INTEGRATED WATER MANAGEMENT WHEN SURFACE AND GROUNDWATER ARE LEGALLY SEPARATE

Charlotte Benson
Assistant Attorney General
State of Arizona

WATER RIGHTS IN ARIZONA

Rights to surface water are acquired under the doctrine of prior appropriation, and rights to groundwater are acquired by the reasonable use doctrine in Arizona. In both methods of allocation, the entitlement is not to a corpus of water but to its beneficial or reasonable use. A surface water code governs the use of surface water, and an independent groundwater code governs the use of groundwater. Reconciling the separate legal frameworks with integrated water management has become important in two contexts: general stream adjudications or water rights determination, and administration of decreed water rights. Integrated water management is required in an arid state like Arizona, where all surface water has been appropriated, but may not be realized because of the legal impediments. The constraints to integrated management, and means for mitigating them, are explored below in the adjudication and decree administration contexts.

GILA RIVER GENERAL STREAM ADJUDICATION

The Gila River Adjudication, initiated in 1974, covers more than half the state of Arizona and includes more than 65,000 claims to water (Fig. 1). The first two decades of the case were spent on litigating threshold matters including whether the state court could adjudicate Indian water rights, who the necessary parties were, and which waters would be adjudicated. The case is a determination of all rights to use water in the "Gila River system and source," which is statutorily defined to include "all water appropriable under A.R.S. 45-141." To decide which waters were appropriable and thus included in the adjudication, the trial court took testimony in 1987 on the interaction between surface and groundwater in the alluvial basins of southern Arizona.

After hearing extensive hydrologic evidence, the adjudication court decided in 1988 that underground water is included in the river system and source to the extent it comprises the subflow of a surface stream. A time/volume test was devised to determine if wells near a stream were pumping subsurface streamflow (appropriable water subject to adjudication) or pumping nonappropriable groundwater. The court's "*50%/90* day rule," however, was rejected as arbitrary when appealed to the Arizona Supreme Court.[2] The Supreme Court explained its adherence to an older distinction between surface and groundwater in recapping the history of Arizona water law:

"This bifurcated system of water rights was not unique to Arizona. It was typical of western states until around the turn of the twentieth century. At that time, scientific investigation was revealing that most underground water is hydraulically connected to surface water. As scientific knowledge progressed, most states revised their water laws to provide for unitary management of hydraulically connected underground and surface water. Arizona, however, did not, and continues to adhere to a bifurcated system of water rights, with compelling implications for general stream adjudications." Gila River, *175* Ariz. 382, 386, 857 P.2d 1236, 1240 (1993).

In Gila River the Arizona Supreme Court affirmed the 1931 opinion in which it had defined "subflow."[3] In Southwest Cotton the Court had determined the relative rights of groundwater pumpers and surface water users by defining subflow narrowly as "those waters which slowly find their way through the sand and gravel constituting the bed of the stream, or the lands under or immediately adjacent to the stream, and are themselves a part of the surface stream." 175 Ariz. at 387. In spite of modern hydrological understanding, the Arizona Supreme Court adhered to its sixty-year old distinction between surface and groundwater because "[t]he Arizona legislature has erected statutory frameworks for regulating surface water and groundwater based on Southwest Cotton. Arizona's agricultural, industrial, mining, and

urban interests have accomodated themselves to those frameworks." Gila River at 389. It affirmed its sixty-year old concept of subflow because "...even though Southwest Cotton may be based on an understanding of hydrology less precise than current theories, it would be inappropriate to undo that which has been done in the past." Id. The Court declined to depart from precedent even though it "...recognize[d] compelling arguments in favor of unified management of Arizona's water resources." Gila River at 393. The Court concluded that any change in existing water law must come from the legislature. Id. The Court remanded the case to the trial court to delineate subflow, thus identifying appropriable underground waters which must be included in the adjudication. The trial court, ordered to define the boundaries of the mythological subflow zone, dutifully scheduled a second round of hydrological testimony on the subject.

The Arizona Department of Water Resources (DWR), which acts as technical advisor to the adjudication court and administrator of water rights, issued a report on how to implement the Supreme Court's decision by identifying subflow and separating surface from groundwater for purposes of the adjudication.[4] DWR attempted to reconcile the Supreme Court's sixty-year old concept of subflow with the hydrology of Arizona. Not surprisingly, Arizona's alluvial basins are integrated hydrologic systems comprised by dynamic surface and groundwater components, and there is no hydrologically distinct subflow. The only rationale for identifying subflow, and distinguishing surface from groundwater in the alluvial systems, was the need for a legal standard to separate appropriable from nonappropriable water. DWR offered the court three alternative means to delineate subflow consistent with the Supreme Court's opinion. The agency concluded that where there is a hydrologic connection between pumping and streamfiow the court could apply interference tests, geographic tests, or flow net tests.

