Davis
CALIFORNIA

June 2022

WATER UTILITY 101

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SOURCES OF WATER

The City of Davis historically relied on groundwater for 100% of our water supply. In June 2016, Davis began adding treated surface water from the Sacramento River to our water system.

Regional Water Treatment

WOODLAND-DAVIS Clean Water Agency

Surface water is treated at the Woodland-Davis Regional Water Treatment Facility (WDCWA). The City of Davis' allotment is 10.2 million gallons per day.

In normal (non-drought) years, WDCWA provides between 85-95 percent of Woodland and Davis customers' water needs. During periods of drought, the City's surface water allotment is less, and water demands are augmented by the City's deep aquafer wells.

What is WDWCA?

WDWCA, the Woodland-Davis Clean Water Agency, is a joint powers authority responsible for managing the delivery of treated surface water from the Sacramento River for the cities of Woodland and Davis, and to UC Davis. Up until 2016, both Davis and Woodland relied on groundwater for their water supply, and for decades this water delivery was adequate to meet the needs of each community. In keeping with the goals to build and maintain a resilient and sustainable water system, and due to a decline in groundwater quality and increasingly strict water quality regulations, the cities partnered together to develop the supply from the Sacramento River. The Regional Surface Water Treatment Plant, located east of Woodland, was completed in 2016.

Did You Know:

Resiliency planning is an essential part of the work of WDCWA. Towards that effort, WDCWA staff participated in the Environmental Protection Agency (EPA) Climate Resilience Evaluation and Awareness Tool (CREAT) for water utility resiliency planning, and are undertaking a water portfolio risk assessment, primarily focused on water rights and water availability.

www.wdcwa.com

How much water is provided through our water rights permits?

WDCWA's water right permit authorizes it to utilize up to 45,000 acre feet of water per year. However, diversions are limited during summer months and other dry periods. During these times, WDCWA utilizes up to 10,000 acre feet of water under a senior water right purchased from the Conaway Preservation Group. The water treatment facility can supply up to 30 million gallons of water per day. Of the 30 million gallons, Davis' share is 10.2 million gallons per day.

CITY INFRASTRUCTURE

City Groundwater Wells

The City currently has 5 deep aquifer wells and 4 intermediate wells in operation. The intermediate wells are typically only operated to ensure they are exercised properly and as required for water quality testing. In 2015, prior to the introduction of surface water, the city used 20 wells, 15 intermediate wells and 5 deep aquifer wells.

The City has a **conjunctive use water system**—it uses both surface and groundwater. After treatment at the Regional Water Treatment Facility in Woodland, the surface water is pumped into a transmission line (larger diameter pipe moves water from sources to storage and/or distribution) and travels six miles to Davis. Surface water enters into the City's distribution system at three main locations in west, central, and south Davis.

The City's wells pump groundwater directly from underlying aquifers. Four deep aquifer wells pump groundwater into the transmission line which is then blended with the surface water prior to entering the distribution system and arriving at the tap. The other wells pump directly into the distribution system, only on an as-needed basis to relieve the four deep wells.

The ratio of surface water to groundwater varies throughout the year. In colder months, when water demand is low, the City uses primarily surface water. In warmer months when there is higher water demand, more groundwater is pumped to meet demand. Wells are still operated periodically during the low demand months to ensure that they are exercised properly and as required for water quality testing.

Did You Know:

The City is part of the local Yolo County Sustainable Groundwater Agency (YSGA) which is a partnership among groundwater users for the Yolo Subbasin to manage the groundwater in a sustainable manner and to meet the requirements of the Sustainable Groundwater Management Act (SGMA).

www.yologroundwater.org

OPERATIONS AND MAINTENANCE

Mission

The mission of the water division is to operate and maintain the water production, transmission, and distribution infrastructure in order to deliver clean, reliable potable water for use by Davis citizens, and non-potable water for irrigation purposes.

The **Water Division** is housed in the Public Works Utilities & Operations Department and has one division manager. The division employees are divided into three water crews:

- **Production**
- **Distribution**
- **Programs**

A water quality coordinator and a water conservation coordinator also assist the division.

Did You Know:
In 2021, the City delivered 3.3 billion gallons of drinking water (64% surface and 36% ground).

