓ Aquifer Recharge (injection wells & basins)
- ✓ Multi-year groundwater modeling effort
- ✓ Tiered rate structure to encourage conservation
- ✓ 100-Year Assured Water Supply Designation
- ✓ Large Landscape Irrigation Efficiency Program
- ✓ Expanded messaging and public awareness campaigns



Recharge basins at Veteran's Oasis Park

Chandler's Drought Plan

Drought stages evaluate supply and implement additional conservation actions

Drought Stages	Declared by	Trigger	Response
Stage 1	Water Resource Manager	A surface water shortage is predicted.	Drought public awareness campaign & expanded conservation messaging.
Stage 2	Public Works & Utilities Director	SRP Supplies reduced by > 40% and/or CAP Supplies reduced by > 10%	Mandatory outdoor water use restrictions for municipal operations.
Stage 3	City Manager	SRP Supplies reduced by > 50% and/or CAP Supplies reduced by > 15%	Voluntary outdoor water use reductions for businesses and residents and continuing mandatory reductions for municipal operations.
Stage 4	City Council	Conditions impacting the City's ability to meet water demands	Mandatory outdoor water use restrictions for businesses, residents and municipal operations.

Note: Triggers could change as Chandler acquires additional supplies and/or drills additional wells

↓ Chandler's Programs

Saved 109 million gallons*

- ✓ 4,813 Chandler students educated
- ✓ 320 Adults attended workshops
- ✓ 1,224 Residential Water Audits
- ✓ 88 Landscape Consultations
- ✓ 196 Conservation Rebates

Conservation Program	2022 Total	2022 Water Saved	Program Description
Water Audits (Residential)	1,224	65.2 million gal	Find and fix leaks, identify irrigation efficiencies
Water Audits (Commercial)	74	22.2 million gal	Find and fix leaks, assistance with irrigation efficiency
Landscape Consultation (Residential)	78	4.2 million gal	Assist with water smart landscaping.
Landscape Consultation (Commercial)	10	13.4 million gal	Assist with water smart landscaping.
Turf Removal Rebates	22	1.9 million gal	Convert turf to xeriscape.
Smart Irrigation Controller Rebates	162	1.9 million gal	Smart controllers adjust watering based on weather and soil

*based on 2022 conservation program results

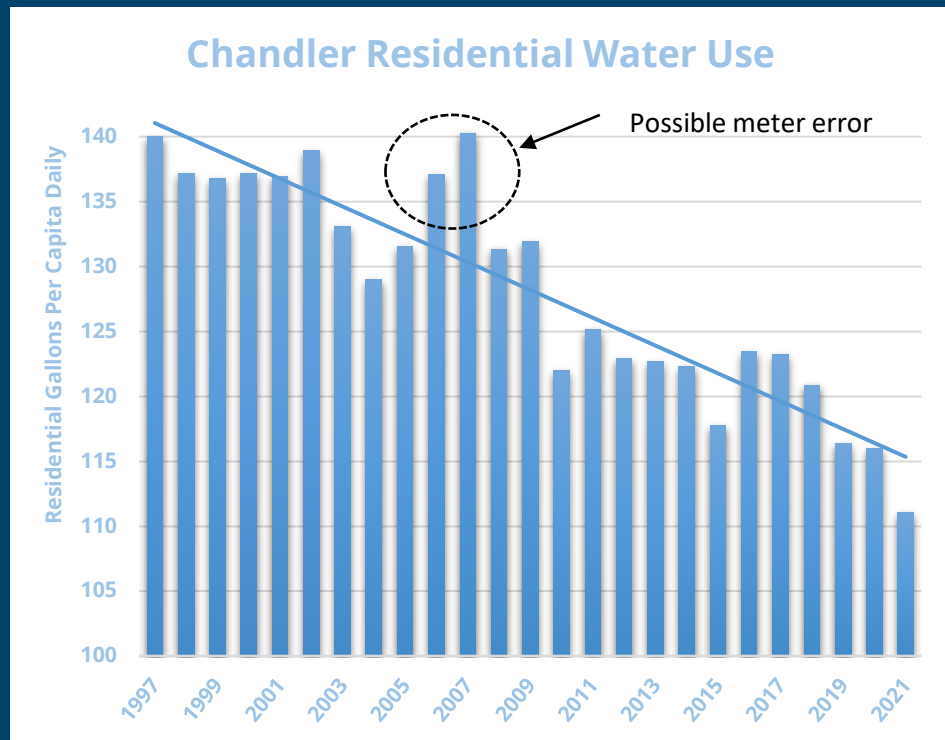
Chandleraz.gov/SaveWater

Chandler Conserves

25 years of declining water use - Chandler cares about conservation!

