

20 Years of the GMA

From Secret Negotiations to Public Policy

The need to control groundwater use in Arizona had long been apparent, but the will to act was lacking. In 1980, various interests rose to the occasion and negotiated the Groundwater Management Act. Signed into law on June 12, 1980, 20 years ago this year, the GMA became the law of the land.

The story of the passage of the GMA is an oft-told tale in the history of Arizona water policy. Gov. Babbitt, responding to a federal threat to cut off CAP funds, worked with an unofficial "rump group," which included representatives of major state interest groups – mining, agriculture and urban. The rump group met in closed negotiating sessions, and the GMA was the result of its labors.

Its passage was not met with unqualified support. Critics complained of the process of negotiating the GMA, claiming, not without justification, that it was undemocratic. The rump group met in private, without public input and outside the purview of the press. Because the rump group was not

Continued on page 12

Raising the Hidden Waters



Through the ages, varied devices brought groundwater to the surface, from windmills and hand pumps to the modern power pump. More complicated than pumping groundwater is regulating groundwater use. Arizona's Groundwater Management Act performs this vital chore. (See GMA story at left) Bottom photos: SRP Archives. Design K. Carpenter.



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Feds, State Work Out CAP Cost Settlement

Other Issues Await Settlement Before Final Approval

In 1993, the U.S. Bureau of Reclamation declared the Central Arizona Project substantially complete. Seven years later, a period of time marked by dispute and litigation, the state of Arizona and the federal government have finally agreed on the amount the state owes as reimbursable costs of building the \$4.7 billion, 336-mile-long canal.

The settlement fixes Central Arizona Water Conservation District's repayment obligation at \$1.65 billion, a significant decrease from the \$2.3 billion the federal government initially sought. Further, the state will receive credit for money paid since the project was completed in 1993. The agreement also allows CAWCD to re-

Continued on page 2

CAP... continued from page 1

tain the exclusive right to market excess water; i.e., CAP water not under contract or under contract but unused by a customer. The agreement is expected to save Arizona \$700 million, over the 50-year payback schedule.

The federal government had initially rejected an Arizona offer lower than the requested \$2.3 billion. Arizona then sued, and a federal judge agreed the state owed no more than \$1.78 billion.

The reimbursement settlement means that property tax payers and water users within the three counties served by CAP — Maricopa, Pinal and Pima — may get a break, with lower property taxes or water rates. CAWCD's payment to the United States for CAP derives from sales of water, excess power and a property tax valuation in the three counties.

In arranging repayment, the CAWCD has agreed to support a congressional act allowing BuRec access to the Lower Basin Development Fund. This fund includes money CAWCD earned by selling electric power and is now to be used to cover Arizona's CAP reimbursement costs. This represents a significant breakthrough in federal reclamation law. BuRec gains use of funds unappropriated by Congress, to be applied to develop Indian water, including the building of water distribution systems.

Although Arizona gained with the settlement not all state water users gained equally. In the long run, farmers eventually will be losing the cheap, abundant water supplies CAP has provided for over a decade. Urban areas instead will be favored by allowing municipal allocations of agricultural priority water. Agriculture will have first options on most annual excess water for the first 30 years. After that period, however, most water will be taken under long-term contract, to the advantage of urban areas.

To help settle longstanding Indian disputes, Arizona will give up its rights to 197,500 acre-feet of CAP water or 13 percent of the canal's total annual capacity, with the federal government expected to use this water to settle Indian water disputes. The tribes in turn could then lease the water to rapidly growing Arizona cities.

Like the final agreement with regards to Arizona's reimbursement costs, the amount of CAP water the state would relinquish for Indian water settlements came after long negotiations. Initially, the federal government requested 240,000 acre-feet. The state responded by determining specific figures of what would be needed for Indian water settlements, for the Gila River Indian Community and the Tohono O'odham, with an extra amount to be used for future settlements. The figures finally accepted were 102,000 acre-feet for the Gila River Indian Community, 28,200 for the Tohono O'odham and about 67,300 for later settlements.

Negotiations also determined the type of water the federal government is to get. At present, 65,600 acre-feet of uncontracted M&I water is in the CAP canal, which the state wants to allocate

to various cities. The federal government intended to take this higher M&I priority water for Indian water right settlements. As part of the negotiated settlement, however, the state gets to keep the M&I water, with the federal government taking agricultural priority water for its 197,500 acre-feet.

To win this concession, the state agreed to act as the federal government's water banker, storing agricultural priority water for at least 100 years, to use in time of shortage. This will involve state expenditures.

Another condition of the settlement is that the BuRec will seek funding from Congress for environmental programs on the Gila and Santa Cruz rivers. Expense for the construction of the CAP, including environmental costs, are potentially shared between the U.S. and the CAWCD. In this case, however, the federal government agrees to pay the total expense of the environmental programs on the Gila and Santa Cruz rivers.

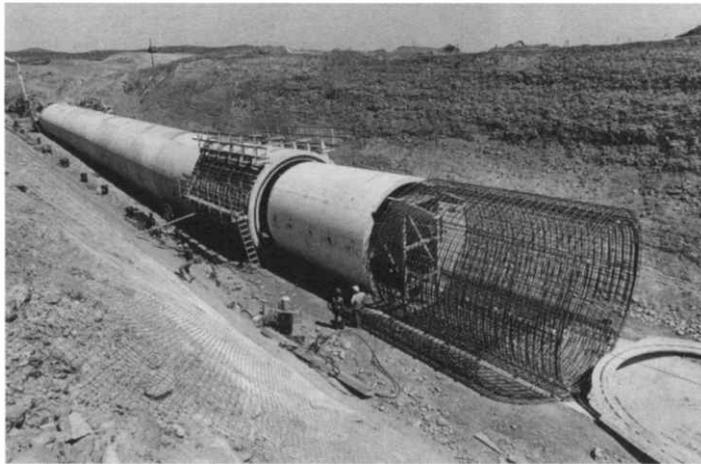
Progress made thus far represents the first step in a complex process, with acceptance of the CAWCD settlement contingent upon two other settlements also to be worked out. Also in need of resolution are water right disputes with the Gila River Indian Community and the Tohono O'odham Nation.

Final approval of the CAWCD settlement also is contingent upon the Secretary of the Interior finalizing the allocation of CAP water, with federal and nonfederal percentages established. The state needs to ensure a sufficient amount for growing municipal needs, and a good system must be in place to ensure supplies of affordable CAP water to irrigation districts, to use instead of groundwater.

