

Final Report of the Water Committee to the Steering Committee for the 2050 Vision

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Vision Statement

To develop and implement a water resources management plan that will encourage aquifer conservation, enhance aquatic habitat in riparian areas and utilize the natural features of the AMA watershed to promote sustainable economic development while maintaining recreational and lifestyle opportunities now and for future generations.

Vision Guidelines

To achieve this vision, the Committee proposes that the City develop and implement a Regional Water Resources Management Plan that will establish guidelines for: 1) aquifer preservation and restoration, 2) stormwater management practices to enhance recharge and to improve water quality, 3) rehabilitation of riparian habitat, 4) needed legal changes to state water law, and 5) a regional development plan containing smart growth initiatives. The Committee believes that it will take a multiple-strategy approach to reach Safe Yield and that the natural setting and conservation are the first places to search for water resources. Large-scale, controversial and costly approaches such as the Big Chino Pipeline and importing water from other basins should be used as a secondary source after all other feasible resources have been utilized.

Water Resources Management Plan

A comprehensive Water Resources Management Plan must be provided for Prescott (and surrounding communities) to successfully maintain, restore, and enjoy the natural resources within its boundaries in a manner that promotes sustainable growth. The Committee defines sustainable growth as economic growth that does not require the use of natural resources at the expense of future generations. A Water Resource Management Plan would define and implement programs that would manage the natural “water budget”

of the Prescott Active Management Area (PrAMA). A plan such as this incorporates techniques and programs that would result in reduced withdrawal from aquifers, improve the maintenance of water distribution systems to prevent water loss through leakage, and creation of incentives for water saving devices in new and existing developments. In addition, it will provide the infrastructure required to enhance surface recharge of aquifers and will promote stormwater management throughout the Prescott area.

Conservation Plan

A Water Resources Management Plan would define city policies toward water use through conservation methods to reduce the demand from the primary source of drinking water in the Prescott area, the PrAMA aquifer(s). The City's Water Conservation Department has achieved dramatic increases in water savings from a limited program of water-use audits and the installation of simple low-cost water saving devices such as drip irrigation. It is conceivable to think that a more robust program could achieve substantial savings on par with water imported through the Big Chino at considerably lower costs. The Committee has seen evidence that increased water rates are the simplest and most direct way to obtain the necessary savings in water consumption. Rate increases should be structured so as not to retard sustainable growth but must be appropriate to represent the value of water and to keep up with demand and management of the environmental resources of the watershed.

Surface Water Management for Sustainable Growth

The Committee recognizes the aquifer underlying Prescott as a precious and finite resource. However, availability can be increased through recharge of surface water using the aquifer as a storage facility. This is accomplished in two ways: artificial recharge and natural recharge. The Committee believes that substantial amounts of rainfall are not adequately utilized as a water supply. Natural recharge comprises less than 2.5% of the total amount of precipitation that falls within the Prescott Active Management Area (AMA). The current volume of natural recharge can be substantially increased through infrastructure improvements using such methods as rainwater harvesting and constructing infiltration basins and galleries. One proposal presented to the Committee would collect water from roofs through roof drains into a pipe system separate from the regular stormwater system. Rainwater would then be conveyed through the piping system to recharge basins and/or galleries in the alluvial sediment north of Prescott. This alternative to managing water resources would require a substantial infrastructure investment for piping, development of infiltration zones, land purchases for infiltration basins and for maintenance of those structures. This is a relatively clean water source and would prevent a substantial amount of runoff from evaporating, another water loss from the budget. Channeling stormwater directly to the aquifer from rooftops without the potential for pollution from surface sources and without loss from evaporation might prove to be less costly to build and operate than the Big Chino Pipeline. Smaller systems can also be developed that trap rainwater and allow it to infiltrate through the sands of the numerous washes in the area.

