

Community Academy: Water Conservation at Home

Dan Mance, Water Conservation Specialist
October 30, 2025

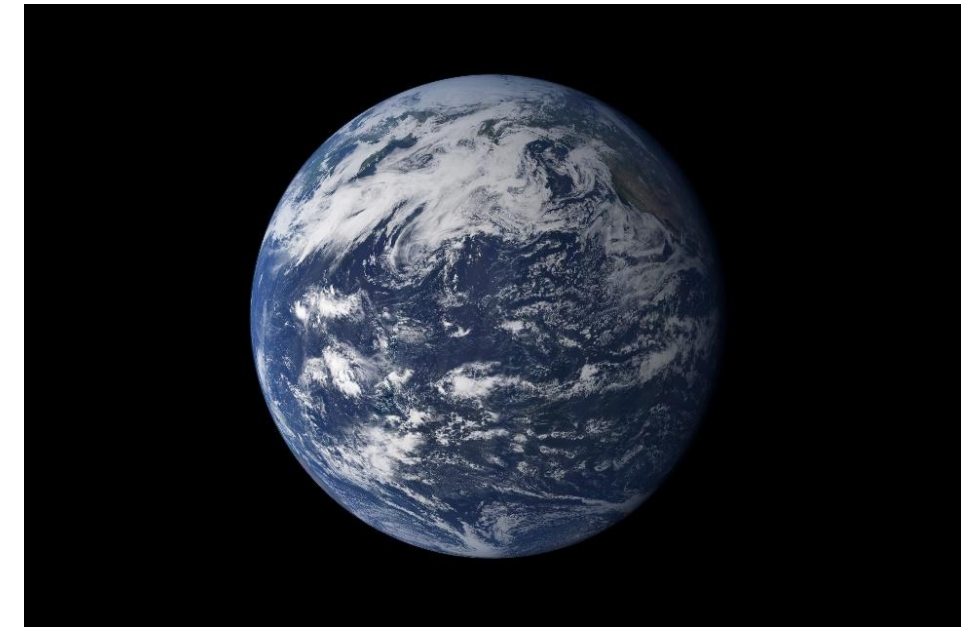


Town of Oro Valley



Earth – Water Planet

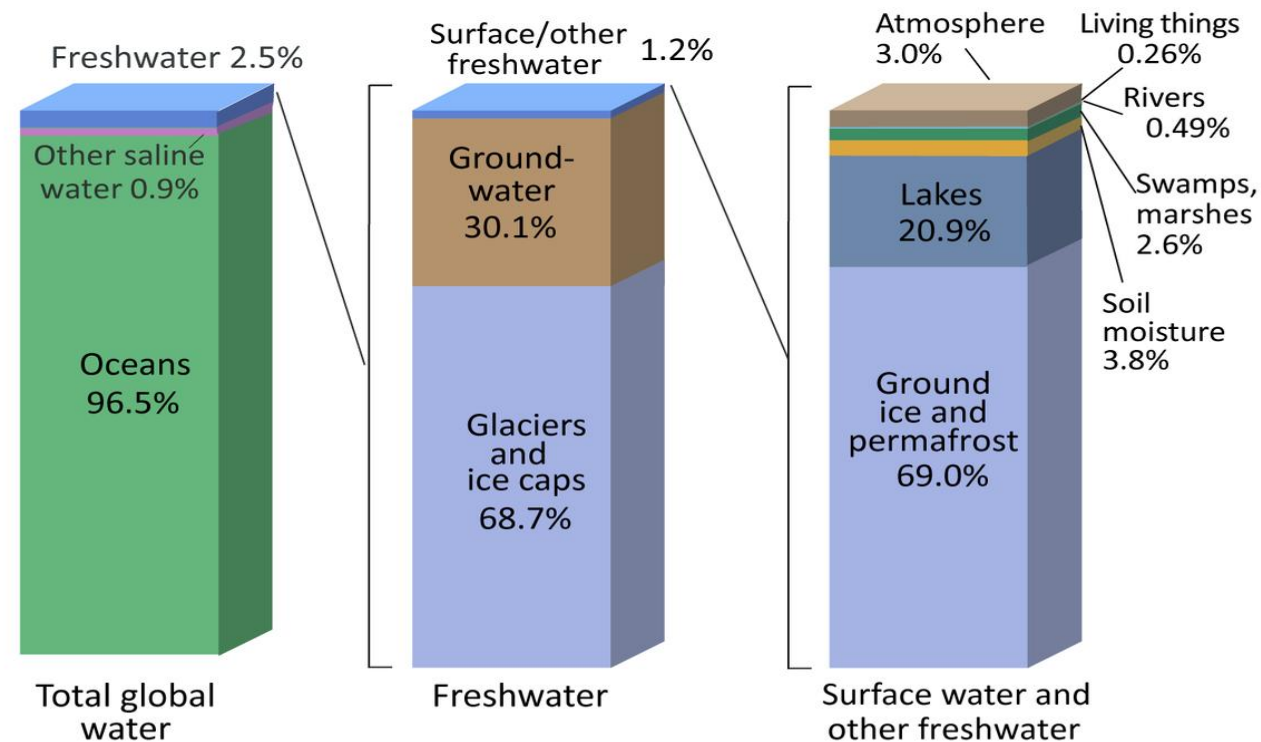
- ▶ An Abundance of Water?
 - ▶ 71% of the Earth's surface is covered by water
 - ▶ Oceans hold 96.5% of all water on Earth
 - ▶ Only 2.5% of the Earth's water is freshwater
 - ▶ Nearly all of that freshwater (about 98.8%) is locked in ice , the atmosphere, or in the ground





Earth – Water Planet

Where is Earth's Water?



Credit: U.S. Geological Survey, Water Science School. <https://www.usgs.gov/special-topic/water-science-school>
Data source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, *Water in Crisis: A Guide to the World's Fresh Water Resources*. (Numbers are rounded).

