City of Goodyear

Water Conservation and Curtailment Plan

December, 2008

Summary

The City of Goodyear plans to reduce water demand to protect its resources and residents and to meet its responsibilities under the State of Arizona's Assured Water Supply Program. The Conservation and Curtailment Plan set out here defines water use reduction goals and identifies strategies to be used to protect City water resources as growth continues. The City's overall conservation goal is to reduce gallons per capita daily consumption by 10% by 2015 and by an additional 5% by 2020. The Curtailment Plan prepares the City to rapidly reduce demand to protect essential water uses in the event of water shortages.

Goodyear will meet its Conservation goal by 1) increasing efficiency of water use by the City itself, 2) strengthening the public culture of water conservation, 3) assuring the water conservation program is fiscally sound, 4) providing financial incentives for conservation, and 5) recommending use of appropriate new water saving technologies. The City will fund water conservation through its water rates, placing the heaviest burden for this cost on the highest water use tiers.

The City will target four components of water use. The City will first demonstrate leadership by increasing the efficiency of its own operations, and develop ordinances, policies and guidelines to help residents and developers minimize waste of water. In order to obtain early results, the City will then address other major uses of water in order of their contribution to overall use: landscaping (both residential and commercial, accounting for 48-60% of overall demand), residential indoor (26% of current demand), and commercial and industrial.

Because it relies heavily upon groundwater, the City water service area's greatest threats of water shortages will come from disruptions or contamination of its water system, not drought. Consequently, the City anticipates that its Curtailment Plan would most likely be invoked on short notice to respond to sudden, short term incidents that may affect only portions of the City service area. Advance education about the Plan will speed public response when it is needed.

The Curtailment Plan will be implemented in stages when foreseeable demand reaches specific trigger levels. Stage 1 (Water Watch), Stage 2 (Water Alert), and Stage 3 (Water Warning) will be triggered as demand rises from 90% to 95% and 100% or more of available supplies. "Available supplies" will include all resources available for delivery within 24 hours. The Mayor may declare Stage 4 (Water Emergency) when demand far exceeds supply; the City Manager will declare other stages.

The plan defines increasingly severe water restrictions for Stages 1 through 4. At Stage 1 only the City faces mandatory restrictions on watering, as well as other outdoor water uses. Parallel voluntary measures for all other users in Stage 1 become mandatory at Stage 2. As the stages progress, all users face steeper limits on outdoor uses as well as construction and other expansion of demand. The City may cancel restrictions when the Water Resources Director determines the conditions for that stage no longer exist.

In coordination with existing *Integrated Water Master Plan* prepared in 2007, these documents will guide the City's efforts to assure safe water supplies are delivered and prudently used by its customers.

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Conservation Plan

Introduction

The City's Conservation Plan is formulated around three core principles. First, the City is committed to making Goodyear a sustainable community. Efficient management and conservation of water are essential to accomplish this in the arid environment of Goodyear. Second, the City is committed to meeting its full legal responsibility to the State of Arizona to reduce per capita groundwater use. This will require water conservation as both its population and business community grow and diversify. Third, the resources of Goodyear, including its water and desert landscape, merit protection in their own right.

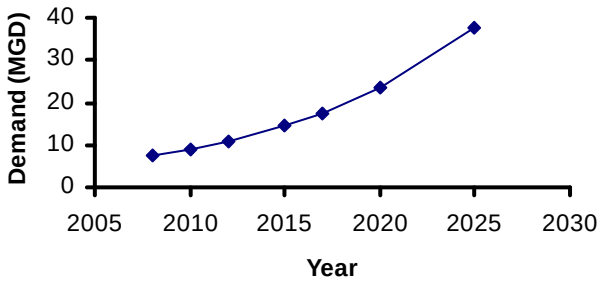
Sustainability: Water Supply and Demand

To make Goodyear sustainable, the City must acquire and manage water resources to reliably serve current and future residents of its service area. That service area includes all of the area within City boundaries south of Interstate-10 (I-10) as well as a strip of land between I-10 and McDowell Road, north of I-10. In anticipation of a projected fourteen-fold population increase by buildout, the City will purchase and develop additional water resources as well as the infrastructure necessary for treatment and delivery. The *2007 Integrated Water Master Plan (IWMP)* prepared by Black & Veatch lays out the resource and infrastructure development requirements to meet those needs in detail.

At buildout the *IWMP* projects that the City will need 92.2 million gallons per day to serve the service area's 502,000 residents, assuming today's usage patterns persist. In 2007, the City used 7.0 million gallons per day to serve just 34,300 people (Maricopa Association of Governments). With Average Daily Usage remaining at current levels, total demand will already exceed 23 MGD by 2020. (See Fig. 1 Average Daily Demand Projection.) Reductions in per capita usage that can be achieved by water conservation will reduce the amount of water that the City must eventually acquire, treat, and deliver. Cost-effective reductions in per capita demand will increase the population the fragile desert environment can support well into the future without depleting City finances.

Fig. 1 **Average Daily Demand Projection**

Assumes 10% annual population increase.



Legal Obligation

As a municipal provider within the State of Arizona, the City of Goodyear must meet conservation requirements established under the Groundwater Act of 1980, including a reduction in reliance upon groundwater. Failure to comply with these requirements would endanger the City service area's Assured Water Supply Designation and consequently prevent further new development.