DWR emphasized that subflow is not a physical distinction in hydrology, but a means for establishing a threshold of interference by pumping with streamfiow, creating an artificial distinction between surface and groundwater. To determine the tolerable or acceptable amount of interference requires a time referent. Any maximum allowable depletion calculation requires an arbitrary time period over which a certain amount of streamfiow is reduced by pumping. DWR made clear to the court that subflow is not a hydrological reality, but a choice of methods to analyze the effect of pumping on streamfiow. Drawing a subflow boundary geographically, based on such mappable factors as uniform distance of wells from the stream, could be used to provide a presumption of interference. The court embraced this suggestion by requiring the parties to draw their proposed subflow boundaries on a map. Pumpers drew narrow subflow boundaries at the edge of the stream, so that their wells were outside the lines, and would be presumed to be pumping percolating groundwater and not appropriable subflow, and thus excluded from the adjudication. Surface water users drew wide subflow boundaries, encompassing the entire younger alluvium, so that most wells would be presumed to be pumping appropriable subflow and would be included in the adjudication. The trial court adopted the wide subflow boundaries, including most wells in the adjudication. That opinion has been appealed to the Arizona Supreme Court and has not yet been decided.

GLOBE EQUITY 59 DECREE ADMINISTRATION

Globe Equity 59 is a 1935 consent decree allocating irrigation rights on the Gila River in southeast Arizona. The federal court retained jurisdiction to enforce its decree and appointed a water master to administer it. In 1990 senior water users asked the court to regulate pumping and diversion practices of upstream irrigators whose wells depleted the flow and increased the salinity of river water. The court determined in 1995 that those practices degrade water quality in violation of the decree and must be changed.[5] The court ordered the parties to propose changes in irrigation practices that would promote decreased salinity and salt load in the Gila River. The parties were unable to agree on a plan, and each submitted its own proposed injunction to the court. After hearing the proposals, the court suggested that instead of enjoining pumping in the alluvial aquifer, the amount of water pumped be charged against the irrigators' decreed surface water entitlements. Because it found that pumping from the younger alluvium depletes streamfiow, the court saw the two as ultimately tapping the same source of supply, and therefore manageable as an accounting matter.

The federal court's commonsense integrated approach to management, addressing surface and groundwater as well as water quality and quantity in one package, may be impossible to apply because of the legal distinction between surface and groundwater in Arizona. While the irrigators have diversion rights for surface water under the decree, their

pumping rights are governed by the reasonable use doctrine. The river's surface flow is managed on the basis of a call system, and pumping rights without priority dates cannot be conformed to priority administration. In addition, the Gila Water Commissioner, who administers the 1935 decree, has no apparent authority to curtail non-decreed uses or pumping in the alluvial aquifer of the Gila. Another complication of any plan to manage Gila River salinity is that critical habitat designated for the razorback sucker includes the reach of the Gila River at issue.

The court issued an injunction in the spring of 1996 to ensure that the San Carlos Apache Tribe "receives the quality of water necessary to cultivate moderately salt-sensitive crops with the least possible disruption to the farming practices of the parties upstream...."[6] The injunction requires the Gila Water Commissioner to install a salinity meter and flow gage where the Gila River enters the reservation, and to monitor the quality and quantity of water reaching the Apache lands. The upstream irrigation districts are enjoined to meet monthly maximums for seasonal average salinity depending on the Tribe's water requirements. The injunction includes a table of increasingly stringent salinity requirements that irrigators must meet beginning in 1997. When salinity requirements are slightly exceeded, calling for "moderate action," irrigators must cease pumping wells of a specific salinity, and must increase flows downstream by either bypassing certain levels of flow at their intakes or by diverting flows and conveying them to the Apache reservation. When salinity levels are such that "severe action" is required (according to the table), irrigators must cease pumping wells of a lower salinity, and must bypass more river water to the reservation. If "severe action" is taken but salinities continue to exceed requirements for five days, the Gila Water Commissioner must shut down more wells and bypass more water. More stringent actions are taken after an additional five days of violation, and again after another five days of attempts to meet salinity requirements.

