



ADVANCING WATER SUPPLY RELIABILITY



CALIFORNIA URBAN WATER AGENCIES

Working Together to Achieve Sustainable Water Management

California's water resources are highly variable—over time (seasonally and annually) and across the state's diverse geographies—posing many challenges to water management. Of these challenges, water scarcity is one of the greatest. The recent extreme drought underscored this reality with the two hottest years (2014 and 2015) and the lowest snowpack (2015) on record. Although hydrologic conditions recovered markedly in 2017, water supplies face many future uncertainties, such as climate change, population growth, aging infrastructure, and regulatory restrictions.

The California Urban Water Agencies (CUWA) remain steadfast in their commitment and actions to provide reliable, high-quality, affordable water for Californians. CUWA agencies are taking a balanced approach for a sustainable water future by managing demands, diversifying supplies, expanding storage, investing in infrastructure, and addressing water affordability. CUWA agencies carefully manage the substantial investments required to support these actions to keep water affordable and reliable. Each CUWA agency has mapped its course for future supply reliability, as summarized in 2015 Urban Water Management Plans (UWMPs) and other long-range plans. This fact sheet builds on a distilled compilation of CUWA agencies' 2015 UWMPs and highlights the agencies' efforts to prepare for California's future.



RETAIL

- Alameda County Water District (ACWD)
- City of Fresno
- East Bay Municipal Utility District (EBMUD)
- Los Angeles Department of Water and Power (LADWP)

RETAIL/ WHOLESALE

- Contra Costa Water District (CCWD)
- City of San Diego
- San Francisco Public Utilities Commission (SFPUC)

WHOLESALE

- Metropolitan Water District of Southern California (MWDSC)
- Santa Clara Valley Water District (SCVWD)
- San Diego County Water Authority (SDCWA)
- Zone 7 Water Agency (Zone 7)

FIGURE 1. Who is CUWA?

CUWA is a non-profit corporation of 11 major urban water agencies. The water delivered by CUWA agencies is a lifeline that supports two-thirds of California's population and the bulk of the state's \$2.5 trillion economy.

Aligning Efforts with the California Water Action Plan

The Governor's California Water Action Plan provides a roadmap for sustainable water management throughout the state. However, statewide sustainability is not possible without the efforts of local water agencies. As acknowledged in the Action Plan, most water management occurs on the local and regional levels. CUWA agencies have long embraced the importance of collaborating with the state to achieve water supply reliability throughout California.

Climate change, catastrophic events, aging infrastructure, and changing regulations all require a shift in thinking about how we plan for the future of California water. CUWA agencies are improving supply reliability and resilience amid these uncertainties through the efforts highlighted in this fact sheet, which correspond to the following Action Plan strategies:

- 1 Make conservation a California way of life
- 2 Increase regional self-reliance and integrated water management across all levels of government
- 3 Manage and prepare for dry periods
- 4 Expand water storage capacity and improve groundwater management
- 5 Provide safe water for all communities
- 6 Identify sustainable and integrated financing opportunities

While the Action Plan includes additional efforts (i.e., achieve the co-equal goals for the Delta, increase flood protection, and increase operational and regulatory efficiency), this fact sheet focuses on the actions related specifically to water supply reliability.

“ THE WATER ACTION PLAN DOES NOT REPLACE THESE LOCAL EFFORTS. IT COMPLEMENTS AND LEVERAGES THEM. COLLABORATION IS ESSENTIAL.”

- CALIFORNIA WATER ACTION PLAN (2014)



Recycled water, distributed through purple pipe, is one of the ways CUWA agencies are diversifying their supply portfolios.



CUWA agencies are promoting California-friendly landscaping as a way to reduce outdoor water use.

1 Leading the Way in Wise Water Use

Wisely managing demands is foundational to ensuring reliable water supply in years to come. CUWA agencies are leading by example in the statewide effort to make conservation a California way of life.

Aggressive investments in emergency conservation programs allowed CUWA agencies to successfully manage California's recent drought.

Moving forward, CUWA agencies continue to prioritize wise water use—through both short-term conservation efforts (i.e., in response to drought or emergency) and long-term water use efficiency for lasting, sustainable effects. CUWA agencies are committed to building on recent gains in public understanding to establish a cultural shift toward more efficient use of water in everyday life.

