

Ensuring Water Supply Sustainability: the Arizona Department of Water Resources' Drought and Water Supply Planning

Overview

The Arizona Department of Water Resources (ADWR) takes an integrated approach to water supply planning and conservation by combining regulations with assistance, outreach, and education efforts. Key elements of this work include requirements for local drinking water system supply and conservation plans, State level support of water conservation practices, and coordination among Arizona's agencies to address drought issues. Arizona has achieved noteworthy water supply improvements by implementing water conservation measures and practices that serve as a strong model for resource managers throughout the country.

Background

The Southwest is generally facing significant challenges as the climate warms. The 2014 National Climate Assessment includes a "key message" that "snowpack and streamflow amounts are projected to decline in parts of the Southwest, decreasing surface water supply reliability for cities, agriculture, and ecosystems." Arizona has a long [history](#) of collaboration and innovation to manage its water supplies to meet the challenges of living in a desert environment. Construction of water storage and supply infrastructure and irrigation projects that began in the early 1900s recently culminated in the completion of the Central Arizona Project, which delivers a portion of Arizona's Colorado River allocation to central Arizona cities including Phoenix and Tucson. These projects were intended to bring resiliency and security to the State's water supply and reduce dependency on groundwater.

The State legislature passed the landmark Groundwater Management Act in 1980, which applies in the State's Active Management Areas where over 80% of the population resides. The Act required all new development to demonstrate a 100-year renewable water supply and initiated a statewide low flow plumbing code. The legislature also created an innovative recharge and recovery program in 1995 whereby the Arizona Water Banking Authority and other parties actively "bank" or recharge surface water, reclaimed water, and other renewable supplies in local aquifers

Program Partners: Arizona Department of Water Resources (ADWR) Water Conservation Program, Arizona Department of Environmental Quality (ADEQ)

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for later recovery to help meet portions of the 100-year renewable water supply requirement. One of the central elements of the 1980 Act was the mandatory conservation requirements for all water use sectors – agricultural, municipal, and industrial – within the Active Management Areas. In 2005, the Governor's Drought Task Force recommended the requirement of water use reporting and drinking water system plans for planning, mitigation, and response purposes. Their recommendations were shortly after solidified by Arizona House Bill 2277, which was passed by the legislature that same year.

Arizona's Integrated Approach to Drought and Water Supply Planning

Arizona's integrated approach to drought and water supply planning includes several innovative elements including a requirement for local water utility plans, statewide support for water conservation, and strong coordination among State and local agencies. The combination of these efforts has allowed the State to reduce its overall water use, which peaked in 1980, to current levels that are lower than the total uses in 1957 despite large increases in both population and economic activity. (Figure 1)

Addressing Drought and Climate Variability through Local Water Utility Planning: In line with the Governor's Drought Task Force recommendations, the ADWR requires annual water use reports and system water plans from all drinking water providers in the State. These plans are established to help



community water systems reduce their vulnerability to climate and drought, and prepare to respond to potential water shortage conditions. Uncertainty surrounding future climate conditions introduces additional challenges for maintaining an appropriate balance between water demand and supply. The State considers water resource planning efforts to be instrumental in the identification and evaluation of these challenges.

To be submitted every five years, the system water plans must include three sections: a water supply plan, a water conservation plan, and a drought preparedness plan.

Water Supply Plan – Describes the service area, transmission facilities, monthly system production data, historic demand for the past five years, and projected demands for the next 5, 10 and 20 years.

Water Conservation Plan – Contains over 50 best management practices including measures to control lost and unaccounted for water, considers water rate structures that encourage efficient use of water, and plans for public information and education programs on water conservation.

Drought Preparedness Plan – Includes drought and emergency response strategies, a plan of action to respond to water shortage conditions, and provisions to educate and inform the public.

State Support for Water Conservation: Water conservation continues to be the foundation of Arizona's water management strategy to meet future water supply needs. Arizona requires mandatory water conservation by all water use sectors in the State's five Active Management Areas (AMAs). All water users in the AMAs are required to meter and report their uses, and users of groundwater are required to pay annual withdrawal fees. The AMAs were established to provide long-term management and conservation of limited groundwater supplies. To accomplish these goals, ADWR administers State laws, explores ways of augmenting water supplies to meet future needs, and routinely works to develop policies to promote efficient use and equitable allocation of available water supplies. ADWR also offers [tools](#) to assist water providers in designing effective conservation strategies;

assists providers in selection of [best management practices](#) (BMPs) to improve water efficiency; provides [tips and materials](#) to inform customers about the importance of water conservation; and sets guidelines for setting up conservation based rate structures. BMPs range from physical system improvements to rebates for users that implement a water conservation practice.