To ensure compliance with the injunction, the Gila Water Commissioner measures weekly the salinity of wells which discharge into canals or into the river. The Commissioner has contracted for installation of the salinity flow measurement station in the river above the reservation, and pending its completion he takes measurements by hand. It will be interesting to see whether this pragmatic approach to integrated management of surface and groundwater to achieve a specific purpose is effective.

PROSPECTS FOR INTEGRATED WATER MANAGEMENT IN ARIZONA

The judicial forum for the adjudication and administration of water rights has not provided the means for integrating surface and groundwater in Arizona. The state court has expressly declined to do so, and the federal court has not succeeded in doing so. Other institutional mechanisms for integrated management include statutory changes by the state legislature, regulatory control by state or federal agencies, and local or regional water administrative bodies based on public participation.

The Arizona Supreme Court, in maintaining the historical distinction between surface and groundwater allocation, stated that any change in that law must come from the legislature. The Arizona legislature, whose constituencies are made up of surface water users and groundwater pumpers, both holders of property rights in water, is unlikely to fundamentally change the law of surface and groundwater. The 1980 Groundwater Management Act was a difficult legislative achievement, and the 1995 amendments to the surface water code and adjudication statute are still under constitutional challenge. In addition, it is not clear that legislating water allocation is the most effective means to approach integrated management.[7]

Integrated management through rulemaking and regulation by the Arizona Department of Water Resources appears remote. The structure of DWR reflects the statutory bifurcation of surface and groundwater maintained by the judiciary and the legislature. Separate directors head the surface water and groundwater divisions, which are further compartmentalized into an Adjudications section and Active Management Areas (AMA5) under the groundwater act. In addition, DWR and its predecessors have been unable to consolidate plenary control of water resources (like that formerly held by state engineers in many western states) due to the political power of large corporate water users and quasi-public water organizations in Arizona.

Like many other western states, Arizona's water quantity and water quality are the responsibilities of separate state agencies. Water quality lies within the province of the Department of Environmental Quality, which has little required interaction with the Department of Water Resources. Water quantity allocation is a jealously-guarded state function, while water quality regulation is a responsibility shared with, or dominated by, the federal government. Endangered species protection is largely a federal function in Arizona. These institutional frameworks erect a significant barrier to using an administrative agency mechanism for integrated water management.

Integrated water management by local or regional water commissions based on public participation has not been attempted in Arizona. The office of the Gila Water Commissioner established to administer irrigation rights under the Globe Equity decree is Arizona's closest approximation to that mechanism. Although the Commissioner "regulates" the Upper Gila River, his authority extends only to decreed water rights, which are almost exclusively rights to surface water for irrigation purposes. He has no authority over water quality, except to the extent that the federal court orders regulation of surface flows to control salinity at a particular delivery point. The Commissioner has no authority under the Decree (addressing water quantities for irrigation) to curtail groundwater pumping in the alluvial aquifer, and no authority to modify surface water allocations in response to endangered species or riparian habitat concerns.

Institutional change is clearly necessary for integrated management of surface and groundwater, and the legislature is the single most significant mechanism for accomplishing such change. The sociopolitical changes required as a predicate, however, are probably not currently feasible in Arizona.

ENDNOTES

1. A.R.S. 45-141(A). The waters of all sources, flowing in streams, canyons, ravines or other natural channels, or in definite underground channels, whether perennial or intermittent, flood waste or surplus water, and of lakes, poinds and springs on the surface, belong to the public and are subject to appropriation and beneficial use as provided in this chapter.

2. In re the General Adjudication of All Rights to Use Water In the Gila River System and Source, 175 Ariz. 382, 857 P.2D 1236 (1993).

3. Maricopa County Municipal Water Conservation District Number One. et al**.** V. Southwest Cotton Co. Et *p1.*, 39 Ariz 65,4 P.2d 369 (1931)

4. Technical Assessment of the Arizona supreme court Interlocutory Appeal Issue No. 2 Opinion, Arizona Dept. Water Resources (Dec. 15, 1993).

5. Phase IV Memorandum and Order (April 14, 1995) Amended March 23, 1996, United States v. Gila Valley Irruption Dist.. et al. Globe Equity No. 59, 920 F. Supp. 1444 (D. Ariz. 1996).

6. Water Quality Injunction, Globe Equity 59 (May 28, 1996) at 1-2.

7. See Nebraska's LB 108 (April 12, 1996), an act to provide for management of interrelated ground water and surface water resources, inter alia, establishing an integrated management process initiated either by the department of Water Resources or a Natural Resources district.