As CUWA agencies continue to support long-term water use efficiency, the capacity for short-term water use reductions becomes more limited. With the success of the CUWA agencies' extensive, long-standing demand management programs, effectively adapting to declining flows will compel partnerships with other utility departments and more integrated water management approaches in coming years.

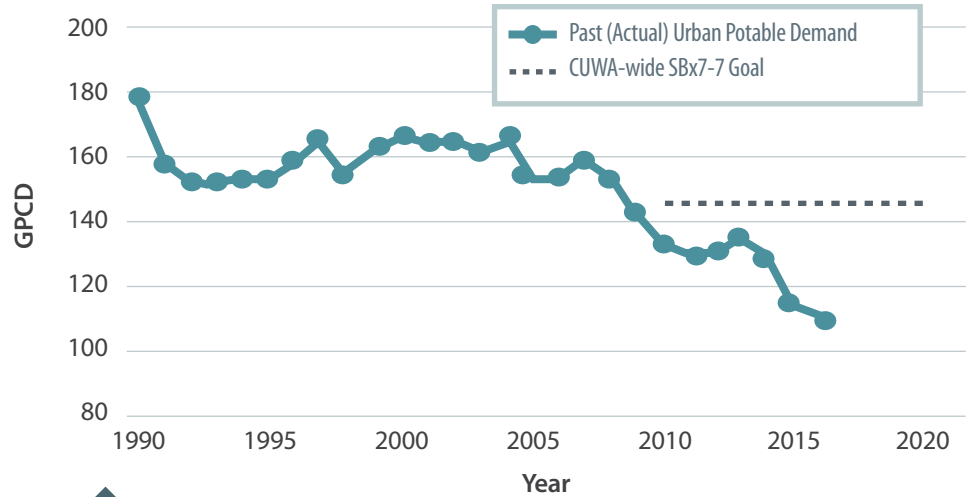


FIGURE 2. CUWA Retail Agencies' Collective Per Capita Water Usage ★

Urban (municipal and industrial) potable demand has decreased significantly in CUWA retail agencies' service areas, surpassing their collective SBx7-7 reduction goal. Though largely due to ongoing efficiency programs, recent reductions were also attributed to socioeconomic conditions (e.g., the economic recession in the late 2000's) and extraordinary conservation during the recent drought.

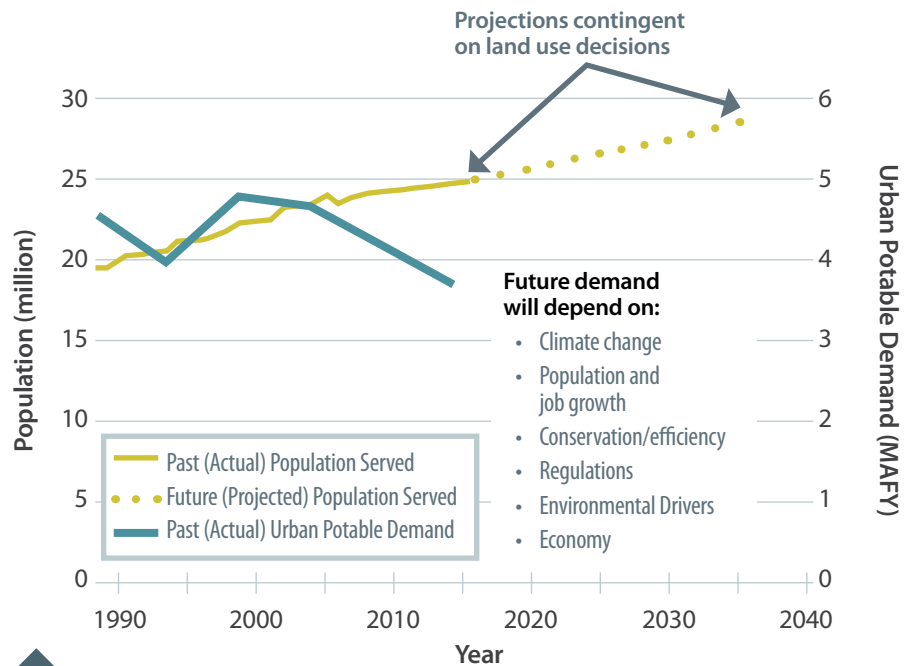


FIGURE 3. CUWA Agencies' Collective Population and Urban Potable Demands ★

Throughout robust population growth, CUWA's collective potable demands for urban uses have declined over the past 25 years.