OPERATIONS AND MAINTENANCE

Water Team Tasks

Production Crew

- Operates the water system and maintains pressure
- Monitors the City's SCADA (Supervisory Control And Data Acquisition) system
- Operates 3 water storage tanks and 9 groundwater wells
- Coordinates deliveries of surface water from the Regional Water Treatment Plant in Woodland
- Checks chlorine residuals at well sites
- Operates the North Davis Meadows (NDM) system

Programs Crew

- Monitors Aclara (the City's meter database)
- Performs water meter reads, testing, and water meter and reader maintenance
- Performs backflow testing
- Conducts continuous use checks for single-family residences
- Conducts Underground Service Alert (USA) marking requests for the water, wastewater, and stormwater infrastructure

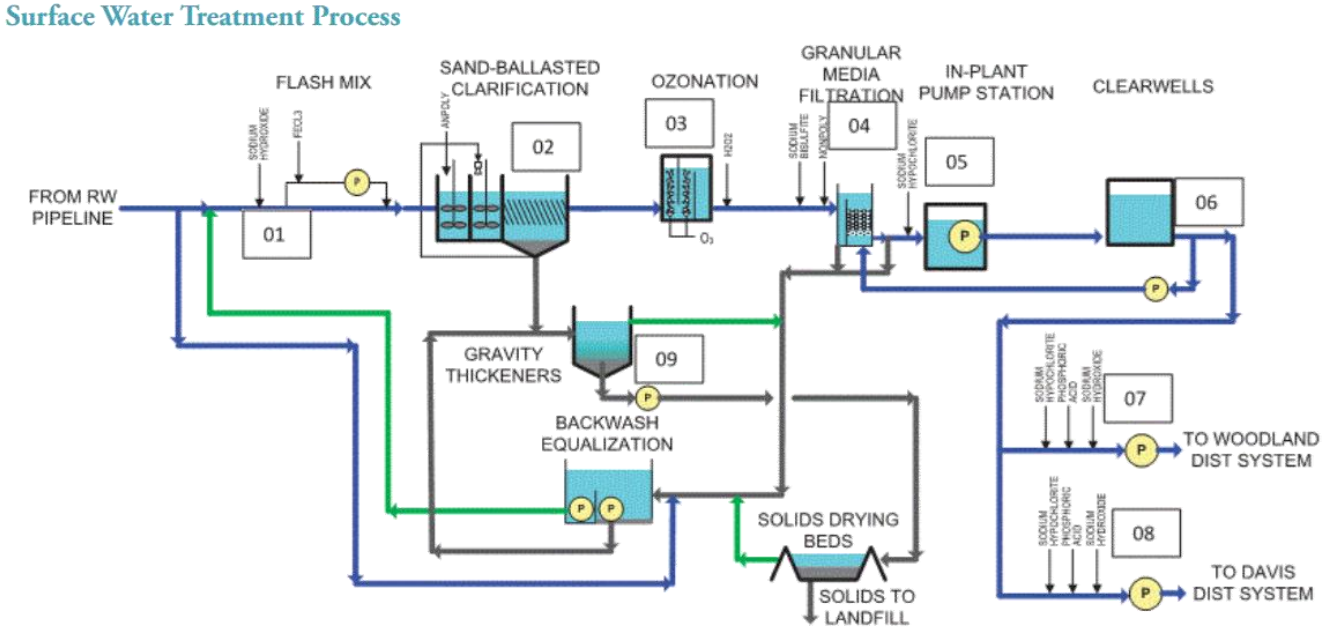
Did You Know:
The message "Sol Omnibus Lucet" (in English: *The sun shines on us all*) is painted on the East Area Tank and can only be read during the summer solstice.

Distribution Crew

- Maintains 191 miles of distribution and transmission mains
- Replaces hydrants, valves, and service lines
- Repairs main breaks
- Conducts valve exercising and flushing operations
- Support team for the other Water divisions
- Also maintains infrastructure at NDM

WATER QUALITY

Since the inclusion of surface water into the City's system, the quality of the drinking water has significantly changed. Surface water contains very few metals and is much softer than local groundwater. Below is a diagram of the surface water treatment process prior to entering the distribution system.



