The Senate Committee on Natural Resources

Interim Report to the 80th Legislature

Water Issues

December 2006

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INTRODUCTION

The most devastating drought to impact Texas took place from 1950 to 1957. As a result of this drought, by the end of 1956, 244 of Texas' 254 counties had been declared disaster areas.[1] Were it not for the flood of 1957, Texas soil, reservoirs and aquifers would have been permanently damaged. The enormous losses suffered by the State as a result of the 1956 drought of record prompted lawmakers and citizens to take steps to ensure that Texas would never again be caught off-guard. Drought preparedness has proved to be a formidable challenge, and one that has been molded through almost 50 years of trial and error. However, Texas has persisted and today stands better equipped than ever to face major drought conditions.

In 1957, the 55th Legislature created the Texas Water Development Board (TWDB), laying the groundwork for the State's current water planning efforts. Initially, planning for Texas' future water needs consisted mainly of dam and reservoir construction. This trend carried on through the 1960s and 1970s. In the 1980s, focus began to shift away from major construction projects and toward effectively managing existing water resources.[2] Meeting water supply demands through management strategies such as conservation and reuse became essential components of every state water plan. In 1992, TWDB opened the water planning process to include the participation of other state agencies, which widened the scope of planning to more thoroughly address the diverse needs of the entire State.[3] The process was improved, and Texas was attacking water concerns on a broader scale than had ever been attempted.

In 1996, drought again tested the State's water resources and the resolve of policy makers. The devastation caused by the drought showed citizens and lawmakers that while Texas was better prepared than before, it was ill-equipped to effectively absorb the effects of another drought of record. This realization led to the passage of Senate Bill (S.B.) 1 by Brown/Lewis during the 75th Legislature in 1997.

Senate Bill 1 recognized that the diversity of climate, water resources and water demand in Texas was so great that no universal statewide measure would suffice to adequately prepare every part of the State for record drought conditions. To allow the necessary flexibility for differing regions of the State, S.B.1 established a new, bottom-up approach for the water planning process by creating 16 Regional Water Planning Groups (RWPG) (see Appendix A). Made up of local and regional stakeholders, RWPGs determine the most efficient and plausible methods by which the water demands of each region can be met. These methods are the basis for each RWPG's Regional Water Plan, which is submitted to TWDB, who then combines the regional plans into a comprehensive State Water Plan. This revolutionary approach completely changed the manner in which Texas water policy was designed.

As the planning process laid out by S.B. 1 moved forward, there arose a need for more reliable water data and analysis, and it became clear that several key regions of the State were lacking in their management of water resources. These factors led the authors of S.B. 1 to file a follow-up bill, S.B. 2, during the 77th Legislature. Senate Bill 2 charged

TWDB with the development of detailed three-dimensional, mathematical models for the major and minor aquifers of the State. The bill required additional focus on environmental impacts of water supply strategies and increased water conservation efforts by all 16 regions (see Appendix B). Senate Bill 2 created the Water Infrastructure Fund (WIF) and attempted to generate revenue to fund the account, but revenue did not materialize, nor did the Legislature make an appropriation.

Virtually all of the problems associated with the 2002 State Water Plan -- including concerns regarding validity of data, level of active conservation efforts and lax attention to environmental issues -- were erased with the passage of S.B. 2. However, more work was left to be done. In response to the need for additional study, Lieutenant Governor David Dewhurst appointed the Senate Select Committee on Water Policy (Select Committee) during the Interim of the 78th Legislature. Chaired by Senator Kenneth Armbrister, the Select Committee was charged with examining a multitude of issues related to ground and surface water law, policy, and management. After extensive study, the Select Committee released their final report and recommendations to the 79th Legislature (see Appendix C). These recommendations were shaped into S.B. 3 by Armbrister/Puente, a bill that focused on further implementation of the water planning system established by S.B. 1 and S.B. 2.

Senate Bill 3 was designed to move the State another step toward implementation of the State Water Plan. The bill featured comprehensive changes in state water policies regarding environmental flows, water conservation, and planning. Like its predecessor, S.B. 3 attempted to generate revenue to fund water infrastructure projects contemplated in the State Water Plan.

While S.B. 3 would have taken some bold steps in Texas' water policy, the bill failed to pass the 79th Legislature. Because many of the issues addressed in S.B. 3 remain important and unresolved, Lieutenant Governor Dewhurst again issued a comprehensive water policy charge during the Interim of the 79th Legislature. The charge was directed to the Senate Committee on Natural Resources (Committee), currently chaired by Senator Kip Averitt of Waco.

INTERIM CHARGE

Study and assess all issues related to ground and surface water law, policy and management, including, but not limited to:

- the role of federal, state, regional and local governments, including river authorities and other water management entities, and their jurisdiction, authority, and coordination in setting consistent, nondiscriminatory water policies;
- the statutory, regulatory, and/or economic impediments to implementing key water management strategies recommended in the Regional and State Water Plans;
- the role of groundwater conservation districts;

- conjunctive use of both ground and surface water resources;
- rule of capture;
- historic use standards;
- water infrastructure and financing, including financing sources for new water resources;
- interbasin transfers;
- water rights, including environmental flows, junior water rights;
- the transition of water rights from agricultural to municipal and industrial uses and coordination among transitioning water management authorities;
- conservation;
- drought preparedness;
- and water marketing.

WATER PLANNING PROCESS

INTERIM COMMITTEE HEARINGS

The Senate Committee on Natural Resources held a public hearing in Houston, Texas, on August 8, 2006. The testimony taken focused on the Draft 2007 State Water Plan and the policy recommendations contained therein. The Houston hearing agenda can be found in Appendix D.

BACKGROUND

The water planning process as established by S.B. 1, 75th Legislature, by Brown/Lewis required the 16 RWPGs to submit local water plans to TWDB every five years.[4] Section 16.051 of the Texas Water Code directs TWDB to:

> prepare, develop, formulate, and adopt a comprehensive State Water Plan that incorporates the regional water plans approved under Section 16.053. The State Water Plan shall provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions, in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the entire State.

The first post-S.B. 1 State Water Plan was adopted by TWDB on December 12, 2001. The first five-year revision is due to the Legislature by January 5, 2007. The regional water plans were approved by TWDB during the Spring of 2006, and incorporated into the State Water Plan, entitled *Water for Texas 2007*.[5] *Water for Texas 2007* marks the 50th anniversary of the end of the drought Texas endured from 1950-1957, as well as the 50th anniversary of the creation of TWDB.[6] Highlights of the 2007 State Water Plan can be found in Appendix E and the Plan can be viewed in its entirety online:

http://www.twdb.state.tx.us/publications/reports/State_Water_Plan/2007/2007StateWaterPlan/2007StateWaterPlan.htm.

CURRENT STATUS

The 2007 state water planning process reminded Texans that drought carries with it dire consequences and that we must plan for future water needs.[7] *Water for Texas 2007* revealed potential water shortages, underscoring the need for implementation of the water supply projects identified in the Plan. As the water planning process continues to evolve, the need to progress from planning to implementation increases. In the executive summary of the final version of *Water for Texas 2007,* TWDB identified legislative policy recommendations related to implementation of the State Water Plan. The TWDB's policy recommendations are provided in Appendix F.

REGIONAL WATER PLANNING

INTERIM COMMITTEE HEARINGS

In the San Antonio, Texas, hearing held on September 22, 2006, the Committee examined the regional water planning process. Testimony taken at the hearing focused primarily on Region L's challenges during the most recent planning cycle. The San Antonio hearing agenda can be found in Appendix D.

BACKGROUND

As noted earlier, Senate Bill 1, 75th Legislature, established 16 RWPGs. These groups are responsible for assessing regional water needs and identifying strategies to satisfy those needs. The RWPGs were charged with submitting regional plans to TWDB by January 5, 2006, for incorporation in the 2007 State Water Plan.[8]

While fifteen of the sixteen RWPGs submitted their plans to TWDB by the deadline, Regional L submitted their plan fourteen days late. Failure to submit a plan by the deadline does not result in exclusion from the report, but Regional L projects as a whole are not eligible for financial assistance from the State, nor can they receive surface water permits from the Texas Commission on Environmental Quality (TCEQ).[9] However, TWDB has the authority to grant a waiver to allow specific projects to receive financial assistance,[10] and they are considering projects included in the Region L Plan on a case-by-case basis.

The late submission of the Region L Plan has prompted a debate about the merits of the deadlines associated with the water planning process. One side argues that the integrity of the water planning process will be compromised if the deadlines are not upheld, while the other side argues that missing the deadline by a few days is inconsequential and should not result in penalizing an entire region.[11]

Current Status

The late Senator Frank Madla of San Antonio, filed S.B. 11 during the 3rd Called Session of the 79th Legislature (see Appendix G). This bill would have statutorily required that Region L be included in *Water for Texas 2007* and would have resulted in associated projects being eligible for state assistance. Due to the Legislature's focus on school finance during the 3rd Called Session, S.B. 11 failed to pass. However, legislation similar to S.B. 11 will likely be debated during the 80th Legislature.

Conclusions

By in large, RWPGs appear to be accomplishing the goals envisioned for the bottom-up planning process. "The 2007 State Water Plan mirrors its 2002 predecessor in many ways but especially in one important feature--in its actualization of the vision of Senate Bill 1 that the State Water Plan embody and reflect an open and participatory process with specific decisions made at the regional level."[12] The 80th Legislature, however, will be faced with analyzing the lessons learned from Region L and the 2007 planning process. Ultimately, legislators will have to make a decision about whether or not deadlines should be enforced, and consider the policy implications associated with their decision.

Barriers to Implementation of the State Water Plan

Interim Committee Hearings

In the August 8, 2006, hearing in Houston, Texas, the Committee examined barriers to implementation of the State Water Plan. Testimony was taken regarding statutory barriers, as well as those barriers existing from the RWPG standpoint. The Houston hearing agenda can be found in Appendix D.

Background

According to the 2007 State Water Plan, the population in Texas is expected to double by 2060, which will result in a 27 percent increase in demand for water.[13] During the 2007 regional water planning process, the 16 RWPGs identified 4,500 water management strategies and projects to generate an additional 9.0 million acre-feet of water. If Texas does not implement the State Water Plan, "85 percent of the state's projected population will not have enough water by 2060 in drought conditions."[14]

CURRENT STATUS

The 2002 State Water Plan marked the first comprehensive plan since passage of S.B. 1 in 1997. In order to determine the rate of implementation of the 2002 Plan, TWDB contacted cities and water utilities included in the municipal water use category with needs of at least 1,000 acre feet per year.[15] Of the 238 entities contacted, the majority (149, or 63 percent) reported some form of progress on strategy implementation. Of those reporting progress, 21 (nine percent) reported that strategies were operational, and 12 (five percent) reported that project construction had begun. Because the rate of project implementation has been slow, policy makers have been exploring barriers to implementation. As noted earlier, the Committee heard testimony from two invited panels on August 8, 2006, in Houston, Texas, about barriers to implementation of the State Water Plan. One panel featured representatives from RWPGs around the State and the other panel featured attorneys specializing in water law. Witnesses on both panels offered their experience with various water projects and highlighted successes and failures. Testimony from the two panels addressing barriers to implementation of the State Water Plan can be found in Appendix H.

CONCLUSIONS

The two most frequently cited barriers to implementation of the State Water Plan are financing for water infrastructure projects and statutory impediments to movement of surface water around the state. As the population in Texas grows exponentially, the Legislature must continue to explore options for financing water infrastructure projects and thoroughly review the value of restricting movement of surface water. In order to meet the future water needs of all Texans, the State will inevitably be faced with the need to move water from water-rich areas of the State to water-poor areas, and the infrastructure necessary to accomplish such transport must be built.

WATER INFRASTRUCTURE AND FINANCING

INTERIM COMMITTEE HEARINGS

The Committee discussed the financing of water infrastructure projects at a public hearing held in Houston on August 8, 2006. Testimony taken at this hearing explored potential revenue streams and alternative approaches to water financing. The Houston hearing agenda can be found in Appendix D.

BACKGROUND

Implementation of the State Water Plan cannot be achieved without funding for water infrastructure projects. Since passage of S.B. 1, financing has been the biggest impediment to implementation of the State Water Plan.[16] There have been several attempts to adopt a financing system, but these attempts have been unsuccessful. The

TWDB exhaustively researched and compiled a report regarding water financing options in 2000, prior to the introduction of S.B. 2, and they revisited their research prior to the introduction of S.B. 3. The TWDB's financing report is included in Appendix I. A subsequent summary of potential revenue sources and a review of funding mechanisms for water projects in other states is also included in Appendix J.

CURRENT STATUS

To design, construct and implement the 4,500 water management strategies and projects identified in *Water for Texas 2007* by 2060, the cost would be $30.7 billion. If the State chooses to look no further than the next budget cycle, TWDB has indicated that $78 million would be needed during the 2008-2009 biennium to fund critical projects.[17]

An economic impact analysis of state water management strategies is included in Appendix K. This analysis highlights the potential economic losses that may be incurred if the State Water Plan is not implemented, as well as the cost savings associated with timely implementation. A list of specific projects included in the 2007 State Water Plan can be found at the end of Appendix K, and a breakdown of projects by region is located in Appendix L.

Two investment representatives from Wall Street testified before the Committee at the hearing in Houston about the merits of public/private partnerships in the water arena. The witnesses highlighted non-traditional financing options that may allow the State to generate a higher return on state dollars. Testimony provided by the witnesses who participated on the related panels is included in Appendix M.

CONCLUSIONS

If implementation of the State Water Plan is never achieved, the water planning process is an exercise in futility. The planning component envisioned by S.B. 1 has been a success, but to ensure that future generations have an adequate supply of water, implementation of projects identified through planning must be expedited. The Legislature should take bold steps toward adopting a method of finance for water infrastructure projects and should consider incorporating public/private partnerships into any solution.

CONJUNCTIVE MANAGEMENT

INTERIM COMMITTEE HEARINGS

The Committee discussed conjunctive management of surface water and groundwater resources in a public hearing held in Dallas, Texas, on July 14, 2006. Testimony was taken on conjunctive management projects currently in place in Texas, as well as possibilities for future expansion of the State's conjunctive management practices. The Dallas hearing agenda can be found in Appendix D.

BACKGROUND

Conjunctive management is the combined use of groundwater and surface water in a manner that optimizes the benefits of each natural resource.[18] This strategy seeks to diversify water supply resources in order to decrease reliance on a single, potentially strained source. It is widely recognized that the State must employ conjunctive management as a means of maximizing resources and planning for future water needs, and policy makers have been moving in that direction.

CURRENT STATUS

In order to implement conjunctive management projects, state laws and policies must complement this strategy. In some cases, surface water laws and groundwater laws are inconsistent, which can make conjunctive management challenging. Testimony provided at the Dallas hearing reviewed surface water and groundwater law and policy in Texas. A comparative analysis of such policies is included in Appendix N.

Since passage of S.B. 1, reuse of surface water and developed groundwater is an issue that has been highly debated. There are two types of reuse: direct reuse and indirect reuse. Reuse pertains to effluent that is treated and then used again for another purpose. Direct reuse is diverting effluent from a point of discharge back into a treatment system for use prior to release into state waters.[19] Indirect reuse is a strategy that requires discharging effluent into state waters and then diverting all or part of the discharge for use at another point downstream. Estimates included in *Water for Texas 2007* project that by 2060 reuse projects will provide 1.6 million acre-feet of the water needed to satisfy state demand; today, the state utilizes only 360,000 acre-feet.[20] A summary of current practices at TCEQ related to reuse is provided in Appendix O, and a comprehensive review of unresolved policy issues related to reuse is provided in Appendix P.

CONCLUSIONS

The Legislature should continue to employ conjunctive management as the major tenet of state water planning. When crafting and/or amending water laws, the Legislature should pay particular attention to inconsistencies in surface water and groundwater policies that may pose an obstacle to achieving conjunctive management.

There are policy issues related to reuse that must be addressed. The TCEQ and the water community have turned to the Legislature for direction. In order to satisfy the water needs that *Water for Texas 2007* proposes to meet through utilization of reuse projects, the Legislature should clarify statutory and regulatory ambiguities surrounding this issue.

ENVIRONMENTAL FLOWS

INTERIM COMMITTEE HEARINGS

The Committee examined the State's developing environmental flows issues in a public hearing held on June 16, 2006, in Austin, Texas. Testimony was provided to the Committee outlining the current status of the issue as well as the history of environmental flows legislation in Texas. The Austin hearing agenda can be found in Appendix D.

BACKGROUND

The following historical review of environmental flows in Texas was presented by TCEQ's General Counsel, Derek Seal, to the Committee in a public hearing held in Austin, Texas on June 16th, 2006:

Environmental Flows Laws/Commission Action and Cases

LAWS:

- Prior to 1975, there were no requirements that the TCEQ's predecessor agency consider environmental flows in water rights permitting.
- In 1975, the 64th Texas Legislature required the Texas Water Development Board to comprehensively study the "effects of freshwater inflow upon the bays and estuaries of Texas." The Legislature also required the Texas Water Commission in water right applications to "assess the effects, if any, of the issuance of such permit upon the bays and estuaries of Texas."
- In 1985, the 69th Legislature granted the Commission the authority to provide permit conditions to maintain beneficial inflows to bays and estuaries. In addition, the Legislature added requirements that the Commission shall consider conditions necessary to maintain existing instream uses, water quality, and fish and wildlife habitats.
- The 69th Legislature also added additional separate sections of the Water Code dealing with Emergency Suspension of Permit Conditions; Collection of Bays and Estuaries Data; Effects of Permits on Water Quality; and Effects of Permits on Fish and Wildlife Habitats. Another section provided that TPWD and TWC would have joint responsibility to review the bay and estuary studies and to determine inflow conditions necessary for the bays and estuaries.
- In 1997, the 75th Legislature passed S.B. 1, a comprehensive water resource management bill establishing, in part, the Regional Water Planning Process, and providing additional guidance on the use of state waters for recognized beneficial uses. Of note were the provisions included to weigh the effect of amendments to water rights on the environment, reuse, interbasin transfers, and water right cancellation.
- In 2001, the 77th Legislature passed S.B. 2, a follow-up to S.B. 1 (1997), which included, in part, the creation of the Texas Water Advisory Council and a new

section of the Water Code (16.059) entitled: Collection of Instream Flow Data; Conduct of Studies. This section established the Texas Instream Flow Program to collect and analyze data for flow conditions in Texas streams and rivers that are necessary to support a sound ecological environment. The instream flow provisions were tailored similar to the Water Code provisions for the Bay and Estuary Studies.

- In 2003, the 78th Legislature passed S.B. 1639, relating to the waters of the state. The bill included a section on policy regarding waters of the state, and established the Study Commission on Water for Environmental Flows. The Study Commission was charged to: "…conduct public hearings and study public policy implications for balancing the demands on the water resources of the state resulting from a growing population with the requirements of the riverine, bay and estuary systems including the granting of permits for instream flows dedicated to environmental needs or bay and estuary inflows…" Additionally, the bill provided that the Commission could only issue permits for water rights for express purposes in the Water Code and that the legislature has not "expressly authorized granting water rights exclusively for instream flows dedicated to environmental needs or inflows to the state's bay and estuary systems." The bill also contained a provision stating TCEQ could not issue a (stand-alone) new permit for instream flows or for freshwater inflows to the estuaries.
- S.B. 3 (79th Legislature, 2005) and S.B. 15 (79th Legislature 1st Special Session 2005) would have set up a new process for determining what environmental flow conditions should be placed in new water right appropriations.

COMMISSION ACTION AND COURT CASES:

- In July of 2000, the San Marcos River Foundation filed an application to appropriate 1.3 million acre/feet from the Guadalupe for instream uses. The Commission denied the application on March 20, 2003, determining that it did not have the authority to issue permits solely for instream uses for environmental purposes.
- In September 2002, Caddo Lake Institute filed an application to appropriate 2.15 million acre feet/year for instream uses in the Cypress Basin. In October, 2002, the Lower Colorado River Authority filed an application to appropriate all remaining flows in the Colorado River Basin for instream flows. In November, 2002, the Matagorda Bay Foundation filed an application to appropriate 663,774 acre feet/year for instream uses and freshwater inflows to Matagorda Bay. In November, 2002, Galveston Bay Foundation filed an application to appropriate 3.8 million acre feet/year for instream uses and freshwater inflows into Galveston Bay. On December 30, 2002, Lavaca-Navidad River Authority filed an application to appropriate 346,300 acre feet/year from the Colorado-Lavaca Coastal Basin and 163, 572 acre feet/year from the Lavaca-Guadalupe Coastal Basin for instream uses.

- On November 19, 2003, the Commission denied these applications, determined that it did not have the authority to issue permits solely for instream uses for environmental purposes.
- The San Marcos River Foundation appealed the Commission's order to district court in April, 2003. Caddo Lake Institute, and Matagorda, and Galveston Bay Foundation appealed the Commission's order in March, 2004.
- The district judge granted San Marcos River Foundation, Caddo Lake Institute, and Matagorda and Galveston Bay Foundation's motion for summary judgment on February 7, 2006. The judge determined that the Commission did have authority to issue these permits. The judgments are not final, however, since there are other issues pending.
- On February 9, 2006, the Lower Colorado River Authority refiled its application for all the remaining unappropriated flows in the Colorado River Basin for instream uses.

Through Executive Order No. RP-50, Governor Rick Perry created the Environmental Flows Advisory Committee (EFAC) in order to "examine relevant issues and make recommendations for commission action and legislation on methods for making future decisions to protect instream flows and freshwater inflows, while integrating such needs with human needs, including methods to address allocation of flows during drought conditions."[21] Governor Perry's Executive Order is included in Appendix Q.

CURRENT STATUS

The EFAC met six times in 2006 to discuss issues related to environmental flows and to explore competing proposals. The EFAC approved their final recommendations and submitted their report to the Governor, Lieutenant Governor, and the Speaker of the House of Representatives on December 20, 2006. Recommendations provided by EFAC and comments provided by individual EFAC members are included in Appendix R.

CONCLUSIONS

During the Committee hearing on June 16, 2006, a letter was submitted by EFAC industry representative Lori Ryerkerk of ExxonMobil, voicing concern with the previous unadopted environmental flows process. The stakeholder process has contributed to the crafting of well-rounded policy, but there are still unresolved issues to address as evidenced by the Ryerkerk letter. Legislators should reconcile any outstanding issues and work toward adoption of legislation related to environmental flows during the 80th Legislature.

CONSERVATION

INTERIM COMMITTEE HEARINGS

Texas water conservation was reviewed by the Committee at a hearing held on July 16, 2006, in Austin, Texas. Testimony focused on water conservation efforts in different areas of the State, as well as the potential for further conservation measures. The Austin hearing agenda can be found in Appendix D.

BACKGROUND

Although water conservation is a vital tool in the State's water management toolbox, conservation has not always been embraced by the water community. However, as options for developing new water supply sources become more limited, conservation practices are being developed and implemented in Texas. Public outreach programs designed to raise the awareness among citizens and municipalities about the value of conservation measures are resulting in the adoption of proactive programs to increase efficient water use.

CURRENT STATUS

Texas Water Development Board

With the passage of S.B. 1094 by Duncan/Puente, the 78th Legislature created the Water Conservation Implementation Task Force (WCIT). This bill instructed TWDB to select WCIT's membership from a list of 16 water conservation entities and interest groups. The WCIT was directed to:

> review, evaluate, and recommend optimum levels of water use efficiency and conservation for the state by:
>
> (1) identifying, evaluating, and selecting best management practices for municipal, industrial, and agricultural water uses and evaluating the costs and benefits for the selected best management practices;
>
> (2) evaluating the implementation of water conservation strategies recommended in regional and state water plans;
>
> (3) considering the need to establish and maintain a statewide public awareness program for water conservation;
>
> (4) evaluating the proper role, if any, for state funding of incentive programs that may facilitate the implementation of best management practices and water conservation strategies;
>
> (5) advising the Texas Water Development Board and the Texas Commission on Environmental Quality on:
>
> (A) a standardized methodology for reporting and using per capita water use data;

(B) establishing per capita water use targets and goals, accounting for such local effects as climate and demographics; and

(C) other possible uses as appropriate; and

(6) evaluating the appropriate state oversight and support of any conservation initiatives adopted by the legislature.[22]

The WCIT compiled their findings and recommendations into the Water Conservation Best Management Practices Guide, which identified 21 municipal, 14 industrial, and 20 agricultural best-practices for improving water use efficiency. These management practices were intended to serve as voluntary measures for entities wishing to further their water conservation efforts. The entire Water Conservation Best Management Practices Guide can be found in Appendix S.

Water IQ

In June of 2006, the Water IQ: Know Your Water program (Water IQ) was launched by the North Texas Municipal Water District (NTMWD). Water IQ is a public education campaign that uses television, radio, outdoor, print, and gas station advertising to teach Texans methods by which they can conserve water in their homes and businesses. Water-saving tips suggested by Water IQ include sprinkler system maintenance adjustments, minor alterations in landscaping techniques, upkeep of home plumbing, and swimming pool water level monitoring. The NTMWD was the first regional water and sewer service provider to launch Water IQ. Other regions around the State have replicated this initiative and implemented similar Water IQ campaigns.[23]

City of San Antonio

Among municipalities, the City of San Antonio has emerged as a water conservation leader. Through their conservation efforts, San Antonio has reduced water use by over 40 percent --from 225 gallons per person, per day in the early 1980's to 130 gallons per person, per day in 2005. San Antonio credits their successful conservation progress to education, incentives, leak detection, and regulation enforcement, all of which are made possible by an annual investment of $5 million. While this is a large investment for the City of San Antonio, the benefits outweigh the cost. A study performed in 2003 revealed that for every dollar spent on conservation, the City of San Antonio sees a return of five to seven dollars through reduction or delay of the need for new water projects and infrastructure.[24] Through their water conservation efforts, the City of San Antonio has effectively established itself as an example by which other cities may guide their own conservation programs.

CONCLUSIONS

Water conservation in Texas is increasingly regarded as a practical, cost-effective water management tool that could, in time, result in a reduced demand on primary water sources of the State. The Legislature should continue to provide incentives that would encourage a widespread adoption of conservation practices by all regions of Texas.

DROUGHT PREPAREDNESS

INTERIM COMMITTEE HEARINGS

The Committee addressed drought preparedness in Austin, Texas, on July 16, 2006. The testimony included an overview of the State's most current Drought Preparedness Plan. The Austin hearing agenda can be found in Appendix D.

BACKGROUND

Drought has long been a major concern of policy makers. Efforts to battle the effects of drought have met with varying levels of success. While the problem has not been solved, by preparing in advance for the inevitable occurrence of drought, Texas can more efficiently minimize the harm inflicted upon the State.

In an effort to focus more attention on drought preparedness, the Texas Drought Preparedness Council (DPC) was created during the 76th Legislature through passage of H.B. 2660 by Swinford/Ogden. The DPC is part of the Office of the Governor's Emergency Management Division and they are charged with the following responsibilities:

- assessing and public reporting of drought monitoring and water supply conditions
- advising the Governor on significant drought conditions
- recommending specific provisions for the defined state response to drought-related disasters
- advising the regional water planning groups on drought-related issues,
- ensuring effective coordination among state, local, and federal agencies in drought-response planning
- reporting to the Legislature, no later than January 15 of each odd-numbered year, significant drought conditions in the State[25]

CURRENT STATUS

The DPC issues a State Drought Preparedness Plan that is reviewed and updated not less than once a year. The latest version of this plan can be found in Appendix T.

CONCLUSIONS

Drought continues to be a problem in Texas and will be so in the future. This fact motivates Texas policy makers to persevere in their efforts to find new ways to counteract the devastating effects of drought.

GROUNDWATER MANAGEMENT

INTERIM COMMITTEE HEARINGS

The Committee took testimony in Dallas, Texas, at the July 14, 2006, hearing on H.B. 1763, 79th Legislature, by Cook/Duncan. The Dallas hearing agenda can be found in Appendix D.

BACKGROUND

House Bill 1763, 79th Legislature, by Cook/Duncan, established a process for regional groundwater management and planning. The bill provided a process to enable consistent management of groundwater resources within 16 Groundwater Management Areas (GMAs) across the State. The State's GMAs and the Groundwater Conservation Districts (GCDs) contained within each GMA can be viewed in Appendix U. House Bill 1763 established that the GCDs within each GMA be responsible for determining the Desired Future Conditions (DFC) for the aquifer in that region and submitting those conditions to TWDB. The TWDB is responsible for determining the managed available groundwater supply for each GMA based on the established DFCs. When establishing DFCs, each district within a management area is allotted one vote. Areas within a GMA that do not fall within the boundaries of a GCD are not afforded a vote during the planning process. The provisions of H.B. 1763 will not be fully implemented until December 2010.

CURRENT STATUS

Senate Committee on Natural Resources Chairman, Kip Averitt, and the Senate sponsor of H.B. 1763, Robert Duncan, submitted a letter to all County Judges in the State of Texas advising them of the bill's passage and encouraging them to participate in the planning process. The Averitt/Duncan letter, which is included in Appendix V, was an attempt to heighten awareness about the H.B. 1763 process and to encourage statewide participation.

Because the voting structure established in H.B. 1763 provides for one vote per GCD within a GMA, there has been discussion about whether or not this structure could encourage the creation of single-county GCDs. Chairman Averitt submitted a letter to the TWDB inquiring about the agency's position on the potential for a proliferation of single-county GCDs and requested possible solutions for revision if a perceived advantage was given to single-county districts over regional districts. Chairman Averitt's letter is included in Appendix W. Executive Administrator of TWDB, Kevin Ward, provided a response to Chairman Averitt indicating that H.B. 1763 did provide an advantage to creating single-county GCDs and suggested that the GMA voting structure be modified. Kevin Ward's letter is included in Appendix X.

Under H.B. 1763, preference was given to the GMA process over the regional water planning process. If a regional water plan includes a water project that is in conflict with the stated supply goals of the GMA, that project may be ineligible for state financial assistance.

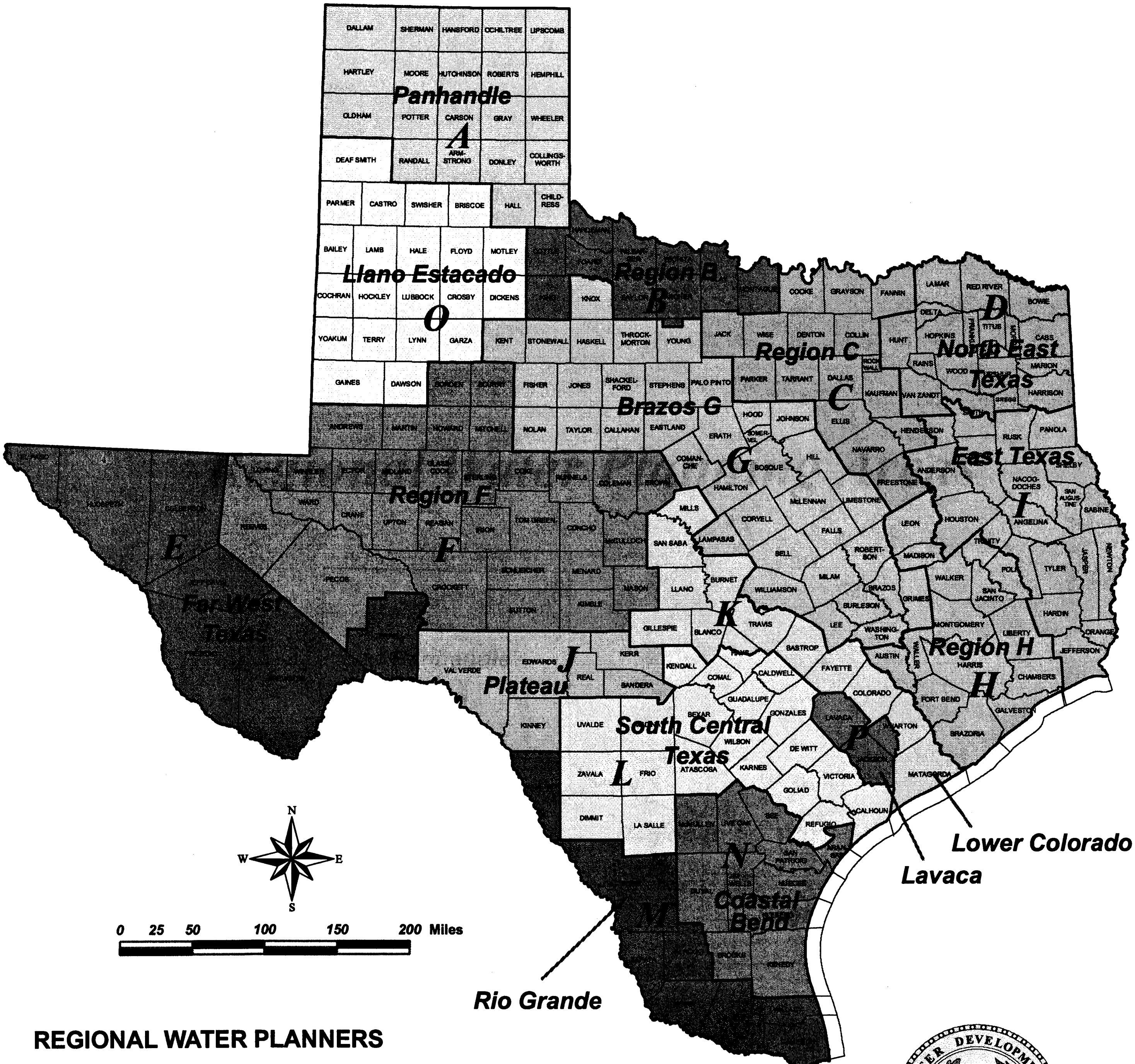
CONCLUSIONS

The Legislature should continue to monitor implementation of H.B. 1763 and should not make any major changes to the statute until the process has had adequate time to unfold. During implementation, the Legislature should pay particular attention to the involvement of areas of the State that are not represented by a GCD and should analyze whether H.B. 1763 has encouraged the creation of new GCDs. Additionally, the Legislature should carefully review the GMA voting structure to ensure that the one vote per GCD does not encourage the proliferation of single-county GCDs.

[1] Texas Water Development Board, *Water for Texas 2007* - Volume II, October 2006.
[2] Id.
[3] Id.
[4] Texas Water Development Board, "SB 1 Water Planning," www.twdb.state.tx.us/TWPG/what-is-rwp.asp.
[5] Texas Water Development Board, *Water for Texas 2007* - Volume I, Cover Letter, October 2006.
[6] Texas Water Development Board, *Water for Texas 2007* - Volume I, October 2006.
[7] Id.
[8] Texas Water Development Board, "Regional Water Planning 2002-2006," February 2005.
[9] Kevin Ward, Testimony before the Senate Committee on Natural Resources, August 8, 2006, Houston, Texas.
[10] Con Mims, Testimony before the Senate Committee on Natural Resources, September 22, 2006, San Antonio, Texas.
[11] Id.
[12] Id at 1, page 116.
[13] Id at 1.
[14] Id, page 7.
[15] Id at 1.
[16] Id.
[17] Id.
[18] Id.
[19] Id.
[20] Id.
[21] Rick Perry, Executive Order RP50, October 28, 2005.
[22] SECTION 3, S.B. 1094, Duncan/Puente, 78th Legislature, 2003.
[23] Carole D. Baker, Testimony before the Senate Committee on Natural Resources, June 16, 2006, Austin, Texas.
[24] Dr. Calvin R. Finch, Testimony before the Senate Committee on Natural Resources, June 16, 2006, Austin, Texas.
[25] Jack Colley, Testimony before the Senate Committee on Natural Resources, June 16, 2006, Austin, Texas.

Appendix
A

Regional Water Planning Areas



REGIONAL WATER PLANNERS

Kathleen Ligon (512) 463 - 8294 - Regions E & M
Temple McKinnon (512) 475 - 2057 - Regions B, H & I
Virginia Sabia (512) 475 - 2056 - Regions C & D
Kathleen Garrett (512) 463 - 8290 - Regions A & O
Matt Nelson (512) 936 - 3550 - Regions L & N
David Meesey (512) 936 - 0852 - Regions K & P
Kevin Kluge (512) 936 - 0829 - Regions F, G & J

TEXAS WATER DEVELOPMENT BOARD

Updated by Mark Hayes
Mapping Coordinator
RIO Division/GIS Section
8/31/2006

Appendix B

SB1 Document - Kevin Ward

Since the passage of SB 1 from the 75th Legislative Session, the management and conservation of water resources has improved tremendously. Aside from the fundamental changes to the state water planning process that shifted the responsibility of planning for future water supply to weather drought conditions from the state to the local governments and stakeholders, there were significant changes to regulatory laws that gave a greater focus to the natural resources affected by the use of water when considering surface water permits, and there were multiple groundwater conservation districts created. Finally, water finance laws for state programs were overhauled to state-of-the art provisions to ensure the state could efficiently deliver the resources necessary to fund the projects needed. The regional water planning process born in SB 1 required the collection of data, modeling of ground and surface water, and consistency in accounting for the upcoming 50 year demand and supply for water during times of record drought.

As the work began on the first 5-year cycle of SB 1 planning, the need for more reliable groundwater data and analysis as well as the acknowledgement of a systemic lack of management of groundwater in several key regions of the state led to the passage and funding of Senate Bill 2 of the 77th Legislature, in which the TWDB was charged with the development of detailed three-dimension mathematical models for the major and minor aquifers of the state, with a completion deadline of October 1, 2004 for all of the major aquifers – in time to be incorporated in the second round of planning. Additionally the bill required additional focus on environmental impacts of water supply strategies and additional efforts for water conservation by all the regions. Senate Bill 2 was passed in 2001 at the same time the first round of regional plans were adopted by the TWDB and just prior to the adoption of the 2002 State Water Plan – the first SB 1 state water plan.

Today, the second round of SB 1 regional water plans have been adopted by the TWDB and the 2007 State Water Plan is being drafted. The second SB 1 State Water Plan will be a huge improvement over the prior plan because of the tremendous investment of time and energy by local and regional interests to avail themselves of all the new data and tools developed by the state to assist in the planning process. The doubts of validity of the data and lack of confidence in the level of conservation or attention to environmental issues that emerged with the delivery of the 2002 State Water Plan have disappeared for the most part. By all accounts, water policy has moved forward in the last 10 years on the back of the SB 1 planning effort, because of a newly created ability to raise awareness of all the issues important to Texas when considering the need to move or develop the water resources of the state to ensure the future of our economy, citizens and the natural and cultural resources of the state.

Appendix C

The Senate Select Committee on Water Policy

Interim Report to the 79th Legislature

December 2004

SENATE SELECT COMMITTEE ON WATER POLICY

December 13, 2004

The Honorable David Dewhurst
Lieutenant Governor of Texas
Members of the Texas Senate
Texas State Capitol
Austin, Texas 78701

Dear Governor Dewhurst and Fellow Members:

The Senate Select Committee on Water Policy of the Seventy-Eighth Legislature hereby submits its interim report including findings and recommendations for consideration by the Seventy-Ninth Legislature.

Respectfully submitted,

Senator Ken Armbrister, Chairman

Senator Kip Averitt

Senator Robert F. Deuell

Senator Robert Duncan

Senator Troy Fraser

Senator Jon Lindsay

Senator Eddie Lucio

Senator Frank Madla

Senator Eliot Shapleigh

Senator Todd Staples

Senator Tommy Williams

P.O. Box 12068 • Austin, Texas 78711
(512) 463-0390 • FAX (512) 463-6769 • Dial 711 For Relay Calls

Senate Select Committee on Water Policy
Senator Ken Armbrister, Chair

INTERIM CHARGE

The Committee shall:

1. Study all issues related to ground and surface water law, policy and management, including, but not limited to:
   - the role of federal, state, regional and local governments, and their coordination in setting consistent, nondiscriminatory water policies;
   - the authority of the Texas Commission on Environmental Quality (TCEQ) as it relates to water contracts;
   - the role of the Edwards Aquifer Authority;
   - the role of groundwater conservation districts;
   - regional water planning process;
   - conjunctive use of both ground and surface water resources;
   - rule of capture;
   - historic use standards;
   - water infrastructure and financing,
   - interbasin transfers;
   - junior water rights;
   - conservation;
   - water quality standards;
   - drought preparedness; and
   - water marketing.

2 Subcommittee on the Lease of State Water Rights: Study proposals to lease permanent school fund and permanent university lands and their water rights for the purposes of developing and marketing water.
   - Analyze the present and future effects of such proposals on local aquifers, historic stream flows, local underground water conservation districts, and other public and private water interests.
   - Study the process by which the General Land Office considers proposals to lease state water rights, including methodology for holding open meetings, obtaining public input, meeting competitive bidding requirements, and coordination with TCEQ and other governmental units with possible regulatory oversight.
   - Study and evaluate the current and future value of water rights that may be leased to private entities, including the value to state, residential and commercial interests.

3. Monitor the three on-going demonstration desalination projects by the Texas Water Development Board as one step toward securing an abundant water supply to meet Texas' future water supply needs. Study regulatory barriers that impair cost effectiveness of desalination (coastal and brackish) and how to facilitate use of this water source by municipalities

TABLE OF CONTENTS

INTERIM CHARGE NO. 1 -- REPORT AND RECOMMENDATIONS

The **Senate Select Committee on Water Policy** (Select Committee) conducted public hearings in Austin, El Paso, San Antonio, Victoria, Conroe, Waco, Lubbock and Brownsville, Texas. *(See Appendix A. for Select Committee Hearings - Postings, Agendas, Minutes and Witness Lists).*

Just as surface water and groundwater are linked together in the hydrogeologic cycle, all of the interim water charges are also interrelated. However, during the Select Committee's discourse, as well as the nature of the extensive testimony at the state-wide hearings, the issues organized into three major topics, with subcategories as indicated:

1. **Groundwater Issues**
   - 1.1. Rule of Capture
   - 1.2. Role of Groundwater Conservation Districts
   - 1.3. Historic Use Standards
   - 1.4. Role of the Edwards Aquifer Authority

2. **Surface Water Issues**
   - 2.1. Interbasin Transfers and Junior Water Rights

3. **Conjunctive Management/Statewide Water Issues**
   - 3.1. Regional Water Planning Process
   - 3.2. Conjunctive Use of Both Surface and Groundwater Resources
   - 3.3. Water Marketing
   - 3.4. Water Infrastructure and Financing
   - 3.5. Water Conservation

Based on its findings and deliberations, the Senate Select Committee on Water Policy submits to the 79th Texas Legislature this report identifying general policy recommendations, with alternative legislative options for more specific policy development. *NOTE: The alternative legislative options were presented to the committee for consideration during the interim hearings. These options are not recommendations of the committee but reflect the range of alternatives discussed.*

1. GROUNDWATER ISSUES
- 1.1. Rule of Capture
- 1.2. Role of Groundwater Conservation Districts
- 1.3. Historic Use Standards
- 1.4. Role of the Edwards Aquifer Authority

Recommendation 1.1. Rule of Capture

Clarify appropriateness of Rule of Capture Doctrine (as currently "modified" within Groundwater Conservation Districts) or an alternative judicial doctrine for groundwater in Texas.

In 1904, the Texas Supreme Court adopted the Rule of Capture. *Houston & Texas Central Railroad Co. v. East*, 81 S.W. 79 (Tex. 1904). This judicial doctrine, as applied to water well use, allows landowners to pump all the groundwater they can capture, without liability to neighboring landowners, even if the pumping interferes with the neighbor's use of groundwater.