By seeking water-generating alternatives through conservation and enhanced groundwater recharge, the City of Prescott might be able to increase water available for consumption for growth without the urgent need for a pipeline. The Committee believes that these other alternatives would get Prescott on the path towards Safe Yield through reduced demand on the aquifer and would achieve greater efficiencies in recharging the aquifer.

Stormwater management techniques such as small-scale infiltration basins, vegetated swales and vegetated stormwater ponds would be another technology the Committee believes should be looked at in order to treat the surface water runoff prior to infiltration.

These stormwater facilities would also provide the necessary water in treated runoff for riparian habitat restoration in the Prescott area. Developing systems that combine the use of infiltration with organic treatment methods would infiltrate the necessary water to recharge the shallow aquifers and bedrock aquifers that supply water to the streams. These techniques reduce the stormwater surges associated with urban development, treat the surface water for riparian use, and re-establish the natural system for stream flow.

The Committee also recognizes that Safe Yield cannot be achieved easily without the recharge of wastewater effluent. However, the recharge of mechanically treated effluent may not be sufficient to preserve groundwater standards for consumption. Therefore, upgrades to the treatment process would be necessary to protect the quality of our drinking water resources while relying on re-use of re-claimed water. Use of re-claimed water can be further treated by the use of wetland areas or other systems for slow infiltration of the wastewater effluent. The use of these alternatives would make the water safer and more appealing to the public for re-use.

The Committee is aware of the challenges of treating wastewater effluent for pharmaceuticals and viruses. Before a large-scale project for artificial recharge of the aquifer using wastewater effluent is implemented, the technology for removal of such compounds and organisms needs to be demonstrated. The use of wetlands for “polishing” the water for storage in the aquifer should also be considered for the potential to remove Pharmaceuticals from wastewater.

Riparian Habitat Restoration

The Committee envisions a water management plan that not only provides adequate supplies of water for future growth in Prescott but also can be utilized for riparian habitat restoration and enhancement. Stormwater runoff from urban areas occurs in “surges.” Rain runs off of impervious surfaces at a much faster rate than in natural settings. Impervious surfaces increase the amount of runoff from storm events, too. The combination of these two factors causes storm surges in creeks and other water bodies. This leads to the impression that there is not sufficient water for this renewable resource. In fact, if the precipitation were to be either stored in retention basins or slowly infiltrated into the soil or bedrock fractures the volume of “surge” stormwater that normally would have runoff and flooded the streams would now be released slowly to the creeks by the natural seepage process. Through this method of stormwater management, riparian areas would not be prone to flooding and pollution in stormwater that can so easily decimate riparian habitat. The result of the slow release of stormwater through the subsurface is the natural hydrologic process and will generate long-term flows in creeks. This natural process will allow creeks to become the natural greenspaces that they were intended to be without costly and artificial means to replace what is lost to conventional development.

The Committee also recognizes the need to either rehabilitate the sewer lines in the creeks or to remove the sewer lines from the creeks as a primary method for achieving improved water quality gains necessary for a healthy riparian habitat.

Riparian habitat provides water quality benefits, aesthetic benefits, and re-establishes the natural hydrologic regime that is necessary for gauging water quality programs in the PrAMA. A properly functioning stream system is the best measure of a healthy urban watershed.

State Law

The Committee cannot see a way to achieve true Safe Yield without a comprehensive overhauling of the State Water Laws to reflect scientific analysis rather than political expediency in assessing aquifer reliability and yield. This aspect of the Committee’s

vision is the most controversial and will be the most difficult to inspire or achieve. However, the development of water resources for a growing region cannot be achieved without making the general public interest the foremost consideration in developing effective State Law. Likewise, development of a credible water resource management plan cannot be achieved unless sound engineering and hydrogeological principles are used in assessing Safe Yield, supply and water quality.

The definitions of Safe Yield must reflect the realities of maintaining the aquifer's storage capacity rather than the water-in equals water-out approach of the current law.

