

Water

Final Report



2010 Oklahoma Academy Town Hall
National Employee Development Center
May 23-26



**2010 WATER TOWN HALL
FINAL REPORT
TABLE OF CONTENTS**

Preface.....Page 3

Introduction.....Page 4

Final report

Water Availability – During and After Emergencies.....Page 5

Water Conservation.....Page 6

Land Use Practices.....Page 9

Intergovernmental Water Resource Management.....Page 10

Oklahoma Interagency Water Resource Management.....Page 11

Surface and Ground Water Relationship.....Page 11

Water Sales and Transfer.....Page 12

Conflict Resolutions.....Page 14

Balancing Supply and Demand in the Face of Change.....Page 15

Stakeholder Involvement.....Page 16

Local and Regional Issues in the State Plan.....Page 17

Recommendations.....Page 19

Addendum.....Page 28

2010 Town Hall Participants.....Page 29

2010 Town Hall Team.....Page 33

2010 Oklahoma Academy Board of Directors.....Page 35

PREFACE

Our hope at the Oklahoma Academy for State Goals is that this special Town Hall on water, held in Norman, Oklahoma, May 23-26, 2010, served to help crystallize statewide thinking about the range of issues involved in developing a long-term strategic water plan for the state.

This Town Hall Report is written to convey the essential discourse of those who participated in two days of panel deliberations and their recommendations from the final plenary session. We believe the Report reflects accurately on the scope, tenor, thoughts and conclusions of those participants.

The narrative includes both description of this Town Hall's working process as well as noting those priorities on which the group managed broad consensus. We think the Report may be as much or more useful in highlighting areas in which no consensus was reached.

This Report is offered to the Oklahoma Water Resources Board (OWRB) and the Oklahoma Water Resources Research Institute (OWRRI) as one step in a planned process of statewide public deliberations on water that began three years ago. Its submission, however, is not merely to fulfill the Academy's contract obligation to the OWRRI and the OWRB to hold a Town Hall on water. It is also offered with the intent that it prove valuable in assisting the Board's responsibility to formulate a state water plan for consideration by the Oklahoma Legislature in 2012.

The Academy recalls four years ago the reason it agreed to the OWRB's request to schedule a special Town Hall on water. It rested on our belief that helping to facilitate a successful long-range plan for water would, in turn, constitute a major step in the direction of generating a formal strategic vision for guiding Oklahoma's social and economic future. In a highly competitive national and global environment, no task will be more important than the one of effectively organizing all of Oklahoma's human and physical assets and harnessing their intelligent and collaborative use to the goal of sustaining and growing the health and prosperity of our citizens.

The Oklahoma Academy for State Goals very much appreciates the opportunity to have provided service to the Oklahoma Water Resource Board and to the State of Oklahoma.

John Feaver
Chairman, Water Town Hall
The Oklahoma Academy

INTRODUCTION

In May 2010, the Oklahoma Academy sponsored a special Town Hall meeting at which 185 participants from across the state gathered to engage in a fair, inclusive and transparent process to determine which strategies should be included in Oklahoma’s next 50 Year Water Plan. This was neither an easy nor unimportant task. Each participant brought to the discussion table their own biases and perspectives formed by their unique experiences and visions of what Oklahoma can, and should, be. Discussions about Oklahoma’s water resources can be contentious – we are not all agreed on who owns the water. Yet, we realize the significance of rolling up our collective sleeves to do this particular job ourselves, and we recognize the importance of starting locally to address issues that impact us all physically and economically.

According to key note speaker Michael E. Campana, hydrogeologist, hydrophilanthropist and professor of geosciences at Oregon State University, “Oklahoma Does It Right – I’ve Seen the Way a Water Plan Should be Developed, and It’s in Oklahoma.” In doing it right, we are able to gather the various stakeholders in one place and give ourselves the opportunity to create our own vision.

Despite disagreements and opposing views, the participating stakeholders were able to come together to make the following report and recommendations. That alone is reason for optimism.

FOREWARD

This Town Hall is one further step in a five-phase public participation process to update Oklahoma’s comprehensive water plan. In this phase, the Town Hall was tasked with reaching consensus on a series of strategic recommendations to be sent to the Oklahoma Water Resources Board (OWRB) for consideration as the water plan is updated. This report is the product of the Town Hall’s deliberation of these strategies.

WATER AVAILABILITY – DURING AND AFTER EMERGENCIES

The Town Hall began with the consideration of how the 50 Year Water Plan should address the availability of water in the event of emergencies.

First and foremost, the generation of a statewide water plan creates an opportunity to take advantage of technical analysis and strengthen the emergency management structure currently in place. The plan should encompass local, regional and state water systems to facilitate communication and coordination among all levels of government, including tribal governments, ensure that concerns are adequately addressed and coordinate financing for water projects. A centralized department or agency with statewide authority should be designated to address long-term planning, implement an emergency management plan and coordinate response efforts across the state. Such a centralized agency could provide local communities with proposed planning guidelines and assistance because local interests and local needs are a critical element to proper planning. However, the authority of agencies and departments currently responsible for water emergency management should be strengthened and reinforced to ensure a more effective and efficient allocation of resources, since adding another layer of bureaucracy will only complicate response times in an emergency situation.

At a minimum, the plan should encourage interagency communication and coordination of efforts to draw upon previous studies, expertise and to identify potential financing sources. Agencies should also coordinate efforts on the placement of, and investment in, infrastructure, as well as supply management. Constitutional concerns barring inter-agency collaboration and planning have to be addressed to maximize planning and interconnectivity for emergency planning.

The emergency aspects of the 50 Year Water Plan should include an analysis of the particular causes or types of emergencies most likely to occur in Oklahoma. Additionally, the plan should identify and inventory the types of water supplies available so that prioritization of the best use of such water in each type or category of emergency can be done. A geographically-specific prioritization scale should be developed for the most suitable determination of water needs in emergencies. Comprehensive public education is also necessary to increase public awareness of the available resources.

More specifically, the 50 Year Water Plan should address water availability during emergencies in the following ways:

- Update the current drought management plan and rename it the Oklahoma Water Emergency and Drought Management Plan
- Expand beyond drought management to include flood management and floodplain planning.
- Ensure that appropriate and adequate infrastructure exists and infrastructure failures are minimized

- Emphasize the interconnectivity among tribal, state, and local communities to ensure the most adequate and effective emergency response plan
- Address contamination issues for both urban and rural areas
- Include groundwater regeneration and the expansion of backup generators within the Water Emergency and Drought Management Plan
- Encourage water banking
- Encourage movement of water among regions
- Identify best water management practices

The following were identified as appropriate steps for the protection of safe and reliable water supplies in the face of shortages from natural and other disasters:

- State assistance to monitor quality, quantity and infrastructure of water resources
- Create incentives to encourage cooperation to efficiently manage resources
- Update treatment facilities
- Improve conservation and soil management
- Create a public information database for Oklahoma's water resources
- Create a risk analysis tool
- Mock emergency planning/ scenario planning
- Ensure continuity of information among relevant state agencies and first level responders
- Eradicate the Eastern Red Cedar
- Concentrated review of dams
- Address sustainability of small water systems
- Create incentives to encourage regional planning
- Identify available supplies
- Assess municipal vulnerabilities
- Create contingency plans using updated OWRB atlases indicating location of the state's water and waste water treatment resources (confidentiality and security of final plans is essential)
- Develop supply and demand outlooks to identify needs
- Establish minimum recommendations for pipeline sizes which would allow for addressing future growth and better fire protection
- Create a state program using software similar to that used by the Virtual Academy for the Semi-Arid Tropics (VASAT) to train operators which would include issues of vulnerability, assessment mapping and interconnectivity

WATER CONSERVATION

The Town Hall addressed incentives and action steps to improve water use efficiency, reduce water waste, and reuse or recycle water.