Alternative judicial doctrines used in other states to govern groundwater resource management include; Prior Appropriation Doctrine; Reasonable Use Doctrine; Correlative Rights Doctrine; and the Restatement of Torts (2nd) approach. *(See Appendix B. "The Rule of Capture in Texas, Ground Water Law in Other States, and Options for Changes to the Rule of Capture")*

Existing Modification of Rule of Capture

Currently, the Rule of Capture is modified, to varying degrees, within local groundwater conservation districts (GWCDs) because GWCDs can regulate groundwater production through measures such as permitting limits on production or well spacing. *(See Appendix C. "Overview of Regulatory Methods Available to GWCDs")*

1.1. ALTERNATIVE LEGISLATIVE OPTIONS INCLUDE:
NOTE: These alternative legislative options were presented to the committee for consideration during the interim hearings. These options are not recommendations of the committee but reflect the range of alternatives discussed.

- Explicitly retain the Rule of Capture Doctrine for Texas (as currently modified within GWCDs), and reaffirm the State's policy that local groundwater conservation districts are the preferred method for managing the groundwater resources in Texas.

- Further modify the Rule of Capture to address specific issues, such as legislatively adopting a domestic well protection rule that subjects liability on an owner of a high-capacity, non-domestic well if the well interferes with a domestic-use well.

- Require GWCDs to adopt the management goal of "aquifer sustainability," with some exceptions, (for the Ogallala and certain other aquifers) to be achieved through strategies such as annual caps on pumping such that annual withdrawals may not exceed average annual recharge; or a flexible annual pumping cap that can fluctuate with rainfall-related recharge.

- Expressly, legislatively abandon the Rule of Capture doctrine and adopt one or a combination of the four alternative judicial doctrines based on more modern developments of law and more flexible systems better attuned to scientific knowledge and advancements.

- In recognition that the Rule of Capture, though appropriate in the past when Texas had abundant water supply relative to water demand, could now, however, result in some rural areas being reduced to 'water source areas' to support urban/industrial growth - replace Rule of Capture with a doctrine that could ensure more equitable groundwater management, such as the Correlative Rights Doctrine.

Recommendation 1.2. <u>Role of Groundwater Conservation Districts</u>

Consider legislative changes to improve the effectiveness of, and provide greater support for, groundwater conservation districts (GWCDs).

The Select Committee determined that GWCDs, generally, are considered to be effectively and judiciously exercising their statutory powers and duties to manage the State's groundwater resources. *(See Appendix D. "Summary of TCEQ's Current Authority Over Groundwater Conservation Districts")* However, the committee identified certain, specific concerns that might benefit from legislative attention. These concerns include:

- single-county GWCDs, often with conflicting management goals, attempting to manage a regional groundwater resource;
- less than effective review process for statutorily-required GWCD management plans;
- GWCDs' use of widely-diverse terminology and methodologies to measure and define the actual amounts of groundwater subject to a GWCD's jurisdiction;
- the potential for excessive litigation relating to GWCDs' rulemaking and permitting decisions; and
- ability of large-quantity groundwater pumping just outside the boundaries of a GWCD to undermine the district's efforts to manage the groundwater resource.

1.2. ALTERNATIVE LEGISLATIVE OPTIONS INCLUDE:

NOTE: These alternative legislative options were presented to the committee for consideration during the interim hearings. These options are not recommendations of the committee but reflect the range of alternatives discussed.

- Change currently permissive strategies for cooperative groundwater management by districts over a single groundwater management area (GMA) - to mandatory requirements that would drive adjoining districts to essentially function as a multi-county, GMA-wide management district.

- Consider requiring single-county GWCDs to be incorporated into larger neighboring districts, where possible.

- Reorganize and/or merge certain GWCDs to better reflect hydrogeologic boundaries.

- Create aquifer-wide or GMA-wide 'super' districts with supervisory authority to coordinate planning and management and to integrate the efforts of the local GWCDs.

- Increase TWDB's staff resources to provide a staff hydrologist for each of the states 16 GMAs - to provide data-related assistance and technical expertise to all districts within the GMA.

- Require groundwater district rules to be based on sound science, respect property rights, promote conjunctive use of surface water and groundwater, and provide for permitting decisions that do not discriminate on the basis of place of use or purpose of use.

- Clarify Chapter 36, Water Code, to ensure sound, consistent hydrogeologic science is used by GWCDs in establishing well spacing and production limits.

- Require GWCDs to follow established procedures when considering rules or permits to provide landowners a fair opportunity to be involved in the process.

- Direct the TWDB to revise its GWCD management plan review process from the current "checklist" practice, and replace it with a substantive review process to ensure quality control and state-wide consistency in GWCD management.

- Expressly identify issue areas in GWCD management plans for which a substantive, qualitative review by the TWDB would be of greatest benefit, including, but not limited to, the areas of data collection efforts and groundwater availability assessments.

- Repeal existing permissive authority for the State Auditor's Office to perform audits of GWCDs.

- Define, in statute, a common lexicon of groundwater measurement terms and require GWCDs to consistently use the same measurement components and terms covering concepts such as the amount of groundwater that can be withdrawn on a sustainable basis without resulting in significant, sustained declines; the annual amount of withdrawals authorized by a local district; projected groundwater supply; total useable amount of groundwater within an aquifer; total aquifer storage; recharge; inflows; discharge; and outflows.

- Provide GWCDs with litigation assistance, possibly in the form of an appeal of GWCD rulings directly to the TCEQ for assignment to an administrative law judge to determine the legality of the GWCD ruling. The TCEQ decision would be appealable to the District Court, where the Attorney General would represent the TCEQ.

- Create a Statewide Groundwater District, to be administered by state water agencies, for areas not currently within a GWCD, to include state-owned land. This would require affected counties to opt into a current GWCD or allow for the formation of a multi-county, GMA based district. Any county not willing to take part in these actions would be subject to state regulation.

- Encourage future GWCDs to establish boundaries that reflect underlying GMA boundaries.

Recommendation 1.3. <u>Historic Use Standards</u>
Clarify statutory provisions relating to historic use standards as used by groundwater districts as a permitting strategy.

1.3. ALTERNATIVE LEGISLATIVE OPTIONS INCLUDE:
NOTE: These alternative legislative options were presented to the committee for consideration during the interim hearings. These options are not recommendations of the committee but reflect the range of alternatives discussed.

- Prohibit any future GWCDs from using historic use standards.

- Allow GWCDs the discretion of using appropriate historic use standards.

- Prohibit existing GWCDs not currently using historic use from adopting it as a permitting strategy.

- For districts currently using historic use, options include:

- ensure that historic use standards may not discriminate against owners of land enrolled in government Conservation Reserve Programs;
- allow continuation of historic use production amounts, but only for as long as the permittees continue to use the water for their initial purpose of use - for example, if they change their use from irrigation to marketing, their historic use production amounts would automatically decrease to the production amounts allowed for non-historic use permittees;
- incrementally decrease the historic use permit amounts, over a set period of years, to eventually achieve equity with other permittees.

Recommendation 1.4. ***Role of the Edwards Aquifer Authority (EAA)***
Clarify the role and jurisdictional authority of the EAA and of the Texas Commission on Environmental Quality (TCEQ) within and outside the boundaries of the EAA.

1.4. ALTERNATIVE LEGISLATIVE OPTIONS INCLUDE:
NOTE: These alternative legislative options were presented to the committee for consideration during the interim hearings. These options are not recommendations of the committee but reflect the range of alternatives discussed.

- Require the Edwards Aquifer Authority (EAA) and the South Central Texas Water Advisory Committee *(See Appendix E. "TCEQ's Role in South Central Texas Water Advisory Committee's Appeal of EAA's Actions")* to periodically report to the appropriate legislative oversight committees with progress and status updates on:
  - the EAA's Habitat Conservation Plan;
  - the EAA's Critical Period Management Plan;
  - the EAA's proposed bifurcated (junior/senior) pumping caps; and
  - Kinney County Groundwater Conservation District issues.
- Authorize aquifer recharge projects to take water from the Edwards-Trinity Aquifer and recharge it into the Edwards Aquifer, and limit the use of the recharged water to areas within the EAA.
- Include part or all of Kinney County in the EAA, and dissolve the Kinney County Groundwater Conservation District.
- Statutorily recognize the aquifer boundary between the Edwards Aquifer and the Edwards-Trinity Aquifer as being the Spofford Fault, with description delineating its location.
- Clarify that the aquifer pumping caps and other restrictions placed on permits for the Edwards Aquifer do not apply to permits for the Edwards-Trinity Aquifer and other minor aquifers in Kinney County (e.g., the Austin Chalk).

2. SURFACE WATER ISSUES

2.1. Interbasin Transfers and Junior Water Rights

Recommendation 2.1. Interbasin Transfers and Junior Water Rights

Evaluate the appropriateness of the junior water rights provision and other interbasin transfer permit requirements added to Section 11.085, Water Code, as part of Senate Bill 1 in 1997.

Interbasin transfers (IBT) of surface water and the associated junior water rights are some of the most volatile and controversial issues in the current water policy/water politics arena. Since the passage of Senate Bill 1 in 1997, "interbasin transfers (IBTs)" have been the subject of endless discussions and the focus topic of innumerable water law conferences, legislative hearings (Interim and Session), water policy seminars and symposiums, state agency agendas, work sessions and briefings, and a wide range of other public policy forums.

A concise historical overview of IBT issues, recently presented at a state agency work session, is partly reproduced in the text following this paragraph.[1] Also, *see Appendix F. "Interbasin Transfers of Water Rights,"* for more detailed information TCEQ process and requirements regarding water right applications involving IBTs.

BACKGROUND: INTERBASIN TRANSFER ISSUES

The sources of water in Texas do not always align with its population. The greatest amount of water is found in the east, especially the Sabine and Sulphur basins. These areas are sparsely populated. For these reasons, interbasin transfers (IBTs) -- or the movement of water from one river basin to another river basin -- have historically been an important way to provide water throughout Texas.

To obtain the right to use water outside the river basin in which the water is located, an individual or entity must obtain an IBT permit. Current statute makes an IBT junior in priority to water rights granted before the IBT application is accepted for filing. (This will be called the "junior priority provision.") The issue of priority is important because Texas uses a "first in time first in right," or prior appropriation doctrine for surface water allocation. This doctrine gives the person with the earliest priority date the right to call on the use of water first. Thus, all water rights granted before the IBT have a right to use the water first.

The junior priority provision does not impact a new permit that includes an IBT, since the priority date of the IBT will be the same as the entire water right. It may impact a water right holder seeking to amend an existing water right to add an IBT, since the junior priority provisions means the IBT could not obtain the priority date of the original right. Before the junior priority provision was enacted, TCEQ issued some IBT amendments with the priority date of the original right, and issued others with the priority date of the application for the IBT.

The junior priority provision, now found at Water Code Section 11.085(s), was added with the passage of S.B. 1 in 1997, when *many other changes* were made to the method for reviewing and granting IBTs. These include:

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[1] The reproduction of this work session briefing document begins following this paragraph - as set off by the double line break - and ends at the start of Section 2.1. ALTERNATIVE LEGISLATIVE OPTIONS INCLUDE.

***S.B. 1 Standard for granting IBT*:**
The 1997 amendments allow an IBT to be granted *only to the extent* that:

- detriments to the originating basin are less than benefits to the receiving basin, and
- the applicant has a drought contingency plan and a water conservation plan that will result in the highest practicable levels of water conservation and efficiency achievable within the applicant's jurisdiction.

SB 1 IBT Permit Review criteria.
S.B. 1 added significant review criteria. These include weighing the effect of the transfer by considering:

- the needs of the basin of origin and receiving basin for the period of transfer, but not more than 50 years,
- mitigation or compensation proposed to basin of origin, and
- factors identified in the regional water plan, including:
  - alternative supplies in the receiving basin,
  - amount and purpose of use of the water,
  - conservation and drought contingency efforts in the receiving basin,
  - efforts of the receiving basin to put the water to beneficial use,
  - economic impact in each basin, and
  - impacts of the transfer on existing water rights, instream uses, water quality, aquatic and riparian habitat and bays and estuaries. The analysis for amendments is based on historical use of the water right (as opposed to full use of the paper right, which is the test applicable to general amendments of permits).

The statutory changes resulting from S.B. 1 may have reduced consideration of IBTs as a water management strategy. Because amendments to IBTs lose their priority date, they often become less reliable, thus less feasible. [*See Appendix H. "List of Pending Water Rights Applications Involving Interbasin Transfers")*] The review standards for new IBTs may be imposing. These two factors may have increased consideration of both groundwater transfers and the building of new reservoirs rather than relying on existing out-of-basin reservoirs.

State Water Plan Recommendations
In Water for Texas - 2002, the TWDB recommended that the legislature consider needed changes to continue crafting a policy that addresses the imbalance between the location of water resources and the location of water needs, while recognizing broad public interests and the need to weigh the interest of the basin of origin and the needs in the receiving basin.[2]

2.1. ALTERNATIVE LEGISLATIVE OPTIONS INCLUDE:
NOTE: These alternative legislative options were presented to the committee for consideration during the interim hearings. These options are not recommendations of the committee but reflect the range of alternatives discussed.

[2] The reproduction of the agency work session briefing document ends here.

- Keep junior rights provision, Section 11.085(s), Water Code, but with "modifications" as needed to move forward with critical water supply projects and to assure adequate future supply of the water resource for the region of origin and for the environment..

- Keep Section 11.085(s), Water Code, the junior rights provision itself, but repeal some of the other additional "protection of basin of origin" IBT permit requirements added by SB 1 (75thR), to assure adequate future supply of the water resource for the region of origin and for the environment.

3. CONJUNCTIVE MANAGEMENT/STATEWIDE WATER ISSUES

3.1. Regional Water Planning Process
3.2. Conjunctive Use of Both Surface and Groundwater Resources
3.3. Water Marketing
3.4. Water Infrastructure and Financing
3.5. Water Conservation

Recommendation 3.1. <u>Regional Water Planning Process</u>
Consider legislative changes to improve the effectiveness of and support for the Regional Water Planning Process.

Senate Bill 1 (75th Regular Session, 1997) was a comprehensive water resource management bill that restructured the process of water planning in Texas. Among the legacies from that bill are the efforts of the state's sixteen Regional Water Planning Groups (RWPGs), created by S.B. 1 to assess the water needs in each region, and to develop regional water plans to meet those needs. Built on the foundation of those regional water plans, in December 2002, the TWDB adopted the first Senate Bill 1 water plan, "Water for Texas - 2002." (Available on the TWDB's website at http://www.twdb.state.tx.us/publications/reports/State_Water_Plan/2002/FinalWaterPlan2002.asp)

Senate Bill 2 (77th Regular Session, 2001), the surface water/groundwater conjunctive management water bill, enacted significant amendments to the regional water planning process. Since 2001, the RWPGs have effectively implemented many changes directed by S.B. 2.

3.1. ALTERNATIVE LEGISLATIVE OPTIONS INCLUDE:
NOTE: These alternative legislative options were presented to the committee for consideration during the interim hearings. These options are not recommendations of the committee but reflect the range of alternatives discussed.

- Maintain the Regional Water Planning process and, to the extent possible, support the Regional Water Planning process with state funding and/or technical assistance.

- Amend the regional water planning process to create an expedited notice and hearing process for minor amendments to the Regional Water Plans (Section 16.053(h), Water Code). Limit the use of the expedited amendment process to only those amendments that are expected to have little impact on other water rights, the water resources, or the environment. (Currently, each amendment to a Regional Water Plan must comply with rigorous notice and hearing requirements that are expensive and involve long time frames.)

- Provide more opportunity, via the Regional Water Planning process and/or other venues, for technical input into the development of the State's water planning tools, such as the Groundwater Availability Models (GAMs) or the surface water Water Availability Models (WAMs).

- Provide for the Regional Water Planning process to evaluate and consider aquifer recharge and enhancement and maintenance of springflows.

- Amend Chapters 16 and 36, Water Code, to provide for more consistency of groundwater management goals established by GWCDs with the Regional Water Plans; i.e., direct TWDB to develop management tools to optimize aquifer use and development - to be used by GWCDs and by RWPGs under their stated management goals.

- Direct the TWDB to facilitate joint planning efforts between GWCDs and RWPGs within a GMA, to avoid or resolve conflicts, and direct GWCDs to reflect future demands for groundwater consistent with demand projections made by the RWPGs.

Recommendation 3.2. <u>Conjunctive Use of Both Surface and Groundwater Resources</u>
Reaffirm policy of the State endorsing the conjunctive use of surface and groundwater resources and explore mechanisms by which to promote conjunctive use projects.

Water management in Texas must become more cohesive and less fragmented. Water itself is inextricably linked throughout every stage of the hydrological cycle. Water policy and water management frameworks must reflect these interconnections and conjunctively address both surface water and groundwater.

Texas regulations, laws, and institutions will have to continue to evolve in order to keep pace with, and sometimes to encourage, new developments in technology, better science and increased understanding of the complex issues involved in sustaining our ground and surface water resources so that they can, in turn, sustain Texas and its economies.

3.2. ALTERNATIVE LEGISLATIVE OPTIONS INCLUDE:
NOTE: These alternative legislative options were presented to the committee for consideration during the interim hearings. These options are not recommendations of the committee but reflect the range of alternatives discussed.

- Direct the TCEQ and the TWDB to evaluate the relationship between groundwater and surface water to ensure that riverine base flows derived from groundwater springs are maintained. The TCEQ and the TWDB should work with other state water agencies to issue a report to the Legislature by January 1, 2006.

- Amend the Water Code to include clear policy statement that effective rural watershed management be considered an essential tenet of State water policy; and that rural, riverside, and coastal land stewards, both public and private, must be included in the development and

Appendix D

AGENDA
Senate Committee on Natural Resources
Interim Hearing
Dallas City Hall, Room 6ES
1500 Marilla Street
Dallas, Texas
July 13, 2006, 10:00 a.m.
and
July 14, 2006, 8:00 a.m.

Thursday, July 13, 2006

I. Call to Order

II. Texas Commission on Environmental Quality Commissioner Remarks
Kathleen White, Chairman, Texas Commission on Environmental Quality
Larry Soward, Commissioner, Texas Commission on Environmental Quality

III. Dallas/Fort Worth State Implementation Plan Update
David Schanbacher, Chief Engineer, Texas Commission on Environmental Quality

IV. Overview of Texas Commission on Environmental Quality Power Plant Permitting Process
Richard Hyde, Director of Air Permitting Division, Texas Commission on Environmental Quality

V. Issues Related to Reliability Panel
Barry Smitherman, Commissioner, Public Utility Commission
Sam Jones, Interim President and CEO, Electric Reliability Council of Texas

VI. Texas Environmental Research Consortium Update
George Beatty, Chair, Consortium Advisory Council, Texas Environmental Research Consortium

VII. Environmental Panel
Ramon Alvarez, Scientist, Environmental Defense
Tom "Smitty" Smith, Director, Public Citizen, Texas Office

VIII. Integrated Gasification Combined Cycle (IGCC) Panel
Steve Jenkins, IGCC and Gasification Technology Leader, URS Corporation
Dr. Don Carlton, Founder and former CEO, Radian Corporation
Richard Furman, Retired Consulting Engineer

IX. Industry Panel
Michael McCall, Chairman and CEO, TXU Wholesale
Steve Winn, Executive Vice President, NRG Energy and President, Texas Region, NRG Energy
Monty Jasper, Director of New Plant Development, American Electric Power

X. Public Testimony

XI. Recess

Friday, July 14, 2006

I. Call to Order

II. Review of Surface Water and Groundwater Policy in Texas Panel
Martin Rochelle, Attorney, Lloyd, Gosselink, Blevins, Rochelle & Townsend
Brian Sledge, Attorney, Lloyd, Gosselink, Blevins, Rochelle & Townsend

III. Review of HB 1763, 79(R) by Cook/Duncan Panel
Bill Mullican, Deputy Executive Administrator of Planning, Texas Water Development Board
Gary Westbrook, President, Texas Alliance of Groundwater Districts
C.E. Williams, General Manager, Panhandle Groundwater Conservation District

IV. Conjunctive Management Panel
Carolyn Brittin, Director of Water Resources, Texas Water Development Board
Ed McCarthy, Attorney, Jackson, Sjoberg, McCarthy and Wilson, LLP
Jace Houston, General Counsel, Harris-Galveston Subsidence District
Myron Hess, National Wildlife Federation

V. Public Testimony

VI. Recess

AGENDA
Senate Committee on Natural Resources
Organizational and Interim Hearing
June 16, 2006
9:00 a.m.
Capitol Extension, E1.012

I. Call to Order

II. Welcoming Remarks and Introduction of Staff

III. Adoption of Committee Rules

IV. Environmental Flows Update

Kathleen White -	Chairman, Texas Commission on Environmental Quality
Joseph B.C. Fitzsimons -	Chairman, Texas Parks and Wildlife Commission
Derek Seal -	General Counsel, Texas Commission on Environmental Quality
J. Kevin Ward -	Executive Administrator, Texas Water Development Board
E.G. Rod Pittman -	Chairman, Texas Water Development Board Chairman, Environmental Flows Advisory Committee
Dean Robbins -	Assistant General Manager, Texas Water Conservation Association
Mary Kelly -	Senior Attorney, Environmental Defense
Ben Vaughn III -	Coastal Conservation Association Texas

V. Drought Preparedness

Jack Colley -	Chief, Governor's Division of Emergency Management

VI. Water Reuse

Larry Soward -	Commissioner, Texas Commission on Environmental Quality
Todd Chenoweth -	Manager, Water Rights Permitting, Texas Commission on Environmental Quality
Norman Johns -	Water Resources Scientist, National Wildlife Federation
Dean Robbins -	Assistant General Manager, Texas Water Conservation Association
Lyn Dean -	Chair, Water Laws Committee, Texas Water Conservation Association Associate General Counsel, Lower Colorado River Authority

VII. Water Conservation

Allan Jones -	Director, Texas Water Resources Institute
Carole Baker -	Director, Intergovernmental Relations, Harris Galveston Subsidence District
Calvin Finch-	Director of Water Resources, San Antonio Water System
Bill Mullican -	Deputy Executive Administrator, Texas Water Development Board

V. Public Testimony

VI. Recess

AGENDA
Senate Committee on Natural Resources
Interim Hearing
North Harris County Regional Water Authority
Room 110
Houston, Texas
August 8, 2006, 10:00 a.m.

I. Call to Order

II. Welcoming Remarks
Al Rendl, President, North Harris County Regional Water Authority

III. Water Funding
Larry Soward, Commissioner, Texas Commission on Environmental Quality

IV. Review of Texas Commission on Environmental Quality Water Programs
Mark Vickery, Deputy Executive Director, Texas Commission on Environmental Quality

V. Review of Texas Water Development Board (TWDB) Water Programs
Kevin Ward, Executive Administrator, Texas Water Development Board

VI. Review of Senate Bill 3 Funding and Other Possible Revenue Streams
Kevin Ward, Executive Administrator, Texas Water Development Board

VII. The Wall Street Perspective on Financing Water Projects
Roy Torkelson, Senior Advisor, Environmental Finance, East Group
John Ma, Vice President, Municipal Finance and Infrastructure Group, Goldman Sachs

VIII. Public/Private Partnerships and Success Stories
Christopher Malinowski, Texas Water Division Manager, PBS&J

IX. Review of North Harris County Regional Water Authority Projects
Jimmie Schindewolf, General Manager, North Harris County Regional Water Authority

X. Review of TWDB's Policy Recommendations for the 2007 State Water Plan
Bill Mullican, Deputy Executive Administrator, Texas Water Development Board

XI. Review of Statutory Barriers to Implementation of State Water Plan Panel
Ed McCarthy, Attorney, Jackson, Sjoberg, McCarthy & Wilson
Ken Ramirez, Attorney, Brown McCarroll
Robert Stokes, Attorney and President, Galveston Bay Association
Glenn Jarvis, Attorney, Law Offices of Glenn Jarvis
Lynn Sherman, Attorney, Winstead Consulting Group

XII. Review of Regional Water Planning Group Barriers to Implementation of State Water Plan Panel
Tom Gooch, Engineer, Freese and Nichols (Region C)
Ed Archuleta, General Manager, El Paso Public Service Board (Region E)
Jeff Taylor, Deputy Director, Public Utilities Division, City of Houston (Region H)
Bill West, General Manager, Guadalupe-Blanco River Authority (Region L)
John Bruciak, General Manager, Brownsville Public Utilities Board (Region M)

XIII. Public Testimony

XIV. Recess

SENATE COMMITTEE ON NATURAL RESOURCES

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HOUSE COMMITTEE ON NATURAL RESOURCES

KIP AVERITT
CHAIR, SENATE NATURAL RESOURCES

ROBERT PUENTE
CHAIR, HOUSE NATURAL RESOURCES

AGENDA
Joint Interim Hearing
Senate and House Committees on Natural Resources
San Antonio City Council Chambers
September 22, 2006, 10:00 a.m.

I. Call to Order

II. Welcoming Remarks
The Honorable Phil Hardberger, Mayor, City of San Antonio
The Honorable Nelson W. Wolff, Bexar County Judge
Sam Dawson, Chair-Water Committee, Greater San Antonio Chamber of Commerce

III. Review of Texas Water Development Board Policy Recommendations in the Draft 2007 State Water Plan
Thomas Weir Labatt III, Board Member, Texas Water Development Board

IV. Water Planning Panel
Carolyn Brittin, Director of Water Resources, Texas Water Development Board
Bill Mullican, Deputy Executive Administrator of Planning, Texas Water Development Board
Con Mims, Nueces River Authority, Region L Chair
- a. Review of the 2007 Draft State Water Plan
- b. Update on the Regional Water Planning Process
- c. Region L - Lessons Learned

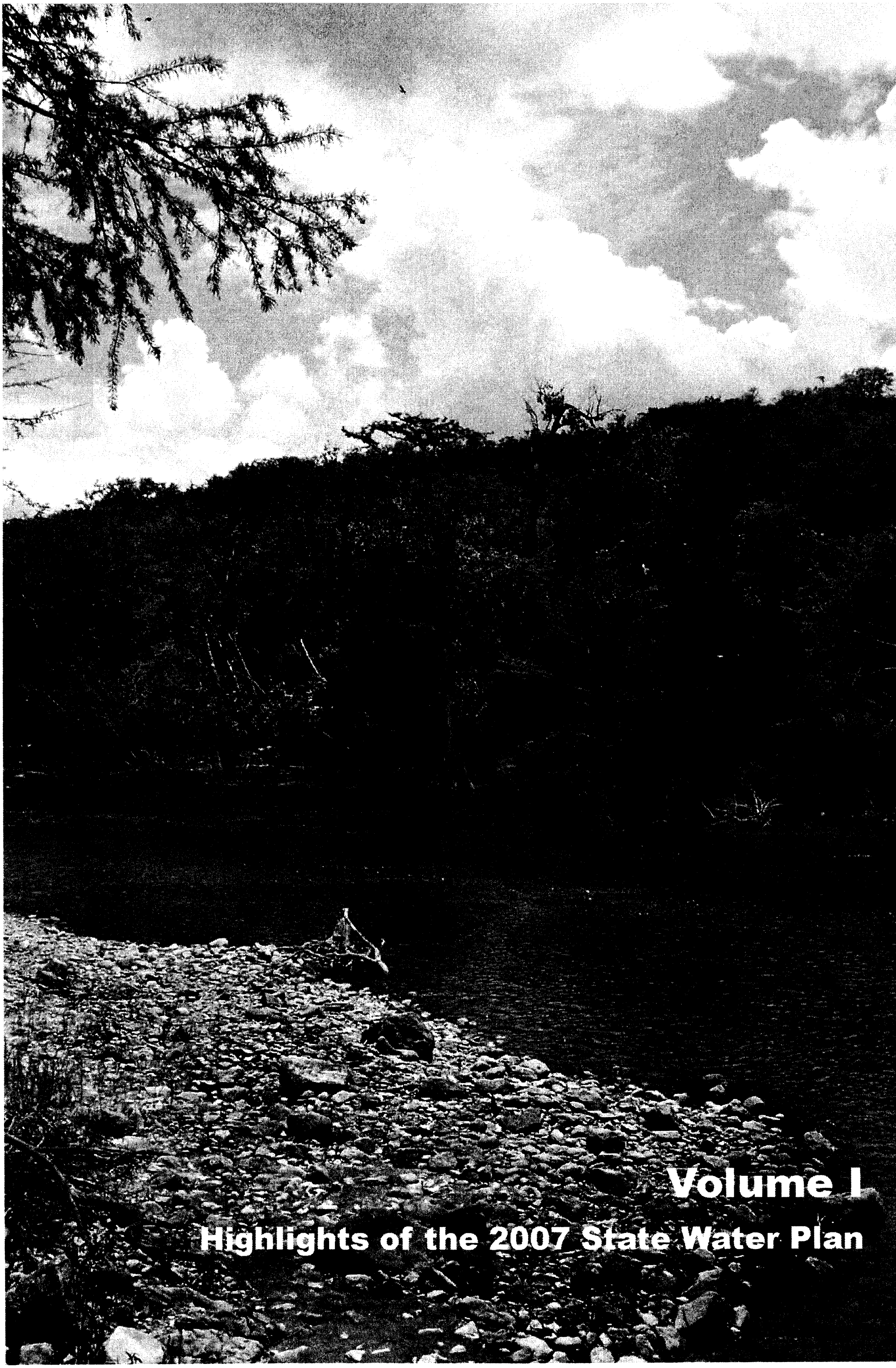
V. Overview of House Bill 41/Senate Bill 24 79(1) by Puente/Armbrister
Robert Potts, General Manager, Edwards Aquifer Authority

VI. House Bill 41/Senate Bill 24 79(1) by Puente/Armbrister and Regional Water Issues
- a. David E. Chardavoyne, President and Chief Operating Officer, San Antonio Water System
- b. Gil Olivares, General Manager, Bexar Metropolitan Water District
- c. Will Carter, Board Member, Bexar-Medina-Atascosa Water Control and Improvement District #1
- d. Greg Rothe, General Manager, San Antonio River Authority
- e. Thomas Boehme, State Director-District 10, Texas Farm Bureau
- f. Bill West, General Manager, Guadalupe-Blanco River Authority
- g. Gary Middleton, Chairman, South Central Texas Water Advisory Committee

VII. Public Testimony

VIII. Recess

Appendix E



Volume I

Highlights of the 2007 State Water Plan

Volume I

Highlights of the 2007 State Water Plan

Population in Texas is expected to more than double between the years 2000 and 2060, growing from about 21 million to about 46 million.

The demand for water in Texas is expected to increase by 27 percent, from almost 17 million acre-feet of water in 2000 to 21.6 million acre-feet in 2060.

Existing water supplies—the amount of water that can be produced with current permits, current contracts, and existing infrastructure during drought—are projected to decrease about 18 percent, from about 17.9 million acre-feet in 2010 to about 14.6 million acre-feet in 2060. This decrease is primarily due to the accumulation of sediments in reservoirs and the depletion of aquifers.

Texas is going to need an additional 8.8 million acre-feet of water by 2060 if new water supplies are not developed.

The planning groups identified about 4,500 water management strategies and projects to generate an additional 9.0 million acre-feet per year of water supplies for Texas.

The planning groups estimated that the capital costs to design, construct, or implement the 4,500 water management strategies and projects would cost about $30.7 billion.

If Texas does not implement the water plan, water shortages during drought could cost businesses and workers in the state about $9.1 billion by 2010 and $98.4 billion by 2060.

If Texas does not implement the water plan, about 85 percent of the state's projected population will not have enough water by 2060 in drought conditions.

This water plan marks the 50th anniversary of the end of the drought of record Texas experienced from 1950-1957. It also marks the 50th anniversary of the creation of the Texas Water Development Board, established by the citizens of Texas to develop a state water plan and finance water supply projects to ensure that the catastrophic consequences of the drought of the 1950s would not be repeated in the future. *Water for Texas—2007* is the eighth state water plan since 1957 and the second developed as a result of the nationally recognized regional water planning process in Texas.

At the same time the 2007 State Water Plan was being drafted from May 2005 to August 2006, the citizens of Texas were once again reminded of the many dire consequences that drought can have on our people, our economy, and our environment. The negative impact of the 2005-2006 drought on agriculture may be worse than any drought since the drought of the 1950s. Wildfires in the winter and spring of 2006 burned over 1.9 million acres of land and a number of homes and buildings, resulting in the loss of human life. Water supplies to both large and small water supply systems have been seriously threatened during this drought. Water use has been restricted in almost every region of the state as a result of declining water supplies.

Why do we plan?

Simply put, we plan so that Texas will have enough water in the future to sustain our cities and rural communities, our farms and ranches, our businesses and industries, and the environment. While Texas is blessed with an abundance of natural resources, water is sometimes in short supply, particularly during periods of drought. Texas has a long history of droughts, and there are more to come. Our state also has one of the fastest growing populations in the country. In 1950, only 8 million people lived in Texas. In 2000, nearly 21 million people called Texas home, and another 25 million will likely arrive by 2060. A growing population, combined with Texas' vulnerability to drought, makes water supply a crucial issue.

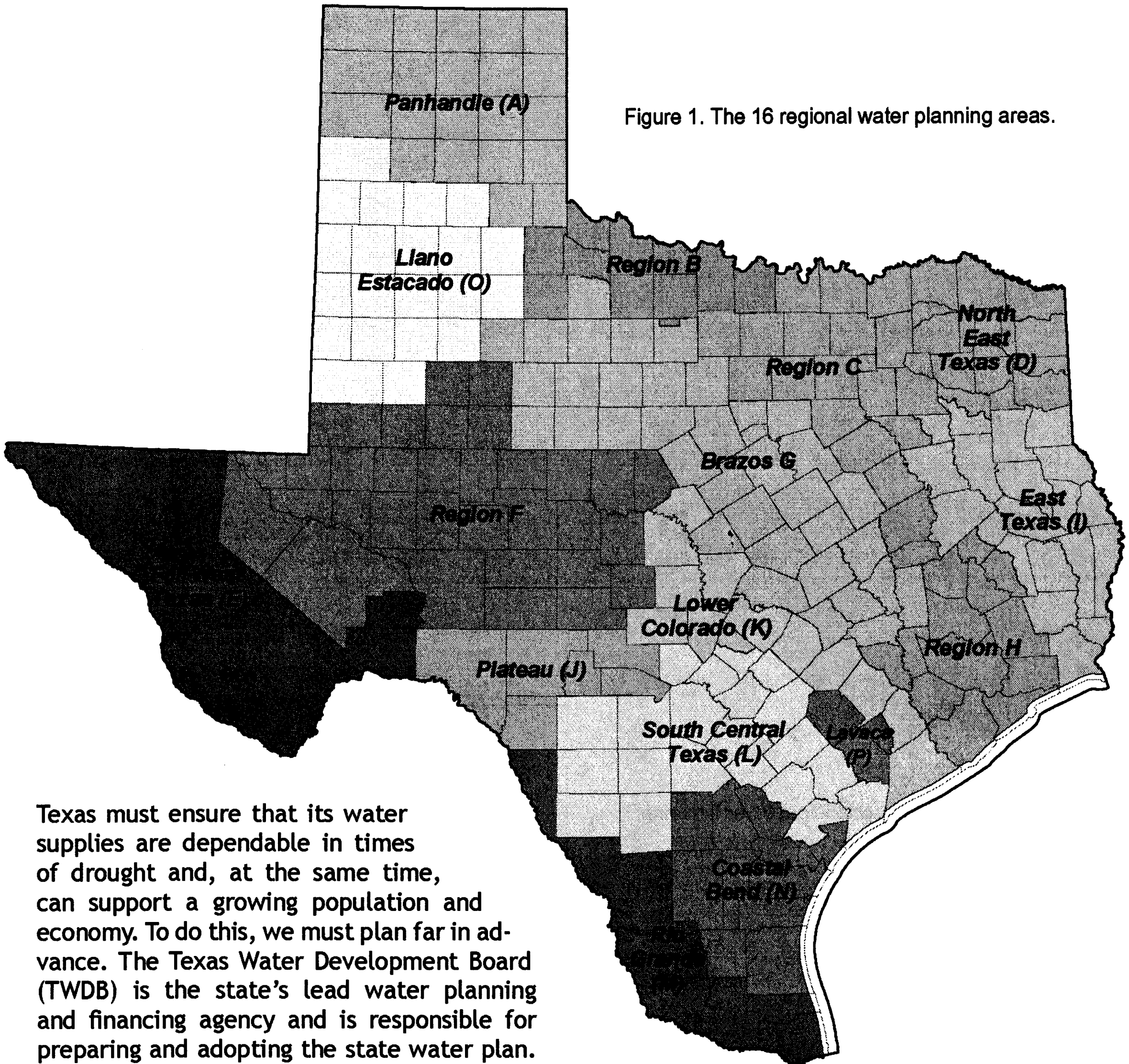
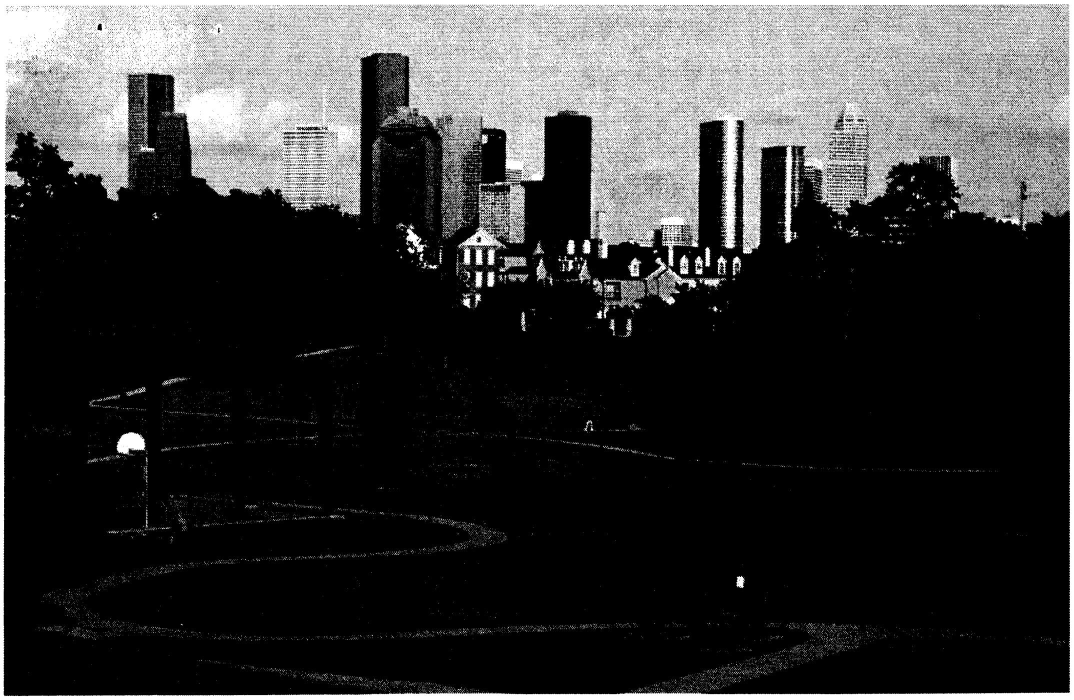


Figure 1. The 16 regional water planning areas.

Texas must ensure that its water supplies are dependable in times of drought and, at the same time, can support a growing population and economy. To do this, we must plan far in advance. The Texas Water Development Board (TWDB) is the state's lead water planning and financing agency and is responsible for preparing and adopting the state water plan. It is important that water plans are updated regularly to reflect and respond to changes in population, water availability, technological improvements, information, and policy. Because the legislature recognizes the importance of water to the future of Texas, it requires the development of a state water plan.

How do we plan?

Water planning in Texas is based on a "bottom-up," consensus-driven approach. The state is divided into 16 regional water planning areas (Figure 1). Each planning area is represented by a planning group that consists of about 20 members representing a variety of interests, including agriculture, industry, environment, public, municipalities, business, water districts, river authorities, water utilities, counties, and power generation. Each planning group evaluates population projections, water demand projections, and existing water supplies available during drought. Based on this information, each planning group identifies who will not have enough water, recommends strategies and projects that could be implemented to obtain more water, and estimates the costs of these strategies and projects. Once the planning group adopts the regional water plan, the plan is sent to TWDB for approval. TWDB then compiles information from the regional water plans and other sources to develop the state water plan. The entire process is open to the public.



cent, from almost 17 million acre-feet of water in 2000 to a projected demand of 22 million acre-feet in 2060 (Figure 3). Demand for municipal water is expected to increase from 4 million acre-feet in 2010 to just over 8 million acre-feet in 2060. However, demand for agricultural irrigation water is expected to decrease, from 10 million acre-feet per year in 2010 to approximately 9 million acre-feet per year in 2060, due to more efficient irrigation systems, reduced groundwater supplies, and the transfer of water rights from agriculture to municipal uses.

How many Texans will there be?

Population in Texas is expected to more than double between the years 2000 and 2060, growing from about 21 million to about 46 million (Figure 2). The growth rates, however, will vary considerably across the state. While some areas will double or even triple their populations, others will grow only slightly, and still others will lose population. Forty-three counties and 297 cities are projected to at least double their population by 2060, but another 45 counties and 137 cities are expected to lose population or remain the same. The rest are expected to grow slightly.

How much water will we require?

Although the population of Texas is expected to double over the next 60 years, the demand for water in Texas will increase by only 27 per-

How much water do we have now?

Existing water supplies—the amount of water that can be produced with current permits, current contracts, and existing infrastructure during drought—are projected to decrease about 18 percent, from about 17.9 million acre-feet in 2010 to about 14.6 million acre-feet in 2060 (Figure 4). Water supplies are from three primary sources: surface water, groundwater, and reuse water. Surface water supplies are projected to decrease about 6 percent, from about 9.0 million acre-feet in 2010 to about 8.4 million acre-feet in 2060. This decrease in surface water supply

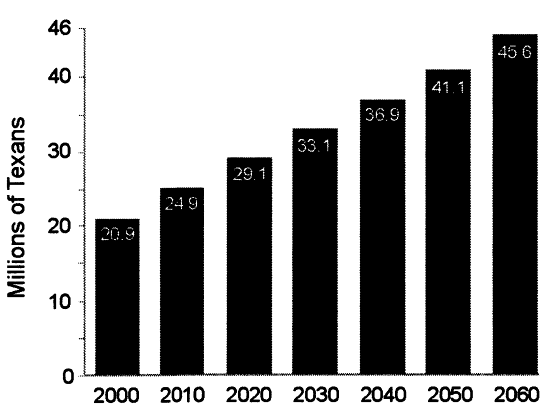


Figure 2. Projected population growth.

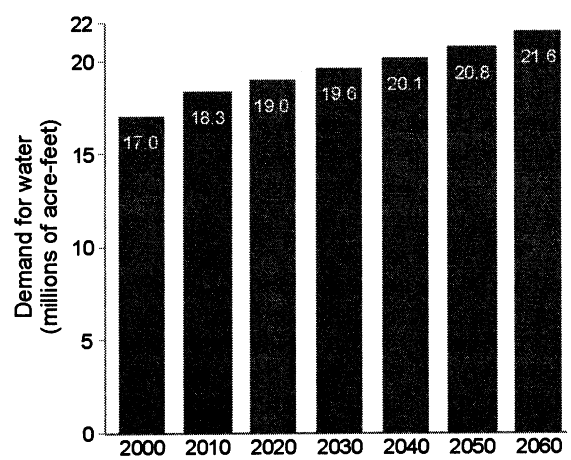


Figure 3. Projected water demand.

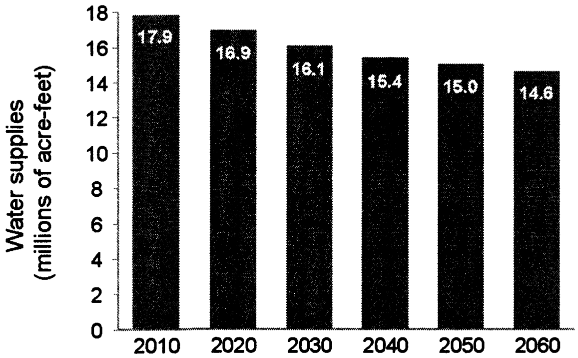


Figure 4. Projected supplies of water with current permits, current contracts, and existing infrastructure during drought.