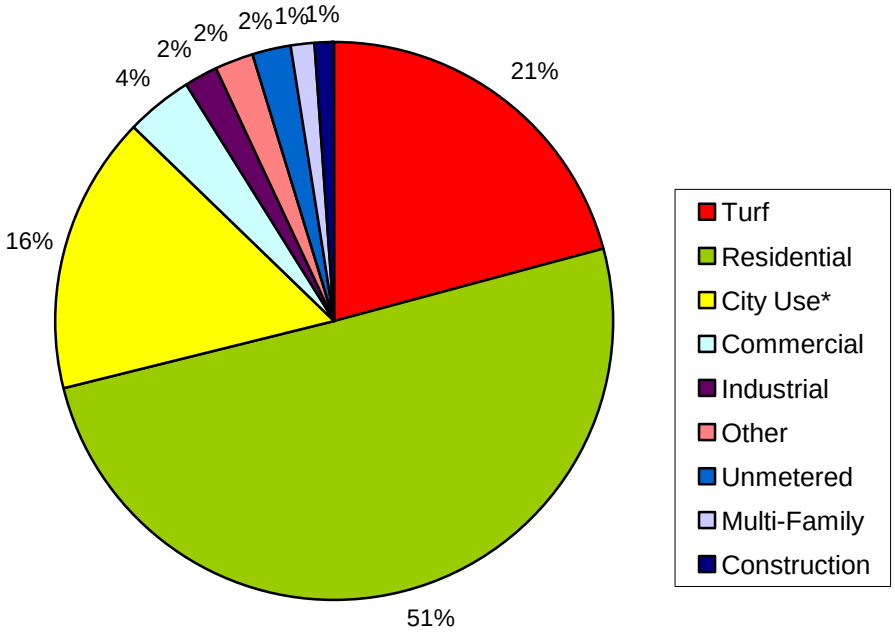
The City intends to continue to meet the State's Conservation Requirements, through participation in the Gallons Per Capita Per Day (GPCD) Program. This program requires that participants make reasonable reductions in the per capita daily demand for water within their service area. The City's Conservation Plan is designed to reduce its per capita daily demand from the 2007 level of 218 GPCD.

As the mix of water users in Goodyear diversifies, all users will need to adopt more efficient water practices to simply maintain the current overall GPCD. Achieving further water savings will require creative, persistent, and diverse initiatives. This plan outlines the framework for those initiatives for the next twelve years, beginning with the current users.

Current Usage Patterns

The latest usage figures available come from 2007. The City delivered 2.57 billion gallons of water that year. Single family residences used more water than any other users. Collectively, they use 51% of City-delivered water. See Fig. 2. Water Use by Customer Type.

Fig. 2. Water Use by Customer Type



* This is use not billed to the City, but reported for Arizona Department of Water Resources

Turf and irrigation use at all types of facilities combined comes in a distant second at 21%. Studies regularly show that Arizona residences use 50-70% of their water outdoors, irrigating landscapes and keeping pools operational. This makes it reasonable to estimate that 47-57% of all water delivered in the City service area is used outdoors.

The City uses 21% of all City-delivered water (including both the portion not billed to the City and the portion billed for rights of way, median and parks as well as facilities), making municipal usage the third highest category. (Finance Department, 2008) The City also uses 102.8 million gallons of water from Litchfield Park Service Company for facilities and irrigation of medians, rights-of-way, and parks north of I-10 (LPSCo, 2008).

Non-residential users of all types collectively used less than 300 million gallons in 2007. Individual sectors within the group have a relatively low impact on demand for City water at this time. These user groups will see the greatest percentage increase in contribution to water demand as Goodyear matures.

Water Conservation Targets and Impact

The City's water conservation goal will be to prevent annual increases in per capita demand, and begin reducing the amounts currently consumed. Successfully doing so may extend the time frame for significant water resource expansion.

Target 1: Reduce per capita daily demand 10% by 2015 (to 196.2). Achieve an additional 5% reduction to reach per capita daily demand of 185.3 by 2020.

If water demand grew in direct proportion to population, total demand would grow in exactly the same pattern as the population over the next seventeen years, as shown in Figure 1 above. But this is only true when growth of both residential and non-residential uses remains at a fixed number of gallons per resident.

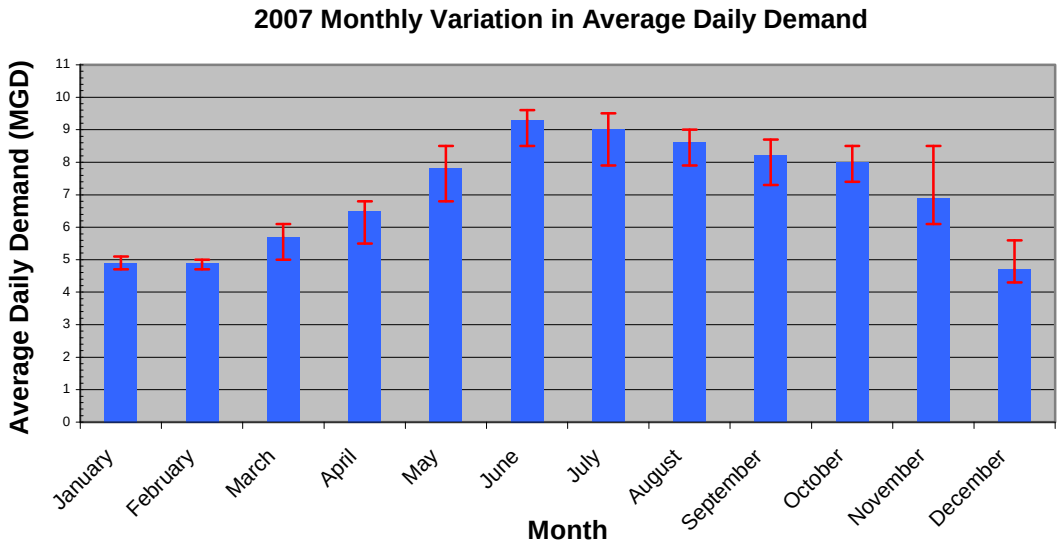
Whenever non-residential demand grows faster than residential demand, the per capita daily demand may rise, even if residential customers do not change behavior. However, the targeted improvements of 1.4% per year (2008-015) and 1.0% per year (2015-2020) understate the amount of conservation that will be required. Currently, Water Resources is using a 10% annual population growth rate to project demand (lower than the Maricopa Area of Governments projection of 16% based on early 2000 growth). Community and Economic Development are projecting retail and office development at the same rate (10%), but projecting industrial growth at 15% per year. To maintain a constant GPCD, the additional 5% per year must be made up by conservation and shifts to surface and reclaimed water for portions of our supply.

With the anticipated expansion of commercial activity in Goodyear, these targets will be sufficiently ambitious for the early years of our program.

Target 2: Reduce the spike of peak demand above annual average daily demand 5% by 2013. Peak demand spikes are measured by dividing the peak day's demand by the annual average daily demand. The six year average for this multiplier was 167% in 2006. A five per cent reduction would hold the peak day demand to 158% of annual average daily demand.

