

## **9. Environmental Conditions**

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## 9. Environmental Conditions

### 9.0 Introduction

Preserving air and water quality as well as protecting natural resources are important features in maintaining the City of Goodyear's quality of life. Goodyear covers a diverse geographic area which consists of unique physical features. Included in the Environmental Element are geographical issues that are unique to Goodyear.

### 9.1 Slope

The slope in the planning area of Goodyear is less than three percent, and does not pose any significant constraints or associated costs on development. The relatively flat surface within the Goodyear planning area allows for buildings of various types and general construction. The Sierra Estrella Mountains are an exception, with their rocky slopes and foothills, which have the potential to increase costs and considerations associated with development. These conditions are unchanged from the Goodyear General Plan 2003 – 2013, and also apply to the recently annexed area in the southern portion of the City.

### 9.2 Drainage

The natural drainage in Goodyear is relatively the same as described in the Goodyear General Plan 2003 – 2013. The two rivers that are a major portion of the drainage system are the Gila and Agua Fria River. Both of these rivers typically have no flow except during periods of high seasonal runoff, or when it is required to release water from the dams and diversion structures due to a lack of upstream storage capacity. Historically, the flows of the rivers were from upper watershed runoff and snowmelt. The addition of dams and diversion structures upstream of the planning area now provide irrigation water and flood protection, controlling the natural flows.

The Agua Fria watershed is approximately 2,340 square miles and drains the region to the north and west of the City, including the White Tank Mountains. The Agua Fria River intersects with the Gila River approximately at the Litchfield Road alignment. The Waddell Dam, completed in 1993, controls 1,459 square miles of the upper Agua Fria River and contains most of the runoff generated upstream of the dam, thus reducing the volume and peak flood flows in the river. New River is located outside of Goodyear, but contributes to the Agua Fria. South of the Agua Fria/New River confluence, which is located north of the

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planning area, flooding is primarily due to the flows of the New River and localized stormwater runoff. Additionally, there are localized areas of surface water that contribute to the river due to irrigation practices and discharges from wastewater treatment plants. The current 100-year stormwater runoff at the Agua Fria/Gila River confluence is estimated to be 48,200 cubic feet per second (cfs).

The Gila River's upstream contributing watershed area is approximately 39,700 square miles, which includes the Salt and Verde Rivers as tributaries. The largest storage facility in this system is Roosevelt Dam, which controls 5,800 square miles of the Salt River. However, the Gila River will still cause significant flood flows. The largest historical documented flood event occurred in 1891 and the stormwater flows were estimated to be in excess of 275,000 cfs, clearly illustrating the magnitude of its drainage shed function.

In the north and central regions of the planning area, Bullard and Cotton Lane Washes intercept a majority of the flows from the White Tank Mountains and convey these flows southerly toward the Gila River.

In the southern portion of Goodyear, three major washes (Corgett, Lum, and Waterman) and numerous smaller washes transport surface water northwest from the Estrella Mountains to the Gila River.

The Flood Control District of Maricopa County has developed the Loop 303 Corridor/White Tanks Area Drainage Master Plan and the El Rio Water Course Master Plan which identify floodplains and flood hazards, and respectively provide a stormwater management plan and flood control management alternatives. The Loop 303 Corridor/White Tanks Area Drainage Master Plan covers the proposed SR-303L corridor which runs approximately north of Grand Avenue to the Gila River. The study identified existing drainage issues and provides regional stormwater management plans through the use of basins and channels, as shown in Map 9.2 for basin and channel locations.

The El Rio Water Course Master Plan (El Rio WMP) was created due to proposed development along the Gila River, the historic flooding events, and the increased need for health and safety measures. The recommended alternative for flood control management is a combination of the soft structural and non-structural options presented in the El Rio WMP. The project began as a restoration effort to return the Gila River to its natural state

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while accomplishing the goal of improved flood control. Currently, the river is choked with salt cedar trees and has become a dumping place for trash, abandoned automobiles and appliances. With effort, the river could not only become beautiful and safe again, but also become a recreational corridor that brings high-end economic development to West Valley communities. The El Rio WMP covers the 17.5 mile reach of the Gila River from the confluence of the Agua Fria River west to the SR-85 Bridge.

According to the General Plan, there are several identified 100-year flood hazard areas within the planning areas, as regulated by the Federal Emergency Management Agency (FEMA). These hazard areas within the planning area have greater than a one percent change of flooding in any given year. FEMA is currently updating this information, and so the above mentioned condition is subject to change.

### 9.3 Soils

As stated in the General Plan for Goodyear, soil properties can play a major role in development options, impacting land uses and associated development costs. The United States Department of Agriculture group soils into “associations” based upon degrees of soil pattern uniformity and the extent of dominant soils in a given area. Association names reflect the dominant soils, and are connected by a hyphen. Two main development considerations to be made for soil composition are the effects on erosion and drainage rates.