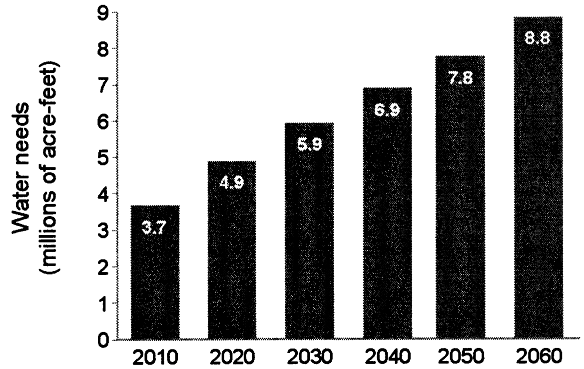
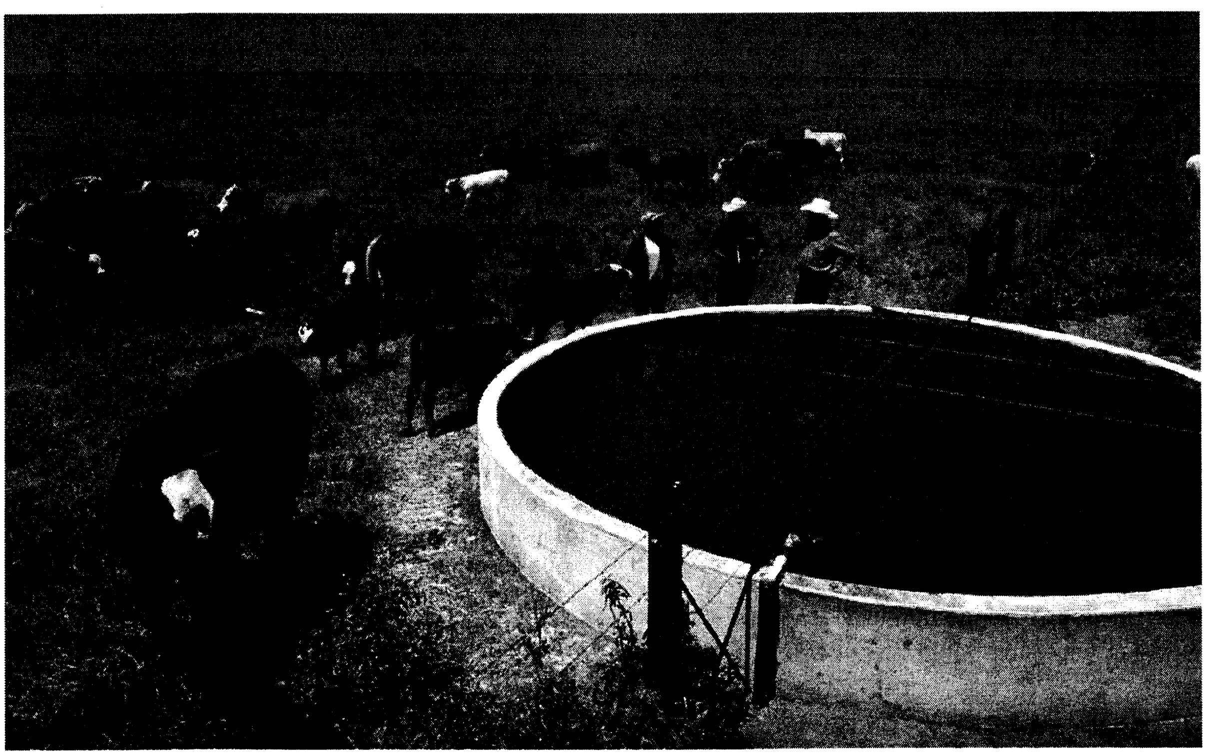


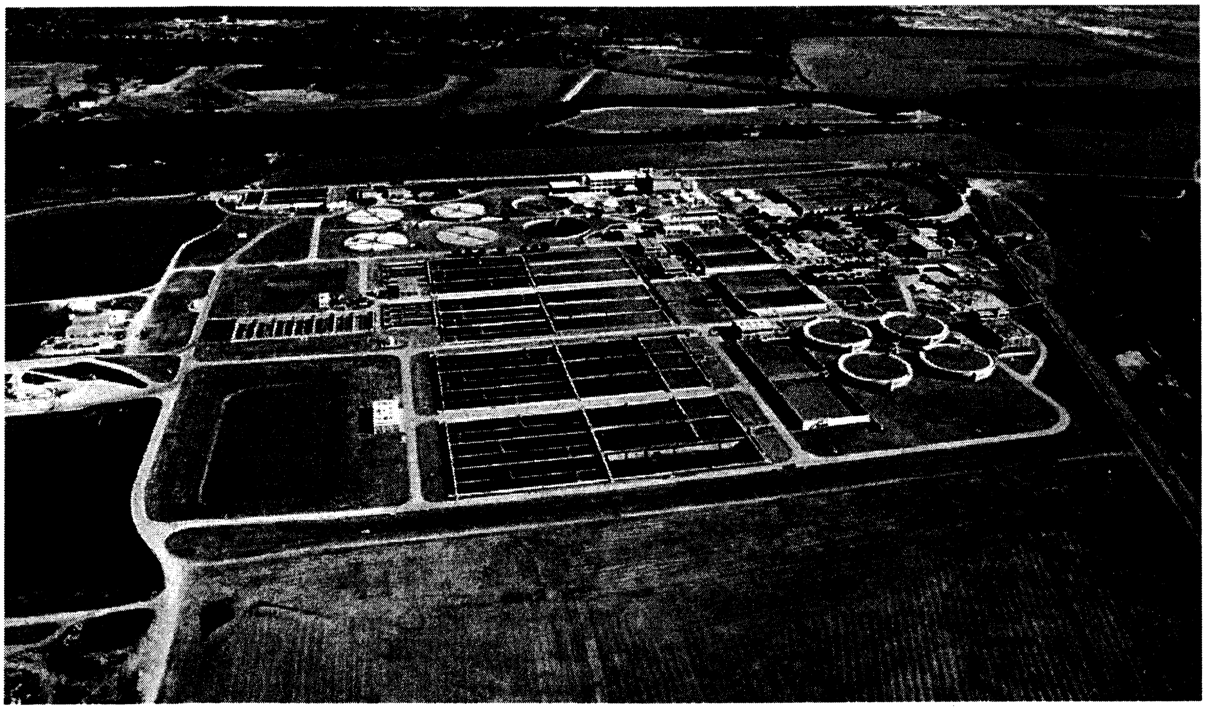
Figure 5. Projected need for additional water in times of drought.

is partly due to the accumulation of sediments in reservoirs. Groundwater supplies are projected to decrease 32 percent, from about 8.5 million acre-feet in 2010 to about 5.8 million acre-feet in 2060. This decrease is primarily due to reduced supply from the Ogallala Aquifer as a result of depletion and reduced supply from the Gulf Coast Aquifer due to mandatory reductions in pumping to prevent land subsidence. Existing water supply from water reuse—the use of water after it has already been used—is expected to be about 370,000 acre-feet per year by 2060.

Do we have enough water for the future?

We do not have enough existing water supplies today to meet the demand for water in the future during times of drought. If Texas does not implement new water supply projects or management strategies, then homes, businesses, and agricultural enterprises throughout the state are expected to need an additional 3.7 million acre-feet of water in 2010 and an additional 8.8 million acre-feet in 2060 (Figure 5).





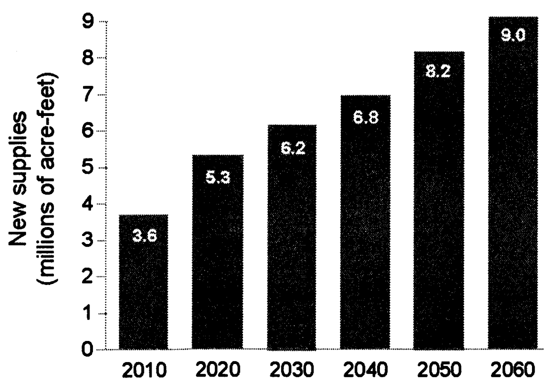


Figure 6. New water supplies from water management strategies in the state water plan.

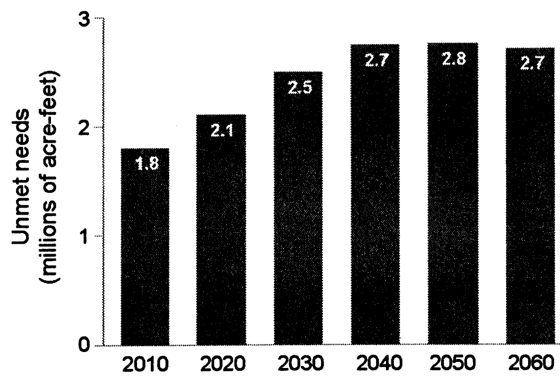


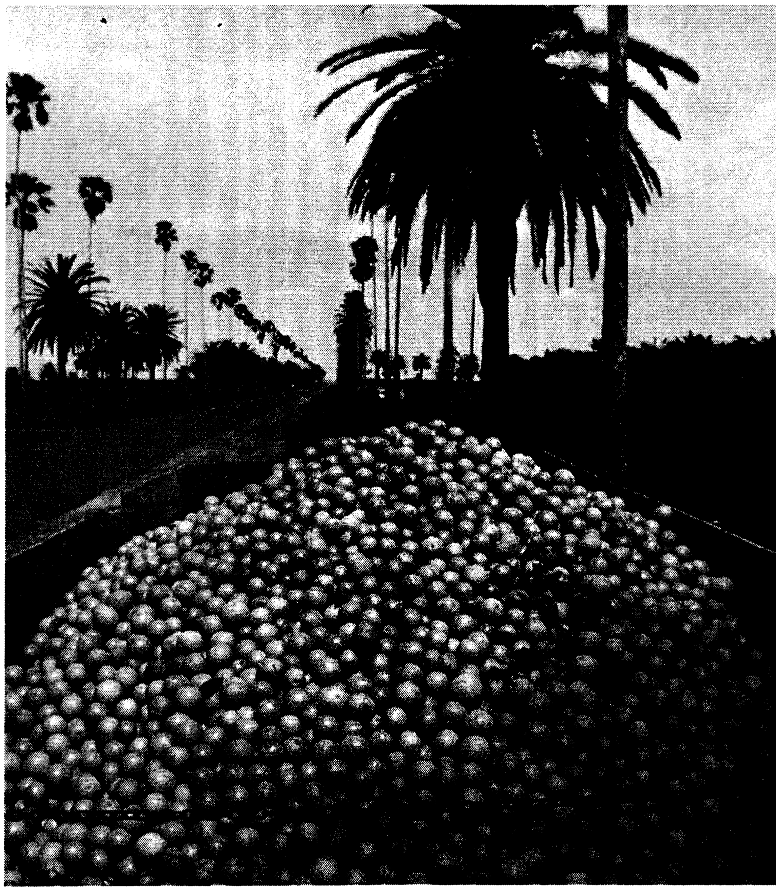
Figure 7. Unmet water supply needs.

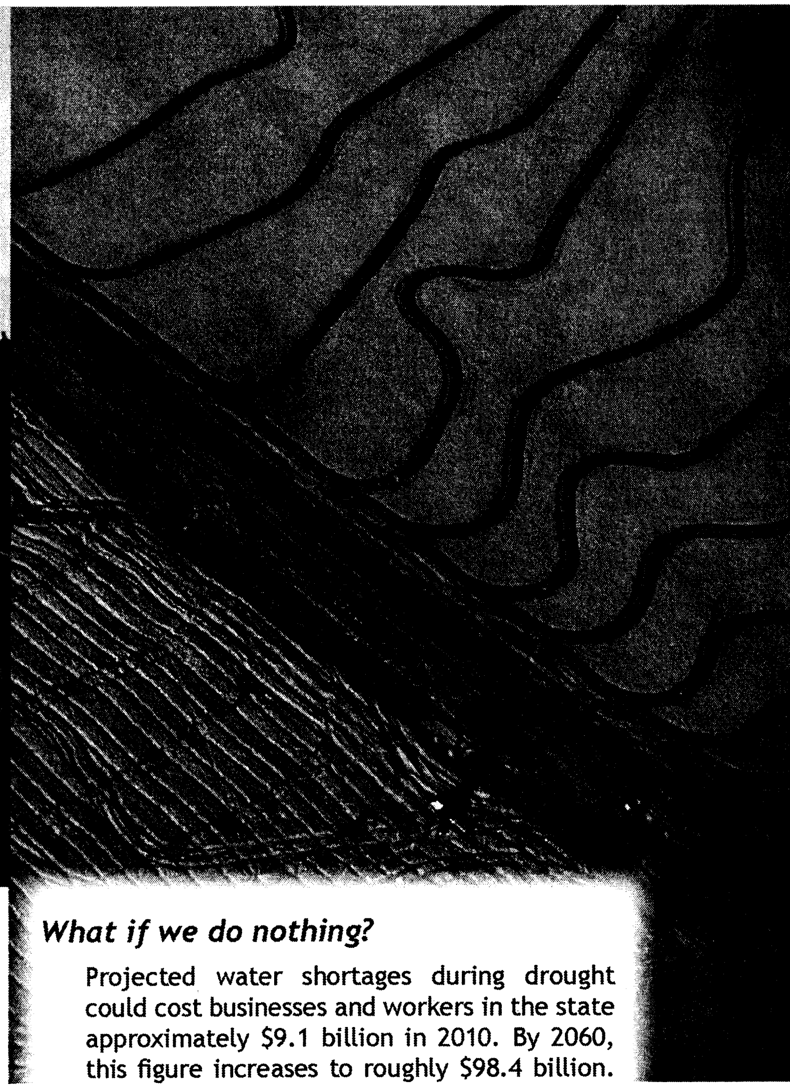
What can we do to get more water?

The planning groups identified about 4,500 water management strategies to generate additional water supplies for Texas during drought. A water management strategy is a specific plan to increase water supply or maximize existing supply to meet a specific need. If these strategies are implemented, Texas will increase its water supplies by 3.6 million acre-feet per year by 2010 and 9.0 million acre-feet per year by 2060 (Figure 6). The water management strategies include municipal and agricultural conservation, reservoirs, wells, water reuse, desalination plants, and other strategies. Additional municipal water conservation strategies would result in about 617,000 acre-feet per year of water by 2060. Additional irrigation conservation strategies would result in about 1.4 million acre-feet per year by 2060. Fourteen new major reservoirs would result in about 1.1 million acre-feet per year by 2060. Additional water wells would result in about 800,000 acre-feet per year by 2060. Additional water reuse would result in about 1.3 million acre-feet per year by 2060. Desalination projects would result in about 313,000 acre-feet per year by 2060.

Are all water supply needs met?

Nine planning groups were unable to meet all water supply needs for each water user group in their planning areas. Approximately 1.8 million acre-feet of water supply needs are unmet in 2010, increasing to approximately 2.7 million acre-feet in 2060 (Figure 7). Unmet water sup-





ply needs occur for irrigation, steam-electric power generation, and mining water user groups in 2010 and 2060. The major reason for not meeting a water user group's water supply need is that the planning group did not identify an economically feasible water management strategy to meet the water supply need.

What will it cost?

The planning groups also estimated how much the 4,500 water management strategies would cost to implement. Total capital costs, which primarily consist of up-front money needed to design, construct, or implement strategies, are about $30.7 billion. Based on surveys conducted as part of the planning process, local jurisdictions indicate that a significant part of the total costs can be borne by local sponsors. However, the local jurisdictions identified specific funding needs that the state could fill. Therefore, TWDB recommends that the legislature consider an initial appropriation of $77.5 million for the 2008-2009 biennium, which would provide grants and loans for constructing $929.6 million in projects. Cumulative appropriations of $674.6 million between 2008 and 2028 would result in $1.7 billion in projects. These funds would help ensure that Texas has enough water for the future.

What if we do nothing?

Projected water shortages during drought could cost businesses and workers in the state approximately $9.1 billion in 2010. By 2060, this figure increases to roughly $98.4 billion. The loss of state and local business taxes associated with lost commerce could amount to $466 million in 2010 and $5.4 billion in 2060. If we do nothing, about 85 percent of the state's projected population will not have enough water by 2060 during drought conditions.

What can we do now?

The planning groups noted several issues that the legislature should consider addressing to help implement the state water plan and ensure Texas has water for the future. Based on these planning group recommendations, TWDB developed legislative recommendations on the following issues:

- financing of recommended water management strategies
- reservoir site designation and acquisition
- interbasin transfers of water
- environmental water needs
- water conservation
- expedited amendment process for regional water plans
- indirect reuse

Appendix F

TWDB Policy Recommendations to the Legislature

The specific TWDB legislative policy recommendations are included at the beginning of each issue section below and are followed by a general summary of each issue.

Issue: Financing Water Management Strategies

The legislature should consider appropriating funds to TWDB for debt service to the State Participation and Water Infrastructure Fund programs to fund water management strategies in the 2007 State Water Plan. An initial appropriation of $77.5 million for the 2008-2009 biennium would pay the first two years of debt service on general obligation bonds and grants, ultimately resulting in funding $1.7 billion in projects needed through 2020. The total appropriation needed through 2028 for debt service and grants is $674.6 million.

The legislature should maintain the existing state programs for water and wastewater infrastructure financing in order to provide adequate financial assistance for ongoing compliance with regulatory requirements and ensure Texas continues to access federal funds for water-related infrastructure projects.

Capital costs for recommended water management strategies in the 2007 State Water Plan are about $30.7 billion. Estimates of capital costs include both the direct costs of constructing facilities, such as materials, labor, and equipment, and the indirect expenses associated with construction activities, such as costs for engineering studies, legal counsel, land acquisition, contingencies, environmental mitigation, interest during construction, and permitting fees. Capital costs do not include funds for internal water distribution systems and wastewater infrastructure but only costs associated with getting water supply to a system, which can include cost of treatment plants. To determine the amount of state assistance that would be needed for the $29.3 billion of municipal water supply management strategies in the 2006 Regional Water Plans, the planning groups sent surveys to water providers. Based on the results of those infrastructure financing surveys, the planning groups estimated that $2.1 billion in state financial assistance would be needed between now and 2060. These surveys indicate nearly 91 percent of the $30.7 billion in total cost for implementing the 2007 State Water Plan is anticipated to be provided by local project sponsors through traditional financing mechanisms. However, of the $2.1

billion needed from the state, over $1.7 billion will be needed by 2020. If water management strategies from the 2007 State Water Plan are not implemented, approximately 60 percent of the state's projected population will not have enough water in 2020. Projected shortfalls in 2020 are estimated to be about 4.9 million acre-feet of water.

Factors that contribute to the funding gap and the need for additional state financial assistance include the following:

- *Increasing cost burdens on local water providers and governments*—Municipalities and other entities that provide water and wastewater services in Texas are now facing a more difficult financial future than they have in the past several decades. Over the years, reduced federal support for new capacity and rehabilitation of existing infrastructure are increasing the financial burden on local communities. This increase in responsibility is coming at a time when real interest rates are rising and sources of new water supplies are becoming more scarce and expensive. Moreover, operating and maintenance costs have escalated in recent years due to rising energy costs that place an additional strain on the budgets of local utilities. Population growth also increases the financial burden on local governments for nonwater-related infrastructure, including: new roads, schools, law enforcement, and other public service facilities. These services provide more apparent and highly publicized benefits and jobs for communities when compared to water and wastewater infrastructure projects.
- *Timing issues of implementing large-scale water supply projects*—Without state assistance, many communities may not actively plan and build needed improvements. Under current legal and regulatory requirements, large-scale water supply projects require up to 10 years for planning, permitting, designing, and constructing before water flows through the pipes. Often, local project sponsors are reluctant to approve large capital expenditures for projects that will take many years to realize benefits to the community.
- *Financing constraints in rural, and/or economically disadvantaged communities*—Small, rural, and economically disadvantaged areas in Texas are particularly hard pressed to raise the necessary capital for water projects for a simple reason: ratepayers in these communities lack sufficient income to pay the rate increases required to obtain traditional financing to improve or maintain existing water infrastructure to meet minimum regulatory requirements. These types of communities are far less likely to be able to implement water management strategies that will ensure their water supplies are dependable enough to withstand drought.

TWDB's existing State Participation Program and Water Infrastructure Fund can assist the state in providing financial assistance to fill the gap needed to implement water management strategies that will provide Texas with sufficient quantities of water under drought conditions (Tables 1 and 2, Figure 8). An initial appropriation of $77.5 million for the 2008-2009 biennium would provide grants and loans to construct $929.6 million in projects. Cumulative appropriations of $674.6 million between 2008 and 2028 would result in $1.7 billion in projects. TWDB estimates the investment needed based on a combination of debt service on general obligation bonds and grants to respond to the needs indicated in the Infrastructure Finance Survey for the 2006 Regional Water Plans. This recommendation is consistent with current authorizations in statute and requires appropriations by the legislature.

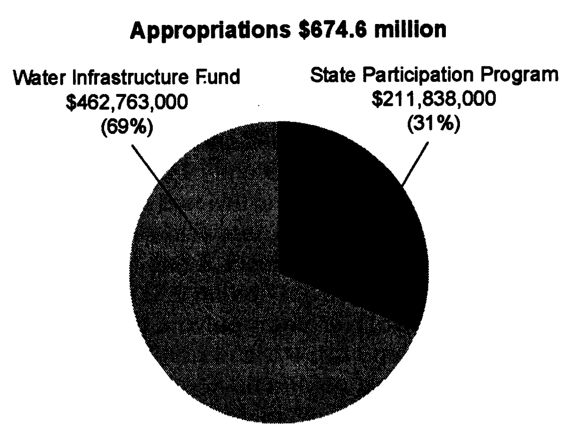


Figure 8. Total appropriations needed for the Water Infrastructure Fund and State Participation Program.

Table 1. Total recommended funding for municipal water supply projects identified in the 2007 State Water Plan (monetary figures reported in millions of dollars)

Fiscal year	2008	2009	Biennium totals	2010-2020	Total (2008-2020)
Funding for project implementation					
Loans and payment deferrals for construction for excess project capacity (State Participation Program)	158.0	158.0	316.0	410.7	726.7
Loans and payment deferrals for construction of nonexcess capacity and support for design and permitting costs and loans for projects that do not meet criteria of the State Participation Program (Water Infrastructure Fund)	352.9	214.0	566.9	355.7	922.6
Grants for economically distressed areas (Water Infrastructure Fund)	9.8	18.1	27.9	0	27.9
Grants and loans for projects in rural areas (Water Infrastructure Fund)	6.6	12.2	18.8	0	18.8
Total	527.3	402.3	929.6	766.4	1,696.0

Table 2. Total recommended appropriations for municipal water supply projects identified in the 2007 State Water Plan (monetary figures reported in millions of dollars)

Fiscal year	2008	2009	Biennium totals	2010-2020	Total (2008-2020)	2021-2028	Grand Total
Projected appropriations							
Loans and payment deferrals for construction for excess project capacity (State Participation Program)	8.1	16.2	24.3	183.1	207.4	4.5	211.9
Loans and payment deferrals for construction of nonexcess capacity and support for design and permitting costs and loans for projects that do not meet criteria of the State Participation Program (Water Infrastructure Fund)	23.2	24.9	48.1	315.6	363.7	27.0	390.7
Grants for economically distressed areas (Water Infrastructure Fund)	0.9	2.5	3.4	27.5	30.9	19.1	50.0
Grants and loans for projects in rural areas (Water Infrastructure Fund)	0.6	1.4	2.0	11.9	13.9	8.1	22.0
Total	32.8	45.0	77.8	538.1	615.9	58.7	674.6

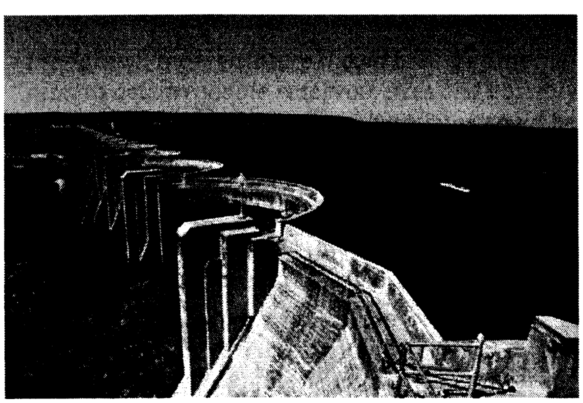
Issue: Reservoir Site Designation and Acquisition

The legislature should designate all remaining viable reservoir sites of unique value for protection under Texas Water Code, Section 16.051(g), that are identified by TWDB and planning groups in the 2006 Regional Water Plans and the 2007 State Water Plan. The legislature should also designate any other feasible sites needed beyond the 50-year regional and state water planning horizon identified by TWDB-funded research currently in progress.

The legislature should designate all river or stream segments of unique ecological value recommended in the 2006 Regional Water Plans and the 2007 State Water Plan for protection under Texas Water Code, Section 16.051(f).

In addition, the legislature should provide a mechanism to acquire viable reservoir sites and possibly associated mitigation areas. These sites could be used to develop additional surface water supplies to meet the future water supply needs identified in the 2006 Regional Water Plans and those that will occur beyond the 50-year planning horizon.

Reservoir construction in Texas was most prolific before 1970. By 1950, Texas had constructed approximately 60 major reservoirs (5,000 acre-feet or greater of conservation storage capacity). Between 1950 and 1980, the number grew to a total of 179, but the pace of construction began to slow in the 1970s and continued the downward trend through the remainder of the 20th century. The reduced number of potentially high-quality reservoir sites, environmental issues or concerns, and increasing costs of reservoir development all contributed to the slow down. Texas currently has 196 major reservoirs. Ten reservoirs that were able to hold more than 5,000 acre-feet of water at conservation pool elevation upon initial impoundment are now no longer able to due to sedimentation and are currently classified as minor reservoirs.



Over time, Texas' state water plans have reflected this slowdown in reservoir development. The 1984 State Water Plan identified 65 major reservoir sites and allocated water from 44 of the new reservoirs to meet needs through 2030. The 1990 State Water Plan included 20 new reservoirs. In contrast, the 1997 and 2002 State Water Plans each recommended only eight major reservoirs to meet needs for additional water supplies through 2050. Major reservoir projects absolutely must remain a strong and viable tool in our water development toolbox if the state is to meet its future water supply needs. Recognizing this, planning groups have recommended 14 new major reservoirs as water management strategies in their 2006 Regional Water Plans to meet future water supply needs (Figure 9).

A number of factors will determine whether or not the major reservoirs recommended in the 2006 Regional Water Plans will actually be developed. One of the primary factors involves the reservoir site itself and the manner in which the state addresses issues associated with preserving the viability of the reservoir site for future reservoir construction purposes.

Certain governmental actions, such as developing public utility infrastructure or actions by federal, state, or local governments to protect natural ecosystems located within the reservoir footprint can significantly impact the viability of a site for future construction of a proposed reservoir. The proposed Waters Bluff Reservoir on the main stem of the Sabine River was prevented in 1986 by the establishment of a private conservation easement. In addition, the proposed Lake Fastrill, which is included in the 2006 Region C Water Plan and the 2007 State Water Plan as a recommended water management strategy to meet the future water supply needs of the city of Dallas, is a current and significant case in point. Land located within the reservoir's footprint is also included within the recently designated Neches River National Wildlife Refuge. If the designation of the Neches River National Wildlife Refuge by the U.S. Fish and Wildlife Service prevails in any legal challenges, it

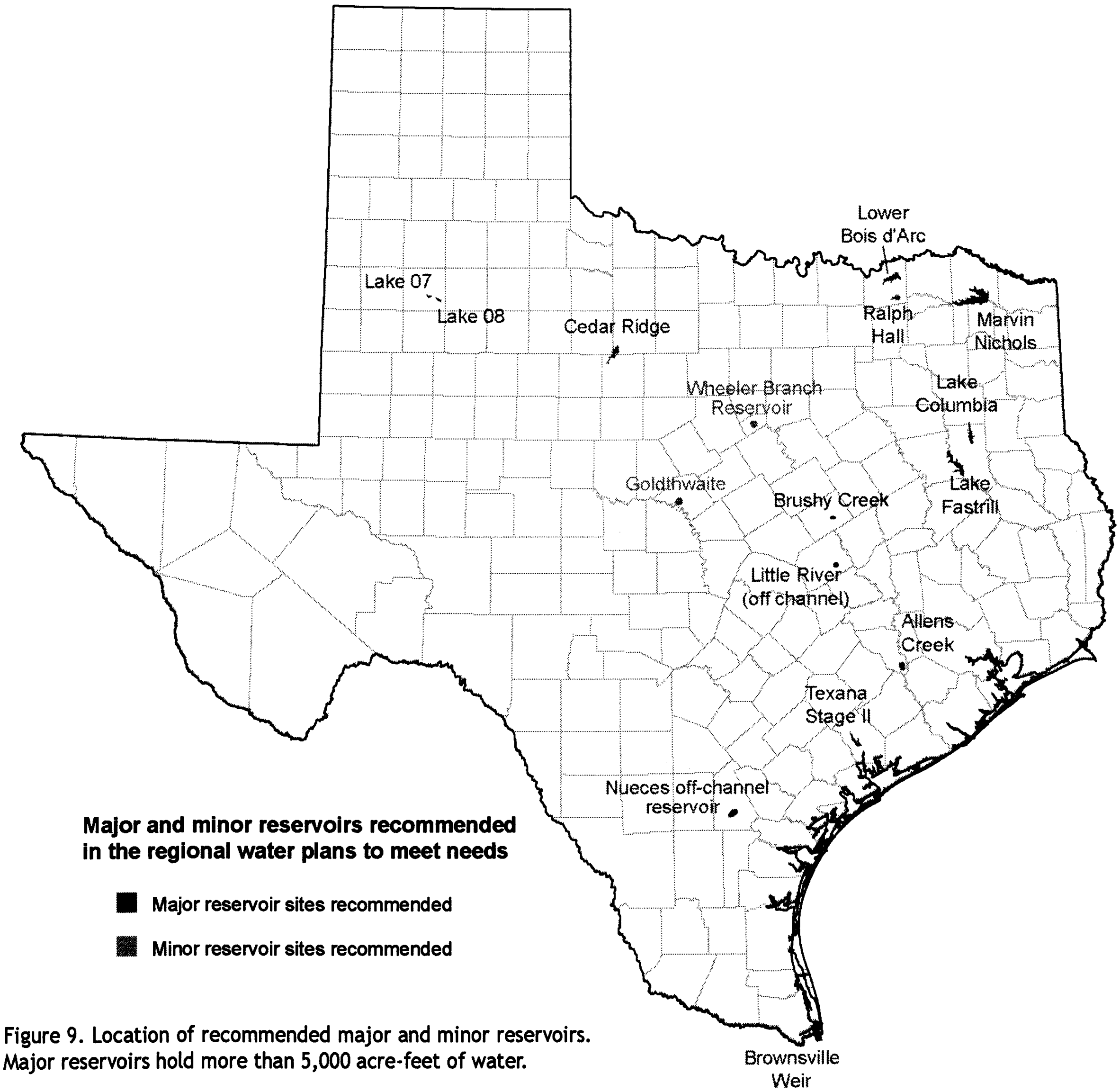
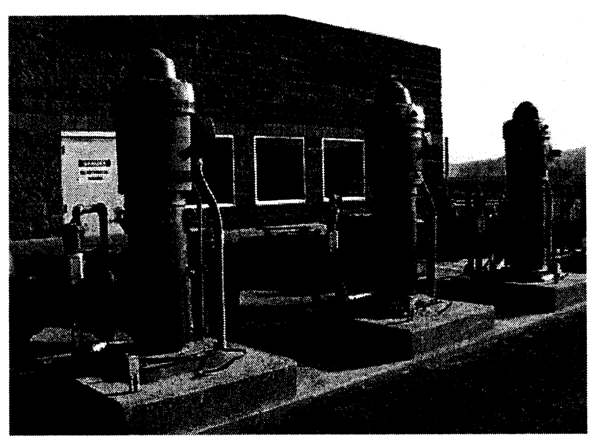


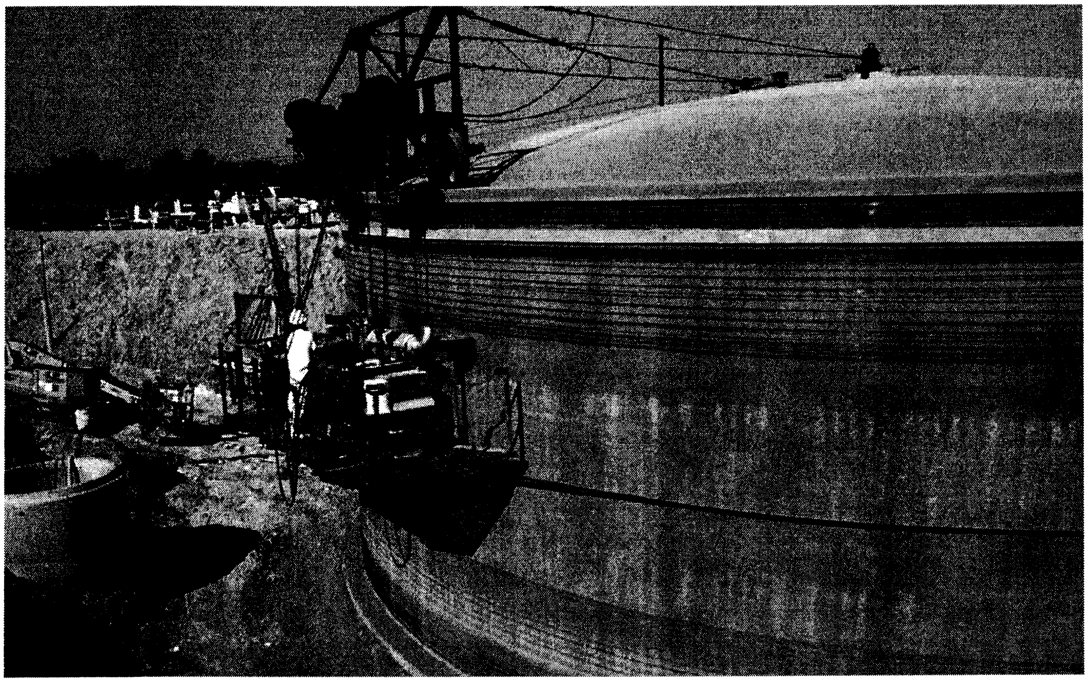
Figure 9. Location of recommended major and minor reservoirs. Major reservoirs hold more than 5,000 acre-feet of water.

would effectively preclude future use of the site for the proposed Lake Fastrill.

Lack of action by the state legislature in protecting reservoir sites has been cited as a problem in precluding federal actions that would otherwise be considered as circumventing the state's primacy over water in the state.

On April 17, 2006, TWDB approved a contract for a research project that will review the potential viability of reservoir projects that have been identified and/or recommended in the past 40 years of state, regional, and local water planning. The major





objective of this research, which is scheduled to be completed by December 1, 2006, will be to identify the remaining viable reservoir sites in the state that are most suitable for protection and/or acquisition.

Designation of Sites of Unique Value for Reservoir Construction

Texas Water Code, Sections 16.051(e) and 16.053(e)(6), provide that state and regional water plans shall identify any sites of unique value for constructing reservoirs that the planning groups or TWDB recommend for protection. Texas Water Code, Section 16.051(g) provides for legislative designation of sites of unique value for the construction of a reservoir. By statute, this designation means that a state agency or political subdivision of the state may not obtain a fee title or an easement that would significantly prevent the construction of a reservoir on a designated site.

Designation by the Texas Legislature provides a limited but important measure of protection of proposed reservoir sites for future development. Issues may arise regarding the level of protection legislative designation provides vis-à-vis certain federal actions. In addition, Texas Water Code, Sections 16.051(e) and 16.053(e)(6), also provide that state and regional water plans shall identify river and stream segments of unique ecological value that the planning groups or TWDB recommend for protection. Texas Water Code, 16.051(f), also provides for legislative designation of river or stream segments of unique ecological value. By statute, this designation means that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in a specific river or stream segment that the legislature has designated as having unique ecological value.

In some areas of the state, protecting critical habitats by designating river or stream segments of unique ecological value may be in competition with water supply projects. As previously noted, the legislature may designate ecologically unique river and stream segments and also unique sites for reservoir construction. A stream segment with significant bottomland hardwoods, for instance, may be eligible for either designation. It was suggested in the 2002 State Water Plan that these designation processes could be linked to protect certain ecologically unique stream segments as habitat mitigation areas associated with specific water supply projects, thus creating a balanced outcome.

There are 19 recommended unique reservoir sites (Figure 10) and 15 recommended unique

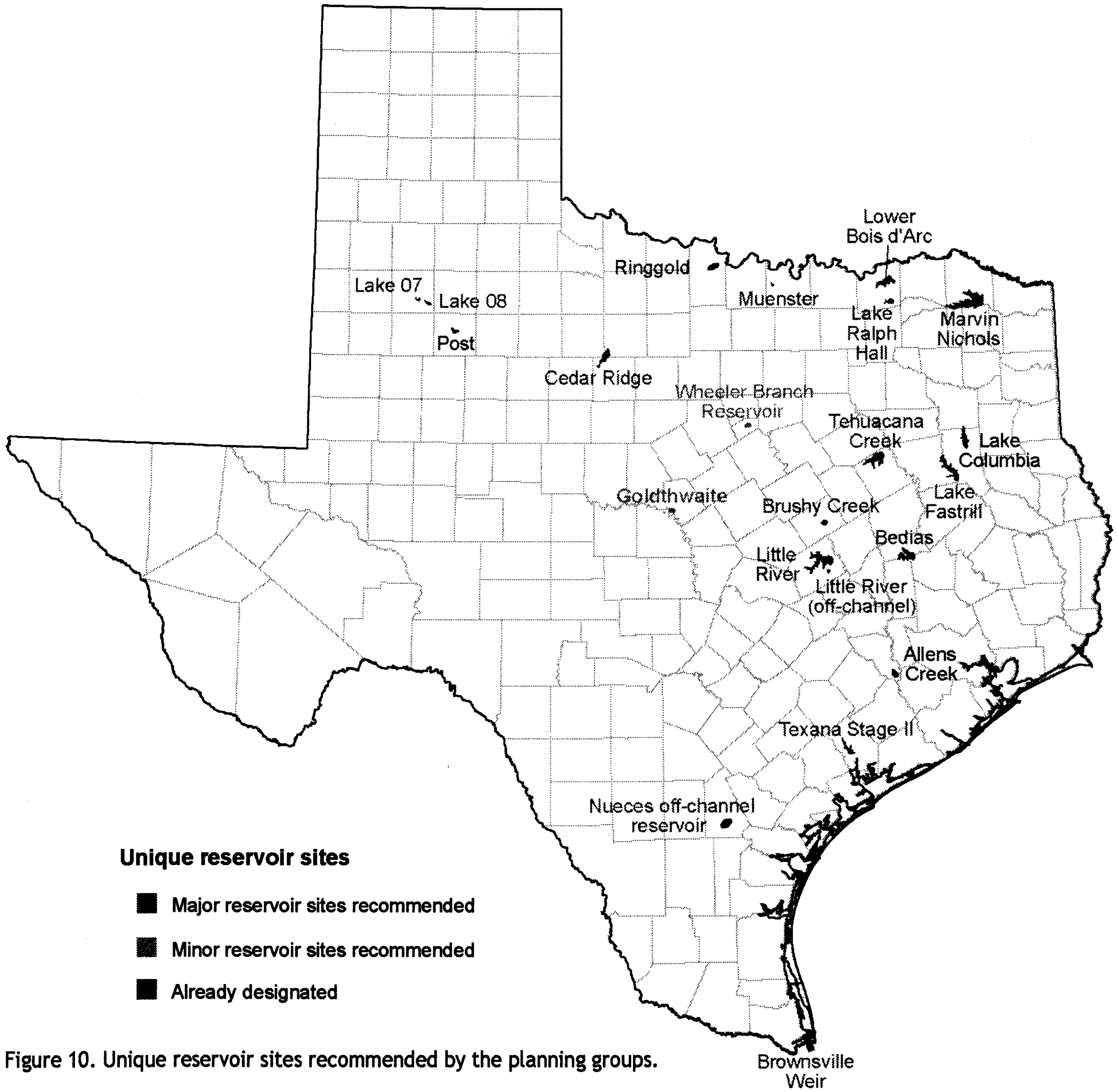


Figure 10. Unique reservoir sites recommended by the planning groups.

stream segments. Seven of the unique stream segments are for Region E (Figure 11), and eight are for Region H (Figure 12).

Aquisition and Protection of Land for Future Development of Surface Water Supplies

In the 1984 State Water Plan, the Texas Department of Water Resources recommended a number of integrated actions to protect suitable sites for future reservoir development, including the following:

- Creation by the legislature of a State Reservoir Site Development Easement System to provide the Texas Department of Water Resources with limited eminent domain power for the purpose of restricting certain land uses that would preclude reservoir construction within sites designated as suitable for reservoir development
- Creation by the legislature of a Reservoir Site Acquisition Fund to be administered by TWDB for the purpose of preserving future reservoir sites

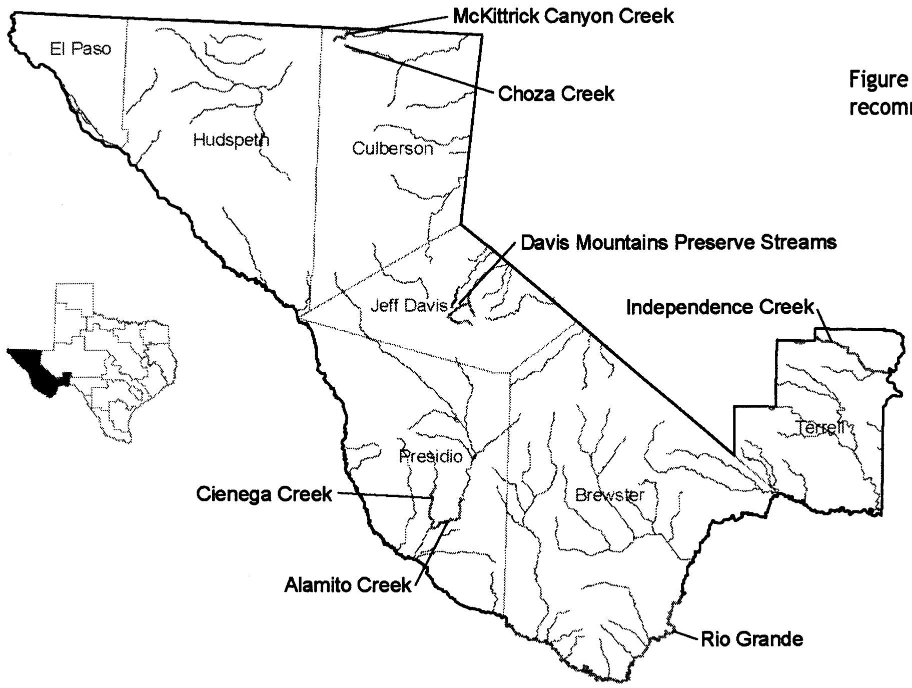


Figure 11. Unique stream segments recommended by Region E.