The terms of the above settlements — the Indian water rights and CAP allocation — must be worked out and met within three years. If such conditions are not met within this time period, CAWCD or the U.S. has the right to return to court and resume the lawsuit over the cost of the CAP system.

The above three related, but divergent strands will likely merge into a single congressional bill. Such a bill will include the CAWCD settlement, final allocation of CAP water, along with the terms of the Gila River Indian Community settlement, which will include funding and an allocation of water. Congressional approval is key to settling the range of issues.

At its March 2 meeting, the CAWCD board approved the CAP settlement by a vote of 12 to 1. Federal officials have tentatively signed off on the settlement. The agreement, however, also must be approved by several federal agencies, with the federal approval process expected to take about 4-6 weeks. Because the agreement is meant to settle the lawsuit Arizona filed against the federal government in 1995, U.S. District Judge Earl Carroll, who has presided over the lawsuit, also must approve. The final step will be drafting a bill for congressional approval.



Arizona's share of the cost of building the CAP was a much disputed issue.



Water Vapors

Canada Turns Off Spigot

A recent news release stated that Canada is placing a ban on bulk water removals, including water for export, from all Canadian water basins.

Few Arizona water users found reason to greet this news with dismay. Few grimaced at the perfidious workings of fate in placing this legal barrier to the state acquiring its share of Canadian water. Few indeed even thought of Canadian water as providing relief to Arizona water supply problems. Yet, upon hearing of the Canadian decision, a few hearty souls may have looked northward with glazed expressions and thought of those buccaneering days of yesteryear when water planners thought big, real big.

Thinking Big

The North American Water and Planning Alliance was a big, big water project, with its name and even its acronym, NAWPA, resounding mightily. NAWPA was the mother of all water projects, a truly mind boggling plan to pump, transport, store, distribute and redistribute water internationally, from Canada, to the United States, even into Mexico. Colossal dams, broad reservoirs, powerful pumps, and deep tunnels and trenches, all were to be used to enable NAWPA to accomplish seemingly Old Testament feats. The flow of rivers would be reversed, and water would flow through tunnels burrowed under mountains.

To reach Arizona and the Southwest, Canadian water would undertake an epic journey, flowing relentlessly southward, its route set by grandiose engineering strategies. For example, there were the Sawtooth Lifts, gigantic siphons capable of shooting 30,000 cubic feet of water per second through tunnels in the Sawtooth Range of Idaho. The water then would surge onward to California, Nevada, Arizona and Mexico. Arizona was to have a lake, formed by a huge reservoir, and the lake was to be called Lake Geneva.

The plan came to naught, and the memory of it now stands as a monument to those stalwart bygone years when the engineering fix promised to solve all water

supply problems. Build it, and it will come. A shift in thinking eventually occurred, and managing water by law and public policy carried the day. Better management and use of available water resources seemed a more likely strategy for ensuring needed water supplies than building extravagant and costly projects to import new water.

Old West/New West

Canada's recent action in prohibiting transboundary shipments of water therefore is not likely to inspire dreams of what might have been; instead it jolts us into realizing how far we have come in our thinking about water resources, from NAWPA to such public policy efforts as the Arizona Groundwater Management Act (GMA). Yet NAWPA, in its slapdash, buckaroo recklessness, can almost be admired, like a legend of the Old West, even if its credibility is in extreme doubt.

Come to the Conference

Meanwhile, the GMA, a product of the New West and now celebrating its 20th anniversary, has proven its credibility and is worthy of admiration and critical attention. Thus, the Water Resources Research Center's GMA 20th anniversary conference, to discuss and evaluate the law, its past, present and future. At its passage, the GMA was nationally recognized as a creative and innovative piece of legislation, in its efforts to control groundwater use. Attend the GMA conference to find out how the law has stood up to the challenges and vicissitudes of time. (Hint: It has fared

better than the NAWPA idea.) See page 10 for additional information about the conference.

Coming Soon: Help Wanted

The University of Arizona's Water Resource Research Center will soon be seeking applicants for its position of assistant director. In its operations, services and its coverage of water issues, the WRRRC covers a lot of ground, and the best person for the position will need to have the flexibility and creativity to work with this multifaceted operation. The person will need to have knowledge of the many water issues of importance to Arizona and the West and be able to work with a wide range of people, from research specialists and regulators to consultants and interested members of the public, including members of both the public and private sectors. Above all the applicant should be able to provide leadership to a team of creative and dedicated people — i.e. present WRRRC personnel — in its varied efforts to serve the Arizona water community. Upon official approval, the position and application requirements will be posted on the WRRRC website, <http://ag.arizona.edu/AZWATER/>

Drought Buster

The Agriculture Department will, on about June 15, test the efficiency of the theory that rainfall can be produced by exploding dynamite carried into mid-air by balloons. The exact locality in the desert for the experiment has not been divulged... —*The Arizona Daily Star June 12, 1891*



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Arizona Water Resource Staff

Editor: Joe Gelt
 Editorial Assistant: Joel Spezeski
 Reporters: Val Little
 Barbara Tellman

Arizona Water Resource

Water Resources Research Center
 College of Agriculture
 The University of Arizona
 350 North Campbell Avenue
 Tucson, Arizona 85719

WRRRC Director: Dr. Peter Wierenga

520-792-9592; FAX 520-792-8518
 Email: wrrc@ag.arizona.edu



News Briefs

Stage Set for Big Wildfire Season, Despite Recent Rains

The swing from El Niño to La Niña has created conditions in the state that threaten severe wildfires, and forest firefighters fear the worst.

"All the indicators are pointing toward severe fire conditions if we don't get sustained, saturating rains and snow," said Ted Moore, a U.S. forest fire management officer. Climatologists expect La Niña to continue through the spring.

The current dry conditions fit a pattern proven to be especially combustible. The state has experienced some of its worst wildfire seasons when dry seasons followed El Niño years by one to three years, said Tom Swetnam, director of the University of Arizona tree-ring lab. This is the situation in the state today. The four-month period beginning Oct 1, 1999 was the driest such period in recorded state history, dating from 1895.

During the El Niño years of 1997 and 1998, grasses, weeds, brush and trees grew profusely in response to the abundant precipitation. Then in June 1998, the moist El Niño season faded and La Niña arrived with dry conditions that still prevail. The lush El Niño vegetation is drying out to become tinder as dry conditions persists.

