

Drought Proofing the Future?

Conceptualizing short- and long-term water challenges facing the City of Goodyear.



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Current and Future Water Challenges

Over reliance on water from the Central Arizona Project and the Colorado River is problematic due to drought, precipitation variability, warming temperatures, and increasing demand.

Groundwater overdraft will also be a challenge, as water is being depleting from the aquifer faster than it can be replenished.



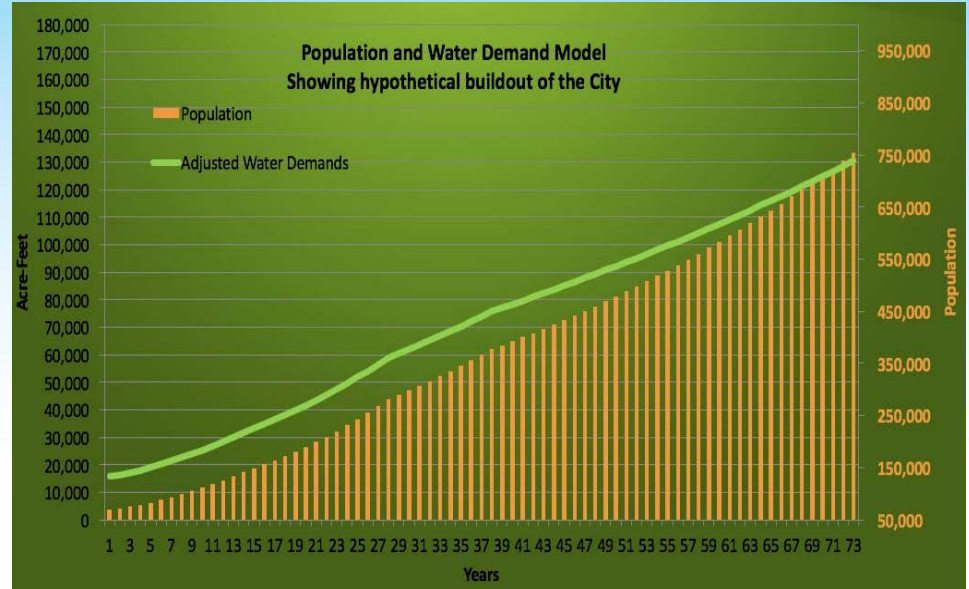
The Colorado River basin extends over seven U.S. states and parts of northwestern Mexico.

Current and Future Water Challenges

Population growth and increases on demand:

Goodyear's build-out population is expected to be 760,000 by 2085.

Consumer demand will exceed the 13,191 acre feet per year of groundwater extraction allowed between 2020 and 2025.



Conservation Analysis

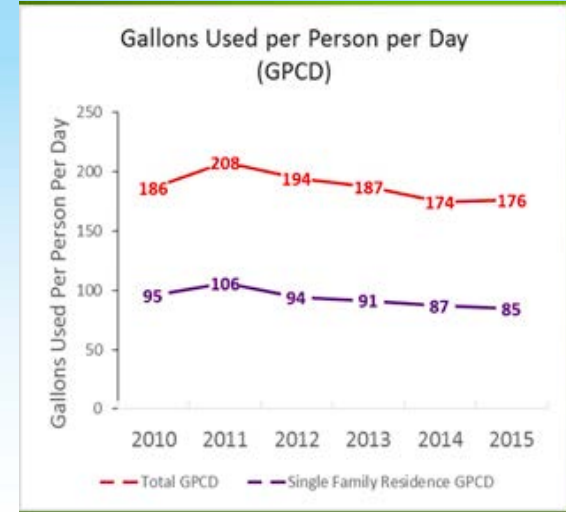
Consumer Education

Conservation classes at the Public Works Administration Building

Water Conservation Committee

Curtailment Plan (2008)

Updated version is expected for July, 2018



What are the Stages?

NORMAL	NORMAL CONDITIONS	Demand is below 90 % of supply	GOAL: Maintain this usage level
STAGE 1	WATER ADVISORY	Demand reaches 90% of supply	GOAL: Reduce demand by 5 %
STAGE 2	WATER ALERT	Demand reaches 95% of supply	GOAL: Reduce demand by 10 %
STAGE 3	WATER WARNING	Demand begins to exceed supply	GOAL: Reduce demand by 15 %
STAGE 4	WATER EMERGENCY	Demand far exceeds supply. Supply is disrupted.	GOAL: Reduce demand to 5 % Below current supply

HOA Partnerships

- 98% of Goodyear's residents live in a community with an HOA
- HOA's can be effective for water conservation through regulations and fines