The soil associations identified in the planning area include: Laveen-Coolidge, Gilman-Estrella-Avondale, Rillito-Gunsight-Perryville, and Cherioni-Rock Outcrop. The Rillito-Gunsight-Perryville soil association is located primarily south of the Estrella Mountains and foothills. Gravelly loams and loams are the main soil types of this association. Major characteristics of this soil are high levels of lime and moderate permeability. All three dominant soils pose only slight threats to the development of dwellings without basements and local streets and roads, although Perryville notes moderate limitations for local roads and streets.

Laveen-Coolidge soils are primarily located north of the Gila River. The soils are characterized by sandy loams, loams, and clay loams on alluvial plains, generally located two to five miles from the mountains. Laveen soils pose slight limitations on dwellings

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without basements and moderate limitations for local streets and roads. Coolidge soils pose slight limitations on both dwellings without basements and local streets and roads. Additionally, Laveen-Coolidge soils are suitable for irrigated crops, range, recreation, and wildlife.

Gilman-Estrella-Avondale soils are characterized by loams and clay loams. Gilman soils have moderate permeability with slow runoff, posing slight limitations on dwellings without basements and moderate limitations on local streets and roads. Estrella soils have moderate permeability. They also demonstrate levels of alkaline ranging from strong to very strong and saline levels from slight to strong which could impact agricultural use. Estrella soils pose moderate limitations to local streets and roads and moderate shrink-swell limitations to dwellings without basements. Shrink-swell refers to the expansion or contraction of the soil as moisture is added or removed. Avondale soils have moderate to moderately slow permeability resulting in slow runoff. These soils contain moderate levels of alkaline, which could impact agricultural use.

The soil association Cherioni-Rock Outcrop is a characteristic of the Estrella Mountains and foothills. Primary soil characteristics include gravelly loam and rock. Six inches of topsoil covering hardpan and andesite bedrock typify Cherioni soils while Rock Outcrop is exposed bedrock. These soils are suitable for recreation, wildlife habitat, and range. Cherioni soils pose severe limitations to both dwellings without basements and local streets and roads.

Soil concerns regarding vegetation on the banks of the Gila River were identified in the El Rio Watercourse Master Plan. Salinity and potential soil contamination are the two primary concerns, especially when considering the establishment and maintenance of native riparian and wetland plant species in the El Rio reach of the Gila River. Site specific soil data is lacking in the project area, but the vegetation type and the appearance of salt deposits on the soil surface indicate that soil salinity increases in the direction of river flow. The dominance of salt tolerant vegetation suggests that existing soil conditions in the El Rio project area have elevated salinity. Native riparian species such as cottonwood and willow have lower salt tolerance than salt cedar and many other species.

### 9.4 Geological Hazards

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The most significant geological hazards present within the Goodyear planning area are flooding, expansive and collapsing soils, and earth fissures.

### 9.4.1 Flooding

The Gila and Agua Fria Rivers both pose a potential flooding hazard, along with the multiple washes located in Goodyear. As described previously, the Flood Control District of Maricopa County has multiple plans and studies that identify areas at risk. Additionally, the District has stormwater management and flood control plans for these areas.

### 9.4.2 Expansive and Collapsing Soils

Also referred to as shirk-swell, expansive and collapsing soils pose a hazard to developments since a significant portion of the soil in the Goodyear planning area's Estrella is associated with this phenomena. According to the Arizona Geological Survey, expansive soils contain clays that are capable of large volume changes in the face of changing water conditions. The resulting changes in soil volume can cause considerable damages to homes, sidewalks, pipelines, and streets. Expansive soils can be recognized by common visual and tactile indicators including: desiccation cracks; popcorn soil texture, soil that is sticky when wet, and by cracked foundations and warped roads.

Collapsing soils consist of loose, dry, low-density material that shrinks in volume when wet, and/or when loaded with substantial weight, such as a building or street. These types of soils are particularly common in the semi-arid southwestern US where wind and ephemeral streams deposit loose, unconsolidated, and dry sediments that are prone to sudden collapse.

### 9.4.3 Earth Fissures

As described by the Arizona Geological Survey, earth fissures are associated with basin subsidence that accompanies extensive ground water mining. During torrential rains they erode rapidly, presenting a substantial hazard to people and infrastructure. Moreover, fissures provide a ready conduit to deliver runoff and contaminated waters to basin aquifers. Rapid population growth in southern Arizona is increasingly juxtaposing population centers and fissures.

