PAYSON GENERAL PLAN UPDATE 2014-2024

DRAFT CHAPTER IV – WATER RESOURCES ELEMENT

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Town of Payson, Arizona

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4 WATER RESOURCES ELEMENT

Utilize prudent allocation of resources to support economic development and environmental sustainability

4.1 OVERVIEW

Water Resources Vision

The Town of Payson has a wealth of natural resources including Ponderosa pines, Tonto National Forest, wildlife habitat, topography, and the Mogollon Rim. Combined, these natural resources offer Payson a beautiful quality of place that is important to protect. Through active water conservation efforts, Town of Payson maintains an abundant supply of ground water to serve demand. A clean, stable water supply is a pillar for the continued success and prosperity of the community.

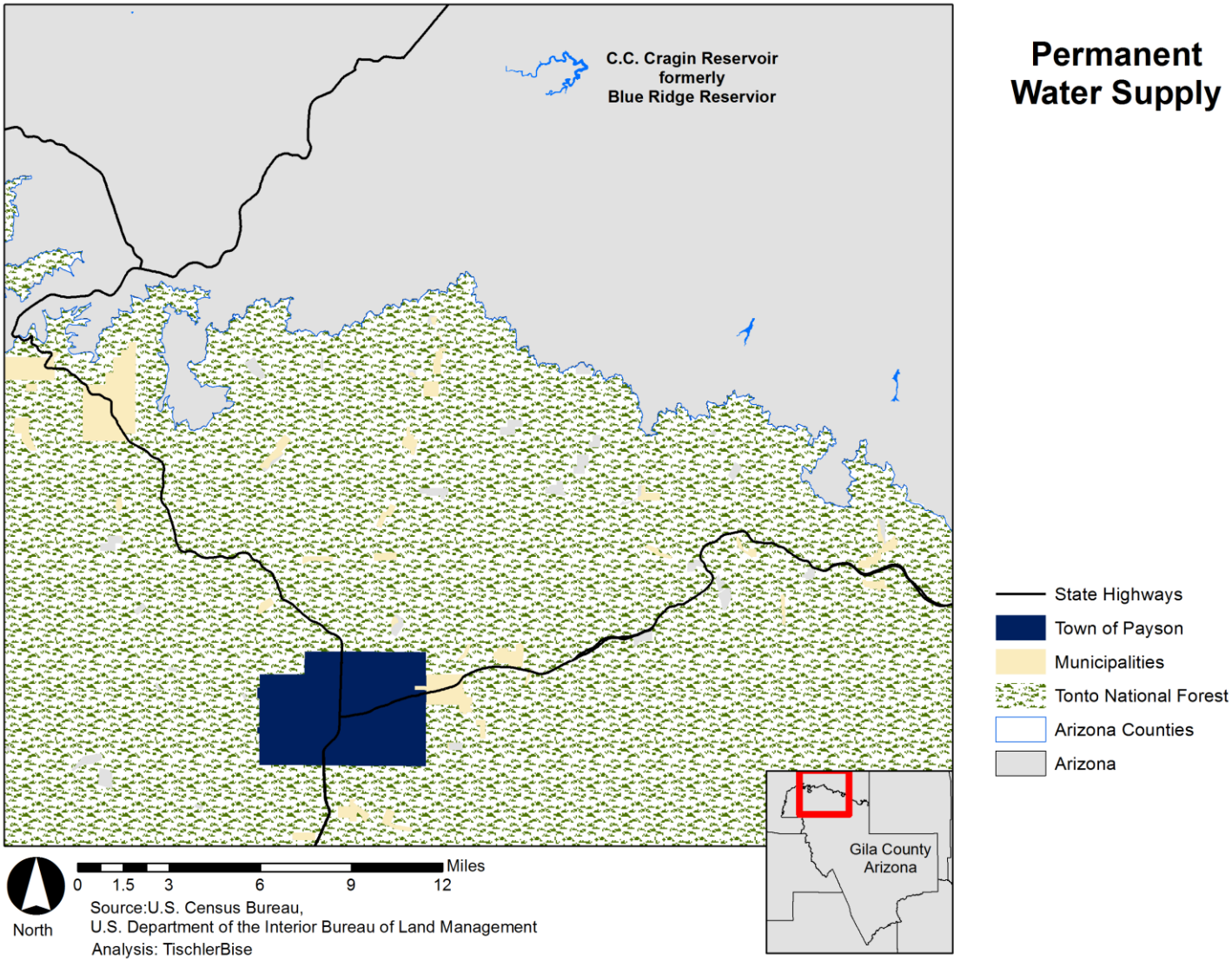
Groundwater provides adequate water to meet current demand within the incorporated municipal boundary of Payson. Groundwater supply is adequate and meets much of the local demand.

