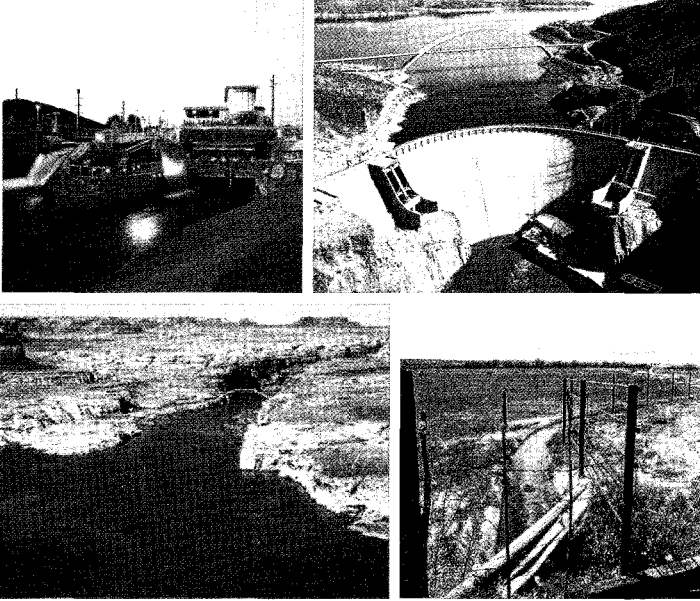


Arizona's Water Future: *Challenges and Opportunities*



85th Arizona Town Hall

*October 31 – November 3, 2004
Grand Canyon, Arizona*

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BACKGROUND REPORT PREPARED BY

THE UNIVERSITY OF ARIZONA®
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EIGHTY-FIFTH ARIZONA TOWN HALL
OCTOBER 31 – NOVEMBER 3, 2004

Arizona's Water Future: *Challenges and Opportunities*

BACKGROUND REPORT PREPARED BY

The University of Arizona
Tucson, Arizona

Office of Economic Development

AND

Water Resources Research Center

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ARIZONA TOWN HALL

Building consensus — Charting progress

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This document, which includes the background report, recommendations and list of participants, is available from Arizona Town Hall at the above address. — Price \$10.00

EIGHTY-FIFTH ARIZONA TOWN HALL

Background Report Prepared By

THE UNIVERSITY OF ARIZONA®

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ARIZONA TOWN HALL

Building consensus — Charting progress

Leaders in all areas of our communities face ever-greater complexity in their business and personal lives. These complexities drive them to focus more intensely and to narrow their viewpoints and beliefs on the challenges and opportunities they confront. Yet, the qualities and capabilities that have propelled these individuals to leadership in their own fields of endeavor are the very qualities essential to understanding and resolving the broader issues and concerns of all Arizonans.

Since 1962, the Arizona Town Hall has been bringing together leaders from across our state to carefully consider and discuss the critical challenges and opportunities facing our state. These leaders come with their varied expertise from a carefully selected cross-section of our state's citizens. The participants at each Town Hall are geographically and occupationally balanced and represent the wide diversity of political, social and economic philosophies found in Arizona.

The eighty-fifth Arizona Town Hall was held at Grand Canyon, October 31 – November 3, 2004 and addressed "Arizona's Water Future: Challenges and Opportunities." This Town Hall examined Arizona's future water supply as it relates to our state's continuing rapid population growth, ongoing drought conditions, potential settlement of Indian water claims, need for water for environmental and recreational uses, and Arizona's institutional and financial capacity to address future water needs.

To provide all participants in the Town Hall with fundamental background information from which to launch their discussions, the University of Arizona developed the following background report. The research team consisted of faculty and professionals from the University, the Arizona Department of Water Resources and ThinkAz—Arizona Center for Public Policy. Our sincere thanks are extended to University of Arizona President Peter Likins and the entire research team who worked so diligently to bring together this document.