Because the majority of Goodyear's water use is for outdoor landscaping, demand is not spread evenly throughout the year. Plantings require more water during the hottest months of the year. Water demand soars to more than twice the winter quarter low, as property owners extend irrigation times to maintain attractive landscapes. See Fig. 3. Monthly Variation in Demand. Reducing the outdoor demand spike during the 151 day peak period will be essential to achieve significant drops in annual water usage.

Fig. 3 Monthly Variation in Demand



Impact of Reaching Targets: Reducing water use from 218 to 196.3 gallons per capita daily by 2015 will produce water savings of approximately 1.754 billion gallons. Dropping this to 185.3 gallons by 2020 per capita daily will net additional savings of approximately 4.592 billion gallons between 2015 and 2020. See Fig. 4 Effect of Conservation on Demand.

Fig. 4 Effect of Conservation Upon Demand 2008-2020

Assumes 10% population increase.

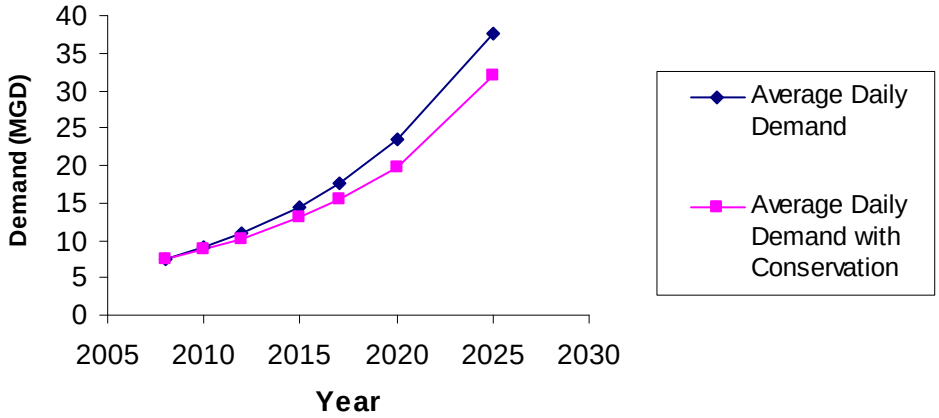


Table 1. Cumulative Water and Monetary Savings through Conservation

Assumes 3% annual inflation on 2007 costs and 10% annual population growth.

Time Interval	Water Savings (MG)	Operating Savings ($M)	Replenishment Savings ($M)
2008-2015	1754.5	$5.1	$1.5
2015-2020	4592.3	$15.4	$4.1
2008-2020	6346.8	$20.5	$5.6

Between now and 2020, the City would save operating and maintenance costs of approximately $20.5 million dollars (Red Oak Consulting, 2007). See Table 1. Water and Monetary Savings through Conservation. The City will also save the cost of replenishing or recharging the unneeded 6,346 million gallons of water and defer the construction costs to build capacity to deliver them. The replenishment cost savings will be substantial. By 2020, cumulative savings on replenishment alone rise to $5.6 million dollars. At 2008 rates, customers would save $23.9 million dollars.

Funding Conservation Efforts

Water conservation will substantially reduce the necessary expenditures for procurement of water resource rights, operations and maintenance, replenishment or recharge, and construction and debt service. These costs make up the cost of service currently used to set rates. The City will incorporate the offsetting water conservation costs into its rate structure.

The City will allocate costs of the conservation program within the rate structure to strengthen incentives for conservation. The City's current rate structure has four residential tiers and three for commercial users. Tiered structures promote conservation by cost-sensitive customers when their usage passes the thresholds between tiers: they pay higher unit costs for their last increment. To intensify this signal, the City will assign the cost for conservation to the highest tiers. This allocation will also place the cost burden on those customers who are capable of gaining the most from water conservation initiatives.

Prioritizing Conservation Efforts

The City will use a mix of conservation measures to assure that all sectors of the City increase efficiency and conserve water where possible. Early successes will build community awareness and make it easier to reach the long term per capita consumption goals. So, the program will target low hanging fruit before adopting tactics that are more costly and slow-acting.

Priority 1: Reduce City demand. The City bears a leadership obligation to conserve water before requiring its citizens to do so. The City is also both the largest single and most readily influenced customer within its service area. It can quickly realize water system operations and regular budget expense reductions if cost-effective means are available to achieve water demand reductions.

Priority 2: Reduce outdoor demand. Outdoor use is the largest type use within the service area. It is also largely discretionary. Many homeowners are unaware of how much water they use outdoors.

Studies repeatedly document that homeowners regularly over-water by 40%. A variety of measures are available to reduce landscape use. Reducing use by 10-15% would generally not have a detrimental effect on appearance. This could produce service area savings on the order of 5-8% of total demand.

Priority 3: Reduce indoor (residential and office) demand. Residential indoor use accounts for 18-27% of total demand. Because Goodyear has little housing stock and commercial space that is over ten years old, most kitchens, and lavatories have low-flow fixtures. There will be greater savings potential in updating codes and guidelines for the 200,000 homes yet to be built than in retrofits of existing housing with current technology. Customer enthusiasm and matching fund availability may drive timing and selection of some offerings.

Priority 4: Increase institutional, commercial, and industrial efficiency. These users collectively represent less than 12% of current demand. The greatest gains in this sector will come from codes and guidelines specifying efficient technology and processes, as well as educational efforts, for future customers opening up in the area.

Financial Standards for Conservation

Water Resources will assess water-savings potential, financial impact for the utility and the customer, and the number of likely participants for all conservation measures prior to adoption. It will also evaluate water savings the City's conservation initiatives realize.

City staff will assess anticipated water savings from individual conservation measures when making recommendations of program options to Mayor and Council. The impacts of services or incentives provided to individual users are amenable to analysis using water consumption histories. Water savings generated by other measures, such as providing educational brochures and school programming for broad audiences are more difficult to assess. Results from Valley and Southwestern metropolitan communities will be used to benchmark the range of likely savings as well as the duration of the effect.