Some relief was provided by a winter storm that dropped about 1.5 inches of rain in the Tucson area and 2.77 inches in Phoenix during the first weekend in March. More than 2 feet of snow fell in parts of northern Arizona. Before that storm, the Arizona Snowbowl, the ski area northeast of Flagstaff, had opened in February, its latest opening on record.

The welcomed precipitation however only provided a short-term fix. The U.S. Forest Service still expects an early and possibly intense wildfire season and is seeking additional federal funding to cope with the situation. The money would be used for more firefighters, air tankers and helicopters.

It is not just the West that is experiencing dry conditions. The National Weather Service recently warned that the United States is in the midst of a worsening

drought following the warmest winter on record. Spring drought forecasts say dry conditions are going to persist and, in some areas, intensify. States expected to be hardest hit are Arizona, Texas, Louisiana, Mississippi, Arkansas, Alabama, Tennessee, Florida and Georgia in the south-southwest and Nebraska, Iowa, Illinois and Indiana in the north-central United States.

Report Faults States, EPA for Expired NPDES Permits

Two environmental groups recently issued a report, the "Clean Water Report Card," indicating that more than 25 percent of the nation's 6,000 major sources of water pollution are operating with expired control permits. Individual states are rated either pass or fail, with each state's grade based on the percentage of expired permits at the beginning of the year. Arizona received a failing grade.

States with more than 10 percent of their permits expired were failed based upon a 10 percent maximum permit backlog set by EPA. The Clean Water Act requires permits to be renewed at least every five years. With each new permit, the pollution limits are lowered toward the eventual goal of zero pollution.

In 43 of the 50 states, clean water permits are issued by state regulators, with EPA running the program in the remaining seven states, including Arizona.

The report card presented the following information about Arizona derived from EPA's Envirofacts database on water discharge permits:

Arizona has 46 NPDES permits classified as major; of those 24 percent (11 permits) were expired as of January 18;

The oldest permit has been expired for 72 months; the average age of expired permits is 21 months;

According to EPA, approximately 12 percent of the state's NPDES permits are classified as major.

The findings add fuel to the controversy that governors of many states and the EPA are not enforcing basic pollution laws. Under pressure from Congress and the Congressional Inspector General, the EPA has recognized the seriousness of the current Clean Water Act permit backlog. Last year, the agency set a goal of reducing the expired permit backlog to no more than 20 percent by the end of 1999 and no more than 10 percent by 2001.

The assistant administrator of the EPA's Office of Water says the backlog is due to increase sources of pollution.

Friends of the Earth and the Environmental Working Group issued the report that is available on the FOE website at www.foe.org/cleanwater/grades. The website provides additional information about Arizona, including a list of facilities with expired permits.



The San Pedro River rolls on. (Photo: B. Tellman)

Recharge Project to Protect San Pedro Flow

The city of Sierra Vista is undertaking a \$7.5 million wastewater treatment project that will protect and sustain the waters of the San Pedro River. The project will be funded through a combination of federal, state and local funds, including a \$925,000 grant from the federal Housing and Urban Development department, \$1.522 million from the U.S. Bureau of Reclamation and \$2.252 million from the Arizona Water Protection Fund Commission. The remaining cost of the project will be paid by residents through sewer usage fees.

The Sierra Vista Wastewater Recharge Project involves the City of Sierra Vista constructing a water reclamation facility, a 10-acre lagoon system, a 50-acre wetlands complex and up to 30 acres of groundwater recharge basins. Treated wastewater will flow through the wetlands to further improve its quality, then be delivered to recharge basins for infiltration into the aquifer. The plan is to create an underground mound of water between the river's aquifer and the wells in the city. Officials are hoping that the project will return between 800 million and 1 billion gallons of water into the ground annually.

Groundwater levels in the area have been dropping for several years due to excess pumping. The result has been reduced flows in the San Pedro River. These flows are needed to support the riparian ecosystem within the national conservation area.

Uranium Tailings Near Colorado River May Move

Prospects now look good that a 10.5 million-ton uranium mill tailings site near the Colorado River at Moab, Utah may be moved. The result of 30 years of uranium production, the tailings are slowly releasing radiation and heavy metals into the Colorado River and downstream bodies of water.

U.S. Department of Energy Secretary Bill Richardson announced his support for a plan to transfer control of the site from the federal Nuclear Regulatory Commission to his agency.

The NRC lacks the authority to move the tailings pile and recently approved a plan to leave the tailings in place, despite its own studies showing that uranium, ammonia and nitrates were leaking into the Colorado River. NRC officials stated that the contamination posed no danger to down river water users.

Richardson recently visited the Moab tailings dump site with a proposal to spend \$300 million to clean up and remove the tailings that cover the equivalent of 118 football fields. Funding for the clean-up effort is included in President Clinton's proposed federal budget for fiscal year 2001. Department of Energy spokesman Bill Wicker says the cleanup has received bipartisan support in Congress and is expected to pass with little debate

Representatives from Nevada, Arizona and California, concerned about the tailings effect on their drinking water supplies, have been urging federal action to move the pile. Bill Davis, lab manager for the Metropolitan Water District of Southern California, says regular monthly testing of Lake Havasu shows a slow increase in levels of radioactivity. Radiation now measures about one-third the maximum contaminant level allowed by the U.S. Environmental Protection Agency. Water is pumped from Lake Havasu, which is formed by Parker Dam, to supply water to Southern California communities including Los Angeles and San Diego.

The Atlas Corp. created the pile by mining and milling uranium before leaving the area.

National Drinking Water Week, May 7-13

The purpose of National Water Week is to increase public awareness of drinking water issues, and it is based on the premise that knowledge and action are important to safeguard our drinking water supplies. The symbol for the occasion is a blue thumb. With a green thumb connoting the ability nurture plants, the blue thumb signifies care of water resources. The American Water Works Association is sponsoring a website to provide Drinking Water Week information and activities, the address is: <http://www.awwa.org/dww>

NRDC to Sue Over Arsenic Drinking Water Standards

The Natural Resources Defense Council announced it will sue the EPA for failing to strengthen the 1942 tap water standard for arsenic, citing new data that shows tens of millions of Americans have been drinking water with unsafe levels of arsenic. NRDC also intends to sue the White House's Office of Management and Budget for blocking EPA efforts to establish new arsenic safeguards. Arsenic is a known toxin and carcinogen.