Pricing and Valuation. The current water pricing structure does not necessarily reflect the fair market value of water, since per unit pricing is not affected by consumption. Appropriately structured, tiered rate, market-based pricing mechanisms should encourage less water usage, and tying water pricing to a relative efficiency level is a potential

incentive toward conservation. Describing water amounts in terms of dollars, fair market value, use, quality and application - instead of just gallons - may be an effective way to increase water conservation.

Education efforts should be made to increase public awareness of the importance and benefits of conservation and the value of water (monetary and otherwise). Conservation practices should be integrated within the public education system from elementary to higher education.

Water Conservation. Several forms of use restrictions were considered. The state should encourage all water conservation practices. Setting maximum loss levels would require inferior water systems to be upgraded and provide assistance to those systems for the repair to their infrastructure and for reduction of water loss.

Incentives. Incentives, such as tax credits, rebates, etc., have been effective in encouraging conservation efforts. For example, rebates on appliances with low water usage encourage water conservation. Building codes can encourage, and even require more efficient water usage. Municipal practices and policies should be revisited to discourage wasteful use of water for revenue generation. Additionally, incentives for water efficiency programs, such as xeriscaping, should be offered for both residential and commercial users.

With respect to agricultural water usage, the state should offer incentives for newer and more efficient irrigation technologies, conservation tillage, crop rotation with more water efficient vegetation, and expand on the ongoing efforts of the conservation districts with respect to eastern red cedar eradication.

Pit water permitting and pit water monitoring in open pit mining operations need to be under the jurisdiction of the OWRB.

Monitoring Water Resources. Long-term, high quality water-resource monitoring is vital to provide baseline water-quality and water-quality information to diagnose availability of water resources. Further, evaluation of water conservation practices through monitoring of water usage and water quality is essential to the long-term viability and public support of conservation programs.

There was considerable Town Hall discussion concerning the need for metering of water usage. As stated in the report of the Planning Work Group on Water Conservation, (page 94 of the Town Hall Resource Document), because most water wells are not currently monitored, the state does not have accurate records of water use and cannot accurately estimate water supply. These issues of measurement and monitoring apply not only to water availability in large aquifers, but stream and ground water sources as well.

Water well metering offers a verification process for actual water consumed by the holder of an appropriation or ground water permit, which leads to reliable compliance and reporting requirements for water rights holders. This can be of critical concern for

industrial and agricultural water well usage. However, metering is expensive and may not be appropriate without sufficient data to justify the expense. Monitoring without metering can be a viable alternative to measuring water availability in aquifers to identify a base-line for industrial and agricultural use, in order to prevent and protect against exploitation, and ensure compliance with permitting conditions. Further, metering wells involves significant private property issues, and any conservation efforts that attempt to regulate the use from these wells must be sensitive to the private property concerns. While some form of monitoring of water supply and usage is necessary, there is no Town Hall consensus for metering.

As an alternative to metering, representative sample points may be gathered at alluvial and bedrock water tables to produce accurate sets of data points.

Infrastructure. Existing infrastructure such as reservoirs, floodplain management systems and storage systems must be updated and modernized. Current state regulations which restrict the ability of municipalities to finance and service their bonds should be appropriately reformed to improve state water delivery infrastructure. Municipal dependence upon user fees should be lessened to encourage the more efficient use of water. Although the State of Oklahoma may not own the groundwater resources in Oklahoma, the state government does provide funding for infrastructure development, which can be used to encourage conservation initiatives. Infrastructure development would also address water loss due to old and inefficient infrastructures.

Watershed Management. Identification and management of watershed ecosystems is an important organic process for water conservation and water quality preservation, and should be emphasized, as well as sustained yield practices, as part of a comprehensive water policy. Watershed management can inform interstate water planning, development, and policy, including considerations of water sales and transfers. As regional development plans are established, the most efficient use of resources should be integrated in intercommunity growth, while identifying the economic development value of water usage to highlight the volume of water usage in those communities. Another example of a desirable conservation or waste prevention method is the desalinization of the Salt Fork of the Arkansas River.

Reuse of Storm Water Runoff. The reuse of storm water runoff and agricultural runoff, as well as the use of brackish water, should be encouraged. Waste water reuse in urban areas and the proper use of potable water is an appropriate drought prevention method. Implementation requires education and standardization of these uses. A regulatory framework for these practices is necessary.

The use of gray water, distinguished from the use of brackish water, should also be encouraged. Gray water has not been treated or has been treated to a lesser degree that is less than that which is required for drinking water. Other states, such as Arizona, have implemented waste-water reuse systems and Oklahoma should strive toward a long-term plan to educate our citizens on the necessity of waste-water reuse for sustainability.

Utilization of programs in public school systems is another means of education that will bring about a cultural change that is necessary for sustainable uses.

LAND USE PRACTICES

Best management practices should be encouraged to ensure enhancement of water quality in the State of Oklahoma because regulations and jurisdictional issues can lead to waste and harm conservation efforts. It is important for best management practices to be coordinated among local communities, tribal governments, federal agencies and the state and neighboring states. It is equally important that both urban and rural areas adhere to best management practices. Chemical and fertilizer runoff, soil erosion and municipal sludge, accompanies development in urban areas. Public education regarding the effect of conservation, development, animal waste, composting, sedimentation, water from mining operations, roadside runoff and nonpoint source pollution on quality is key to achieving effective, coordinated policies. A centralized website should be created to educate the public about land use and other water quality related issues. Programs to increase the awareness of the relationship between the end user and the water source would also be beneficial in improving and maintaining water quality. The Blue Thumb Project, Section 319 projects, the Conservation Enhanced Reserve Program and upstream strategies developed and used by the City of Tulsa are all good examples of how to bridge the gap between the source and the end user.

The following land use policies are recommended:

- Re-establish and develop riparian buffer zones around streams, tributaries, lakes and wetlands to control contaminant input and prevent erosion
- Create and encourage water conservancy districts
- Monitor the number of septic tanks permitted in an area
- Create and develop best management practices for land use through continued and increased incentives (best management practices include rain gardens, xeriscaping, working with municipal officials to prevent leaky pipes, use of organic fertilizer, soil sampling, etc.)
- Provide a state funded technical assistance program for source water protection plans, emergency response plans and wellhead protection plans
- Provide state funding to prioritize watersheds based on need and create incentives for improvements in water quality along with further monitoring and assistance
- Promote cooperation between conservation districts
- Re-evaluate farming incentives
- Encourage storm water management
- Encourage appropriate zoning and residential development to avoid concentration in areas where water is scarce

Efforts should also be taken to identify and address those unincorporated areas where there are no regulations and areas outside city limits where land use affects water quality inside the city. Steps to limit the harmful effects those areas may have on water quality should be taken.

Finally, Oklahoma must consider the interstate impact on water availability and quality when considering land use practices. It is imperative that Oklahoma work with neighboring states to identify best management practices since economic regions do not necessarily end at the state line. For example, water sources in northwest Oklahoma have been negatively impacted by agricultural land use practices in Kansas.

INTERGOVERNMENTAL WATER RESOURCE MANAGEMENT

The governments of the United States, Indian Nations, Oklahoma and neighboring states, counties and municipalities should work more cooperatively and effectively to manage water resources. In envisioning cooperation to effectively manage water resources unique approaches are required. The state must determine potential conflicts and to what extent each entity should be involved. Due to the presence of a number of sovereign states within the state (i.e., federal government, state government and tribal governments) along with municipal governments, achieving cooperation can be difficult. Although a specific approach or methodology could not be agreed upon, the following should be considered:

State/Federal Issues. The state should work with federal entities, such as the Army Corp of Engineers, to develop a regular review process of all lakes and reservoirs in Oklahoma, their intended purpose, and beneficial utility to reflect the modern uses and interests. A statewide review committee should be established. This review should include an updated inventory of resources, availability of supply, infrastructure condition assessments and maximum benefit uses. This review should also include an audit of current allocations.