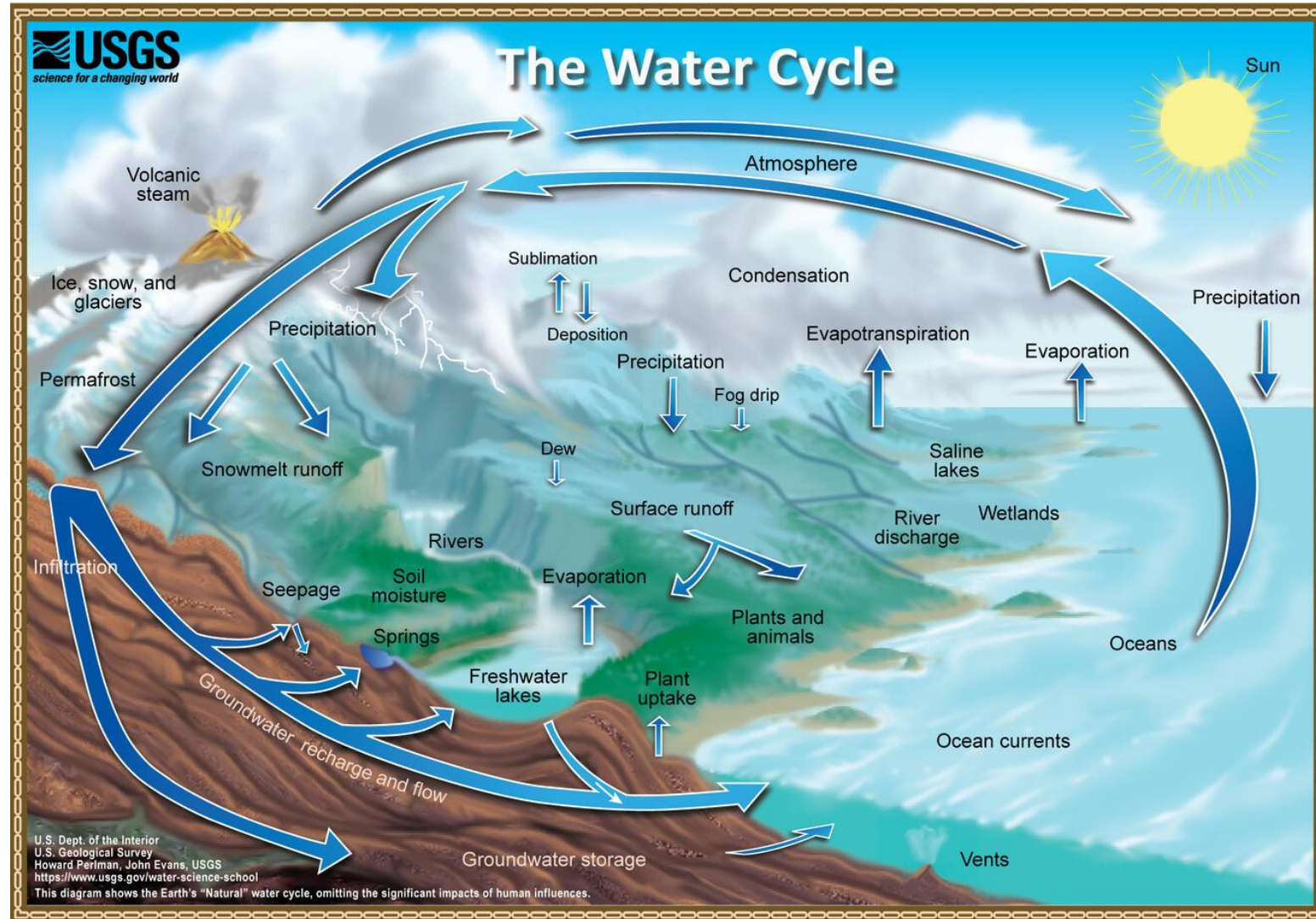


The Water Cycle

“Flow, Fall, Repeat”

- ▶ The continuous movement of water on, above, and below the surface of the Earth
 - ▶ It is powered by the sun and driven by gravity
 - ▶ Key Stages
 - ▶ Evaporation – Water turns into vapor from oceans, lakes, and rivers
 - ▶ Condensation – Water vapor cools to form clouds
 - ▶ Precipitation – Water falls as rain, snow, sleet, or hail
 - ▶ Collection – Water gathers in oceans, rivers, lakes, and groundwater
 - ▶ Why is it important?
 - ▶ Regulates the Earth’s temperature
 - ▶ Supports all life on the planet
 - ▶ Distributes fresh water around the planet

The Water Cycle





Water Conservation

Why is Water Conservation Important?

- ▶ Why is Water Conservation Important?
- ▶ Finite Supply - Water is a finite resource essential for life, health, and the environment. A very small amount of the planet's water is available for human use.
- ▶ Climate Change Impacts- changing rainfall patterns, droughts, and rising temperatures can reduce the availability of water in many regions. Water Conservation practices can help communities adapt to these challenges.
- ▶ Growing Demand - As global population increases, so does demand for water.
- ▶ Conservation is a tool to help ensure those needs are met.
- ▶ Ecosystem Health – Rivers, Lakes, and Wetlands need adequate water to support life. Overuse can dry out ecosystems and harm biodiversity.



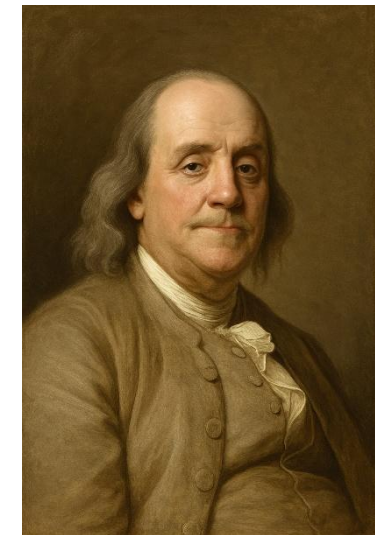
Water Conservation

Why is Water Conservation Important?