## 9.5 Vegetation

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The Goodyear planning area contains vegetation characteristic of desert habitats. There is also vegetation that has been introduced into the area which is not native to the location, yet is intended to meet visual aesthetic and/or agricultural needs. According to the Active Management Area as determined by the Arizona Department of Water Resources, the natural vegetation of Goodyear corresponds with that of the Sonoran Desert Ecoregion. This area contains flora within the biotic communities of the Lower Colorado River Valley and the Arizona Uplands Sonoran desertscrub. Natural vegetation of the planning area within Goodyear largely consists of creosotebush, bursage, cactus, weeds and grasses, mesquite and palo verde trees. Riparian vegetation along the Gila River also contributes a variety of vegetation such as tamarisk, cottonwood-willow, and mesquite. It is important for developers within the City of Goodyear to consider conservation and use of native vegetation to engage in efficient landscaping measures, and to ensure a stable environment is established for current plant communities.

### 9.5 Wildlife

Goodyear is located within the Sonoran Desert which supports an assortment of desert animals. Some of the more prominent animals include the coyote, javelina, bobcat, gray fox, and jackrabbit, along with birds such as owls, roadrunners, falcons and eagles. According to the United States Fish and Wildlife Service (USFWS), there are 15 species of animals that are classified as either threatened, endangered, or as a candidate for endangerment species list within Maricopa County. These species are listed in Table 9.1.

**Table 9.1.1: Maricopa County: Threatened & Endangered Species**

Common Name	Scientific Name	Status	Description	Habitat
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<b>California Least Tern</b>	<i>Sterna antillarum browni</i>	Endangered	Smallest of the North American terns. Body length is 8-9 inches with a wingspan of 18-20 inches. Has black crown and loreal stripe on head, snowy white forehead and underside, and gray upperparts. Outer two primaries black, yellow or grey	Open, bare or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems.
<b>Desert pupfish</b>	<i>Cyprinodon macularius</i>	Endangered	Small (2 inches) smoothly rounded body shape with narrow vertical bars on the sides. Breeding males blue on head and sides with yellow on tail. Females and juveniles tan to olive colored back and silvery sides.	Shallow springs, small streams, and marshes. Tolerates saline and warm water.
<b>Gila topminnow</b>	<i>Poeciliopsis occidentalis occidentalis</i>	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Small streams, springs, and cienegas vegetated shallows.

Source: U.S. Fish and Wildlife Service January 19, 2012

**Table 9.1.2 (cont.): Maricopa County: Threatened & Endangered Species**

Common Name	Scientific Name	Status	Description	Habitat
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**9. Environmental Conditions**

<b>Lesser long-nosed bat</b>	<i>Leptonycteris curasoae yerbabuena</i>	Endangered	Elongated muzzle, small leaf nose, and long tongue. Yellowish brown or gray above and cinnamon brown below. Tail minute and appears to be lacking. Easily disturbed.	Desert scrub habitat with agave and columnar cacti present as food plants.
<b>Mexican spotted owl</b>	<i>Strix occidentalis lucida</i>	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Nests in canyons and dense forests with multilayered foliage structure.
<b>Razorback sucker</b>	<i>Xyrauchen texanus</i>	Endangered	Large, up to 3 feet long and up to 6 lbs, high sharp-edged keel-like hump behind the head. Head flattened on top. Olive-brown above to yellowish below.	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.
<b>Sonoran pronghorn</b>	<i>Antilocapra americana sonoriensis</i>	Endangered	Upperparts tan; under parts, rump, and two bands across the neck are white. Male has two black cheek pouches. Hoofed with slightly curved black horns having a single prong. Smallest and palest of the pronghorn subspecies	Broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.

Source: U.S. Fish and Wildlife Service January 19, 2012

**Table 9.1.3 (cont.): Maricopa County: Threatened & Endangered Species**

Common Name	Scientific Name	Status	Description	Habitat
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**9. Environmental Conditions**

<b>Southwestern willow flycatcher</b>	<i>Empidonax traillii extimus</i>	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wing bars visible. Eye-ring faint or absent	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.
<b>Woundfin</b>	<i>Plagopterus argentissimus</i>	Endangered	Small (4 inches) silver minnow with fairly large fins and a sharp dorsal fin spine.	Inhabits shallow, warm, turbid, fast-flowing water. Tolerates high salinity.
<b>Yuma clapper rail</b>	<i>Rallus longirostris yumanensis</i>	Endangered	Water bird with long legs and short tail. Long, slender de-curved bill. Mottled brown or gray on its rump. Flanks and undersides are dark gray with narrow vertical stripes producing a barring effect.	Fresh water and brackish marshes.