ADWR also administers the Water Management Assistance Program which provides financial and technical resources for the development and implementation of conservation programs, supply augmentation programs, and the monitoring of hydrologic conditions to assess water supply availability in the AMAs. Funding for these programs is supported by a portion of the annual withdrawal fees paid by groundwater users in the AMAs.



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State Agency Coordination on Drought Management: Drought challenges are collaboratively addressed by State agencies through Arizona's Inter-agency Coordinating Group (ICG), which advises the Governor on drought status, impacts, and any necessary preparedness and response actions. ADWR serves as the facilitator of the ICG and the Monitoring Technical Committee (MTC) subgroup, identifies mitigation and adaptation options, and assists with report development and public outreach. The MTC is instrumental in gathering monitoring data, tracking changes in physical climatic conditions, and forecasting future climate conditions for early detection. Annual reports by the MTC analyze seasonality patterns for precipitation, stream flow, groundwater, drought, and climate projections for precipitation and temperature changes. The supporting climate and drought information is being incorporated into a new University of Arizona program called [DroughtView](#) in 2015. This online tool will collect and visualize impact information, as well as incorporate remote sensing and climate-drought monitoring products. In addition, Arizona has been actively evaluating future water supply and demand conditions. The State participated in an extensive

interstate study on the Colorado River water supplies through 2060, and has implemented several efforts to ensure the sustainability of its water supplies (e.g., the Central Arizona Project, the 1980 Groundwater Management Act). A Water Resources Development Commission was also created in 2010 to assess Arizona's water demands and available supplies for the next 25, 50 and 100 years.

The ADWR also released [*Arizona's Next Century: A Strategic Vision for Water Supply Sustainability \(2014\)*](#), which provides a comprehensive water supply and demand analysis for Arizona and a framework for addressing future water supply challenges. Next steps under the *Vision* include: a commitment to conservation and expanding water reuse, expanding monitoring of hydrologic conditions, and developing a financing mechanism to support water supply resiliency projects. These efforts will help Arizona continue to identify and develop additional water supplies to meet projected demands under variable climate conditions.

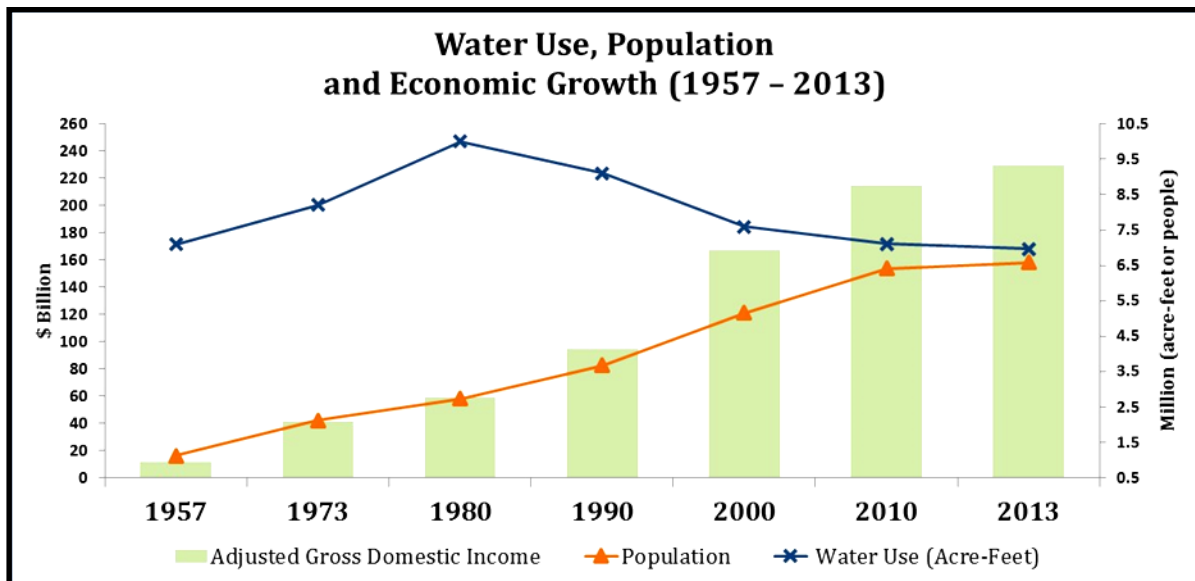


Figure 1. This graph demonstrates the success of Arizona's conservation efforts and pivotal role of the 1980 Groundwater Management Act. The graph displays total statewide water use from 1957 through 2013. Water use peaked in 1980 and has declined to present water use levels below 1957, despite significant growth in population and economic output.