The recommendations developed at this Town Hall have been combined with the background information into this final document for dissemination throughout the state. It is our sincere hope that this report will make a lasting contribution toward identifying what steps Arizona needs to take to ensure that our state will be able to maintain a reliable, adequate and safe water supply for the future.

Sincerely,

Alan E. Maguire
Chairman of the Board

January 2005

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Report of the

EIGHTY-FIFTH ARIZONA TOWN HALL

**“ARIZONA’S WATER FUTURE:
CHALLENGES AND
OPPORTUNITIES”**

**Grand Canyon, Arizona
October 31 – November 3, 2004**

Arizona Town Hall addressed water issues in 1964, 1977, 1985 and 1997. The background report for the 1964 Town Hall quoted a 1963 U.S. Geological Survey Water Supply Paper that is as true of Arizona in 2004 as it was in 1963:

“Arizona’s water problem is grave. The beautiful scenery, fine climate and fertile soil, like those of other southwestern states, have combined to entice an even larger number of people to settle there, and water demands have grown accordingly.”

Since 1964, an alphabet soup of projects and entities have become reality—ADEQ, ADWR, AMA, CAP, CAWCD and GMA, just to name a few. However, the problem remains; current Arizonans, and the millions more who will join us in the future, live in an arid region and need water.

Continuing its commitment to address water issues, and recognizing the challenges and opportunities facing Arizona now and in the future, Arizona Town Hall again turns its eyes to water. The Eighty-fifth Arizona Town Hall welcomed 177 participants to the

TOWN HALL RECOMMENDATIONS

South Rim of the Grand Canyon on October 31-November 3, 2004 for three days of debate on “Arizona’s Water Future: Challenges and Opportunities.”

Community leaders, experts and residents from throughout the state gathered to address the issues and seek consensus. The following conclusions and recommendations represent areas of consensus reached by the participants. While not all of the Town Hall participants agree with each of these conclusions and recommendations, this report reflects the significant degree of consensus achieved at the Eighty-fifth Arizona Town Hall.

Expectations and Goals

Arizonans expect a safe and reliable water supply to support Arizona’s diverse and increasing population, sustain our varied economic interests and preserve our wonderful quality of life now and for future generations. Arizonans demand certainty that water will be available to support both consumptive and non-consumptive uses including when they turn on the tap, open irrigation pipes, visit recreation areas and to sustain natural habitats.

To meet these expectations, participants identified research, data collection, education, strategic planning, conservation, environmental protection and increased coordination as goals. Through statewide

Through statewide leadership and local control, Arizona must address regional concerns while improving water quantity and quality.

leadership and local control, Arizona must address regional concerns while improving water quantity and quality. Regardless of our expectations and goals, water is going to become more expensive.

TOWN HALL RECOMMENDATIONS

Current Challenges

Although Arizona and other Colorado River basin states are suffering from a drought, many Arizonans do not understand the critical nature of Arizona's water challenges. In the short term, all Arizonans must be educated about the severity of the issue, supply limitations and potential solutions. In essence, Arizonans need to become water literate.

Other short-term challenges include drought response, voluntary water transfers and cooperation between public and private entities, tribal communities, basin states and Mexico to protect and restore aquifers. Many of these issues also are long-term challenges.

To avoid crisis management, Arizona must engage in long-term planning based on good science and data collection that should be made widely available throughout the state. A statewide water assessment plan, taking into consideration regional needs, must be implemented by state and local policymakers. The statewide drought plan should be finalized, adopted and implemented by the state and local policymakers by the end of 2006. Planners also must evaluate what levels of population can be sustained by available water supplies. Further research and development of new technologies should be part of the long-term strategy to improve water supplies.

To avoid crisis management, Arizona must engage in long-term planning based on good science and data collection that should be made widely available throughout the state.