Charlotte Benson is an Assistant Attorney General for the State of Arizona, serving as trial attorney in the water rights unit of the environmental enforcement section. She holds a doctorate in anthropology and formerly worked as an archaeologist. Her research interests focus on water resources allocation and management in arid environments, particularly institutional arrangements and the nature of property rights in water.
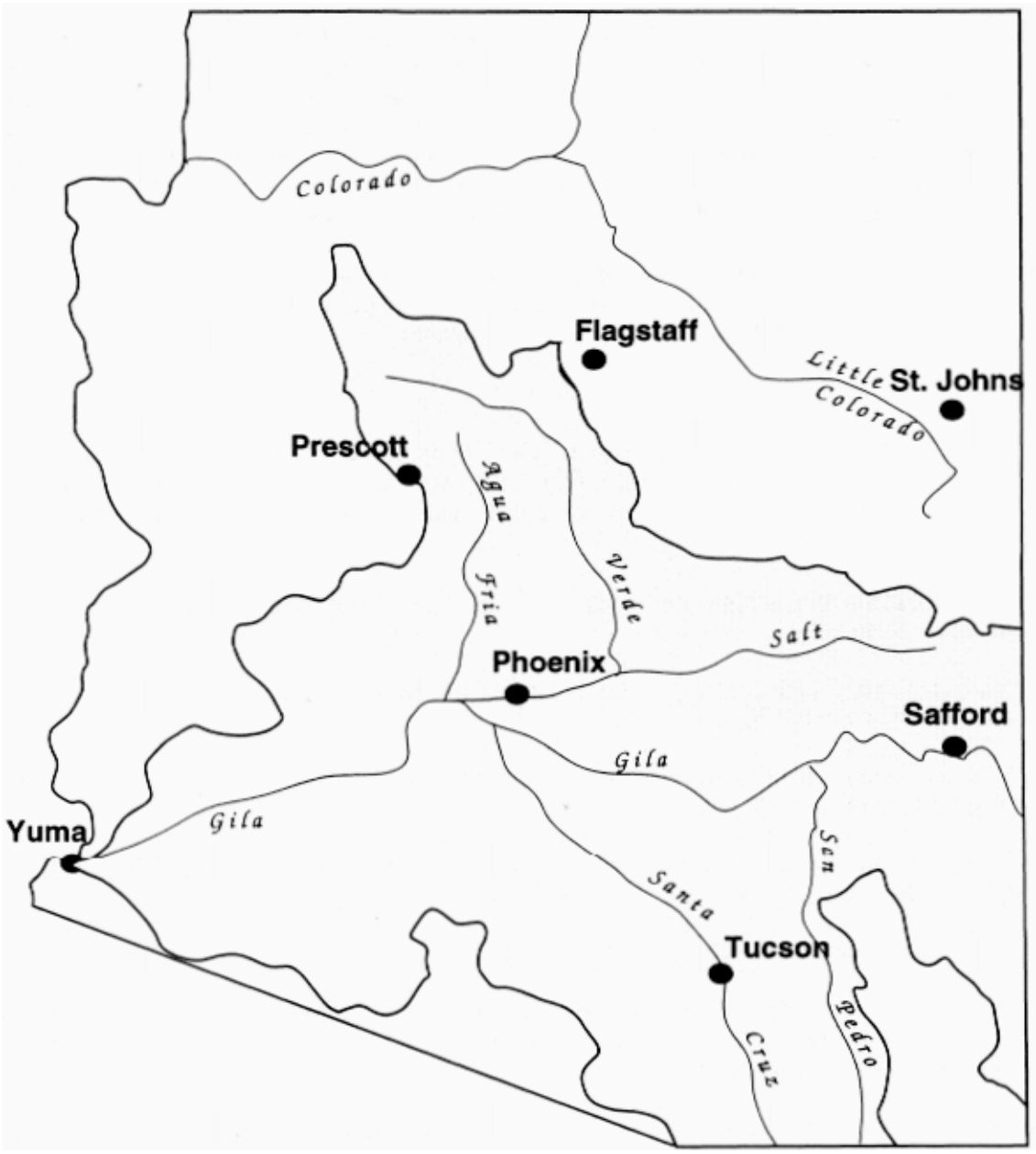
Fig. 1. Gila River, Arizona, showing area of Gila River General Stream Adjudication.