- Appropriation by the legislature of $100 million in each successive biennium to the Reservoir Site Acquisition Fund to compensate landowners for easements and land options to secure lands for reservoir site preservation

In its discussion of these recommended actions, the 1984 State Water Plan recognized that implementation will directly impact the traditional emphasis upon protection of rights of landowners in areas outside of municipalities. It also recognized that the proposed actions must include proper mechanisms for reservoir site designation and preservation and ways to mitigate the local tax effects of such actions. Also, it is noted that between the time a reservoir site is selected and construction is initiated, the value of land and improvements escalate due to market forces and that protecting reservoir sites from commercial development and inordinate price increases will require new legal and public policy approaches. In a broad context, the 1984 State Water Plan recommendations and discussion of issues related to the preservation of reservoir sites continue to be relevant.

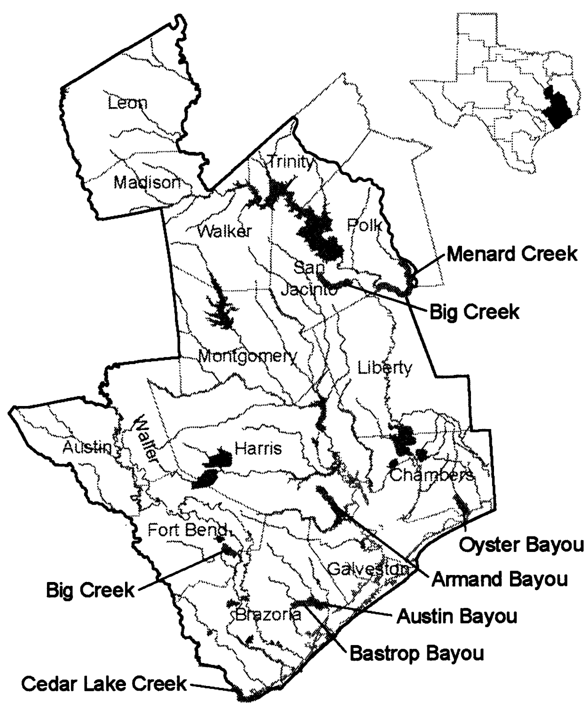


Figure 12. Unique stream segments recommended by Region H.

Texas Water Code, Chapter 15, Subchapter E, contains provisions for a Storage Acquisition Program to be administered by TWDB These provisions, enacted into law primarily by the 67th Texas Legislature (1981) and 69th Texas Legislature (1985), established a Storage Acquisition Fund and authorized TWDB to use the fund for certain projects including the design, acquisition, lease, construction, reconstruction, development, or enlargement in whole or part of any existing or proposed water storage project.

Texas Water Code, Chapter 16, Subchapter E, contains provisions authorizing TWDB to use the State Participation Program to encourage optimum regional development of projects, including the design, acquisition, lease, construction, reconstruction, development, or enlargement in whole or part of reservoirs and other projects. A recent example of TWDB's use of state participation authorization for this purpose was its approval in 2004 of $10 million in financial assistance to the Angelina and Neches River Authority to develop an environmental impact survey on and to purchase most of the fee title land necessary to build Lake Columbia in Cherokee County.

Prior to using the Storage Acquisition Fund (Texas Water Code, Chapter 15) and State Participation Program (Texas Water Code, Chapter 16) for eligible projects, TWDB is required by statute to determine that the state can reasonably expect to recover its investment in the project.

Issue: Interbasin Transfers of Surface Water

The legislature should provide statutory provisions that eliminate unreasonable restrictions on the voluntary transfer of surface water from one basin to another.

Interbasin transfers of surface water have been an important, efficient, and effective means of meeting the diverse water supply needs of an ever-increasing population in Texas. According to Texas Commission on Environmental Quality data, there have been approximately 193 interbasin transfer permits issued either for existing or planned water supply projects. These interbasin transfers are, or will be, used to meet a wide variety of water demands, including municipal, manufacturing, steam-electric power generation, and irrigated agriculture demands.

Both the historical and current importance of interbasin transfers across the state is illustrated by the interbasin transfer of water from Lake Meredith in the Canadian River Basin to 11 cities in the Canadian, Brazos, and Colorado river basins on the High Plains of Texas. Since the original delivery of water from Lake Meredith on April 1, 1968, by the Canadian River Municipal Water Authority, this project has served as the primary source of water supply for Amarillo, Brownfield, Borger, Lamesa, Levelland, Lubbock, O'Donnell, Pampa, Plainview, Slaton, and Tahoka. Without this project, local groundwater supplies from the Ogallala Aquifer, in many cases already severely depleted, would not have been able to meet the increasing municipal and manufacturing demands of the region.

Prior to the passage of Senate Bill 1, 75th Legislative Session (1997), Texas Water Code, Section 11.085, was entitled Interwatershed Transfers and contained the following provisions:

- Prohibited transfers of water from one watershed to another to the prejudice of any person or property within the watershed from which the water is taken
- Required a permit from the Texas Commission on Environmental Quality to move water from one watershed to another
- Required the Texas Commission on Environmental Quality to hold hearings to determine any rights that might be affected by a proposed interwatershed transfer
- Prescribed civil penalties for violations of these statutory requirements

In Senate Bill 1, 75th Legislative Session, Texas Water Code, Section 11.085, was amended to replace the above provisions with significantly expanded requirements for obtaining an interbasin transfer authorization. Since the amendments to the Texas Water Code requirements for interbasin transfers in 1997, there has been a significant drop in the amount of interbasin transfer authorizations issued. According to Texas Commission on Environmental Quality

data, only two interbasin transfer authorizations that were subject to those provisions have been granted since the passage of Senate Bill 1 in 1997. There has been a significant amount of public discussion about whether the 1997 amendments to Texas Water Code, Section 11.085, have had a negative effect on issuing interbasin transfer authorizations.

Issue: Environmental Water Needs

The legislature should enact statutory provisions similar to those in Article 1, House Committee Substitute Senate Bill 3, 79th Legislative Session considering recommendations from the Environmental Flows Advisory Committee, in light of the importance of balancing human water needs with the needs for instream flows and bay and estuary freshwater inflows and the need for greater certainty in water right permitting.

Debate continues in the state as to how much and by what means water should be provided to the environment for instream flows and freshwater inflows to bays and estuaries. It is important for water planners and surface water right permit applicants to have greater certainty or predictability in how environmental flow conditions will be determined in the water right permitting process. The state, through TWDB, the Texas Commission on Environmental Quality, and the Texas Parks and Wildlife Department, has studied the environmental inflow needs for bays and estuaries since 1977. However, the results of those studies have not obtained widespread acceptance and are not readily incorporated into the water right permitting and regional water planning processes. In addition, these agen-

cies were directed by the 77th Legislature to conduct priority instream flow studies, resulting in the Texas Instream Flows Program that is currently in progress, ultimately diverting resources away from the agencies' bay and estuary studies.

In 2003, the Study Commission on Water for Environmental Flows was created by the legislature to evaluate options for providing adequate environmental flows (Senate Bill 1639, 78th Legislative Session). This commission issued a report in 2004, which was the basis for environmental flow legislation proposed in Article 1, Senate Bill 3, 79th Legislative Session. That legislation proposed a basin-specific, consensus-based process to recommend environmental flow regimes that would be incorporated into an environmental flow standard through rulemaking by the Texas Commission on Environmental Quality. The recommended flow regimes would also be considered in future water right permit applications. In addition, the Texas Commission on Environmental Quality would establish an amount of water that would be set aside for the environment through rulemaking. In the event of an emergency, the Texas Commission on Environmental Quality could temporarily make available any environmental flow set aside for other beneficial uses. Applications for new water issued prior to Texas Commission on Environmental Quality's rulemaking for environmental flow standards and set aside in the applicable basin would contain provisions to adjust any environmental flow condition by 12.5 percent. The legislation authorized TWDB to use the Research and Planning Fund of the Water Assistance Fund to cover certain administrative and technical assistance costs associated with science advisory and stakeholder activities.

At the conclusion of the 79th Legislative Session, however, Senate Bill 3 did not pass. In October 2005, Governor Perry issued an

Executive Order creating the Environmental Flows Advisory Committee and appointed members to the committee in February 2006. The committee was charged with developing recommendations to establish a process that will achieve a consensus-based, regional approach to integrate environmental flow protection with flows for human needs.

Issue: Water Conservation

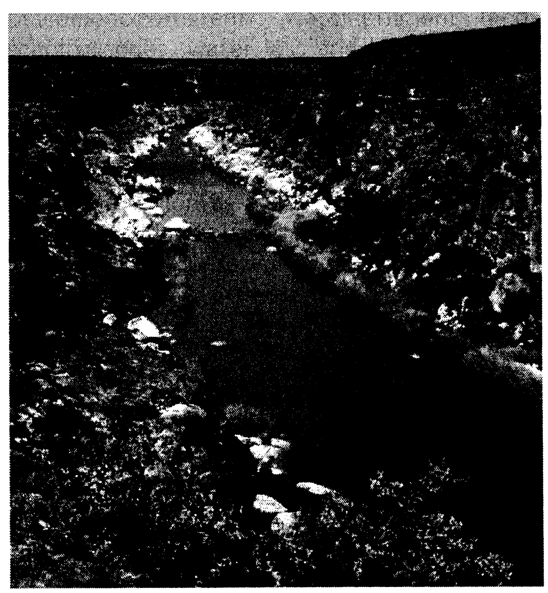
The legislature should review the Water Conservation Implementation Task Force recommendations and implement those that will result in optimal levels of water use efficiency and water conservation for the citizens of Texas.

In 2001, Senate Bill 2, the 77th Texas Legislature emphasized the importance of water conservation as a water management strategy. This legislation requires that planning groups consider water conservation practices for each need identified for a water user group. A comparison of the 2007 State Water Plan to the 2002 State Water Plan shows the growing importance of water conservation in Texas. For example, recommended water management strategies for conservation in the 2002 State Water Plan generated 14 percent of the water needed to meet the state's needs in 2050—a total of about 990,000 acre-feet per year. In the 2007 State Water Plan, conservation accounts for nearly 23 percent of required water in 2060—a total of about 2 million acre-feet. These figures represent "active conservation," measures usually initiated by water utilities, individual businesses, residential water consumers, and agricultural producers to reduce water consumption. In the 2006 Regional Water Plans, 14 of the 16 planning groups included some water conservation strategies to meet needs, and 13 of the 16 planning groups included policy recommendations concerning water conservation.

In 2003, the 78th Texas Legislature considered a broad spectrum of issues related to water conservation and established the Water Conservation Implementation Task Force via passage of Senate Bill 1094. The task force was created to review, evaluate, and recommend optimum levels of water use efficiency and conservation for the state. The task force also developed a Best Management Practices Guide consisting of 21 municipal, 14 industrial, and 20 agricultural water conservation best management practices. The practices contained in the Best Management Practices Guide are voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and can be implemented within a specified timeframe.

Municipal water conservation strategies in the 2006 Regional Water Plans relied heavily on the Water Conservation Implementation Task Force's Best Management Practices Guide and included aggressive plumbing fixture replacement programs, water-efficient landscaping codes, water loss and leak detection programs, education and public awareness programs, rainwater harvesting, and changes in water rate structures. Fourteen of the 16 planning groups recommended municipal water conservation as a potential way to meet future municipal water needs. In total, municipal water conservation strategies constitute nearly 617,000 acre-feet (7 percent) of water generated by all recommend strategies by 2060.

Twelve of the 16 planning groups recommended agricultural water conservation as water management strategies to meet water needs. In total, irrigation conservation strategies would generate nearly 1.4 million acre-feet of water in 2060, which equals about 15 percent of water generated by all recommend strategies by 2060. The planning groups also relied heavily on the Best Management Practices Guide to identify strategies that include the following:



- Irrigation water use management, such as irrigation scheduling, volumetric measurement of water use, crop residue management, conservation tillage, and on-farm irrigation audits
- Land management systems, including furrow dikes, land leveling, conversion from irrigated to dry land farming, and brush control/management
- On-farm delivery systems, such as lining of farm ditches, low pressure center pivot sprinkler systems, drip/micro irrigation systems, surge flow irrigation, and linear move sprinkler systems
- Water district delivery systems, including lining of district irrigation canals, replacement of irrigation district and lateral canals with pipelines
- Miscellaneous systems, such as water recovery and reuse

In addition to identifying specific water conservation best management practices as municipal and agricultural water management strategies to meet needs, many of the planning groups recognized that individual water user groups may adopt additional best management practices that were not selected as strategies in the regional water plans.

The task force made 25 recommendations that will greatly enhance the ability and desire of Texans to implement water conservation strategies to meet their water supply needs. These recommendations are summarized below:

1. Consider best management practices to be voluntary measures only
2. Create and fund a statewide water conservation public awareness campaign

3. Provide regional water conservation coordinators to planning groups
4. Establish a public recognition program for water conservation efforts
5. Provide grant funding for innovative water conservation programs
6. Provide cost-share funding for on-farm agricultural water conservation best management practices
7. Continue funding the state brush control program
8. Develop a standard methodology to calculate gallons per capita per day water use
9. Adopt the task force's recommended targets and goals for water conservation
10. Encourage planning groups to consider recommending water conservation water management strategies to meet any identified water supply need
11. Require water conservation as a criteria for state funding and provide for enforcement of entities that fail to adopt a water conservation plan or conduct required reporting on water conservation efforts
12. Create a water conservation advisory council to advise on water conservation matters
13. Develop a database for cataloging and tracking water conservation plans
14. Establish performance standards for toilet retrofits
15. Establish a water management resource library
16. Continue funding state water conservation programs
17. Continue funding for state water conservation research and education programs
18. Endorse land stewardship as a water conservation strategy
19. Study the impacts, if any, of "take-or-pay" contracts on water conservation efforts
20. Expand funding of Texas A&M University's potential evapotranspiration network
21. Coordinate state requirements for water conservation and distribution system capacities
22. Provide protection from cancellation of water rights due to water conservation efforts
23. Conduct "end-use" studies of residential water demand
24. Provide funding assistance to bridge gaps in water conservation resources
25. Provide additional funding for water use data

Three of the recommendations (7, 16, and 17) request continued funding of existing programs. Eight of the recommendations (3, 4, 6, 13, 15, 20, 23, and 25) require new or additional funding from the legislature for implementation. Thirteen of the recommendations (1, 2, 5, 8, 9, 11, 12, 14, 18, 19, 21, 22, and 24) require legislation and, in most cases, funding for implementation.

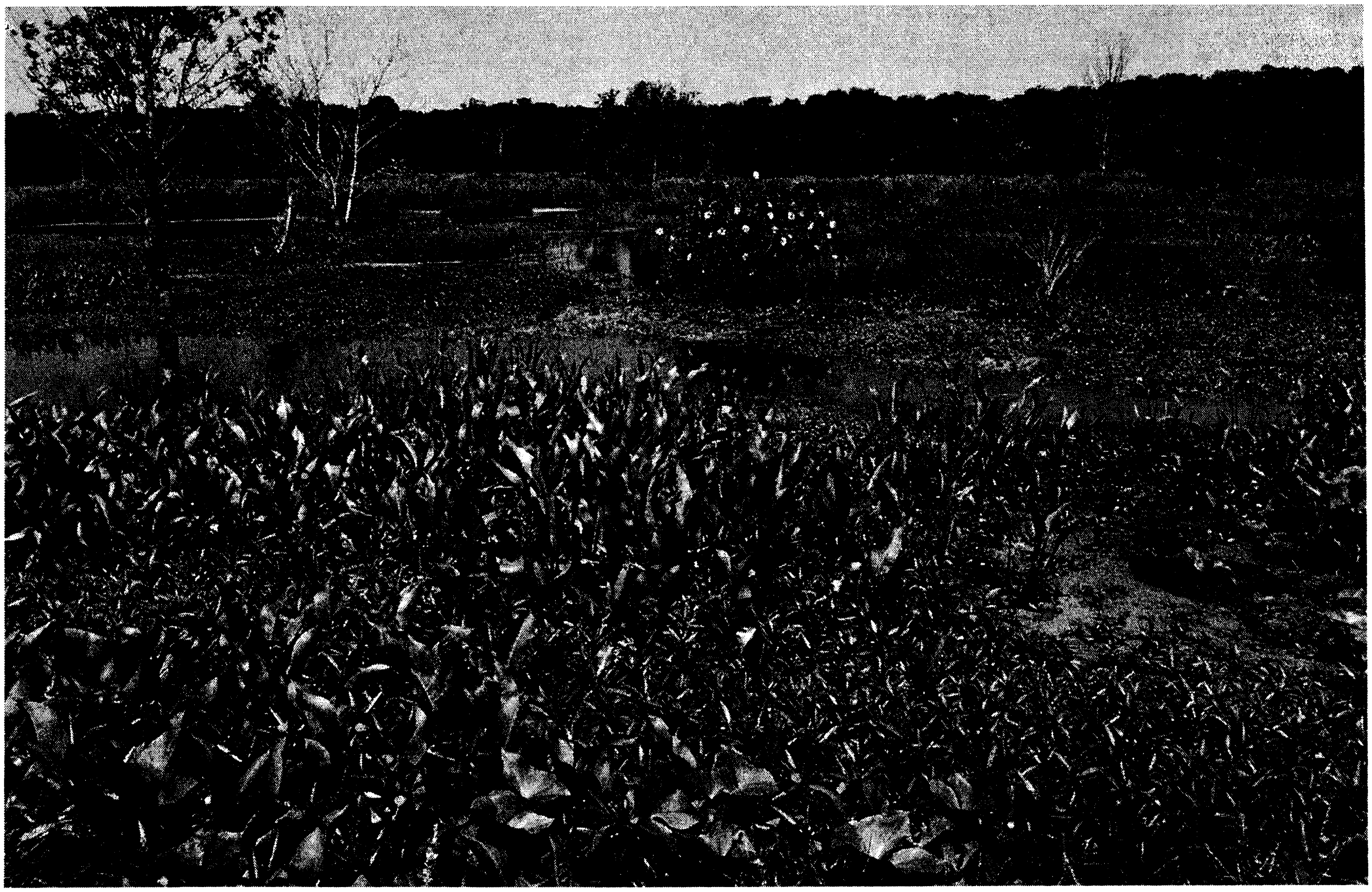
The task force recognized a need for promoting public awareness of water conservation issues (Recommendation 2) and recommended implementing a program that will focus on delivering a simple, enduring, universal water awareness message. The main goal of the program is to promote the importance and relevance of water conservation to all Texans and to strive to make all Texans aware that their natural water resources are limited and not immune to consequences of individual behavior. In 2004, TWDB contracted with consultants to conduct research to develop a market strategy and brand for a possible statewide water conservation public awareness program. The project was funded by a voluntary coalition of 36 water utilities, municipalities, businesses, and conservation groups.

Data from the 2004 study showed that only 28 percent of Texans "definitely know" the natural source of their drinking water. The research also showed a strong correlation between knowledge of water sources and willingness to conserve. As part of the study, 11 logo and tagline variations were tested in focus groups in five cities: El Paso, Laredo, Houston, Dallas, and Lubbock. "Water IQ: Know Your Water" rose to the top as an effective brand because "it challenges you to think" and can be tailored with local information and informative tips. "Water IQ" also resonated with Spanish-speaking Texans with the tagline "Conozca Tu Agua."

Because of local drought impacts, four significant regional water providers and one groundwater conservation district have embraced the "Water IQ" campaign concept and are currently implementing pilot projects to establish a "Water IQ" awareness in their service areas. Their efforts will contribute print ads, public service announcements, and television spots that can be used in developing a statewide program. To date, the North Texas Municipal Water District, the Lower Colorado River Authority with the City of Austin, and the City of Lubbock with the High Plains Underground Water Conservation District have implemented their pilot projects.

In the 79th Texas Legislature, House Bill 1224 provided for implementing recommendation 19 by requiring TWDB to conduct a research study of the impacts of "take-or-pay" contracts on water conservation efforts. House Bill 1225 addressed recommendation 22 by protecting water rights from cancellation due to nonuse associated with water conservation. The 79th Legislature approved funding to continue to partially address recommendations 7, 16, and 17. In addition, due to efforts of individuals and local and regional water providers, recommendation 2, the conservation public awareness program, has been initiated in various locations.

House Bill 1226 and Senate Bill 3, 79th Legislative Session, did not pass into law; however, one or both of them contained statutory provisions that would have implemented recommendations 1, 2, 3, 5, 11, 12, and 18. Other



bills that did not pass would have implemented recommendation 14 (House Bill 1223) and recommendation 15 (Senate Bill 961). In the First Special Session of the 79th Legislature, House Bill 79 and Senate Bill 57 addressed recommendations 1, 2, 11, and 18 but did not pass.

Issue: Expedited Amendment Process

The legislature should provide statutory authority in Texas Water Code, Section 16.053, to allow for an expedited process for minor amendments to regional water plans where TWDB's Executive Administrator determines the amendment will not result in over-allocation of a source, is not related to a new reservoir, and does not have a significant impact on instream flows or freshwater inflows to bays and estuaries.

Texas Water Code, Section 16.053, requires that water supply projects meet needs in a manner consistent with the state water plan and an approved regional water plan to qualify for state financial assistance. In addition, Texas Water Code, Section 11.134, requires that proposed water appropriations address water supply needs in a manner consistent with state and regional water plans to receive a water right permit from the Texas Commission on Environmental Quality. In the event an applicant's project does not meet needs in a manner consistent with the state and regional water plans, the applicant must seek an amendment of the appropriate regional water plan and the state water plan or seek a waiver of this requirement. Such amendments can be costly and time-consuming because of the following requirements relating to amendments:

- 60 days notice and comment period prior to amending their plan
- Notice must be provided to each municipality greater than 1,000 population, each county judge, each river authority or special law district, each retail public utility, and each surface water right holder
- Notice must be published in a newspaper of general circulation in each county located in whole or in part in the regional water planning area
- A public hearing on the proposed amendment must be conducted to obtain public comments

This recommendation for an expedited amendment process would result in the following requirements for adopting minor amendments to regional water plans:

- Two weeks notice, posted in a place readily accessible to the general public, of the public meeting at which the amendment will be considered, similar to notice of a regular planning group meeting
- Consideration of public comments by the planning group at their public meeting where the amendment is being considered

Issue: Indirect Reuse

The legislature should develop policy in response to the following questions identified by the Texas Water Conservation Association's Reuse Committee:

(1) Under current law, is the use of wastewater effluent after discharge to a stream a use of "state water" subject to the laws of prior appropriation or is it subject to a different regulatory scheme?

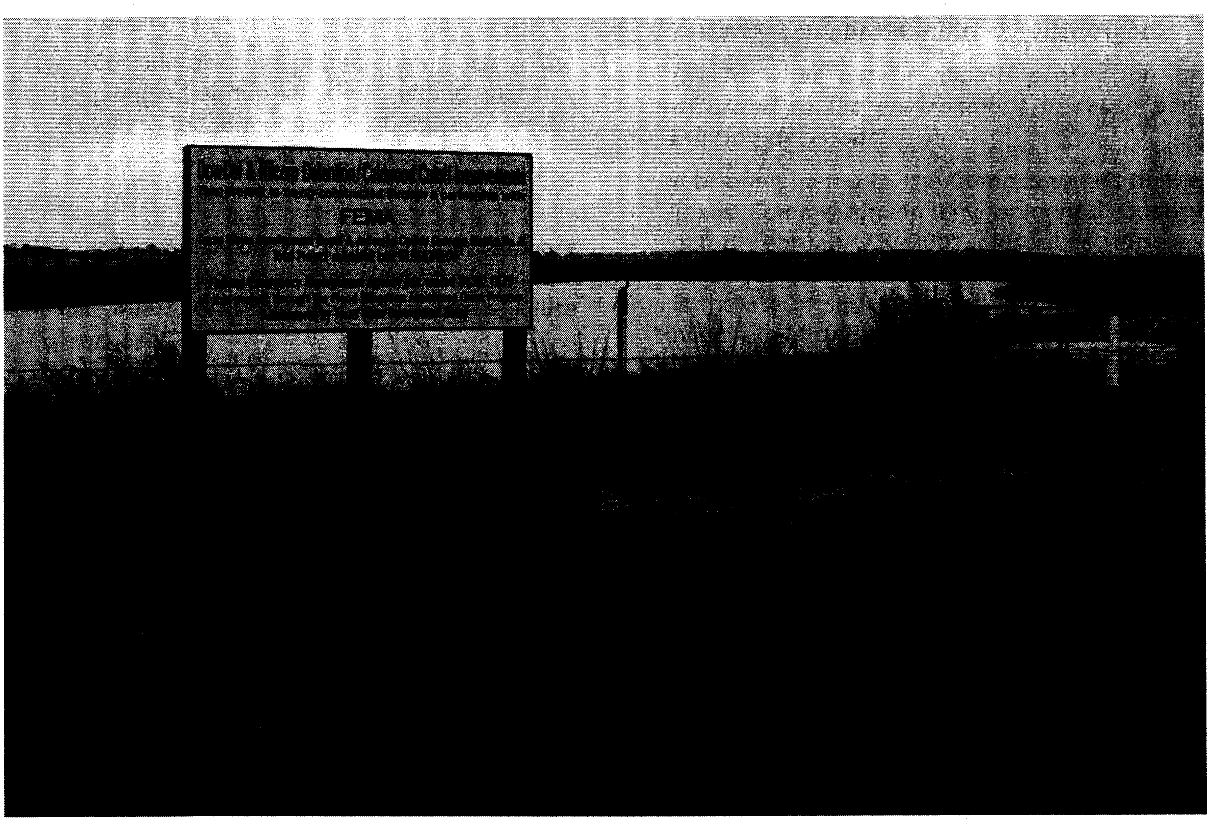
(2) Does current law allow effluent derived from different sources of water to be treated differently for purposes of evaluating a request to reuse this effluent?

(3) Does current law provide for different treatment of effluent derived from "future" and "existing" return flows, regardless of the source?

(4) Who can obtain indirect reuse rights?

(5) To what extent should protection be afforded to the environment in reuse permitting decisions?

A briefing memo to the Commissioners of the Texas Commission on Environmental Quality dated February 25, 2005, describes reuse as follows: "In water rights permitting, 'reuse' is the use of surface water which has already been beneficially used once under a water right, or the use of groundwater which has been used," 30 Texas Administrative Code §297.1(44). There are two types of reuse: indirect reuse and direct reuse. Indirect reuse is the reuse of water, usually effluent, which is placed back into a river or stream. This generally occurs when a wastewater treatment plant discharges effluent into a stream and either the discharger or another person or entity diverts the effluent further downstream

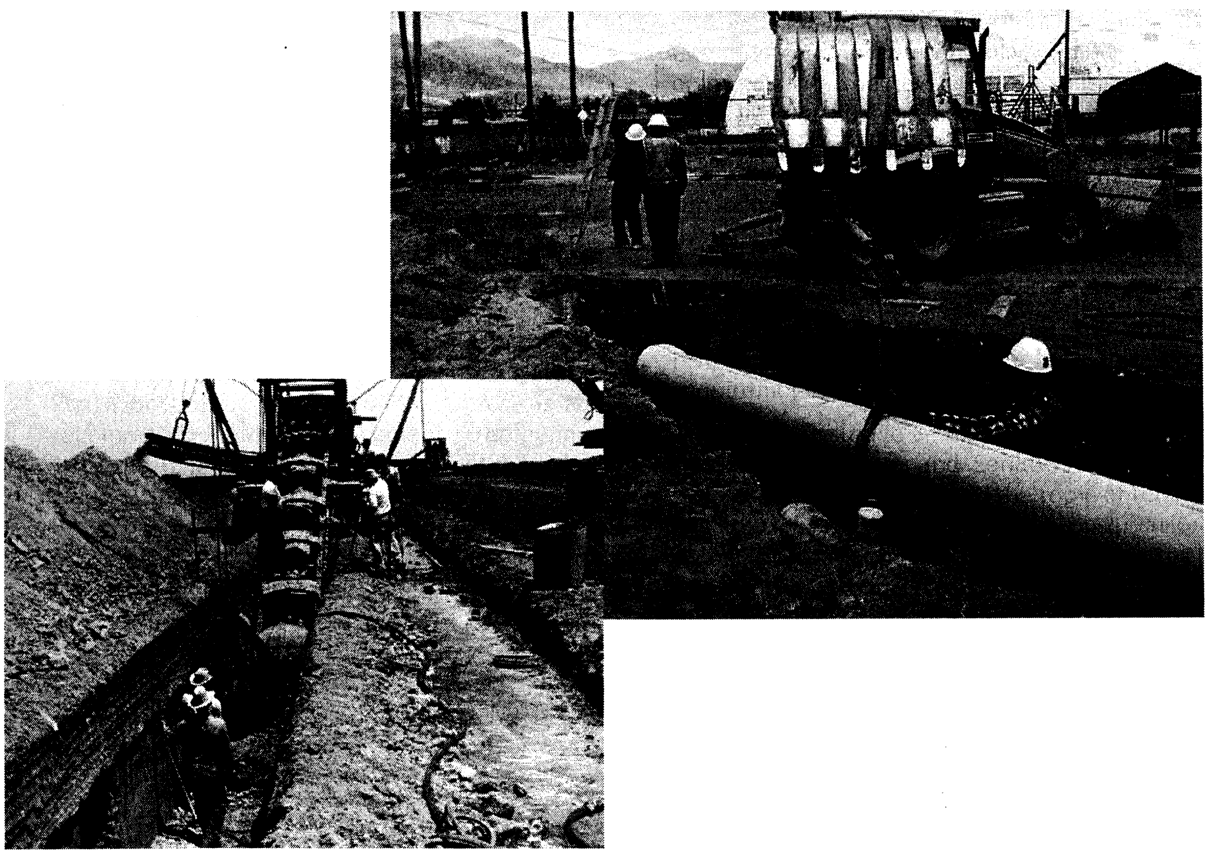


to use again. In contrast, direct reuse occurs when effluent from a wastewater treatment plant is piped directly to a place where it is used.

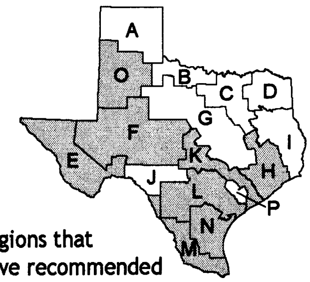
Historically, much of the effluent from wastewater treatment plants was returned to the rivers or streams of the state. Some of the water rights in this state have been permitted based on the existence of treated effluent in the rivers and streams. In addition, a portion of the effluent that has been discharged into rivers and streams has been available to the environment. Increasingly, there is interest in reusing this effluent to meet increasing water supply needs. In the 2006 Regional Water Plans, both direct and/or indirect reuse is a recommended water management strategy in 14 of the 16 plans. These recommendations include a total of 1.3 million acre-feet of supply by 2060 which includes approximately 416,000 acre-feet from direct reuse and 846,000 acre-feet from indirect reuse.

In permitting indirect reuse through a bed and banks authorization from the Texas Commission on Environmental Quality, several issues arise related to the existing Texas Commission on Environmental Quality rules or the statute. Some of these issues include: what type of analysis is required for bed and banks permits; should the indirect reuse of groundwater have the same requirements as for indirect reuse of surface water; does the owner of the water right, the entity that has contracted to purchase water and treated the wastewater, or other parties have the right to apply for a bed and banks permit; and should historically discharged effluent have the same requirements as future discharges?

The 80th Legislative Session's interim charges for both the House and Senate Natural Resources Committees include the topic of reuse. In addition, the Texas Water Conservation Association has appointed a Reuse Committee, which prepared a report titled "Texas Water Rights and Wastewater Reuse" (See Appendix).



New Water from Desalination



Regions that have recommended water management strategies for desalination.

Freshwater in Texas is limited—there is only so much rainfall and fresh surface water and groundwater to go around. With the population of Texas expected to reach almost 46 million by 2060, it will not be enough to simply identify new sources of fresh water. Texas needs new water. Desalination—the process of turning saline water into freshwater—is the only current technology that promises to deliver substantial amounts of new, drought-proof water.

Because of its location, desalination is ready made for Texas. The state has 367 miles of coastline bordering the Gulf of Mexico, which is a limitless supply of saline water. Even people deep in the heart of Texas can benefit from desalination: there is an ocean of saline water, called brackish groundwater, hidden in the ground—2.7 billion acre-feet worth.

Desalination has been around for decades, but only recently has become affordable on a large scale—and Texas is leading the way. Governor Perry, recognizing the importance of desalination to the future of Texas, directed TWDB to develop a large-scale demonstration seawater desalination project. The Texas Legislature supported these efforts by providing funding for feasibility and pilot plant studies for Brownsville, Corpus Christi, and Freeport. The legislature also provided funding for brackish groundwater desalination demonstration projects, which was awarded to the North Cameron Regional Water Supply Corporation and the cities of Kenedy and San Angelo. The El Paso-Fort Bliss Brackish Desalination Project currently under construction shows great promise and, when completed, will be the largest inland desalination plant in the world. In the current regional water plans, eight of the 16 planning groups included desalination projects as recommended water management strategies to meet water supply needs.

Desalination is not without challenges. Disposal of the concentrate—the salty waste product of the desalination process—can be expensive and have environmental consequences. High energy costs affect the cost of desalinated water. Predicting the long-term ability of brackish groundwater aquifers to produce water is difficult because there is a lack of information on these aquifers. Permitting desalination plants and the disposal of concentrate can be challenging. However, TWDB and others are working to address these economic, policy, and scientific challenges.

Over the last five years, Texas has made great strides toward delivering on the promise of desalination. Today, Texas is recognized as a national and world leader in this important technology.

HOW TO USE THE STATE WATER PLAN

The 2007 State Water Plan has three volumes, each representing a different tier or level of detail.

Volume 1 is an executive summary to provide a basic overview of the plan with major highlights and the TWDB's policy recommendations. Volume I summarizes information at the state level.

Volume II includes more detail and discusses key results of the 2006 Regional Water Plans including:

- **Chapter 1** (*Introduction*) ***summarizes the results of the state water plan.***
- **Chapter 2** (*Regional Summaries*) ***provides graphics, tables, and text summarizing results for each planning area.***
- **Chapter 3** (*Fifty Years of Water Planning in Texas*) ***presents the general history of state water planning in Texas, including how water management strategies and the planning process have evolved over the past 50 years, and discusses the implementation status of water management strategies recommended in the 2002 State Water Plan.***
- **Chapter 4** (*Population and Water Demand Projections*) ***summarizes the methodology and results for population and water demand projections, including discussions of how different economic sectors use water.***
- **Chapter 5** (*Climate of Texas*) ***discusses the climate of Texas, including general rainfall patterns and information on the frequency and magnitude of drought in the state.***
- **Chapter 6** (*Surface Water Resources*) ***presents detailed information on the state's surface water resources and includes estimates of available and existing surface water.***
- **Chapter 7** (*Groundwater Resources*) ***presents detailed information on the state's groundwater resources and includes estimates of available and existing groundwater.***
- **Chapter 8** (*Water Reuse*) ***discusses water reuse in Texas, including projections of existing water supplies generated by this practice.***
- **Chapter 9** (*Water Supply Needs*) ***summarizes water supply needs for different water users in the state during drought conditions and the potential socioeconomic impacts of not addressing water supply needs.***
- **Chapter 10** (*Water Management Strategies*) ***discusses water management strategies recommended by planning groups and the volume and costs associated with these strategies.***
- **Chapter 11** (*Plan Implementation Funding*) ***summarizes implementation costs of the 2007 State Water Plan, including statewide and regional cost estimates for water supply, water distribution and transmission infrastructure, wastewater treatment, and flood control.***
- **Chapter 12** (*Challenges and Uncertainties in Water Supply Planning*) ***analyzes the challenges and uncertainties, such as changing conditions, natural or human disasters, and policy and legislative impacts, that affect regional and state water planning.***
- **Chapter 13** (*Planning Group Policy Recommendations*) ***presents the range of policy issues and recommendations identified by planning groups.***

Volume III is a digital version of the 16 regional water plans and a database of the regional water planning information for each water user group in Texas. It is on the TWDB Web site. The regional water plans are available at: http://www.twdb.state.tx.us/rwpg/main-docs/2006RWPindex.asp and the TWDB's Regional Water Planning Database 2007 can be accessed at http://www.twdb.state.tx.us/data/db07/DefaultSelect.asp.

Appendix G

79S30109 RMB-F

By: Madla S.B. No. 11

A BILL TO BE ENTITLED

AN ACT

relating to the temporary extension of the deadline for submitting a regional water plan to the Texas Water Development Board for approval and inclusion in the state water plan.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Notwithstanding Section 16.053(i), Water Code, the Texas Water Development Board may approve and include in the state water plan for the five-year period beginning January 5, 2007, a regional water plan that was submitted to the board after the deadline prescribed by that subsection if the regional water plan was adopted by the applicable regional water planning group not later than January 19, 2006, and meets the other requirements of Section 16.053, Water Code.

SECTION 2. This Act takes effect immediately if it receives a vote of two-thirds of all the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect on the 91st day after the last day of the legislative session.

Appendix H

DRAFT -- OFFICE USE ONLY
SENATE NATURAL RESOURCES
COMMITTEE - HOUSTON
EXCERPT: ED MCCARTHY TESTIMONY
AUGUST 8, 2006
TAPE 3

(Senator Averitt in the Chair)

MCCARTHY : Mr. Chairman, if it's okay, I'll go ahead and go first then.

CHAIRMAN : You bet.

MCCARTHY : My name is Ed McCarthy. I'm an attorney from Austin with the firm of Jackson, Sjoberg, McCarthy and Wilson. It's a pleasure to be here. I thank you, Senators, for the opportunity to make this presentation. The topic that this panel is going to address is, is basically statutory provisions which are impacting, or, or possibly even retarding, the implementation of the State Water Plan. And, I think that you may hear several topics talked about by several of us. I'm gonna try and be brief and, and give an overview, and, and others will fill in some of the gaps, and then we'll be happy to answer questions. A--among the topics I'd like to address as part of my presentation are funding, interbasin transfers, Four Corners, water rights amendment process, environmental flows, groundwater issues, the issue of reuse, the treated effluent, aquifer storage and recovery, enforcement of water rights provisions, science issues, watermaster programs in the regional planning.

: (Inaudible, not speaking into the microphone)

CHAIRMAN : Those are your comments, (strictly)?

: (Laughter)

: (Inaudible, background conversation) that's, that's--

: Is that all?

: --I--

: (Inaudible, background conversation)

: He's gonna be brief.

: (Inaudible, background conversation)

: You're more ambitious than I am.

: (Inaudible, background conversation)

MCCARTHY : I'm gonna be brief, or try to be, Mr. Chairman. From a funding perspective, this morning, you've already heard several speakers address it, and--and I will be brief, but I think that one of the things we wanna look at is that we have, effectively, three pieces of legislation in the last ten years that we've looked at, two of which have actually passed, Senate Bill 1 and Senate Bill 2, and Senate Bill 3, which we attempted to bring a lot of loose ends together and, and because of time we simply couldn't accomplish that last Session. From a funding perspective, Senate Bill 1 failed on that issue. Senate Bill 1 attempted to have a funding provision, but because of the massive nature of the overhauls of state water law that were included in Senate Bill 1, adding that funding mechanism there was just too much too soon, and so we let it go by. In Senate Bill 2, we really didn't have the energy to come back to the funding mechanism. There were attempts by the Legislature, but, it, Senate Bill 2, really went a different direction. Senate Bill 3, last Session, was really an energized effort to develop the funding mechanism that was going to address the hundred billion plus dollar problem we have, to get infrastructure in place, to really implement all of the planning tools that Senate Bill 1 had provided to us. In part, you heard complaints about surprise, that it was, it--it was sprung on people without a lot of vetting and a lot of opportunity to explore different options. We also heard talk of it, effectively, provided a Robin Hood scheme where larger communities were being asked to fund statewide initiatives, and not being allowed to keep enough of that money at home to fund what they felt were their long-term problems. So, Senate Bill 3 provided the first step for us to talk about the issue, and, and the opportunities you're giving us here today to continue to talk about it are very helpful, but what's critical for the future and for truly allowing the state to implement the State Water Plan is that we develop funding mechanisms. One of the other things, from a funding perspective, I think is important to know, is that when the Texas Water Commission changed its name for the first time, in the last several decades, to the TNRCC, and then to TCQ, and we took water out of the name of the agency, my personal sense, and in those of other water practitioners that I do work with, was that from a funding perspective, that agency's focus, and most of the money it was provided, came and, and was placed in other initiatives, particularly, air, and that the emphasis on water that had once been there was lost at the agency. That lack of funding resulted in a reduction of manpower, which is redu--re--resulted in many instances of backlogs in various processing for water, and the ability for the agency to develop the expertise, and retain the expertise, that will allow them to process water rights applications, and ensure that we are successful in implementing Senate Bill 1. So, I would hope that the Legislature in the future would look at increasing funding for that agency, in that specific area. I think it would also be useful if the Legislature, as part of its funding initiatives, could look at more projects being funded that are a little less nontraditional, such as the desalinization, which we have spent some money on, but obviously, the water available in the Gulf is going to be a long-term resource we wanna look at. Aquifer storage and recovery is another area where, throughout the state, not only using fresh water, but brackish water, and treated effluent, we have some statutory limitations I'll talk a little bit more about, but from a funding perspective, if we could put some money in the resources of the development board to fund more pilot projects in that area around the state, I think would be helpful. The issue of recharge, and how we can basically capture the rainfall and allow it to naturally go back into our aquifers, is another area for funding. The question of direct reuse, I think, as we talk about environmental flows and other issues again, from a science perspective, funding is necessary to study what the true impacts are, and the true potential of that particular water development tool. And then, lastly, pilot projects that would look at taking treated effluent, and not just using it directly for non-potable uses, but actually linking it back, developing the science that will allow us to put treated effluent to a direct potable use back into our treatment plants. I'd like to move to interbasin transfer, briefly. You've heard several speakers, again, talk about that statute. When 11085 was amended, and we basically used every letter in the al--alphabet to develop a subsection for it, it became no longer a water, a development tool, or a protective measure, to truly protect the region from which the, the basin of origin. It really became almost a complete defense to moving any water out of a river basin. The costs are onerous, the time involved, we've always talked about water reservoir projects, big projects, being 20-year lead-time projects. When we looked at interbasin transfer, and the changes to that statute, the time constraints really doubled, as a--a practical matter. And one of the things we have to remember about Texas is, we all re--remember Governor Bullock saying, God bless Texas, and God truly has blessed Texas, but the massive nature of the geography of Texas, and the diversity of its geography, and the fact that we go from arid deserts to almost rainforests in the east of Texas, we only have certain locations where water is going to be found. And as the s--state's population contri--continues to grow, and will double in the next 20 years, we're going to have to develop the water resources, and we're going to have to move water resources, and we're going to have to agree that we're going to have to share the available resources we do have. Currently, 11085 is a true barrier to that possibility. I think it would be helpful for the Legislature to look at that, and consider what are some of the true problems. One is, of course, the junior issue, and I know you've all heard about that. I won't dwell on it. The other to look at, though, in particular in 11085, are the requirements that the basin which is seeking the transfer have achieved the maximum count--conservation measures that could be achieved, and it's without it, further definition, it's not necessarily it could be achieved in that locale or the characteristics of that community. If you took the language of that statute, and, and took it literally, it's possible to argue that if you look at the very low per capita consumption in the western parts of the state, like El Paso, where there is no water, and there's no opportunity, and there's no grass, no lawns to be watered, you get a truly low per capita usage. And that's not necessarily achievable in any other part of the state, but the way the statute reads, it's possible that that requirement could be placed on these other areas, and that, again, could be an impediment to water development projects and the implementation of the state plan. The issue of four corners and the amendment process for water rights in Texas, The Four Corners Doctrine, I, I'll briefly describe, is that when a water right is issued, the presumption, both in statute, and as the Supreme Court has found, is that a 100 percent of that water must be considered to be consumed on an annual basis. And for that reason, the impact of that water right, at the time it's issued, based upon what it says on paper, is to be considered and modeled, and you're going to treat it as if it has been used. That allows long-term use of that permit, by the water right holder, particular municipalities, which as they grow into their, into their needs, and their, their needs change, they can make modification, within the four corners of the water right, without having to go back to full-blown processes, incur the expense, the time and delay that is associated with that. In the '90s, we, we amended the amendment statute, which said that, t--intended to say, that so long as you stayed within the four corners of your water right, the process would be expedited, there would not necessarily be opportunity for hearing in contested cases, and the idea was to save money, save time, and to get the water to where you needed it. Recently, the City of Marshall tested that statute, the Commission followed its language, and, and granted the amendment. That was challenged in the courts, and to date, Texan cour-- Texas courts have said that what we thought 11.122(b) said is not what it said, and that in fact, there would be opportunities for, for contest, and that the water right you had obtained originally might not have the flexibility for you to modify it in the future to meet your long-term needs. I think this is an issue that would be beneficial for the, for the Legislature to look at. Briefly, on environmental flows, as Mr. Mullican said, Senate Bill 3 contained Article 1, and, and those of us that participated in that process felt we had consensus at the time, and a willingness to go forward. That was a great step for the state. Environmental flows are a very big issue. Protecting the environment is something that everybody believes in, and we need certainty, though, for municipal and other water developers, to, to know, when they go into the process, what's the cost of business going to be, what other aspects, or other features, of their water right application are they going to need to, to consider, what scientific issues will they have needed to address, as part of the permit process. Again, having some certainty as to what the rules of the game are will expedite the process for all parties, hopefully reduce the costs, and make the projects come online sooner. That kind of certainty is necessary for the State Water Plan to truly be implemented. I believe that TCEQ needs your guidance to help them make the decisions necessary. We have tried to advocate, at times, for the Commission, that there are parts of the environmental flow statute they could be implementing. They're reluctant, looking as a s--as a creature of the Legislature, looking to guidance from you. So, we really need in the next Session, some version of that Article 1 to come out, and, and get us that certainty. With respect to groundwater issues, this is an, a very interesting topic, because unlike other water topics, we have basically decentralized control over groundwaters. The concept of local control has, has placed the possibility for as many as 200 plus entities, if we were to have a groundwater district in every county, or, or several counties, to be in control of a very valuable resource. Again, because of the, where water is located in the state, we have to go to the water. Large cities, large metropolitan areas, that need water, don't necessarily have it in their backyard, and they have the obligation to develop it, and they'll be going out, looking for water, and many times they're met with the roadblock of local control, and we don't want the water to leave our district. There (are), we have tried, through House Bills 1763, to develop a process that will help alleviate some of those issues, and get consistency, as between various districts that are overseeing the same aquifer, but have different regulations regarding its control. Yes, Sir.

