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**ARIZONA GROUNDWATER MANAGEMENT ACT:
RECENT ISSUES AND FUTURE PROSPECTS**

by

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**Uncovering the Hidden Resource: Ground-Water
Law, Hydrology, and Policy in the 1990s**

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- * The views contained in this paper are those of its authors, and do not represent the position of the Arizona Department of Water Resources or the University of Arizona.

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I. INTRODUCTION

As western states face difficult resource allocation problems, Arizona's experience may offer instructive lessons. This paper describes the 1980 Arizona Groundwater Management Act, offers an appraisal of its accomplishments, comments on lessons to be learned, and analyzes some unresolved problems. Part II introduces the Act's essential features and focuses on the Arizona Department of Water Resources' management tools. Part III briefly updates legislative amendments since 1980.

In Part IV, we concentrate on what other states might learn from the Arizona experience. First, legislation must not only protect existing water users but also pay heed to the concerns of other, less powerful interests. Second, each state's history sets the context within which change will occur. Reform efforts must devise ways to bridge deep-rooted conflicts among interest groups. Third, legal rules that are out of touch with hydrologic reality will produce a nightmare for administrators and decisionmakers. Fourth, legislation that attempts to finesse serious conflicts by delegating resolution to the discretion of administrators only postpones the day of reckoning. Fifth, an administrative agency must receive clear directions from the legislature and a regulatory approach works best in conjunction with incentive and assistance programs.

We address three current controversies in Part V. First, as negotiated settlements quantify Indian reserved rights claims, who will use the "wet" water? Second, the Central Arizona Project ("CAP") will supply Arizona with a substantial quantity of Colorado River water. However, Arizona may be unable to make productive use

of some CAP water in the early years, and California and Nevada have expressed a desire to augment their legal allotment of water from the Colorado River. What will happen, in Congress or elsewhere, to Colorado River water rights? Third, state regulatory agencies are pushing and pulling water providers in different directions. Should we not eliminate inconsistent regulatory objectives?

II. BACKGROUND

In 1980, the Arizona Legislature enacted the Groundwater Management Act, Ariz. Rev. Stat. Ann. §§ 45-401 et seq., in order to deal with chronic overdrafting of the State's groundwater reserves. This system replaced the traditional Reasonable Use Doctrine that had permitted virtually unlimited use of groundwater. The Act embraced a number of innovative features including a system for quantifying groundwater rights that protected all existing users within Active Management Areas (AMAs), which essentially comprised the heavily populated areas of the State. The Act also erected a permit system that restricted new groundwater use within AMAs, created a new state water agency with strong management authority, the Department of Water Resources ("DWR" or "Department"), and insisted on water conservation by agricultural, industrial, and municipal users.

The Act operates like a ratchet, moving only in one direction: that of controlling water use. It requires DWR to develop a series of Management Plans that, over 45 years, will aim to reduce the quantity of groundwater used. Inside AMAs, the Act prohibits the irrigation of new lands, encourages a shift from irri-

gation to less consumptive non-irrigation uses, and prohibits a shift from non-irrigation uses to irrigation.

The basic policy objective of the Act is to achieve an equilibrium between groundwater withdrawal, and natural and artificial recharge, or "safe-yield." To achieve safe-yield, the Act provides DWR four management tools: (1) conservation requirements, (2) water augmentation and conservation assistance funds, (3) an "assured water supply" program, and (4) the potential for state retirement of agricultural land.

The conservation program which is included in DWR's management plans provides an administrative structure for statutorily-defined conservation standards, the details of which are beyond the scope of this paper. Thus far, some evidence suggests that the conservation program has not been particularly effective, but, as each successive management plan tightens the ratchet on various water users, there is hope that substantial conservation will be achieved.

The Act's conservation program contains two essential weaknesses. First, for the municipal sector, the conservation measures do not address the necessity of limiting the absolute quantity of groundwater that is used. Rather, the Legislature mandated reductions in gallons per capita per day ("GPCPD") usage. These reductions ignore the fact that, as the State's population increases, each new consumer will create additional demands for water.