Whenever possible, recommendations will also identify the anticipated range in cost per unit savings, both to the City and to program participants. Piloting programs may be the best and only way to assess the cost-effectiveness for voluntary measures, in which likely participants have a wide range of capabilities to save, at a fixed cost for participation.

Many municipalities have not regularly documented the water savings of their conservation programs. The Water Conservation Office will analyze the water histories of participants in financial incentive and individual service programs (e.g. audits) to document water savings and unit program costs to guide future decision-making. In order to assure the appropriate water consumption data will be available, all participants will be asked to sign a release of water consumption records before participating. The Water Conservation Office will also use participation levels, customer savings and reaction to assess program success.

Existing Conservation Measures

City of Goodyear Operational Efficiency

All supply connections to the City's water distribution system are metered. In 2007, the City performed a comprehensive meter change-out of existing meters, installing a radio-read system. The City also set a requirement that all new meters will be required to have meters for flushing and disinfection. This will reduce unaccounted for water.

The City conducted a leak detection study of its system in 2007. Within four months all leaks were repaired, at an estimated savings of 23 million gallons of water per year.

The City is currently awaiting a report on the water audit conducted on all facilities, rights-of way, medians, and parks held by the City for at least two years. Newer facilities were excluded because there are not established usage patterns for evaluation. The City will review and implement recommendations that are cost-effective and timely as resources permit.

Education

Through its membership in Arizona Municipal Water Users Association for the past 23 years, the City has supported printing and distribution of brochures and booklets on water conservation. It has also supported the regional multi-media water conservation awareness campaign—Water Use it Wisely (WUIW). Tips from WUIW have been regularly used in City newsletters and on its website.

This year, outreach has been expanded with additional web content, branding of the water conservation program (H2O 365—Save H2O 365 days a year), and distribution of a water conservation calendar bound with the Consumer Confidence Report on water quality.

This summer, the City launched its first Beat the Peak summer outdoor water use awareness campaign. This campaign used exhibits at City Hall and the July 4 celebration, distribution of Conserve Water booklets to elementary children, free distribution of rain and sprinkler gauges, messages on the City's phone system, the City newsletter, conservation calendar release, and repeated press releases to build awareness of the peak and customer's role in managing it.

Instructors have been identified and schedules for adult classes on water-efficient yard maintenance and irrigation practices are being set.

Staffing

The City hired its first Water Conservation Specialist in November, 2007 to expand its efforts in water conservation.

Ordinances and Guidelines

The City has Water Waste and Unauthorized Use of Water sections in its City Code. Both are enforced throughout the entire city.

City landscape guidelines for single family residences include the State's limit on maximum turf area.

As Landscape Guidelines for medians, flood retention basins, and rights-of-way were revised this fall, Engineering and Water Conservation staff began to inject more conservation-enhancing language into them. Staff are committed to organize the City's recommended plant list to better communicate the xeriscape principles on its next revision.

City water rates define four usage tiers for residents and three for commercial customers. This structure provides a financial incentive for some conservation. In the future, it may become necessary for additional water consumption tiers to be added.

Rebates and Retrofits

Commercial kitchens throughout the City have been offered the opportunity to participate in the Arizona Rinse Smart pre-rinse valve retrofit program. The Water Conservation Office worked closely with Litchfield Park Service Company to assure that businesses north of its service area would be eligible to participate.

Currently there are no other rebates or retrofit offered. The Water Conservation Office is reviewing the potential savings, costs, and relative advantages of artificial turf, SMART controllers, and turf conversion programs in reducing outdoor water usage. Re-circulating pumps, on-demand heaters, and other point of use devices that will reduce wait time for hot water would also be possible retrofits.

Conservation Goals

The City will build its water conservation program around five strategic goals. Key actions and specific objectives related to each strategy are outlined following the overview of the strategies.

Goal 1. The City will lead water conservation by example. Citizens expect their governmental institutions will practice the discipline City leaders ask residents to follow. The City of Goodyear will display such leadership and manage its water resources prudently by maximizing its own conservation efforts.

Goal 2. Build customer commitment to improve efficiency in all use of water, especially potable water. The fraction of the City service area's water used to meet municipal demand will decrease as further development occurs. Building commitment to water conservation among all customer classes will be essential to achieve and maintain savings. Currently residential users dominate numerically and in collective use. Targeting them before other users will have a greater impact. Enacting guidelines that define water efficiency standards for future businesses and residences before they increase our usage will be cost-efficient for both customers and the City.

Goal 3. Assure water conservation program is fiscally sound. The City will commit a portion of the revenues from its highest rate tiers to conservation efforts. This will provide a cost signal to encourage conservation and place the costs upon users who could most benefit from the initiatives they fund. In addition, Water Resources will actively seek cost-sharing partners for these initiatives. The program will use cost-benefit ratios, participation levels, and customer behavior as measure of success, recognizing that innovative offerings and pilots will incur some risk of low returns on investment.

Goal 4. Assess water conservation technologies and recommend appropriate usage. As awareness of water scarcity increases among society, more creative efforts will be focused upon technology and design practices that maximize water efficiency. In order to create the best possible water conservation program, the City will maintain an active research program, that may include testing of water-saving devices for broader community use.

Goal 5. Create financial incentives that accelerate adoption of water conserving practices and technology. Money talks--and water customers listen. While some listen more when they pay their water bills, and others when they make landscaping and plumbing fixture selections, all notice when conservation efforts pay. The City will use its rate structure, rebates, and retrofits, and water budgeting to make conservation pay for the customer. The City will prioritize its offerings (see Prioritizing Conservation Efforts) without ignoring chances to partner in outside programs, such as Arizona Rinse Smart.

Conservation Activities by Goal

Goal 1. The City will lead water conservation by example.

Action: Reduce municipal water use to meet annual conservation targets, through cooperation among City departments.
Cooperation among operating, regulatory and design departments of the City will present many opportunities to increase municipal conservation as City operations grow during the next decade. The City will accept responsibility to maintain miles of rights-of-way and medians in developments that are currently in design. It will also build a City Center and new parks to serve large numbers of people. Each new facility will offer opportunities to design for maximum efficiency and install fixtures that maximize life cycle efficiencies.

Evaluate and improve City water use at existing facilities and operations.