State/Tribal Issues. State and tribal issues must be resolved through meaningful government-to-government negotiations, preservation and building up on history of “good neighbor” relations, and implementation of the specific recommendation made on this subject in the 1995 state water plan so that the state and tribes can work cooperatively and more efficiently to resolve water issues. Tribal governments should be involved in the development of the 50 Year Water Plan so as to best address tribal water issues. The recommendation from the 2003 Town Hall regarding the creation of an Annual Governor’s Listening Conference should be adopted and implemented. The creation of a cabinet level position to address compacts was considered; however, no consensus regarding the creation of such a position was reached.

Regional Approach. Regional involvement is essential and discussions (whether such discussions involve neighboring cities, counties, tribal entities and/or states) where all stakeholders have a seat at the table and an opportunity to be heard should be encouraged to provide a foundation for further collaboration. Regional cooperation is necessary to avoid federal preemption and control. Parties to any regional discussions should respect territorial boundaries. Regional discussions should be based upon appropriate resource information to ensure long-term needs can be addressed. Negotiation, not litigation, is the preferred dispute resolution method. Success is achieved when all interested

stakeholders in a particular region are consulted and present in an open and transparent negotiation process to effectively manage our water resources.

OKLAHOMA INTERAGENCY WATER RESOURCE MANAGEMENT

Oklahoma has several agencies that have a role in water resources management. These agencies are not located in close proximity to each other and information comes in different formats making it difficult for the public to interact with them. In addition, water resource management is fragmented and inconsistent because of insufficient interagency coordination, jurisdictional conflicts, and regulatory gaps.

Interagency Coordination. Under the interagency coordination approach, a coordination committee should be established that includes representatives from all agencies having jurisdiction over water. Agency representatives should be the department or division heads from the sections of the agencies that have authority over water. Relevant federal agency personnel should also be included on the committee. The committee should work with regional stakeholder-based water resource management groups to help meet its goals. To help the agencies facilitate cooperation and allow for ease of public access, agencies should be relocated in close proximity to each other.

The committee should meet regularly and report annually to the Governor and Legislature on the progress and implementation of the comprehensive water plan, success of the coordination efforts between agencies and other accomplishments. The report should also suggest ideas for improving water resource management and making legislative changes. All meetings held under the Open Meetings Act, and all reports should meet the guidelines of the Open Records Act.

SURFACE AND GROUNDWATER RELATIONSHIP

There was no consensus as to the conjunctive use and management of groundwater and surface water resources. Better coordination and management of the interrelation of surface and groundwater resources is essential. Our surface water allocation system (prior appropriation) does not recognize groundwater/surface water interactions. These interactions can be a significant source of problems limiting the effective management of water.

Increased public awareness of the connection between groundwater and surface water is essential. In recognition of our stewardship role with respect to our state's natural resources, we must better understand and manage the very real connection between the use of those resources while balancing the right of a beneficial, consumptive use of those resources.

A comprehensive, independent hydrologic study should be undertaken to identify how the two systems are related and better understand how to effectively manage the two. Any such study should also include a determination of the quantity and the quality of

groundwater, including levels of contamination, the maximum annual yields of aquifers, the impact of precipitation levels, the impact of pumping groundwater on the appropriation of surface water, and the effect of the depletion of surface water on groundwater. Long-term hydrological studies are also needed to predict impacts on use and recharge.

Coordinating management of groundwater and surface water raises concerns about private property rights. In developing new policies for the coordinated management of surface water and groundwater, the rights and needs of private property owners, municipalities and water districts must be balanced with the need for additional regulation in this area.

One approach to a coordinated management system is the development of regional basin organizations to monitor and manage groundwater resources. In preserving surface water resources, more reservoirs could be constructed for storage opportunities to reduce the need for groundwater withdrawal and increase groundwater recharge. In developing a local management system it should be recognized that any interactive management system is appropriate to each region and may not be necessary statewide. Incentives should be available to private property owners to encourage participation in any coordinated management system.

WATER SALES AND TRANSFERS

If water is going to be sold out of state, an appropriate management system must be implemented. However, questions regarding vested rights in the water subject to sale or transfer must first be resolved.

Prior to any further transfers or sales, it must be determined whether a surplus of water actually exists. This would necessarily involve protecting the water basin of origin, determining the needs of Oklahomans and finally addressing out-of-state demands.

This requires a more thorough analysis on basin studies, downstream interests, interstate compact requirements, intrastate needs and conservation requirements prior to advancing such a sale or transfer. Additionally, regional and basin-based economic impact analysis and best management practices are essential to increasing support for, specifically, interbasin transfers or water sales. As water resources are managed in Oklahoma, the priority for water development should be for economic and community growth within Oklahoma as opposed to fueling the economic growth of our neighbors.

If the interstate sale of water is appropriate, it is important to leverage regional interests, municipalities, water districts, tribal governments and the state, to broker the most beneficial agreement possible for development and prosperity within our state, while ensuring the best management of our resources. A substantially similar analysis should be applied on a regional interbasin analysis regarding intrastate sales or transfers.

As economic development potential and water management are considered, particular attention should be paid to the ecological impact and environmental costs of water development and whether such development is the best use of the resource.

Oklahoma has an opportunity to create a process to involve all stakeholders in the sale of water to other states. As Oklahoma has only had a 30-year water plan in place, this is a significant opportunity for thoughtful and rigorous planning. This is a renewable resource that must be managed with a regard for conservation and provision for our state's own needs first and foremost.

The creation of regional water-basin advisory boards, with oversight by the OWRB, is an oversight system that would study and make sales and transfer recommendations to the OWRB. The OWRB should then, based upon these recommendations, make determinations with respect to contracts for out-of-state sales. Under this system, revenue from water sales could accrue to the benefit of the particular region from which the water is sold, as well as the entire state, and can be used for water conservation and infrastructure projects.

Drawing on the article by Governor David Walters (page 166 of the Town Hall Resource Document), a "Water Development Authority" should be created that gives real voice to all stakeholders, including tribes, environmentalists, farmers, ranchers, wildlife conservationists and activists against water sales and transfers. Oklahoma should not rely on out-of-state interests to develop the necessary infrastructure to capture the water and effectuate these transfers and sales. Finally, infrastructure development can create an economic boom to the southeast Oklahoma economy, while always giving first priority to Oklahoma's needs.

The best interest of all stakeholders must be taken into account, and the establishment of a Water Development Authority will accomplish this. Support was expressed for HB 1483, especially with regard to the provision that requires other states to demonstrate a need for the water contracted for sale. An extension of the purview of the Water Development Authority to 100 years should be considered to align our governance structure within the laws and regulations of other states.

Two major issues exist with regard to in-state transfers: 1) the funding for creating and maintaining infrastructure; and 2) the region from which the water is sold is made whole and receives the benefit for the water transferred. In the approval process for the transfer, all stakeholders must be involved, and tribal water rights must be considered. A state-wide water supply grid should be developed to account for water supply and demand transfers within state. The 50 Year Water Plan should include a statewide water conveyance plan. Comprehensive water conservation plans should be submitted and adopted in advance by any recipient of an intrastate water transfer.

CONFLICT RESOLUTION

As water-related conflicts become more frequent and complex, access to conflict resolution services will become imperative. Although parties should be encouraged to resolve conflicts informally at the local level, conflict resolution approaches that are low-cost, transparent, involve all interested stakeholders and involve subject matter experts should be made accessible to the public. Several conflict resolution methods and procedures were considered.

Mediation. Mediation should be voluntary, non-binding and involve all stakeholders. Several suggestions regarding how to provide better access to mediation services were made. First, the OWRB should further develop and expand its mediation services. Additionally, agencies, including the OWRB, should begin to provide mediation services based upon the Oklahoma Agricultural Mediation Program, federally funded with a 94% success rate. If a particular conflict cannot be resolved through mediation, an administrative hearing before the agency with jurisdiction over the issue should be conducted prior to litigation.