Water delivered by WDCWA and treated water (for disinfection) from the City's wells is potable water, and is also called 'drinking water.' As befits such a widely-consumed resource (everything from drinking, to gardening, washing, filling pools, etc.) there are a number of state-regulated tests on water quality that the City conducts.

Annual Water Quality Report

Released every year in the spring, and required by the US Environmental Protection Agency and the California Water Resources Control Board.

CityofDavis.org/WaterQuality

Most Frequently Asked Water Quality Question

One particular water quality question that customers ask the most is what is my water hardness. The answer is water hardness fluctuates based on the percentage of surface and groundwater provided during the year. The range of water hardness in Davis' distribution system is typically 58 - 120 parts per million (ppm) or 3.4 - 7.0 grains per gallon (pgp). Water "Hardness" is usually the sum of naturally occurring magnesium and calcium presence in water.

WATER QUALITY
REGULATIONS AND TESTING

Water Quality Regulations

The City is required to monitor its source water and treated drinking water for Title 22 compliance, as mandated by the California Code of Regulations. The City operates its water system under Permit 01-09-17-PER-006 and must follow the requirements of the permit to ensure delivery of safe drinking water.

The City is required to sample certain constituents weekly, quarterly, and/or annually to ensure safe drinking water is delivered. These results are reported to the State by the 10th of the following month. One full time employee, the City's Water Quality Compliance Specialist is responsible for the water quality programs.

Water Quality Testing

The City collects samples on a weekly, monthly, quarterly, and annual basis depending on the constituent and sampling program.

Typically, the City collects:

- 20 distribution system bacteriological samples weekly
- 4 distribution system monitoring samples monthly
- 22 groundwater well samples and 40 disinfection by-products quarterly
- 132 groundwater well samples
- 30 residential Lead and Copper Samples Triennially

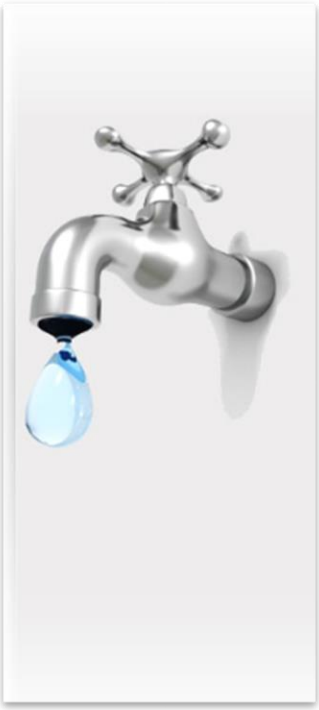
The City collects samples beyond what is required by State and Federal drinking water standards in order to better understand the quality of water being delivered.

Did You Know: The City has over 35 dedicated sample stations around town just to verify the quality of the water delivered.

Water Quality Inquires and Concerns

The City receives and responds to various water quality questions and concerns, ranging from discolored water or changes in the taste and odor of their drinking water to general questions regarding water hardness and water testing results. Each question and complaint is address on an individual basis, and may include discussion over the phone or a field investigation to determine the cause.

WATER RATES



Current Rate Structure

The City's current rate structure is a variable/fixed rate structure where the majority of revenue is generated by the volumetric rate instead of the fixed rate or service charge.

Water Utility Billing

Water rates on the utility bill consist of:

- Water base rate (based on meter size)
- Consumption charge (based on monthly water consumption)

Water usage is billed two months after use (i.e. January water usage will show up on the March city utility bill)

Water rates cover the cost of: operations and maintenance based on industry best practices; rate stabilization; capital repair and replacement costs; major capital improvement project costs; an adequate reserve fund; required debt coverage; and necessary studies to maintain an efficient and resilient utility.