- ▶ Energy and Cost Savings – Pumping, treating, and heating water requires energy. Using less water reduces energy consumption and lowers utility bills
- ▶ Food Security – Agriculture uses about 70% of global freshwater. Efficient water use helps ensure stable food production reducing the risks of shortages
- ▶ Future Generations – Conserving water today helps ensure clean and reliable supplies for future generations

“When the well is dry, we know the worth of water.”

- Benjamin Franklin





World's Water Crisis

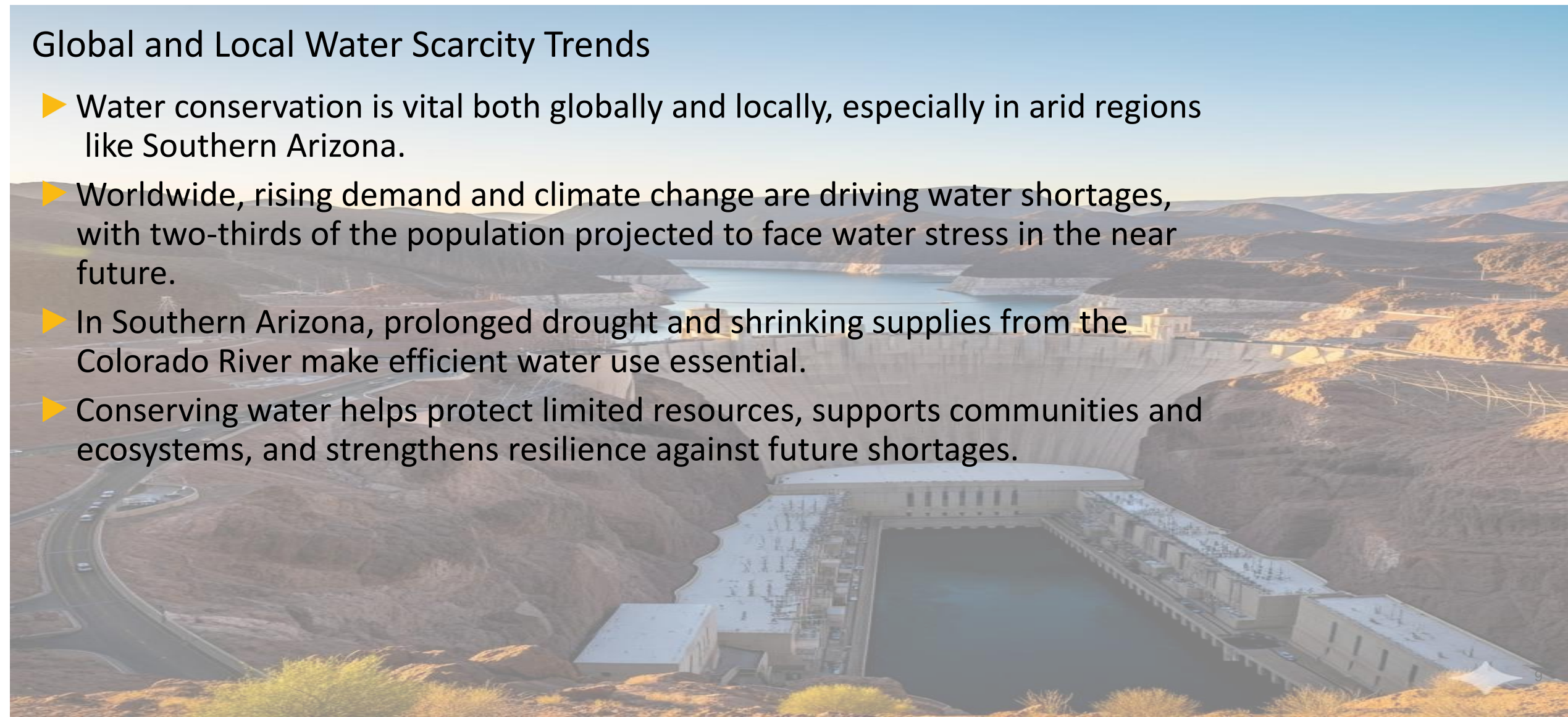




Water Conservation

Global and Local Water Scarcity Trends

- ▶ Water conservation is vital both globally and locally, especially in arid regions like Southern Arizona.
- ▶ Worldwide, rising demand and climate change are driving water shortages, with two-thirds of the population projected to face water stress in the near future.
- ▶ In Southern Arizona, prolonged drought and shrinking supplies from the Colorado River make efficient water use essential.
- ▶ Conserving water helps protect limited resources, supports communities and ecosystems, and strengthens resilience against future shortages.