: I was just noticing, I think we have somethin' to work with here, because I've heard, since we've been sitting here, that we didn't want the tax dollars to leave the big city, and you're sayin' maybe the, the rural areas have somethin' that they could sell.

MCCARTHY : Yes, Sir, and we--and we have, b--we have provided for that, in part, through transport fees. And I think that there's a--

: I think we got somethin' to work with here--

MCCARTHY : Yes, Sir--

: --is what I'm sayin'.

MCCARTHY : --yes, Sir. House Bill 1763 is in its infancy. We won't know for ten years or more whether or not the process that we've created there truly is going to work, but it's something that the Legislature needs to continue to oversee and supervise during that process. We also want, again, to encourage the idea that, that we have to share our resources, and yes, sometimes we'll, you know, we, the idea of buying and selling them is, is a good one for all parties to look at. One of the things the Legislature, I, I think, is going to have to help with, is the issue of the ownership of--

: (Yes.)

MCCARTHY : --groundwater, and bringing that issue to a landing. I think that the courts have been very clear throughout their history in the treatment, that the ownership of groundwater in the ground resides with the owner of the surface. Groundwater districts feel differently. The courts at some point may have, will have the opportunity to address it, but it's a, an issue the Legislature may wanna take up. With respect to reuse, that's an issue that we clearly need your guidance on. There are, are more than 60 pending applications for reuse at the Commission right now. And, of those, virtually all of them are subject to a case-by-case determination, because when you file a reuse application, the Commission has told everyone, in the last two years, that we don't know what our policy is, we are developing our policy, and as your application comes in and is processed, in their letter they write, your application may not be treated the same way that the last reuse application was treated. So, as the applicant, you really have no idea what the rules are, you have a moving target, and in the current state of, of where the Commission is, in terms of not having developed a true set of guidance, where reuse is almost the number one water development concept in the state plan, and on a regional basis, it's--it's in the top five, we really can't move forward with reuse projects until we know how they'll be permitted, so I think it would be very useful, the Legislature to look at that. On the question of, of funding, I also wanna mention science, in all of the legislation that, that we've recently, you've recently enacted, and what I hope you will enact in the future, science has to be at the forefront. We have to be making decisions based upon good, sound science. While that may take time, it's--it is essential, but it needs to be moved up, and funding for that, and reinvestment of dollars that come out of fees, either in surface water rights or in groundwater rights or transport of groundwater, really needs to be directed and funneled toward science, and I think you're hearing some of that from your reuse committee and the science committee that is a foundation of that committee. But that's something we truly need. It's one of the building blocks of House Bill 1763, but again, until we have ten or more years of that cycle, and the science being provided, we really won't be able to make the kinds of decisions, and if we don't have the science, we'll never be able to make them. Enforcement and watermaster issues, the state has now three watermaster programs, one in the Rio Grande, one in South Central Texas, and, and now one in the San Angelo area. This drought that we're currently in, watermasters are truly earning their keep, they're scrambling, but questions about enforcement and riparian rights, and people just thinking that because they've got the plan that fronts on a river, they put their straw in, and they can take as much as they want, or they can build a dam on it, we don't really have the mechanisms in place to truly be able to enforce it. Under current law, if you, if you're not within a watermaster program, you're supposed to make a call to TCEQ, and it's their duty to look into it. They really don't have the resources, or, or the manpower, I think, to be able to do that, so our ability to protect the priority system that we have, I think, is in jeopardy, particularly when we have situations like we do in the current drought. Regional planning, very quickly, we've seen something that, that nobody really anticipated, this past year. Region L found themselves a day light, day late, and now possibly millions of dollars short, in the regional planning process. They missed the deadline for filing their plan by a day. As a result of that, there is no approved Region L plan, and because of the way the statutes are written, they're, they are subject to not being eligible for any funding that may be available for any of their projects, and I think that, that there needs to be something, some mechanism, to address that. It wasn't an intentional, you know, delay, or, or dallying on their part. They ran into a roadblock that was unanticipated, and I think it's something that could happen in other parts of the states. I also think it's something that could happen even at the state level, I, and I'm not suggesting that the Water Development Board would miss their deadline, but if they were, we don't have a mechanism to compensate, or overcome that, currently. And the rationale that they applied in the Region L situation, if they applied it to that situation, we would not have a State Water Plan for five more years. And we'd be without one, I mean, that was the consideration. There would be no plan. It's not that the old plan carries forward, you're just without a plan. And I think that could be detrimental. Lastly, and briefly, I'd like to address some examples of projects that I think have, were parts of the State Water Plan, but have failed because of some of the problems that we have. The first project I'd like to use as an, as an example, is one that was the, described as the cornerstone of Region L's plan. It was the lower Guadalupe--

: Really?

: --Basin project. It was a project that involved taking Region L, which is the San Antonio, Central Texas area, along the I-35 corridor, going down to, to the--

: (Inaudible, background conversation)

MCCARTHY : --to the mouth of the, of the Guadalupe-San Antonio River, and enlarging reservoir-building, some off-channel reservoirs, and doing some groundwater, to conjunctively manage the resources, maximize them, bring that water back, towards San Antonio, with the ability to, to stem off of that, and provide for communities all along the way, was a project that was, went into by three large, substantial partners, SAWS, San Antonio River Authority, and Guadalupe-Blanco River Authority. They put lots of funding towards that project they began, and, even now, are continuing studies, again, not knowing what the rules were on environmental flows, and what the rules were on groundwater, or what the rules would be on reuse, doing multiple studies to try and anticipate what the issues were, and have that information available so that they could answer questions, whether they were brought by the regulatory authorities, by environmentalists, or local communities simply worried about not having their groundwater. The political contests that were made to that, the local contests that were made to that, and the threat of potential litigation that could tie up what was already a ten plus year project, in it, in its, by the planners, the people who brought it, caused that project to go down the tubes before it really got off the ground. As I said, some of the studies are continuing because the information that will be developed will be useful for future water projects, but that project, which probably was a billion-dollar project, and would have provided long-term water supplies to that region, is no longer on the books. What many of you have heard referred to, the groundwater project, the Alcoa SAWS deal, where SAWS was looking to acquire rights, in Central Texas, to groundwater under Alcoa mining and coal leases, that SAWS had some interest in, similarly, because of l--of local control issues and concerns, SAWS has pulled back from that project. So, those are two very big projects, that because of some of the things I'm describing, basically are no longer on the books. And we're now into our ninth year of our first ten years since Senate Bill 1, and so where we had implementation starting, we've now lost that implementation. With that, I'll shut up. Thank you very much. I appreciate the opportunity.

CHAIRMAN : Thank you. Any questions?

: Mr. Chairman, you've got your work cut out for you.

: (Laughter)

CHAIRMAN : Just a few things here and there.

END OF EXCERPT

GALVESTON BAY FOUNDATION

Senate Committee on Natural Resources
Interim Hearing
August 8, 2006

Testimony of Robert J. Stokes, Jr.
President and General Counsel
Galveston Bay Foundation

"Statutory Barriers to Implementation of State Water Plan"

The mission of the Galveston Bay Foundation ("GBF") is to preserve, protect, and enhance the natural resources of Galveston Bay and its tributaries for present users and posterity. Its balanced programs in conservation, education, advocacy, and research strive to ensure that Galveston Bay remains a beautiful and productive place for generations to come. GBF has been in existence for nearly 20 years. It was formed to be inclusive of all Galveston Bay users and its board includes representatives who are recreational, commercial, and industrial users of Galveston Bay. It balances the multiple uses of Galveston Bay and attempts to reach consensus on issues facing Galveston Bay by bringing those multiple users of the bay together to address those conflicts.

GBF has been involved in water planning and advocating for freshwater inflows for Galveston Bay for nearly its entire history. It has been actively involved with the Galveston Bay Freshwater Inflows Group ("GBFIG") since its inception and has also been involved at the board level of the Region H water planning group since it was formed. It believes that the development of a scientifically based environmental flow regime for Galveston Bay is crucial not only for conservation purposes, but for maintaining the incredible economic output Galveston Bay provides.

At over 600 square miles, Galveston Bay is the seventh largest estuary in the United States. However, it is the *second* most productive estuary in the Untied States. It produces an incredible bounty of seafood. It had the largest oyster production of any estuary in the country and the largest commercial harvest of blue crabs in Texas. It also produces over half of Texas's bay shrimp in an average year. Overall, it generates over

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1/3 of the state's commercial fishing income- $358 million a year. Furthermore, it holds the third largest recreational boating fleet in the entire country and sport fishing and associated expenditures in and around Galveston Bay have been estimated to generate as much as $2.8 billion per year.

This productivity is due to the health of the estuary. Estuaries are one of the planet's most productive ecosystems. A healthy estuary depends on an adequate source of freshwater to provide the appropriate mixing of fresh and salt water. Without freshwater, production in the estuary will decline. Determining the amount of fresh water necessary and securing that fresh water is crucial to Galveston Bay's future health.

We believe that a statutory barrier to implementation of the State Water Plan is the lack of guidance from the Legislature on environmental flows. The Legislature should address the issue to move us toward certainty on the issue. This barrier means that these determinations, to the extent they are being made, are being made on a case by case basis without the comprehensive study that is needed. Both the water development community and conservation community want certainty in this area so that we can move forward. The environmental flows provisions that were contained in Article 1 of Senate Bill 3 in the 79th Regular Session provided the framework for making this happen and I urge you to move in that direction to remove this barrier. We need to ensure the development of a scientifically based environmental flow regime for each coastal bay and its associated river basins. The regime should cover the timing and frequency of flows as well as the volume of the flows. And it is imperative that we move in that direction quickly. The health of our bays and of our economies depends on it.

It is worth noting that even without specific guidance from the Legislature, at least one of the state's regional water planning groups has recognized the need for study of environmental flows. The Region H Water planning group recently began planning for their third planning cycle. They adopted a scope of work for regional planning and listed environmental flows as their number one priority. Their goals are to better define environmental flow needs in the Region and to develop better planning tools for evaluating and assessing water management strategies. They should be commended for moving in this direction. Their actions indicate the local demand for certainty in this area. I urge the Legislature to pass a bill regarding environmental flows that will bring them and others towards that certainty.

GALVESTON BAY FOUNDATION

- The mission of the Galveston Bay Foundation is to preserve, protect, and enhance the natural resources of the Galveston Bay estuarine system and its tributaries for present users and for posterity. The Foundation was incorporated in July 1987, and is a non-profit organization under Section 501 (c)(3) of the Internal Revenue Service Code. GBF continues to serve Galveston, Harris, Chambers, and Brazoria counties, as well as interested residents throughout Texas.

- A strong Board of Trustees manages the Foundation. Representatives from sport and commercial fishing groups, government agencies, recreational users, environmental groups, shipping, development, and business interests serve on the board of GBF and provide a broad cross-section of Bay users to identify problems and seek solutions to issues facing Galveston Bay.

- Throughout its nineteen years of service to the Galveston Bay area, GBF has earned numerous awards and prestigious honors, including a Texas Environmental Excellence Award from the Texas Commission on Environmental Quality and Gulf of Mexico Gulf Guardian Award in 2000. In 1999, the Galveston Bay Foundation was the recipient of the National Oceanic and Atmospheric Administration's Non-Governmental Organization of the Year Award. GBF also received a 5-Star Award from the Environmental Protection Agency for its community-based restoration efforts surrounding the very successful Marsh Bash 1999 event.

- With its partners, GBF has successfully supported passage of state and federal legislation on behalf of the Bay: the Texas Oil Spill Prevention and Response Act, the Texas Estuaries Act, the Texas Coastal Management Program, and the Federal Clean Waters and Estuary Restoration Act of 2000.

- GBF's Habitat Conservation Blueprint, an inventory of restoration sites, strategies, and resources, is considered a model for regional and national restoration plans. Both the technical and condensed documents provide the lay person with clearly defined environmental terms and habitat types, detailed maps, and ways citizens can involve themselves in estuary protection.

- As part of its conservation activities, GBF owns about 3,000 acres of property identified as having significant habitat or educational value. This acreage, conserved for the future, allows GBF to demonstrate restoration and management techniques for use in the Bay system.

- GBF has delivered its signature Bay Ambassador Presentation, and abbreviated exhibit talk thousands of times, reaching a collective audience of nearly 100,000 participants. Galveston Bay Expeditions, GBF's outdoor education program, annually draws close to 1,000 participants who explore the Bay as part of youth, adult, family, or teacher expeditions. Thousands more are introduced to the Bay each year through GBF's Bay Day festival and celebration.

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Senate Committee on Natural Resources
Interim Hearing
Houston, Texas
August 8, 2006, 10:00 a.m.

By

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REVIEW OF STATUTORY BARRIERS TO IMPLEMENTATION OF STATE WATER PLAN

I. Rio Grande Regional Water Planning Group (Region M) Recommendations on the Rio Grande:

A. The following are selected State Legislation recommendations for the 2006 Regional Plan on the Rio Grande:

1. Funding: The State should continue financing brackish groundwater projects and the demonstration seawater desalination project as means to increase water supply alternatives in the region.

2. Funding: The State should authorize the Rio Grande Watermaster to manage the Rio Grande WAM and should fully appropriate to the Texas Commission on Environmental Quality fees paid by Rio Grande water right holders as specified in Section 11.329 of the Texas Water Code for the purpose of fully funding Rio Grande Watermaster operations. (That is, so that fees paid by water rights holders are not placed in general fund).

3. Funding: The State should assist in finding new technical and financial resources to help the region combat aquatic weeds and salt cedar and thus protect its water supplies. The Rio Grande RWPG joins with the Far West Texas and Plateau RWPGs to encourage funding for projects aimed at eradicating salt cedar and other invasive plant species in the Rio Grande watershed and for ongoing long-term brush management activities.

4. Funding: The State should continue providing technical and financial resources to fully develop the regional GAM.

5. Funding: The State should appropriate sufficient funds to the Texas Railroad Commission to allow for capping abandoned oil and gas wells that threaten groundwater supplies.

6. Funding: The Texas Legislature should provide technical and financial assistance to implement water management strategies identified in the regional water plans.

7. Funding: The Texas Legislature should appropriate funds to continue the regional water planning process.

8. Funding: The Texas Legislature should appropriate funds to the Texas Water Development Board to implement and provide assistance to water user groups in developing and implementing appropriate Advanced Water Conservation measures, including a statewide public outreach and education program.

9. Plan Amendment Process: The provisions dealing with Amendments to adopted Regional Water Plans should be simplified (as proposed in S.B. 3 filed last session).

B. International and Federal Issues – Legislative Resolution:

There are also recommendations dealing with International and Federal issues arising out of enforcement of the 1944 Treaty with Mexico. Mexico continues to be behind in meeting its Treaty obligation under the 1944 Treaty, and is continuing to create deficits in water deliveries. The Governor and the TCEQ were most supportive and helpful in the past in negotiations between the Federal Government and the Mexican Government, and in representing the Texas interest on the Rio Grande. The State Legislature is limited in what it can do on these issues. However, a legislative resolution supporting certain basic positions would operate as guidelines to the TCEQ, and other State entities involved and strengthen the State's position in this dispute.

In this respect, the Regional Water Plan made the following recommendations which could be considered for support by legislative resolution:

1. The International Boundary and Water Commission (IBWC) should renew efforts to ensure that Mexico complies with Minute 309 and set in place means to achieve full compliance with the 1944 Treaty, including enforcement of Minute 234, which addresses the actions required of Mexico to completely eliminate water delivery deficits within specified treaty cycles. Water saved in irrigation conservation projects in Mexico should be dedicated to ensure deliveries to the Rio Grande pursuant to the 1944 Treaty under Article 4B(c) and Minute No. 234.

2. The United States and Mexico should reinforce the powers and duties of both Sections of the IBWC pursuant to Article 24(c) which provides, among other things, for the enforcement of the Treaty and other Agreement provisions that "*... each Commissioner shall invoke when necessary the jurisdiction of the Courts or other appropriate agencies of his Country to aid in the execution and enforcement of these powers and duties.*"

3. The Minute 309 conservation projects funded by the North American Development Bank and other projects funded by national and international agencies to modernize and improve the facilities of irrigation districts in the Rio Grande Basin should be supported and given priority. In particular, both countries should support continued grant funding for conservation projects through the NADBank's Water Conservation Investment Fund.

4. The conservation irrigation projects currently underway through the Bureau of Reclamation for improvement to the irrigation systems of irrigation districts in the Rio Grande Basin in the United States should be supported and implemented.

5. For purposes of clarity, the IBWC should approve a Minute setting out the definition of "extraordinary drought" as that term is implicitly defined in the second subparagraph of Article 4B(d) as an event which makes it difficult for Mexico "... to make available the *run-off* of 350,000 acre feet (431,721,000 cubic meters) annually." A drought condition occurs when there is less than 1,050,000 acre feet annually of *run-off waters* in the water sheds of the named Mexican tributaries in the 1944 Treaty, measured as water enters the Rio Grande from the named tributaries.

6. Accounting of water between the United States and Mexico pursuant to the 1944 Treaty should be consistent with the 1906 Convention, which provides that all waters measured at Fort Quitman, Texas, are 100 percent allocated to the United States.

7. For better water management in the Lower Reach of the Rio Grande, downstream of Anzalduas Dam, both countries should reaffirm operational policies that Mexico continue to take its share of waters through the Anzalduas canal diversion at the Anzalduas Dam or account for its water at that point, including any diversions by Mexico from the proposed Brownsville Weir Project storage, to the extent of its participation in the project.

8. IBWC should convene a binational meeting of water planners and water use stakeholders in both countries within six months following completion of the annual water accounting in which an annual deficit in flows from the named Mexican tributaries in the 1944 Treaty occurs. This meeting would be designed to share data and information useful in planning for water needs and contingencies in the intermediate future.

9. The IBWC should assume all local and regional financial responsibility for upkeep and maintenance of El Morillo Drain.

10. IBWC should coordinate bilateral efforts to review and evaluate existing sources of data regarding groundwater development in both countries in the Rio Grande Basin below Fort Quitman to the Gulf of Mexico. This effort should be focused

on the potential impact on surface water supply in the Rio Grande watershed, with the goal of pursing such actions as may be necessary to evaluate present conditions and promote programs protecting the historical surface water supply in affected regions.

11. Regional watershed planning should be encouraged on both sides of the Rio Grande throughout the basin, including efforts to promote binational coordination of long-range water plans.

12. Interstate compacts between affected states in Mexico, similar to the Rio Grande Compact and Pecos River Compact between affected states in the United States, which deal with apportionment of available water supply from the Rio Grande and its tributaries to each state consistent with existing domestic and international law should be encouraged.

II. Regional Water Authority:

The 2002 Regional Plan recommended formation of a regional water authority.

Legislation was passed creating the Rio Grande Regional Water Authority ("RGRWA"). Difficulties arose in implementing activities of this entity and another existing entity.

Legislation will be offered proposing certain changes to the enabling legislation of the RGRWA which has consensus support, and should improve the overall functioning of the RGRWA.

III. Environmental Flows:

Rio Grande issues with statewide implication would be support for the passage of legislation dealing with environmental flow issues along the lines contained in SB 3 filed in the last session of the Legislation with necessary modifications due to continued study of those issues since the last session. Identification, quantification, and scientific based criteria is needed for better water planning in the State.

IV. Comment on recent Supreme Court decision in *Case No. 03-1111; City of Marshall and TCEQ vs. City of Uncertain, et. al.*, Motion for Rehearing pending.

V. Re-use of water – direct and indirect resuse issues.

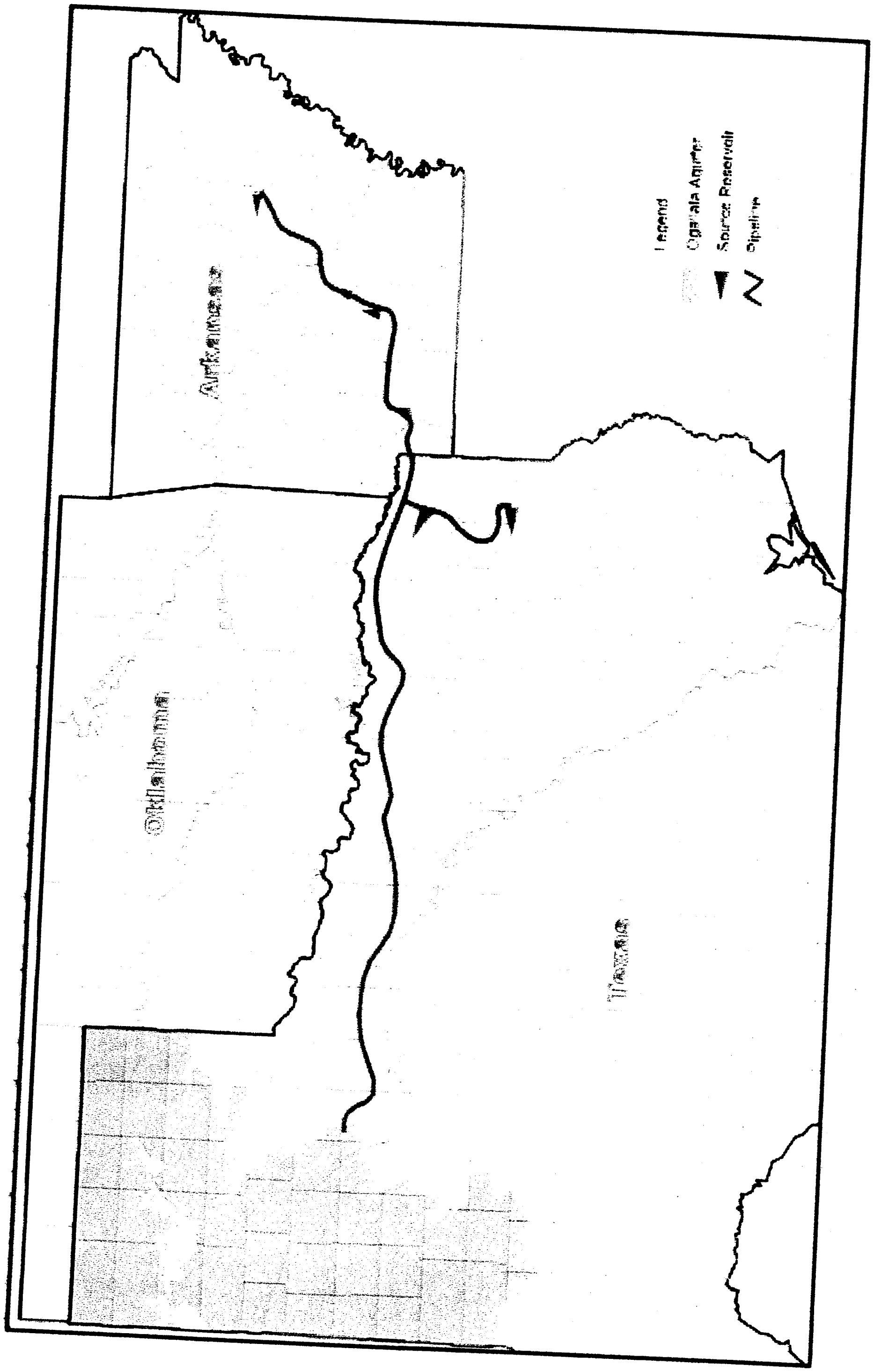
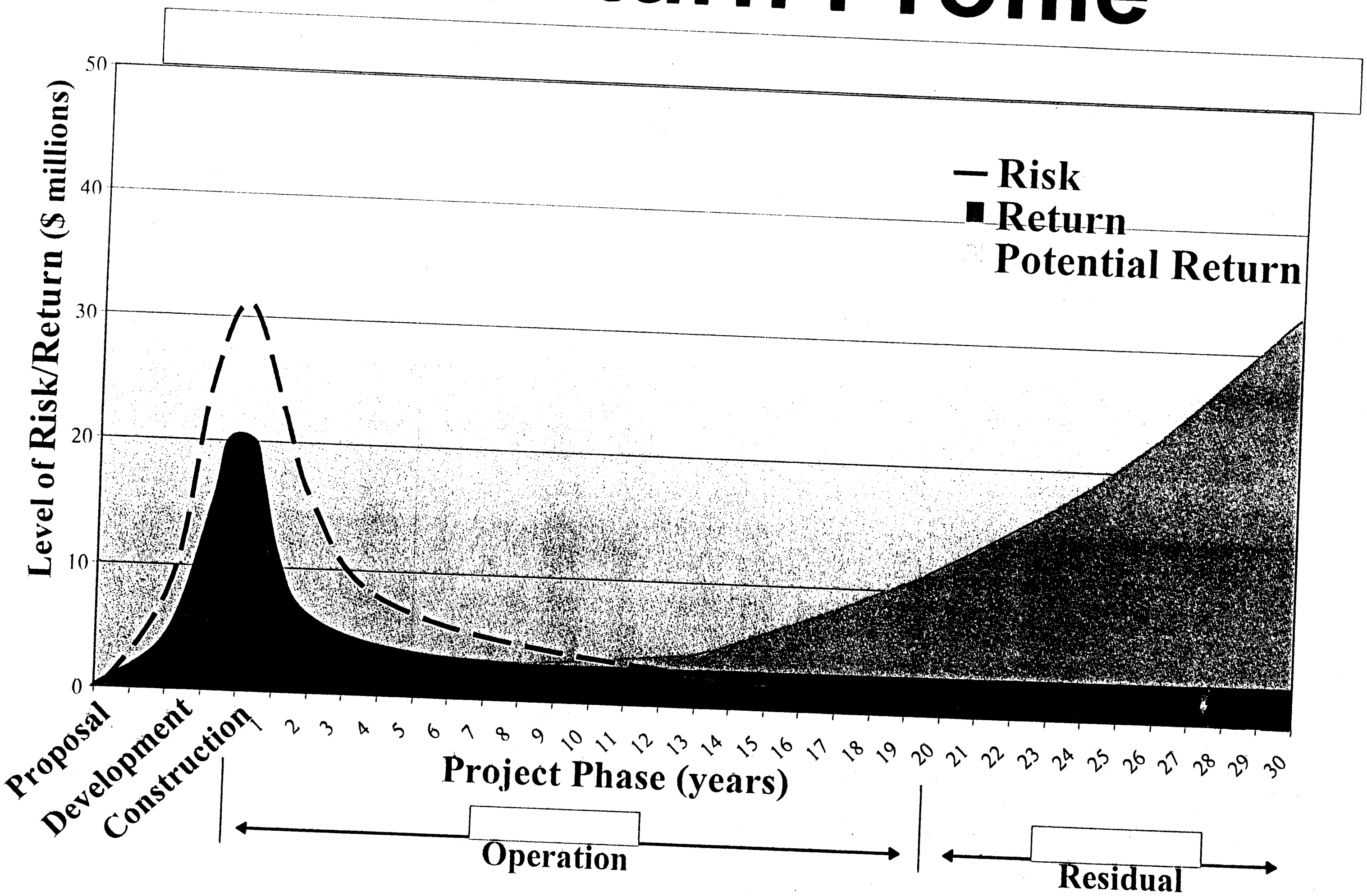


Figure 5-11. Pipeline Alignment for Water Import Option

Typical Project Risk/Return Profile



Source: The National Council for Public Private Partnerships

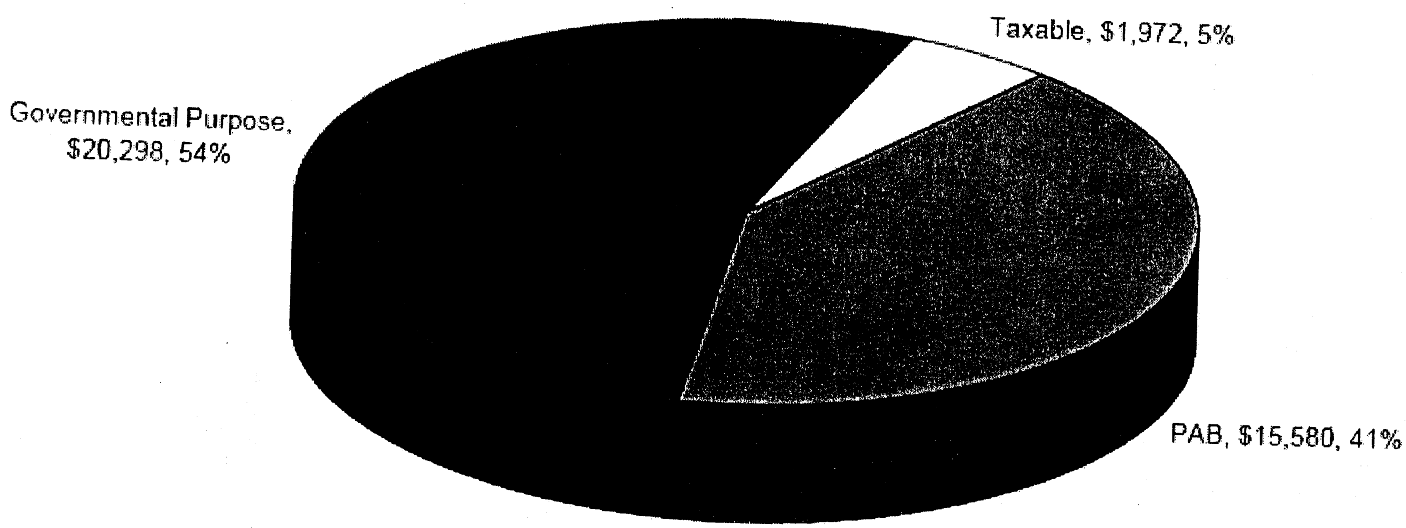
Compare experience in solid waste

- Crisis in early ’80’s due to declining landfill capacity and rapidly increasing costs.
- Congress responded by eliminating tax-exempt private activity bond cap for municipal solid waste disposal projects.
- As a result, over $15 billion in PABs have been issued since 1986 to solve the crisis.

Source: Stephen H. Howard, Sr. V.P., Lehman Brothers, Inc., testifying to the Congressional Transportation and Infrastructure Subcommittee on Water Resources and Environment, June 14, 2005.

Solid Waste Historical Data

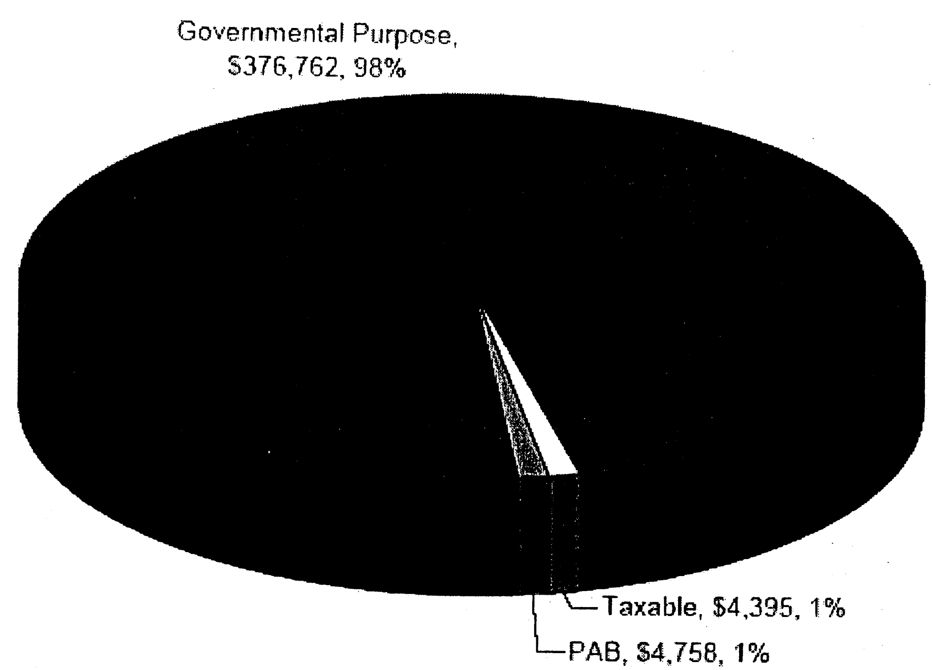
Solid Waste Transaction Allocation ($ Millions)
Total Issuance: $37,850 Million
Years: 1986-2005



Average Issuance/Year ($ Millions)	
PAB	$779
Governmental Purpose	$1,015
Taxable	$99

Water/Wastewater Historical Data

Water/Wastewater Transaction Allocation ($ Millions)
Total Issuance: $385,915 Million
Years: 1986-2005



Average Issuance/Year ($ Millions)	
PAB	$238
Governmental Purpose	$18,838
Taxable	$220

Testimony before the Texas Senate Natural Resource Committee
August 8, 2006

Thomas C. Gooch, P.E.
Vice President, Freese and Nichols, Inc.

Obstacles to Implementation of Regional Water Planning

General Points

- The Regional Water Plans just completed for Texas show that we need to develop additional water supplies to meet projected population growth and economic development in Texas.
- Water conservation and drought response strategies are an important part of our future water systems, and they are currently being implemented throughout the state.
- The reuse of treated wastewater is an important component of our supplies for the future.
- We also need to pursue water transmission projects to connect existing sources and to develop new supplies for the future.

Obstacles to Implementation of Regional Water Planning

- A recurring theme is the problem of uncertainty – uncertainty regarding rules and laws, regulatory policies and practices, and actions by federal and state agencies.
- Uncertainty is increased by the lack of reliable, up-to-date data. State agencies play an indispensable role in collecting and dispensing data.
- It is difficult to plan, permit, finance, and implement projects in the face of uncertainty.

<u>Laws Restricting Interbasin Transfers of Surface Water</u>

- Interbasin transfers are a large part of the current water supply for Texas.
    - 15 of Texas' 20 largest cities currently obtain supplies from IBTs.
    - There are currently over 190 permitted IBTs in the state.
    - IBTs are a major part of future water supplies for major Metropolitan areas in Texas.
        - Dallas-Fort Worth Metroplex
        - Houston Area
        - San Antonio Area
        - Corpus Christi
- The laws governing IBTs were changed in 1997.
- Few IBTs have been permitted since, and no opposed IBTs have been permitted.
- The current laws set tougher standards for IBTs than for any other type of water supply, including new reservoirs.

- Requirement for "the highest practicable levels of water conservation and efficiency achievable". Meaning is uncertain – not required for any other right.
    - Many extra permitting requirements in terms of notice, hearings, data development.
    - IBTs made junior to all in-basin water rights – effectively makes IBTs of run-of-river rights less reliable and encourages reservoir development instead.
- Current IBT regulations foster an on-going debate - whose water is it? Does water belong to Texas, or to the citizens of a river basin, a region, or a regional water planning area?

Uncertainty and Variability of State Policy on Reuse

- Reuse of treated wastewater is an important source of future water supply.
    - Typically has low environmental impacts compared to other supplies.
    - Typically is a low cost supply.
    - Is generally reliable in a drought.
    - Increases efficiency in the use of resources.
    - Reuse is a major element of the 2005 Regional Water Plans (1.66 million acre-feet per year of supplies from reuse by 2060).
- Permitting for direct reuse (where treated reuse water is pumped straight from the treatment plant to reuse) is easier than for indirect reuse (where treated reuse water is delivered by the bed and banks of streams and lakes).
- Indirect reuse is a better approach for municipal supplies because of multiple protective barriers between discharge and reuse.
- There is uncertainty on the meaning and application of current laws regarding reuse. Legislation to clarify the laws and encourage reuse should be considered.

Need for Protection of Potential Supplies

- There are limited sites for reservoirs to increase the state's water supplies.
- There is opposition to almost all new reservoirs.
- Federal actions that prevent reservoir development have been made in the past and are under consideration.
- Legislative designation of unique reservoir sites is a critical step to protect future supplies.
- In addition to legislative designation of unique reservoir sites, the purchase of designated sites with state funds would enhance the development of future water supplies for Texas.

Need for Protection of Existing Supplies

- Reservoirs originally developed for water supplies face conflicting agendas from stakeholders – environmental interests, downstream landowners, recreational users.

- Environmental and recreational interests should be considered, but the water supplies we have already developed need to be protected so they are available for future use.

Financial Considerations in Plan Implementation

- The financial commitment required to implement plans is huge - $31 billion statewide from now through 2060 (2002 prices).
- Treatment and distribution of drinking water by local water suppliers generally costs even more than the raw water supply.
- Raw water supplies have historically been $0.25 to $0.65 per thousand gallons, while future supplies will cost up to $2.00 per thousand gallons, and more in some areas.
- Prudent long-term development of water supplies requires challenging short term costs. State participation can help, and additional funds are needed.
- The unit costs of water supply can be much higher in rural areas, with smaller populations to provide funding. Impacts on small, rural, and economically disadvantaged areas can be staggering. Continued state assistance will be needed here.

State Help Is Needed in Water Conservation

- Activities and recommendations of the Water Conservation Implementation Task Force were an important start.
- Many water conservation measures require the modification of individual behavior. Public awareness and support is essential for effective conservation efforts, and the state can play a key role in increasing awareness of water supply issues and encouraging water conservation by citizens.
- Conservation planning and decisions should be local, but the state has an important role.
  - Statewide information/public education campaign
  - Education for water suppliers
  - Technical resources and assistance
  - Studies of conservation programs and measures to show what is effective.
- Water conservation alone will not meet the future water needs of the state of Texas.

Uncertainties in Environmental Flow Policies

- Maintenance of proper environmental flows to protect streams, bays, and estuaries is important.
- In Texas, natural flows are highly variable. Environmental flow policies should also allow variability, including temporary low flows under drought conditions.
- Statewide program to implement environmental flows on the basis of sound science is needed.

Requirement for Consistency with State and Regional Water Plans

- Current laws require consistency with regional and state water plans for state permits and for state funding.
  - Water planning needs to be flexible to respond to changing conditions
  - Regional water planning is a broad process – permitting and project development requires far more detailed analysis, which can lead to better plans.
  - Although TWDB and TCEQ can waive requirements for consistency, they have been reluctant to do so.
  - Many regional water planning groups do not want to be in charge of the details of local planning.
- Following input from regional water planning groups, TWDB has proposed legislation to streamline the process for amending regional water plans, and this legislation should be passed.
- Laws and regulations governing planning should allow for alternative projects, which can be implemented if recommended projects encounter difficulties in permitting, financing, or construction.

Financing for Planning and Data Development

- The TWDB plays a key role in leading and overseeing state water planning efforts, and adequate funding for planning is essential.
- Reliable data is an essential part of all good planning.
- As the Federal government has decreased its support for data collection, Texas state agencies have helped fill the gap by increasing their programs.
- Increased state funding for data collection activities could make a big difference in future planning efforts. Examples include:
  - Stream flow gaging
  - Water quality data
  - More detailed information on water use
  - Data on conservation program implementation and effectiveness.

Senate Natural Resources Committee
Houston, Texas
August 8, 2006

W. E. West, Jr.
General Manager
Guadalupe-Blanco River Authority

Impediments to the Implementation of the State Water Plan

Impediments to implementation of the State Water Plan – "Best laid plans of mice and men". Whether the plan is on the back of an envelope or the product of an elaborate process, a plan is still just a plan. Those of us that have the responsibility to put these projects in place need your help. You have already heard about some of the impediments, therefore, I will focus on only those that are of particular concern for our region.

I. Interbasin Transfer of Surface Water Rights

The significantly expanded requirements of Section 11.085 of the Texas Water Code by Senate Bill 1, 75th Legislative Session has virtually prohibited projects associated with basin transfers. One of the factors leading to the cancellation of a major project moving water from the Guadalupe River to San Antonio in Region L was the obstacle, created by the expanded requirements of Section 11.085.

Interbasin transfers are a necessary means by which water is transported from supply sources to demand centers. There are over 150 interbasin permits on the books in Texas, not including the Rio Grande – only two permits have been granted since Section 11.085 was amended.

In the western states, interbasin transfers are a way of life. The west could have never been developed without interbasin transfers.

Water resource managers need relief from the restrictions on interbasin transfers added in 1997 and the State needs water.

II. Financing of Projects

Financing of proposed projects is the largest impediment to implementing the projects in the State Water Plan. Only the large cities with a substantial tax base have the ability to finance major water projects. Municipal bonds, supported by the city tax base, can be sold. Small cities do not have the tax base to sell these bonds. Support for long-term water projects can be a difficult issue for local office holders whose terms will end years before the twenty to thirty years typically required to develop a major project, and get the water to those who need it. Regional entities such as river authorities need take-or-pay contracts to support the sale of bonds, but the wholesale customers are hesitant to sign contracts that have a 10 to 15 year lead time for the development of a water project. Some entities are looking at joint public-private ventures to make water projects "affordable" to the end user. GBRA is actively negotiating with a private group for development of a groundwater supply project.

The Texas Water Development Board has several financing mechanisms in place that could provide a tremendous assistance to project sponsors -- the Water Infrastructure Fund and the State Participation Fund. The Texas Water Development Board has accessed the funding requirements for projects in the State Water Plan and Bill Mullican has briefed you on the level of funding required.

The State must expand current support for water supply infrastructure. The Legislature should consider appropriating funds to the Texas Water Development Board for debt service and grants to assist local and regional water providers to fill the "gap" for the amount of funding needed to develop new water supplies and related infrastructure in addition to existing programs and local resources.