In addition, State Law must address "exempt" wells within the AMA. It is unknown what their impact is on Safe Yield because there are no regulations governing their use or metering their use. It is estimated that exempt wells in the PrAMA may account for up to 14% of water usage in the area. This is a significant volume of water removed from the aquifer for an unknown number of people. For a Resource Management Plan to develop a water budget for public use, all sources of water removed from the aquifer need to be accounted for within the AMA. Therefore, the Committee recognizes that some change must be made to this exemption in order to manage the usage.

Comprehensive Land Use Plan

Finally, a Water Resource Management Plan cannot be successful without a Comprehensive Regional Land Use Management Plan. A Land Use Management Plan must be regional if all municipalities within the PrAMA are beneficiaries of the water within the Management Area. The Committee agrees that in order to manage water resources, future growth must be quantified through zoning and land use rules. Water use and demand is directly tied to increased land use as a result of population growth so should be allocated in direct proportion to increased land use as impervious surface increases.

One example of a regional land use plan presented to the Committee would incorporate the use of conservation subdivisions that would utilize stormwater runoff treatment technologies, greenspace, water quality enhancement structures, and water use within the home. Technologies such as low flow toilets, low flow washing machines and dishwashers, and modified shower fittings are included in the homes for the development to qualify as a conservation subdivision. Drip irrigation outside the home and the use of rainwater harvesting would also be integral parts of any conservation subdivision.

Education

Educational efforts by the City of Prescott will be required to demonstrate that sustainability is the use of a resource that will not compromise or jeopardize any future generations' use and enjoyment. These efforts can include conservation "training" for residents, school programs about water conservation and rain water harvesting, the ecological impact of habitat manipulation, as well as advertising campaigns for public awareness.

Programs for Consideration in a Regional Water Resources Management Plan (RWRMP)

The Committee has identified a number of proposed programs and activities that the City can prioritize when developing the RWRMP. Certain low-priority programs can be developed or implemented simultaneously while other high-priority programs could possibly take years to design, develop and construct. The revision of State Law should

begin immediately as this aspect of the RWRMP would take the longest time to develop and enforce. The Committee did not prioritize these although certain members had preferences, The Committee believes that if the City will adopt this Vision, it must set their priorities based on future land use projections, budgetary constraints, and public preference. The general consensus of the Committee, however, is that the development of a RWRMP, revision of State Law and the creation of a Regional Water Authority (a component of revised State Law), are among the first that need to be approached and activated. The Committee also recognizes that certain aspects of the Surface Water Management Plan for Sustainable Growth can be implemented through the City's National Pollution Discharge Elimination System (NPDES) Permit, so improvements to water quality and reduced flooding can be funded, designed, and constructed through that Clean Water Act Permit.

The Programs to be considered for prioritizing are:

1. Establishment of a Central/Regional Water Management District
2. Water Usage conservation methods, considering the upgrade of indoor fixtures, graywater and rainwater harvesting for outdoor irrigation, increased rates, new water saving devices in homes and businesses.
3. Macro and micro-scale aquifer recharge projects some of which might include infiltration zones, rainwater catchment basins.
4. The widespread use of impervious surfaces for parking lots, driveways, sidewalks and/or residential streets throughout the City to reduce stormwater runoff.
5. Curtailing and eliminating the use of invasive species for landscaping.
6. Alternative septic systems or small-scale wastewater treatment facilities in un-sewered areas.
7. Land use ordinances to reduce water consumption, enhance recharge, and promote habitat preservation.
8. Eliminate the exemption for all wells (consider some form of compensation).
9. Technical improvements for high-quality drinking water and wastewater treatment facilities.
10. Riparian Habitat Preservation
11. Water Importation. The Committee found this method to be the least desirable for immediate consideration without evaluating the feasibility of the other watershed management techniques available to the City. The Committee finds that the watershed approach is preferable to maximize water storage and usage rather than water importation. It is the Committee's belief that such substantial savings could be achieved through the programs outlined in this Vision that the need for water importation would be a secondary consideration or would be used as a back-up during drought conditions.