Water Conservation

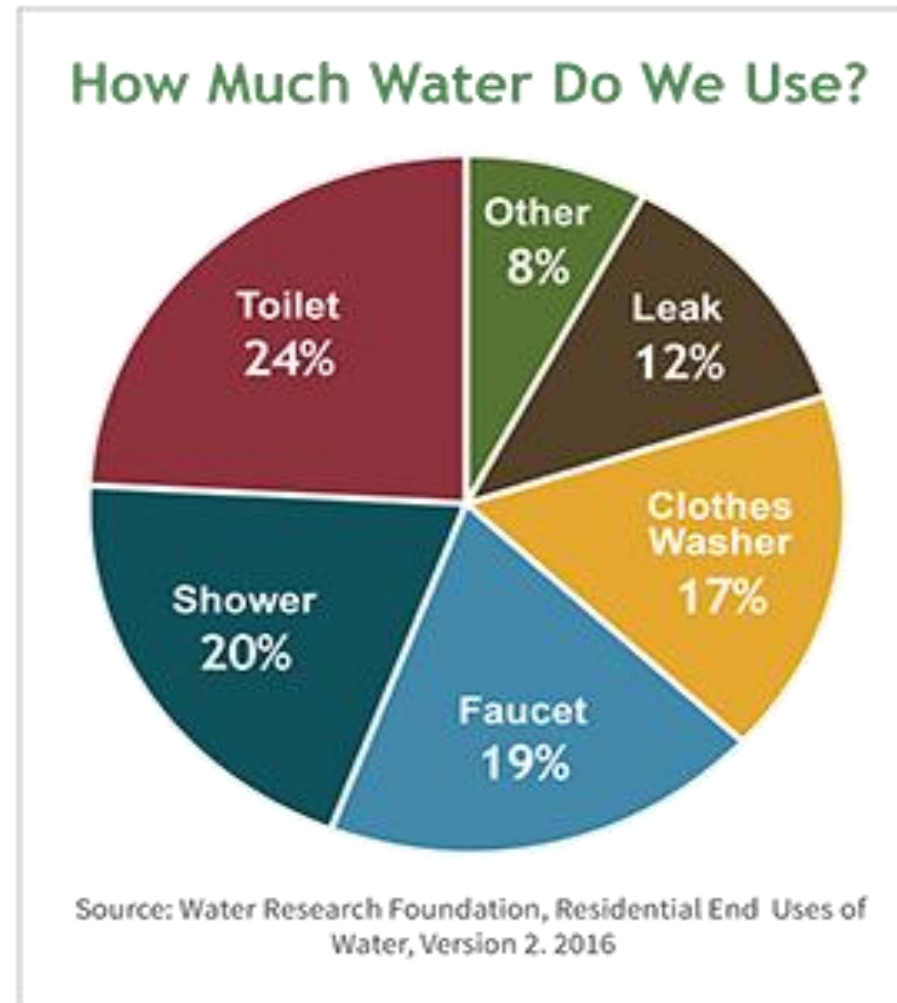
Environmental Impacts of Overuse

- ▶ Water overuse harms the environment by drying up rivers, depleting groundwater, and worsening droughts. It destroys habitats, threatens wildlife, and disrupts the natural water cycle.
- ▶ Over-pumping aquifers can cause land subsidence and long-term loss of water storage, making ecosystems and communities more vulnerable to water shortages.



Household Water Use

Breakdown of where water is used most in homes



Water-Saving Tips by Area

Bathrooms

- ▶ Fix leaks!
- ▶ A dripping faucet can waste about 3,000 gallons per year – enough for 180 showers!
- ▶ A running toilet can waste more than 200 gallons per day, which adds up to over 70,000 gallons per year if left unrepaired.
- ▶ A running tap uses about 2-4 gallons of water per minute. Turn it off while brushing teeth or shaving!





Water-Saving Tips by Area

Bathrooms

- ▶ Standard older toilets use 3.5-7 gallons per flush (gpf).
- ▶ Modern low-flow toilets use 1.28-1.6gpf.
- ▶ For the average family of four this can save up to 13,000 gallons per year – particularly if replacing multiple old toilets.
- ▶ Older Showerheads use 3-5 gallons per minute (gpm).
- ▶ Low-flow models use 1.5-2.0gpm.
- ▶ This can save up to 2,700 gallons per person per year based on a 10- minute shower.

Water-Saving Tips by Area

Kitchen

- ▶ Use the dishwasher efficiently (full loads, energy-saving mode).
- ▶ Modern dishwashers are very good for water conservation when used efficiently. Modern Energy-Star rated dishwashers use about 3-4 gallons of water per cycle, which is often less than washing dishes by hand (@20 gallons).
- ▶ Scrape dishes instead of rinsing before washing – doing so can save up to 20 gallons of water per load.
- ▶ Install aerators on faucets – Faucet aerators reduce water flow by mixing air into the stream, cutting water use by up to 50%. Easy and low-cost way to save water and lower bills.



Water-Saving Tips by Area

Laundry Room

- ▶ Use high efficiency washing machines – high-efficiency washing machines reduce water use by up to 70% compared to older models.
- ▶ Only wash full loads – running full loads instead of small ones and using shorter wash cycles can also help conserve water without sacrificing cleanliness.
- ▶ Adjust water level settings – be sure to select the proper water level for the load.



PARTIAL LOAD

FULL LOAD



Water-Saving Tips by Area

Outdoors (Yard & Garden)

- ▶ Water early morning or late evening – Watering in the early morning or late evening reduces evaporation, allowing more water to reach plant roots.
- ▶ Use drought-tolerant plants and native landscaping – local nurseries are an excellent source of information on drought-tolerant plants and native plants which thrive in our area.
- ▶ Install drip irrigation – Drip irrigation conserves water by delivering it directly to plant roots, reducing evaporation and runoff. It uses 30-50% less water than sprinklers and is ideal for dry climates.
- ▶ Collect rainwater with barrels – Rain Barrels collect rainwater from rooftops for outdoor use reducing water bills and conserving resources.
- ▶ Regularly walk out the system inspecting for leaks.



Water Saving Tips by Area

Xeriscape: Beautiful, Sustainable Landscaping

- ▶ Traditional landscapes (especially turf/lawns) require an excessive amount of water, stressing local water supplies and increasing costs.
 - ▶ Up to 50% of residential water is used for outdoor landscaping.
- ▶ Xeriscaping is a smart approach. Xeriscape focuses on efficiency, natural beauty and native resilience.
- ▶ Its not just rocks and cactus! It's mindful design.
- ▶ Key Benefits
 - ▶ Water savings (up to 50-75% reduction).
 - ▶ Lower maintenance time – less mowing and weeding
 - ▶ Reduced fertilizer/pesticide use
 - ▶ Lower utility bills

Xeriscape – The Seven Principles

1. Planning and Design

- ▶ Planning and Design: Create a detailed blueprint of the landscape layout.
 - ▶ Use graph paper and a measuring tape to draw a to-scale diagram of your entire property. A common scale is 1 inch = 10 feet
 - ▶ Include all permanent features of the property: your house, driveway, patios, walkways and other permanent structures.
 - ▶ Mark the North arrow for orientation
- ▶ Analyze Site Conditions
 - ▶ Sun/Shade Exposure: Note on the property areas that receive full sun (6hrs), partial sun, and full shade.
 - ▶ Slopes and Drainage: Observe how water naturally flows and pools. Use this to place high-water-use plants.