III. Policy Issues

There are several key statewide issues that greatly complicate the planning process as well as the actual project implementation. First, there is the issue of return flows i.e. reuse either direct or indirect. Depending on the final determination by the Legislature on this issue, major adjustments may needed for some key assumptions in the current State Water Plan. If the amounts of return flows from major cities are materially changed, then alternative options must be developed for downstream users that historically have been dependent on the upstream return flows.

Second, the question of instream flows and bay and estuary requirements must be addressed. Current regional plans simply have "place holder" requirements around which the plans have been developed. The quantities were derived from the Consensus Environmental Criteria developed by the Texas Commission on Environmental Quality, the Texas Water Development Board, and the Texas Parks and Wildlife Department as temporary planning data. I served on the 2003 Study Commission on Water for the Environment created by the Legislature to evaluate options for providing adequate environmental flows. The report issued by the Commission was the basis for environmental flow legislation proposed in Article 1, Senate Bill 3, last session. As we all know Senate Bill 3 did not pass. Governor Perry subsequently issued an Executive Order creating the Environmental Flows Advisory Committee. The Legislature should pass statutory provisions similar to those in Article 1, House Committee Substitute Senate Bill 3 in light of the importance of balancing human water needs with the needs for instream flows and bay and estuary freshwater inflows and the need for greater certainty in water right permitting.

Third, the availability of groundwater for development must be determined. Until the "future desired conditions" of each aquifer is determined by the groundwater districts as provided last session in HB 1763, the amount of water available is in question. In Region L there are 20 ½ counties, 3 watersheds, 4 major aquifers, and 16 groundwater districts. The conjunctive use of surface and groundwater sounds good in theory, but putting it in practice is another story given the obstacles found in the Texas Water Code. One of the basic premises in Senate Bill 1 was for this plan, for the very first time, to include plans for groundwater use because the water needs for the next 50 years must be supplied by both surface and groundwater. We have relatively good estimates of surface water availability. We are making great progress on quantifying available groundwater supplies, but the amounts available for permitting from the groundwater districts vary greatly.

The last issue I would like to address is basically the foundation of the State's planning criteria. The question here is simply whether the foundation for our planning efforts will be based on bedrock or sand. There is currently debate between Region L Committee members as to what level of drought should be used for estimating water requirements now and in the future. Per the Water Code and Texas Water Development Board planning criteria:

•Drought of Record -- The period of time when natural hydrological conditions provided the **least** amount of water supply [TAC §357.2(2)].

•Regional water plan development **shall** include evaluation of adequacy of current water supplies legally and physically available to the regional water planning area for use during **drought of record** [TAC §357.7(a)(3)].

•Regional water planning groups **shall** provide water management strategies to be used during a drought of record [TAC §357.5(e)(2)]. [Emphasis mine]

The drought of record provides a challenging standard for our planning efforts. At least one major city has decided to use a significantly lesser standard. However, we should all be aware that planning for a drought less than the drought of record makes as much sense as planning for a category one hurricane when you have been hit with a category four in the past.

IV. Final Comment

Over the years I have participated in numerous State water planning efforts. Due to the concept and direction provided by the Legislature this effort has produced a nationally recognized product. The Legislature and the Texas Water Development Board are to be commended for their leadership.

However, there is one observation I would like to make. With all the good elements of the process there is a negative element. While the Texas Commission on Environmental Quality permitting process provides the ultimate approval for many projects, the current planning process is serving as a platform for special interest groups to derail needed projects. Remember, prior to the passage of Senate Bill 1 in 1997 the State produced water plans in

1961, 1968, 1984, 1990, 1992 and 1997. None of the plans were ever fully implemented and many of the participants in those efforts will tell you that the primary result of the planning effort was to organize the opposition to the various projects in the plans. The planning committees have no authority regarding the approval of projects, yet it is difficult to obtain project permit approval from the Texas Commission on Environmental Quality without the project being in an approved regional plan. In some cases the regional plans can be another big obstacle to putting a project in place.

Thank you for the opportunity to comment.

Appendix I

Funding Analysis of the State Role in Financing Texas' Water Needs

Prepared for
Senator Ken Armbrister, Chairman, Senate Natural Resources Committee
Senator Robert Duncan, Chairman, Senate State Affairs Committee
by
Texas Water Development Board

Draft September 9, 2004

EXECUTIVE SUMMARY

Texas will require significant investment in its water infrastructure over the next 50 years. While local and regional entities can generally finance most of the needed internal systems to treat and distribute water, or to collect and treat wastewater, state financial assistance is crucial to provide:

- Municipal water supply;
- Agricultural water supply, primarily through conservation; and
- Disadvantaged areas water treatment and distribution systems, and wastewater collection and treatment systems.

TWDB estimates that a state investment of $713.9 million over the next six years (average of $119 million per year) would provide the $3.0 billion required through 2011 for these purposes.

- $506 million over the next six years (average of $84.3 million per year) would provide the $2.4 billion required through 2011 in state assistance for water supply needs;
- $67.7 million over the next six years (average of $11.3 million per year) would provide the $133 million required through 2011 in state assistance for agricultural water conservation; and
- $140.2 million over the next six years (average of $23.4 million per year) would provide $462 million in assistance through 2011 for disadvantaged infrastructure needs. While this does not take care of the total ***immediate*** needs of these disadvantaged areas (estimated at $4.8 billion), the funds would be expected to leverage other resources, and also represents what TWDB expects can realistically be administered over this time period.

The legislature has given the TWDB a wide range of programs that can provide this assistance. However, the most crucial assistance will require a state subsidy to be effective, as well as legislative change. As requested by Senators Armbrister and Duncan, TWDB has compiled a list of revenue sources and annual revenue estimates to assist the legislature in exploring the use of dedicated sources of funding for crucial water needs. In order to measure the return on investment that may be possible by expanding the state role in water development, TWDB recommends that a cost/benefit analysis be conducted using various revenue sources to fund programs that target state assistance to water supply strategies and to disadvantaged communities, as described in this report.

INTRODUCTION

Texas' population is projected to grow substantially over the next 50 years, increasing from 21 million in 2000 to 40 million in 2050. According to the latest State Water Plan, *Water for Texas – 2002*, total projected demand for water is expected to increase by 18 percent over this same period. Planning and building an infrastructure to supply water to Texas communities, as well as assisting those communities that cannot afford to fund their own local infrastructure, are key to the safe provision of water to Texas residents and to ensuring public health and safety in Texas.

Over the years, the Texas Water Development Board's (TWDB) funding programs have evolved to better provide assistance with water-related projects in the state. With Senate Bill 1 (1997), the Texas Legislature acknowledged the need for state investment in water supply infrastructure by further improving the TWDB's financial assistance programs. As a result, the state currently has programs for funding disadvantaged communities in both the drinking water and clean water state revolving funds. In the years following Senate Bill 1, pursuant to legislative direction, the TWDB has also implemented limited new programs such as the Rural Water Assistance Fund, the Small Community Hardship Program in the Water Assistance Fund, and the Rural Water and Wastewater Fund. Additionally, statutes and rules are in place to implement the Water Infrastructure Fund (WIF) if funding is provided by future legislatures.

In 1997, the TWDB was given the ability to restructure the management of the TWDB's general obligation debt to allow better utilization of those programs and in 2001, the TWDB was given an additional $2 billion in general obligation bond authority by the voters of the state. Nevertheless, the first-ever State Water Plan generated from the regional water planning process created by Senate Bill 1 shows a need that will require a significant infusion of funds into the state's financing programs.

Projected needs in funding water-related projects through 2050 cannot be met solely through current levels of funding. The most acute gaps in funding that must be filled are those that will assure:

- Texas' communities have a drought-proof water supply, with a focus on allowing state participation in projects that promote optimum efficiency to achieve the lowest per-unit cost;
- agricultural water needs are met, with a focus on water conservation; and
- disadvantaged communities are able to meet their water and wastewater needs.

Prepared pursuant to a request by Senators Armbrister and Duncan (see Appendix 1), this report provides an overview of the need for funding for water and wastewater infrastructure in Texas, and of potential sources for such funding. The report includes a description of projected municipal, industrial, and agricultural water supply needs in the next 50 years, with a focus on funding those needs through 2011, and a similar review of water treatment and distribution, and wastewater project needs. The report includes a description of the potential funding sources for dedication to future water-related projects.

WATER AND WASTEWATER COSTS

The provision of water from its source to Texas' citizens requires an infrastructure system that includes:

- obtaining a source of water (water supply strategies);
- treating and distributing water; and
- collecting and treating wastewater.

Though many Texas cities are able to fund their own water treatment and distribution and wastewater needs, economically disadvantaged communities often require financial assistance. For this reason, economically disadvantaged communities are discussed separately.

Municipal and Agricultural Water Supply Strategy Costs

In January 2002, the TWDB released the first State Water Plan based on a bottom-up planning approach. *Water for Texas – 2002* documented approximately \$18 billion[i] in capital costs for key water management strategies needed to meet Texas' water supply needs through 2050 (Table 1). Of this amount, approximately \$16.2 billion is required for municipal water supply, and \$575 million will be needed for water supply for irrigated agriculture. The remaining \$1.2 billion consists primarily of capital costs associated with future needs of mining, manufacturing, and electric power generation, and are expected to be borne by individual and private funding sources. The ten-year projected (2000-2010) cost for municipal water supply strategies is \$4.9 billion, with approximately \$257.5 million of this amount estimated to be required for disadvantaged and small communities.

Water Treatment and Distribution Costs

Treatment and distribution costs of water through 2050 are estimated at approximately \$41.7 billion, with approximately \$6.7 billion of that needed in the first decade through 2010 (Table 1). The total costs associated with collecting and treating wastewater through 2050 is estimated to be \$47 billion, with approximately \$7.4 billion of that needed through 2010.

Water and Wastewater Treatment and Distribution in Disadvantaged Areas

Infrastructure costs for water and wastewater needs associated with disadvantaged areas are included within the statewide figures in Table 1. However, two recent studies provide more detailed information specific to disadvantaged areas. By utilizing these studies, a breakout of costs associated with disadvantaged areas can be obtained.

In 1989, the Texas Legislature directed the TWDB to create and implement the Economically Distressed Areas Program (EDAP). As part of its mandate, the TWDB completed a series of studies to identify water and wastewater needs of disadvantaged communities in EDAP-eligible counties.[ii] The latest study resulted in the *Assessment of Water and Wastewater Facility Needs for EDAP Counties,* published in 2003[iii]. This study specifically covers the 42 counties that were eligible for EDAP funding in 2002, and identifies approximately \$785 million in water and wastewater needs. Of this, approximately \$389 million is required for water needs and \$396 million is for wastewater needs.

Table 1: Water Supply Strategy Capital Costs, (in billions)*

Statewide	Through 2010	Through 2050
Municipal Water Supply Strategies (1)	$ 4.90	$ 16.2
Agricultural Water Supply (2)	$ 0.13	$ 0.58
Mining, Manufacturing, Electrical Power Generation (2)	N/A	$ 1.20
Subtotal		$ 17.98
Water Treatment and Distribution Systems (3)	$ 6.69	$ 41.67
Wastewater Collection & Treatment Systems (3)	$ 7.38	$ 46.99
State Total	$ 19.10	$ 106.64
Disadvantaged Communities**	**Existing Needs**	
Water Supply Strategies (1)	$ 0.26	
Water Treatment and Distribution Systems (4)	$ 2.21	
Wastewater Collection & Treatment Systems (4)	$ 2.34	
Disadvantaged Communities Total	$ 4.81	

Notes:
* In 2001 dollars
** Disadvantaged community figures are a subset of the statewide water and wastewater system numbers contained in this table.
Sources:
(1) *Infrastructure Financing Report*, TWDB, October 2002.
(2) *Water for Texas – 2002*, TWDB, January 2002.
(3) TWDB estimates, January 2002.
(4) *Assessment of Water and Wastewater Facility Needs for EDAP Counties*, FY 2002 TWDB Water Research Study, October 2003; and *Water and Wastewater Needs of Non-EDAP Eligible Disadvantaged Areas*, FY 2000-2001 TWDB Water Research Study, March 2001.

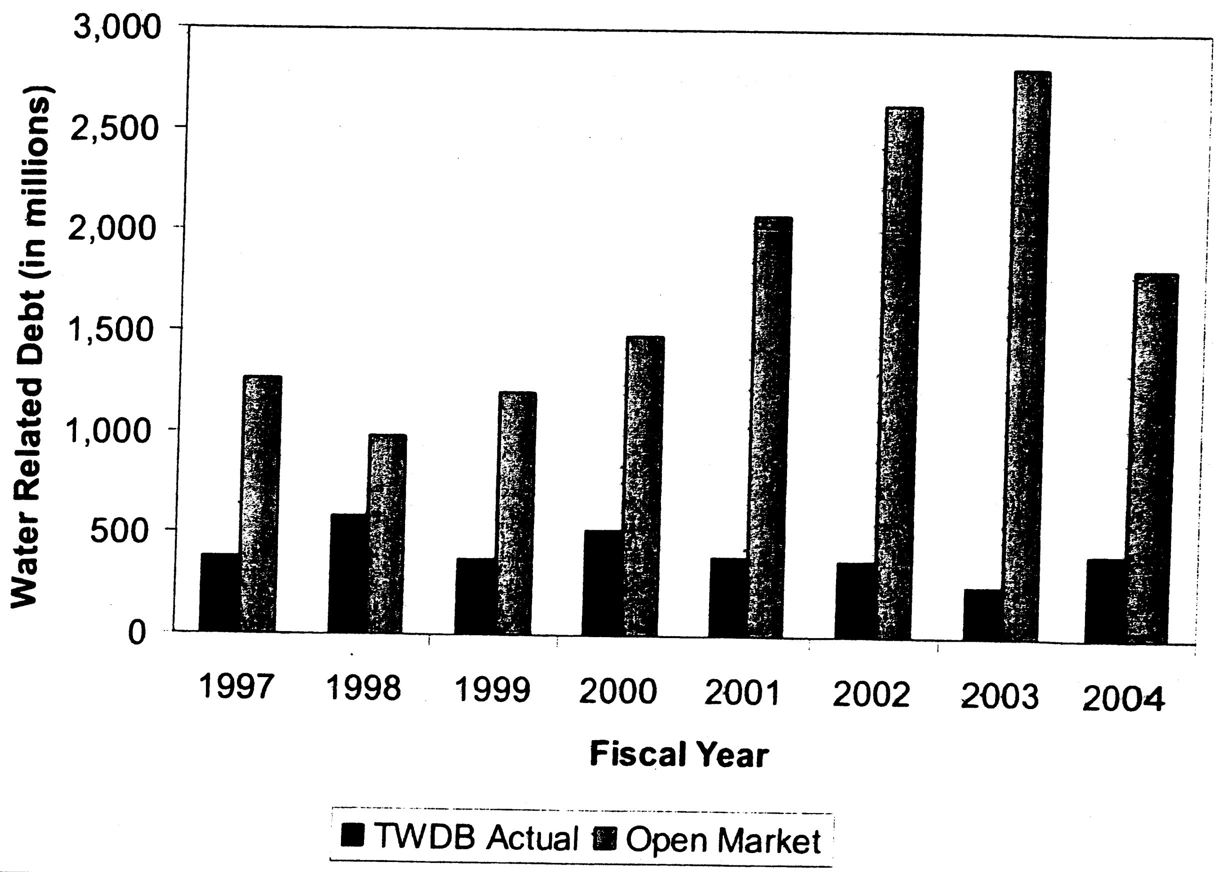
In 2000 the TWDB contracted a study entitled *Water and Wastewater Needs of Non-EDAP Eligible Disadvantaged Areas.*[iv] Published in March 2001, this "Statewide Needs Assessment" surveyed officials in counties not eligible for EDAP, requesting information pertaining to disadvantaged communities. The majority of the communities identified represent rural areas. The study identified $3.8 billion in water and wastewater infrastructure needs. Approximately $1.8 billion is needed for water infrastructure and $2.0 billion for wastewater.

Cost estimates in both studies represent immediate infrastructure needs ranging from first time facilities to upgrades of inadequate systems. Based on these studies, total statewide estimates of needs in disadvantaged areas equal $4.55 billion, comprised of $2.21 billion for water treatment and distribution and $2.34 billion for wastewater infrastructure (Table 1). These two studies represent the first time there has been an estimate of economically distressed areas water and wastewater infrastructure needs for the entire state based on detailed survey methods.

LOCAL AND REGIONAL ROLE

Investment by local and regional entities in water strategies and in water and wastewater treatment and conveyance projects primarily occurs through expenditures that are financed through the issuance of municipal bonds on the open market. Most financial assistance provided through the TWDB is evidenced by municipal bonds issued by the entity receiving the assistance. The following chart (Figure 1) shows the annual amount of issuance for the TWDB and all other market issues for water-related projects. On a state fiscal year basis, from 1997 to 2004, over $17.6 billion of bonds, sold in 2,367 different series, contributed to the development of local and regional projects[v] (Appendix 2, Table A2.1).

Figure 1: Water and Wastewater Debt Issued in Open Market, FY 1997-2004*



* The open market figure for 2004 may increase once final figures are reported.

STATE'S ROLE

This section analyzes the needs that cannot be funded by local and regional entities. Based on the historical issuance of bonds by local and regional entities to finance internal infrastructure discussed in the previous section, TWDB assumes that most water treatment and distribution needs, and all wastewater collection and treatment needs can be met by the local and regional entities **with the exception of disadvantaged areas.** This section, therefore, breaks needs down only by municipal water supply, agricultural water supply, and disadvantaged area needs for treatment, collection, and distribution.

In October 2002, in response to legislative mandate, the TWDB issued its *Infrastructure Financing Report: A Look Ahead at Water Supply Funding Needs* (IFR). In the IFR, the TWDB provided its evaluation of water supply funding needs for local political subdivisions, using information provided by the 16 Regional Water Planning Groups (Planning Groups). The data that follow are primarily from the IFR.

The data contained in previous sections regarding needs clearly indicate that there is a huge backlog of projects necessary to provide basic water and wastewater services to disadvantaged areas of the state. Additionally, based on project implementation activity observed at the regional water planning level, many entities are not proceeding to implement vital water supply strategies included in the first decade of needs of the 2002 State Water Plan. The analyses that follow are based on the premise that the funding of water supply strategies, including those for disadvantaged communities, should proceed at a rate equal to the annualized amount of need per year for the first decade of the 2002 State Water Plan, even though the beginning of the funding effort may be FY 2006. The funding sources are assumed to be direct appropriations, TWDB-issued general obligation bonds, and appropriations for debt service and on those bonds.[vi]

Municipal Water Supply Strategies

In the IFR, TWDB identified 129 projects with capital costs of approximately $4.9 billion that must be initiated by 2010. Of the total, TWDB estimates that local political subdivisions may need $2.4 billion in financial assistance through 2011 to implement these water supply projects (Table 2). Approximately $257.5 million (for 47 projects) of this overall $2.4 billion is attributable to disadvantaged and small communities (Table 1).[vii] TWDB estimates that $506 million[viii] (Table 2) in cash from the state is needed for the $2.4 billion in bonds and grants used for this financial assistance through 2011,[ix] with a total of approximately $1.3 billion in cash appropriations needed over the next 30 years for debt service on bonds issued through the 2011 period.

The estimated bonds and grants needed to provide state assistance, as well as the associated general or dedicated revenues needed through FY 2011 are (Table 2):

- $300 million ($100 million per biennium) of bonds issued to fund State Participation[x] for optimum sizing of regional projects.
    - Appropriations required: $63 million total during the next three biennia for debt service on the bonds issued for this purpose.
- $207.1 million in grant assistance, consisting of $156.7 million in 100 percent grants to disadvantaged communities statewide; $50.4 million in 50 percent grants for small communities.[xi]
    - Appropriations required: $207.1 million total to the Water Infrastructure Fund (WIF)[xii] evenly spaced over the next three biennia.
- $1.7 billion in bonds issued over the three biennia to fund below-market interest rate loans. This would include $50.4 million in loans for small communities to match the 50 percent grants described previously.
    - Appropriation required: $191.9 million total during the next three biennia to pay debt service not covered by the below-market-rate loans.
- $207.1 million for up-front permitting costs of projects. These projects would access the WIF's below-market-rate loans with 10-year payment deferrals of principal and interest.[xiii]
    - Appropriation required: $44.2 million total through the next three biennia for debt service.

Table 2: Water Supply Strategies (in millions)

Grants & Bond Issuance							
Fiscal Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
Grants (10% of Assistance)	$34.52	$34.52	$34.52	$34.52	$34.52	$34.52	**$207.10**
Loans w/10 year deferral (10% of Assistance)	$34.52	$34.52	$34.52	$34.52	$34.52	$34.52	**$207.10**
Loans (80% of Assistance)	$276.14	$276.14	$276.14	$276.14	$276.14	$276.14	**$1,656.81**
State Participation	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	**$300.00**
Totals	$395.17	$395.17	$395.17	$395.17	$395.17	$395.17	**$2,371.00**

Projected Appropriations							
Fiscal Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
Grants (direct appropriations)	$34.52	$34.52	$34.52	$34.52	$34.52	$34.52	**$207.10**
Loans w/10 year deferral (debt service)	$1.98	$4.13	$6.29	$8.45	$10.60	$12.76	**$44.22**
Loans (debt service)	$20.60	$25.16	$29.71	$34.26	$38.82	$43.37	**$191.93**
State Participation (debt service)	$2.98	$6.23	$9.48	$12.17	$14.87	$17.28	**$63.00**
Totals	$60.07	$70.04	$80.00	$89.40	$98.80	$107.93	**$506.25**

Agricultural Water Supply Strategies[xiv]

Of the $575 million needed to complete water management strategies to meet the 50-year needs for irrigated agriculture identified in the 2002 State Water Plan, $133 million is estimated to be needed for the first decade (2000-2010). Conservation-type activities represent 95 percent of this total estimated cost. TWDB assumes that grants are needed to provide this funding, as past TWDB experience shows there is little demand for state loan funds for agricultural water conservation projects. Senate Bill 1053 of the 78th Legislative Session consolidated all previous agricultural water conservation programs of the TWDB into a single fund, combining assets from a prior Trust Fund and loan funds to be made available to invest in the agriculture sector, including incentives and highly visible demonstration initiatives.

Experience in funding of agricultural initiatives shows that having state grant funds available to match local and federal resources leverages the state capital, and provides a more efficient and effective delivery mechanism for funding than low interest loans. Federal Environmental

Quality Incentives Program (EQUIP) funding provided through the Natural Resources Conservation Service, is being made available to fund conservation projects. Border canal systems have been targeted for assistance through the Lower Rio GrandeValley Water Resources Conservation and Improvement Act, and land stewardship activities that include range management are growing across many watersheds and receiving interest from other federal agencies.

Using a portion of the remaining agricultural water conservation bond authority, combined with the loan repayments and investments in the fund, over $133 million in grants for projects and equipment could be provided in the next three biennia. Approximately $ 67.8 million in appropriations will be needed for debt service on the bonds issued for these grants over the same period. If federal funds are leveraged, this investment could grow to two to three times the amount of funding provided and based on prior experience, would result in saving approximately 2.8 million acre/ft of water per year by 2050.

Table 3. Agricultural Water Conservation Strategies (in millions)

Fiscal Year	2006	2007	2008	2009	2010	2011	Total
Grants*	$22.20	$22.20	$22.20	$22.20	$22.20	$22.20	**$133.20**

Projected Appropriations

Fiscal Year	2006	2007	2008	2009	2010	2011	Total
Ag Bond (debt service)	$1.12	$4.88	$9.29	$13.39	$17.50	$21.59	$67.77

* funded with bond proceeds

Water and Wastewater Treatment and Distribution in Disadvantaged Areas

As identified earlier in this report, recent studies indicate an immediate $4.6 billion need in disadvantaged communities statewide for water and wastewater collection, treatment and distribution infrastructure. The 1989 EDAP program resources are exhausted, and a constitutional referendum would be required to authorize additional bonds for the original program. Other existing TWDB funding programs do not adequately meet the needs of these communities, which historically have required grant funding in order to successfully complete and sustain their projects. For illustration, it is assumed that a new program, similar to the EDAP, would be made available statewide to disadvantaged communities. As modeled, the proposed program would have funds available in the form of grants and loans, at a ratio of 90 percent grant and 10 percent loan. Facility planning grants would also be available.

The magnitude of total assistance needed would be unmanageable if implemented at one time. Therefore, the program is assumed to be phased. A first phase of $450 million in grants for construction over the next three biennia (2006-2011) represents three times the rate ($25 million in bonds issued per year) originally authorized for the EDAP. An additional $2 million per year would be used for planning grants. A program structured in this manner would require appropriations of $140.2 million through 2011. Annually, this would allow for $75 million in design and construction grants/loans and $2 million in facility planning grants over the six year period. It is anticipated that, similar to the original EDAP, the new program would be leveraged with federal grants to speed up the implementation of these vital infrastructure projects. Table 4 below provides further breakout of the associated costs and available assistance.

Table 4. Statewide Disadvantaged Infrastructure Strategies (in millions)

Grants & Bond Issuance							
Fiscal Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
Facility Planning Grants	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	**$12.00**
Grants	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	**$450.00**
Totals	$77.00	$77.00	$77.00	$77.00	$77.00	$77.00	**$462.00**

Projected Appropriations							
Fiscal Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Total**
Facility Planning Grants (direct appropriations)	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	**$12.00**
Grants (debt service)	$6.54	$12.47	$18.40	$24.33	$30.27	$36.20	**$128.21**
Totals	$8.54	$14.47	$20.40	$26.33	$32.27	$38.20	**$140.21**

TWDB FINANCIAL ASSISTANCE PROGRAMS

The Regional Water Plans and IFR recommend that the state should have a broader role in providing funding for water supply projects. The legislature has, over time, significantly expanded the TWDB's financial programs in an attempt to address gaps in funding. (See Appendix 3). Current TWDB financial assistance programs appear to have most of the legal authority to address proposed water management strategies and to address the projects needed for disadvantaged communities. However, current funding sources do not allow full use of the legal authority provided.[xv] Two crucial programs, the Rural Water Assistance Fund (RWAF)[xvi] and Water Infrastructure Fund (WIF), were authorized in 2001 specifically to fill funding gaps. Money has never been appropriated or dedicated to these funds. The State Participation Program, structured for optimum-sizing of projects that ultimately are most cost effective, requires an initial influx of general revenue for it to succeed. Table 5 provides a summary of the TWDB programs available for projects. A full discussion of TWDB's programs is found in Appendix 4.

Table 5. TWDB Programs

Program	Grant / Loan	Inception Date	Funded (1) FY 98-04	Approximate Annual Amount Available (2)
Agricultural Water Conservation Bond Program	Loan	1985	**$32,145,000**	**$300,000**
Clean Water State Revolving Fund	Loan	1987	**$1,992,397,599**	**$353,000,000**
Colonia Plumbing Loan Program	Loan	1991	**$687,500**	**$100,000**
Colonia Self-Help Program	Grant	2001	**$389,385**	**$250,000**
Colonia Wastewater Treatment Assistance Program	Grant	1993	**$208,526,827**	**(3)**
Drinking Water State Revolving Fund	Grant/Loan	1997	**$417,369,941**	**$95,800,000**
Economically Distressed Areas Program	Grant/Loan	1989	**$59,725,198**	**(4)**
Rural Community Water & Wastewater Fund	Loan	2001	**$1,350,000**	**(5)**
Rural Water Assistance Fund	Loan	2001	**$35,160,000**	**$25,000,000**
State Participation	State ownership repurchased	1962	**$117,705,000**	**(6)**
Texas Water Development Fund I & II	Loan	1957/1997	**$672,362,450**	**$75,000,000**
Water Assistance Fund	Grant/Loan	1981	**$8,056,732**	**(7)**
Small Community Hardship Program	Grant	2004	**$3,500,000**	**(5)**
Water Infrastructure Fund	Grant/Loan	2001	**$0**	**(8)**
Total			**$3,549,375,632**	**$549,450,000**

(1) Only includes commitments approved by the TWDB since FY 1998 and closed as of July 19, 2004.

(2) Based on annual bond issuances, historical demands, or actual annual available amounts as appropriate

(3) $300 million total authorized through Federal Appropriations. Currently all funds are allocated to ongoing projects.

(4) $37 million in authorized but unused bonds are allocated to ongoing projects.

(5) Funding dependent upon direct appropriations; currently no appropriation.

(6) Funding dependent upon legislative authority to issue bonds, with associated appropriation for debt service; currently no appropriation.

(7) Funds from Texas Water Resource Finance Authority allocated for FY 05. Reduced projections for future years.

(8) Program created, however, no funding appropriated.

POTENTIAL REVENUE SOURCES

Pursuant to a request from Senators Armbrister and Duncan, this section discusses potential revenue sources that could fund the needed state role in water-related projects. Recommendations in the Regional Water Plans and in the IFR indicate that the state should have a broader role in providing funding for water projects. This includes additional funding sources such as general revenue appropriations, dedicated revenue sources, and additional bond authorization. Without these additional resources, implementation of the strategies and projects recommended in the State Water Plan will be difficult to achieve.

Dedicated Funding Sources Considered in Prior Legislative Sessions

In prior legislative sessions, Senate and House committees gave consideration to creating dedicated funding for water programs. Table 6 provides a summary of dedicated sources and amounts of funds for water-related projects considered during the development of past legislation and for which estimates are available. Appendix 5 provides a detailed description of these fees, and how they were calculated.

Planning Group Input

While the Planning Groups recommend a wide range of options for addressing funding shortages, a review of the 16 surveys conducted by the Planning Groups for the 2002 IFR indicates the broadest support for the following four recommendations:

- A tax on the sale of bottled water;
- Appropriation of general revenue;
- Increased authorization and use of state general obligation bonds; and
- Appropriation of state matching funds to take full advantage of federal grant assistance.

Eight of the 16 Planning Groups support some form of tax on the sale of bottled water as a dedicated source of revenue to help political subdivisions pay for water supply projects.

Table 6. Potential Dedicated Revenue Sources for Water Infrastructure for which Estimates are Available*

	Estimated Revenue Generated (in millions)
Authorized water rights fee [a]	Estimates may range from $3.6 to $213.07depending on the exemptions and rate structures imposed
Reported use fee [b]	$17.7 in 2010 $18.1 in 2020
Public water supply connection fee [c]	$75.4
County assessed water fee [d]	$ 20.9 in 2000 $ 24.5 in 2010 $ 28.8 in 2020
Sales tax on water and wastewater [e]	$ 234.2 in 2002 $ 253.8 in 2006
Bottled water fees	
Fee on receipts [f]	$0.87
5 cent surcharge per bottle [g]	$ 52.1 in 2002 $ 65.2 in 2006
Sales tax per bottle [h]	
taxed at 6.25 percent	$ 55.4 in FY 2005 rising to $ 67.4 in FY 2009
taxed at 6.75 percent	$ 59.3 in FY 2005 rising to $ 72.1 in FY 2009
taxed at 7.5 percent	$ 64.9 in FY 2004 rising to $ 78.9 in FY 2009
Tiered residential use fee [c]	$ 8.5 million (exempting use of ≤ 7000 gallons) $ 9.1 million (exempting use of ≤ 5000 gallons)

* See Appendix 5 for detailed estimates

[a] Based on Total Authorized Water Rights (7/30/2004) TCEQ.

[b] Based on projected demand under drought conditions. *Water for Texas - 2002*

[c] Based on TWDB Water Use Survey, 2000. Number of connections may include some sales to industry.

[d] Based on projected population. *Water for Texas - 2002*

[e] LBB, 2001. Fiscal Note for introduced version of SB 2.

[f] HB 1802 staff working papers. 1997.

[g] LBB, 2001 Fiscal Note for engrossed version of SB 2

[h] Texas Comptroller. May 2004.

Other fees

Below is a list of further dedicated sources of revenue that might be considered, but for which no revenue estimates are available.

- Surcharge on fishing licenses
- Surcharge on hydroelectric production
- Surcharge at water parks
- Annual permit fees at TCEQ for all public water systems
- Charge on all groundwater permits
- Hotel-Motel tax

Additional Studies Needed

Finally, these fees require additional research. Revenue estimates for these additional fees, and a thorough economic impact analysis related to the establishment and implementation of dedicated funding sources for water infrastructure projects, is also clearly necessary.

RECOMMENDATIONS

In order to provide for Texas' water supply and water and wastewater infrastructure needs that cannot be met by local, regional or federal entities, TWDB makes the following recommendations:

- State assistance should focus on financing gaps associated with implementation and funding for:
  - regional water supply projects; +
  - disadvantaged communities; and
  - agricultural and municipal water conservation.

- State general revenues or dedicated revenues should be made available to allow existing state assistance programs to offer:
  - grants for research into water conservation techniques and innovative technologies (such as desalination);
  - grants for agricultural water conservation equipment, which will leverage matching federal funds
  - payment deferrals for planning, design, and environmental and other permitting activities;
  - grants, zero-interest loans and below-market loans to disadvantaged communities; and
  - state participation projects.

- Conduct a cost/benefit analysis of using various revenue sources to fund programs that target state assistance to water supply strategies and to disadvantaged communities, as described in this report.

- Provide additional general obligation bond authority for TWDB.
- Statutory authority should be provided to allow TWDB the flexibility to offer grants for water and wastewater projects using state general obligation bond proceeds.

- Remove the statutory prohibitions (Water Code Section 15.974) that limit the WIF to no more than 10 percent in each of the following areas:
    - grants and low or zero-interest loans; and
    - loans at or below-market interest rates for planning, design and permitting costs, including a 10-year deferral on principal and interest.

- Funding should be provided for adequate staffing for expanded financial assistance programs, including outreach assistance and development of training programs in financial and technical management.

APPENDIX 1

The Senate of
The State of Texas
Austin, Texas 78711

April 13, 2004

Mr. J. Kevin Ward
Executive Administrator
Texas Water Development Board
1700 N. Congress Avenue
Austin, Texas 78711-3231

Dear Mr. Ward:

As you know, in order to fully implement the State Water Plan for this state, bold decisions, that will impact our state for many years to come, must be made. The Texas Water Development Board, the Regional Water Planning Groups, and the citizens of this state continue to do a remarkable job identifying needs and solutions, and it is time that we advance implementation mechanisms.

In continuing to explore opportunities for providing state financial assistance for the implementation of the State Water Plan, we request that the Texas Water Development Board consider conducting research to develop estimates of the revenue that could be generated through a variety of potential funding sources, including interactions with a formal stakeholders process.

We plan to be aggressive with the results and pragmatic with our approach. We believe that this research and stakeholders process will be of great value to us in the Legislature and to the many others in our state in implementing the State Water Plan.

If you have any questions on this matter, please contact our offices.

Very truly yours,

Robert Duncan
Chairman
Senate State Affairs Committee

Ken Armbrister
Chairman
Senate Natural Resources Committee

cc: Lieutenant Governor David Dewhurst

TEXAS WATER DEVELOPMENT BOARD

E. G. Rod Pittman, *Chairman*
William W. Meadows, *Member*
Dario Vidal Guerra, Jr., *Member*

J. Kevin Ward
Executive Administrator

Jack Hunt, *Vice Chairman*
Thomas Weir Labatt III, *Member*
James E. Herring, *Member*

June 14, 2004

The Honorable Kenneth Armbrister
Chairman
Senate Committee on Natural Resources
Room 1E.14, Capitol Building
Austin, TX 78701

The Honorable Robert Duncan
Chairman
Senate Committee on State Affairs
Room 3E.12, Capitol Building
Austin, TX 78701

Dear Chairmen Armbrister and Duncan:

This letter is in response to your April 13, 2004 letter requesting the Texas Water Development Board (TWDB) consider conducting research to develop estimates of revenue that could be generated through a variety of potential funding sources to implement strategies and projects recommended in the 2002 State Water Plan.

The TWDB is moving forward with this request. Within the next 45 days, we will present you with a report that provides a comprehensive overview of the need for funding for strategy and project implementation and frames related policy issues. Specifically, this report will include: an overview of our progress in implementing legislatively mandated financial assistance programs; a description of financial assistance programs currently available for funding projects in the 2002 State Water Plan; progress toward meeting rural and disadvantaged communities' needs for basic water and sewer infrastructure; projected funding needs; and potential revenue sources.

On a parallel track, the TWDB recently published a Request for Qualifications (RFQ) in the *Texas Register* on April 30, 2004 to develop recommendations for establishing dedicated funding sources (see Attachment A). We anticipate receipt of statements of qualifications from interested research firms to assist in this endeavor by mid-June. After careful consideration, we determined that the expertise needed to provide comprehensive revenue estimating and impact analyses would require the use of outside consultants. The attached work plan outlines the proposed process for this effort (see Attachment B).

Our Mission
To provide leadership, planning, financial assistance, information, and education for the conservation and responsible development of water for Texas.
P.O. Box 13231 • 1700 N. Congress Avenue • Austin, Texas 78711-3231
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URL Address: http://www.twdb.state.tx.us • E-Mail Address: info@twdb.state.tx.us
TNRIS - The Texas Information Gateway • www.tnris.state.tx.us
A Member of the Texas Geographic Information Council (TGIC)

After our submittal of the TWDB report, we plan to structure the RFQ consultant contract in a manner that will allow us to obtain direction and guidance from each of you, other legislative leaders, and stakeholders to ensure the final report meets expectations. My staff will make every effort to ensure that the final report identifies all available revenue sources that may be considered and related economic impacts of implementation to the state. This report will also highlight the benefits for rural and urban sectors.

We welcome your comments and look forward to briefing you on the status of this effort in the near future.