Xeriscaping

- HOA's set the standard for yard appearance
- Xeriscaping = drought-resistant, native plant species and efficient watering
- Homes that converted to xeriscaping in Nevada used 33% less water per month



Pool Covers and Car Washes

- An average pool can lose over 19,000 gallons of water per year due to evaporation
- Pool covers prevent 95% of evaporation when used correctly
- Rebates could encourage the purchase and use of pool covers
- HOA's could include monthly car wash pass in their dues
- A ten minute car wash at home with a standard hose can use up to 100 gallons of water
- A conveyor car wash uses about 30-50 gallons and is better for the environment



High-Density Development

- Low-density sprawl results in more impervious material and less water reaching groundwater aquifers
- High-density development is recommended because it:
 - Conserves water
 - Reduces congestion
 - Saves money on and materials for infrastructure
 - Increases walkability
 - Reduces air pollution

Sustainable Design and Green Building

D. Water Efficiency, Conservation and Management

D.1 Water Reduction and Innovative Plumbing Systems

Objective: To increase water efficiency and conserve water within buildings by utilizing innovative plumbing systems.

Rationale: Increasing water efficiency and conserving water reduces water bills and leaves more water in the rivers, lakes and other freshwater sources. Water conservation also reduces the burden on municipal water supply and wastewater systems, saves energy from reduced amounts of water pumped, treated and distributed, and reduces wastewater treatment collection.

Overarching Question: Do the Codes/ Ordinances:	Potential Tools and Techniques	Specific Questions	Assessment of Specific Question	Do Requirements Come from State or Country?	Code/ Ordinance Reference
Allow for water use reduction through innovative plumbing systems and individual metering?	Efficient shower heads, faucets, toilets, or urinals, waterless urinals and composting toilet systems.	Is the use of high efficient and innovative plumbing fixtures and fittings encouraged?	G <input checked="" type="checkbox"/> Required by code/ordinance	<input type="checkbox"/> Yes, State <input type="checkbox"/> Yes, County <input type="checkbox"/> No	
			<input checked="" type="checkbox"/> Incentives provided		
			Y <input checked="" type="checkbox"/> Expressly allowed		
			<input checked="" type="checkbox"/> Code/ordinance silent, but typically allowed		
			R <input type="checkbox"/> Code/ordinance silent, but not typically approved		
			<input type="checkbox"/> Expressly prohibited		

Credit: Sustainable Design and Green Building Toolkit

Conservation Implementation Plan

1. Preparation	2. Capacity	3. Community Mobilization
<ul style="list-style-type: none">• Interview expert home developers and landscape architects.• Focus on future developments.	<ul style="list-style-type: none">• Design landscaping design standards.• Collaboration efforts between Conservation Committee and HOA's.	<ul style="list-style-type: none">• Spur community engagement through education and open house events.• Asses community vulnerabilities.



Conservation Implementation Plan

4. Implementation

- Establish new codes and guidelines for developers established by city council.
- Utilize the STAR communities rating system and the Sustainable Design and Green Building Toolkit.

5. Review and Evaluation

- Monitor residential per capita use.
- Evaluate stakeholder conservation strategies (Water Conservation Committee).



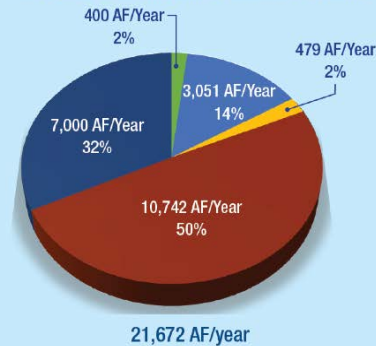
Concluding Remarks

As Goodyear grows and water supplies become increasingly costly and uncertain, steps to reduce water usage even further need to be taken:

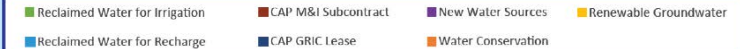
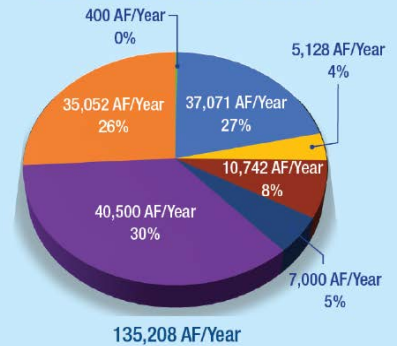
- Collaboration and transparency between stakeholders,
- A shift in people's relationship with water that fosters conservation,
- Starting with small changes to achieve long-term transformations.

Goodyear's **CURRENT WATER RESOURCE PORTFOLIO** is sufficient to support growth to 2040, but additional water resources are needed beyond 2040.

Goodyear's Current Water Resource Portfolio



Water Resource Needed for Buildout



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