Continuing efforts to reduce uncertainty requires resolving water rights disputes, identifying supplies and uses and estimating population growth. Such efforts are necessary to develop

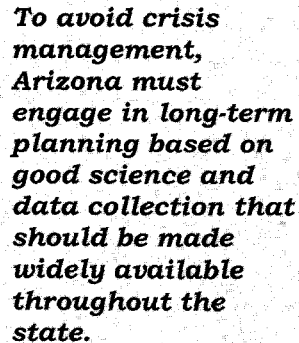
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TOWN HALL RECOMMENDATIONS

and implement both long and short-term goals. Arizona now must address both short and long-term challenges.

Water Supplies

Sustainability of water supplies should be the primary goal of the state. Participants generally accepted the background report's working definition of sustainability as "the ability of current generations to meet their needs without compromising the ability of future generations to meet their needs." However, the measurement and implementation of "sustainability" varies by region.

Safe yield, which is a subset of sustainability, is defined as a long-term balance between the annual withdrawal and recharge of groundwater. This basin-wide concept may not address localized areas

...the collection and dissemination of information about water supplies and demand is a statewide concern and must be improved, particularly in non-AMA areas. ...ADWR should be responsible for such research and communication and coordinate long-range, statewide water planning.

of groundwater overdraft. Safe yield is an appropriate goal for the AMAs where it applies, but may not be suitable for all areas. Management goals should reflect local conditions.

Past predictions of water supply and demand have been inadequate at best. Participants strongly agreed that the collection and dissemination of information about water supplies and demand is a statewide concern and must be improved, particularly in non-AMA areas. The Arizona

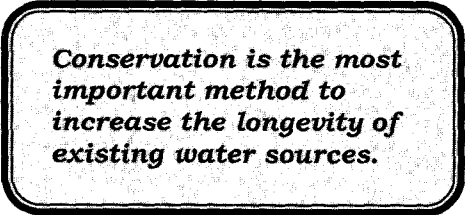
Department of Water Resources (ADWR) should be responsible for such research and communication and coordinate long-range, statewide

TOWN HALL RECOMMENDATIONS

water planning. Adequate and sustained funding must be provided for such activities.

Water Options

Conservation is the most important method to increase the longevity of existing water sources. Conservation requires comprehensive public education beyond slogans and sound bites. Pricing of water, to reflect its long-term cost, recognizing existing contract requirements, is the most effective conservation tool. Consideration should be given to step and block pricing as a tool of conservation. Incentives, not penalties, should be offered to encourage conservation.



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Recycling water and efficient use of effluent must be expanded beyond current processes. Although expensive, recycling has proven to be a useful technology. The quality of recycled water should be improved to expand its potential use. Public awareness and education about the safety of water treatments could lead to use of recycled water for human use. Existing regulations should be amended or new regulations adopted to allow expanded use of quality recycled water.

Water exchanges within Arizona, including tribal communities, and with other states should be explored. If legal issues regarding water transferability can be resolved, water exchanges or sales from agricultural users could increase water availability to non-agricultural users.

Financial participation with California and Mexico in desalination of sea water should be explored as a means to increase Arizona's share of Colorado River water. While sea desalination

TOWN HALL RECOMMENDATIONS

technology is improving, the cost and environmental impact may be an obstacle to current use.

Proper watershed management of new water reclamation projects, such as collection of storm water run-off, can utilize and redistribute water supplies. Water banking practices should be improved and expanded.

Arizona must continue developing and testing new technologies to improve efficiency in production and transfer capability and prevent contamination. New technologies and sources also raise new concerns, such as costs, legal issues, environmental impacts and diversion of infrastructure investment.

The viability of the various water options is a product of values, priorities, public perceptions, education and economics.

Water Management

Compared to other states, Arizona effectively manages water, particularly within AMAs. The strength of the AMAs is the flexibility to adapt to the needs of particular localities. The AMAs must recognize that their decisions impact other regions. AMAs should evaluate their procedures in light of balancing population growth and water supplies.