Payson proactively sought to secure a permanent water supply, to ensure an abundant resource to serve anticipated growth in demand. The Town of Payson secured a water allocation from the C.C. Cragin Reservoir as an additional and permanent water source for the Town. The reservoir, with a storage capacity of 15,000 acre-feet, is in Coconino County about 25 miles north of Payson atop the Mogollon Rim in the Coconino National Forest. See Map 5 on the next page for more detail. The Town of Payson is contracted to tap up to 3,000 acre-feet annually. To quantify this, the Payson aquifer, the Town's major groundwater source is estimated at approximately 2,681 acre-feet per year.

The Town of Payson is known for its well-managed water conservation policies, which are based on a "Safe Yield" estimate for the Town of Payson not to exceed 2,681 acre-feet per year. Water usage data for 2010 show ground water usage in the Town reached only 60 percent of "Safe Yield". Water usages in 2010 was affected by lingering economic recession impacts including commercial and residential vacancies; however, it is still well below "Safe Yield" caps, allowing for continued supply as development occurs.

The Water Resources Element is a direct compliment to the Environmental Planning Element, but is designed to explore the long-term implications of water demand. The *Goals and Strategies* of this Element will address the availability and use of surface water, groundwater, and effluent supplies. Meeting current demand and implementing measures to meet expected future demand in an environmentally sustainable manner, is the focus of this Element

Map 5: C.C. Cragin Reservoir



Existing Conditions

Groundwater

Water for the Town of Payson is supplied almost entirely from groundwater wells within the Town limits, with one well located outside the Town limits. The wells are relatively shallow at 300 to 1,000 feet below land surface in the Payson Granite, Gibson Creek Batholith (mostly diorite and gabbro), and gneissic granitoids that underlies almost the entire Town. Ground water is stored in weathered zones, in complex fracture systems and joint sets, and in fault zones. Along these structural discontinuities, in many places weathering has produced deep zones of decomposed igneous rock. This decomposed rock has greater porosity and permeability than the unaltered igneous rock, presenting opportunities for developable groundwater resources.

Surface Water

Local hydrology consists of a few small seeps and springs throughout the area. The only sizable surface water resource in Payson consists of several small artificial lakes at Green Valley Park. Precipitation averages 22 inches per year. The heaviest precipitation generally occurs during the summer monsoon season. Thunderstorms are common most afternoons between July and September, which quickly clear in the evening. Winter precipitation is most commonly snow. Payson on average experiences one to five moderate snow falls per year. Snow rarely accumulates on the ground and most snow accumulation lasts less than one day.

Floodplains

Floods are a natural occurrence, and floodplains have beneficial functions for groundwater recharge and wildlife habitat. In 1968, the National Flood Insurance Act established the National Flood Insurance Program (NFIP).In 1973, the Flood Disaster Protection Act required NFIP participation to receive some type of disaster assistance. Thus under the direction of the Federal Emergency Management Agency, Gila County regulates building in designated floodplains. All requests are examined to see if any of the affected parcel is considered in a floodplain. A site plan could place a development out of the floodplain or help establish the correct elevation requirement of the lowest floor.