★ Supplemental data available at: www.cuwa.org

2 Diversifying Portfolios to Enhance Local and Regional Self-Reliance

In addition to carefully managing demands, CUWA agencies are continuing to diversify their supply portfolios to address future uncertainties and increase reliability and resilience. Local, alternative supplies can replace traditional supplies and/or accommodate growth as needed to support California's growing economy.

The progress in supply portfolio diversification is striking when comparing the CUWA agencies' collective supply portfolio from 1990 to the normal year supplies projected for 2035, based on CUWA agencies' 2015 UWMPs (carefully compiled to adjust overlapping service areas). To meet future demands, the agencies are diversifying their collective portfolio with a wider range of local supplies and reduced reliance on traditional sources, such as imported water. Normal year supplies exceed demands due to management practices (storage and carryover) to support dry year supply needs, including environmental flows.

As part of their efforts to diversify supplies, CUWA agencies are advancing regional partnerships and leveraging joint resources to pursue a broader set of projects that would not be possible individually. Additionally, agencies are establishing integrated and adaptive plans to promote flexible decision making in light of future uncertainties.



Several CUWA agencies have plans to expand potable reuse programs.



Spreading grounds allow agencies to capture and store stormwater.

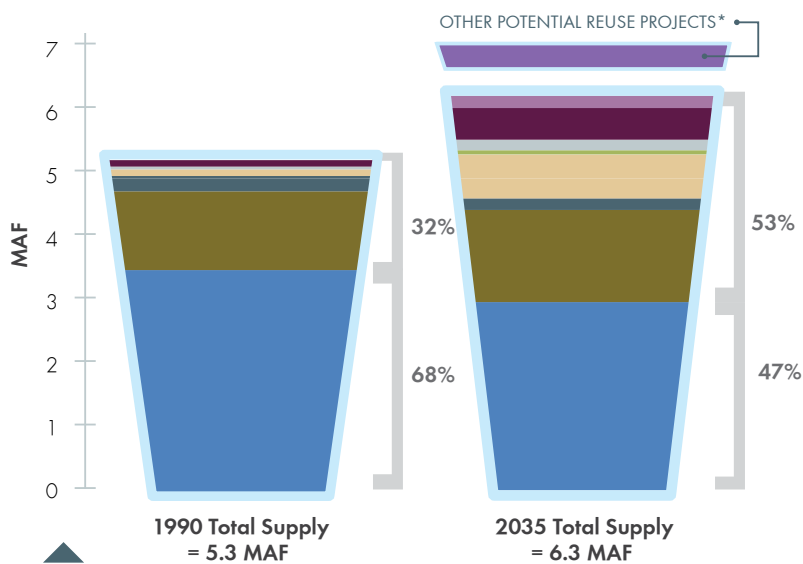


FIGURE 4.
CUWA Agencies' Collective Supply Portfolio ★

While continuing to focus on wise water use, CUWA agencies are also diversifying and expanding supplies to address future challenges.

Supply Source	Percent Yield (Normal Year)	
	1990	2035
Advanced Purified Water (Potable Reuse)	-	4%
Recycled Water, Non-Potable	2%	7%
Desalination	<1%	3%
Urban Stormwater Capture	-	1%
Water Transfers or Exchanges	2%	11%
Local Surface Water/Storage	4%	4%
Groundwater	24%	23%
Imported Water	68%	47%

*Other potential reuse projects are beyond reuse projections reported in UWMPs. These projects may offset traditional supplies or augment the total CUWA-wide supply portfolio by as much as 5% in 2035.

★ Projected normal year supplies exceed demands to support dry year needs, as noted above. Supplemental data available at: www.cuwa.org

3 Preparing for and Managing Dry Periods

Drought is a recurring feature of California; however, the recent drought (2012-2016) was extreme and unprecedented in modern times. Fortunately, CUWA agencies' judicious planning efforts paid off.

As noted in the Public Policy Institute of California's recent report on drought resilience, large urban water agencies were well prepared for the recent drought. CUWA agencies used their comprehensive drought response planning documents to effectively manage shortages and respond to the state emergency regulation conservation mandates.

As climate change intensifies, droughts may be more frequent and extreme in the years to come. CUWA agencies are preparing for future dry periods through many water management actions, such as expanding local water storage capacity and improving groundwater management.