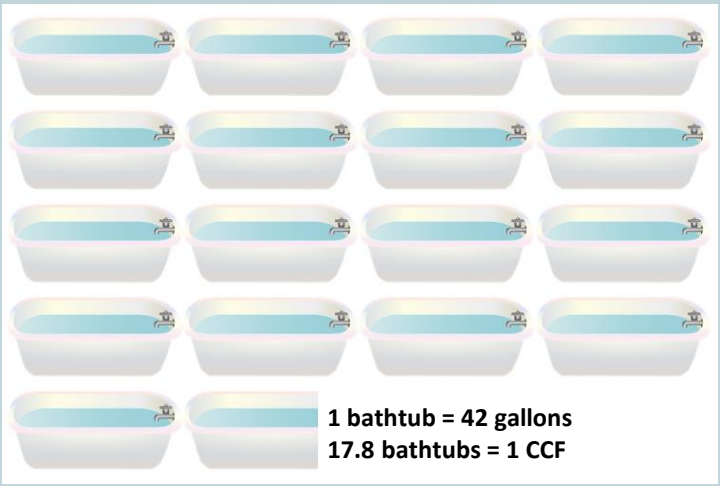
Benefits and Challenges of Volumetric Rates

While volumetric rates are often an incentive for conservation (given that the less water you use, the less money you pay), rate structures that are driven largely by usage often include a level of uncertainty with revenue, as no forecast of use will perfectly match reality, and conditions such as drought and associated enforcement in water use restrictions will impact a utility with volumetric rates more heavily.

What is a CCF?

One of the questions frequently received regarding water usage on their City utility bill is "What is a CCF?"

A **CCF** (hundred cubic feet) is 748 gallons. This is the equivalent of the amount of water it would take to fill 17.8 bathtubs (each bathtub = 42 gallons). Davis water customers may also see water usage displayed in AquaHawk and other sources as cubic feet (cf), and/or gallons. 1 cf = 7.48 gallons

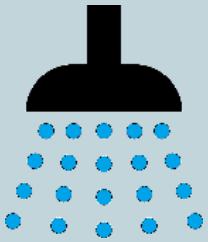


MONITOR YOUR WATER USE

Water Leaks

The Environmental Protection Agency (EPA) WaterSense Program estimates that the average household's leaks can account for nearly 10,000 gallons of water unintentionally wasted every year. Common types of leaks found in and around the home include worn toilet flappers, dripping faucets, pool and spa auto-fills and valves, and irrigation leaks such as failing valves, broken sprinkler heads and pipes, or missing drip emitters. The WaterSense program website, epa.gov/watersense/fix-leak-week, as well as the City's website, www.savedaviswater.org, have many tips on how to find and fix leaks.

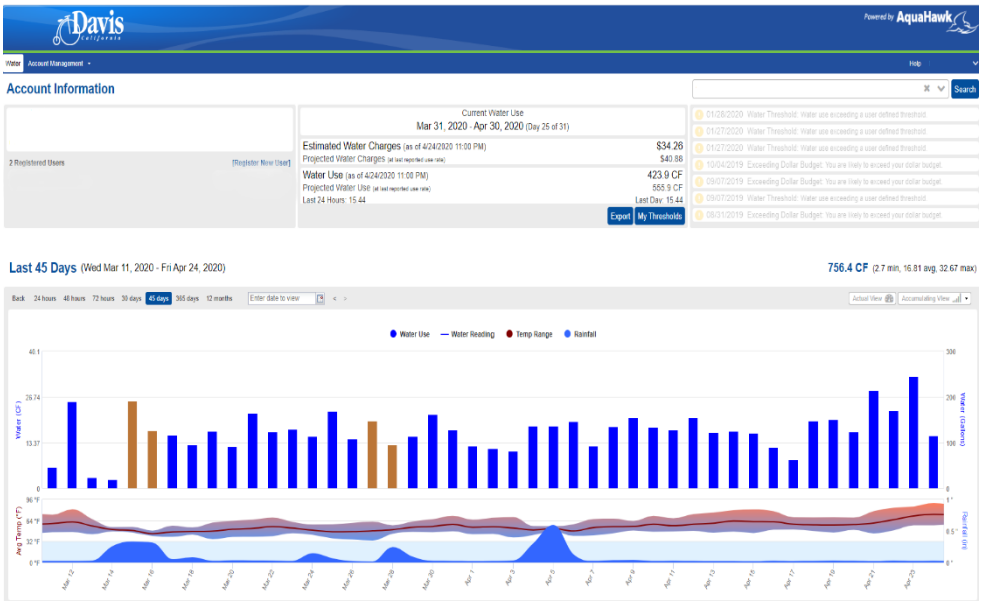
Water customers are often surprised by the amount of water typical leaks can waste over time. A leaky faucet that drips at the rate of one drip per second can waste more than 3,000 gallons per year (the water needed for 180 showers). AquaHawk can be used to assist in finding leaks in the home and around the property.