Second, the Act chose generous historical measurements as the baseline for what it expected of agricultural irrigators. Although water duties assume an increase in efficiency above historic use,

the allotments are based on the maximum irrigated acres in the historic period. The Act then gives 100% credit to irrigators whose water use is below the conservation target. The credits accumulate in an uncapped "flexibility account" which farmers may either use in subsequent years or sell to other irrigators in the year immediately following the accrual. As of 1992, farmers had accumulated approximately 3 million acre feet (MAF) of credits, prompting a former director of DWR and a prominent Arizona water lawyer to conclude that "conservation requirements for some farmers are meaningless." Kathleen Ferris, *The Arizona Groundwater Management Code: The First Ten Years*, in *Arizona's Water Law: Overview and Current Topics* 129, 149 (State Bar of Arizona 1990).

The second management tool, the water augmentation and conservation assistance program, comes from the Act's provisions (and recent amendments) allowing DWR to collect annual groundwater withdrawal fees from various parties. The rationale for this program is twofold: first, to provide technical assistance and encourage acquisition of additional supplies; second, to provide grants and other direct conservation assistance. Unfortunately, the Act significantly restricted the effectiveness of this program by setting the withdrawal fees at an extremely low rate. See Ariz. Rev. Stat. Ann. § 45-611 (Supp. 1991).

In Arizona, the principal augmentation source is the Central Arizona Project (CAP). As the CAP comes on line and agricultural and municipal water providers begin to use CAP water, it is hoped that some of the overdraft problems will be alleviated. In the Tucson area, CAP will serve two-thirds of the water demand in the year 2025. Effluent utilization and recharge of surplus supplies

are also important components of the augmentation program. Other options are being considered at the state level but those that offer the possibility of yielding substantial additional water, such as watershed management and weather modification, are likely to encounter environmental objections and funding problems.

The third management tool that the Act provides DWR is the "assured water supply" (AWS) program. Under the Act, private water companies, municipalities, and private developers must demonstrate to DWR that they have an adequate supply of water for their customers prior to approval of new subdivisions. Under the Act, an assured water supply means that (1) there is sufficient quantity and quality of water available to satisfy the needs of the proposed use for 100 years; (2) the proposed use is "consistent with the management plan and achievement of the management goal"; and, (3) the water provider or developer has demonstrated the financial capability to construct the delivery system and any necessary treatment works. The assured water supply requirement has been extremely controversial.

During the 1980s, the 100-year supply element led a number of Arizona cities and towns to purchase large farms in rural Arizona with substantial water rights. The cities and towns reasoned that these water rights could either demonstrate a "supply" or the water could be transported from the rural areas to the cities for urban uses. Rural communities responded bitterly to this development which they perceived as threatening their economic independence and future.

DWR has struggled with developing rules to implement this portion of the Act. In February 1992, DWR published a concept

paper providing various options for administering the assured water supply program and setting out a two year process at the completion of which the Department will promulgate regulations.

A fourth management tool, allowing state retirement of agricultural rights, will be available in the future. As of the year 2006, the Act permits DWR to set up a program for purchasing and retiring agricultural rights. See Ariz. Rev. Stat. Ann. § 45-611(A)(3) (Supp. 1991). A problem with this tool comes not only from its delayed implementation but also from the funding for the program. Although DWR can levy and collect various fees from persons withdrawing groundwater, the fees for purchasing and retiring agricultural rights may not exceed \$2 per acre foot per year. Only a sharp increase in the fees that DWR may charge all groundwater users in AMAs will provide an adequate fund to produce a meaningful retirement of irrigation water rights.