Stormwater

As communities continue to build out, stormwater management grows in importance and complexity. More impervious surfaces mean less infiltration of water into the ground, higher volumes flowing through traditional floodplains, the creation of new floodways, and lost recharge of critical groundwater.

Infiltration of stormwater into sewer lines is a significant issue for the Gila County Sanitation District. Heavy rainstorm saturate the soil with much of the water seeping into buried, clay sewage pipes. This increases the amount of water running into the treatment facility. The district is planning to increase capacity to handle storm water flows of up to 12 million gallons a day, which is almost three times current peak levels. This magnitude underscores the impact development has on exacerbating stormwater levels.

Green Valley Park Water Reclamation Project

Green Valley Park is a cooperative water reclamation project between the Northern Gila County Sanitary District and the Town of Payson. This award winning park has been designed to recharge the Town's water table through passive percolation of treated effluent through the bottom of the lakes into the groundwater aquifer. The lakes also provide storage of the effluent for reuse customers throughout Town and for watering of landscaping in the park. Monitoring of water levels in wells located around the edges of the Park allows the Town to assess the effectiveness of the recharge process. Approximately 300,000 gal/day are passively recharged to the Payson granite aquifer via the Green Valley Recharge project.

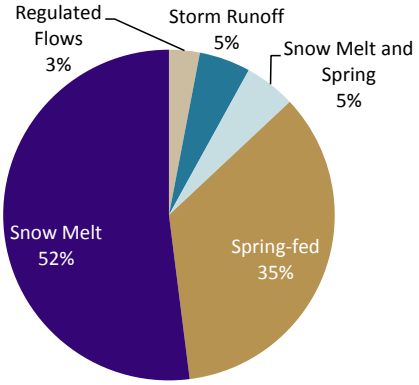
Watersheds

The U.S. Forest Service Tonto National Forest was designated in 1905 to protect the watersheds of the Salt and Verde rivers. The Salt River drains an area of approximately 5,980 square miles and is the largest tributary of the Gila River. The Salt River headwaters originate in the White Mountains from the confluence of the White and Black Rivers at 11,400 feet in elevation and flows approximately 140 miles to its confluence with the Gila River at an elevation of about 900 feet above mean sea level. A series of major reservoirs make up the dammed portions of the Salt River (Roosevelt, Apache, Canyon, and Saguaro Lakes).Perennial flows are found at the higher elevations due to winter snow, monsoon storms, and springs and most intermittent streams are found in the western portion of the watershed.

The Verde River drains an area of approximately 6,188 square miles and traverses a distance of about140 miles. The Verde River headwaters originate just south of Paulden and flows southeast into Horseshoe and Bartlett Lakes before joining the Salt River. Many large tributaries contribute to the Verde River including Sycamore Creek, Oak Creek, Wet Beaver Creek, West Clear Creek, Fossil Creek, and the East Verde River. The Verde watershed includes the highest peak in Arizona, Humphrey's Peak at 12,600 ft. The lowest elevation in the Verde watershed is at the confluence of the Verde and the Salt Rivers at 1,300 ft.

According to the Arizona Department of Environmental Quality, the main sources of perennial flows sampled for the Salt and Verde watersheds were snowmelt at 52% and springs at 35%. The streams in these watersheds flow through a variety of landforms such as mountain meadows, coarse colluvial deposits, bedrock canyons, and alluvial deposits. Precipitation in the Salt and Verde watersheds generally increases with altitude and varies widely from season to season. Precipitation is usually highest during summer months and peaks again during winter months; the driest period is from April through June.

Perennial Flow by Source



Source: Arizona Department of Environmental Quality. (2008).