In areas outside AMAs, water users, water sources and environmentally sensitive areas have few protections. For example, wildcat subdivisions resulting from lot splitting and exempt wells are significant issues in both AMA and non-AMA areas and make strategic planning problematic. Non-AMA areas should have management tools specific to the needs of each region. Such tools include the authority to

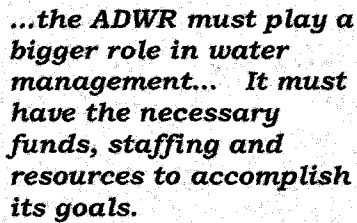
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TOWN HALL RECOMMENDATIONS

meter wells and report the results, regulate exempt wells, impose water impact fees and authorize local governments to restrict subdivision development to only areas with adequate water supplies in order to insure adequate supplies for new growth and protect existing water users.

While water shortages have prompted many communities to better manage their resources, it is imperative that communities plan for water shortages before they occur.

To avoid crisis management, the ADWR must play a bigger role in water management and be proactive. It should immediately implement a comprehensive water storage and recovery planning process. It must have the necessary funds, staffing and resources to accomplish its goals. ADWR also can encourage conservation and facilitate cooperation between regional management entities.



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Management policies should encourage conservation. Where appropriate, market forces should be allowed to reflect the long-term cost of water and promote its efficient use. Management policies should ensure accurate data collection and information dissemination throughout the state.

A comprehensive water banking system should be further developed. The system must ensure that proper locations are used, a means of recovery is provided, and the quality of the banked water is considered. Maximum use of Natural Resource Conservation Districts should be utilized because they are a legal subdivision of state government with locally elected officials. They have been in water conservation activities for more than fifty years.

TOWN HALL RECOMMENDATIONS

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TOWN HALL RECOMMENDATIONS

Balancing Economic and Population Growth

Water needs to be recognized as a key factor in managing growth in both urban and rural areas. Continuing pressure for growth is a fact of life. At some point, the exceptional quality of life enjoyed by Arizonans may be affected unless new populations can pay for the water resources required to support them.

Sound water policy is an important contributor to Arizona's economic vitality. Effective water management and infrastructure investment sustain economic health. Agricultural economies in rural areas depend on available and affordable water.

Arizona should create incentives for more efficient industrial water use.

Active Management Areas

Existing AMAs generally are effective but need some modification. A major concern is the rapid growth of the Central Arizona Groundwater Replenishment District (CAGRDR) membership and the District's ability to meet the growing long-term replenishment obligations. Another concern is that developers are rushing to develop land on untapped aquifers and in non-AMA areas located just outside AMA boundaries.

New or amended legislation also is required to empower counties and local entities to address water management issues.

New or amended legislation also is required to empower counties and local entities to address water management issues such as water adequacy for subdivisions, lot split authority, land use and monitoring of water resources and recording of statements of adequacy or inadequacy. In addition legislation should

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be considered to authorize locally initiated and operated regional water authorities for coordinated management of regional water resources.

Environmental and Quality of Life Issues

Water management should be approached in a multi-faceted manner. It should include producing quality water, restoring and sustaining healthy ecosystems and providing recreational uses, while also addressing the needs of agriculture, industry and domestic water users and water providers. These goals will require increased levels of funding to meet higher costs.

Quality of life and healthy natural environments are mutually dependent, not mutually exclusive. Comprehensive, multi-use watershed planning is essential to assure a sustainable water supply for human use while maintaining a healthy natural environment such as preserving the natural flow in our remaining river systems, including the Verde, San Pedro and Upper Gila Rivers. In-stream groundwater recharge programs can concurrently support riparian preservation and recreational areas.

To improve watershed health, Arizona must manage the vegetation in watersheds to decrease non-native plants. Ongoing forest management, including reduction of forest and woodland tree densities and restoring grasslands, will improve watershed health and provide recharge for our communities, recreation and wildlife. Riparian areas need to be protected and, where feasible, restored using appropriate tools such as the well setback recommendations of the Governor's Water Management Commission. Consideration should be given to existing uses in watershed areas.

