

Column: Pathways to water resources sustainability

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Limited water resources and our dry climate in the American Southwest challenge us to apply new approaches along with traditional strategies to meet both human and environmental water demands. Such water management methods incorporating the interdependence of society and the natural environment are slowly emerging through scientific, legal, economic, social and political pathways. Will such practices be adopted and effective to ensure that future water security in our region is comprehensive and resilient?

The Arizona Groundwater Management Act of 1980, the centerpiece of the state's water management framework, established the groundwater management goal: to achieve and maintain "safe-yield" by the year 2025 within Active Management Areas (AMAs), such as the Prescott AMA (PrAMA). The state's AMAs are located in agricultural and population centers where groundwater usage is greatest.

The GMA generally defines safe-yield as the long-term balance between annual groundwater withdrawals and natural and artificial recharge to aquifers. Unfortunately, natural recharge rates in the PrAMA average only about 1 to 3 percent of annual precipitation amounts. Hence, groundwater mining has been occurring for many years within the PrAMA due to much larger groundwater withdrawals.

The safe-yield goal is not a regulatory mandate. Although PrAMA aquifers contain roughly 3 million acre-feet (one acre-foot is 325,851 gallons) of recoverable water, there are severe consequences for noncompliance with safe-yield by 2025 and beyond. Conceivable outcomes include continued falling water levels in many wells, costly public and private well deepening into lower water-quality zones, increased pumping costs, Verde River discharge declines, and potential land subsidence accompanied by earth fissures that can damage property and infrastructure.

It may surprise you that some Arizona water specialists predict the PrAMA, or any AMA, will not achieve safe-yield by the year 2025. In fact, projections of PrAMA overdraft in 2025 exceed 20,000 acre-feet per year. Despite the state's good intentions to manage our finite shared groundwater resources through the GMA, there are some scientific and statutory shortcomings and flawed assumptions.

A common misunderstanding is that the exploitation of an aquifer is "safe" if safe-yield is attained. In reality, the safe-yield concept is widely recognized to be an oversimplification of groundwater withdrawals and responses within aquifer systems. For example, the safe-yield goal does not require that regional water tables be maintained at levels that provide natural outflows to springs and streams (Del Rio Springs is predicted to go dry by 2025).

Nonetheless, many believe that the collective provisions of the GMA gradually bring us closer to more sustainable, longer-term water management due to its regulation of groundwater withdrawals and efforts to understand the dynamic nature of aquifers and water budgets. Despite its limitations, the GMA is essentially aligned with sustainability approaches that foster an inclusive and long-term view of water supplies.

Three recommendations that will move us more rapidly to safe-yield and closer to sustainable water resources are:

1. Arizona's political and community leaders must find the means to manage water resources more collaboratively to craft innovative and integrated solutions across economic, social and ecosystem needs. In our region this may materialize as "PrAMA Safe-yield Plans" with longer-term goals to address water scarcity and climatic patterns, augmentation of water supplies, and measures to protect the Verde River.

2. Obsolete water laws must be modernized to allow conjunctive management of groundwater and surface waters. The safe-yield goal must address existing gaps, such as surface water impacts and increased protection of aquifers outside AMA boundaries. Also, aquifer replenishment must be expanded with hydrologically-sound artificial recharge and recovery locations to better balance aquifer storage and water levels basin-wide. Legislatively, these and other changes may be feasible through amendments and addendums to the GMA.
3. Policies and ordinances must be authorized to enhance irrigation efficiencies and water conservation (including rainwater harvesting); to promote the use of effluent and other reclaimed supplies through advanced technology (including direct potable reuse); and to improve evaluations of private domestic well (exempt wells) and industrial groundwater pumping impacts.

Simply, but not so simple, local and regional water management strategies need to be better coordinated, evaluated, broadened, and adaptable. The business, environment and regulatory communities must work together on this. If we don't progress, we go backward – as stated in the GMA, "...the basic economy and welfare of this state and its citizens depend on a secure water future."

Water smart landscapes can help secure our water future. Learn how March 11. Details at www.cwagaz.org.

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