III. RECENT LEGISLATIVE DEVELOPMENTS

The Groundwater Transportation Act of 1990 resolved many of the rural/urban issues by severely limiting the number of groundwater basins from which water could be transferred to the AMAs and by addressing various economic and environmental concerns. Other recent legislation has improved access to renewable supplies for remote portions of Active Management Areas. This additional flexibility is expected to facilitate adoption of assured water supply rules and the achievement of safe-yield. New legislation includes provisions for recharging water into aquifers for subsequent recovery, creates an "in-lieu" or indirect recharge program transferring current renewable supplies for future

groundwater rights, and authorizes the formation of new water districts in the Phoenix and Tucson AMAs. The Phoenix district, if formed, would have mandatory membership for all non-irrigation users, and a replenishment tax on all mined groundwater. The Tucson version is a voluntary approach, with water users contracting with the district for access to renewable supplies. These major changes to the Groundwater Act have addressed some of its weaknesses. The amount of energy devoted to legislation that is generally supportive of the objectives of the Act testifies to the desire to make Arizona's groundwater management system work.

IV. LESSONS LEARNED

A. Include Existing and Potential Users and Interests in Reform Efforts

The Arizona Groundwater Management Act experience offers a number of lessons to other states facing conflicts between an increased demand for water and inadequate supplies. First, it is extremely unlikely that any legislation will pass that does not protect the interests of existing water users. In Arizona, the GMA was the product of prolonged and sensitive negotiations among irrigators, the mines, and cities. Their constituencies accounted for essentially all water consumption in the State. Had any of the three key interests refused to get aboard, the Legislature would not have enacted the Act.

When existing interests were excluded, problems ensued. The failure to include rural interests, developers, private water companies, Native Americans, and environmentalists in the negotiating sessions has proven to be a source of conflict since 1980.

The developers have been most upset about the assured water supply rules, while environmentalists found the lack of protection for in-stream flows and riparian habitat problematic. As a consequence, the State has recently been reexamining the structure of the GMA in light of the interests of developers and environmentalists. The failure to include less powerful, though still substantial, interests permitted the legislation to be enacted but put off the day of reckoning with developers and environmentalists.

B. Respect the Teachings of History

Another lesson concerns respecting the wisdom of history. In Arizona, there is deep-rooted antipathy between the cities and mines, on the one hand, and farmers on the other. In Arizona and every other western state, farmers consume 80 percent or more of each state's water. Cities criticize farmers for using excessive water. Farmers, in turn, perceive the cities as attempting to take away their way of life without compensation. In Arizona, the cities and mines have opposed buying farmers' water rights because that would allow the farmers "to retire to La Jolla and raise martinis." Without such a program, however, the Arizona experience suggests that it may be impossible to achieve safe-yield.

It is essential both to recognize this historical antipathy and devise ways to bring the antagonists together. All interests in the State of Arizona have a significant stake in achieving the safe-yield goal. Otherwise, the water table in the aquifers will continue to decline, thus imposing on all users spiraling energy costs. As U.S. Congressman George Miller said in a speech last December, "Only in water are we prepared to lock up the resource

in a fashion as to deny it the flexibility to meet competing needs."

A recent proposal toward this end is retiring current water uses. See Robert Jerome Glennon, "Because That's Where The Water Is": Retiring Current Water Uses To Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act," 33 ARIZ. L. REV. 89 (1991). Without a reduction of water use by current users, it may be impossible to achieve the safe-yield goal because each new user places additional demands on the resource. The most likely area to curtail current uses is agriculture which annually consumes 80% of the State's water. The proposal advocates creating incentives to reduce irrigation use. Although the mechanics of this proposal are beyond the scope of this paper, DWR could use the assured water supply program in order to require or provide incentives to new development to purchase and retire existing water rights. By conditioning new water uses on achieving a net reduction in water consumption, Arizona can move towards safe-yield.

This proposal takes into account the profoundly changing role of agriculture in Arizona's economy. As recently as 1960, agriculture contributed approximately 25% to the total state income. Today, however, that figure hovers around one percent. Many farmers and irrigation districts are eager to sell their land and/or water rights to cities and developers. The development community may agree to absorb some increase in costs in exchange for a supply of potable water.