Federal, state and local governments should improve inter-agency communication and coordination of goals and activities. They also must work together to implement and enforce environmental regulations and protections. Additional funding and support should be developed for existing programs, including programs based on the Endangered Species Act – Section 10, such as the Lower Colorado

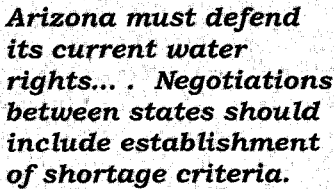
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River Multi-Species Conservation Program and the Arizona Water Protection Fund.

Citizen participation in policymaking must be encouraged to develop trust and identify common ground between groups. Communication and mediation, not litigation, are most effective for resolution.

Colorado River Water

Arizona's allocation of water from the Colorado River is critical to the state's current and future economic vitality. Because of the junior status of the CAP and other Arizona post-1968 contractors among the recipients of water in the Lower Basin, improving their priorities requires unified and significant, but not impossible, efforts.



Arizona must defend its current water rights... Negotiations between states should include establishment of shortage criteria.

Arizona must defend its current water rights, while at the same time work to maintain good relations with its sister river basin states. The current drought has necessitated more

dialogue between the states. Negotiations between states should include establishment of shortage criteria.

Arizona's agricultural users are particularly concerned about Arizona's current priority. Agricultural water users and other post-1968 contractors are concerned about the priority of their water rights because they will be the first to lose water if shortages occur in the Lower Basin.

Storage reservoirs along the Colorado River, such as Lake Powell, should continue. Operation of the Yuma desalination plant is the responsibility of the federal government and is critical to the resolving of delivery of water to Mexico while protecting

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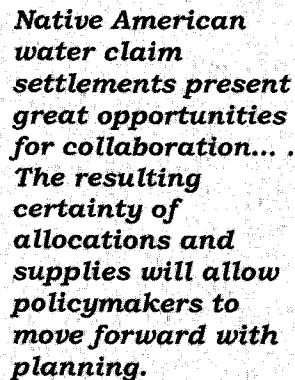
environmental values. Utilization should be expedited, recognizing the need to maintain adequate flows to the Cienega consistent with U. S. treaty obligations. The 1964 Arizona Town Hall stated that “no solution should be suggested or implemented that would result in any water in the Colorado River entering Mexico which is not chargeable to Mexico’s treaty allocation.” Forty years later, 100,000 acre feet per year of water is being removed from storage, delivered to Mexico, and not charged to the Mexican treaty obligation. Operation of the Yuma desalination plant would preserve this water and keep delivering to Mexico within the treaty obligation.

The water quality of the Colorado River continues to be a major concern for all users.

Native American Water Claims

Native American water claim settlements present great opportunities for collaboration between non-tribal communities and tribes on water and non-water related issues, but challenges remain. The resulting certainty of allocations and supplies will allow policymakers to move forward with planning.

The tribal communities in Arizona have a tremendous economic opportunity as a result of the settlements, including leasing water rights to municipalities, developing their own agricultural interests and/or using their rights in other ways. Inter-governmental collaboration about infrastructure development and water exchanges should occur.



Native American water claim settlements present great opportunities for collaboration... . The resulting certainty of allocations and supplies will allow policymakers to move forward with planning.

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The stakeholders in the settlement of Native American claims are commended for their remarkable achievements. Remaining Native American water claims should be resolved as quickly as possible through negotiation and not costly litigation.

Fluctuating Water Supplies

Arizona must prepare for the variability of water supplies. Collaboration about the effect of fluctuating water supplies should involve all levels of government and should include all stakeholders. However, the state, through ADWR, should take the lead in strategic planning. ADWR should collect and disseminate necessary information, establish guidelines and monitor activities to address the fluctuations. Drought contingency planning should be a top priority, and all providers and communities should be required to have drought contingency plans.

Local entities need to have the tools necessary to develop comprehensive watershed plans and to enforce their implementation. Coordination with state agencies, such as the Arizona Corporation Commission (ACC), Arizona Department of Environmental Quality (ADEQ), ADWR and other agencies should occur.