- ↓ Chandler residents reduced water use by 20%
- ✓ 29 gallons per person daily
 - ✓ 8.1 million gallons per day
 - ✓ 9,073 acre-feet per year
 - ✓ 111 – 2021 GPCD

Chandleraz.gov/SaveWater



Drought & Conservation Education

Frequently updated information available online

[Pay](#) [Jobs](#) [Contact](#) [A-Z](#) [Translate](#) [News](#) [Text Size](#) [Search](#)

 **CHANDLER**
arizona

EXPLORE RESIDENTS BUSINESS GOVERNMENT

Water Conservation in Action

[Home](#) | [Residents](#) | [Water](#) | [Water Conservation in Action](#)

Chandler is committed to educating our community on the **best ways to save water** and ensure a sustainable water supply for our future. Here are some of the water conservation actions taken by our community in 2021, along with the water we saved.

3,332 Youth Reached Through Water Conservation Education	917 Water-Wise Site Visits	513 Water-Wise Workshop Attendees
221 Residents Installed Water Efficient Weather-Based Controllers	88 Water Conservation Kits Issued to Homes Built Prior to 1992	61 Non-Residential Site Visits
47 Landscape Consultations	29 Turf to Xeriscape Conversions	18 Large Landscape Water Efficiency Program Participants

80+ million gallons after 1 year

404 million gallons after 5 years
when conservation measures are continued

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EXPLORE RESIDENTS BUSINESS GOVERNMENT

Drought Preparedness

[Home](#) | [Residents](#) | [Water](#) | [Water Conservation](#) | [Drought Preparedness](#)

Chandler has been preparing for drought and surface water shortages for decades. Smart water management decisions and water policies help us maintain a reliable water supply. We have proactively invested in infrastructure, **diverse water supplies, water reuse, storing water underground and conservation programs.**

Due to historic drought, climate change and over-allocation, conditions on the Colorado River are worsening. Chandler recognizes the seriousness of the current Colorado River situation and will continue to plan for a future with less water. While shortages on the Colorado River may come quicker than anticipated, Chandler is well prepared. The City will continue to monitor the drought and evaluate its water supplies to determine if activating Chandler's **Drought Management Plan** is appropriate.



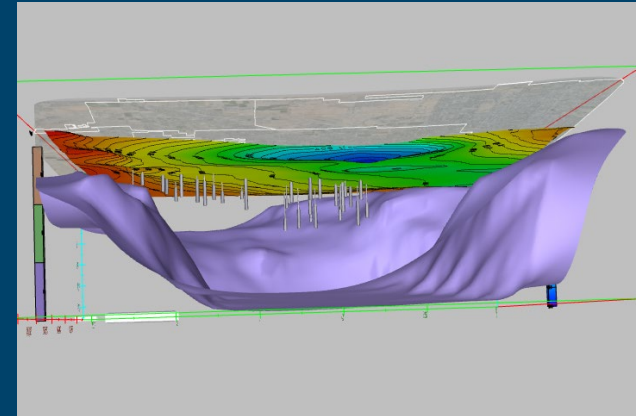
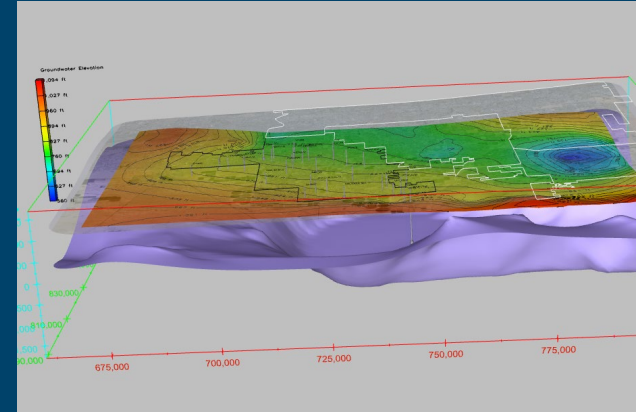
Did you know that only a portion of Chandler's water supplies come from the Colorado River? Approximately 57% of Chandler's drinking water supplies come from the Salt and Verde rivers. During a water shortage, the City can also rely on water stored underground over the past two decades. Chandler has enough water stored

[Chandleraz.gov/SaveWater](https://chandleraz.gov/SaveWater)

[Chandleraz.gov/Drought](https://chandleraz.gov/Drought)

Groundwater Modeling

- **Groundwater modeling** - evaluated the local aquifer impacts of increased regional groundwater pumping
- **Two Scenarios** -
 1. **Moderate Pumping Scenario**
(due to frequent Colorado River shortages)
 2. **High Pumping Scenario**
(due to severe and sustained Colorado River shortages)
- **Recovery of Stored Water** - Well depth sufficient to recover stored water under sustained pumping
- **Physical Availability** - Local aquifer is deep and productive



Tiered Rate Structure

Tiered rates help to signal the value of water and encourage conservation

- **Tiered Structure** - First tier water is used for essential needs and costs less than water used in higher tiers for discretionary uses.
- **Efficiency** - Customers who use water more efficiently are rewarded with lower rates
- **Regular Updates** – Rates reviewed every other year to keep pace with costs. Cost of Service Study performed every five years.