In a conservative analysis of EPA data from 25 states, including Arizona, NRDC found more than 34 million Americans in at least 6,900 communities are drinking tap water supplied by systems with arsenic at

unsafe levels. The EPA data comes from local water tests conducted between 1980 and 1998. Arsenic levels can fluctuate over time, but what is most significant from a cancer risk standpoint is long term exposure. (Check the NRDC website [www.nrdc.org] for a list of public water systems in Arizona in which arsenic was found and reported to the EPA from 1980 to 1998.)

"What will it take to convince EPA to do something about this enormous health risk?" asks NRDC senior attorney Erik Olson. "Congress told the agency to update the arsenic standard in the mid-1970s and again in the late 1980s, but it never happened. In 1996, Congress asked for the third time, making January 1, 2000 the deadline for a proposal."

NRDC recommends that the EPA reduce the current drinking water standard for arsenic of 50 parts per billion (ppb) to three ppb. This is the level most labs can reliably detect.

AZ
Water Community
NEWS

After serving for more than 20 years as the director of the Pima County Wastewater Management Department, **George A. Brisko** has announced his retirement, effective April 14. Mr. Brisko arrived in November 1979 to merge separate county and city sanitary sewer and wastewater treatment systems into the only regional wastewater treatment system in the state.

Water utilities and agricultural businesses in the Tucson area have formed their own organization as a first step toward regional water resource planning. Named the **Southern Arizona Water Users Association**, the new organization includes representatives of public agencies, such as **Tucson Water** and **Metro Water District**, and private water users, including **BKW Farms** of Avra Valley and the **Cortaro-Marana Irrigation District**. An important issue confronting SAWUA is determining the use of water allocated through the Central Arizona Project.



Guest View

ADWR, Administering the GMA to Ensure Arizona's Water Future



Rita P. Pearson, Director of the Arizona Department of Water Resources, contributed this Guest View.

Back in 1954, Gov. Howard Pyle faced a dilemma. The Arizona Underground Stream Commission was set to go out of business at midnight, a victim of legislative inattention. Gov. Pyle was not happy when he signed House Bill 367 into law, continuing the commission.

"It doesn't begin to approach the legislation that is absolutely necessary if we are to cope with eventualities implicit in the failure of successive Arizona Legislatures to deal effectively for more than 20 years with our continuously diminishing supplies of underground water," the Governor wrote in a message accompanying the new law. And it would be another 26 years until leaders enacted the landmark 1980 Groundwater Management Code and created the Arizona Department of Water Resources.

The Code was everything Gov. Pyle said House Bill 367 was not. The Code was visionary, far-reaching, and tough. A lot of people hated it. A lot of people still do. But the Code has enabled the people of Arizona to dream of a future far different from our territorial past. It now is possible to have a stable supply of water for millions of people in one of the world's driest places.

Fast forward from Gov. Pyle to the 21st Century. Instead of the underground stream commission, ADWR is about to celebrate its 20th Anniversary. It is a modern, technology-driven agency with more than 250 employees.

What, in its first 20 years, have ADWR and the Groundwater Code wrought?

This is an agency that has been extremely creative in taking advantage of its opportunities. In the 1930s, Gov. Benjamin Moeur was so angry that California was building Parker Dam that he sent troops to the Colorado River. Today, we are talking with our neighbors, Nevada and, yes, even California, about "banking" water for them to assist our neighbors in the Lower Colorado Basin endure the inevitable dry cycles.

One of ADWR's charges, the Arizona Water Banking Authority, created in 1996, will have stored more than 1 million acre-feet for Arizonans by year's end. More and more, we are taking advantage of opportunities in technology. Well measurement, if it occurred at all, used to be a sweaty, imprecise job performed out in the hot sun by men who relied on experience and instinct to assess the condition of an aquifer hundreds of feet below ground.

Today, we are installing remote "transducers" in wells that provide real-time accurate measurements of the ebb and flow of water levels in hard-to-reach areas. The agency is using gravity measurement to determine water in storage and tracking changes in the Earth's surface down to the last millimeter to better understand land subsidence. We capture data from satellites in Earth's orbit to make maps, understand the weather patterns and observe irriga-

tion activities throughout the state.

The dedicated men and women at ADWR, as well as water providers, irrigation districts and individual water users throughout Arizona are working to maximize the value of the public's investment in the agency and of this essential natural resource.

Nature lovers the world over appreciate the stunning natural beauty of the San Pedro River in southeast Arizona, a river corridor that is a stopping point for hundreds of species of birds on their annual migrations.

But the San Pedro is a river at risk. More people are moving to the area every day, and there is concern about the San Pedro's ability to co-exist with the booming City of Sierra Vista. The Arizona Water Protection Fund, in partnership with Sierra Vista and the U.S. Bureau of Reclamation, has come up with a plan to replenish groundwater through effluent recharge, hopefully protecting the fragile San Pedro ecosystem.

The most important development of the first 20 years for ADWR has been creation of a management structure to protect groundwater supplies. We now have five Active Management Areas: Phoenix, Pinal, Prescott, Santa Cruz, and Tucson. About three-fourths of the state's population lives in these five areas, and about 80 percent water consumption occurs there.

The Code told us that the groundwater supplies are to be protected for future generations through conservation and by switching to renewable water supplies as our primary source for consumption. Consequently, we have been working with providers and agricultural entities to use Colorado River water that comes to us via the 336-mile Central Arizona Project canals. With the completion of the CAP, we are able to use some of the water to help Native Americans settle their water rights claims. Final settlement may soon be within our grasp as we work to conclude complex negotiations involving repayment of the CAP costs, agriculture's water future and Indian water rights.

The Code set a goal of "safe-yield," a balance between withdrawal and replenishment of groundwater by 2025, in four of the AMAs. It is not at all clear that we will make it in some areas, but we are pledged to do all we can to make it happen.

Through our series of 10-year management plans, we are imposing strict conservation measures and replenishment obligations, encouraging xeriscaping as a substitute for water-intensive landscaping, and promoting ever more creative and widespread re-use of reclaimed water for public and private purposes. We require new subdivisions to have access to renewable water sources.

What will the next 20 years hold? We will see more widespread use of technology. Through entities such as the Governor's Water Management Commission and local task forces, we will re-examine our management approach and work to obtain better, more accurate information about the water supplies in some of the critical areas of the state.

ADWR will remain vigilant and innovative in meeting our charge and stay in the lead in seizing opportunities to maintain a stable, secure supply of water for the people of Arizona.