“ DESPITE THE ADDITION OF 9 MILLION NEW RESIDENTS SINCE THE EARLY 1990S, THE STATE'S LARGE URBAN WATER SYSTEMS WERE BETTER PREPARED FOR THIS DROUGHT THANKS TO SIGNIFICANT INVESTMENTS IN CONSERVATION, STORAGE, NEW SUPPLIES, AND INTERCONNECTIONS THAT ENABLE SUPPLY SHARING.”

- BUILDING DROUGHT RESILIENCE IN CALIFORNIA'S CITIES AND SUBURBS
(PPIC, 2017)

4 Expanding Local Water Storage Capacity and Improving Groundwater Management



Surface reservoirs can store water for later use.



Groundwater recharge basins help agencies maintain healthy aquifers.

In California, the demand for water is highest when it is least plentiful. Storage enables agencies to capture water during wet periods for later use in dry periods. Whether in surface reservoirs or groundwater, storage is a vital component of water management, especially in regions prone to drought that require sufficient reserves to meet the demands of water customers.

CUWA agencies have been investing in local off-stream storage expansions to improve supply reliability and operational flexibility while also increasing resilience to drought, climate change impacts, and other emergencies (e.g., earthquakes).

Many groundwater basins in California are critically overdrafted, which threatens sustained use and may result in land subsidence and seawater intrusion, among other issues. To sustain a healthy groundwater supply, CUWA agencies prudently manage their groundwater resources and replenish their aquifers (e.g., with recycled water, stormwater, or other supplies) through direct injections, natural percolation, and/or constructed recharge basins. CUWA agencies are actively engaged in implementing the 2014 Sustainable Groundwater Management Act to ensure judicious management of groundwater resources.

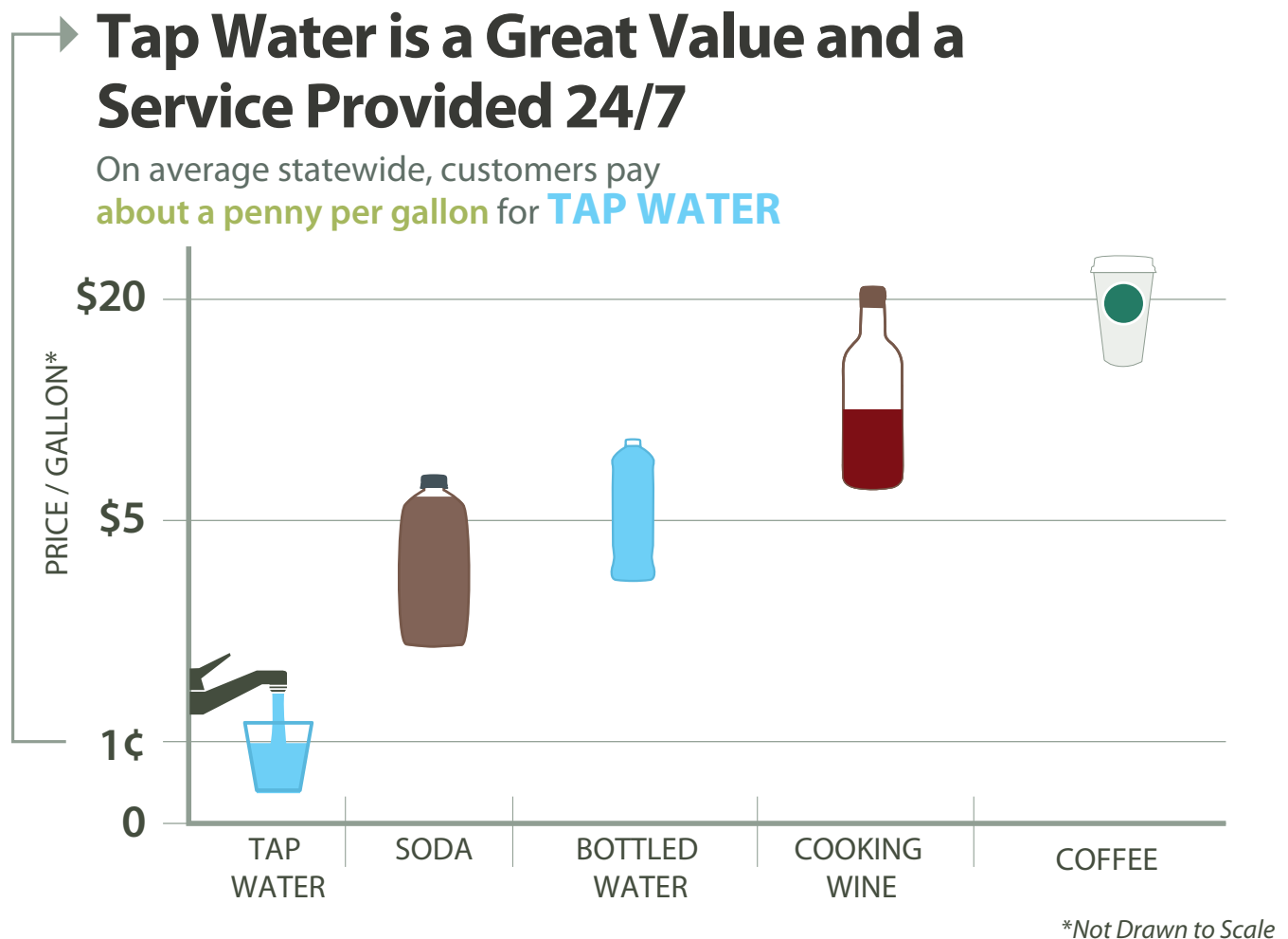
In recent years, groundwater banking has become an important part of CUWA's water supply management. Groundwater banking increases supply reliability by allowing agencies to deliver surplus water to the bank during wet years and then withdraw water (via transfers or exchanges) during dry years. Several CUWA member agencies use groundwater banking to reduce their dependence on imported water during supply shortages.