Xeriscape – The Seven Principles

2. Soil Improvement

- ▶ Amend the soil for better absorption and root growth.
- ▶ Determine Soil Type: Is it heavy clay (which holds water but drains slowly), or fast-draining sand/gravel (which retains little water)?
- ▶ Spread a 1-3-inch layer of organic material (like high quality compost or well-rotted manure) over the area and work into the top 6-8 inches of existing soil.
- ▶ Caution with Native Plants – Many truly native plants are adapted to lean, poor soil. In some cases, adding too much rich compost can be detrimental.
- ▶ Use mulch extensively – Adding mulch helps retain soil moisture and prevent water loss as quickly through evaporation. Wood chips, bark, and gravel are all good options.



Xeriscape – The Seven Principles

3. Efficient Irrigation

- ▶ Utilize Drip Irrigation: This is the most highly recommended method for trees, shrubs, flowers, and ground cover in a xeriscape.
 - ▶ Drip Irrigation delivers water slowly and directly to the plant's root zone via a network of tubes and emitters.
 - ▶ Benefits include minimizing water loss from evaporation and wind (30-70% less water loss than with sprinklers), reduced weed growth, and promotes a healthy soil-water-air balance.
- ▶ Bubblers/Micro-sprayers: These are suitable for individual large plants or densely planted beds, delivering a low volume of water directly to the base of the plant.



Xeriscape – The Seven Principles

4. Plant Selection

▶ The “Right Plant, Right Place” Principle

- ▶ The golden rule of xeriscaping. The goal is to choose plants that naturally thrive in your site’s specific conditions, minimizing the need for supplemental water, excessive soil amendments, or extensive care.
- ▶ Native Plants: These are excellent choices that handle the local conditions and require the least intervention once established.
- ▶ Drought/Tolerant Plants: These are species from other arid regions of the world that are well-adapted to dry conditions.
- ▶ Site-Specific Factors: Sun exposure, soil type and microclimates.
- ▶ Limiting Turfgrass
- ▶ Only keep a lawn where it has a functional purpose (play area for example).

Xeriscape – The Seven Principles

5. Turf Alternatives/Limitation

- ▶ Replace high water using lawn areas
- Construction of a 500,000-gallon reservoir
- ▶ Check with nurseries for alternative choices
 - ▶ Consider hardscapes and non-living alternatives such as pavers, gravel, or river rock as they help the soil retain moisture, suppress weeds and serve as excellent accents around planted beds
 - ▶ 7-miles of transmission pipeline from Partnered reservoir to OVWU service area
 - ▶ Artificial Turf: while it requires a significant initial investment, it mimics the look of grass without the maintenance and is a viable alternative in our area





Xeriscape – The Seven Principles

6. Mulching

- ▶ Apply a layer of organic or inorganic material to the soil surface to conserve moisture, moderate soil temperature, and suppress weeds.
- ▶ Mulch acts as a protective blanket. It significantly reduces water evaporation from the soil.
- ▶ Use materials like shredded bark, wood chips, gravel or decomposed granite at a depth of 2-4 inches. Mulch also prevents soil erosion and keeps roots cool in the summer.

Xeriscape – The Seven Principles

7. Appropriate Maintenance

- ▶ The independent projects consist of:
 - ▶ Construction of a 500,000-gallon reservoir
 - ▶ Construction of 4 booster stations
 - ▶ Construction of a groundwater blending main
 - ▶ Construction of two E-Zone tie-in transmission mains
 - ▶ 7-miles of transmission pipeline from Partnered reservoir to OVWU service area





Town of Oro Valley

Water-Saving Tips by Area

Outdoors (Yard & Garden)





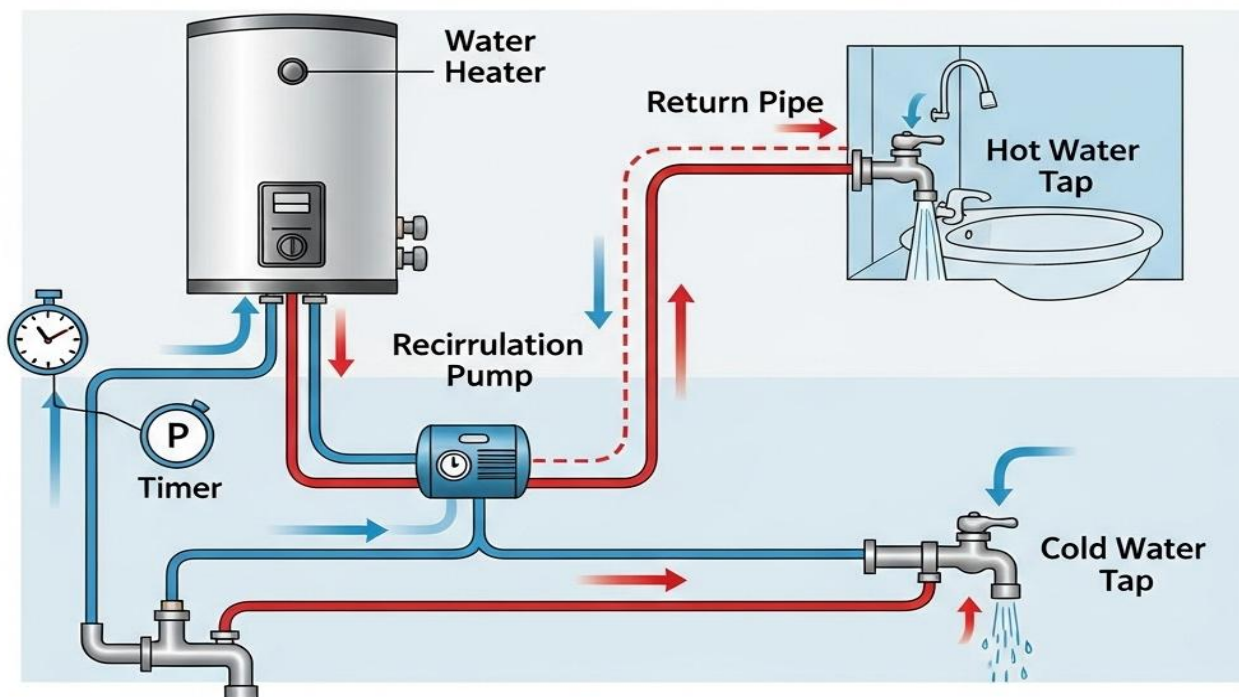
Smart Technology and Tools

▶ Outdoors (Yard & Garden)

- ▶ Smart irrigation controllers: adjust watering based on weather and soil conditions, reducing outdoor water use by 20-50%. They prevent overwatering, save money, and are ideal for dry climates
- ▶ Leak detection systems: monitor water use, alert you to leaks, and can prevent waste and damage. They help conserve water, lower bills and protect your home.