Legislation and Law

Rules Revised to Protect More Wetland Areas

The U.S. Army Corps of Engineers recently announced major new revisions to its nationwide permit program regulating development of wetland areas. The new rules are designed to protect thousands of acres of wetlands by making it more difficult to build near streams and marshes.

Under Nationwide Permit (NWP) 26, the most commonly used permit involving potential impacts on wetlands, developers have been able to develop up to three acres of wetlands at each site without costly and time consuming individual site inspections.



Wetland area in central Arizona. New wetland regulations will protect additional lands.

With NWP 26 expiring in June 2000, the Corps is issuing five new narrowly defined permits and modifying six others. The replacement permits still authorize many of the same activities previously allowed under NWP 26, but now they are subject to intensive federal scrutiny before approval. The new and modified NWPs reduce the amount of wetlands that may be developed without individual permits from three acres to one half acre.

Most of the new permits require the Corps to be notified if activities impact as little as one tenth of an acre. Previously the Corps was to be notified of impacts to more than one third of an acre.

The National Association of Home Builders (NAHB) is challenging the legality of the new permitting process, saying it is based on insufficient evidence of the impacts of development on wetlands. NAHB President Robert Mitchell said, "As a result of this ill-advised decision by the Corps, builders can expect delays of months or even a year if they cannot avoid the small areas of essentially dry land on their sites that qualify as wetlands."

NAHB is urging Congress to delay rule implementation, which could occur this June, in order to conduct an investigation of the Corps' decision making process for the new permits and review

studies of the resulting paperwork load. Mitchell also warned that "NAHB may consider legal action on the new NWP one half acre threshold if the Corps goes beyond its regulatory authority as given by Congress."

The final version of the permits is in response to a settlement between the Corps and the Natural Resources Defense Council. NRDC filed suit to force changes in the nationwide permitting process. "This is a major victory for NRDC and the environment," said NRDC attorney Daniel Rosenberg.

But the NRDC remains concerned that the new restrictions do not cover all projects in floodplains, which President Bill Clinton had promised in an October 1998 speech to environmentalists. "We're disappointed," said Rosenberg, "but NRDC will continue to fight for full floodplain protection for wetlands to preserve critical environmental resources and prevent flooding."

Petition Sought in Arizona Supreme Court Groundwater Decision

Several private water users recently filed a petition in U.S. Supreme Court in response to an Arizona Supreme Court decision that Indian rights to groundwater trump the state-granted rights of cities, mines and others. (See AWR, Vol. 8, No. 3) In effect, the justices rejected the premise that state laws have precedence in determining who may pump from underground aquifers. On February 17, the private water users filed a petition for certiorari in U.S. Supreme Court regarding the decision.

The petition presents to the Court the question whether a state court "may ... create federal common law to govern a federal reservation's groundwater rights where nondiscriminatory state law already provides a rule of decision giving all landowners in the State equal rights to groundwater."

The petitioners in arguing for a grant of certiorari claim that the Arizona decision "frustrates clear federal policies and conflicts with controlling decisions of [the U.S. Supreme] Court." They argue that the Arizona opinion conflicts with ... [the] *Winters* doctrine by finding a federal reserved right to groundwater without considering the purposes of any specific reservation."

Petitioners also argue that "the [Arizona] opinion ... fails to integrate federal groundwater rights with existing state groundwater law," and that it "rejects state law as a rule of decision and therefore conflicts with [*U.S. v.*] *Kimbell Foods* and *Wilson [v. Omaha Indian Tribe]*." They claim that the Arizona decision is "inconsistent with Arizona groundwater law and will arbitrarily impact Arizona groundwater users." Furthermore, petitioners argue that "if adopted as precedent in other states, [the Arizona decision] will result in conflicts with state laws governing allocating and management of groundwater throughout the United States." Finally, petitioners claim that the Arizona finding "conflicts with a prior decision of the Supreme Court of Wyoming."

Parties participating in the petition include Phelps Dodge Corporation, Arizona Public Service Company, the Gila Valley Irrigation District and the Franklin Irrigation District.



Publications

Proceedings Of The Small Drinking Water And Waste Water Systems International Symposium And Technology Expo

These proceedings are from a conference held January 12-15 in Phoenix. With various sponsors, including the National Science Foundation and the Rural Water Research & Education Foundation, the symposium discussed a range of innovative solutions now available to address water sanitation challenges. The papers in the proceedings of the symposium address issues such as: decentralized/on-site systems, regulatory and compliance tools, membranes and filtration, innovative wastewater treatment, operations distribution and resources, innovative drinking water technologies, system management, ETV programs, analysis and monitoring, assistance and assessment and international issues.

Conference proceedings are available. For more information contact Kelly Stump: phone: 734-913-5789; fax: 734-827-6840; email: stump@nsf.org



ENSO Signal Newsletter

This free newsletter is intended for those interested in the El Niño Southern Oscillation cycle and its impacts on ecosystems and societies. The ENSO Signal seeks to promote interest in this irregularly recurring natural phenomenon between active cycles, with the idea that the best time to learn more about it is when it is not under way. The newsletter provides news items, publications, web sites, and articles of interest to readers.

The ENSO Signal is published quarterly free of charge by the Environmental and Societal Impacts Group at the National Center for Atmospheric Research. It is available both in hard copy and an electronic version. For more information contact: D. Jan Stewart, Editor, ESIG/NCAR; PO Box 3000, Boulder, CO 80307; phone: 303-497-8134; fax: 303-497-8125; email: jan@ucar.edu The newsletter is available on line at www.esig.ucar.edu

The following two items are articles within publications, a newsletter and a journal, but can be obtained separately

Undamming Glen Canyon: Lunacy, Rationality or Prophecy

Scott Miller
This is an analysis of the Sierra Club's 1996 proposal to restore Glen Canyon. The study was independently written by Scott Miller, an attorney with the U.S. Department of the Interior. In his study, Miller examines the laws governing Colorado River management; the technical and economic issues pertaining to water storage and energy supply; and the impact of recreational activities within the Glen Canyon area. The study argues that the draining of Lake Powell is feasible and even inevitable. At issue are the costs and benefits associated with decommissioning the dam as well as the economic, recreational and environmental impact of draining the lake. The study was published in the *Stanford Environmental Law Journal*, 559 Nathan Abbott Way, Stanford University Law School, Stanford CA 94305-8601; phone: 650-725-0183. Copies of the study also are available for \$5 from the Glen Canyon Action Network PO Box 466, Moab, UT, 84532; phone: 435-259-1063.