Reality

Arizona has a bifurcated system of surface and groundwater law which results in considerable inconsistency in achieving water management goals. Arizona's grandfathered groundwater rights system in AMAs moves away from the reasonable use philosophy of prevailing groundwater law. For the owners of farmland, the right to irrigate exists in perpetuity, but there are incentives and requirements to conserve water. Arizona's surface water law of prior appropriation (first in time is first in right) unfortunately is inconsistent with its groundwater law. The most significant conflict is the failure to protect senior surface water diverters from junior pumpers of hydrologically-connected groundwater.

The Department's position is that all sources of water need to be managed conjunctively to achieve the safe-yield goal. However, recent court cases such as Arizona Public Service v Long, 160 Ariz. 429, 773 P.2d 998 (Sup. Ct. 1989), have dealt major blows to the Department's authority to manage effluent even indirectly. The failure to focus on the general water supply conditions, regardless of the source of supply, may be the weakest part of the Code.

The incongruence of the surface and groundwater law is a major concern in two pending General Adjudications of surface water rights. These Adjudications will determine the priority and volume of surface water rights in the Gila River and Little Colorado River watersheds, which cover most of the State. The Gila River Adjudication, with 66,000 claims, is one of the largest civil cases ever handled in the United States. A primary dispute involves ground-

water pumpage in the vicinity of streambeds. If the Special Master determines that groundwater pumping of water hydrologically-connected to surface flows interferes with senior prior appropriation rights, this finding may conflict with groundwater rights established by the Act. Because the Adjudications will probably stretch out over 15-20 years, the outcome of these conflicts will not be known for some time. The lesson from this experience is the imperative of avoiding the construction of legal boundaries that are not hydrologically supportable.

Arizona has enjoyed more success in respecting hydrologic reality and regional differences in the establishment of AMAs. The focus on the AMAs has proven a bit myopic because rural areas have been virtually ignored while a major planning effort was concentrated on the AMAs, but the use of basin boundaries rather than political jurisdictions facilitates sound policymaking and administration. It has allowed the planning process to respond to localized demand and supply conditions as well as to specific community values. The recent water transfer debate illustrates that the data gathering and planning focus must now respond to the needs of water users in rural areas as well. This fall, the Department will release for public review a State Water Assessment which will analyze water supply and demand issues statewide.

D. Assured Water Supply: The Ongoing Debate

The original drafters of the Act chose not to address the thorniest issue in groundwater management, limitations on groundwater usage by municipal development. Although the Act's criteria for assured water supply require that new developments use water in a manner that is consistent with the management goal, the Act

left the specifics of this program to the discretion of the director through the rulemaking process. Lloyd Burton in "The Arizona Groundwater Management Act: Origins and Issues" in Taking the Arizona Groundwater Management Act into the Nineties, Univ. of Ariz. Water Resources Research Center, issue paper No. 8, at 13 (1990), offers a historical explanation for this situation:

An analysis of negotiations leading up to the act's passage indicates that, to a remarkable extent, the director was given so much power for much the same reasons that the interior secretary gained control over management of the Lower Colorado River in the 1968 act authorizing construction of CAP. Essentially, whenever negotiators came upon an issue over which they reached an impasse and compromise proved impossible, they simply decided to delegate that determination to the DWR director.

The financial implications of the assured water supply program for individual landowners are significant because renewable water supplies will have to be used in lieu of mined groundwater. The political implications have become painfully obvious. In fact, the Department's first attempt to adopt assured water supply rules in 1988 resulted in such a public outcry that the proposed rules were withdrawn. The lesson from this Arizona experience is that too much administrative discretion may be as damaging as too much legislative involvement in the details of implementation.

The assured water supply rules that are now in process are expected to be substantially different from those promulgated in 1988. The Department's concept paper concentrates on the issue of consistency with the safe-yield goal. This is the key component of the program, because it controls how much groundwater will be pumped for future municipal use. The Department is attempting to maximize public input because of the substantial implications.

Despite the political outcry, the impending development of assured water supply rules signals a major achievement: long-term planning has become a reality. Arizona's historical dependence on groundwater has insulated many areas from the impacts of short term drought. But, as the state has become more dependent on renewable supplies, water supply and demand projections have become routine parts of utility planning.