5 Keeping Clean Water Affordable and Accessible for All Californians

CUWA agencies are committed to supporting access to safe and affordable water for all Californians. Within the CUWA agencies' service areas, affordability is a pressing issue; 5.5 million people struggle with water affordability. CUWA agencies, which serve the majority of California's low-income households, are exploring long-term solutions, including a range of low-income rate assistance programs.

Outside of CUWA agencies' service areas, many communities do not have access to clean drinking water because of contaminated or diminished local supplies. CUWA is collaborating with the state and local advocacy groups to explore means to address water quality and technical capacity issues in these rural disadvantaged communities. At the same time, CUWA is conscientious of approaches that would compound affordability issues for urban low-income households. Sustainable financing options are critical for developing and maintaining high-quality supplies without compromising affordability.

CUWA agencies remain committed to keeping water services both reliable and cost-effective. On average statewide, customers pay about one penny per gallon of tap water. It's a tremendous value, considering the extensive systems needed to provide clean, reliable water for our communities.



6 Investing in Long-Term Reliability

Public water systems move millions of gallons of water each day, often for hundreds of miles through infrastructure constructed in the early to mid-20th century. Much of the state's critical water supply infrastructure is susceptible to drought, earthquakes, flooding, and deterioration with age.

To continue delivering safe, reliable water, CUWA agencies have invested approximately \$32 billion over the last 25 years in system reliability and supply diversification and plan to invest at even greater levels in the future. These investments will continue to boost water supply resilience as agencies adapt to future conditions.

Water supply infrastructure is the lifeline that provides the public with safe, clean drinking water at any given moment. CUWA agencies actively assess the condition of their water systems and prioritize infrastructure repair/replacement to judiciously manage the substantial investments required to address vulnerabilities. While these investments are reflected in the cost of service billed to customers, tap water remains a great value, and CUWA agencies continue to be mindful of keeping water affordable for all Californians.



Investments in system reliability help prevent catastrophic failures.

★ CUWA investments in water supply reliability over the past 25 YEARS:

\$25B SYSTEM RELIABILITY IMPROVEMENTS

\$7B WATER CONSERVATION AND SUPPLY DIVERSIFICATION

Numbers do not include CUWA wholesale customer investments

★ Supplemental data available at: www.cuwa.org



SPOTLIGHT ON INNOVATION: Enhancing Reliability, Quality, and Efficiency

As leaders in water management, CUWA agencies are adapting to new, increasing challenges through innovative technologies to more efficiently and effectively treat and deliver reliable water supplies. Some examples include:

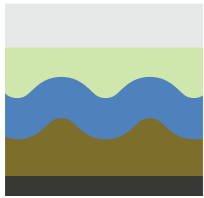
- **Intelligent water systems** – using technology to do more with less, such as automated processes, real-time data for operators and customers, and water loss control
- **Advanced treatment and monitoring** – improving water quality and preparing for episodic/catastrophic events
- **Energy efficiency** – reducing the energy demand for water system operations and customers' water use

In this time of growing uncertainties, flexibility and innovation are key. CUWA is continually pursuing new and better ways to enhance services for their customers.