The Human Right to Water

Peter H. Gleick
This paper argues that access to safe drinking water and sanitation systems is a fundamental human right, a right which is being neglected when more than a billion people lack safe drinking water and almost three billion lack access to adequate sanitation systems. Gleick argues that governments, international aid organizations and local communities should work to end substantial and preventable human suffering by providing all humans with the water and sanitation systems necessary for life and health. Copies of this paper are available free of charge from the Pacific Institute for Studies in Development, Environment and Security. Contact Lorelei Muenster at lmuenster@pacinst.org or 510-251-1600.

Taking the Arizona Groundwater Management Act into the Nineties. *Proceedings of a conference/symposium commemorating the tenth anniversary of the Arizona law*

The Groundwater Management Act represents an ongoing process, with a sequence of management plans, from one to five, established at different points in time, to enforce greater groundwater savings. Evaluating the GMA at various intervals then provides a sense of its progress. In 1990, the year of the law's tenth anniversary, the Water Resources Research Center sponsored a conference, and this volume is the proceedings of that conference. At the time, the GMA was under attack on a number of fronts, and a conference theme was concern the GMA not be gutted when various controversial issues are resolved. As one speaker said, "In 1980, Arizona set itself on a transcendent course. The GMA may well undergo some adjustments in the interest of staying that course, or the entire enterprise may be aborted by those who see themselves disadvantaged by the new direction the state has taken. Whether the new policy stays on track or not will depend heavily on how Arizonans feel about their children." This volume provides an historical context for viewing the GMA this current year, during its 20th anniversary, with the act on firmer footing. Copies of the proceedings can be obtained without charge from WRRC, University of Arizona, 350 N. Campbell Ave., Tucson, AZ 85721; phone: 520-792-9591 (WRRC will be hosting a 20th GMA anniversary conference on May 1-2 in Tempe. See page 10 for details.)



Special Projects

Study Shows Climate a Variable in Determining Water Supplies

A recent University of Arizona study examines the effects of climatic fluctuation and population growth on water supply and demand in five southern Arizona water management areas — Tucson, Phoenix and Santa Cruz Active Management Areas (AMA) and the Benson and Sierra Vista subwatersheds. The study highlights the distinct sensitivities each of the study areas is likely to experience under different climatic scenarios.

The five geographic study areas, each with varied population sizes and water supply and demand characteristics, represent a variety of water management areas and can be studied to determine the disparate impacts of climatic variability. The central question is: What effect would one-, five- and ten-year drought periods have on the water supply and demand of each area?

Researchers gathered climatic, demographic, and water supply and demand data for each study area. One-, five-, and ten-year precipitation scenarios that encompass maximum dry conditions in the Southwest at each time scale were assembled. The researchers also gathered demographic data for the year 2025, with the intention of examining possible effects of population growth on water supply and demand, both under average and extreme precipitation scenarios. Water supply and demand data also was collected

The renewable supplies figuring into the calculation include surface water, natural groundwater recharge, CAP deliveries and effluent supplies. The study areas each use different proportions of these supplies, and analysis shows that reliance on a greater or lesser proportions of each supply is an important variable contributing to an area's overall sensitivity to climatic changes.

The collected data was then used to construct various scenarios for each of the five study areas. The scenarios show changes in supply, changes in demand, and changes in groundwater balance due to certain key variables.

For example, the Phoenix AMA's supply change scenarios are graphed at the one-, five- and ten-year time scales and include the following: Third Management Plan (TMP) 1995 baseline (for comparative purposes); TMP 2025 baseline; TMP baseline + drought; and TMP baseline + drought, with CAP for one-year scenario and without CAP for five- and ten-year scenarios. Similar scenarios are

developed for the other study areas using variables appropriate to those areas.

The next set of scenarios show changes in demand, with demand scenarios for the year 2025 including projected population increases. The data are overlaid with historic one-, five- and ten-year drought conditions as well as with a scenario that hypothesizes that all irrigated agriculture is eliminated.

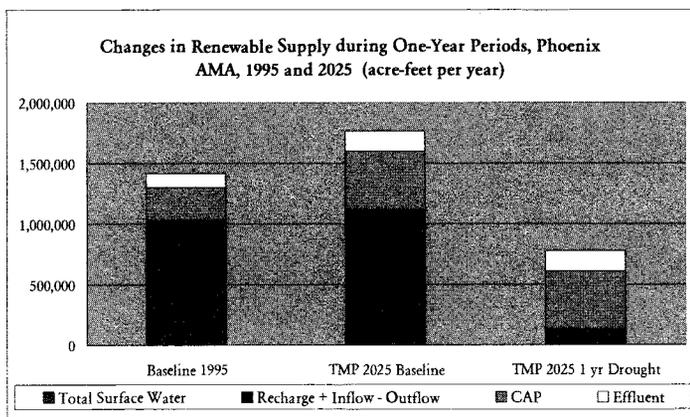
The study also calculates groundwater impacts for the five study areas under the various 2025 scenarios. Groundwater overdraft reflects the amount of groundwater not replaced by recharge under normal circumstances, and is therefore unsustainably mined. In calculating scenarios showing changes in groundwater balance, both variations in natural recharge due to increased or decreased precipitation and the added effects of changes in human demand on the water balance were explored. Also these scenarios represent combinations of the supply and net consumption changes shown in the supply and demand scenarios.

By showing the importance of climatic variability in evaluating water supply and demand, the study is of critical importance when reviewing public policy and statutes such as the Groundwater Management Act. The GMA established a regulatory framework to manage supply and demand in certain populated areas of the state, to safeguard the state's groundwater reserves. The management plans developed in response to the GMA, however, do not give due consideration to the effects of climatic variability when developing water budgets that reflect supply and demand.

For example, the study shows the effect a drought similar to the one that occurred in the 1950s would have on Phoenix and Tucson water supplies in the year 2025, the year the GMA targets yield for the Phoenix and Tucson AMAs to achieve safe yield. (Safe yield is the long-term balance between the annual amount of groundwater withdrawn and the amount of natural and artificial recharge.) Even without drought occurring, the Phoenix AMA is projecting a 24 percent groundwater overdraft and the Tucson AMA a 15 percent overdraft. With a 10-year drought, the Phoenix overdraft could reach 39 percent and the Tucson 25 percent.

The study highlights differences in the relative sensitivity of the study areas to climate impacts, an important factor to be taken into account when formulating and implementing water management policies. For example, the existence of well-known and valued riparian areas in the Sierra Vista subwatershed and the Santa Cruz AMA suggests that, under severe extended drought conditions, difficult choices may have to be made regarding allocation of scarce resources.