Source: U.S. Fish and Wildlife Service January 19, 2012

**Table 9.1.4 (cont.): Maricopa County: Threatened & Endangered Species**

Common Name	Scientific Name	Status	Description	Habitat
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<p><b>Desert tortoise Sonoran population</b></p>	<p>Gopherus agassizii</p>	<p>Candidate</p>	<p>Large herbivorous reptile with domed shell and round stumpy hind legs. The carapace is a dull brown or grey color and the plastron is unhinged, often pale yellow in coloration.</p>	<p>Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran deserts scrub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.</p>
<p><b>Roundtail chub</b></p>	<p>Gila robusta</p>	<p>Candidate</p>	<p>Member of the minnow family Cyprinidae and characterized by streamlined body shape. Color usually olive gray with silvery sides and a white belly. Breeding males develop red or orange coloration on the lower half of the cheeks and on the bases of paired feet.</p>	<p>Cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams.</p>

Source: U.S. Fish and Wildlife Service January 19, 2012

**Table 9.1.5 (cont.): Maricopa County: Threatened & Endangered Species**

Common Name	Scientific Name	Status	Description	Habitat
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<p><b>Sprague's pipit</b></p>	<p><i>Anthus spragueii</i></p>	<p>Candidate</p>	<p>Small, sparrow-sized bird (10-15 cm in length), with buff and blackish streaking on the crown, nape, and under-parts. Has a short bill with a blackish upper mandible, a buffy face with a large eye ring, white outer tail feathers and pale to yellowish legs.</p>	<p>Strong preference to native grasslands with vegetation of intermediate height and lacking woody shrubs.</p>
<p><b>Tucson shovel nosed snake</b></p>	<p><i>Chionactis occipitalis klauberi</i></p>	<p>Candidate</p>	<p>Small snake (10-17 inches total length) in the family Colubridae, with a shovelshaped snout and an inset lower jaw. Overall coloring mimics coral snakes, with pale yellow to cream-colored body, 21 or more black or brown saddle-like bands across the back.</p>	<p>Sonoran Desertscrub; associated with soft, sandy soils having sparse gravel.</p>
<p><b>Yellow-billed cuckoo</b></p>	<p><i>Coccyzus americanus</i></p>	<p>Candidate</p>	<p>Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill that is blue-black with yellow on the lower half. Plumage is grayish-brown above and white below, with rufous primary flight feathers.</p>	<p>Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).</p>

Source: U.S. Fish and Wildlife Service January 19, 2012

### 9.7 Wildlife Linkages

The Arizona Game and Fish Department (AGFD), Arizona Department of Transportation, and various private and public entities have identified individual habitat

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linkages specific to the area within the state of Arizona. These linkages were determined in order to assist with conservation and planning efforts and identify habitat blocks, fracture zones, potential linkage zones, and riparian habitats.

The purpose of identifying these linkages is to evaluate the trans-roadway movement patterns of animals. The data collected for each linkage can be used to plan for placement of wildlife crossing structures in an attempt to reduce the fragmentation and degradation of natural wildlife movement.

There are two wildlife linkages that fall within the Goodyear planning area as well as the Sonoran Desert Ecoregion; Linkage 74: North Maricopa Mountains – Sierra Estrella Mountains and Linkage 151: Gila River/Salt River Corridor Granite Reef Dam – Gillespie Dam.

Linkage 74 is located within Maricopa County. The biotic community identified with this linkage is the Lower Colorado River Sonoran Desertscrub. The identified species of this linkage include the Arizona chuckwalla, banded gila monster, bighorn sheep, bobcat, javelina, mountain lion, and the Sonoran Desert tortoise, among others. The water sources identified for preservation include Waterman Wash and West Prong Waterman Wash. Threats to this linkage include agriculture, border security, Rainbow Valley Highway, and urbanization.

Linkage 151 is also located within Maricopa County. The biotic communities associated with this linkage are the Arizona Upland Sonoran Desertscrub and the Lower Colorado River Sonoran Desertscrub. The identified species of this linkage include the Arizona chuckwalla, bald eagle, cactus ferruginous pygmy-owl, desert pupfish (classified as endangered), western yellow bat and the Yuma clapper rail (classified as endangered), among others. There are many water sources that fall within this linkage including the Buckeye Canal, Central Arizona Project Canal, Gila River, and the Granite Reef Dam. Threats to this area include canals, Granite Reef Dam, highways (I-10, SR 85, and SR 101), railroad, and urbanization.

### 9.8 Water Quality

The City water supply is one hundred percent groundwater that is controlled and accumulated in storage operating systems. The water quality meets all Federal and State

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water regulatory requirements. In 2010, the City's tap water was in compliance with the EPA's and the State of Arizona's drinking water health standards.

Potential water quality issues in the City water supply include total dissolved solids (TDS), hard water (specifically salinity, calcium, and magnesium), and inorganic chemicals (specifically nitrate and arsenic). These compounds have the potential to negatively affect customers' water quality.