Proposed Action	Year to be completed
Coordinate City water use audits.	2008 and at 5 year intervals
Implement recommendations from audit.	2 years following audit as budget allows.
Establish annual targets for City water conservation.	December, 2009 and after each audit
Reduce frequency of bay washing at fire stations from twice daily to once a week.	2008
Use non-potable water where quality water is available, for bay washing and fire training. Site hydrants appropriately as firehouses are added.	2009
Implement additional uses for non-potable water in fire and safety functions.	2010
Minimize water use for safety and construction tests to extent allowable in law.	2011

Improve outdoor water use efficiency.

The City maintains a large and growing acreage of street medians, rights-of-way, and park lands. These landscapes are highly visible and display the community's attitude toward appropriate landscaping in the desert. They are all currently irrigated with potable water. Reclaimed effluent is available from the existing reclaimed line along Estrella Parkway.

Proposed Action	**Year to be completed**
Irrigate practice fields at Goodyear Ball Park Complex with 50%+ reclaimed/remediated water.	2008
Use raw water for irrigation at Bullard Water Complex.	2008
Convert irrigation of medians to reclaimed water where available.	December 2009
Implement plan to reward appropriate water use by maintenance contractors.	2010
Reduce City water use in irrigation of all 2 year-old area by 5%.	June 2010
Shift 50% of City irrigation demand to non-potable water.	2020

Install and build to higher efficiencies.

The City will build its City Center in the next two to four years, and its other facilities will be put to new purposes in the next decade. The City Center presents a special opportunity to showcase the City's commitment to water and resource conservation. Design and construction of each new facility and park will offer opportunities to incorporate more efficient technologies and designs.

Proposed **Action**	**Year to be completed**
Require leak detection studies before City accepts responsibility for landscape maintenance.	2008
Add water budgets and mature plant-size based densities to median and right of way Landscape Guidelines.	2009
Apply water sections of green building codes to minimize City water use at all new facilities.	2010
Exceed standards for water conservation in Landscape Guidelines and Planning and Zoning Ordinance at all new City facilities' landscapes.	2009
Use non-potable water sources at all future City facilities within 200 feet of reclaimed or remediated water lines.	2010
Install demonstrations of rainwater harvesting and gray water at City sites.	2012

Action: Make meaningful contributions to area partnerships and initiatives for water conservation.

The maturing of City water conservation initiatives will give the City additional opportunities to provide West Valley and regional leadership. Collaborative efforts will continue to generate cost savings and provide valuable professional development for staff.

Proposed Action	Timing
Obtain full voting membership in Arizona Municipal Water Users Association. Continue to financially support its efforts.	Ongoing
Finance and participate in regional planning by Water Use it Wisely campaign Regional Partners.	Ongoing
Host at least one regional water conservation meeting per in Goodyear.	Annually

Goal 2. Build customer commitment to improve efficiency in all use of water, especially potable water.

Action: Build public ethic supporting water conservation.

Distribute information and provide education on desert, water sources, and conservation.

Proposed Action	Year to be completed
Conduct xeriscape, irrigation and other water conservation classes for adults.	2009-2020
Prepare and distribute information on water savings and water sources through publication, media, annual calendar/publication, and City website.	2009-2020
Design, pilot, and offer school water education program.	2010-2020
Use City-sponsored events and targeted water conservation events to focus attention on conservation.	Events 2009 and 2014?
Design and build demonstration garden and exhibits interpreting water reclamation and water sources at library/City Center.	2010-2012

Create resources for consumer evaluation of water use.

Proposed Action	Year to be completed
Display prior usage in online billing to aid consumer decision-making	2009
Conduct pilot residential irrigation audit program.	2009
Hire/assign additional staff person to handle irrigation audit service and high use calls as demand grows.	2011

Action: Recommend and support adoption of City ordinances, policies, and guidelines that reduce future city-wide water use.

Enact appropriate ordinances.

Proposed Action	**Year to be completed**
Conservation and Curtailment Ordinance implementing Curtailment Plan.	2008
Publicize and increase enforcement of Water Waste and Theft ordinances City-wide.	December, 2008
Model Homes Ordinance promoting use of higher efficiency fixtures, rainwater, and gray water.	2009
Reclaimed Water Ordinance including requirement for non-potable water for dust control/construction and within City Water Service Area and requiring that new development on major arterials irrigating stub out irrigation to use non-potable water as it is available.	2009
Adopt 2006 plumbing code revisions that promote water conservation.	2010
Implement green building ordinance incorporating water conservation requirements to establish standards for certification in Goodyear.	2009
Additional ordinances that define water conservation requirements.	As required

Establish policy and administrative guidelines strengthening water conservation.

Proposed Action	**Year to be completed**
Strengthen water conservation requirements in Engineering, Storm water, and Zoning and Planning Landscape Guidelines.	2009 on
Obtain council approval for performance-based financial incentives.	2010
Discourage semi-annual and monthly commercial sprinkler testing. Continue annual requirement.	2008
Notify all Occupancies that discharge from sprinkler riser testing must be directed to landscaping instead of asphalt or concrete.	January 2009
Eliminate second fire flow tests unless project delays for more than one year.	2008
Create and offer incentive to developers and builders that incorporate more water efficient features into their plans.	2010
Require developers and new businesses to submit and execute water conservation plans that meet specified water budgets.	2012
Modify plumbing codes and landscape guidelines to increase efficiency and clarify code requirements for gray water use and rainwater harvesting.	Ongoing

Action: Promote use of alternative water sources.

Make capital investments and operating decisions to support the expansion of use of these sources.

Proposed Action	Year to be completed
Extend reclaimed and remediated distribution system.	As development fees and demand merit
Site extraction wells for Superfund site where there are irrigation users.	Where feasible
Identify financing mechanism for increased use of reclaimed/remediated water within existing customer base.	2013
Shift 50% of City's irrigation demand to reclaimed/remediated water.	2020

Provide information on how to acquire and use these water sources.

Proposed Action	Year to be completed
Include non-potable water supplies in pre-planning materials (Economic Development)	2009
Publicize Arizona tax incentives for use of alternate water sources at residences.	2009-2012
Conduct workshops and evaluate use of incentives to promote residential gray water and rainwater use.	2011

Action: Target reduction of expensive, infrastructure-intensive summer demand.