An even more amazing change since 1980 is the acceptance of the role of conservation in water supply planning. When compared to identifying and obtaining new supplies of water, the cost-effectiveness of conservation is no longer questioned by most large utilities. The long-range plans for the cities of Tucson and Phoenix, for example, substantial reductions in demand over the next 100 years as a result of plumbing and landscape ordinances, conservation-oriented rates, education activities, rebates and other conservation programs. Effluent use, which is used interchangeably as a conservation program and a supply enhancement, has also gained legitimacy and acceptability as municipal providers scramble to show sufficient long-term supplies.

E. Mandatory Conservation: The Need for a Kinder, Gentler

DWR

Despite the growing acceptance of conservation, Arizona's highly regulatory approach to conservation has been strongly criticized by farmers and municipalities alike. The lessons to be learned from this criticism include: first, that legislated, enforceable conservation requirements must not impose an overwhelming administrative burden on the agency or the regulated com-

munity, and, second, that incentive and assistance programs should accompany regulatory measures.

Unlike the assured water supply section of the Act, most conservation standards in the statute are extremely specific, especially for the agricultural sector. These requirements have resulted in a data-intensive, cumbersome process for setting annual allotments for farms. The analysis used in setting a farm's "water duty" includes crop histories, consumptive uses for each crop historically grown, cost-benefit studies of various alternative management practices and irrigation systems, amortization costs, subsidies, etc. Using this information, the Department has set allotments for 10,000 farms.

In order to try to be as equitable as possible, the Department developed a highly sophisticated water allocation model. The complicated data base and assumptions have resulted in substantial confusion and suspicion on the part of the agricultural community. In the context of a devastating economic climate and plummeting crop prices, agricultural interests have generated substantial sympathy in the Arizona Legislature. As a result, a bill may pass this session that will reduce agriculture's future conservation requirements, in spite of the millions of acre-feet of credits in farmers' flexibility accounts.

DWR's conservation programs, which are more highly regulatory than those in any other state, have created a communication problem with the regulated community. As one effort to foster better relations, DWR supported a recent amendment to the Act that added conservation assistance programs to the management plans. The

combination of a carrot and a stick will hopefully result in increased water conservation.

V. CURRENT CONTROVERSIES

This section will consider several recent and unresolved controversies. These disputes pose significant political, economic, and environmental challenges to the State of Arizona.

A. Indian Water Rights Settlements: The Last Watering Hole?

A major wild card in the Arizona water management scheme is the settlement of Indian water rights claims. The Indian reservations in Arizona are so large that application of the practicably irrigable acreage ("PIA") standard would undoubtedly exceed the entire State's annual renewable supplies. Negotiated settlements have made substantial progress in quantifying Indian water rights claims. For one tribe alone, the Gila River Indian Community, the negotiations involve a water budget of 650,000 acre-feet per year. Thus, the impact on other users may be profound.

It is not clear how the Indians will use the water rights obtained through these settlements. Although some water will undoubtedly be used for agricultural and municipal uses on reservations, it is assumed that Indians will lease, transfer or exchange much water to non-Indian users. The quantities of water involved clearly make this potential source the "next watering hole" for thirsty municipal interests. Some speculation suggests that the Central Arizona Project canal, originally conceived as an agricultural project, then transformed into a municipal growth

supply, may end up delivering more water for Indian claims than to any other sector.

B. The Central Arizona Project: An Impending Crisis?

Water issues in Arizona have been multiplying over time as DWR has struggled to implement the Act. In the 1992 legislative session, the Department tracked over 40 water-related bills. However, these regulatory issues pale in relation to the potential crisis associated with the Central Arizona Project.

In 1968, the Colorado River Basin Project Act authorized construction of the CAP. Over 330 miles in length, the canal will bring Arizona's share of Colorado River water to municipal entities in central Arizona such as Phoenix and Tucson, as well as numerous irrigation districts. It includes 13 pumping stations that will lift the water 3,000 feet to the terminus south of Tucson. The total cost of the project is almost four billion dollars, including non-federal distribution system costs.