Private water companies should be given greater flexibility to adjust pricing to reflect the long-term cost of water, to pay for additional planning, to develop appropriate infrastructure investment and to promote conservation. Pricing flexibility and clearly established drought mitigation criteria are necessary.

Flood plain management should be an integrated component of land use plans, with a focus on ensuring natural flows, encouraging recharge and protecting riparian habitats in addition to the primary purpose of protecting homes, businesses and farmlands. In some areas of the state, water logging is a greater concern than shortages, and these areas could be a source of supply. Expanding the portfolio of water options will reduce, but not eliminate, the impact of fluctuating supplies. Town Hall believes that water banking is a beneficial use and

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therefore, recommends that water banking continue through entities such as the Arizona Water Banking Authority.

The conversion of agricultural water use to municipal and industrial use is a continuing trend, but consideration should be given to policies designed to preserve a significant measure of agricultural use. Such use can act as a buffer — providing increased water resources in times of critical shortage.

Water Conservation

Although Arizona has made progress in water conservation compared to other states, more must be done to create a culture of conservation. Societal values must adjust to desert and arid region realities. Conservation should be a duty of all water users regardless of water availability. Mandatory use restrictions and other conservation measures may be necessary in times of water shortage.

Conservation should be a duty of all water users regardless of water availability.

A statewide water conservation framework should be put into place, with local communities developing specific conservation plans. Plans should take into consideration the various economic interests in each region, for example tourism and agricultural uses. Local water policymakers should develop baseline conservation goals, measure progress and establish trigger mechanisms to implement mandatory practices if voluntary conservation is not adequate.

General access to water must remain affordable. Alternative pricing structures should be explored and developed to allow basic access and discourage waste. Institutional barriers, such as certain inflexible ACC policies, currently undermine such efforts.

Education programs for all Arizonans are critical to create a statewide conservation ethic and encourage participation in

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conservation activities. Arizona should take a national leadership role in developing and implementing a new K-12 conservation curriculum that is aligned to state educational standards.

Financial incentives for conservation should be offered for low water use landscape modifications and installations, conservation easements and new technologies. Policymakers should evaluate existing water subsidies and not reward wasteful practices.

Current Resources

A number of effective programs and institutions, staffed with talented people, exist to address Arizona's water needs. However, these resources are inadequate to resolve Arizona's current and future challenges.

... a primary objective in any planning process is for ADWR to collect comprehensive hydrological data on all Arizona water resources, including water quality in conjunction with ADEQ, and disseminate such information throughout the state.

ADWR must play a central leadership and advocacy role. The Agency's statewide mission should be expanded and strengthened in the areas of policy development, planning and data collection. ADWR's strategic plan should be implemented by local policy-makers on a regional basis. Town Hall recommends that a primary objective in any planning process is for ADWR to collect comprehensive hydrological data on

all Arizona water resources, including water quality in conjunction with ADEQ, and disseminate such information throughout the state. It also should lead in the statewide conservation campaign. Town Hall recognizes that ADWR is significantly under-funded and under-staffed.

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Non-AMA communities need ADWR to serve a central research and coordination function to provide accurate assessment data on water supplies and demand.

Town Hall recommends that additional dedicated funding be provided to ADWR to fulfill its mission. In addition to increased general budget appropriations, new funding mechanisms should be explored.

Town Hall commends the establishment of the virtual “water university” that, working with the public and private sectors, brings together the resources of Arizona State University, Northern Arizona University and the University of Arizona. Collaborative efforts also should include community colleges and other educational institutions.

New Infrastructure

Existing infrastructure should be improved and maintained. Additional physical infrastructure required to assure adequate quality and water delivery include the following: pipelines, storage facilities, the means to deposit and recover recharged water and recover storm-water, more and improved water treatment and transfer facilities, and additional monitoring equipment.

Existing infrastructure should be improved and maintained.

...The cost of any new infrastructure should be evaluated in light of its anticipated benefits.

Proper funding is necessary for physical infrastructure. The cost of any new infrastructure should be evaluated in light of its anticipated benefits. Cost analysis should include anticipated future maintenance costs.