Arbitration. Arbitration can be a powerful tool for negotiations in lieu of litigation. Arbitration procedures, with subject matter experts familiar with local issues, should be implemented to address water conflicts.

Ombudsman Process. An ombudsman process should be created under the Secretary of the Environment for disputes between individuals which may not be appropriate for mediation. The ombudsman, directly accountable to the Secretary of the Environment, would be a neutral party acting in an advocacy role to promote conflict resolution among the interested parties.

Conflict Resolution Center. Arbitration and mediation offered through a conflict resolution center, possibly supported by academic centers within the state, was considered. However, resources for conflict resolution outside of the courtroom already exist. For example, the OWRB, Department of Agriculture and several academic centers currently provide mediation and/or arbitration services. An analysis of current conflict resolution services and providers should be conducted before a separate conflict resolution center is created.

Tribal Conflicts. Addressing conflicts related to tribal water claims requires the establishment of a clearly delineated framework which should require negotiation before litigation. Any state/tribal conflicts should be resolved through compacts.

Interstate and Federal Conflicts. Conflict resolution methods should also be implemented to address any potential interstate and state/ federal conflicts. Such conflicts could also be resolved through compacts.

Poor communication and customer service often lead to conflicts. Those state agencies with jurisdiction over water issues and resources should strive to provide good customer

service, and easy access to information, direction, and advice in an effort to avoid conflicts.

BALANCING SUPPLY AND DEMAND IN THE FACE OF CHANGE

Ensuring that adequate supply exists to meet statewide water demand requires commitment to stewardship and conservation programs. Continued investment in flood control programs and water storage through raising dams is an important step in water conservation and planning. Conservation district efforts at enhancing and managing these programs should be further supported.

In meeting our statewide needs, we should be careful in committing our resources to growth patterns in regions outside of our control, such as neighboring sovereign states. Additionally, conservation and water quality necessities would be well served by adopting base flow requirements for certain planned releases and watershed recharge.

Land use, zoning, and community planning tools need to be implemented appropriately across the state to ensure responsible growth, development, and sustainable use of our resources. Communities should invest in green space development to prevent environmental degradation, contamination and waste of water resources.

In the face of changes in climate patterns, such as drastic increases or decreases in rainfall or increased evaporation, a comprehensive overview of resources must occur. It is urgent that USGS stream gauges should be widely utilized for monitoring and sampling of resources. Planning for the 50 year needs of our state requires an inventory of the ecological or environmental health of our watersheds, especially as they relate to our demands and ability to meet supply. Conservation efforts should be used in conjunction with new capture technology.

Addressing the health of aquatic habitats and ecosystems in advance of drastic adverse impacts is much easier than attempting to restore the aquatic ecosystems. As such, ecological and environmental preservation should be a priority in planning for the 50 year development of Oklahoma's water resources.

Reliable, up to date, independent, scientific and technical studies must be conducted and referenced as a baseline for developing a comprehensive water plan that evaluates and provides for a balanced economically and environmentally sound policy. A comprehensive water plan for Oklahoma requires further statewide river basin and reservoir studies.

Additional development of storage capacity and aquifer recharge are important for ensuring adequate supply.

Base flow, instream flow or environmental flow regimes should be implemented to preserve water quality, ecological diversity and economic development, including recreation, hunting and fishing. Excess flow regimes and capture need to be addressed as

well. Furthermore, the intensity and efficiency of land use needs to be revisited to maximize the planting and development of less water intensive crops to ensure adequate supplies and prevent waste.

Tribal rights in streams, reservoirs and groundwater alike, must be addressed to ensure an accurate statewide water plan. Likewise, the plan must be representative of urban, suburban and rural communities, identifying and balancing supply and demands needs, including provisions for transfers and water supply systems.

Other ideas discussed to ensure supply meets demand over the next 50 years include:

- Long range water supply and demand forecasts by region that are periodically updated to reflect changing elements
- Development of new technologies for the utilization of brackish water
- Development of new methods of capturing excess flood water
- Periodic re-evaluation of the Water Plan to ensure appropriate adjustments and modifications
- Transparent mechanisms to prioritize water demands
- Strategies to address evapotranspiration by Eastern red cedar, salt cedar and other invasive species
- Development of a smaller, more affordable lake system throughout the state, used for such things as flood control, consumptive use and erosion control

STAKEHOLDER INVOLVEMENT

Continuity of the meaningful and inclusive dialogue at this Town Hall is necessary for the successful implementation of the 50 Year Water Plan. To ensure this, all tribal governments in Oklahoma should be adequately consulted and included in the process. Additionally, the Governor should bring tribal leaders and other vital state and tribal authorities together for a symposium to discuss water issues.

Citizens and non-government organizations (NGOs) should also be involved in implementing water resource management programs and future updates and revisions. To ensure citizen and NGO involvement, a three-tier arrangement of advisory groups should be established: local, regional and statewide. Membership in these groups should include, but not be limited to, representatives from local organizations, tribal nations, industry, municipalities, rural water districts, tourism, recreation and individuals based on watersheds, aquifers or both. These groups should be grassroots-driven and all inclusive.

Local groups should be established initially. One or more local groups should be identified to serve as host to provide administrative support. These local groups would then select representatives to serve on regional groups based on 13 major watersheds in Oklahoma. Citizens selected for the 13 regional groups should be representative of stakeholders in the area. Finally, a state advisory board should be formed with representatives selected by the regional watershed groups.

The advisory groups could serve various functions. For example, the groups could formulate policy advice to be funneled through the state group to the state government on issues such as water use permits, land use practices, water planning, and water quality protection. The groups could also make decisions to resolve zoning and planning conflicts with an appeals process to the appropriate agency.

Regional conflicts and trans-local water issues, such as infrastructure and water sales, could be mitigated using regional groups, working through the state group, with the appropriate state agencies or regulatory authorities. Additionally, the groups could participate in educational programs to keep citizens informed about water issues, encourage conservation, and help land users employ best management practices to reduce pollution.

Another option is for appropriate governmental agencies with jurisdiction over water regulation and management, such as the OWRB, to partner and coordinate efforts with local and grassroots organizations. Existing local entities, such as rural water districts and conservation districts, should be utilized to determine each region's needs and incentivize cooperation.

Successful stakeholder involvement can be measured by increased support of the 50 Year Water Plan, greater community involvement, and the creation of a common basis of understanding.

LOCAL AND REGIONAL ISSUES IN THE STATE PLAN

The ideal relationship between local and regional water planning authorities would provide adequate representation to all stakeholders and oversight and assistance by the OWRB at the regional and local level. The local plan should feed into the regional plan and the regional plan should feed into the state plan. The process should be “organic” and built upon mutual interests from the ground up. Guidance and policies should not be handed down from the state to region or region to local. Support was expressed for local advisory boards that then feed into regional watershed and basin regions, which should then inform and advise an appropriate state plan.

Improved coordination and communication between the municipal and rural water districts is necessary with incentives for cooperative efforts on storage, supply, infrastructure and conservation. Coordination among local and regional planning authorities and the relationship between plans and regions must be defined. These regions can be based upon the 13 watershed basins with representation from the varied interests within the basin, identifying planning priorities at the local level while integrating it into the regional plan. The regional planning authorities need flexible boundaries and membership guidelines to allow for the most appropriate regional planning, including potential subsections based upon aquifers or sub-basins. The success of local and regional authorities hinges upon the decentralized approach to policy development.

Kansas and Texas models deserve review and consideration for adoption in Oklahoma to streamline the relationships between local and regional water planning authorities.

The State should encourage public policy that incentivizes and funds planning assistance, technical assistance, and regional cooperation, plus education. The goal of the policy should be to encourage conservation, reduce inefficiencies, prevent duplications and eliminate inconsistent government.