The Central Arizona Water Conservation District (CAWCD) is a three-county special district that will operate the CAP canal and oversee the repayment of Arizona's share of the cost, approximately two billion dollars. Prior to 1995 when the aqueduct is completed, the State will begin annual payments of approximately \$45 million to repay capital charges and fixed operations and maintenance charges. CAWCD's revenues come from the sale of water and power, plus an ad valorem real estate tax that has been collected since 1974.

In 1983, the U.S. Secretary of the Interior allocated 638,823 acre-feet of CAP water per year to municipal and industrial (M & I) users and 309,828 acre-feet per year to Indian users. The CAP

allocations for agricultural users are based on a percentage of the available supply because agricultural users have a lower priority on the system and are expected to take reduced deliveries in shortage years. The CAWCD has estimated the amount of CAP water available for agriculture in a "normal" year to be 550,000 acre-feet.

It was assumed that agricultural users would take the bulk of the CAP deliveries in the early years, with municipal uses expanding over time as agricultural lands are converted for urban development. CAWCD's subcontractors have constructed distribution systems for agriculture that can deliver approximately 900,000 acre-feet per year. There is currently no other demand in Central Arizona for the use of this much water, and some observers believe the water will not be used for the next 20 to 30 years.

As the CAP system nears completion, there is substantial doubt about whether agricultural users will be able to afford to use their CAP allocations. The size of the agricultural debt is a staggering \$300 million with more than 2/3 in federal interest-free loans and the remaining debt in private loans. Moreover, a combination of circumstances, mostly related to the falling price of cotton and assessments charged by irrigation districts to pay for CAP capital improvements, has pushed many agricultural districts to the brink of bankruptcy. Arizona Governor Fife Symington, with assistance from Elizabeth A. Rieke, Director of DWR, has initiated a task force with representatives from water agencies, municipalities, agricultural and Indian interests to identify mechanisms to utilize more CAP water in the early years. Ideas being contemplated include a tax to maximize recharge opportunities, municipal subsidies of agricultural use in exchange for

some future benefit in water or money, and the possibility of sale or lease of CAP water out of state.

In addition, U.S. Congressman George Miller, the chairman of the Committee on Interior and Insular Affairs, has affected CAP utilization in Arizona by taking a strong stand for reclamation reform. As a consequence, large farms in Arizona (over 960 acres in size) continue to be precluded from using CAP water. As an unfortunate by-product of this reform, these farms will continue to use mined groundwater into the foreseeable future.

The potential for agricultural bankruptcies and the difficulties farmers face in meeting their repayment obligations are substantial concerns. These concerns are exacerbated by pressure from California to continue to divert Colorado River water in excess of its 4.4 million acre-feet allocation (MAF). The lower basin states have an annual right in a normal year to 7.5 MAF. As Arizona's usage increases, California must reduce its normal year diversions from the present level of 5.2 MAF.

In addition to California's 6-year drought, other factors have increased California's need for additional water supplies to serve the southern part of the State. The endangered species issues and water quality problems in the Bay-Delta have curtailed diversions from the Sacramento River. A recent judicial decision protecting fish habitat in streams that feed Mono Lake has also limited supplies available to Los Angeles. Finally, the demographics of Southern California suggest that water demand will increase in spite of conservation efforts.

In August 1992, California through the Colorado River Board of California, circulated to the other Colorado River Basin States

a report containing several proposals to increase California's interim supply of Colorado River water. The concept paper recognized that Colorado River reservoir levels are currently being drawn down. California argued, however, that average annual runoff exceeds average annual depletions and a surplus therefore exists that should permit California to increase its diversions. Second, the report advocated creation of an "interstate water bank," that would allow individuals to sell Colorado River water across state lines. Finally, the report suggested establishing an escrow account to pay "damages" for excess use. Since all of these proposals are likely to damage Arizona's interests, Arizona has been understandably reluctant to negotiate on these points. Arizona and other basin states recognize, however, that California's water supply problem will take time to resolve.