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New Information and Planning Resources

While significant information and planning resources exist in AMAs, there are major data gaps regarding non-AMAs and all wells. There is a need for improved collaboration among the various holders of available information. Public officials often lack necessary information to make effective water management decisions. Local officials often lack funding for travel to training or the ability to bring the expertise to their community for education of those in leadership roles. Arizona's virtual water university concept is an example of positive collaboration and accessibility to information and expertise.

In order to plan effectively, more information about population growth, statewide water plan assessment, supply and demand, the nature and quality of resources must be obtained. Additionally, ADWR needs to complete more studies and provide more information to users and planners. Regular monitoring activities also must improve.

Funding

Water management policies and information needs deserve to be among the very highest priorities for state funding. Arizonans should participate in funding water management strategies necessary to secure Arizona's water future. Costs caused by growth should be funded by growth. Costs of ADWR and programs that have wide benefits should be broadly funded. Funding options include:

- Bonding;
- Exempt well fees;
- Federal programs such as Water 2025;
- Surcharges;
- Permit and impact fees;
- Private sector donations coupled with tax credits or deductions;

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- Property taxes; and
- User taxes.

The primary recommendation from this Town Hall is that dedicated and secure funding sources be created to finance Arizona's critical water management, planning and infrastructure needs. Without such secure funding, the other recommendations of this report are not achievable.

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Initialisms, Acronyms and Abbreviations

ACC	Arizona Corporation Commission
ADEM	Arizona Division of Emergency Management
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADWR	Arizona Department of Water Resources
AF	Acre-Feet
AMA	Active Management Area
ARS	Arizona Revised Statutes
AWBA	Arizona Water Banking Authority
AWS	Assured Water Supply
CAGRD	Central Arizona Groundwater Replenishment District
CAP	Central Arizona Project
CAWCD	Central Arizona Water Conservation District
CLIMAS	Climate Assessment for the Southwest
DES	Department of Economic Security
ED	Endocrine Disruptor
ENSO	El Niño-Southern Oscillation
EPA	Environmental Protection Act
ET	Evapotranspiration
GMA	Groundwater Management Act
GPCD	Gallons per Capita per Day
GRD	Groundwater Replenishment District
GRIC	Gila River Indian Community
GSF	Groundwater Savings Facility
GUAC	Groundwater Users Advisory Council
GWAC	Governor's Water Management Commission
HSR	Hydrographic Survey Report
IBWC	International Boundary and Water Commission
ICUA	Intentionally Created Unused Apportionment
IGFR	Irrigation Grandfathered Right
INA	Irrigation Non-Expansion Area
M&I	Municipal and Industrial
MSCP	Multi-Species Conservation Plan

NIWWTP	Nogales International Wastewater Treatment Plant
PDO	Pacific Decadal Oscillation
PIA	Practicably Irrigable Acreage
RNCA	Riparian National Conservation Area
SAHRA	Semi-Arid Hydrology and Riparian Areas
SAWRSA	Southern Arizona Water Rights Settlement Act
SRP	Salt River Project
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
USF	Underground Storage Facilities
UWS	Underground Water Storage, Savings and Replenishment Act
WMAP	Water Management Assistance Program
WMIDD	Wellton-Mohawk Irrigation and Drainage District

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The research team included persons from several disciplines: economics, anthropology, geography, environmental planning, public policy, law and chemistry. Different academic, research and public service units at The University of Arizona were represented on the writing team: Bonnie Colby of the Department of Agricultural and Resource Economics; David de Kok of the Office of Economic Development; Kathy Jacobs of the Department of Soils, Water and Environmental Science, the Water Resources Research Center and the Center for Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA); Sharon Megdal of the Water Resources Research Center and the Department of Agricultural and Resource Economics; Gary Woodard of SAHRA in the Department of Hydrology and Water Resources and; Marshall Worden from the Office of the Associate Vice President for Economic Development. In addition, the research team included Rita Maguire of the Arizona Center for Public Policy.

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