These actions will directly address Target 2: reducing the summer demand spike.

Proposed Action	Year to be completed
Conduct Beat the Peak Campaign targeting outdoor water use and waste.	Annually
Pilot residential irrigation audits.	2009
Expand residential audit program if reductions in use are sustained.	2011
Evaluate need for seasonal surcharges adoption.	Rate reviews

Goal 3. Assure water conservation program is fiscally sound.

Action: Set goals for and evaluate cost-efficiency of water savings measures.

Water Conservation staff will estimate water and financial savings to customer and City for all financial incentives. In order to assure the City can make informed financial decisions about water

saving measures the City will require that recipients of all financial incentives release their water history for evaluation purposes.

Proposed Action	Year to be Completed
Identify and schedule interior retrofit initiatives that reduce gallons used per dwelling unit by 20 gallons per day.	2013
Identify and schedule outdoor watering reduction incentives that produce 5% reduction in gallons used per dwelling unit annually.	2009-2010

Action: Identify and procure funding and partnerships to support conservation.

Proposed Actions	Year to be Completed
Add a rate class for irrigation and set rates set to discourage waste.	2009
Dedicate an increasing percentage of highest tier rate to water conservation.	Rate reviews
Identify cost-sharing partners for initiatives north of I-10.	2010
Identify sponsors for at least 50% of cost of large community water education event.	2009, 2014

Goal 4. Assess water conservation technologies and recommend appropriate usage.

Action: Research new conservation technologies and their cost-effectiveness.

Proposed Action	Year to be Completed
Join local, regional, and professional groups' collaborative research and clearing houses on efficiency, reuse, and conservation.	Ongoing
Successively target research to large-scale outdoor water efficiency, interior residential fixtures and appliances, and commercial fixtures and equipment.	Ongoing

Action: Recommend appropriate usage and assist in adoption.

Proposed Action	Year to be Completed
Utilize leak detection service as final condition to certify completion of warranty on landscape irrigation being turned over to the City.	Begin 2009
Set up pilots of technology of interest at City, school, or residential sites, as appropriate.	2013
Install demonstrations of rainwater harvesting and gray water at City sites.	2012
Adopt fixed-base remote meter reading for Amaranth.	2020

Goal 5. Create financial incentives that accelerate adoption of water conserving practices and technology.

Action: Provide financial incentives to reduce key water usage components.

The Water Conservation Office has begun researching costs and relative benefits of several popular rebate programs to identify the best initial offerings. Rebates for customer purchases, bulk contracting for resident discounts, distribution to customers, and direct installation, are all options to provide incentives to use specific efficient fixtures.

Artificial turf, turf conversions to xeriscape, residential audits, and SMART controllers all address the high outdoor water use. Re-circulating pumps, on-demand tankless heaters, and several point of use devices address the indoor water loss while waiting on hot water. Energy savings will increase the value of such retrofits for consumers while costs of operation may sometimes offset water savings.

In addition, when special grants or cost-sharing programs for retrofits, like Arizona Rinse Smart, become available, H2O365 will encourage their adoption.

Proposed Action	**Year to be Completed**
Enact tiered water rates structured to reward conservation.	2009
Set highest rate tier high enough to cover cost of conservation initiatives.	2009
Link rebate/retrofit payments to water savings achieved by recipients.	2010
Implement financial incentives for reducing community associations', multi-family and commercial outdoor use, as well as single family's overall use.	2009-2012 As resources permit
Structure incentives around water budgets and technology adoption for commercial and industrial users.	2014 on

Conclusion

The City of Goodyear commits itself to use a mix of strategies to reduce per capita daily use of groundwater by 10% in the next seven years and an additional 5% in the following five years. The City will lead by example and focus its conservation efforts on outdoor water use and enacting guidelines to assure future customers initiate water-efficient practices when they initiate water service. This will provide a solid underpinning to continue reducing GPCD in a service area where commercial and industrial activity are expected to grow more rapidly in the future than in the past.

Curtailment Plan

Introduction

As the drought in Arizona continued and worsened, the State of Arizona mandated that all municipal providers prepare and utilize drought contingency plans. The plans must identify demand reduction measures, the levels of water shortage at which they would be triggered, and the ways in which the plans would be implemented and enforced.

Because the City of Goodyear currently obtains all its potable water supplies from groundwater and will be heavily reliant upon it for the next ten to fifteen years, drought conditions will not affect its potable water sources as much as other possible events. The City has therefore chosen to prepare a curtailment plan to be used in a broader range of circumstances that may create water shortages, including major breaks in the distribution system, treatment failures, contamination, and other widespread disruptions of service.

Purpose and Objectives

The Curtailment Plan is designed to assure that water shortages do not prevent the City from meeting its obligation to provide healthy and safety services to those in its service area, as well as all its facilities outside its service area, while minimizing economic impact. Preserving capacity supporting medical services, cooling, and fire suppression will take priority over less universally beneficial uses such as lawn and park irrigation, fountains, and outdoor cooling.

The Curtailment Plan enables City leaders to respond promptly and apply restrictions that suit the particular circumstances. By distributing the Plan broadly, the City gives its residential and business customers the same opportunity to promptly react.

The Plan defines water supply drought stages, provides authority and enforcement, and sets demand reductions that go beyond the water conservation lifestyle practices of the Conservation Plan. The Plan has the City set example by reducing its water demand before and more severely than citizenry in water shortages.

Demand Management Options

Public Education for Voluntary Reduction

Voluntary demand reductions may prevent conditions reaching the point that mandatory restrictions will be imposed. Public awareness of the water supply status of the City will build cooperation in reducing demand. The City will conduct regular educational outreach to build understanding of droughts, regional drought status, the Curtailment Plan, and ways to reduce household demand as part of its conservation education program.

The City will post the Curtailment Plan as well as its water supply status on its website. The Water Conservation Office and Public Information Office will escalate communication when demand approaches levels that would trigger implementation of the Curtailment Plan. Broadcast media, marquee signage, web site features, reverse 911 calling, and all other appropriate media will be used in the event the Plan is implemented.