Respectfully,

J. Kevin Ward

J. Kevin Ward
Executive Administrator

Attachment A:	April 30, 2004 Notice Published in *Texas Register*
Attachment B:	Work Plan

c w/attachments: Board Members

APPENDIX 2

Table A2.1 Water and Wastewater Related Debt Issued in the Open Market FY 1997-2004

	COMPOSITE AVERAGE*		TWDB ACTUAL		TOTAL UNIVERSE IN TEXAS		TDWB's $ Volume Market Share
Fiscal Year	Water Related Debt	# of Issues	Water Related Debt	# of Issues	Water Related Debt	# of Issues	
1997	$1,261,014,599.00	185	$380,528,560.00	82	$1,641,543,159.00	267	23.18%
1998	979,376,962.50	162	584,018,000.00	102	1,563,394,962.50	264	37.36%
1999	1,199,342,500.00	209	376,617,556.00	92	1,575,960,056.00	301	23.90%
2000	1,485,921,450.00	240	518,344,659.65	84	2,004,266,109.65	324	25.86%
2001	2,081,473,070.05	218	387,197,000.00	72	2,468,670,070.05	290	15.68%
2002	2,636,274,355.88	219	375,995,000.00	74	3,012,269,355.88	293	12.48%
2003	2,822,927,957.25	245	250,295,000.00	72	3,073,222,957.25	317	8.14%
2004	1,834,558,931.00	260	409,941,000.00	52	2,244,499,931.00	312	18.26%
Total	**$14,300,889,825.68**	**1,737**	**$3,282,936,775.65**	630	**$17,583,826,601.33**	**2,367**	18.67%

* Data represent average amounts obtained from the Texas Bond Review Board and the Texas Municipal Advisory Council

APPENDIX 3

Although the TWDB's authorization and role in funding water and wastewater projects has evolved over time, the greatest changes were made in:

- 1981: Water Assistance Fund (WAF) and sub-accounts (Water Loan Assistance Fund and Research and Planning Fund, State Participation Account)
- 1985: Purposes of State Participation Program expanded; flood control and agricultural water conservation purposes added to state bond programs; general obligation bond authority increased, Agricultural Trust Fund created with money from WAF
- 1987: State Water Pollution Control Revolving Fund (CWSRF)
- 1989: Economically Distressed Areas Program
- 1991: Colonia Plumbing Improvement Loan Program
- 1997
  - Increased general obligation bonding authority
  - Development Fund II to implement changes to structure of bonding program to provide more efficiency in use of funds, segregation of State Participation Account flow of funds
  - Increased projects eligible for grants from WLAF
  - Drinking Water SRF and its disadvantaged program
- 2001
  - Rural Water Assistance Fund (RWAF)
  - Colonia Self-Help Program
  - Water Infrastructure Fund (WIF)
  - Rural Community Water and Wastewater Loan Fund
  - Increased general obligation bond issuance authority ($2 billion); allowed 100 percent state ownership in projects.
- 2003
  - Consolidated agricultural water conservation programs, created linked deposit program
  - Linked deposit for nonpoint source pollution control projects in CWSRF

APPENDIX 4: TWDB PROGRAMS

STATE PROGRAMS

TEXAS WATER DEVELOPMENT FUND I and II
(other than EDAP and State Participation)

- **Source of Funds**: TWDB issued General Obligation (G.O.) Bonds.
- **Bond Repayment**: Revenue from loan repayments from political subdivisions.
- **Eligible uses**: Since 1957, the Texas Water Development Fund I has been authorized to provide loans for water supply, water quality enhancement (sewer), flood control and state participation. In November 1997, the Texas Constitution was amended to create Texas Water Development Fund II, the main purpose of which was to modernize the flow of funds and maximize the use of the remaining bond authorizations. Approximately $25 million per year used to provide state matching funds for the CWSRF and DWSRF programs.
- **Borrower's Advantage**: Political subdivisions and water supply corporations that borrow from the fund receive a lower interest rate than they might otherwise receive due to the TWDB's superior credit rating.
- **Constraints**: Projects funded are those that cannot go to the market and are either too urgent to meet deadlines or are ineligible for the CWSRF and DWSRF (see, Federal Programs discussed later in this report). Statutory or constitutional restrictions prevent the proceeds from being used to provide grants to political subdivisions, or any financial assistance to individuals or private entities.
- **Amount available**: To date, the TWDB has sold over $2 billion of these bonds. The TWDB is authorized to provide up to $4.68 billion in Texas Water Development Bonds ($2.3 billion in bond authorization remaining).
- **Total Funds Provided Since September 1, 1997 (FY1998)**:

Outstanding Commitments	Loans Closed	Total
$ 95,830,000	$ 576,532,450	$ 672,362,450

ECONOMICALLY DISTRESSED AREAS PROGRAM (Development Funds)

- **Source of Funds**: TWDB issued state G.O. bonds.
- **Bonds Repayment**: Approximately 90 percent general revenue appropriation; approximately 10 percent revenue from loan payments from political subdivisions.
- **Eligible uses**: Grants and loans for the construction, acquisition or improvements to water supply and wastewater collection and treatment works, including all necessary engineering work.
- **Borrower's Advantage**: Assistance provided primarily as grants, with a loan amount determined by the capital contribution available from the rates to be paid by the customer base.
- **Constraints**: The program applies only to areas of the state meeting the definition of an "economically distressed area," primarily in counties along the Texas/Mexico border.
- **Amount available**: G.O. Bond authorization of $250 million; only $213 million has been issued due to appropriation limitations.
- **Total Funds Provided Since September 1,1997 (FY1998)**:

Outstanding Commitments	Loans & Grants Closed	Total
$ 1,880,739	$57,844,459	$ 59,725,198

STATE PARTICIPATION (Development Funds)

- **Source of Funds**: Board issued G.O. Bonds issued under the authority provided for Dfund I and II.
- **Bond Repayment**: General Revenue appropriations pay the related debt service until a sufficient rate base develops in the project area to allow local participants to purchase the State's interest. Ultimately, the state recovers the total amount of bonds and appropriations from the local government.
- **Eligible uses**: Water, wastewater, and flood protection projects to be "built for the future" using both local and state funding. Local interests pay for the portion of the project that meets current and near term-projected needs. The state purchases the portion of an eligible facility that results in excess capacity above current and near term-projected needs that is beyond the ability of the current rate-paying base to ensure the optimal development of the project. The state may purchase an ownership interest in such excess capacity of the eligible regional facility of up to 100 percent.
- **Borrower's Advantage**: Local governments obtain economies of scale for projects that are beyond their current financial capability. In addition to interest savings, the program reduces the necessity and added capital expense of building new structures or replacing undersized structures in the future. The Board's experience has been to fund projects producing over 30 percent in capital savings.
- **Constraints**: Legislature has limited the funding level each biennium in the appropriations bill.
- **Amount provided**[xvii]: $50 million for FY1998-1999; $50 million for FY2000-2001; $35 million[xviii] for FY 2002-2003; $0 for FY 2004-2005
- **Total Funds Provided Since September 1, 1997 (FY 1998)**:

Outstanding Commitments	Assistance Closed	Total
$ 25,260,000	$ 92,445,000	$ 117,705,000

AGRICULTURAL WATER CONSERVATION LOAN AND GRANT PROGRAM

- **Source of Funds**: Agricultural Water Conservation Fund, which was consolidated with the Agricultural Water Trust Fund and the Agricultural Soil and Water Conservation Fund, resulting in total existing assets of approximately $20 million, together with TWDB authority to issue state G.O. bonds.
- **Bond Repayment**: Revenue from loan repayments from political subdivisions; legislative appropriation for debt service for special projects.
- **Eligible uses**:

  ◊ Grants to state agencies, political subdivisions (such as soil and water conservation districts, irrigation districts and groundwater conservation districts) for conservation programs (such as technical assistance, research, demonstration, technology transfer, or educational programs) or conservation projects (such as irrigation systems efficiency improvements, converting irrigated land to dryland and improving dryland use of natural precipitation, installing water meters, and brush control activities);

  ◊ Loans to political subdivisions for conservation programs or conservation projects or to make loans to individual farmers and ranchers; or

  ◊ Linked deposits to local lending institutions (such as banks or farm credit associations) to make loans to individuals for conservation projects.
- **Borrower's Advantage**: Grants and subsidized loans.
- **Constraints**: Limited to cash on hand and bond authority.
- **Amount available**: G.O. Bond authorization not to exceed $200 million; $ 35.16 million has been issued to date.
- **Total Funds Provided Since September 1, 1997 (FY1998)**:

Outstanding Commitments	Loans & Grants Closed	Total
$ 0	$ 32,145,000	$ 32,145,000

WATER LOAN ASSISTANCE FUND OF THE WATER ASSISTANCE FUND

- **Source of Funds**: An initial appropriation and periodic appropriations from the Legislature, transfers of funds available from the Texas Water Resources Finance Authority (TWRFA). A recent donation from a water-related organization is designed specifically to fund a water conservation education research effort.
- **Eligible uses**: The Water Assistance Fund consists of various sub-funds. The most relevant for financing of water and wastewater projects is the Water Loan Assistance Fund that provides assistance in the form of loans and limited grants for water conservation, water development, water quality enhancement, flood control, drainage, recharge, brush control, weather modification, regionalization, and desalination.
- **Borrower's Advantage**: Grants and lower interest loans may be available. Provides pre-construction funding.
- **Constraints**: Limited by legislative appropriations or availability of TWRFA funding
- **Amount provided**:
- **Total Funds Provided Since September 1, 1997 (FY1998)**:

Outstanding Commitments	Loans Closed	Total
$986,400	$ 7,070,332	$ 8,056,732

WATER INFRASTRUCTURE FUND

- **Source of Funds**: No funding to date. May be funded with appropriations and fees or revenues from legislature, gifts, grants and donations, other available sources.
- **Bond Repayment**:
- **Eligible uses**:
  - Loans for projects to political subdivisions, at or below market rates
  - Grants, or low-or-zero-interest loans for projects outside metropolitan areas to ensure implementation of projects, or for economically distressed areas (but not to exceed 10 percent of financial assistance each year)
  - Loans for planning and design, permitting, and state and federal regulatory activities, at or below market rates, with deferral of principal and interest payments for up to 10 years, or until construction begins
  - Economic Development Programs
- **Borrower's Advantage**: Up-front funding for preliminary project costs with payment deferral; low interest loans or grants
- **Constraints**: Program has not been funded
- **Amount provided**: None
- **Total Funds Provided Since September 1, 2001 (program inception)**:

Outstanding Commitments	Loans Closed	Total
$ 0	$ 0	$ 0

RURAL WATER ASSISTANCE FUND

- **Source of Funds**: Currently funded with TWDB-issued G.O. bonds using the state's Private Activity Bond Cap to access tax-exempt rates. Appropriations are a possible future source of funds.
- **Bond Repayment**: Revenue from loan repayments from political subdivisions.
- **Eligible uses**: Water and wastewater projects for political subdivisions and water supply corporations.
- **Borrower's Advantage**: Below market loans for terms of up to 40 years. Additionally, water supply corporations are exempt from paying sales taxes for any project financed through the RWAF.
- **Constraints**: Unless appropriated funds become available to supplement the program, it will remain economically unavailable for a great majority of the communities it is designed to help, since most of these communities need some sort of increased subsidy for their infrastructure. The program is restricted to rural communities with service area ≤ 10,000 population or that otherwise qualifies for financing from a federal agency, or to counties in which no urban area exceeds 50,000 population.
- **Amount provided**: $50 million for FY 2002-2003; $25 million for FY 2004.
- **Total Funds Provided Since September 1, 2001 (program inception)**

Outstanding Commitments	Loans Closed	Total
$ 25,538,000	$ 9,622,000	$ 35,160,000

COLONIA SELF-HELP PROGRAM (Water Assistance Fund)

- **Source of Funds**: Currently funded from future payments of TWRFA. Potential funding sources include legislative transfers, and gifts, grants and donations.
- **Bond Repayment**: Not applicable.
- **Eligible uses**: Water and wastewater projects sponsored by non-profit organizations that rely on community residents' labor to help construct the project.
- **Borrower's Advantage:** 100 percent grant funds.
- **Constraints**: Limited funding; limited to non-profit organizations.
- **Amount provided**: No funds appropriated; TWDB using TWRFA proceeds as may be available
- **Total Funds Provided Since September 1, 2001 (program inception)**:

Outstanding Commitments	Grants Closed	Total
$310,208	$79,177	$389,385

SMALL COMMUNITY HARDSHIP PROGRAM (Water Assistance Fund)

• **Source of Funds**: TWDB initiated this program based on legislatively expanded ability to make grants from the Water Loan Assistance Fund by using funds available from TWRFA. Appropriations are a potential future source.

• **Bond Repayment**: Not applicable.

• **Eligible uses**: Water and wastewater projects in communities with populations of 5,000 or less.

• **Borrower's Advantage**: Up to 90 percent of project costs not to exceed $1 million in grant funds

• **Constraints**: Limited funding. Program will need to access funds that allow reduced rate loans and grants to be useful.

• **Amount provided**: $3.47 million

• **Total Funds Provided Since July 1, 2004 (program inception)**:

Outstanding Commitments	Loans Closed	Total
New program without any commitments or loans to date		

RURAL COMMUNITY WATER & WASTEWATER LOAN FUND

• **Source of Funds**: General Revenue. Appropriations also legally available: Water Assistance Fund transfers

• **Bond Repayment**: n/a

• **Eligible uses**: Loans to rural communities for water and wastewater projects

• **Borrower's Advantage**: Loan agreement, may use sales tax as revenue pledge

• **Constraints**: Limited to cities and counties with population less than 5,000, or districts or authorities of similar population located outside cities ETJ

• **Amount provided**: $520,000 for FY 2002-2003; $830,000 for FY 2004-2005

• **Total Funds Provided Since September 1, 2001 (program inception)**:

Outstanding Commitments	Loans Closed	Total
$ 0	$ 0	$ 0

FEDERAL PROGRAMS

CLEAN WATER STATE REVOLVING FUND

- **Source of Funds**: Annual federal capitalization grants matched with TWDB issued revenue bonds and loan repayments deposited back into the fund.
- **Bond Repayment**: No repayment of the federal grant required; Revenue from loan repayments from political subdivisions for the G.O. bonds.
- **Eligible uses**:
  - ◊ Reduced interest loans of wastewater projects addressing compliance issues consistent with Clean Water Act goals;
  - ◊ 1 percent and 0 percent interest loans of wastewater projects addressing compliance issues in Disadvantaged Communities;
  - ◊ Linked deposits to local lending institutions (such as banks or farm credit associations) to make loans to individuals for nonpoint source projects;
  - ◊ Loans for Estuary Management projects.
- **Borrower's Advantage**: Subsidized interest rates.
- **Constraints**: Federal goal based priority distribution of funds requiring that projects be listed on annual Intended Use Plan to receive funding.
- **Amount provided**: Determined during federal appropriations process.
- **Total Funds Provided Since September 1, 1997 (FY 1998)**:

Outstanding Commitments	Loans Closed	Total
$500,925,000	$ 1,491,472,599	$ 1,992,397,599

COLONIA PLUMBING LOAN PROGRAM

- **Source of Funds**: Allocation of $15 million from 1990 Clean Water Federal Capitalization Grants.
- **Bond Repayment:** No repayment of the federal grant required; Revenue from loan repayments from political subdivisions for the G.O. bonds.
- **Eligible uses**: Low-interest loan program available to assist colonia residents in financing the cost of plumbing connections to water and wastewater systems and with the installation of necessary plumbing improvements within their homes
- **Borrower's Advantage**: Subsidized interest rates for which loan repayment is requested but not required.
- **Constraints**: State law requires this assistance be in the form of a loan though the funds could be disbursed as grants under federal oversight.
- **Amount provided**: $15 million.
- **Total Funds Provided Since September 1, 1997 (FY 1998):**

Outstanding Commitments	Loans Closed	Total
$599,500	$ 88,000	$687,500

COLONIA WASTEWATER TREATMENT ASSISTANCE PROGRAM

- **Source of Funds**: Federal appropriations for federal FY1992 - 1997 with state match requirement in varying amounts for each grants.
- **Bond Repayment**: No repayment of the federal grant required; state match from GO bonds is paid with state general revenues.
- **Eligible uses**: Grants for wastewater projects and water projects for unincorporated areas of the state that meet the definition of an "economically distressed area" and located in counties within 100 kilometers (62.14 miles) of the Texas/Mexico border.
- **Borrower's Advantage**: Grants with loan component
- **Constraints**: Initially only for wastewater projects; limited to areas within 100 kilometers of the international border. Limited funds available.
- **Amount provided**: $300 million with $75 million in State EDAP funds.
- **Total Funds Provided Since September 1, 1997 (FY1998)**:

Outstanding Commitments	Loans Closed	Total
$27,152,859	$ 181,373,968	$208,526,827

DRINKING WATER STATE REVOLVING FUND

- **Source of Funds**: Annual federal capitalization grants matched with TWDB issued general obligation bonds and loan repayments deposited back into the fund. Revenue bonds also available for providing money to the fund, but have not yet been utilized.
- **Bond Repayment**: No repayment of the federal grant required; revenue from loan re-payments from political subdivisions for the G.O. bonds.
- **Eligible uses**: Water projects addressing compliance issues consistent with Drinking Water Act goals.
- **Borrower's Advantage**: Subsidized interest rates, loan forgiveness or zero percent loans for disadvantaged communities
- **Constraints**: Projects must be on annual Intended Use Plan to receive funding; Federal goal-based priority distribution of funds; 30 percent of capitalization grant set aside for disadvantaged communities. Upgrades or replacements of existing systems only. Funds cannot be used for growth or to purchase water rights.
- **Amount provided**: Determined during federal appropriations process
- **Total Funds Provided Since September 1, 1997 (FY1998)**:

Outstanding Commitments	Loans Closed	Total
$104,617,706	$ 312,752,235	$ 417,369,941

APPENDIX 5

POTENTIAL REVENUE SOURCES

Authorized water rights fee.

An authorized water rights fee is assessed to water rights holders according to the number of acre-feet authorized. Fees may be flat or vary according to the type of use (e.g., municipal, industrial, agricultural).

Estimated revenue generated:
Estimates, based on 2004 figures, indicate that $213 million dollars could be generated by assessing a flat $5 fee per acre-foot of water rights for all water rights types. A flat fee of $1 for all rights would generate $42.6 million. Exempting municipal and saline rights, and assessing a 50-cent fee on industrial and a 10-cent fee on irrigation and other uses would generate $3.5 million.

Table A5.1. Estimated revenue generated with water rights fees under various rate structures (in millions)

	Acre feet (2004)	Rate (1)	Revenue	Rate (2)	Revenue	Rate (3)	Revenue	Rate (4)	Revenue	Rate (5)	Revenue	Rate (6)	Revenue
Municipal	11,106,862	$5.00	$55.53	$5.00	$55.53	$1.00	$11.11	$0.50	$5.55	$0.50	$5.55	**	**
Industrial	6,099,562	$5.00	$30.50	$5.00	$30.50	$1.00	$6.10	$0.50	$3.05	$0.50	$3.05	$0.50	$3.05
Irrigation	5,261,417	$5.00	$26.31	$1.00	$5.26	$1.00	$5.26	$0.50	$2.63	$0.10	$0.53	$0.10	$0.53
Other	380,833	$5.00	$1.90	$1.00	$0.38	$1.00	$0.38	$0.50	$0.19	$0.10	$0.04	$0.10	$0.04
Saline	8,532,970	$5.00	$42.67	$0.25	$2.13	$1.00	$8.53	**	**	**	**	**	**
Hydro-power	11,231,731	$5.00	$56.15	$0.25	$2.81	$1.00	$11.23	**	**	**	**	**	**
TOTAL			$213.07		$96.62		$42.61		$11.42		$9.17		$3.61

(1) Fee of $5.00 on all types of water rights (all water rights holders)
(2) Fee of $5.00 for municipal and industrial with declining rates for irrigation, other ($1.00), saline and hydropower ($.25) (all water rights holders)
(3) Fee of $1.00 on all types of water rights (all water rights holders)
(4) Fee excludes hydro and saline. Flat fee of $.50 for all other rights.
(5) Fee excludes hydro and saline. Declining rates for irrigation and other.
(6) Fee exempts municipal, saline and hydro with declining rate for irrigation and other (all water rights holders)
Source: TCEQ. Total Authorized Water Rights in Texas (as of 7/30/2004)

Reported-use fees.

This water rights fee is assessed according to the number of acre-feet used, based on reports to the state.

Estimated revenue generated: Estimates based on projected demand for water under drought-of-record conditions indicate that this type of fee could generate $17.7 million in 2010 if a $1 flat fee was assessed. This would increase to $18.1 million in 2020, $18.7 million in 2030, $19.4 million in 2040 and $20.0 million in 2050.

Table A5.2 Estimated revenue generated with reported-use fees.

Year	Total Acre-Feet	Revenue Generated by $1.00 fee (in millions)
2000	16,919,477	$ 16.9
2010	17,661,815	$ 17.7
2020	18,195,393	$ 18.1
2030	18,732,275	$ 18.7
2040	19,369,125	$ 19.4
2050	20,022,209	$ 20.0

Source: *Water for Texas - 2002.*
Note: Estimates are based on drought-of-record needs and projected forward according to population projections

Table A5.3 Projected demand for water under drought conditions (AFY)

	2000	2010	2020	2030	2040	2050
Municipal	4,232,056	4,805,100	5,411,198	6,024,533	6,558,065	7,064,605
Manufacturing	1,809,190	2,015,510	2,138,378	2,247,948	2,448,825	2,660,680
Mining	253,149	245,618	244,708	252,063	252,079	244,329
Steam-Electric	607,527	831,301	917,994	1,007,424	1,057,929	1,134,644
Irrigation	9,686,983	9,408,736	9,111,517	8,814,113	8,649,991	8,497,706
Livestock	330,572	355,550	371,598	386,194	402,236	420,245
TOTAL	16,919,477	17,661,815	18,195,393	18,732,275	19,369,125	20,022,209

Source: *Water for Texas - 2002.*
Note: AFY estimates are based on drought-of-record needs and projected forward according to population projections

Public water supply connection fee

Assessed annually to public water supply systems based on the number of connections. Rates could reflect type of water used and the amount of water used by different classes of users. Residential customer fees would not exceed $1 per month.

Estimated revenue generated:
The revenue estimated for this fee, based on 1997 figures, is $65.0 million.
The revenue estimated for this fee, based on 2000 figures, is $75.4 million[xix].

2000 Total Connections	6,285,451

County-assessed water fee.

Fees assessed to counties in the state according to the population in each county (based on the number of residents as reflected in U.S. Census figures on population).

Estimated revenue generated:

Revenue generated would be $20.9 million according to 2000 figures, and would bring in $24.5 million by 2010, $28.8 million by 2020 and $36.8 million by 2040.

Table A5.4 Revenue generated with county-assessed water fee

Year	Total Population	Revenue generated by $1.00 fee (in millions)
2000	20,864,933	20.86
2010	24,537,141	24.54
2020	28,792,303	28.80
2030	32,774,870	32.77
2040	36,413,817	36.41
2050	39,617,389	39.62

Source: *Water for Texas – 2002, Projected population.*

Sales tax on water and wastewater

Sales tax assessed to domestic potable water and sewer services.

Estimated revenue generated:

Revenue estimates associated with extending the sales and use tax to include domestic potable water and sewer service is estimated to be $234.2 in fiscal year 2002, rising to $253.8 by 2006. The potable water estimate was derived using an exemption estimate in the Comptroller's "Tax Exemptions and Tax Incidence" report (January 2000), while revenue from the tax being extended to domestic sewage was estimated by the Comptroller based on the potable water estimate adjusted using a "return share" figure provided by the TWDB.[xx]

Bottled-water fees.

Two different versions of bottled water fees were considered in the past during HB 1802 and SB 2.

The fee considered during HB 1802 is an annual fee on receipts of the bottled water supplier based on a graduated scale from $250 to $15,000 with the largest fee based on receipts of more than $10 million. The fee on bottled water considered during SB 2 was a bottled water surcharge of five cents per individual container of water bottled for retail sale.

Estimated revenue generated by a bottled water fee to bottled water suppliers:

In 1997, the estimated revenue generated by this fee was $.87 million dollars[xxi].

Estimated revenue generated by a bottled water 5-cent surcharge fee:
It is estimated that revenues would total $52.1 million in fiscal year 2002, rising to $65.2 million by 2006. This estimate is based on 2001 data for volumetric sales of water that were converted to a number of containers and used as the basis for an estimate of the revenues expected from the bottled water surcharge[xxii].

Estimated revenue generated by imposing a bottled water sales tax:
More recent estimates for a tax on bottled water purchases are listed in the table below. A 6.25 percent tax on the sale of all bottled water would generate $ 55.4 million in 2005, rising to $67.4 in 2009. A tax of 6.75 percent on the sale of all bottled water would generate $ 59.3 million in 2005, rising to $72.1 in 2009, while a tax of 7.5 percent on the sale of all bottled water would generate $ 64.9 million in 2005, rising to $78.9 in 2009. These estimates assume a tax on all bottled water, exclusion of bottled water of three gallons or more would reduce the revenue gained by approximately 18 percent.

Table A5.5 Revenue estimates for bottled water taxes*

	Revenue (in millions)				
Taxing sales of bottled water	FY2005	FY2006	FY2007	FY2008	FY2009
@ 6.25 percent	$ 55.4	$ 58.2	$ 61.1	$ 64.2	$ 67.4
@ 6.75 percent	$ 59.3	$ 62.3	$ 65.4	$ 68.6	$ 72.1
@ 7.5 percent	$ 64.9	$ 68.1	$ 71.5	$ 75.1	$ 78.9

Sources: Strayhorn, Carole Keeton, Texas Comptroller. Letter to The Honorable James R. Pitts. 4 May. 2005.
Strayhorn, Carole Keeton, Texas Comptroller. Letter to The Honorable Talmadge Heflin. 28 May. 2005.
*Assumes taxation on all bottled water. An exclusion for sizes of greater than three gallons would reduce revenue gains by approximately 18 percent.

50 percent of groundwater export fees

Considered during SB 2, dedicates 50 percent of groundwater export fees to funding water infrastructure.

Estimated revenue generated:
Revenue from the groundwater export fee provision of the bill is not expected to be significant

Fees to groundwater conservation districts

This fee would be assessed to groundwater conservation districts (GCDs) to make them eligible to use funds from the Water Infrastructure Fund. A fee of 7 to 10 cents per acre feet withdrawals based on previous 3-yr average) would be optional fee GCDs.

Estimated revenue generated:
No estimate provided.

Tiered residential use fee

A fee that is based on a tiered structure of volume of use per connection with rates increasing as volume of use increases. Usually exempts low volume users depending on as predetermined threshold of gallons used (such as 3,000 or fewer gallons, 5,000 or fewer gallons, 7,000 or fewer gallons.

Estimated revenue generated:
Below are two examples of tiered residential rate structure estimates. The first generates $ 8.54 million annually. The second rate structure would generate $9.1 million annually.

Table A5.6 Tiered Residential Rate Structure Estimates (7,000 gal. or fewer exempt)

Level of Water Use	Percent of Total Connections Statewide	Total Connections	Fee Charged	Total Annual Revenue Generated (in millions)
7,000 or below gallons	4.6%	289,619	$0.00	$0.00
7,001 - 15,000 gallons	28.3%	1,781,889	$1.00	$1.78
15,001 - 30,000 gallons	54.3%	3,410,609	$1.50	$5.12
30,001 - 50,000 gallons	12.0%	753,005	$2.00	$1.51
50,001 - 70,000 gallons	0.6%	39,951	$2.50	$0.10
70,001 - 90,000 gallons	0.0%	1,440	$3.00	$0.00
90,001 gallons or greater	0.1%	8,938	$4.00	$0.04
Total	100.0%	6,285,451		$8.54

Source: TWDB Water Use Survey, 2000
Note: May include some sales to industry.

Table A5.7 Tiered Residential Rate Structure Estimates (5,000 gal. or fewer exempt)

Level of Water Use	Percent of Total Connections Statewide	Total Connections	Fee Charged	Total Annual Revenue Generated (in millions)
5,000 or bellow gallons	1.6%	98,893	$0.00	$0.00
5,001 - 15,000 gallons	31.4%	1,972,615	$1.00	$1.97
15,001 - 30,000 gallons	54.3%	3,410,609	$1.50	$5.12
30,001 - 40,000 gallons	6.0%	377,713	$2.00	$0.76
40,001 gallons or greater	6.8%	425,621	$3.00	$1.28
Total	100.0%	6,285,451		$9.12

Source: TWDB Water Use Survey, 2000
Note: May include some sales to industry.

Interbasin Transfer fee

The interbasin transfer fee considered during the development of HB 1802, was intended to dedicated funds for (recharging) the basin of origin. This fee would be not less that $1.00 per acre-foot of water right paid annually through the duration of an interbasin transfer. This revenue generated would be used solely for projects benefiting the basin of origin.

<u>Estimated revenue generated</u>:
No estimate as to amount of revenue generated was estimated.

ENDNOTES

[i] In 2001 dollars.

[ii] An EDAP–eligible county is a county: (A) that has a per capita income that averaged 25 percent below the state average for the most recent three consecutive years for which statistics are available and an unemployment rate that averaged 25 percent above the state average for the most recent three consecutive years for which statistics are available; or (B) that is adjacent to an international border.

[iii] Turner,Collie, and Braden, Inc. *Fiscal Year 2002 Water Research Priority Topic: Assessment of Water and Wastewater Facility Needs for EDAP Counties*. October 31, 2003. TCB Project No. 052.321413.0001.

[iv] Tuner, Collie, and Braden, Inc. *Summary of the Statewide Needs Assessment: Water and Wastewater of Non-EDAP Eligible Disadvantaged Areas*. March 2001. TCB Job No. 37-83851-002 for TWDB Project No. 200-483-348.

[v] Data represent average amounts obtained from the Texas Bond Review Board and the Texas Municipal Advisory Council.

[vi] Approximately $2 billion of authorized but unissued balance for 06-07 biennium. The analyses use the TWDB's Water Infrastructure Fund (WIF) and State Participation Program to fund the strategies, as these currently are sufficient vehicles to implement the water supply strategies identified in Water for Texas – 2002.

[vii] While $257.5 million is a relatively small portion (11.5 percent) of the total need, rural and disadvantaged communities typically require significant amounts of grant assistance. The sparse populations typically associated with these communities usually imply higher construction and operational costs per utility connection. Low per capita incomes in these communities make it difficult for them to pay for the full cost of providing water and wastewater service, thus necessitating assistance in the form of grants.

[viii] This includes cash for grant assistance and debt service payments on bonds. These figures are based on revised funding scenarios developed by TWDB since the IFR was released to reflect a State Participation analysis that requires interest payments by participants in the first ten years.

[ix] While the IFR used a 2010 timeframe, to align with the decadal needs assessments of the state and regional water plans, this report is using a 2011 timeframe for illustrating the impact of funding, to align more closely with the state biennia. In order to more closely align with the state's budget structure, it is assumed that the needs of 2010 can be met in 2011.

[x] The State Participation Program (Water Code Chapter 16, Subchapters E and F) allows large-scale and regional projects to be undertaken to their optimum development, size and scale. It is more cost effective to build many of these projects to take care of future growth at the time of original construction than to only build for the immediate or near-term needs of the entities involved. However, it is often difficult for local and regional entities to undertake this long-term financial obligation. The State Participation Program allows TWDB to own portions of these facilities, or the entirety of facilities, until they are needed by the local entities, thus allowing state funds to optimize the size of the project. However, because the state does not immediately realize repayment of its investment, general revenue draws are required to make initial TWDB bond payments.

[xi] It is assumed that disadvantaged communities do not have resources at all for these projects. Small communities have high costs per connection due to their often rural nature and are estimated to require 50 percent of their funding in grants.

[xii] Texas Water Code, Chapter 15, Subchapter R. The WIF is uniquely structured to implement water supply strategies. A combination of principal and interest deferrals on planning and permitting costs and below market interest rate loans provide incentives to move forward sooner with implementation of all water management strategies. Additionally, grants and zero and low interest loans are available for projects outside metropolitan statistical areas (rural) and economically distressed areas for water supply strategy implementation. In order to provide comprehensive implementation of strategies, the statutory language for rural and economically distressed areas allows for project sponsors. For example, a major pipeline could be built by a large entity with capacity paid for with grants for the water allocable to all the rural and distressed areas along the route. Finally, the WIF includes the economic development language necessary to fund water conservation incentive programs that may provide benefit to private individuals (such as low flow toilet retrofit programs.) The percentage distribution of funds for the WIF is prescribed as 80 percent/10 percent/10 percent for below market interest rate loans, principal and interest deferrals, and grants, zero and low interest loans, respectively. The funding sources used in the analysis include a combination of appropriations and Water Financial Assistance Bonds (general obligation bonds.) All of the provisions that make the WIF an attractive and viable program for funding water supply projects require a cash source to implement. However, the WIF was not funded during the two legislative sessions since its creation.

Currently, TWDB has $50 million in general obligation bond authorization "earmarked" for the WIF as required by Texas Constitution, Article 3, Section 49-d-9. However, implementation of the WIF using bond proceeds does not achieve the intended purpose of the program to provide subsidized loans and grants. A dedicated revenue source, sufficient appropriations, or appropriations to pay the debt service on bonds would allow grants or low interest loans to be made from the WIF

[xiii] The WIF may defer payments of principal and interest for up to 10 years for preliminary project elements (such as planning, design, and permitting, including actions to obtain environmental approvals), using up to 10 percent of the WIF's funding. *Texas Water Code Section 15.974(a)(3),(b), (c).*

[xiv] IFR, pages 4 and 12-13

[xv] Of the new programs added in 2001, only the Rural Community Water and Wastewater Fund was funded by appropriations, and this in a very limited amount ($520,000) compared with the statewide need. The 2003 Appropriations Act also directed TWDB to use $830,000 from the Texas Water Resource Finance Authority for the Rural Community Water and Wastewater Loan Fund. TWDB has used limited funds available from the purchase of its bond portfolio in 1999 by TWRFA to help fund the Water Assistance Funds and some of its accounts, (including the Small Community Hardship Program and the Colonia Self-Help Program). While these funds provide some assistance, it is not in sufficient quantities to meet all anticipated needs. TWRFA funds are limited, and will diminish over time.

[xvi] Texas Water Code, Chapter 15, Subchapter Q. The RWAF was created to provide financial assistance to smaller, rural water suppliers at lower cost than was then available to such entities, and to ensure the public outreach and technical assistance necessary for these smaller systems to succeed. The RWAF can also assist small systems in participating in regional water projects, which benefit from economies of scale. Although the RWAF was established to consist of appropriations, which would allow for the reduced interest rates and public outreach components, funds have not been appropriated. The TWDB has been able to partially implement the RWAF by transferring funds derived from Water Development Fund general obligation bonds issued under a portion of the State's Private Activity Bond Cap. This funding for RWAF has provided some benefit, however the rural communities which this program is designed to assist need deeper financial subsidies than general obligation bonds alone can provide, and also need the outreach and technical assistance to enable access to the program. The RWAF can play an important role in implementing water supply projects for rural areas if provided with a cash-funding source.

[xvii] TWDB may use unissued Development Fund bond authority, however, since the program requires a general revenue draw in the first years of a project, the Legislature limits the amount of funds for the program.

[xviii] Though the FY2002-2003 appropriation bill authorized TWDB to issue $35 million in bonds for State Participation program, due to the budget constraints in FY2003 the TWDB only issued $20 million for the program.

[xix] Revenue estimate based on total number of connections from TWDB Water Use Survey, 2000.

[xx] Legislative Budget Board. 2001. 77th Regular Session. Fiscal Note. Introduced version. *SB 2, Relating to the development and management of the water resources of the state, including the ratification of the creation of certain groundwater conservation districts; providing penalties.*
ONLINE. Available: http://www.capitol.state.tx.us/cgi-bin/tlo/textframe.cmd?LEG=77&SESS=R&CHAMBER=S&BILLTYPE=B&BILLSUFFIX=00002&VERSION=1&TYPE=F [9 August 2004]

[xxi] Ibid.

[xxii] Legislative Budget Board. 2001. 77th Regular Session. Fiscal Note: Engrossed version. *SB 2, Relating to the development and management of the water resources of the state, including the ratification of the creation of certain groundwater conservation districts; providing penalties.* ONLINE. Available: http://www.capitol.state.tx.us/cgi-bin/tlo/textframe.cmd?LEG=77&SESS=R&CHAMBER=S&BILLTYPE=B&BILLSUFFIX=00002&VERSION=3&TYPE=F [9 August 2004]

Appendix
J

Introduction

The following document contains estimates of potential revenue sources for funding Texas water supply programs. Revenue sources considered include: 1) a tax on retail sales of water and/or sewer services provided by public water suppliers, 2) a fee on retail water sales applied to the volume of water use as opposed to a tax on utility revenues (i.e., a "water conservation development fee"), 3) a fee on water rights, 4) a "tap fee" on all water utility connections, and 5) a tax on retail sales of bottled water. In addition, this Appendix provides some examples of water related fees and taxes enacted by other state legislatures throughout the nation.

1. Sales Tax on Retail Sales of Utility Water and Sewer

1.1 Description

The sales tax would apply to retail sales of water and/or sewer services provided by Public Water Supply systems. As defined by the Texas Commission on Environmental Quality, Public Water Suppliers are those that meet the definition of "community water systems." These are systems that have the potential to serve at least 15 residential service connections on a year-round basis or that serve at least 25 residents on a year-round basis. Community water systems include municipal water utilities, various types of districts established under state law (e.g., municipal utility districts), and investor owned water utilities.

Exemptions from the tax include:

- the first 5,000 gallons of residential water use regardless of total monthly consumption;
- industrial customers;
- government and institutional customers; and
- religious, educational, and charitable organizations; chambers of commerce, convention and tourist promotional agencies and any non-profit organization including hospitals providing charity care.

Tax rates applied in estimates are:

- state: 6 1/4%
- cities and counties: assumed an average rate 1.80% (actual value may vary depending upon local rates)

An "administrative fee" for utilities to administer and process tax collections would be allocated from total tax revenues at a rate of 0.5 percent.

1.2 Estimated Revenues

Water

Over the next several biennia, projected revenues for water range from about $168 million in 2008 to $185 million in 2011 (Table 1). Local governments would receive an estimated $38 million in 2008 and $41 million in 2011, while the state share totals $130 million in 2008 to $144 million in 2011.*Sewer*

Table 2: Potential Revenues Generated from a Sales Tax on Retail Sewer Service Provided by Community Public Water Suppliers in Texas ($millions)

	Estimated utility sales (sewer)	Estimated taxable utility sales (sewer) *			
	2006	2008	2009	2010	2011
Residential	$1,579.79	$1,062.94	$1,098.38	$1,135.00	$1,172.85
Commercial	$293.03	$312.89	$323.32	$334.10	$345.24
Irrigation	$0.00	$0.00	$0.00	$0.00	$0.00
Industrial	$130.38	$0.00	$0.00	$0.00	$0.00
Government, fire and other/unspecified	$153.24	$0.00	$0.00	$0.00	$0.00
	Projected tax revenues (sewer)				
State tax revenues (6.25% of taxable revenues)	-	$85.99	$88.86	$91.82	$94.88
Local tax revenues (1.80 % of taxable revenues)	-	$24.77	$25.59	$26.44	$27.33
Administrative fee for utilities (0.5% of tax revenues)	-	$0.55	$0.57	$0.59	$0.61
Total tax revenues to state and local government	-	$110.20	$113.88	$117.67	$121.59

Exemptions

- first 5,000 gallons of residential water use is exempted from the tax
- industrial
- government and institutional,
- non-profits, religious organizations etc.

Source: TWDB analysis of data from American Water Works Association, data from the Texas Commission on Environmental Quality and data from the TWDB Water Uses Survey. "na" = not applicable.

Table 3: Sensitivity of Revenues to Changes in Levels of Residential Exemption for a Sales Tax on Water and/or Sewer ($millions, total projected state and local 2008 revenue levels)

	2008	
Water		
5,000 gallon exemption	$167.13	0%
4,000 gallon exemption	$185.66	+ 11%
3,000 gallon exemption	$198.72	+ 19%
2,000 gallon exemption	$213.05	+ 27%
1,000 gallon exemption	$221.60	+ 33%
No exemption on residential water	$232.89	+ 39%
Sewer	2008	
5,000 gallon exemption	$110.20	0%
4,000 gallon exemption	$124.28	+ 13%
3,000 gallon exemption	$160.18	+ 45%
2,000 gallon exemption	$145.10	+ 32%
1,000 gallon exemption	$151.60	+ 38%
No exemption on residential water	$160.18	+ 45%
Water and Sewer	2008	
5,000 gallon exemption	$277.34	0%
4,000 gallon exemption	$309.94	+ 12%
3,000 gallon exemption	$332.92	+ 20%
2,000 gallon exemption	$358.15	+ 29%
1,000 gallon exemption	$373.20	+ 35%
No exemption on residential water	$393.07	+ 42%

Source: TWDB analysis of data from American Water Works Association, data from the Texas Commission on Environmental Quality and data from the TWDB Water Uses Survey. "na" = not applicable.

An "administrative fee" for utilities to administer and process tax collections would be allocated from the total tax revenues raised at a rate of 0.5 percent.

2.2 Estimated Revenues

Over the next several biennia, projected revenues from a water conservation and development fee range from $70 million in 2008 to $72 million in 2011assuming a 5,000 gallon exemption on residential water sales (Table 5).

2.3 Sensitivity of Tax Revenues to Changes in Level of Residential Exemption

Changes in the level of residential water exempted from the fee will affect revenue levels (Table 6). On average, a 1,000 gallon reduction in the exemption level increases revenues by roughly $9 million per year over the next two biennia.

2.4 Cost Increases for Water Consumers

With a 5,000 gallon exemption, costs to residential water consumers would rise by an estimated $0.48 per month on average (Table 7). A typical commercial customer would see an increase of $4.66 on their monthly water bill.

Table 5: Potential Revenues Generated from a Water Conservation and Development Fee as Proposed Under Senate Bill 3 of the 79th Texas Legislature ($millions)

	Estimated utility sales volume (acre-feet)	Estimated taxable utility sales volume (acre-feet)			
	2006	2008	2009	2010	2011
Residential	2,048,180	977,257	985,407	993,626	1,001,913
Commercial	569,804	567,761	572,496	577,271	582,086
Irrigation	112,859	114,750	115,707	116,672	117,645
Industrial	310,857	0	0	0	0
Government, fire and other/unspecified	246,154	0	0	0	0
	Projected tax revenues ($millions)				
Total fee revenues	na	$70.31	$70.90	$71.49	$72.08
Administrative fee for utilities (0.5% of fee revenues)	na	$0.35	$0.35	$0.36	$0.36
Total fee revenues to the state	na	$69.96	$70.54	$71.13	$71.72

Exemptions

- first 5,000 gallons of residential water use is exempted from the tax
- industrial
- government and institutional,
- non-profits, religious organizations etc.

Source: TWDB analysis of data from American Water Works Association, data from the Texas Commission on Environmental Quality and data from the TWDB Water Uses Survey. "na" = not applicable.

3. Water Rights Fee

3.1 Description

A water rights fee would place a charge on authorized water rights in the state. Although the fee could vary according to type of use, for this presentation a $1.50 surcharge per acre-foot of authorized water for municipal, industrial, irrigation and mining water rights holders would apply. Water rights allocated to in-stream uses (i.e., recreation and hydroelectric) would be exempt as would water rights for storage.

3.2 Estimated Revenues

Over the next two biennia, projected fee revenues for this option are approximately $53 million dollars per annum (Table 8). The majority of revenues would stem from fees on municipal ($20 million per year) and industrial use ($25 million per year).

3.3 Cost Increases for Water Consumers

For municipal water rights holders, average annual costs would total $21,235, and costs for industrial permit holders would amount to $38,836 per year. Annual costs to irrigators and mining operations are lower at $1,203 and $1,025 respectively.

Table 8: Potential Revenues Generated from a Fee on Water Rights in Texas ($millions)

	Annual volume permitted (acre-feet)	No. of permit holders	Avg. volume per permit holder (acre-feet)	Projected annual fee revenues (2008-2011)	Avg. annual cost per permit holder
Municipal	13,562,347	958	15,881	$20.34	$21,235
Industrial	17,010,275	657	37,468	$25.52	$38,836
Irrigation	4,816,611	6008	846	$7.22	$1,203
Mining	170,865	250	1,068	$0.26	$1,025
Hydroelectric	11,231,731	33	748,782	na	na
Other	410,504	1,678	34,385	na	na
Total	47,202,333	9584	83,843	$53.34	$5,566

* Assumes an annual fee of $1.50 per acre-foot of permitted water. "Other" primarily includes storage rights, recreation, domestic and livestock uses and recharge. Source: Based on data from the Texas Commission on Environmental Quality Water Rights Database 2006. "na" = not applicable.

5. Sales Tax on Bottled Water

5.1 Description

A sales tax on bottled water would extend state and local sales taxes to retail sales of bottled water and would likely include:

- non-carbonated bottled water commonly sold in retail outlets (e.g., Evian or Ozark Springs) in various size containers;
- distilled water sold in gallon or larger sized containers often used for cooking and drinking;
- carbonated or seltzer water including brands such as Perrier and a wide variety of products sold as "club soda;" and
- "cooler" or delivered water to venues such as homes, offices, factories and schools. These are typically sold in 5 to 10 gallon containers and dispensed via drinking water coolers.

This does not include non-packaged bulk water delivered by tanker truck and dispensed into residential cisterns or wells, nor would it include water sold at community dispensers.

5.2 Estimated Revenues

Based on information from the International Bottled Water Marketing Association and the U.S. Beverage Marketing Association, sales of bottled water in the U.S. have risen sharply over the years. In 1976, retailers sold about 354 million gallons of bottled water. In 2005, they sold 7,357 million gallons worth $9,803 million. The average annual growth rate in revenues has been 12 percent per year. Per capita consumption has grown from 1.6 gallons in 1976 to nearly 17.0 gallons in 1999. California leads the nation in consumption with about one fourth of the market followed by Texas and Florida. Texas has consistently made up about 10 percent of the national market based on volume; and since 1985, volumetric sales in the state have grown by 500 percent (Figure 1). In 2005, estimated sales of bottled water in Texas totaled nearly $980 million.

Projected tax revenues for bottled water in 2008 would amount to about $99 million with $77 million in state taxes and $22 million in local taxes (Table 10). By 2011, bottled water sales will likely increase sharply resulting in total revenues worth $158 million in 2011 ($129 million in state taxes and approximately $29 million in local revenues).

Survey of Water Related Fees and Taxes in Other States

Table 11 contains examples of water related fees and taxes that state governments in other areas of the nation have enacted over the years. The list is not intended to be comprehensive, but rather serves to illustrate how some other states have approached water use from the perspective of public finance.

Table 11: Survey of Water Related Fees and Taxes Enacted by Other States

State	Financing mechanism	Description of financing mechanism and other comments
Arizona	• Sales tax/transaction privilege tax on water • State water quality tax • Storm Water Fee:	Sales tax: A city, county & state sales tax is imposed on water fees at a rate of 7.0 percent (5 percent state and 2 percent local). Applies to retail sales of utility water (cooperatives, municipalities, water haulers or other private entities in the business of producing and furnishing or furnishing water to consumers are taxable under the utilities classification). Exemptions: Ice cubes and bottled water including carbonated and mineral water is exempt. Bottled water, however, that is delivered by a retailer to an office or other business establishment is not considered food for home consumption and is therefore subject to tax under the retail classification. Exemptions also include sale or delivery of water by the U.S. government, any state governmental entity, such as an agricultural improvement district or irrigation district, or an authorized agent thereof that is acting in fulfillment of a governmental function is not subject to taxation. State water quality tax: mandates a fee of $0.0065 per 1,000 gallons of water usage for the preservation of water quality is charged to residential and commercial accounts and is paid to the state's revolving fund for water quality improvement projects. Storm water fee: A surcharge of $0.50 is charged to each utility account
Arkansas	• Sales tax on retail water • Water use fee	Sales tax: 6.0 percent state sales tax on residential, commercial and industrial water sales. Water use fee: requires all users of surface and ground water be assessed an annual water use fee in the amount of $10 per registered-surface water diversion and $10 per registered well, which are payable at the time of water use reporting (October 1 through March 1). Fees collected are used for cost-share on water conservation practices, administration, and information/education programs
California	• Fee on water rights	Effective in 2004, California assesses an annual water right fee to each holder of a permit or license based upon the volume of water in acre-feet authorized for diversion under that water right permit or license. The annual water right fee for permits and licenses in fiscal year 2003-2004 is the greater of $100 or $0.03 per acre-foot based on the total annual amount of diversion.
Georgia	• Recently increased state sales tax to fund water infrastructure	Increased state sales tax by 1 percent in 2004 to fund water infrastructure for the City of Atlanta.