There is also considerable trepidation in Arizona that California might flex its incredible political power in Congress to amend the Boulder Canyon Project Act, which initiated the allocation of Colorado River water among the upper and lower basin states and Mexico. If this were to happen, Arizona's short-term inability to utilize CAP could result in a loss of long-term supplies due to the possibility of a congressional reallocation.

The desire to maximize CAP usage has resulted in ten indirect or "in-lieu" recharge projects and applications. The indirect recharge projects involve delivery of excess CAP water to agricultural users in return for the right to pump the groundwater that they would have used. Most of these projects are being subsidized by CAWCD or municipal interests, who will benefit from the recharge credits in the future.

Another groundwater management implication of this temporary glut of available CAP water is the difficulty of enforcing conservation requirements while simultaneously encouraging additional CAP use. The Department's perspective is that despite the temporary high resource availability all water supplies should be used efficiently. However, the Department has taken steps to relax the conservation targets for municipal and agricultural entities that are using non-groundwater supplies. For example, the Second Management Plan contains an Alternative Conservation Program that allows more water use in the non-residential sector if the use is based on non-groundwater supplies.

The Arizona Legislature is presently considering a bill (HB 2452) that provides an alternative to the gallons per capita per day ("GPCD") standard for municipal providers who eliminate their dependence on mined groundwater. The bill would allow the Director to replace the GPCD standard with residential and non-residential measures designed to achieve the same efficiency as the GPCD. However, if the bill passes, total water use by these entities may increase. In the case of the agricultural sector, the bill would substantially relax the conservation requirements. The bill would permit higher water duties for those using non-groundwater supplies, exemptions for some areas that are upstream in an aquifer from a waterlogged area, and easier water duty standards in the management plan that takes effect in the year 2000.

Another component of the current water supply scenario is interest shown by California and Nevada in recharging surplus Colorado River water in Arizona, in the expectation that Arizona would need to divert less Colorado River water in dry and normal

years. Nevada interests have also considered buying Arizona farmland with CAP allocations so that the allotment could be used permanently in Nevada.

Among the CAP use options receiving the most attention in Arizona are subsidies for agricultural water users. Some feel that irrigation districts are in such bad financial shape that cheaper water costs will make little difference in their viability. Others believe that increasing CAP utilization is worth whatever it costs, even if a side-effect is artificially supporting the agricultural economy.

CAP issues are evolving rapidly at both the interstate and intrastate level. Hopefully, the "crisis" can be reframed into an opportunity to resolve a number of water allocation issues and institutional limitations.

C. Colliding Regulatory Objectives

State administrative agencies are pulling water providers in different directions. On the one hand, the State's public utility commission (the Arizona Corporation Commission) has authority over privately-owned water companies. These for-profit corporations receive an exclusive franchise from the ACC and, in return, agree to provide water to anyone within the service area. The ACC comprehensively regulates private water companies, especially the rates charged to customers. Because the ACC understandably envisions its mission as preventing private water companies from exploiting their monopoly position and gouging their customers, the Commission insists that companies have a convincing justification for a rate increase. Moreover, the rate increase process, involving public notice and hearings, consumes a considerable period

of time and is itself rather costly. This "regulatory lag" slows the implementation of any rate increase.

In sharp contrast, the conservation mandate of the Groundwater Management Act encourages higher water rates, at least in the short term. Natural resource economics suggests that water consumption is responsive to the price structure of a market system. Sharp increases in water rates almost always translate into reduced consumption. While DWR is insisting that water companies encourage their consumers to conserve water, the ACC opposes significant rate increases for fear of consumers suffering "rate shock." The ACC has also been reluctant to allow "pass-through" of conservation costs to customers, or to allow increases to offset the reduced revenues that result from a successful conservation program. Results of some recent rate hearings indicate that the ACC may also be limiting access to renewable supplies through their pricing policies.