Increasing Financial Incentive Programs

In drought and other long duration water shortages, the City will look at ways to escalate and enhance its rebate, retrofit and other conservation programs that can produce immediate reliable water demand reductions. The City may levy a drought surcharge upon high water use and use revenue from fines for violations of mandatory restrictions to fund such program expansions.

Municipal Use Reductions

The City will set the example by reducing its own potable water use first. Discretionary water use that will not impact services or job creation will be reduced first. For example vehicle washing and irrigation of medians and rights of way would be reduced, before watering of park lands, and finally playing fields.

Outdoor Use Restrictions and Bans

In Goodyear, over half of water consumption occurs outdoors. Because swimming pools, green yards, and flowers are amenities rather than essential life services, it is appropriate to reduce the water used for these functions before other uses. Should water shortages reach extreme levels, it may be necessary to ban certain outdoor water uses. The City would delay imposing restrictions upon the Goodyear Ballpark until the shortages are severe.

All locations using non-potable water, rather than potable water, would be exempt from such restrictions and bans, as long as their water source is not also in short supply. These locations, including the Goodyear Recreational Sports Complex, would be required to post signage identifying that their irrigation uses non-potable sources.

Reduction of New Connections

Goodyear is a growing area, with construction and development continuing to add new demand. The new development provides jobs and revenue to the City. In a water shortage, adding new demand to the water system exacerbates the problem.

Because development is vital to Goodyear's health, the City would only completely halt addition of new customers and construction in the most extreme shortages. Limits on new permits and service would expire with the end of the shortage. During less severe shortages, the City will decrease the issuance of new permits and otherwise limit the addition of new demand. This will avoid magnifying the problem. Applicable federal, state, and local laws will be followed by the City during the implementation of mandatory water restrictions.

Physical Rationing and Mandatory Bans

Physical rationing of water can be imposed through percentage reductions or specific use bans. Percentage reductions assign customers a consumption reduction goal, depending on water use, compared to some established prior use. Violations of physical reduction requirements can only be caught after the water has been used, when meters are read.

Specific use bans are imposed primarily through education and enforcement. Allowing watering only on specified days and prohibiting use of water features and refilling pools can be effective. Bans build awareness and prioritize water uses. They establish as sense of equity within the community. They can be enforced while water is in use, so that the undesired use may be immediately halted. This plan incorporates bans rather than percentage reductions.

Water Use Restriction Stages

The City may invoke four stages of water restrictions based on levels of shortage. Shortage conditions are defined by demand for water as a fraction of currently available water supplies. The restrictions may be imposed on portions of the service area or the entire region, depending upon the cause of the shortage. Additional restrictions may be imposed in accordance with the City Charter.

The demand (seven day average daily demand) and available supply (total production available for delivery within 24 hours notice) are posted on the City's website (Water Use Report).

Stage One Water Watch (Voluntary)
The City of Goodyear invokes voluntary reductions for all users except the City. The City will make mandated reductions. Stage one may be triggered when demand reaches 90% of supply or is expected to do so for the next seven days. Restrictions will be used to reduce demand by 5%.

Stage Two Water Alert
The City invokes mandatory restrictions for all users. Stage Two may be triggered when demand reaches 95% of supply, is anticipated to do so for the next seven days or if Stage One lasts for fourteen days. Restrictions will be used to reduce demand by 10%.

Stage Three Water Warning
More stringent reductions than in Stage Two apply to all users except when non-potable water is used. Stage Three may be triggered when demand exceeds supply or Stage Two has been in effect for 14 days. Restrictions will be used to reduce demand by 15%.

Stage Four Water Emergency
The City invokes the most severe restrictions and may take additional action to address severe disruptions of distribution, storage, or supplies. Restrictions will be used to reduce demand to 5% below supply throughout the duration of the curtailment or drought.

Water Use Restriction by User Category

Exemptions

- Uses to maintain health, welfare and safety of water customers of the City of Goodyear
- Hospitals, medical offices, and clinics
- Sanitation trucks and trucks used to carry food or perishables are exempt from vehicle washing restrictions
- Immediate fire, hazardous waste, or sanitation hazards
- Construction of projects essential to maintain health, safety and welfare of the public
- Users of reclaimed, remediated or other non-potable sources of water

City of Goodyear

Stage One Water Watch

- Outdoor water use is restricted to every other day on even/odd day depending on address.
- Outdoor watering permitted only 8 pm -6 am.
- City irrigation to irrigate 75% of base ET, Goodyear Ball Park exempt.
- Vehicle washing only with damcel or at automatic carwashes with recycling or re-circulating water.
- No washing of sidewalks, driveways, or parking lots except for dust control.
- No street sweeping with potable water.
- Fountains will be shut off unless used for indoor cooling. Must be posted.
- Outdoor misting is prohibited.
- No fall overseeding except at Goodyear Ball Park and Goodyear Sports Complex.
- Pools must be back-washed to landscaping or to a water truck for reuse.
- No trench compaction via water consolidation.

Stage Two Water Alert

All Stage One restrictions apply plus:

- Outdoor water use is restricted to every 3 days.
- City irrigation to irrigate 60% of base ET, except for Goodyear Ball Park.
- No fall overseeding except at Goodyear Ball Park.

Stage Three Water Warning

All Stage Two restrictions apply plus:

- Outdoor water use restricted to Sun. and Thurs.
- No fall overseeding.
- City irrigation to irrigate 60% of base ET.
- No filling or refilling of pools or artificial lakes.
- Drought surcharge may be implemented.
- Line flushing to water trucks or landscape if feasible.
- Construction water use limited and only on approval of Water Resource Director.
- City will reduce reverse osmosis use to Council approved levels.

Stage Four Water Emergency

All Stage Three restrictions apply plus:

- City irrigation to irrigate 50% of base ET.
- Vehicle washing may be restricted to use only recycled water.
- Line flushing may be rescheduled or to water trucks or landscape.

Stage Four Water Emergency City of Goodyear, cont.

- All washing of City vehicles not required for sanitation may be prohibited.
- Permits for all new City construction may be withheld.
- Water demand may be further reduced by methods determined by City Manager.