The following are elements of an appropriate relationship:

- Interface with regional/local planning processes and/or the inclusion of region/local provisions in the state plan
- Division of planning and implementation responsibilities between state and regional/local authorities
- Technical assistance in local and regional planning
- Coordination of access to water supply (reservoirs, aquifers, rivers)
- Regionalization of infrastructure (shared infrastructure)
- Funding of local and regional infrastructure (water and wastewater collection, treatment, and distribution)

Other items for an ideal relationship between local and regional water planning authorities could include:

- Small municipalities and water districts cooperating in the development of infrastructure, with cost considerations
- Existing models, such as the various Grand Lake water planning authorities, that are regionalized into one system
- Incentivizing planning authorities to cooperate in one regional water system. When communities come together and consider all stakeholders, the state could reward and provide technical assistance, grants, loans, etc.

To accomplish these relationships, the following should occur:

- A unified state plan that is developed by and executed at the local and region level to the extent possible.
- Establish a state plan that is adaptable to each locality and regional, which adaptation must be approved by OWRB. Technical and expert support should be provided by OWRB when appropriate.
- Establish floodplain management boards. FEMA gives money to areas that do floodplain planning because reduces damages during floods. A relationship between water planning and OWRB could result in incentives (a better REEP score).
- It is critical that conservation districts be a part of the regional groups (local cities, counties and watershed).
- Local water entities have their water plan and emergency response approved by the Watershed Authority (group) to access the resources (incentive).
- A forum should be organized for the entities to get together and share ideas, resources, etc. Open communication is essential.

RECOMMENDATIONS

The following recommendations were developed by the Panels from their Monday and Tuesday deliberation and discussion sessions. During the Panel Caucus Sessions Wednesday morning, the six Panels were asked to vote individually on the recommendations with a majority vote indicating acceptance or rejection by the Panel as a whole. The Panel votes are recorded after each recommendation.

Monday Morning Panel Discussion Session: *Water Availability*

A. Water availability including during and after emergencies

1. **Panel Arbuckle** recommends the state perform a failure modes and effects analysis for Oklahoma water emergencies. This will identify sources of water emergencies, their consequence, and suggest responses. Response accountabilities and responsibilities can then be suggested or assigned.

Accepted – 4 panels to 2 panels

2. **Panel Wichita** recommends including water and wastewater emergency planning in the state and municipality water system operator training programs

Accepted – unanimously

3. **Panel Ozark** recommends state assistance for monitoring water quality, quantity and infrastructures to insure sustainable water resources on a local, regional and state level.

Accepted – 5 panels to 1 panel

4. **Panel Ozark** recommends the state develop a comprehensive pro-active plan to incentivize interconnection and shared storage of water between or within local, regional and state water systems. The state should evaluate overall risks associated with various types of emergencies and encourage local entities to do the same by way of incentives and technical assistance.

Accepted – unanimously

B. Water conservation

1. **Panel Wichita** supports grants and loans for “leakage surveys or assessments” by municipalities or rural water districts. Wichita contends that substantial conservation of wasted water treatment dollars can be achieved if system leakage is addressed.

Accepted – unanimously

2. **Panel Ozark** recommends increased funding for research and development along with education on the issue of water conservation on a local, regional and state level. The relevant state agencies shall serve as a clearing house for water conservation information.

Accepted – unanimously

3. **Panel Ouachita** recommends the state provide additional funding for water ` related infrastructure, water conservation, land-use, water emergency management planning, drought planning, water supply increase and water related education in the context of existing programs at the state level. The increased funding for this recommendation will be provided by a temporary one cent sales tax increase levied over five years with extension reconsideration thereafter.

Rejected – 5 panels to 1 panel

4. **Panel Ouachita** recommends that public water supply and waste water operators be required to identify and report water losses in order to qualify for government funding. Ouachita also recommends that water based pricing of water should be implemented and that water conservation measures such as red cedar eradication and composting should be incentivized.

Accepted – 4 to 2

C. Land Use Practices

1. **Panel Ouachita** recommends that voluntary water management practices be encouraged for agriculture lands, urban storm water as well as urban and suburban developments. These voluntary management practices should include cost sharing or incentives funded through the appropriate state agency.

Accepted – unanimously

2. **Panel Ouachita** recommends establishing and promoting connections between riparian buffers and wetlands and water filtration, to inform land-use practices in both rural and urban areas.

Accepted – 5 panels to 1 panel

3. **Panel Ozark** recommends that the State, through DEQ, OWRB and the Oklahoma Conservation Commission, provide technical assistance to public water supply systems in developing source water protection plans and wellhead protection plans, in order to protect water supplies from potential pollution sources.

Accepted – unanimously

4. **Panel Wichita** recommends that the Oklahoma Conservation Commission emphasize roadside erosion as a major contribution to water quality degradation by sediment. The State should work with county commissioners to improve or fund proper construction and maintenance of roads to reduce sediment contribution from roadsides.

Accepted – unanimously

5. **Panel Arbuckle** recommends that the State develop a legal connection with neighboring states on water quality standards and encouraging cooperation for conservation and water quality efforts or enhancements.

Rejected – 4 panels to 2 panels

6. **Panel Arbuckle** recommends creating a competitive grant program for the State's 13 watershed planning areas. The purpose is to demonstrate "best practices" that incorporate the spirit and practice of the Oklahoma Water Plan approved by the Oklahoma legislature.

Accepted – 5 panels to 1 panel

Monday Afternoon Panel Discussion Session: *Water Management*

A. *Intergovernmental Water Resource Management*

1. **Panel Black Mesa** recommends the State of Oklahoma begin the planning process between representatives of the state and the Tribal Nations with the expectation to proactively resolve water issues. The collaboration should be ongoing and organized through a water "watershed" approach. This planning dialogue shall occur prior to the consultation process.

Accepted – unanimously

2. **Panel Ouachita** recommends the creation of a cabinet level tribal liaison officer to advise Oklahoma governments and negotiate on a tribal government-to-state basis on water issues.

Rejected – 4 panels to 2 panels

3. **Panel Ouachita** recommends for the OWRB to revive the previously developed interstate compact between Texas, Oklahoma, Kansas and Nebraska to begin a dialogue on future Ogalla aquifer water use and status.

Accepted – 5 panels to 1 panel

4. **Panel Ozark** recommends the adoption of the Oklahoma Agriculture Mediation Program model to assist parties with resolving their disputes and / or improve negotiations concerning water issues, and to continue its funding in the future.

Accepted – unanimously

5. **Panel Ozark** recommends that the State should enact legislation to create a statewide framework of 13 watershed – based coalitions with diverse representation, including but not limited to citizens, local, state, tribal and federal authorities, and non-governmental organizations. Implementation should be coordinated through the Governor's cabinet level authority, working with several state agencies. The 13 coalitions should identify local water resources issues and develop actions plans and recommendations for OWRB to implement.

Accepted – 4 panels to 2 panels

6. **Panel Quartz** recommends giving the Oklahoma Water Plan the teeth it needs to force the federal government, tribes and state to the table to negotiate the issue of ownership before proceeding on with the adopting of the Oklahoma Water Plan. We must settle this or all other work and issues are in vain.

Rejected – 5 panels rejected this recommendation; 1 panel had a tie vote

B. *Interagency Water Resource Management*

1. **Panel Ozark** recommends clarification and education on jurisdictions and statutory responsibilities of various agencies by establishing a central point of contact such as a website, hotline, frequently asked questions list or similar mechanism to be coordinated between level secretaries and agencies.

Accepted – unanimously

2. **Panel Ozark** recommends creating an interagency water resources committee which meets regularly and has an open meeting requirement, based upon the Funding Agency Coordinating Team model to be implemented by all agencies with water resources jurisdiction using existing agency personnel. The purpose of this committee is to foster better coordination among water resources agencies and inform and work cooperatively with the public.

Accepted – 5 panels to 1 panel

3. **Panel Ozark** recommends establishing a baseline of understanding of the current atmosphere and effectiveness for agency working relationships by using a variety of survey tools regularly to assess constituent and agency staff opinions by the State. The Water Resources Board would be responsible for implementation to occur biannually with a financial cost of \$25,000 - \$100,000 annually.