High levels of TDS concentration impact all consumers in a negative way. Dissolved solids are any minerals, salts, metals, cations or anions dissolved in water. The City's groundwater resources before the cleaning process takes place contain TDS levels in the range of 2,000 – 3,000 parts per million (ppm), exceeding the EPA recommended 500 ppm standard for potable water. When cleaned, Goodyear's current water supply provides 700 ppm TDS levels. TDS, calcium, and magnesium present several challenges to customers such as: limiting soap's effectiveness, leaving calcium deposits on home appliances (i.e. sinks, faucets, showerheads, evaporative coolers, as well as on the inside of pipes, hot water heaters, and automatic dishwashers), and limiting appliances life span.

An additional contributor is salinity. High levels of salinity have the ability to reduce crop yields, limit the variety of crops to be farmed, kill trees, and make land unsuitable for agricultural purposes. In the industrial setting, high levels of salinity can produce corrosion, scale, and poor steam quality as well as increase the need for chemicals used in water treatment.

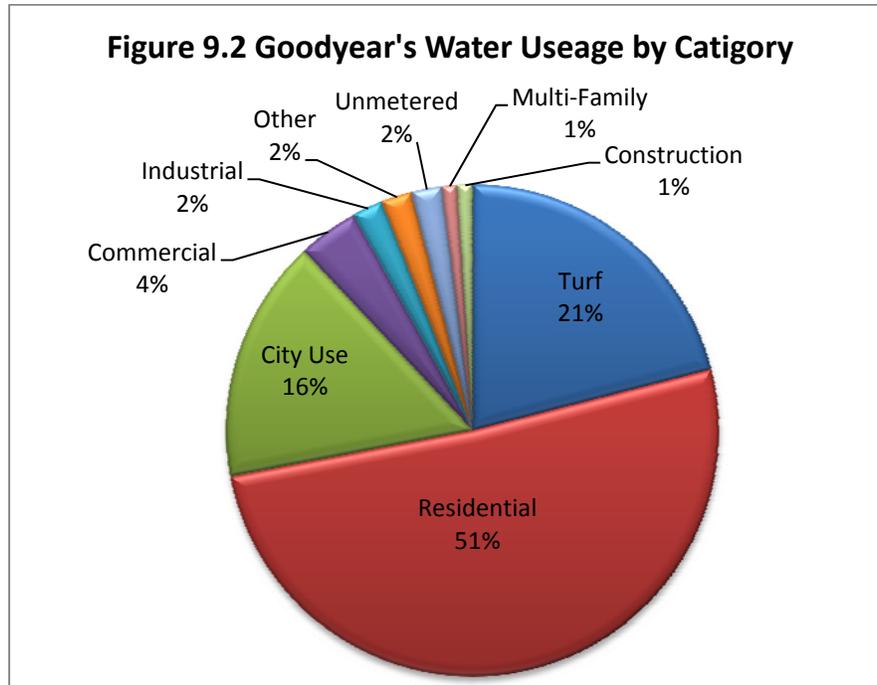
According to the 2010 Water Sampling Result completed by the City of Goodyear, nitrate and arsenic levels were in compliance with the EPA regulation standard of 10.0 maximum contaminant level (MCL). Nitrate readings were at 10.1 MCL maintaining and arsenic levels were at 9.4, demonstrating both inorganic chemicals compliance. This reading shows that nitrate levels fall above the recommended reading; however the appropriate levels for compliance allow readings to slightly exceed the maximum amount.

### 9.9 Water Supply and Demand

In 2007, the City delivered 2.57 billion gallons of water. Single-family residences consumed fifty-one percent of the City-delivered water; turf and irrigation were second in use with 21 percent of City water. The third highest water user is the City, consuming 16