The Committee believes that the items above should be considered using the following criteria for prioritization:

General equity in allocating water resources
Management of water resources on a regional scale
Maintenance of water availability to achieve Safe Yield and Assured Water Supply
Maintenance of water quality
Regulatory compliance to the Safe Drinking Water Act and the Clean Water Act

THE STORY SEEN FROM 2050

This year (2050), half way through the century, Prescott is a community with a vibrant economy a wonderful place to live and still has an outstanding natural environment. This is in no small part due to the visioning process initiated in 2008. A bold, forward-looking city government implemented this visionary process, which is now recognized as a model for the southwest. These visionary leaders, who we now honor, understood that we needed a new way of looking at and allocating resources that the town relied on to prosper. One of the boldest steps taken was the declaration that the City of Prescott would live within its environmental means. These leaders understood the enormous amount of water falling on the Prescott AMA watershed- 450,000 acre feet per year, most of which was wasted and resolved to look at new ways of working within this resource base. Despite opposition and dire predictions of economic collapse the opposite has proved true. Once this idea was in place it triggered all kinds of action. The first controversial step was to put the pipeline project on hold. No work would go forward until all legal impediments to its completion were eliminated. This saved \$100 million, which was then diverted to other ways of creating more available water. The difference in consumption between summer and winter was a first focus. It is hard to believe the amount of water that was used in the past. Water use was 5 million gallons a day in the winter, and then jumped to 12 million gallons in summer! Today we see it as an obvious waste but in the past it was seen as perfectly normal. Changing this required a huge education push plus bold legislation that virtually eliminated outside watering. Initial opposition was great but as there were provisions for small flower or vegetable plots that could use city water and incentives for gray water systems to be used for irrigation the legislation eventually passed. By seriously reducing the use of city water for non-native landscaping over 5 million gallons of water per day were saved in summer (about 1,500 acre-feet annually). This contributed to continued growth in new housing and ensured a secure water supply. This new housing was required to be water smart. Water harvesting is now required on all new construction and can be used for either irrigation or flushing toilet fixture. All fixtures including washing machines and dishwashers are now required to be ultra water efficient and save a combined 2/3rds of all domestic water. The City of Prescott provided financial incentives to homeowners in existing homes to implement these water saving strategies. The money came from what would have gone to the energy costs for pumping water 35 miles mostly uphill. This allowed the homeowner to purchase brand new fixtures at almost zero costs.

To protect the aquifers the cities of Prescott, Prescott Valley, and Chino Valley then initiated a visionary watershed protection initiative in which the money saved from the pipeline project was used to protect the watershed areas from development by buying development easements. This ensured that paving over the land would not compromise

water infiltration into the aquifer. In addition the watershed protection legislation provided money to improve the infiltration of the water through many small projects designed to spread and sink the water and slow runoff. This required increasing the natural recharge 2.5% to 5% (roughly 8,000 acre-feet). Point source injection into the aquifer is still maintained but new, innovative methods of increasing infiltration with a new constructed water recharge system has added even more water to the aquifer.

Water quality has improved due to small-scale projects throughout the Prescott basin that help treat street runoff before it reaches the creeks. In addition the City of Prescott has initiated programs that require less pavement for parking areas and requires all parking runoff to go into planted retention basins. Through many small scale project in the city the quality of water flowing into the creeks has improved to the point where federal regulation of water discharge is being met.

Of course none of this would have been possible without State legislation regulating individual wells, which were identified and recognized as a real concern to basin-wide water resource sustainability and the capacity for future generations to continue growing.

As we now look forward to the final fifty years of the 21st Century we feel assured that the Verde River will continue to be protected for its valued riparian and aquatic habitats, along with restored Granite Creek and its tributaries for their economic, ecologic, aesthetic, and recreational attributes.

Today in 2050 we salute these visionary leaders for showing us a bold way to continue our economic development while protecting the most precious resource we depend on for our very lives.