Rejected – 5 panels to 1 panel

4. **Panel Ouachita** recommends expanding the Secretary of the Environment responsibilities to include providing consumers with stop reference to the appropriate water agency, be the watch dog to assure consistent enforcement of water regulation, with renewed emphasis on coordination of agencies with water responsibility. The Secretary of Environment or perhaps the Secretary of Environmental & Water would be responsible for implementation with an estimated financial cost of implementation of \$500,000.

Rejected – 5 panels to 1 panel

5. **Panel Ouachita** recommends that the preliminary question of tribal water rights must be resolved immediately.

Accepted – 5 panels to 1 panel

6. **Panel Wichita** recommends that the implementation of the portion of the State Water Plan, which is the State’s responsibility, should be assigned exclusively to OWRB, with OWRB contracting with other state agencies for the taking of necessary actions within their regulatory authority for which state funding for the plan is provided.

Tied – 3 panels to 3 panels

Tuesday Morning Panel Discussion Session: *Water Rights and Conflicts*

A. Surface and Ground Water Relationship

1. **Panel Wichita** recommends the State fund and conduct hydrologic studies on surface and ground waters in as comprehensive a manner as possible. These studies should include completion of aquifer and yield studies previously mandated but not funded. Data gathered from the studies should be adequate to facilitate future drought modeling and readings.

Accepted – unanimously

2. **Panel Arbuckle** recommends that a comprehensive hydrologic evaluation be conducted of all stream and alluvial systems statewide, including interactions between surface and groundwater as well as stream maintenance needs to be conducted on a priority basis. These evaluations should be scheduled to repeat in each basin on a twenty year interval.

Accepted – unanimously

B. Water Sales and Transfers

1. **Panel Ouachita** recommends that the funds from the sale of water that go back to the “State of Oklahoma” (i.e. the government) shall be earmarked for water programs, including infrastructure, studies, implementation and maintenance of the statewide water plan and water quality. These funds should be deposited into the state revolving fund. The funds from the sale would go back to the basin of sale, as well as a larger portion to the state.

Rejected – 5 panels to 1 panel

2. **Panel Wichita** recommends the state’s share of any proceeds from interstate water sales should not go to the general fund but should be allocated to a legislatively created trust or authority with members appointed by the Governor and approved by the Senate. The authority would be directed to expend such proceeds for water infrastructure, water studies to understand and develop Oklahoma’s water resources and for actions consistent with the State Water Plan. This money should not reduce the normal appropriations for water projects.

Accepted – 5 panels to 1 panel

C. *Conflict Resolution*

1. **Panel Ouachita** recommends that the State of Oklahoma negotiate with the Tribes to develop plans or agreements on how to handle water conflicts.

Accepted – 4 panels to 2 panels

2. **Panel Ouachita** recommends the adoption of Alternative Dispute Resolution, as demonstrated by the Oklahoma Agriculture Mediation Program, is an effective alternative to court action for to landowner disputes with other landowners, state agencies and other water related interests such as “basin shareholders”.

Accepted – unanimously

3. **Panel Arbuckle** recommends that the Secretary of Environment develop Ombudsman services to assist conflict resolution as early as possible using knowledgeable experts to work with conflicted parties for ODEQ and OWRB, modeling the program of the Department of Human Services.

Rejected – 4 panels to 2 panels

Tuesday Afternoon Panel Discussion Session: *Water Planning*

A. *Balancing Supply and Demand in the Face of Change*

1. **Panel Arbuckle** recommends the OCWP adopt and continually improve a dynamic supply and demand planning tool. The current use of the Oklahoma water tool makes Oklahoma a national leader and model; and OCWP should initially adopt this standard.

Accepted – unanimously

2. **Panel Arbuckle** recommends the use of funds to build over 300 flood control lakes currently on the books, for additional water sources for consumptive use or agriculture. Matching funds from USDA are usually included.

Accepted – 4 panels to 2 panels

3. **Panel Arbuckle** recommends development and implementation of a strategy as a part of the OCWP to manage eastern red cedar, salt cedar and other invasive species statewide as a means of increasing water supply.

Accepted – unanimously

4. **Panel Arbuckle** recommends the water plan process (planning and evaluation) must have a reliable dedicated source of revenue to ensure success in meeting Oklahoma’s water needs. The state water plan process must be viewed as a continuous improvement process.

Accepted – 5 panels to 1 panel

5. **Panel Black Mesa** recommends incorporating the Oklahoma Water Tool, Instream Flow Study Work Group and Geographic Information Systems into the Water Plan.

Accepted – unanimously

6. **Panel Ouachita** recommends the growth of the supply of water for beneficial uses by storage of desalinated brackish water, increasing soil organic matter to reduce runoff, recharging of aquifers, rehabilitating existing dams to include municipal and industrial supply, building new dams for water supply, and flood control and improvement through water yield from pasture and rangeland by removing eastern red cedars.

Accepted – 5 panels to 1 panel abstention

7. **Panel Ouachita** recommends the Regional Water Planning Authority (Watershed Planning Regions) will produce a 10 year supply and demand plan (updated?) using the state supplied Water Decision Support Tool by collecting and analyzing information on water supplies and usage within the region/watershed and supply to OWRB.

Rejected – 5 panels to 1 panel

B. Stakeholder Involvement

1. **Panel Arbuckle** recommends the establishment of three levels of interactive advisory groups to be on the geographic boundaries of the 13 identified watershed basins. The local level advisory groups are sub-watershed groups comprised of interested persons in a defined sub-watershed area. Regional advisory groups will follow the 13 Basin Boundaries, with a Statewide Advisory Board used an advisory to the water agencies. The supervisory administrative organization such as the Council of Governments, will establish a plan of organization in conjunction with the Oklahoma Water Resources Board.

Rejected – 4 panels to 2 panels

2. **Panel Arbuckle** recommends that we recommend to the governing legislative leadership that they invite tribal governments to a Sovereign Symposium to develop a compact on water rights.

Rejected – 5 panels to 1 panel

3. **Panel Arbuckle** recommends the existing Citizen Planning Group should form the core of the formal Citizen Advisory Group to the OWRB. This group will maintain broad stakeholder involvement in OWRB planning activities and form the core of the next statewide citizen planning group the formal Citizen Advisory Group to the OWRB. This group should be formalized effort that will be sponsored in repeating cycles to continue updating the plan.

Rejected – 5 panels to 1 panel

4. **Panel Ouachita** recommends local, regional and statewide advisory groups for watershed and aquifers should be established, including all interests groups as described on page 182 of water background document and following “Stakeholder Advisory Groups.”

Tied – 3 panels to 3 panels

5. **Panel Ozark** recommends that each ten year update of the Oklahoma Comprehensive Water Plan include a Town Hall (or similar) meeting and an annual updating session at Governor’s Water Conference (open forum for discussion).

Accepted – 5 panels to 1 panel

6. **Panel Ozark** recommends the OWRB should create staff liaisons to represent and report back to the agency on the issues of the 13 regional water planning districts.

Tied – 3 panels to 3 panels

7. **Panel Ozark** recommends the OWRB will establish a training program to educate elected or appointed boards, councils, districts, etc. involved in the allocation of funds for water infrastructure, on the value and governance of water eligibility entities will receive DWSRF/CWSRF priority points for loans, grants, etc. for water infrastructure needs after attending the training.

Rejected – 4 panels to 2 panels

C. *Local and Regional Issues in the State Plan*

1. **Panel Arbuckle** recommends the next Citizen Plan Group should begin at the grass roots level with an open and well advertised Water Town Hall meeting that includes interested stakeholders in each area. On-going practice for future water planning at regular intervals over the next 50 years should be encouraged.

Rejected – 4 panels to 2 panels

2. **Panel Arbuckle** recommends the State should encourage public policy that incentivizes and funds planning assistance, technical assistance, regional cooperation and education to enable informed decision.