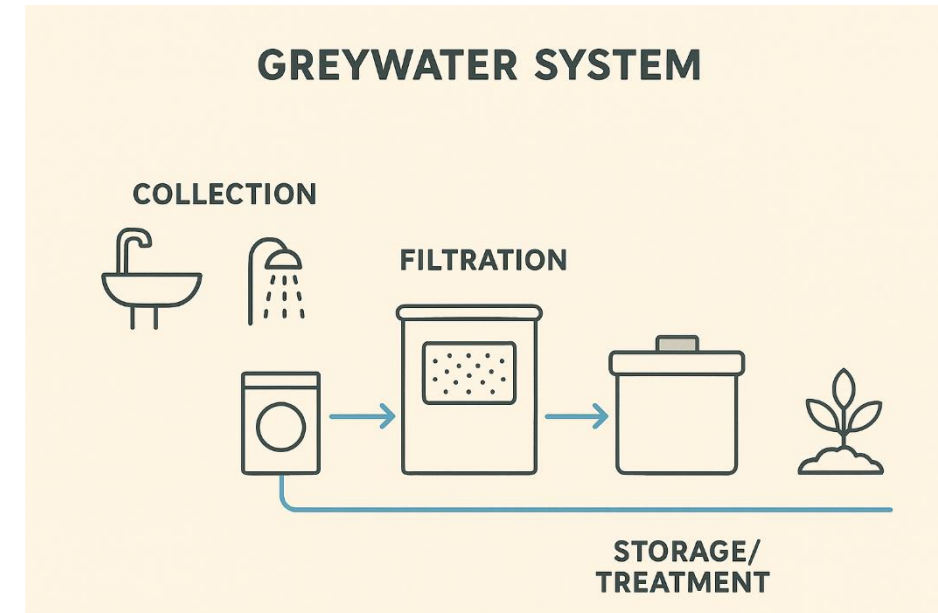
Smart Technology and Tools

- ▶ Hot Water Recycling System
 - ▶ Recirculates hot water from the water heater through a continuous loop back to the tap, ensuring on-demand hot water
 - ▶ Reduce water waste and save energy



Smart Technology and Tools

- ▶ What is Grey Water?
 - ▶ Used water from household sources like showers, sinks, and laundry
 - ▶ Does NOT include water from toilets or kitchen (*known as black water*)
 - ▶ Makes up roughly 50-80% of residential wastewater
- ▶ Why use a Grey Water System?
 - ▶ Water Conservation! It reduces the demand for potable water
 - ▶ Environmental benefits! Decreases the amount of wastewater entering sewer or septic systems
 - ▶ Cost savings! Lowers your water bill



Smart Technology and Tools

► Rainwater Harvesting

- What is rainwater harvesting: the practice of collecting and storing rainwater for a variety of uses
- Captures water before it becomes runoff, reducing the demand on public water supplies

► How a Rainwater Harvesting System works

- Catchment: The roof collects the rain.
- Conveyance: Gutters and Downspouts guide the water.
- Filtration: Removes debris.
- Storage: A tank or cistern holds the water.
- Distribution: A pump or gravity-fed system delivers the water for use



Smart Technology and Tools

- ▶ Rainwater Harvesting Benefits
 - ▶ Environmental: Reduces the water consumption and energy requires for water treatment
 - ▶ Economic: Lowers your water bill
 - ▶ Social: Promotes water independence and community resilience
- ▶ Rainwater Harvesting Uses
 - ▶ Garden and landscape irrigation
 - ▶ Flushing toilets
 - ▶ Laundry use
 - ▶ Cleaning