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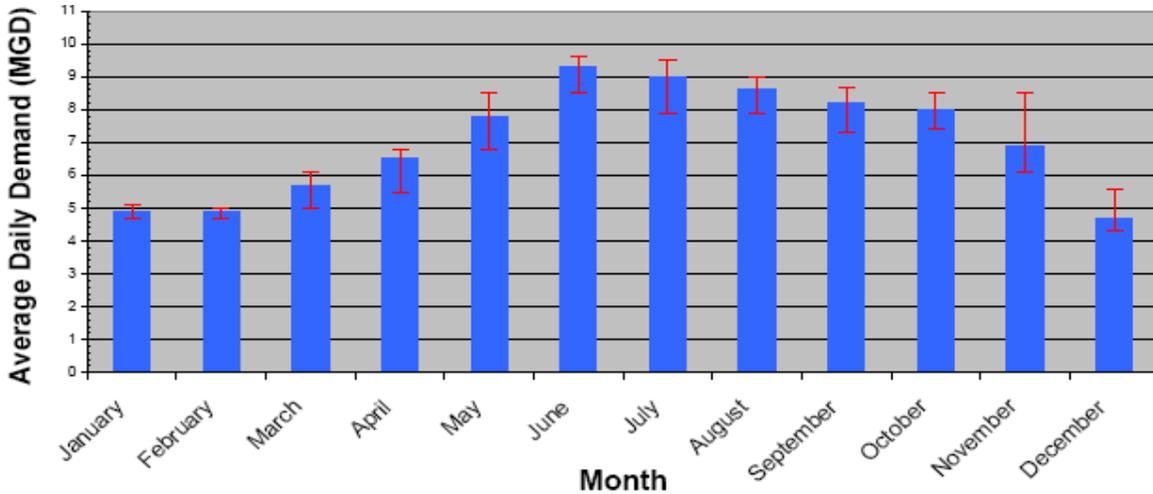
percent of total water. Studies regularly demonstrate that Arizona residences use 50 to 70 percent of their water consumption to irrigate landscapes and maintain pools. The City estimates 47 to 57 percent of all water delivered to the City's service jurisdiction is utilized outdoors. Non-residential users of all types collectively used less than three-hundred million gallons.



Due to outdoor landscaping during the summer, water demand is not evenly distributed throughout the year. According to the 2007 Monthly Variation in Average Daily Demand, water consumption begins to increase in the month of March and high use continues until November. Water utilization decreases by almost half during winter months. (See Figure 9.3)

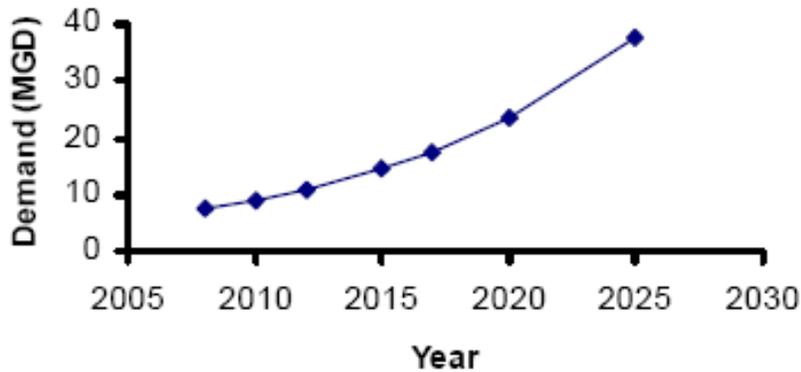
**Figure 9.3 2007 Monthly Variation in Average Daily Demand**

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The 2007 Integrated Water Master Plan (IWMP) prepared by Black & Veatch, projects the City will need 92.2 million gallons per day to serve its residents, assuming today's usage patterns persist. (See Figure 9.4) In 2007, the City used 7.0 million gallons per day to serve just 34,300 people. With the Average Daily Usage remaining at current levels, total demand will exceed 23 MGD (millions of gallons per day) by 2020.

**Figure 9.4 Average Daily Water Demand Projection**



*\*Assumes 10% annual population increase*

### 9.6.2 Water Conservation

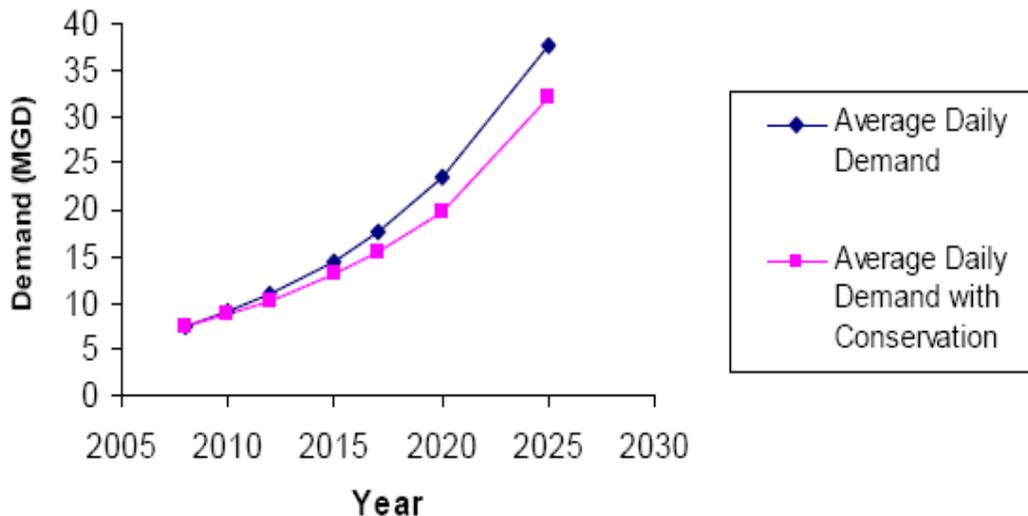
The City of Goodyear has implemented two water conservation methods. These methods will prevent annual water increases, per capita demand, and extend the time to establish significant water resource expansion. This mixture of conservation methods has created five cornerstone goals for the conservation program. First, the City will lead water