Accepted – unanimously

3. **Panel Arbuckle** includes the Statement of Purpose to be used as the Preamble to the Comprehensive Water Plan:

“The Comprehensive Water Plan is a dynamic, evolving, but unifying blueprint to be used and modified as necessary to include unique regional differences in water policy and regulation throughout the State. The Oklahoma Water Resources Board shall convene local and regional advisory panels to ensure that local priorities are met and that regional policy and regulatory differences are incorporated into the Comprehensive Water Plan.”

Rejected – 4 panels to 2 panels

4. **Panel Ozark** recommends that the OWRI utilize local feedback meetings as an opportunity to discuss the composition of regional water planning districts and notify potential participants.

Rejected – 5 panels to 1 panel

5. **Panel Ouachita** recommends that the local and regional authorities should be encouraged to have cooperative, integrated relationships and through interlocal agreements, create synergistic water resource planning and emergency response coordination. These efforts should be rewarded by the watershed planning authority by using incentives for funding technical assistance, loans and grants for future water resource planning and implementation.

Rejected – 4 panels to 2 panels

6. **Panel Wichita** recommends OWRB incentivize effective regional collaboration to create and fund projects of merit endorsed by regional groups.

Accepted – 5 panels to 1 panel

ADDENDUM – MINORITY REPORTS

The following Minority Reports were submitted and met the guidelines of having appropriate support and not being just “one person’s” opinion.

Scientific Information

Scientific information should be developed on the various ways, particularly those mentioned in the Town Hall workshops, to increase supply or decrease demand of water for use in future Supply/Demand planning. This should include, by region, an idea of the costs per acre foot, total cost of an efficient project, estimate of magnitude of water achieved, practicality of time approach, time to implement, and other informative comments. It would be helpful if a first pass could be included in the Long Range Plan to give recipients an idea of future costs that might need to be incurred. It is recognized that before implementation of a project, more detailed analysis would be needed, and that technology and other factors will change future cost effective relationships.

Regional Groups

A considerable number of references are made to regional groups in both the workshops and the Town Hall. It is recommended that a study be made of what key elements would need to be addressed in formulating such groups. Specifically, consideration should be given as to what legal entity, resources, legislative action, liability and other organizational elements would be needed to best do the jobs outlined in the meetings. Reference to how states such as Nebraska, Texas and Kansas do these jobs would be helpful. As the meetings have postulated both authoritative and advisory entities, comments on how well each of these would be able to handle such job responsibilities would be desirable. This study should be included in long range plan report.

Balancing Supply and Demand in the Face of Change

The Town Hall Report section pertaining to Balancing Supply and Demand in the Face of Change contains a number of statements about which attendees at the Town Hall did not reach consensus. The Ozark group offered an amendment in the plenary session to delete the statement that “Additionally, conservation and water quality necessities would be well served by adopting base flow requirements for certain planned releases and watershed recharge” (page 24, lines 1-2), as well as asking for deletion of the claim that “Base flow, in-stream flow or environmental flow regimes should be implemented to preserve water quality, ecological diversity and economic development, including recreation and hunting and fishing” (page 25, lines 12-14). The vote on the motion to amend by deletion failed 61-59. That close vote indicates there was not a consensus on adopting instream flows in Oklahoma. One other group offered an amendment to delete the page 25, lines 12-14 language. That amendment was voted down as well. However, it appeared more people voted it down because it was a repeat of the previous proposed amendment which failed, rather than from a conviction that instream flows are a good idea.

We are therefore requesting the following sentence be inserted on page 24, line 1: “There was no consensus regarding the advisability of adopting and/or implementing base flow, in-stream flow or environmental flow regimes.”

2010 WATER TOWN HALL PARTICIPANTS

Frank Acker Idabel, OK	Kassandra Bentley Tulsa, OK	Pat Burt Adams, OK
Richard Alig Okarche, OK	Robert Bierschenk Oklahoma City, OK	Mary Jane Calvey Oklahoma City, OK
Lawrence Allin Norman, OK	Larry Boggs Wilburton, OK	JeanAnne Casey Hennessey, OK
Randy Archer Mountain Park, OK	Jerry Brabander Deer Creek, OK	Larry Casey Pryor, OK
Sinclair Armstrong Muskogee, OK	David Braddock Altus, OK	Cheryl Cheadle Bristow, OK
Harvey Arnold Atoka, OK	Andrea Brauetigam Stillwater, OK	Larry Cofer Lawton, OK
Margaret Avard Durant, OK	John Britton Leedey, OK	James Collard Shawnee, OK
Kim Baker Meeker, OK	Lauren Brookey Tulsa, OK	Daryl Covey Lexington, OK
Sherry Barby Laverne, OK	Ginger Brown Tahlequah, OK	Cara Cowan Watts Claremore, OK
Stanley Barby Beaver, OK	Wilt Brown Hobart, OK	Ed Crone Big Cabin, OK
Howard Barnett Tulsa, OK	Fred Brown, Jr. Texhoma, OK	Bill Cunningham Lawton, OK
James Barnett Oklahoma City, OK	Bill Brunk Fittstown, OK	Julie Daniels Bartlesville, OK
Marilyn Barton Edmond, OK	Tom Buchanan Altus, OK	Jo Davis Shawnee, OK
Bob Baxter Okmulgee, OK	Angela Burckhalter Oklahoma City, OK	Chester Dennis Clayton, OK

Richard DeShazo Kingfisher, OK	Claudia Glass Claremore, OK	Mark Helm Oklahoma City, OK
Terry Detrick Oklahoma City, OK	Kay Goebel Oklahoma City, OK	Tom Hendrix Broken Arrow, OK
Bob Donaho Davis, OK	Victoria Gonzales Blanchard, OK	Faye Henson Weatherford, OK
Cheryl Dorrance Edmond, OK	Michael Graves Norman, OK	Jill Herrlein Muskogee, OK
Bob Drake Davis, OK	Stephen Greetham Ada, OK	Ada Hill Wynnewood, OK
John Duck Stillwater, OK	Robert Gregory Tulsa, OK	Chris Hitch Guymon, OK
Jerry Ewen Cushing, OK	Marjorie Griswold Yukon, OK	Robert Hitt Enid, OK
Mead Ferguson Woodward, OK	Bud Ground Oklahoma City, OK	Lowell Hobbs Haskell, OK
Larry Findeiss Tulsa, OK	Diane Hammons Tahlequah, OK	Phyllis Holcomb Kellyville, OK
Fred Fischer Hooker, OK	Monte Hannon Oklahoma City, OK	Joe Ihle Bristow, OK
Amy Ford Durant, OK	Larry Hare Oklahoma City, OK	Robert Jackman Tulsa, OK
Billy Frazier Oklahoma City, OK	Leonard Harjo Wewoka, OK	Paul Jackson Ringling, OK
Paul Fruendt Guthrie, OK	John Harrington Oklahoma City, OK	Rick Jeans Tonkawa, OK
Jay Fulton Chickasha, OK	Claudean Harrison Lindsay, OK	Steve Kerr Edmond, OK
Barbara Gilbertson McAlester, OK	Eric Held Shawnee, OK	Brett Kimbro Marlow, OK