City of Chandler Water Rates (effective 7/1/2022)

Tier (Gal. Used)	Base Monthly Charge*	Single Family Inside City (\$/kgal)	Multi-Family Inside City (\$/kgal)
0 - 10,000	\$9.26	\$1.62	\$0.89
10,001 – 20,000	\$9.26	\$2.11	\$1.09
20,001 – 60,000	\$9.26	\$2.65	\$1.49
60,000 +	\$9.26	\$3.31	\$2.25

*Base monthly charge for 5/8" meter

Conservation Public Awareness Campaigns

Expanded messaging - drought awareness, landscape rebates and outdoor water use tips

The image displays four overlapping social media posts from the City Government of Chandler, Arizona, each promoting a different water conservation campaign. The posts are arranged diagonally from the bottom-left to the top-right.

- Post 1 (Bottom-Left):** Titled "CHANDLER IS PREPARED" with the subtitle "FOR A HOTTER AND DRIER FUTURE". The background shows a large dam. The text states: "Due to drought in the Colorado River Basin and a Tier 2 shortage in 2023, Chandler has implemented Stage One of its Drought Management Plan. However, a Colorado River shortage does not mean shortage at the tap. Learn how Chandler has prepared for drought." The Chandler Arizona logo is at the bottom.
- Post 2 (Middle-Left):** Titled "LIMIT OUTDOOR WATER USE" with the subtitle "LAKE MEAD IS AT HISTORIC LOWS". The background shows Lake Mead. The text states: "Lake Mead is at Historic Lows and a Tier 2 Shortage has been declared for 2023. Please limit outdoor water use. Learn how at chandleraz.gov/OutdoorWaterSavings". The Chandler Arizona logo is at the bottom.
- Post 3 (Middle-Right):** Titled "SKIP WINTER GRASS THIS YEAR" with the subtitle "AND SAVE THOUSANDS OF GALLONS OF WATER". The background shows a hand holding grass. The text states: "Help Chandler save water by doing absolutely nothing. Skip your winter lawn and make time for what you enjoy. Even better, you'll save water and money... save up to 8,000 gallons per year for every 1,000 square feet of grass you don't overseed." The Chandler Arizona logo is at the bottom.
- Post 4 (Top-Right):** Titled "WATER-WISE REBATES" with the subtitle "REPLACE GRASS WITH WATER-SAVING DESERT LANDSCAPE OR INSTALL A SMART CONTROLLER". The background shows a desert landscape. The text states: "Did you know that more than half the water used by Chandler residents is used outdoors? One of the best ways to help save water is by replacing thirsty grass with drought tolerant native plants. Chandler offers rebates to replace your grass!" The Chandler Arizona logo is at the bottom.

Each post includes the City Government of Chandler, Arizona logo and a "Sponsored" tag. The bottom of each post features a link to [CHANDLERAZ.GOV](https://chandleraz.gov) and a "Learn more" button.

What's Next?

Recommended continued investment in water efficiency and regional partnerships

- ✓ **Chandler's Drought Plan - Prepare to implement Stage Two**
 - ✓ Stormwater retention basins – convert grass to xeriscape design
 - ✓ City Parks – Invest in irrigation efficiency tools and grass removal
 - ✓ Water Operations – pressure analysis
 - ✓ Cooling Towers - Invest in water efficiency when replacement is needed
 - ✓ Chandler online dashboard with key performance metrics
- ✓ **Regional Partnerships**
 - ✓ Bartlett Dam Modification Feasibility Study
 - ✓ Roosevelt Flood Control Space Optimization
 - ✓ SRP/CAP Interconnect Facility
- ✓ **Monitor Colorado River Shortage Negotiations**
 - ✓ Near-term proposals for emergency shortage reductions
 - ✓ New Colorado River operating guidelines begin in 2027



What's Next? (cont.)

Recommended new standards for outdoor landscaping and updated water rates and policies.