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conservation by example. Second, build customer commitment to improve efficiency in all use of water, especially potable water. Third, assure water conservation program is fiscally sound. Fourth, assess water conservation technologies and recommend appropriate usage. Finally, create financial incentives that accelerate adoption of water conserving practices and technology.

Currently, the City has placed two main targets to reduce per capita water demand; first, to reduce the daily water peak demand, above the annual average, by five percent. Second, by 2015 the City projects to reduce daily per capita demand by ten percent (to 196.2). By implementing these targets, it is estimated water usage will reduce from 218 to 196.3 gallons per capita daily by 2015. This practice will approximately save 1.75 billion gallons of water. The City is projected to save an additional 4.6 billion gallons between 2015 and 2020 by reducing the per capita daily water demand to 185 gallons (See Figure 9.5).

**Figure 9.5 Effect of Conservation on Demand 2008 - 2020**



### 9.10 Air Quality

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Air pollution in the City of Goodyear consists of two major components: criteria pollutants and particulate matter. The EPA and the Clean Air Act of 1977 (CAA) specifically require the measurement of criteria pollutants and particulate matter in all urbanized areas. Criteria pollutants include: ozone (O<sub>3</sub>), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur dioxides (SO<sub>2</sub>), and lead (Pb). Particulate matter (PM) is a mixture of air born particle consisting of nitrates, sulfates, organic chemicals, metals, soil, and dust, which directly impact human health. Particulate matter is categorized by particle size; inhalable coarse particles larger than 2.5 microns but smaller than 10 microns are classified as PM<sub>10</sub>, and fine particles (including smoke and haze) which are smaller than 2.5 microns are classified as PM 2.5.

Emission sources are classified as major sources if the resulting output exceeds 100 tons per year for any single criteria pollutant, 10 tons per year of any single hazardous pollutant, or 25 tons per year of any combined hazardous pollutants. The principal sources of pollutants in Maricopa County include industrial facilities, landfills, mineral processing plants, and the manufacturing and use of volatile organic compounds in industrial processes. The most common minor sources of pollutants are rock processing, concrete manufacturing, and asphalt production. Particulate generated from agricultural sources is exempted from the air quality regulations.

The majority of pollutants are related to vehicle use either from direct emissions or particulates disturbed by vehicles on the roadway. The strategies for reducing vehicular emissions center on reducing vehicle miles traveled (VMT's). This can be achieved by: decreasing the numbers of single occupant vehicles, increasing transit options, adjusting times of peak vehicle use, encouraging telecommuting, and modifying planning to allow more opportunities for work centers to be closer to residential areas. Other tactics for pollution reduction include: sharply curtailing the use of off-road vehicles, greater levels of street cleaning to reduce particulate matter, reduction in the miles of unpaved roads, and better control and management of disturbed land areas which are susceptible to extreme wind events. Of particular interest will be controlling particulate in the Sonoran Valley area, which is characterized by miles of unpaved roads.

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The State of Arizona and Maricopa County are required to regularly measure for compliance with national standards in order to qualify for Federal Highway Funding. The Maricopa County Environmental Services Department has implemented a testing program for air quality sensors which take hourly measurements on a county-wide basis. Currently, Maricopa County is not in compliance with the guidelines set forth by the EPA and is designated as a non-attainment area for CO, O<sub>3</sub>, and PM<sub>10</sub>. The Federal Highway Administration has threatened to hold future road monies until the area comes into compliance. Maricopa County has filed an appeal challenging the ruling, citing that the measurements were based on a series of naturally occurring “extreme events,” days on which dust storms related to monsoon conditions caused the PM<sub>10</sub> readings to exceed the allowable limits. While there are currently no monitoring stations located within the planning area of the City of Goodyear, there are nearby stations at 61<sup>st</sup> Avenue and Encanto Boulevard., Rheems Road and Grand Avenue.

### 9.11 Hazardous Waste

The EPA defines hazardous waste as waste that is dangerous or potentially harmful to people’s health or the environment. The presence of hazardous materials (waste) can have negative impacts on development and projects within the Goodyear planning area. There are fifteen potential or actual incidences of hazardous material sites within the El Rio Watercourse project area. These sites limit the flood control options for the areas because they could be a source of contamination.