Titled "Assessing the Sensitivity of the Southwest's Urban Water Sector to Climatic Variability," the study was conducted by Rebecca H. Carter, Petra Tschakert and Barbara Morehouse from the UA's Climate Assessment Project for the Southwest (CLIMAS). CLIMAS is a NOAA-funded program housed within the UA's Institute for the Study of Planet Earth. For additional information, contact Barbara Morehouse, CLIMAS program manager, UA, phone: 520-622-9018; email: morehoub@u.arizona.edu





Announcements

Funding for Drinking Water Research

The AWWA Research Foundation is issuing requests for proposals for applied research on drinking water. Thirty RFPs are being issued within the following strategic research goal areas: 1) protecting the drinking water consumer from microbial risk; 2) protecting the consumer from adverse health effects due to chemicals; 3) improving utility management to obtain optimum water quality and system reliability; 4) improving utility infrastructure for the reliable delivery of high quality water to the customer's tap; 5) providing science and technology to the drinking water community to improve public and customer relations; and 6) ensuring access to and wise use of water resources and protection of the environment.

The deadline is May 8 for projects requesting under \$250,000 and July 17 for projects requesting more. Contact: Kathryn Martin, AWWA Research Foundation, 6666 W. Quincy Ave., Denver, CO 80235. phone: 303-347-6130; fax: 303-730-0851. email: kmartin@awwarf.com; website: <http://www.awwarf.com/>

Funds for New Environmental Technologies

The National Science Foundation announces an initiative for high risk/high return, exploratory research feasibility studies on new technologies applied to the environment — to environmental sensing, remediation, and environmentally benign manufacturing.

Proposals for Phase I studies may be submitted by U.S. academic institutions and nonprofit research institutions in support of individual investigators or small groups. FY 2000 project fund-

ing is \$3 million, to fund about 20 projects. Submission deadline is May 15. Additional program information can be obtained from the NSF website: <http://www.nsf.gov>

CAP Grants for Water Education.

The Central Arizona Project provides grants for water education and environmental programs and is now accepting applications for funding to be awarded in June. Funds are available to primary and secondary schools, community colleges, universities and technical institutions and other organizations. Projects that depend on CAP water, enhance alternative water usage, or promote water conservation are also considered for support. Check the CAP website for additional information: <http://www.cap-az.com/CAP> or call 623-869-2450 or 888-891-5795 (within Arizona) to obtain a grant application. Deadline to apply is May, 15.

Arizona Riparian Council Annual Meeting

The Arizona Riparian Council will hold its 14th annual meeting. May 12-13 at the Eastern Arizona College in Thatcher, Arizona. This year's theme is the Upper Gila River Watershed: Conservation and Management. Sessions will focus on managing the Gila Box and San Pedro National Riparian Conservation areas. The meeting is to provide insights on the management and protection of large-sized riparian systems with watersheds beyond Arizona's borders. For more information contact Cindy Zisner, Arizona Riparian Council: phone: 480-965-2490; fax 480-965-8087; email: Cindy.Zisner@asu.edu



20th Anniversary Conference — May 1-2, 2000 Arizona's Groundwater Management Act



Conference grand finale is a boat tour of Tempe's new Town Lake.

The University of Arizona's Water Resources Research Center is planning a spring conference devoted to Arizona's Groundwater Management Act's 20th anniversary. This conference is a sequel to a 1990 WRRRC-sponsored conference in honor of the 10th anniversary of the GMA.

On May 1, a joint public meeting of the Groundwater Users Advisory Councils from each Active Management Area will be conducted. A reception will follow, from 6:30 to 8 p.m. Monday's session is sponsored by the Arizona Department of Water Resources.

May 2 is devoted to various presentations, with topics that include a twenty year GMA retrospective; learning from the past and looking to the future; and a critical look at achievements and needs. Contrasting view sessions will discuss such topics as safe yield and assured water supplies; ability of water supplies to keep up with population growth; and CAP recharge as a good long-term solution.

Speakers include Governor Jane Hull; Rita Pearson and Kathy Ferris, present and former ADWR directors respectively; the directors of the Phoenix, Pinal, Tucson, Prescott, and Santa Cruz AMAs, along with representatives from various organizations and programs within the public and private sectors. A grand finale to the groundwater conference is a boat tour of the new Tempe Town Lake.

Cost include: \$30, day one only (includes reception); \$45 day two only (includes lunch); \$75 both days; and \$5 for boat trip. For additional information see the following websites: <http://ag.arizona.edu/AZWATER/> or <http://www.adwr.state.us/> or call 520-792-9591.



Calendar of Events



RECURRING



Arizona Hydrological Society (Flagstaff). 2nd Tuesday of the month (during the school year). Meeting times and locations may vary, NAU, Southwest Forest and Science Complex, 2500 S. Pine Knoll Dr., Room 136, Flagstaff. Contact: Abe Springer 520-523-7198, email: abe.springer@nau.edu

Arizona Hydrological Society (Phoenix). Usually 2nd Tuesday of the month. Contact: Christie O'Day 602-379-3087, ext 224.

Arizona Hydrological Society (Tucson). Usually 2nd Tuesday of the month. Contact: Mike Block 520-575-8100 or mblock@metrowater.com

Arizona Water Banking Authority (Phoenix). Next quarterly meeting will be held on Mar. 15th at the ADWR in Phoenix. Contact: Nan Flores 602-417-2418.

Arizona Water for People Committee. Phoenix, meets on the 2nd Thursday of even-numbered months at City of Phoenix Squaw Peak Facilities, 6202 N. 24th St., Phoenix at 6 p.m. Contact Dave Christiana 602-417-2400, ext 7339; Tucson, meets the 3rd Thursday of even-numbered months. Time and place varies. Contact Sheila Bowen, 520-625-8409 or sbowen@communitywater.com

Arizona Water Protection Fund Commission. Contact: Irma Lisa Horton 602-417-2400 ext. 7016.

Arizona Water Resources Advisory Board. Contact: Kathy Donoghue 602-417-2410.

Central Arizona Water Conservation District. Usually 1st and 3rd Thursdays of the month, time to be determined one week in advance. CAP Board Room, 23636 N. 7th St., Phoenix. Contact: Ardis McBee 602-869-2210.