Residential

Stage One Water Watch (Voluntary)

- Outdoor water use is restricted to every other day on even/odd day depending on address.
- Outdoor watering permitted only 8 pm-6 am.
- Vehicle washing only at automatic carwashes with recycling or re-circulating water .
- Fountains will be shut off unless used for indoor cooling. Must be posted.
- Outdoor misting is prohibited.
- No fall overseeding.
- Pools must be backwashed to landscaping or to a water truck for reuse.

Stage Two Water Alert

All voluntary restrictions in Stage One are now mandatory.

- Outdoor water use is restricted to every other day on even/odd day depending on address.
- Outdoor watering permitted only 8 pm-6 am.
- Vehicle washing only at automatic carwashes with recycling or re-circulating water or.
- Fountains will be shut off unless used for indoor cooling. Must be posted.
- Outdoor misting is prohibited.
- No fall overseeding.
- Pools must be backwashed to landscaping or to a water truck for reuse.

Stage Three Water Warning

All Stage Two restrictions continue to apply plus:

- Outdoor water use restricted to Sat. and Wed.
- New home building may be curtailed.
- Drought surcharge may be implemented.
- May not fill or refill pools or artificial lakes.
- Construction water use limited and only on approval of Water Resource Director.
- Residents asked to voluntarily turn off reverse osmosis and water softeners.

Stage Four Water Emergency

All Stage Three restrictions, continue to apply, plus:

- Water demand may be further reduced by methods determined by City Manager.
- All washing of vehicles, except for commercial car washes that use recycled water, is prohibited.

Stage Four Water Emergency Residential, cont..

- Outdoor watering may be restricted to once a week on assigned days.
- Permits for new residential construction may be withheld.
- Permits for occupancy may be withheld.
- Water service may be halted intermittently within sections of the service area.

Commercial and Industrial

Stage One Water Watch (Voluntary)

- Outdoor water use is restricted to even/odd day schedule.
- Outdoor watering permitted only 8 pm -6 am.
- Vehicle washing only at automatic carwashes with recycling or re-circulating water.
- No washing of sidewalks, driveways, or parking lots except for sanitation and dust control.
- Fountains will be shut off unless used for indoor cooling. Must be posted.
- Outdoor misting is prohibited.
- No fall overseeding.
- Pools must be backwashed to landscaping or to a water truck for reuse.
- No trench compaction via water consolidation.
- Restaurants serve water only upon request.
- Hotels launder linens daily only upon request.

Stage Two Water Alert

All Stage One measures are now mandatory.

- Outdoor water use is restricted to even/odd day schedule.
- Outdoor watering permitted only 8 pm -6 am.
- Vehicle washing only at automatic carwashes with recycling or re-circulating water.
- No washing of sidewalks, driveways, or parking lots except for sanitation and dust control.
- Fountains will be shut off unless used for indoor cooling. Must be posted.
- Outdoor misting is prohibited.
- No fall overseeding.
- Pools must be backwashed to landscaping or to a water truck for reuse.
- No trench compaction via water consolidation.
- Restaurants serve water only upon request.
- Hotels launder linens daily only upon request.

Stage Three Water Warning

All Stage Two measures continue to apply plus:

- Outdoor water use restricted to Mon. and Thurs.
- No construction permits issued for high water users.

Stage Three Water Warning Commercial and Industrial, cont.

- Construction meters restricted to only one meter given out for every two taken in.
- Drought surcharge may be implemented.
- May not fill or refill pools or artificial lakes.
- Construction water use limited and only on approval of Water Resource Director.

Stage Four Water Emergency

All Stage Three measures continue to apply plus:

- Outdoor watering may be reduced to once a week on assigned days.
- All washing of vehicles, except commercial car washes that recycle water, is prohibited.
- Permits for new construction may be withheld.
- Permits for occupancy may be withheld.
- Water service may be halted intermittently within sections of the service area.
- Businesses or institutions may be required to halt operations to reduce demand.
- Water demand may be further reduced by methods determined by City Manager.

Implementation of Plan and Restrictions

The Conservation and Curtailment Ordinance will authorize the City Manager to request that the Water Resources Director or the City Manager's designee update the Plan as needed.

The Curtailment Plan may be initially implemented at any stage, depending on the shortage level. The Water Resources Director or the City Manager's designee will provide information to the City Manager and Mayor and Council on water supplies in the event that shortages appear likely. The City Manager may declare Stage One, Two, Three, or Four as demand reaches the level specified for each stage. Mayor and Council shall be advised of proposed mandatory restrictions during a Stage Four Water Emergency at their next regular meeting.

The City Manager may terminate the Curtailment of any Stage upon learning that the water shortage no longer exists from the Water Resources Director or the City Manager's designee. Applicable federal, state, and local laws will be followed by the City during the implementation of mandatory water restrictions.

Enforcement and Penalties

The City will enforce the mandatory restrictions of each stage of the Curtailment Plan in all parts of the service area that lie within the City. When a report of a violation is investigated or a City Code Enforcement, Water Conservation, or staff designated by the City Manager observes a violation, an educational notice will be handed to the resident or business operator or left at the address. If the violation is not corrected in a timely manner, defined in proportion to the severity of the shortage, enforcement will move to the next step.

Violations of Stage One, Two, and Three restrictions will be treated as civil code violations, as laid out in the current Waste of Water Ordinance (14-7-8). After a warning notice is given on the second report, the City will issue a citation. Each day a violation is not corrected will be treated as a separate violation.

Second and succeeding violations of Stage Four restrictions will be treated as possible misdemeanors as defined in the current Unauthorized Use of Water Ordinance (14-7-6). Each day may be charged separately.

Conclusion

The Curtailment Plan provides an orderly, rapid means for the City to reduce water demand when shortages require prompt action. Publicizing the Curtailment Plan and its trigger levels to build advance awareness will be essential to obtain quick, full cooperation from affected water users. The Curtailment Plan is not a substitute for conservation to expand supplies. Instead it protects supplies and residents from life-threatening situations when water supplies are disrupted.

References

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LPSCo, 2008, Monthly Water Use by City of Goodyear Reports per Meter, July, 2005- June, 2008, Litchfield Park, AZ.

Red Oak Consulting, 2007, City of Goodyear Water Resources Department Cost of Service Study - Phase II , December 2007, Denver, CO.