Jimmy Kinder Walters, OK	Ron Melton Mooreland, OK	Fred L. Rice Edmond, OK
Bryan Kroeker Enid, OK	James Milton Tulsa, OK	Alan Riffel Woodward, OK
Michael Lapolla Tulsa, OK	Kathy Moore Woodward, OK	Jim Rodriguez Oklahoma City, OK
CM Lin Weatherford, OK	Mason Mungle Norman, OK	Sam Samandi Oklahoma City, OK
Jim Lindsey Tahlequah, OK	Kevin Murphy Ponca City, OK	Dick Scalf Ada, OK
Roy Lee Lindsey, Jr Oklahoma City, OK	Ronny Nelson Washington, OK	Joe Schulte Tulsa, OK
George Lodes Elgin, OK	Bud Osborne Locust Grove, OK	John Schutte Oklahoma City, OK
Dan Lowrance Duncan, OK	Don Owens Guymon, OK	Dan Sebert Chandler, OK
Rick Maloney Oklahoma City, OK	Terry Peach Oklahoma City, OK	Guy Sewell Ada, OK
Dale Maronek Stillwater, OK	Marla Peek Oklahoma City, OK	Dick Sheffield Ft. Gibson, OK
Mike Mathis Oklahoma City, OK	Shanon Phillips Oklahoma City, OK	Shannon Shirley Mill Creek, OK
Monty Matlock Pawnee, OK	Clay Pope Loyal, OK	Bill Sims Mountain View, OK
George Matthews Mill Creek, OK	Brenda Porton Idabel, OK	Marty Smith Bokchito, OK
Neal McCaleb Edmond, OK	Rodney Ray Owasso, OK	Robert Smith Devol, OK
Cheryl McClellan Norman, OK	John Redman Durant, OK	Vernon Smith Sand Springs, OK

Carolyn Sparks
Sulphur, OK

Brooks Trammell
Oklahoma City, OK

Angela Williams
Pauls Valley, OK

Robert Stephenson
Altus, OK

Jenny Trett
Ada, OK

Laurie Anne Williams
Ardmore, OK

Macy Strom
Copan, OK

Tommy Tucker
Sweetwater, OK

Marty Williams
Henryetta, OK

Kevin Stubbs
Tulsa, OK

Shawna Turner
Shawnee, OK

Zack Williams
Edmond, OK

Jason Stutzman
Pryor, OK

Greg Turpin
Allen, OK

Dick Williamson
Tulsa, OK

Ron Suttles
Oklahoma City, OK

Chris Tytanic
Oklahoma City, OK

Bill Wilson
Kinta, OK

Dave Taylor
Duncan, OK

Michael Vanderburg
Okmulgee, OK

J.T. Winters
Mooreland, OK

Merritt Taylor
Atoka, OK

Jeff Warmuth
Ada, OK

Randy Worden
Norman, OK

Mickie Taylor
Tulsa, OK

Tom Weichel
Colony, OK

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Poteau, OK

Steven Thompson
Oklahoma City, OK

Junior Welch
Wayne, OK

Terry Wyatt
Hollister, OK

Mike Thralls
Oklahoma City, OK

Gene Whatley
Oklahoma City, OK

Jack Yates
Tishomingo, OK

Robert Tippeconnie
Lawton, OK

Richard Wheatley
Tulsa, OK

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Tulsa, OK

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Wynnewood, OK

Waldo Zerger
Edmond, OK

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Anita Poole, General Counsel, American Farmers & Ranchers, Oklahoma City

Richard Wansley, Professor, OSU - Center for Health Sciences, Tulsa

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Panel Recorders

Amanda Ewing, Oklahoma Association of Conservation Districts, Oklahoma City

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Evan Vincent, Crowe Dunlevy, Oklahoma City

Chase Schnebel, Phillips Murrah, Oklahoma City

Bud Scott, OK Progressive Policy, Oklahoma City

Tracy Zahl, Riggs Abney, Oklahoma City

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Bill Davis, Camp Dressler & McKee – Water Demands & Conservation

Dean Couch, Oklahoma Water Resources Board – Policy & Law

Joe Freeman, Oklahoma Water Resources Board – Finances

Bryan Mitchell, Camp Dressler & McKee – Urban Planning & General Water Issues

John Rehring, Camp Dressler & McKee – Water Availability & General Water Issues

Lindsay Robertson, University of Oklahoma – Tribal Issues

Edwin J. Rossman, US Army Corps of Engineers – Reservoirs

Mike Smolen, Oklahoma State University – Land Use

Derek Smithee, Oklahoma Water Resources Board – Interagency Relationships

Terry Sparks, Oklahoma Water Resources Board – Planning & Quality

Kim Winton, US Geological Survey – Hydrogeology & Monitoring

RESOURCE OBSERVERS

J.D. Strong, Sec. of Environment; Interim Director, Oklahoma Water Resources Board

Kyle Arthur, Oklahoma Water Resources Board, Oklahoma City

Will Focht, Director, Oklahoma Water Resources Research Institute, OSU, Stillwater

Jeri Fleming, Project Manager, Oklahoma Water Resources Research Institute, OSU, Stillwater

Diana Leggett, Project Assistant, Oklahoma Water Resources Research Institute, OSU, Stillwater

Mike Langston, Oklahoma Water Resources Research Institute, OSU, Stillwater

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Tulsa

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The University of
Central Oklahoma
Edmond

David Braddock
Latham, Nelson &
Associates
Altus

John Feaver
University of Science &
Arts of Oklahoma
Chickasha

Jeff Houser
Fort Sill Apache Tribe
Apache

Andrea Braeutigam
OSU
Stillwater

Will Focht
Oklahoma State
University
Stillwater

Kelly Hurt
Freelance Consulting
Services, Inc
Allen

Douglas Branch
Phillips Murrah
Oklahoma City

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Kay Goebel, Ph.D.
Oklahoma City

Clark Jolley
State of Oklahoma
Oklahoma City

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Tulsa

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AT&T Oklahoma
Oklahoma City

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Nelson, P.C.
Oklahoma City

Craig Knutson
Oklahoma Insurance
Department
Oklahoma City

Lou Kohlman
Court of Criminal
Appeals
Oklahoma City

Terry Kordeliski
Riggs, Abney, Neal &
Turpen
Oklahoma City

Steve Kreidler
University of Central
Oklahoma
Edmond

Lucky Lamons
Oklahoma House of
Representatives
Tulsa

Karen Langdon
Legal Aid Services of
Oklahoma
Tulsa

Michael Lapolla
University of Oklahoma
Tulsa

Neal McCaleb
Chickasaw
Nation/McCaleb Assoc.
Edmond

William McKamey
Tulsa

Thomas McKeon
Tulsa Community
College
Tulsa

Scott McLain
Sonic Industries, Inc.
Oklahoma City

Michael Neal, CCE,
CCD
Metro Tulsa Chamber of
Commerce
Tulsa

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Oklahoma Senate
Ada

Ron Peters
Oklahoma House of
Representatives
Tulsa

Roy Peters, Jr.
Oklahoma
Manufacturing Alliance
Tulsa

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American Farmers &
Ranchers
Oklahoma City

Clay Pope
Oklahoma Association
of Conservation
Districts
Loyal

Tom Price, Jr.
Chesapeake Energy
Corporation
Oklahoma City

Larry Rice
Rogers State University
Claremore

Anne Roberts
INTEGRIS Health
Oklahoma City

Claudia San Pedro
Sonic Corp.
Oklahoma City

Darryl Schmidt
BancFirst
Oklahoma City

Joseph Siano
Norman Public Schools
ISD #29
Norman

Lloyd Snow
Sand Springs Public
Schools
Sand Springs

David Stewart
Cherokee Nation
Entertainment, LLC
Catoosa

Jim Strate
Autry Technology
Center
Enid

Robert Sullivan, Jr.
Sullivan & Co.
Tulsa

Miles Tolbert
Crowe & Dunlevy
Oklahoma City

Steve Turnbo
Schnake Turnbo
Frank/PR
Tulsa

Richard Wansley, PhD
OSU Center for Health
Sciences
Tulsa

Karen Wicker
Schnake Turnbo
Frank/PR
Oklahoma City

Chris Tytanic
M3 Technology
Solutions, LLC
Norman

Matthew Weaver
The Port Authority of
Greater OKC, Foreign
Trade Zone #106
Oklahoma City

Susan Winchester
Research Institute for
Economic Development
Chickasha

Tom Walker
i2E
Oklahoma City

Alba Weaver
OG&E
Oklahoma City

Waldo Zerger, Jr.
Edmond