In the Corridor Improvement Study for SR 303 Loop (2004), for the area between Riggs Road and MC85, incidences were identified from documents provided by the Arizona Department of Environmental Quality (ADEQ). They included the Underground Storage Tank (UST) List, Leaking Underground Storage Tank (LUST) List, and the Hazardous Materials Incident Logbook (HMIL). A full list of the 52 incidences that have been reported in Goodyear up through November 15, 2001 is available from ADEQ. The UST database shows all 100 known tanks within Goodyear and indicates if they have been permanently removed. The LUST database also shows the records for the 28 tanks known within Goodyear and indicates if they are confirmed or closed.

### 9.12 Brownfield and Superfund Sites

## 9. Environmental Conditions

In terms of potential future development and redevelopment within the City of Goodyear, one of the City's concerns is that brownfield and Superfund sites located within the planning area will impose constraints on these activities. A brownfield site is any privately owned property in which expansion, redevelopment, or reuse is complicated by the presence or potential presence of a hazardous substance, pollutant, or any other type of contaminant on the site according to the EPA.

There are currently three Superfund sites within Goodyear of which the EPA supervises the investigations and clean-up. Two sites are both associated with past operations near the Phoenix Goodyear Airport and have such been named Phoenix-Goodyear Airport North (PGA-North) and Phoenix-Goodyear Airport South (PGA-South). The City of Goodyear's Public Works Department works with the EPA and ADEQ, along with neighboring water providers and municipalities, to monitor and protect the underground water supplies near the sites and to assure that the sites are cleaned up.

The third site is located on the east edge of the airport, known as Western Avenue Plume. The State of Arizona monitors and provides protection for water supplies at this site using the Water Quality Assurance Revolving Fund (WQARF), a program administered by ADEQ. The City's Public Works Department works with ADEQ and the City of Avondale to monitor and protect the water supplies near this site, as well as clean up.

### 9.13 Energy

Energy in the City of Goodyear is an important topic of discussion, as it relates to where the energy comes from, how it is used, and how efficiency can be encouraged. The principal sources of energy utilized in the City of Goodyear are electricity, petroleum, and natural gas. From a sustainability perspective, global warming and energy use pose a real challenge to Goodyear's continued economic success in terms of land use planning, transportation practices, energy conservation, and recycling. Through policy, the City of Goodyear seeks to identify means of encouraging efficient energy usage, the development and use of renewable energy sources, and reduction of carbon emissions.

The City of Goodyear is served by Arizona Public Service (APS), utilizing electricity generated by the Pinnacle West-owned Palo Verde Nuclear Generating Station. APS also derives some of its energy portfolio from coal fired generation. Sustainable energy sources

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such as solar, wind, and geothermal power production is used on a limited basis. At this time, consensus dictates that the risks from nuclear electrical generation are less than those associated with the burning of fossil fuels.

There exists a strong network of electrical transmission lines, with substations and hubs located strategically throughout the City, to distribute electrical power for residential areas as well as for manufacturing and warehouse needs in the industrial tier. Currently, there is no concern about any negative health effects from electromagnetic radiation attributed to very high voltage transmission lines.

Energy conservation is promoted throughout the City of Goodyear, including implementing provisions from the Green Building Council, the Leadership in Energy Efficient Design (LEED), and the International Building Code Council design guides and codes for the energy efficient design of buildings and urban places. The intent of these codes is to reduce energy consumption and minimize the environmental impacts of energy usage on the community as a whole. In addition, the City of Goodyear actively promotes efforts to implement solar power generation at the individual parcel scale as well as solar hot water heating, day lighting, and solar powered street lighting and signage.

Lastly, the City of Goodyear has implemented a recycling program as a component of the citywide solid waste program in order to reduce the amount of waste entering the landfill. In addition to residential pickup of household recyclables, the City sponsors drop-off for post-consumer goods as well supporting commercial recycling of commercial and industrial materials.

### 9.14 Opportunity

The City of Goodyear is located in a climate ideally suited for utilizing alternative energy strategies. Insolation levels (solar radiation) and clear days combine to make solar generation a viable means of electrical power generation. Wind generation is another viable source of energy, as the region experiences a significant number of days with sustained wind speeds in excess of five miles per hour. The City of Goodyear has potential to utilize alternative energy practices while encouraging preservation practices to maintain the natural beauty of the region.

### 9.15 Related Policies and Plans

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Documents referenced throughout this element include: Goodyear's General Plan 2003-2013, the Loop 303 Corridor/White Tanks Area Drainage Master Plan, the El Rio Water Course Master Plan, Arizona Geological Survey, Arizona's Wildlife Linkages Assessment Document, and the 2007 Integrated Water Master Plan.

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