Faucet Leak = 3,000 gallons/year Or enough water for 180 showers

AquaHawk

AquaHawk, the City's online customer water use portal, was launched in September 2018 and as of 2022 there were over 7,000 registered users.



AquaHawk provides water customers:

- Access to their hourly water usage.
- The ability to spot and stop potential leaks.
- The potential to save money by knowing daily and hourly water use.

The ability to set usage alerts is one of the primary benefits of the water use portal, allowing for users to spot and repair leaks as quickly as possible.

Did You Know:
An irrigation system that has a hole 0.031 inches in diameter (about the thickness of the tip of a ballpoint pen) can waste about 6,300 gallons of water per month.

WATER USE EFFICIENCY

In California, **water conservation and water use efficiency are a way of life**. The City is responsible for providing outreach and education (in the form of flyers and handouts, workshops, public meetings and more) to encourage citizens to use water efficiently and adhere to use regulations during periods of drought.

The City's Conservation Coordinator for water use efficiency (and water conservation) is responsible for the water use efficiency programs.

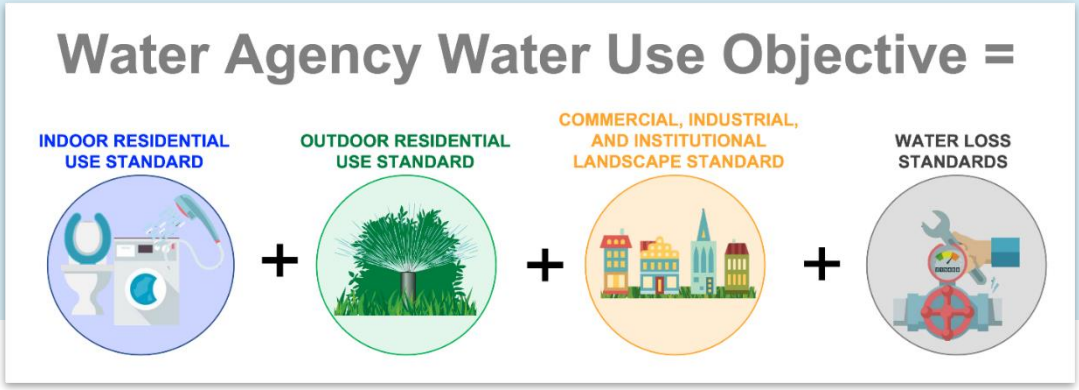
Conservation Updates

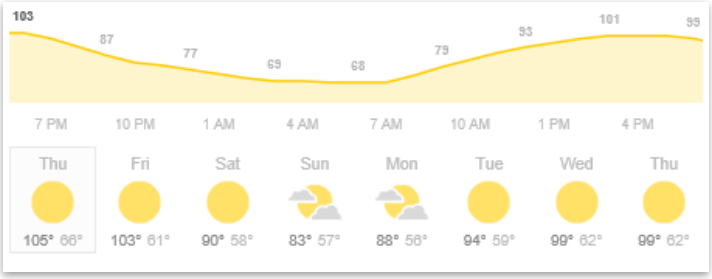
- The City surpassed our 20% by 2020 goal required under Senate Bill x7-7. The state target for the City of Davis was 172 gpcd (gallons per capita per day). For 2021, the City gpcd was 128.
- Long-term water use efficiency regulations were released by the state in Spring 2018.
- With climate change, drought is part of the weather cycle for California.
- Weather patterns may change with dry and wet years but the City is committed to looking at long-term efficiency.

Upcoming Water Use Efficiency Standards

Senate bill 606 and Assembly bill 1668 call for creation of new urban water use efficiency standards for indoor use, outdoor use and water lost to leaks.

After the regulation is finalized, each urban retail water agency will need to calculate and report its water use objective annually.





Seasonal Water Use Trends

Summer water usage in the greater Sacramento area is typically 60% higher than winter water usage due primarily to the hot, dry weather and the need for irrigation. Water from the city's deep water wells is used in the summer months to supplement surface water deliveries.