- ✓ **New Landscape Ordinance Recommendations**

- ✓ Prohibit ornamental grass in new commercial/industrial developments and require water efficient technology for irrigation systems
- ✓ Reduce allowable turf ratio in landscapes areas and eliminate the exemption for reclaimed water use
- ✓ Eliminate turf in stormwater retention basins

- ✓ **New Water Conservation Program Recommendations**

- ✓ Increased funding for rebates, water audits and education programs
- ✓ Aggressively pursue WIFA conservation grant funds

- ✓ **Water Rates** - Evaluate water rate changes and current rate tiers

- ✓ **Optimize Water Quality** – Invest in new water treatment technologies to maximize efficient and strategic use of Chandler's water resources

- ✓ **Update Water Allocation Policy** – Zoning changes that deviate from the water master plan

- ✓ **Messaging & Public Awareness Campaigns** – Spring campaign begins April 24th



Drought Plan – Stage Two

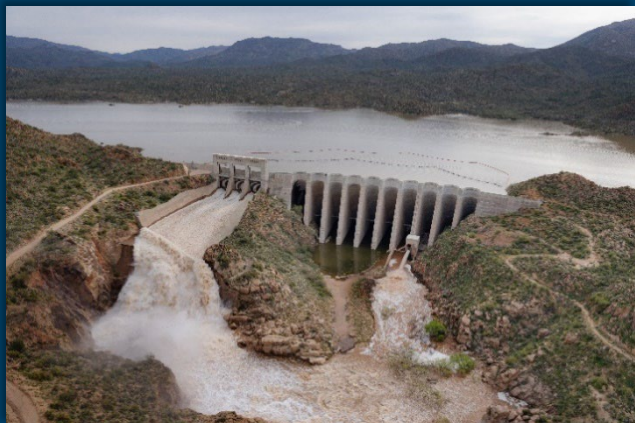
Stage Two of Chandler's Drought Plan includes reductions to municipal operations

- Parks Irrigation Upgrades
 - Baseline irrigation controllers
 - Hiring two outside contractors for irrigation repairs (20 parks, 4 facilities, 14 fire stations, 6 right-of-way, 5 pools and Paseo trail)
 - Irrigation audits and water budgets (Chuparosa, Desert Breeze, Espee, Folley, Nozomi, Pima, Shawnee, Snedigar, Paseo Vista)
- Turf reduction efforts
 - 8 -10 acres of turf conversion (grant funding required)
 - Stormwater retention basins



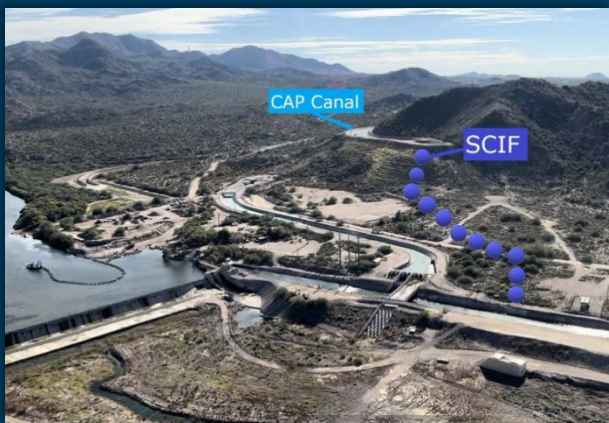
Regional Partnerships and Infrastructure

New infrastructure projects and agreements provide additional flexibility



Bartlett Dam Modification

Funding a feasibility study which evaluates the potential to restore lost capacity due to sedimentation and modify Bartlett Dam height to increase the available storage space



SRP/CAP Interconnect Facility

Funding construction of an interconnect allows Chandler to deliver water stored in the SRP system to our Santan Vista Water Treatment Plant located adjacent to the CAP canal



Roosevelt Dam Flood Control Space

Five-year pilot program to optimize the use of Roosevelt flood control space. Opportunities for planned deviations from normal operations, extending from 20 days to 120 days.

Colorado River Basin Shortage Guidelines

Overallocation and long-term drought have resulted in historic low reservoir elevations and threaten critical infrastructure

- 2007 – Basin States & Mexico agree to shortage sharing guidelines (exp. 2026)
- 2019 – Basin States agree to the Drought Contingency Plan
- 2021 – Lower Basin 500+ Plan
- 2023 – Basin States Modeling Proposals
- 2024 – Possible Federal Action
- 2027 – New Operating Guidelines



Lake Mead – low reservoir conditions

Conservation Rebate Programs

Recommended new and updated water-wise rebate incentives

- Residential Grass Removal
 - Increase grass removal incentive from \$0.20/sq. ft. → \$1/ sq. ft. removed
(current min. 1,000 sq. ft. – new min. 500 sq. ft.)
 - Eliminate new home rebate program
(lack of participation)
- New Commercial Rebate (Multi-family, HOA, Commercial)
 - New grass removal rebate – 25% of project, (up to \$75,000)
min. 5,000 sq. ft
 - Non-functional grass removal – \$3/sq. ft. (up to \$25,000)
 - Water Efficient Technology Rebate – 50% of the cost
(up to \$10,000)
 - Smart Controller Rebate – 50% of the cost (up to \$3,000)



Questions?