There Is No “One-Size-Fits-All” Solution

Water resource challenges demand a diverse supply portfolio. Various factors influence supply decisions, such as **location, reliability, water quality, energy use, environmental considerations, and cost**, which can vary widely (Figure 5).

The choice of sources is very site-specific and depends on regional conditions and accessible resources.



Where aquifers are accessible and managed for long-term sustainability, **GROUNDWATER** can be a reliable local supply.



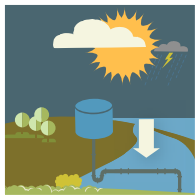
Locally-available **ADVANCED PURIFIED WATER** can provide a new, reliable, drought-resilient supply.



Where treated wastewater is available and not otherwise supporting a beneficial use, **RECYCLED WATER** can supply non-potable beneficial uses through dedicated infrastructure.



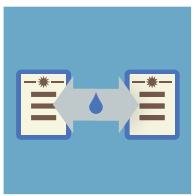
For developed areas with sufficient rainfall and space for significant storage, **URBAN STORMWATER** can be captured during the wet season for later use in the dry season.



Where agencies have available supplies and aquifer capacity and/or conditions conducive for surface water storage, **LOCAL STORAGE** can enhance self-reliance, helping to bridge dry years.



For agencies near a coast or with a brackish groundwater aquifer, **DESALINATION** can provide an abundant, drought-resilient supply.



When nearby agencies have available supplies, **TRANSFERS OR EXCHANGES** can strengthen regional resilience.



For urban population centers located far from more plentiful upstream major surface water sources, **IMPORTED WATER** will continue to be a core source of supply.

RANGES OF SUPPLY COSTS

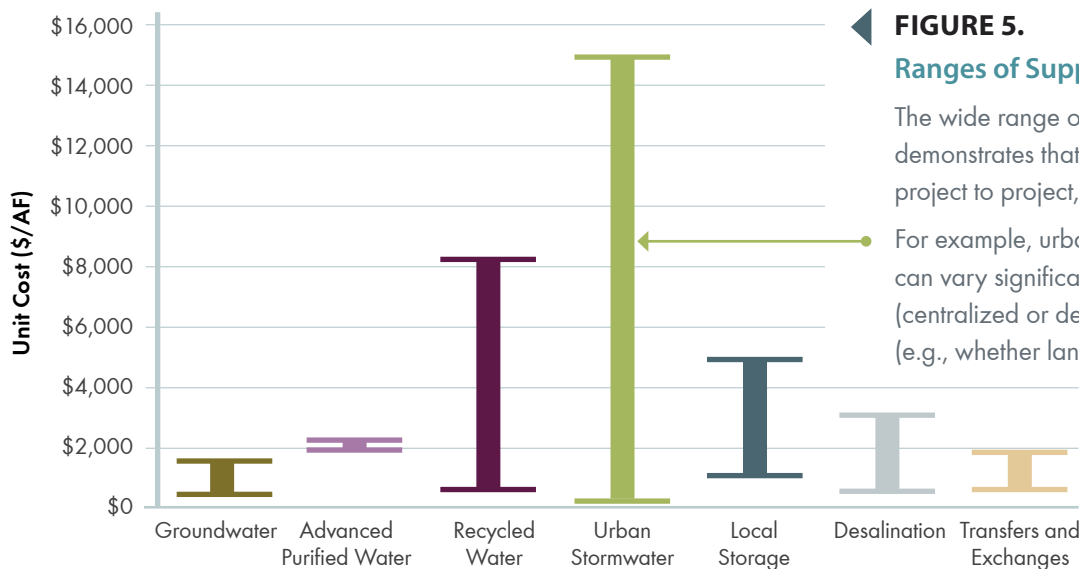


FIGURE 5.

Ranges of Supply Costs [★]

The wide range of costs for various supply sources demonstrates that costs can differ drastically from project to project, reflecting site-specific factors.

For example, urban stormwater capture costs can vary significantly based on system type (centralized or decentralized) and other factors (e.g., whether land must be purchased).

★ Reflects capital and O&M costs of delivering treated water supplies.

Supplemental data available at: www.cuwa.org