Water Supply

The Town of Payson Water Department is the largest local supplier of water to homes, businesses, and the Tonto Apache Reservation. The Water Department produces water from 42 active production wells with a total storage capacity of 8,730,000 gallons. The wells produce water from the local crystalline bedrock aquifer. Because the geology that makes up the aquifer system consists of fractured and decomposed granite that is exposed at the surface in and around Town, it is important to protect the aquifer from potential sources of contamination. This is why the area within the incorporated municipal boundary and areas to the north are considered "well head protection areas" (Payson Water Department, 2013).

Local precipitation and infiltration from surface water runoff replenish water pumped from the aquifer. Average annual recharge to the Payson aquifer is quantified to be 2,681-acre feet per year. Some recharge to the Payson aquifer is accomplished by artificial recharge from the Green Valley Park Water Reclamation project storage lakes. Groundwater recharge from this project is estimated to be approximately 336-acre feet per year.

The amount of treated effluent available from the reclamation project is dependent upon the amount of indoor water use and leakage into the system during winter precipitation events. The Town is prohibited by state law from storing local stormwater due to senior downstream water rights holders so stormwater is naturally discharged to the American Gulch, a tributary to the East Verde River.

Water Demand

The municipal water system does not supply water for any large-scale irrigation uses. The Northern Gila County Sanitary District owns and operates the local wastewater treatment plant and works in partnership with the Town of Payson for storage that provides water for irrigation uses such as golf courses and distribution of reclaimed wastewater for large-scale irrigation needs.

Payson operates its water system using the "Safe Yield" concept. Safe Yield means that the amount of groundwater pumped from the aquifer on a long-term basis must not exceed the amount that is naturally or artificially recharged. Because recharge to the aquifer varies depending upon yearly rainfall totals, in dry years Payson pumps more groundwater from the aquifer than is recharged by that year's precipitation. Conversely, in wet years Payson pumps less water from the aquifer than is recharged by that year's precipitation. The Town implements the Safe Yield concept using the long-term average rainfall (22 inches per year) reduced by a 20% safety factor to accommodate for occasional or sustained years of below average precipitation. This level of precipitation results in approximately 2,681 acre feet (325,840 gallons per acre-foot) of recharge into the Town's aquifer (Payson Water Department, 2013).

The development of the C.C. Cragin Reservoir will alleviate much of the pressure on the Payson aquifer allowing it to recharge more closely to natural replenishment levels and enabling the Town's wells to remain effective sources of potable water. The Town is constructing a 14.5 mile pipeline along East Houston Mesa Road from Washington Park to Payson. The pipeline will move C.C. Cragin Reservoir water to Payson's water treatment plant. Both the pipeline and water treatment plant are scheduled to be operational in the spring of 2015.

Water Quality

In addition to water supply, water quality is always a public health concern. The goal of the Payson Water Department is to produce a safe, dependable water supply for its customers. The Town's drinking water must remain in compliance with the Drinking Water Standards established by the United States Environmental Protection Agency and the Arizona Department of Environmental Quality (AZDEQ).The Town publishes an annual **Water Quality Report** that serves to meet public reporting requirements as well as educate the population on water quality issues.

Water Reuse and Conservation

Water reuse is an important component of resource management. While Payson is fortunate to have a much more reliable water supply than many other communities in Arizona, water should not be wasted when it can be reused. Water reuse can include collection of stormwater, reuse of gray water in homes and businesses, and reuse of treated wastewater. Water can be reused for irrigation, vehicle washing, toilet flushing, and industrial purposes. The Town of Payson abides by the 2001 AZDEQ regulations for reclaimed water (including gray water).

Water reclaimed from shower, bathtub, bathroom sink and washing machine drains is gray water suitable for watering plants. However, the gray water from dishwashers and kitchen sinks that may be contaminated with grease and food particles must not be used. Toilet wastewater, called black water, should never be used. The health risks from gray water are minimal if you gather and apply it properly.