City of Tucson Citizens Water Advisory Committee. Usually 1st Tuesday of the month, 7:00-9:00 a.m., 310 W. Alameda, Tucson. Contact: John O'Hara 520-791-5080 ext. 1446.

Maricopa Association of Governments/Water Quality Advisory Committee. Contact: Lindy Bauer 602-254-6308.

Maricopa County Flood Control Advisory Board. Usually 4th Wednesday of the month, 2:00 p.m., 2801 W. Durango, Phoenix. Contact: Kathy Smith 602-506-1501.

Phoenix AMA, GUAC. Scheduled monthly, please call. Conference Room A, 500 N. 3rd St. Phoenix. Contact: Mark Frank 602-417-2465.

Pima Assoc. of Governments Water Quality Subcommittee. Usually 3rd Thursday of the month, 9:00 a.m., 177 N. Church St., Suite 405, Tucson. Contact: Gregg Hess 520-792-1093.

Pinal AMA, GUAC. Usually 3rd Thursday of the month, 2:00 pm. Pinal AMA Conference Room, 1000 E. Racine, Casa Grande. Contact: Randy Edmond 520-836-4857

Prescott AMA, GUAC. 2200 E. Hillsdale Rd., Prescott. Contact: Phil Foster 520-778-7202.

Santa Cruz AMA, GUAC. Usually 3rd Wednesday of the month, 9:00 am, Santa Cruz AMA Conference Room, 857 W. Bell Rd, Suite 3, Nogales. Contact: Kay Garrett 520-761-1814.

Tucson AMA, GUAC. Usually 3rd or 4th Friday of the month, 9:00 a.m., Tucson AMA Conference Room, 400 W. Congress, Suite 518, Tucson. Contact: Kathy Jacobs 520-770-3800.

Tucson AMA, Safe Yield Task Force. Every Wednesday. Contact Kathy Jacobs 520-770-3800.

Verde Watershed Association. Contact: John Parsons and Tom Bonomo, VWA Newsletter Editors, Verde Watershed Association, P.O. Box 4595, Camp Verde, AZ, 86322. 520-567-2496. Message phone: 520-649-9978, email: obarc@sedona.net; web site: <http://www.vwa.org>

Water Users Association of Arizona, 2nd Friday of the month at noon (except in September). Call for reservations and exact location. Contact: Paul Gardner, 480-987-3240.

Yavapai County Flood Control District Board of Directors. Contact: Ken Spedding, 520-771-3197.

UPCOMING



June 15-18, 2000 Onsite Waste Water Systems Conference, presented by the National Environmental Health Association in Denver CO. Conference topics include: soil treatment systems, health effects of nitrogen in drinking water, natural denitrification and onsite wastewater issues. Dr. Michael Fox will deliver a keynote address on biotechnology and genetic engineering. For more information, contact NEHA headquarters: 720 S. Colorado Blvd., Suite 970-S, Denver CO, 80246-1925; phone: 303-756-9090; fax: 303-691-9490; email: staff@neha.org; website: <http://www.neha.org>

November 6-9, 2000 Annual Water Resources Conference presented by the American Water Resources Association in Miami FL. Conference topics include advances in water reuse, desalination, education in water resources, agricultural demands for irrigation and its impact on water supply and quality, wetlands and habitats, and global water activities. There will also be field trips to water related sites in the Miami Area. For more information Contact Michael J Kowalski, AWRA Director of Operations, phone: 540-687-8390; fax: 540-687-8395; email: mike@awra.org

GMA... continued from page 1

an officially established advisory committee, it was not subject to the open meeting laws.

The strategy was justified by arguing that the negotiations required candor and a willingness to compromise, with agreements carefully crafted to best meet the interests of the involved parties. A delicate balancing act had to be maintained.

Further rankling critics at the time was the nonseverability clause inserted into the pending legislation. According to this provision if any part of the 176-page measure was found unconstitutional, the entire law would fail. Common in groundwater legislation, a nonseverability clause ensures that carefully negotiated compromises are not altered by the courts.

The bill passed handily, but not without some reservations. Sen. Jim Kolbe, R-Tucson, said he was "dismayed by the arrogance" shown by the bill's drafters "by tying this up into one package" with the nonseverability clause. He further added, "There is widespread agreement that the provisions in this bill are unconstitutional." Even Gov. Babbitt, who played a major role in negotiating the bill, felt some foreboding about its future. "For the legal community, this is going to be the greatest gold strike since Sutter's Mill," he said. The headline in the Arizona Daily Star announcing passage of the bill stated: "Long hassle predicted as groundwater bill zips through Legislature."

Off to a rocky start, the GMA has endured as public policy. The law has withstood various challenges, with its operations adjusted and fine tuned along the way. A sense of progress is evident when those early days, marked by resentment over secret negotiations, expectations of legal hassles and a resigned acceptance, are compared to the GMA review in progress today, 20 years later.

An awareness of the need for GMA changes has long been building. In developing third management plans, Active Manage-

ment Areas committed to achieving safe yield by the 2025 found that the goal was not likely to be reached. For example, the Tucson AMA calculated the actual groundwater overdraft by 2025 would be 50,000 acre-feet. The Phoenix AMA likewise found that reaching safe yield by 2025 was not likely by even a larger margin.

An Auditor General's report issued in early 1999 contributed to the sense that changes to the GMA were in order. The report found that the established GMA course would not likely lead to safe yield, with groundwater use brought in line with replenishment. The report recommended a legislative committee be established to evaluate the code to determine new legal GMA strategies for better administration of the law.

Department of Water Resources Director Rita Pearson preferred that a GMA review be initiated from the ground up, at the AMA level, rather than by a legislative committee. In response, each AMA established a task force to review the workings of GMA and identify problems and adopt recommendations. In their work, the AMAs followed different time lines, with the Tucson AMA the first to get started about a year ago. Agendas also differed, reflecting the varied issues confronted by the AMAs.

Meanwhile Governor Jane Hull is to appoint a Multi-AMA Technical Advisory Committee and a Water Management Commission. The advisory committee will address water issues of concern to the AMAs and serve as a resource to the management commission.

From its hard-pressed beginnings, the GMA now is a shared interest. A fairly large number of committed individuals, from various levels and representing different interests, will be working together to determine the future course of the GMA. What ultimately will result from this review process is uncertain. It shows, however, that in 20 years the GMA has gained greater acceptance and has seasoned as law and public policy.



Arizona Water
Resource

Water Resources Research Center
College of Agriculture
The University of Arizona
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