Smart Technology and Tools

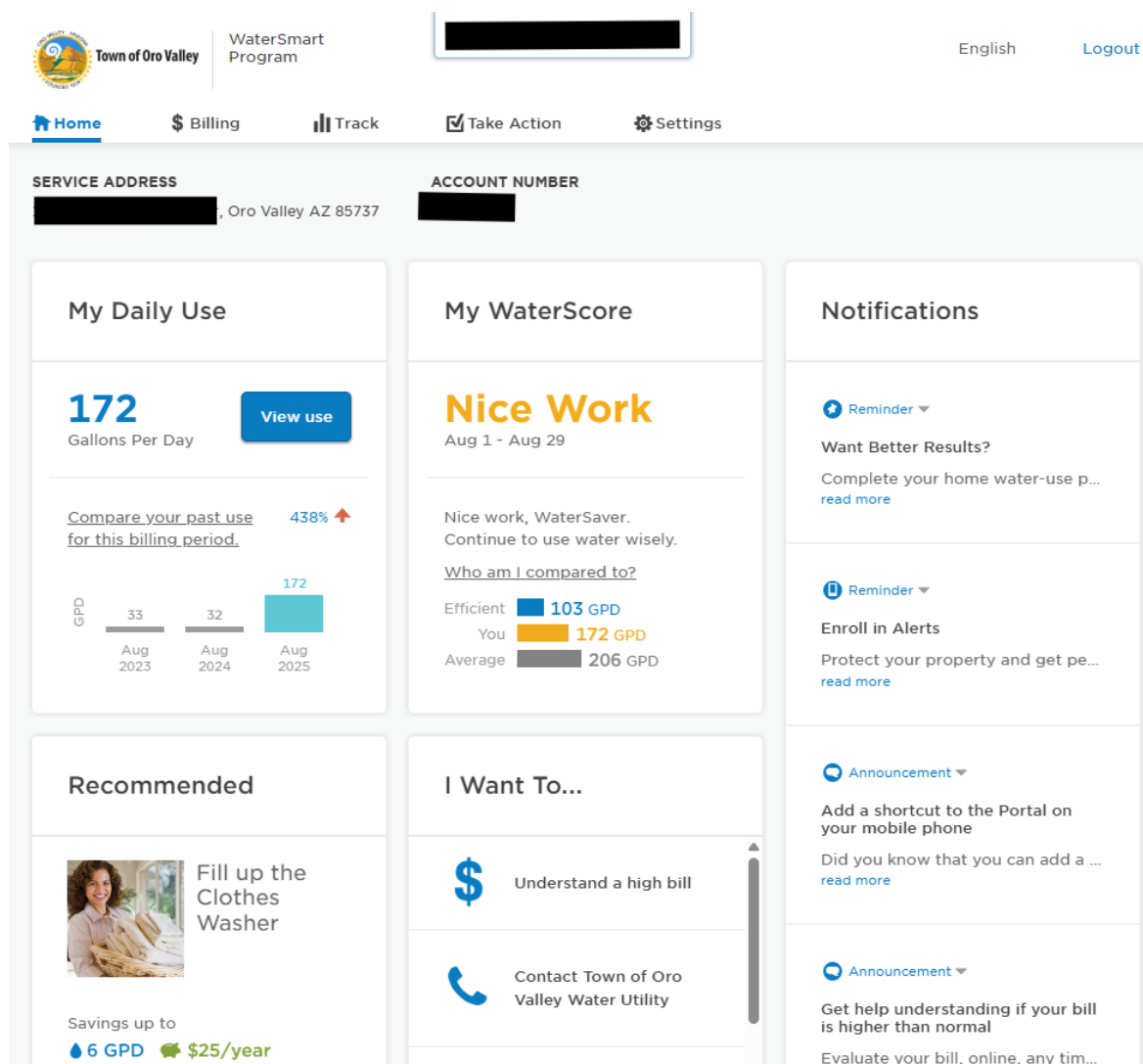
- ▶ WaterSmart – A powerful tool provided at no cost to customers by Oro Valley Water Utility. WaterSmart allows users to monitor their water usage, receive alerts for leaks or unusual spikes, compare usage to similar households, get personalized water-saving tips and forecast future bills.
- ▶ <https://www.orovalleyaz.gov/Government/Departments/Water-Utility/Services/WaterSmart-Portal>



Town of Oro Valley

Smart Technology and Tools

WaterSmart





Town of Oro Valley

Smart Technology and Tools

WaterSmart

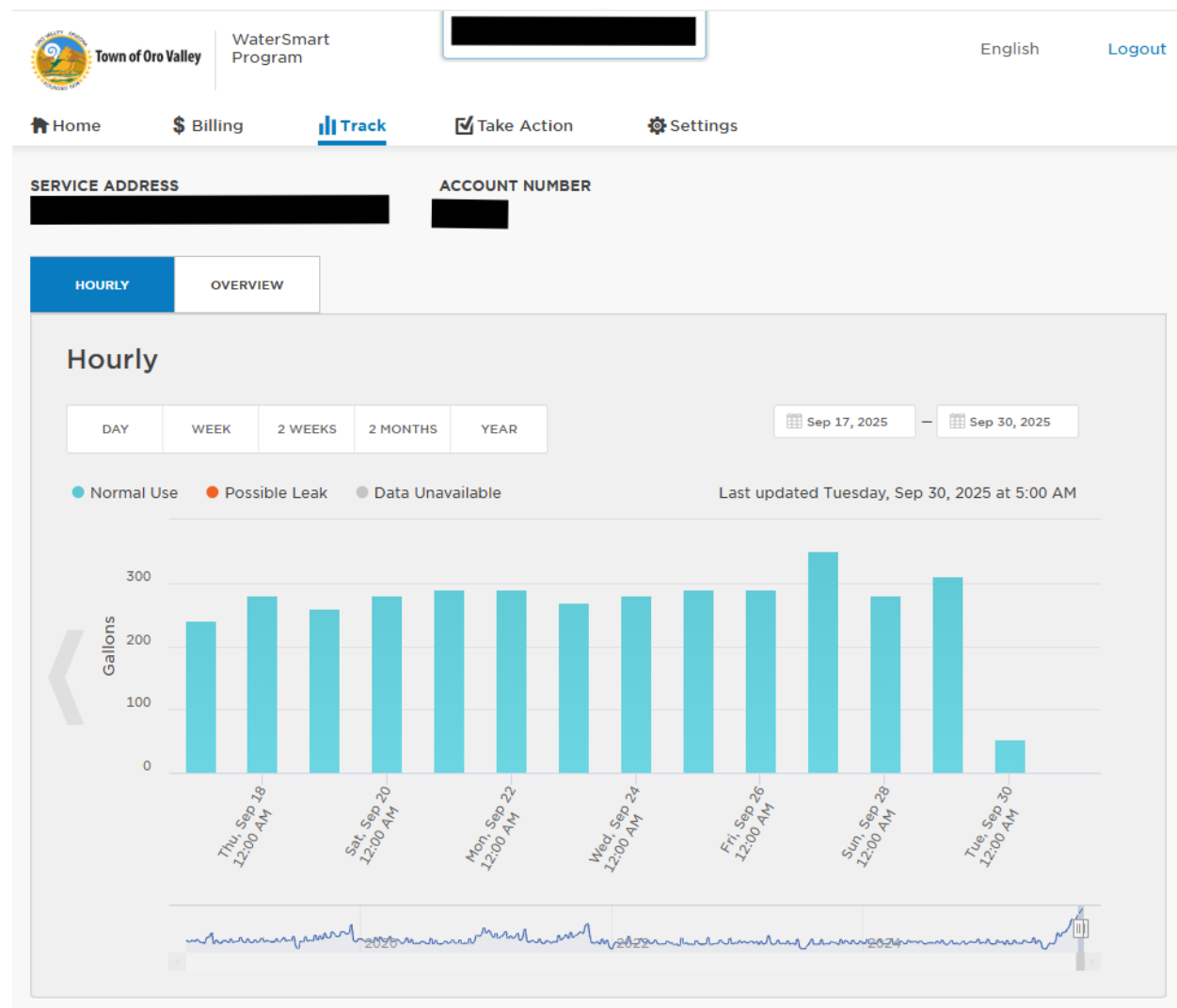
The logo for VXsmart is displayed on a dark blue rectangular background. The letters "VX" are in a light blue color, and the word "smart" is in a black color.