The Payson Town Council, with strong citizen support, passed a water conservation ordinance in an effort to promote sensible water use in the community. The Town of Payson Conservation Ordinance prohibits the following at all residential/commercial services:

1. New turf areas, whether from seed or sod, as well as the expansion of existing turf areas
2. Water features that exceed 50 gallons
3. Outdoor swimming pools, above or below grade (Residential above ground pools that are temporary structures erected between May & September each year & less than5,000 gallons are allowed)
4. Spray or flood irrigation
5. Watering native plants

Other prohibitions for commercial services include:

6. The construction or installation of new spas in or adjacent to motel, hotel, and bed and breakfast rooms
7. The use of evaporative coolers in buildings larger than 3,000 square feet

These measures are re-evaluated periodically and the precise level of conservation is set annually based on actual precipitation levels and local groundwater levels. The addition of the C.C. Cragin Reservoir water allocation to the Town's water supply will ease the danger of drought and low ground water levels. However, water reuse and water conservation measures will remain an integral part of Payson's desert mountain culture to ensure a healthy ground water reserve.

4.2 Critical Issues

4.2.1 Continue to have sustainable water conservation policies that acknowledge the finite resource

4.2.2 Generate revenue through the sale of water sufficient to pay for the system

Discussion

As vital as water is to Payson as a natural resource there were only two primary issues expressed by the community – the need to maintain conservation policies to preserve the water supply as a finite resource balanced with the need to pay for the new infrastructure. The C.C. Cragin Reservoir and pipeline is likely the most significant advance of the past decade for the Town. The current ground water supply is roughly 2,681 acre feet (ac/ft) to supply an annual usage of 1,600 ac/ft. The additional 3,000 ac/ft of surface water from CC Cragin Reservoir effectively doubles the town's permanent supply necessary to sustain a build out population of 40,000 to 45,000 (Payson Water Department, 2013)

As Payson arguably has the most strict water conservation law in the state, the town needs to balance loosening its usage standards with conserving the asset. As of 2013, Payson residents achieved water usage in the amount of 68 gallons per person per day compared to the City of Phoenix's limit of 300 gallons per person per day. Although the C.C. Cragin Reservoir has approximately 15,000 acre feet of water, it is not immune to drought, threats from wildfire (and potential increased sedimentation), and increasing regional demand.

Nonetheless, the additional 3,000 ac/ft of surface water to Payson ensures a permanent water supply for the Town for the foreseeable future and presents an opportunity for the Town to continue its innovations in groundwater recharge and water reuse projects. Revenue generated from its surface water excess can be invested into other water conservation measures and infrastructure maintenance. One of the Town's primary short-term goals is to retire the debt of the pipeline construction to keep the town's financial status strong. The Town is partnered with the U.S. Bureau of Reclamation under terms of the federal Rural Water Supply Act to obtain reasonable long-term financing for the CC Cragin project.

4.3 Goals and Strategies

4.3.1 Continue to promote Safe Yield and conservation of water resources through policies and practices

4.3.1.1 Continue to develop wise use policies and programs in partnership with the Water Department

4.3.1.2 Produce and distribute high quality educational materials to promote best practices

4.3.2 Complete the C.C. Cragin Reservoir pipeline

4.3.2.1 Manage the reservoir in partnership with the Salt River Project to serve as the Town's permanent water supply resource

4.3.2.2 Optimize opportunities to partner with other agencies and localities for service

4.3.3 Retire the pipeline debt through the responsible sale of water

4.3.3.1 Sell water to the golf course(s) when grey water supplies are not adequate

4.3.3.2 Set rates that will efficiently and responsibly maintain and operate the system

4.3.4 Maximize the use of reclaimed wastewater whenever it is safe and economical

4.3.4.1 Work with the Sanitary District to utilize reclaimed effluent wherever possible

4.3.4.2 Continue to educate the public on grey water applications and its safe use

4.3.5 Coordinate with the Sanitary District to provide water and sewer to new development

4.3.5.1 Work with developers in the southeast area of Town to provide water/sewer

4.3.5.2 Require applicants to work with Sanitary District to ensure capacity prior to development approval