STATE WATER REGULATIONS

Water Loss Audits

Water loss control represents the efforts of water utilities to provide accountability in their operation by reliably auditing their water supplies and implementing controls to minimize system losses. Utilities have both real losses (from pipeline leakage) and apparent losses (when customer water consumption is not properly measured or billed).

Water loss control includes efforts to manage leakage to economically low levels, and reducing metering and billing errors to make sure that reliable measures of customer use are obtained.

Senate Bill 555 requires that water loss audits be submitted annually to the state on October 1 of each year. The first water loss audit submitted was in 2017. The City of Davis submits the water loss audit based on the fiscal year. The water loss audits are compiled by a team of city staff including representatives from the water, finance, and environmental resources divisions. The audits require validation from a certified water loss audit validator prior to submission.

Did You Know:
The City is working to Install leak detection equipment throughout the distribution system to find and fix leaks more quickly.

State-Wide Water Loss Performance Standards

The State Water Resources Control Board is required to develop performance standards for water loss by July 2020 for all Urban Retail Water Suppliers. The State Water Board is required to consider life-cycle cost accounting when developing water loss performance standards.

The goal of the water loss audits is to reduce water loss within distribution systems to an economically recoverable level as shown in the graphic below.

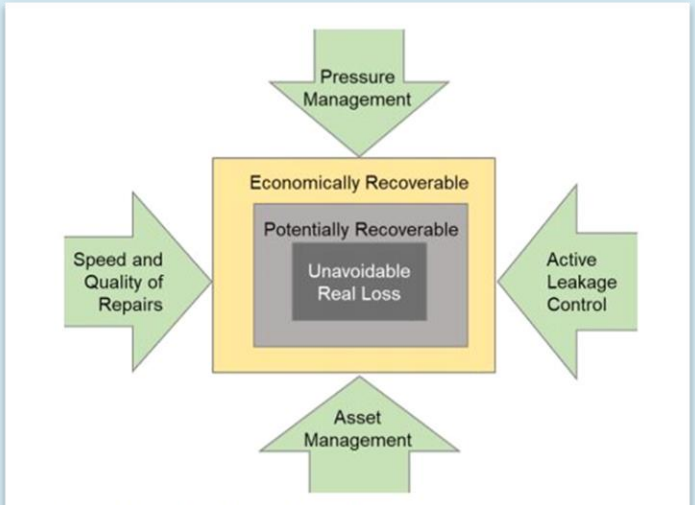


Figure 2 Foundational Approaches to Leak Detection

BUILDING A RESILIENT UTILITY

Planning for a Resilient Utility

The City is actively looking forward with respect to sustainable water supplies by working on the following:

- **Annual water shortage assessment report**: required for California water utilities beginning in 2022.
- **Annual water loss audit**: to evaluate both real water losses within the distribution system and apparent losses through meter inaccuracies or customer billing errors.
- **Emergency Response Plan** for water distribution system: required for California water utilities
- **Integrated Water Resources Study** (IWRS): to identity potential water resource options available to the City and their associated costs. This plan is voluntary, and the City will conduct a study update in the next year.
- **Sustainable Groundwater Management Act** (SGMA): the City is a member of the Yolo Subbasin Groundwater Agency.
- **Climate Action and Adaptation Plan** (CAAP): will include tasks associated with all of the City's utilities.
- **Urban Water Management Plan** : Every five years, urban retail water agencies with over 3,000 connections are required to submit an updated Urban Water Management Plan (UWMP) to the Department of Water Resources (DWR). This plan includes an assessment of the City's water supplies and demands, progress on meeting water use efficiency targets and the City's Water Shortage Contingency Plan.
- **Additional upcoming studies** will look at all sources of potential water supply and provide a basis for future prioritization and determinations of capital improvement projects to provide a sustainable and safe water portfolio for the City.

Planning for Climate Change

- A discussion on climate change in the broader region, including all of Yolo County, is included in the Westside Sacramento Integrated Regional Water Management Plan (IRWMP).
- Climate change and the impacts of climate change on water supplies and demands are discussed in the 2020 Urban Water Management Plan (UWMP).
- Upcoming water use efficiency regulations are being set in part to address periods of drought and the changing climate in order to prepare for more frequent and persistent periods of limited water supply.

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