Town of Oro Valley

Smart Technology and Tools

WaterSmart

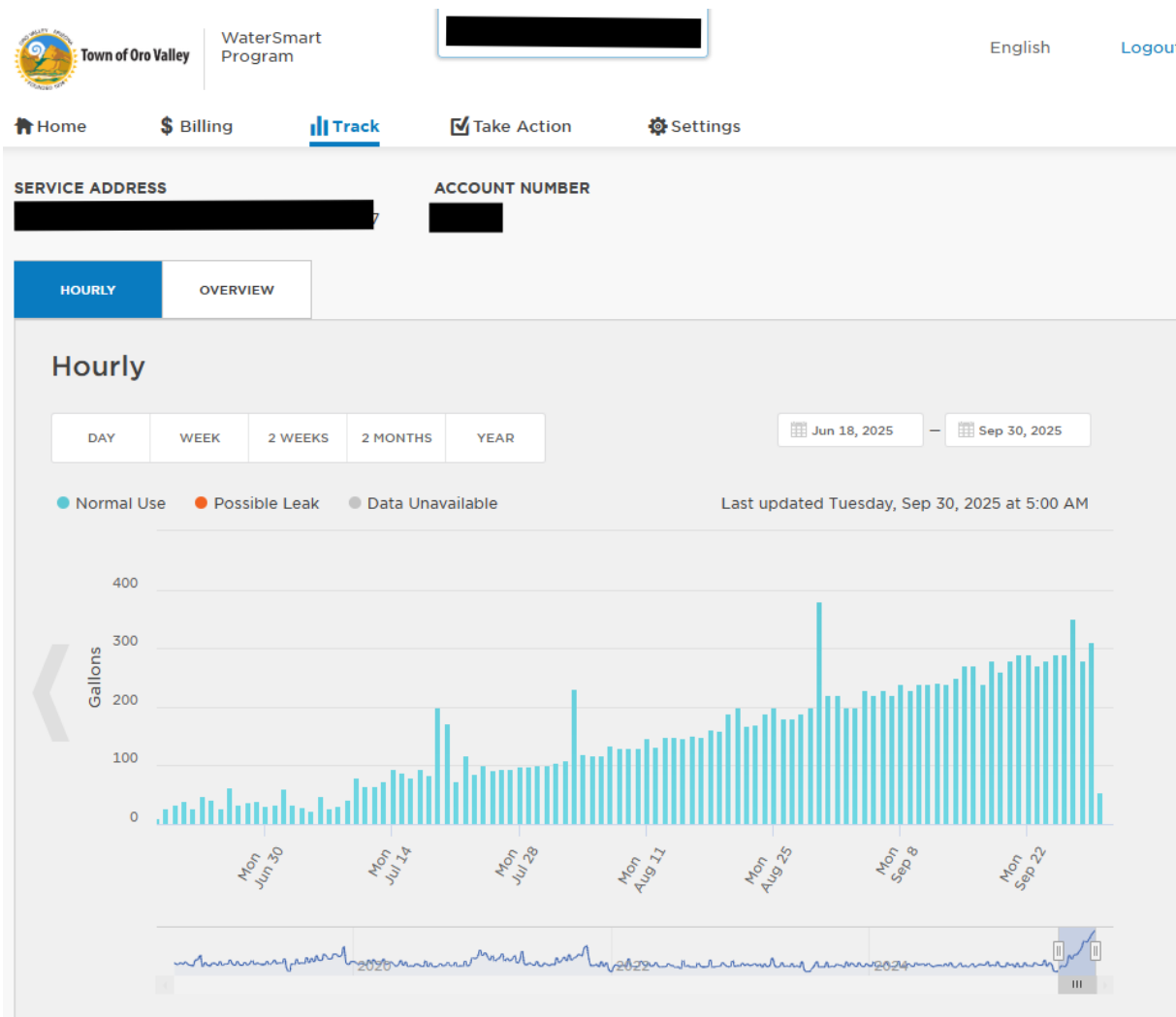




Smart Technology and Tools

Town of Oro Valley

WaterSmart



Water Conservation at Home

Behavioral Changes

- ▶ Develop water-saving habits (shorter showers, turning off taps)
- ▶ Encourage household participation (kids, roommates, etc.)
- ▶ Set Water-saving goals
 - ▶ Install water-efficient fixtures like low-flow toilets and showerheads
 - ▶ Shorten showers – 5 minutes or less
 - ▶ Turn off taps while brushing teeth or shaving
 - ▶ Keep a pitcher near the sink to capture water before it reaches desired temperature for drinking water, plants, pets or cleaning
 - ▶ Run full loads in the appliances
 - ▶ Fix leaks quickly
 - ▶ Sweep driveways and sidewalks instead of hosing them down
 - ▶ Use mulch to reduce evaporation in gardens





Water Audits

- ▶ A Water Audit for a residential customer helps identify how and where water is being used in the home and pinpoints ways to reduce waste.
- ▶ Typically involves checking for leaks, measuring water flow rates in irrigation and fixtures.
- ▶ Provides a clear picture of total water consumption, highlights inefficient systems or habits, and offers recommendations to lower water use, save money, and conserve resources



Water Conservation at Home

Town of Oro Valley