One finds a similar collision of regulatory objectives between the ACC and the Arizona Department of Environmental Quality ("DEQ"). The ACC seeks to maintain the lowest possible water rates while DEQ favors higher rates that would generate funds to assure water quality protection. As the state agency charged with primary responsibility over the environment, DEQ has an obligation to insure that the requirements of the Clean Water Act and the Safe Drinking Water Act are met. Recent amendments to these acts have created substantial financial demands on water utilities around the country.

In Arizona, a utility may receive reimbursement for costs associated with complying with these acts, but only after the

expenditure has been made. The rub comes when a water utility expends funds for water conservation or water quality pursuant to DWR or DEQ regulations, and later discovers that the ACC is unwilling to allow the utility to recover these moneys from its rate-payers. Needless to say, this process does not encourage utilities to engage in water conservation or water quality efforts. In 1989, these conflicts led to the creation of a Private Water Company Advisory Committee, composed of representatives of the three state agencies and private water companies. The Committee was alas, unable to resolve the conflicts, although a policy statement in support of conservation was ultimately adopted by the ACC.

For both municipal water companies and private water companies, existing water rate structures impede the providers' ability to meet environmental and conservation requirements. The utility rate principles for water do not recognize that the resource has any inherent value. A quick reminder of basic principles of water law may help make this point clear. Water law traditionally recognizes rights to divert surface water based on the Prior Appropriation Doctrine (first in time is first in right) and to rights to pump groundwater based on the Reasonable Use Doctrine (any application for a beneficial use is permissible). These doctrines allow exploitation of a valuable resource, oftentimes a nonrenewable supply, without exacting any fees or charges for the resource. In other words, the water is free. To be sure, a farmer who diverts surface water must bear the cost of constructing the ditches and canals for transporting the water from the water course to his or her fields. Similarly, a groundwater

pumper often bears substantial electric or other energy costs. These costs notwithstanding, the resource is still free.

Thus, investor-owned water companies must attempt to serve two masters. DWR, pursuant to the Groundwater Act, requires water providers to establish water conservation programs. However, the Department has no power to impose rate increases or exact costs. Instead, it must focus on mandating efficiency standards or specific conservation programs, such as retrofitting of toilets or prohibitions on single-pass cooling water. One might think that higher water rates would better achieve water conservation, thus rendering unnecessary programs mandated by the administrative agency.

The commendable concern with protecting the consumers of both public and private water companies has unfortunately limited the flexibility of these water providers to encourage water conservation among their consumers. To eliminate these conflicting regulatory objectives may require substantial legal and institutional changes that would allow the implementation of an environmentally-sensitive structure of water pricing.

VI. FUTURE PROSPECTS

Judging from the ever-escalating pace of amendments to the Groundwater Management Act, there is some cause for concern regarding whether its essential structure will survive. Although recent changes have generally supported achievement of the safe-yield goal, it remains to be seen whether the Legislature will provide DWR with adequate resources to administer and enforce the increasingly more complex Act. Having already taken a 10% cut this

year, the DWR staff now faces an additional 10% reduction, while new responsibilities proliferate. It is possible that the whole structure could collapse under the sheer weight of this administrative burden.

On the other hand, some recent legislation substantially reinforces the commitment to safe-yield. The Replenishment District legislation in the Phoenix AMA, for example, would result in safe-yield for municipal and industrial users 15 years prior to the 2025 deadline.

The success of the Arizona water management approach seems more apparent on supply-side issues than on conservation. In analyzing the savings available from conservation, it is clear that agricultural retirement and increased utilization of CAP and effluent are crucial to achievement of the safe-yield goal. The availability of Indian water right settlement water for off-reservation uses is critical, as is the resolution of the CAP utilization crisis and interstate negotiations over Colorado River water. The assured water supply rules also hinge on renewable supply availability. Institutional changes like the Augmentation Authority and the Replenishment District should enhance opportunities for outlying areas to have access to these supplies, thereby enhancing the political acceptability of the rules and the likelihood of achieving safe-yield.

In whatever way Arizona resolves these current issues, one thing is certain: new problems will emerge. Increasing demands on a limited resource that is nothing less than the essence of life will prevent any solution from being permanent.

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