Table 11: Survey of Water Related Fees and Taxes Enacted by Other States		
Nebraska	▪ Sales tax on water and sewer	Sales tax applies to all amounts paid for sewer and water, irrespective of whether there is an actual consumption or not. Thus, there is tax due on all payments whether in the form of a minimum charge, a flat rate, or other billing method. Gross receipts from furnishing sewer service are taxable regardless of the nature of the use. Rental charges made to the customer for meters, bottles, and related equipment are rentals of property and are taxable. Water used for irrigation of agricultural lands, manufacturing purposes, or for the care of or consumption by animal life, the products of which ordinarily constitute food for human consumption or the pelts of which are ordinarily used for human apparel, is not taxable.
Minnesota	▪ Sales tax on retail sales of non-residential water ▪ Water use fee for water permit holders	Sales tax: Non-residential (commercial and industrial) water sales are taxable at a rate of 7 percent. Exemptions include housing authorities, non-profits, government and institutions and ice manufacturers. All sewer service is exempt as is bottled water. Water use fee is collected by the state based on permitted water use: Volume appropriated for each permit: 0 to 50 million gallons — $101 minimum fee 50 to 100 million gallons — $3.00 for each million 100 to 150 million gallons — $3.50 for each million 150 to 200 million gallons — $4.00 for each million 200 to 250 million gallons — $4.50 for each million 250 to 300 million gallons — $5.00 for each million 300 to 350 million gallons — $5.50 for each million 350 to 400 million gallons — $6.00 for each million 400 to 450 million gallons — $6.50 for each million 450 to 500 million gallons — $7.00 for each million Above 500 million gallons — $7.50 for each million Maximum annual water use fees: $750 for any single agricultural irrigation permit $50,000 total for an entity with 3 or less permits $75,000 total for an entity with 4 to 5 permits $250,000 total for an entity with more than 5 permits $250,000 total for a city of the first class $10,000 for a municipality that furnishes electric service and co-generates steam for home heating. Once-through heating and cooling systems only: A separate annual water use fee schedule exists for once-through heating and cooling (HVAC) systems. Non-profit corporations and school districts pay $150 per million gallons and all other entities with once-through heating and cooling systems pay $300 per million gallons. There is no maximum fee for once-through systems.

Appendix K

Introduction

Appendix 6 summarizes the economic impacts of water supply projects and recommended state expenditures discussed in previous sections of this report. Impacts discussed include the:

- potential cost savings of implementing municipal water supply management strategies in the 2007 state water plan;
- impacts of construction and material sales expenditures associated with implementing municipal water supply management strategies;
- impacts of construction and material sales expenditures associated with implementing water and sewer treatment and distribution infrastructure in economically distressed areas; and
- economic development impacts associated with new water and sewer infrastructure in economically distressed areas.

6.1 Potential Cost Savings of Implementing Municipal Water Management Strategies Recommended in the 2007 State Water Plan

Municipal water supply management strategies recommended in the 2007 state water plan will ensure that Texas communities have reliable water supplies over the next 50 years even under severe drought conditions. If projects are not implemented and if drought conditions that persisted in Texas during 1950s reappear, most communities in Texas would face severe to moderate water shortages for an extended period. Implementing water management strategies would effectively eliminate potential economic losses associated with water shortages.

According to the 2007 state water plan, municipal water deficits (i.e., when projected water demands exceed currently available water supplies during drought of record conditions) amount to about 610,000 acre-feet in 2010. By 2030, deficits increase to nearly 882,000 acre-feet and by 2060 they total 3,844,000 acre-feet. Water shortages of this magnitude are substantial. For example, in 2010 nearly 349,000 households in the state would have 50 percent less water than they would typically use on annual basis and nearly 63,000 would only have 20 percent (Table 1 and Figure 1). In 2030, approximately 2,461,000 household would be restricted to 50 percent of annual use and 318,000 would be limited to 20 percent or less. In 2060, slightly more than one-half of all households in Texas would have a deficit of 50 percent and nearly one million would only have 20 percent or less.

Shortages of this magnitude could result in substantial economic losses for municipal water users. As part of the state water planning process, the TWDB developed economic impact models to measure the potential socioeconomic costs of unmet water needs. Assuming that water supply management and infrastructure are not developed, an event similar to the 1950s drought of record could cost municipal water consumers an estimated $20,485 million if it occurred in the decade between 2010 and 2020 (Table 2). In subsequent decades costs increase substantially. For example, in the decade between 2050 and 2060 estimated economic costs could total $117,086 million. Table 3 shows the potential avoided costs of developing municipal water projects recommended for state funding.[1] In the decade between 2010 and 2020, if a drought similar to the 1950s drought event took place it would result in estimated economic losses totaling $2,993 million. In subsequent decades projected costs increase by average of about $1,800 million dollars per decade.

Table 2: Estimated cost savings of implementing municipal water management strategies identified in the 2007 state water plan (constant 2006 dollars)*

Decade	Savings to municipal water consumers ($ millions)	State and local businesses tax savings ($millions)	Total monetary savings to Texans ($millions)	Number of full and part time jobs saved
2010-2020	$19,965	$520	$20,485	99,290
2020-2030	$32,940	$925	$33,865	213,857
2030-2040	$50,774	$1,528	$52,302	391,629
2040-2050	$78,751	$2,557	$81,308	564,953
2050-2060	$113,199	$3,887	$117,086	906,462

*Estimated cost savings are based on negated impacts that would occur if a multi-year drought event comparable to the 1950s drought of record in Texas occurred in each decade. Source: Based on data and analysis conducted as part of the 2007 state water plan.

[1] Table 4 at the end of this Appendix shows the individual projects by total capital costs and regional water planning area.

6.3 Economic Development Impacts of New Water and Sewer Projects in Economically Disadvantaged Communities

Projects in the 2007 state water plan are geared to ensuring reliability of water supply. In other words, they focus primarily on ensuring that adequate amounts of raw water are available for local and regional water users and providers to consume and distribute. In contrast, many communities in Texas lack adequate water and wastewater treatment plants and water distribution infrastructure (e.g., pipes going to and from water treatment plants and homes and businesses) within their communities regardless of weather conditions or the availability of raw water. For the most part, these communities tend to be rural and economically disadvantaged relative to other areas of the state.

As discussed in the 2007 state water plan, many economically disadvantaged communities lack the financial and institutional resources needed to fund water and wastewater treatment projects, and external funding for economically disadvantaged communities is needed to meet their immediate needs beyond water management strategies in the 2007 state water plan. In addition to short-term multiplier effects of construction spending, water and sewer projects in economically disadvantaged areas would likely stimulate private investment thereby creating jobs and improving the overall economic prosperity in communities awarded grants. It is important to stress that these impacts may not occur in communities that build water/sewer facilities exclusively to provide safe drinking water and meet wastewater regulations. The same holds true for communities that implement water supply management strategies in the state water plan; however, the availability of highly reliable raw water supplies could promote business and industry development location in these communities but the effects are difficult to measure.

Estimated economic development impacts for water and sewer projects recommended for funding in economically distressed areas stem from a benchmark study and evaluation conducted by the U.S. Economic Development Administration (USEDA). Like the TWDB, the USEDA provides grants for completing water and/or sewer projects. USEDA grants are awarded only to economically depressed rural and urban areas. In the 1990s, the EDA extensively studied and surveyed 87 communities throughout the nation including seven in Texas that received EDA grants for water and sewer construction.[3]
On average, every $1,000,000 spent on water and sewer projects indirectly created 121 permanent jobs, nearly $2.3 million worth of private investment and about $0.6 million in public investment. In addition, the projects increased local property bases by an average of $2.1 million.

Applying the same multipliers for recommended state funding targeting economically distressed areas in Texas shows that a state investment of $27.9 million could affect communities receiving grants by generating:

- $65.68 million worth private business investment,
- $17.80 million worth of induced public sector investment,
- $59.79 million increase in local property tax base, and
- 3,380 jobs in communities receiving grants:

[3] The local unemployment rates in surveyed communities were on average 10 percent, which was well above the national average at the time. Similarly, per capita incomes in the communities were about 40 percent below state and national averages. See, Bagi, F.S., "*Economic Impact of Water/Sewer Facilities on Rural and Urban Communities*." Published in Rural America. Vol. 17 (4). Winter 2002.

C	Crandall	Kaufman	Expanded Municipal Conservation	$14,942	$7,471	50%
C	Bells	Grayson	Supplemental Wells	$1,220,560	$488,224	40%
C	Bells	Grayson	Woodbine Aquifer (new wells)	$348,000	$139,200	40%
C	Bells	Grayson	Supplemental Wells	$331,826	$132,730	40%
C	Bolivar Water Supply Corporation	Denton	Supplemental Wells	$4,809,912	$1,442,974	30%
C	Bolivar Water Supply Corporation	Denton	Trinity Aquifer (new wells)	$4,398,333	$1,319,500	30%
C	Bolivar Water Supply Corporation	Denton	Supplemental Wells	$1,603,304	$480,991	30%
C	Bolivar Water Supply Corporation	Denton	Supplemental Wells	$531,760	$159,528	30%
C	Bolivar Water Supply Corporation	Denton	Trinity Aquifer (new wells)	$125,667	$37,700	30%
C	Corsicana	Navarro	Water Treatment Plant Expansion	$9,882,000	$2,470,500	25%
C	Corsicana	Navarro	Conveyance Project (pipeline)	$12,643,000	$3,160,750	25%
C	Corsicana	Navarro	Water Treatment Plant Expansion	$15,528,000	$3,882,000	25%
C	Corsicana	Navarro	Expanded Municipal Conservation	$34,486	$8,622	25%
C	Chico	Wise	Supplemental Wells	$1,708,175	$427,044	25%
C	Fort Worth	Tarrant	Conveyance Project (pipeline)	$37,146,820	$9,286,705	25%
C	Fort Worth	Tarrant	New Water Treatment Plant	$57,915,000	$14,478,750	25%
C	Fort Worth	Tarrant	Direct Reuse	$73,130,000	$18,282,500	25%
C	Fort Worth	Tarrant	Water Treatment Plant Expansion	$124,681,000	$31,170,250	25%
C	Fort Worth	Tarrant	Water Treatment Plant Expansion	$86,587,080	$21,646,770	25%
C	Fort Worth	Tarrant	Facility Improvements Reuse Sources (pipeline)	$130,010,400	$32,502,600	25%
C	Fort Worth	Tarrant	Water Treatment Plant (new reuse sources)	$42,702,000	$10,675,500	25%
C	Fort Worth	Tarrant	Water Treatment Plant Expansion	$231,097,000	$57,774,250	25%
C	Ennis	Ellis	Ennis Reuse	$27,127,000	$5,425,400	20%
C	Ennis	Ellis	Expanded Municipal Conservation	$27,821	$5,564	20%
C	Honey Grove	Fannin	Supplemental Wells	$1,408,348	$211,252	15%
C	Lewisville	Denton	New Water Treatment Plant	$21,740,000	$2,174,000	10%
C	Lewisville	Denton	Water Treatment Plant Expansion	$13,552,000	$1,355,200	10%
C	Lewisville	Denton	Water Treatment Plant Expansion	$13,552,000	$1,355,200	10%
C	Lewisville	Denton	Water Treatment Plant-Expansion (reuse sources)	$9,882,000	$988,200	10%
C	Lewisville	Denton	Conveyance Project (pipeline)	$9,314,000	$931,400	10%
C	Lewisville	Denton	Expanded Municipal Conservation	$61,985	$6,199	10%
C	Kaufman	Kaufman	Expanded Municipal Conservation	$22,543	$2,254	10%
C	Dallas	Dallas	Wright Patman Reallocation of Flood Pool (pipeline)	$572,036,000	$22,881,440	4%
C	Dallas	Dallas	Lake Fastrill (reservoir)	$569,170,000	$22,766,800	4%
C	Dallas	Dallas	Lake Palestine Connection (pipeline)	$414,447,000	$16,577,880	4%
C	Dallas	Dallas	Dallas Water Utilities Reuse	$391,772,000	$15,670,880	4%
C	Dallas	Dallas	Water Treatment Plant Expansion	$382,441,000	$15,297,640	4%
C	Dallas	Dallas	Lake Fork Connection	$362,916,000	$14,516,640	4%
C	Dallas	Dallas	Dallas Water Utilities Reuse	$63,110,000	$2,524,400	4%
D	Grand Saline	Van Zandt	New Wells	$574,243	$574,243	100%
D	Clarksville	Gregg	New Wells	$1,518,443	$1,518,443	100%
D	R P M Water Supply Corporation	Van Zandt	New Wells	$574,243	$287,121	50%
D	Waskom	Harrison	New Wells	$455,466	$227,733	50%
D	County-Other	Van Zandt	New Wells	$1,138,599	$569,299	50%
D	County-Other	Van Zandt	New Wells	$3,377,883	$1,688,941	50%
E	Tornillo WCID	El Paso	New Well	$500,000	$350,000	70%
F	San Angelo	Tom Green	Develop Hickory Aquifer Supplies	$91,582,000	$45,791,000	50%
F	San Angelo	Tom Green	Desalination (pipeline and water treatment plant)	$40,590,000	$20,295,000	50%
F	San Angelo	Tom Green	Rehabilitation Of Pipeline	$5,000,000	$2,500,000	50%
F	San Angelo	Tom Green	Brush Control	$0	$0	50%

M	Webb County Water Utility	Webb	Water Conservation (pipeline and water treatment)	$10,460	$7,845	75%
M	Webb County Water Utility	Webb	Expand Existing Groundwater Wells	$9,134	$6,850	75%
M	Webb County Water Utility	Webb	Acquisition of Water Rights (pipeline and water treatment)	$972,047	$729,036	75%
M	Santa Rosa	Cameron	Water Conservation	$11,809	$7,676	65%
M	Eagle Pass	Maverick	Advanced Water Conservation	$23,056	$5,764	25%
M	Eagle Pass	Maverick	Brackish Water Desalination	$855,828	$213,957	25%
M	Los Fresnos	Cameron	Water Conservation	$39,365	$9,841	25%
M	Los Fresnos	Cameron	Brackish Water Desalination	$1,221,551	$305,388	25%
M	Primera	Cameron	Acquisition of Water Rights (pipeline and water treatment)	$26,422	$2,642	10%
M	Primera	Cameron	Advanced Water Conservation	$13,384	$1,338	10%
M	Primera	Cameron	Brackish Water Desalination	$63,189	$6,319	10%
M	Primera	Cameron	Acquisition of Water Rights (pipeline and water treatment)	$593,758	$59,376	10%
M	Rio Hondo	Cameron	Water Conservation	$2,812	$141	5%
M	Rio Hondo	Cameron	Acquisition of Water Rights	$651,288	$32,564	5%
N	Corpus Christi	Nueces	USCOE Nueces Feasibility Projects (pipeline)	$105,428,000	$10,542,800	10%
N	Corpus Christi	Nueces	Lake Texana/Construction On The Lavaca River	$149,185,000	$14,918,500	10%
N	Corpus Christi	Nueces	Garwood Pipeline and Off-Channel Reservoir Storage	$81,117,000	$8,111,700	10%
N	Corpus Christi	Nueces	Nueces Feasibility Projects Off-Channel Reservoir	$248,919,000	$24,891,900	10%
N	Corpus Christi	Nueces	Nueces Feasibility Projects - Seawater Desalination	$155,028,000	$15,502,800	10%
O	Petersburg	Hale	Local Groundwater Development	$265,452	$212,362	80%
O	Idalou	Lubbock	Local Groundwater Development	$596,508	$447,381	75%
O	Lorenzo	Crosby	Local Groundwater Development	$276,408	$138,204	50%
O	Wolfforth	Lubbock	Local Groundwater Development	$3,957,513	$1,899,606	48%
O	Farwell	Parmer	Local Groundwater Development	$619,608	$254,039	41%
O	Sundown	Hockley	Local Groundwater Development	$753,720	$248,728	33%
O	Morton	Cochran	Local Groundwater Development	$922,944	$230,736	25%
-	-	-	Total	$7,696,387,729	$2,114,508,524	

Source: Water for Texas, 2007 "Infrastructure Financing Survey"

Appendix
L

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
	PROJECTS IDENTIFIED FOR 2010					
A	Stratford	Sherman	Overdraft Aquifer (pipeline)	$984,300	$935,085	95%
A	Dalhart	Dallam	Overdraft Aquifer (pipeline)	$2,200,100	$1,980,090	90%
A	Dalhart	Dallam	Overdraft Aquifer (pipeline)	$829,400	$746,460	90%
C	Mac Bee Water Supply Corporation	Kaufman	Water Treatment Plant Expansion	$5,011,000	$5,011,000	100%
C	Gainesville	Cooke	Water Treatment Plant Expansion	$4,941,000	$4,941,000	100%
C	Van Alstyne	Grayson	Supplemental Wells	$2,933,600	$2,933,600	100%
C	Van Alstyne	Grayson	Overdraft Trinity Aquifer (new wells)	$2,224,000	$2,224,000	100%
C	Howe	Grayson	Supplemental Wells	$1,746,093	$1,746,093	100%
C	Fairfield	Freestone	Carrizo Wilcox Aquifer (new wells)	$412,300	$391,685	95%
C	Fairfield	Freestone	Supplemental Wells	$1,949,968	$1,852,470	95%
C	Whitesboro	Grayson	Supplemental Wells	$2,066,684	$1,860,016	90%
C	Whitesboro	Grayson	Overdraft Trinity Aquifer (new wells)	$240,600	$216,540	90%
C	Whitesboro	Grayson	Overdraft Trinity Aquifer (new wells)	$179,400	$161,460	90%
C	Greater Texoma Utility Authority (GTUA)	Grayson	Lake Texoma (interim purchase from GTUA)	$15,729,000	$12,583,200	80%
C	Greater Texoma Utility Authority (GTUA)	Grayson	Collin-Grayson Municipal Alliance System	$51,454,400	$41,163,520	80%
C	Sherman	Grayson	Supplemental Wells	$14,682,124	$11,011,593	75%
C	Sherman	Grayson	Supplemental Wells	$11,181,498	$8,386,124	75%
C	Sherman	Grayson	Municipal Conservation	$33,049	$24,787	75%
C	Anna	Collin	Overdraft Trinity Aquifer (new wells)	$829,000	$538,850	65%
C	Anna	Collin	Overdraft Woodbine Aquifer (new wells)	$533,000	$346,450	65%
C	Anna	Collin	Supplemental Wells	$467,146	$303,645	65%
C	East Cedar Creek Fresh Water Supply District	Henderson	Water Treatment Plant Expansion	$23,574,000	$14,144,400	60%
C	Walnut Creek Special Utility District	Parker	Water Treatment Plant Expansion	$27,244,000	$13,622,000	50%
C	Crandall	Kaufman	Conveyance Project (pipeline)	$3,093,000	$1,546,500	50%
C	Richland Hills	Tarrant	Supplemental Wells	$2,580,069	$1,290,035	50%
C	Argyle Water Supply Corporation	Denton	Supplemental Wells	$2,163,624	$1,081,812	50%
C	Malakoff	Henderson	Supplemental Wells	$1,153,224	$576,612	50%
C	Ferris	Ellis	Supplemental Wells	$991,834	$495,917	50%
C	Boyd	Wise	Supplemental Wells	$580,748	$290,374	50%
C	Crandall	Kaufman	Expanded Municipal Conservation	$14,942	$7,471	50%
C	Bells	Grayson	Supplemental Wells	$1,220,560	$488,224	40%
C	Bells	Grayson	Woodbine Aquifer (new wells)	$348,000	$139,200	40%
C	Bolivar Water Supply Corporation	Denton	Supplemental Wells	$4,809,912	$1,442,974	30%
C	Bolivar Water Supply Corporation	Denton	Trinity Aquifer (new wells)	$4,398,333	$1,319,500	30%
C	Bolivar Water Supply Corporation	Denton	Supplemental Wells	$1,603,304	$480,991	30%
C	Bolivar Water Supply Corporation	Denton	Supplemental Wells	$531,760	$159,528	30%
C	Bolivar Water Supply Corporation	Denton	Trinity Aquifer (new wells)	$125,667	$37,700	30%

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
C	Chico	Wise	Supplemental Wells	$1,708,175	$427,044	25%
C	Fort Worth	Tarrant	Conveyance Project (pipeline)	$37,146,820	$9,286,705	25%
C	Fort Worth	Tarrant	Direct Reuse	$73,130,000	$18,282,500	25%
C	Fort Worth	Tarrant	Water Treatment Plant Expansion	$86,587,080	$21,646,770	25%
C	Ennis	Ellis	Expanded Municipal Conservation	$27,821	$5,564	20%
C	Honey Grove	Fannin	Supplemental Wells	$1,408,348	$211,252	15%
C	Lewisville	Denton	Water Treatment Plant Expansion	$13,552,000	$1,355,200	10%
C	Lewisville	Denton	Water Treatment Plant-Expansion (reuse sources)	$9,882,000	$988,200	10%
C	Lewisville	Denton	Conveyance Project (pipeline)	$9,314,000	$931,400	10%
C	Lewisville	Denton	Expanded Municipal Conservation	$61,985	$6,199	10%
C	Dallas	Dallas	Dallas Water Utilities Reuse	$391,772,000	$15,670,880	4%
C	Dallas	Dallas	Water Treatment Plant Expansion	$382,441,000	$15,297,640	4%
C	Dallas	Dallas	Lake Fork Connection	$362,916,000	$14,516,640	4%
C	Dallas	Dallas	Dallas Water Utilities Reuse	$63,110,000	$2,524,400	4%
D	Grand Saline	Van Zandt	New Wells	$574,243	$574,243	100%
D	Clarksville	Gregg	New Wells	$1,518,443	$1,518,443	100%
D	County-Other	Van Zandt	New Wells	$3,377,883	$1,688,941	50%
F	San Angelo	Tom Green	Rehabilitation Of Pipeline	$5,000,000	$2,500,000	50%
F	San Angelo	Tom Green	Subordination	$1,582,400	$791,200	50%
F	Robert Lee	Coke	New Water Treatment Plant	$2,482,500	$496,500	20%
G	Childress Creek Water Supply Corporation	Bosque	Bosque County Regional Project (pipeline)	$2,299,000	$2,069,100	90%
G	Abilene	Taylor	Clear Fork Scalping Into Hubbard Creek (reservoir)	$57,650,000	$23,060,000	40%
G	Abilene	Taylor	Breckenridge Reservoir (Cedar Ridge Site)	$41,377,500	$16,551,000	40%
G	West Central Texas Municipal Water District	Taylor	Breckenridge Reservoir (Cedar Ridge Site)	$41,377,500	$16,551,000	40%
G	West Central Texas Municipal Water District	Taylor	Clear Fork Scalping Into Hubbard Creek (reservoir)	$57,650,000	$23,060,000	40%
G	North Central Texas Municipal Water Authority	Taylor	Millers Creek Augmentation (pipeline)	$18,222,000	$6,559,920	36%
G	Brazos River Authority (BRA)	Johnson	Freeport Desalination Plant	$255,699,000	$63,924,750	25%
G	Brazos River Authority (BRA)	Johnson	BRA System Operations Permit	$61,643,000	$12,328,600	20%
G	Round Rock	Williamson	Wastewater Reuse (pipeline)	$6,369,000	$636,900	10%
H	Montgomery County Municipal Utility District#9	Montgomery	New Contracts From Existing Sources	$1,397,872	$1,397,872	100%
H	Alvin	Brazoria	New Groundwater Wells	$1,822,600	$1,366,950	75%
H	Montgomery County Municipal Utility District#8	Montgomery	New Contracts From Existing Sources	$1,434,986	$717,493	50%
H	Montgomery County Municipal Utility District#8	Montgomery	New Groundwater Wells	$416,000	$208,000	50%
H	Rosenberg	Fort Bend	BRA System Operations Permit	$5,237,596	$1,309,399	25%
H	Rosenberg	Fort Bend	New Contracts From Existing Sources	$6,732,129	$1,683,032	25%
H	Dayton	Liberty	New Groundwater Wells	$1,523,500	$380,875	25%
I	Angelina & Neches River Authority	Angelina	Lake Columbia (reservoir)	$387,107,500	$387,107,500	100%
J	Kerrville	Kerr	Additional Wells In A Remote Well Field	$7,512,000	$3,004,800	40%

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
J	Kerrville	Kerr	Increased Water Treatment and ASR Capacity	$6,650,000	$2,660,000	40%
K	Goldthwaite	Mills	Expansion of Trinity Aquifer	$5,774,580	$1,443,645	25%
K	Goldthwaite	Mills	Goldthwaite Channel Dam	$2,495,692	$623,923	25%
L	County Line Water Supply Corporation	Hays	Local Groundwater (Trinity Aquifer)	$2,693,000	$2,423,700	90%
L	Canyon Regional Water Authority (CRWA)	Comal	CRWA Dunlap Project	$44,837,000	$26,902,200	60%
L	Lockhart	Caldwell	Local Groundwater (Carrizo-Wilcox Aquifer)	$4,806,000	$2,595,240	54%
L	SS Water Supply Corporation	Wilson	Carrizo-Wilcox Aquifer (pipeline and water treatment)	$6,274,000	$2,509,600	40%
L	Bexar Metropolitan Water District	Bexar	Wells Ranch Project	$21,755,000	$7,614,250	35%
L	Bexar Metropolitan Water District	Bexar	Local Groundwater (Trinity Aquifer)	$20,382,000	$7,133,700	35%
L	Bexar Metropolitan Water District	Bexar	Local Groundwater (Carrizo-Wilcox Aquifer)	$2,675,000	$936,250	35%
M	Indian Lake	Cameron	Brackish Water Desalination	$123,850	$111,465	90%
M	Webb County Water Utility	Webb	Acquisition of Water Rights (pipeline and water treatment)	$972,047	$729,036	75%
M	Webb County Water Utility	Webb	Acquisition of Water Rights (pipeline and water treatment)	$43,734	$32,800	75%
M	Webb County Water Utility	Webb	Water Conservation (pipeline and water treatment)	$10,460	$7,845	75%
M	Santa Rosa	Cameron	Water Conservation	$11,809	$7,676	65%
M	Eagle Pass	Maverick	Advanced Water Conservation	$23,056	$5,764	25%
M	Los Fresnos	Cameron	Water Conservation	$39,365	$9,841	25%
M	Primera	Cameron	Advanced Water Conservation	$13,384	$1,338	10%
M	Rio Hondo	Cameron	Acquisition of Water Rights	$651,288	$32,564	5%
O	Wolfforth	Lubbock	Local Groundwater Development	$3,957,513	$1,899,606	48%
			TOTALS FOR 2010	**$2,722,313,298**	**$864,798,261**	
	PROJECTS IDENTIFIED FOR 2020					
C	Gainesville	Cooke	Cooke County Project (pipeline & water treatment)	$35,933,000	$35,933,000	100%
C	Gainesville	Cooke	Indirect Reuse (other infrastructure)	$8,564,000	$8,564,000	100%
C	Gainesville	Cooke	Bed And Banks Permit	$50,000	$50,000	100%
C	Greater Texoma Utility Authority (GTUA)	Grayson	Grayson County Project (pipeline & water treatment)	$215,365,000	$172,292,000	80%
C	Corsicana	Navarro	Water Treatment Plant Expansion	$9,882,000	$2,470,500	25%
C	Corsicana	Navarro	Water Treatment Plant Expansion	$15,528,000	$3,882,000	25%
C	Fort Worth	Tarrant	New Water Treatment Plant	$57,915,000	$14,478,750	25%
C	Fort Worth	Tarrant	Water Treatment Plant Expansion	$124,681,000	$31,170,250	25%
C	Fort Worth	Tarrant	Facility Improvements Reuse Sources (pipeline)	$130,010,400	$32,502,600	25%
C	Fort Worth	Tarrant	Water Treatment Plant (new reuse sources)	$42,702,000	$10,675,500	25%
C	Ennis	Ellis	Ennis Reuse	$27,127,000	$5,425,400	20%
C	Lewisville	Denton	Water Treatment Plant Expansion	$13,552,000	$1,355,200	10%
C	Kaufman	Kaufman	Expanded Municipal Conservation	$22,543	$2,254	10%
C	Dallas	Dallas	Lake Palestine Connection (pipeline)	$414,447,000	$16,577,880	4%
D	R P M Water Supply Corporation	Van Zandt	New Wells	$574,243	$287,121	50%

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
D	Waskom	Harrison	New Wells	$455,466	$227,733	50%
D	County-Other	Van Zandt	New Wells	$1,138,599	$569,299	50%
F	San Angelo	Tom Green	Desalination (pipeline and water treatment plant)	$40,590,000	$20,295,000	50%
F	Andrews	Andrews	Desalination	$4,678,300	$1,871,320	40%
G	Round Rock	Williamson	Regional Surface Water Supply (pipeline)	$101,336,000	$10,133,600	10%
H	Montgomery County Municipal Utility District#9	Montgomery	New Contracts From Existing Sources	$7,628,628	$7,628,628	100%
H	Montgomery County Municipal Utility District#8	Montgomery	New Contracts From Existing Sources	$6,606,914	$3,303,457	50%
L	Guadalupe Blanco River Authority	Guadalupe	LGWSP Capacity For GBRA Needs	$793,072,000	$396,536,000	50%
M	Indian Lake	Cameron	Advanced Water Conservation	$2,812	$2,531	90%
M	Eagle Pass	Maverick	Brackish Water Desalination	$855,828	$213,957	25%
M	Primera	Cameron	Brackish Water Desalination	$63,189	$6,319	10%
M	Primera	Cameron	Acquisition of Water Rights (pipeline and water treatment)	$593,758	$59,376	10%
M	Rio Hondo	Cameron	Water Conservation	$2,812	$141	5%
N	Corpus Christi	Nueces	USCOE Nueces Feasibility Projects (pipeline)	$105,428,000	$10,542,800	10%
O	Farwell	Parmer	Local Groundwater Development	$619,608	$254,039	41%
O	Sundown	Hockley	Local Groundwater Development	$753,720	$248,728	33%
O	Morton	Cochran	Local Groundwater Development	$922,944	$230,736	25%
			TOTALS FOR 2020	**$2,161,101,764**	**$787,790,119**	
	PROJECTS IDENTIFIED FOR 2030					
C	Van Alstyne	Grayson	Supplemental Wells	$441,184	$441,184	100%
C	Fairfield	Freestone	Conveyance (pipeline & water treatment)	$5,478,000	$5,204,100	95%
C	Anna	Collin	Supplemental Wells	$586,826	$381,437	65%
C	East Cedar Creek Fresh Water Supply District	Henderson	New Water Treatment Plant	$7,976,000	$4,785,600	60%
C	Walnut Creek Special Utility District	Parker	Conveyance Project (pipeline)	$23,925,000	$11,962,500	50%
C	Bells	Grayson	Supplemental Wells	$331,826	$132,730	40%
C	Fort Worth	Tarrant	Water Treatment Plant Expansion	$231,097,000	$57,774,250	25%
F	San Angelo	Tom Green	Develop Hickory Aquifer Supplies	$91,582,000	$45,791,000	50%
G	Johnson County Rural Special River Authority	Johnson	TRA Dallas County Reuse (pipeline)	$79,257,000	$39,628,500	50%
G	Brazos River Authority	Johnson	Allen's Creek (reservoir)	$51,012,000	$25,506,000	50%
H	Rosenberg	Fort Bend	Allen's Creek Reservoir	$7,593,841	$1,898,460	25%
M	Los Fresnos	Cameron	Brackish Water Desalination	$1,221,551	$305,388	25%
M	Primera	Cameron	Acquisition of Water Rights (pipeline and water treatment)	$26,422	$2,642	10%
N	Corpus Christi	Nueces	Garwood Pipeline and Off-Channel Reservoir Storage	$81,117,000	$8,111,700	10%
O	Lorenzo	Crosby	Local Groundwater Development	$276,408	$138,204	50%
			TOTALS FOR 2030	**$581,922,058**	**$202,063,695**	
	PROJECTS IDENTIFIED FOR 2040					

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
B	Bowie	Montague	Wastewater Reuse (pipeline & water treatment)	$895,000	$760,750	85%
C	Walnut Creek Special Utility District	Parker	New Water Treatment Plant	$7,976,000	$3,988,000	50%
C	Corsicana	Navarro	Expanded Municipal Conservation	$34,486	$8,622	25%
C	Lewisville	Denton	New Water Treatment Plant	$21,740,000	$2,174,000	10%
C	Dallas	Dallas	Wright Patman Reallocation of Flood Pool (pipeline)	$572,036,000	$22,881,440	4%
E	Tornillo WCID	El Paso	New Well	$500,000	$350,000	70%
K	Smithville	Bastrop	Expansion of Carrizo-Wilcox Aquifer	$479,332	$383,466	80%
L	Canyon Regional Water Authority (CRWA)	Comal	Hays/Caldwell Carrizo Project	$32,592,000	$19,555,200	60%
L	Lockhart	Caldwell	Hays/Caldwell Carrizo Project	$13,036,800	$7,039,872	54%
M	Webb County Water Utility	Webb	Expand Existing Groundwater Wells	$9,134	$6,850	75%
N	Corpus Christi	Nueces	Nueces Feasibility Projects Off-Channel Reservoir	$248,919,000	$24,891,900	10%
N	Corpus Christi	Nueces	Nueces Feasibility Projects - Seawater Desalination	$155,028,000	$15,502,800	10%
O	Idalou	Lubbock	Local Groundwater Development	$596,508	$447,381	75%
			TOTALS FOR 2040	**$1,053,842,260**	**$97,990,281**	
	PROJECTS IDENTIFIED FOR 2050					
C	Corsicana	Navarro	Conveyance Project (pipeline)	$12,643,000	$3,160,750	25%
C	Dallas	Dallas	Lake Fastrill (reservoir)	$569,170,000	$22,766,800	4%
G	Brazos River Authority	Johnson	Little River Reservoir (off channel)	$96,512,000	$48,256,000	50%
G	Brazos River Authority (BRA)	Johnson	Conjunctive Use (Lake Granger Augmentation)	$303,288,000	$60,657,600	20%
I	R P M Water Supply Corporation	Henderson	New Wells - Carrizo Wilcox Aquifer	$58,283	$29,142	50%
K	Bastrop	Bastrop	Expansion of Other Aquifer	$457,814	$457,814	100%
O	Petersburg	Hale	Local Groundwater Development	$265,452	$212,362	80%
			TOTALS FOR 2050	**$982,394,549**	**$135,540,468**	
	PROJECTS IDENTIFIED FOR 2060					
L	San Marcos	Hays	Hays/Caldwell Carrizo Project	$45,628,800	$11,407,200	25%
N	Corpus Christi	Nueces	Lake Texana/Construction On The Lavaca River	$149,185,000	$14,918,500	10%
			TOTALS FOR 2060	**$194,813,800**	**$26,325,700**	
			ALL DECADE TOTALS	**$7,696,387,729**	**$2,114,508,524**	

Source: Water for Texas: 2007 "Infrastructure Financing Survey"

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Senate District(s)	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
	PROJECTS IDENTIFIED FOR 2010						
A	Stratford	Sherman	31	Overdraft Aquifer (pipeline)	$984,300	$935,085	95%
A	Dalhart	Dallam	31	Overdraft Aquifer (pipeline)	$2,200,100	$1,980,090	90%
A	Dalhart	Dallam	31	Overdraft Aquifer (pipeline)	$829,400	$746,460	90%
C	Mac Bee Water Supply Corporation	Kaufman	2	Water Treatment Plant Expansion	$5,011,000	$5,011,000	100%
C	Gainesville	Cooke	30	Water Treatment Plant Expansion	$4,941,000	$4,941,000	100%
C	Van Alstyne	Grayson	30	Supplemental Wells	$2,933,600	$2,933,600	100%
C	Van Alstyne	Grayson	30	Overdraft Trinity Aquifer (new wells)	$2,224,000	$2,224,000	100%
C	Howe	Grayson	30	Supplemental Wells	$1,746,093	$1,746,093	100%
C	Fairfield	Freestone	5	Carrizo Wilcox Aquifer (new wells)	$412,300	$391,685	95%
C	Fairfield	Freestone	5	Supplemental Wells	$1,949,968	$1,852,470	95%
C	Whitesboro	Grayson	30	Supplemental Wells	$2,066,684	$1,860,016	90%
C	Whitesboro	Grayson	30	Overdraft Trinity Aquifer (new wells)	$240,600	$216,540	90%
C	Whitesboro	Grayson	30	Overdraft Trinity Aquifer (new wells)	$179,400	$161,460	90%
C	Greater Texoma Utility Authority (GTUA)	Grayson	30	Lake Texoma (interim purchase from GTUA)	$15,729,000	$12,583,200	80%
C	Greater Texoma Utility Authority (GTUA)	Grayson	30	Collin-Grayson Municipal Alliance System	$51,454,400	$41,163,520	80%
C	Sherman	Grayson	30	Supplemental Wells	$14,682,124	$11,011,593	75%
C	Sherman	Grayson	30	Supplemental Wells	$11,181,498	$8,386,124	75%
C	Sherman	Grayson	30	Municipal Conservation	$33,049	$24,787	75%
C	Anna	Collin	30	Overdraft Trinity Aquifer (new wells)	$829,000	$538,850	65%
C	Anna	Collin	30	Overdraft Woodbine Aquifer (new wells)	$533,000	$346,450	65%
C	Anna	Collin	30	Supplemental Wells	$467,146	$303,645	65%
C	East Cedar Creek Fresh Water Supply District	Henderson	3	Water Treatment Plant Expansion	$23,574,000	$14,144,400	60%
C	Walnut Creek Special Utility District	Parker	30	Water Treatment Plant Expansion	$27,244,000	$13,622,000	50%
C	Crandall	Kaufman	2	Conveyance Project (pipeline)	$3,093,000	$1,546,500	50%
C	Richland Hills	Tarrant	12	Supplemental Wells	$2,580,069	$1,290,035	50%
C	Argyle Water Supply Corporation	Denton	9,12,30	Supplemental Wells	$2,163,624	$1,081,812	50%
C	Malakoff	Henderson	3	Supplemental Wells	$1,153,224	$576,612	50%
C	Ferris	Ellis	22	Supplemental Wells	$991,834	$495,917	50%
C	Boyd	Wise	30	Supplemental Wells	$580,748	$290,374	50%
C	Crandall	Kaufman	2	Expanded Municipal Conservation	$14,942	$7,471	50%
C	Bells	Grayson	30	Supplemental Wells	$1,220,560	$488,224	40%
C	Bells	Grayson	30	Woodbine Aquifer (new wells)	$348,000	$139,200	40%
C	Bolivar Water Supply Corporation	Denton	9,12,30	Supplemental Wells	$4,809,912	$1,442,974	30%
C	Bolivar Water Supply Corporation	Denton	9,12,30	Trinity Aquifer (new wells)	$4,398,333	$1,319,500	30%
C	Bolivar Water Supply Corporation	Denton	9,12,30	Supplemental Wells	$1,603,304	$480,991	30%
C	Bolivar Water Supply Corporation	Denton	9,12,30	Supplemental Wells	$531,760	$159,528	30%
C	Bolivar Water Supply Corporation	Denton	9,12,30	Trinity Aquifer (new wells)	$125,667	$37,700	30%

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Planning Region	Primary User	County	Senate District(s)	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
C	Chico	Wise	30	Supplemental Wells	$1,708,175	$427,044	25%
C	Fort Worth	Tarrant	9,10,12	Conveyance Project (pipeline)	$37,146,820	$9,286,705	25%
C	Fort Worth	Tarrant	9,10,12	Direct Reuse	$73,130,000	$18,282,500	25%
C	Fort Worth	Tarrant	9,10,12	Water Treatment Plant Expansion	$86,587,080	$21,646,770	25%
C	Ennis	Ellis	22	Expanded Municipal Conservation	$27,821	$5,564	20%
C	Honey Grove	Fannin	2	Supplemental Wells	$1,408,348	$211,252	15%
C	Lewisville	Denton	9,12	Water Treatment Plant Expansion	$13,552,000	$1,355,200	10%
C	Lewisville	Denton	9,12	Water Treatment Plant-Expansion (reuse sources)	$9,882,000	$988,200	10%
C	Lewisville	Denton	9,12	Conveyance Project (pipeline)	$9,314,000	$931,400	10%
C	Lewisville	Denton	9,12	Expanded Municipal Conservation	$61,985	$6,199	10%
C	Dallas	Dallas	2,8,9,16,23	Dallas Water Utilities Reuse	$391,772,000	$15,670,880	4%
C	Dallas	Dallas	2,8,9,16,23	Water Treatment Plant Expansion	$382,441,000	$15,297,640	4%
C	Dallas	Dallas	2,8,9,16,23	Lake Fork Connection	$362,916,000	$14,516,640	4%
C	Dallas	Dallas	2,8,9,16,23	Dallas Water Utilities Reuse	$63,110,000	$2,524,400	4%
D	Grand Saline	Van Zandt	2	New Wells	$574,243	$574,243	100%
D	Clarksville	Gregg	1	New Wells	$1,518,443	$1,518,443	100%
D	County-Other	Van Zandt	2	New Wells	$3,377,883	$1,688,941	50%
F	San Angelo	Tom Green	28	Rehabilitation Of Pipeline	$5,000,000	$2,500,000	50%
F	San Angelo	Tom Green	28	Subordination	$1,582,400	$791,200	50%
F	Robert Lee	Coke	28	New Water Treatment Plant	$2,482,500	$496,500	20%
G	Childress Creek Water Supply Corporation	Bosque	22	Bosque County Regional Project (pipeline)	$2,299,000	$2,069,100	90%
G	Abilene	Taylor	24	Clear Fork Scalping Into Hubbard Creek (reservoir)	$57,650,000	$23,060,000	40%
G	Abilene	Taylor	24	Breckenridge Reservoir (Cedar Ridge Site)	$41,377,500	$16,551,000	40%
G	West Central Texas Municipal Water District	Taylor	24	Breckenridge Reservoir (Cedar Ridge Site)	$41,377,500	$16,551,000	40%
G	West Central Texas Municipal Water District	Taylor	24	Clear Fork Scalping Into Hubbard Creek (reservoir)	$57,650,000	$23,060,000	40%
G	North Central Texas Municipal Water Authority	Taylor	24	Millers Creek Augmentation (pipeline)	$18,222,000	$6,559,920	36%
G	Brazos River Authority (BRA)	Johnson	22	Freeport Desalination Plant	$255,699,000	$63,924,750	25%
G	Brazos River Authority (BRA)	Johnson	22	BRA System Operations Permit	$61,643,000	$12,328,600	20%
G	Round Rock	Williamson	5	Wastewater Reuse (pipeline)	$6,369,000	$636,900	10%
H	Montgomery County Municipal Utility District#9	Montgomery	.3,4	New Contracts From Existing Sources	$1,397,872	$1,397,872	100%
H	Alvin	Brazoria	11	New Groundwater Wells	$1,822,600	$1,366,950	75%
H	Montgomery County Municipal Utility District#8	Montgomery	3,4	New Contracts From Existing Sources	$1,434,986	$717,493	50%
H	Montgomery County Municipal Utility District#8	Montgomery	3,4	New Groundwater Wells	$416,000	$208,000	50%
H	Rosenberg	Fort Bend	17,18	BRA System Operations Permit	$5,237,596	$1,309,399	25%
H	Rosenberg	Fort Bend	17,18	New Contracts From Existing Sources	$6,732,129	$1,683,032	25%
H	Dayton	Liberty	4	New Groundwater Wells	$1,523,500	$380,875	25%
I	Angelina & Neches River Authority	Angelina	3	Lake Columbia (reservoir)	$387,107,500	$387,107,500	100%
J	Kerrville	Kerr	24	Additional Wells In A Remote Well Field	$7,512,000	$3,004,800	40%

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Senate District(s)	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
J	Kerrville	Kerr	24	Increased Water Treatment and ASR Capacity	$6,650,000	$2,660,000	40%
K	Goldthwaite	Mills	24	Expansion of Trinity Aquifer	$5,774,580	$1,443,645	25%
K	Goldthwaite	Mills	24	Goldthwaite Channel Dam	$2,495,692	$623,923	25%
L	County Line Water Supply Corporation	Hays	25	Local Groundwater (Trinity Aquifer)	$2,693,000	$2,423,700	90%
L	Canyon Regional Water Authority (CRWA)	Comal	25	CRWA Dunlap Project	$44,837,000	$26,902,200	60%
L	Lockhart	Caldwell	18	Local Groundwater (Carrizo-Wilcox Aquifer)	$4,806,000	$2,595,240	54%
L	SS Water Supply Corporation	Wilson	21	Carrizo-Wilcox Aquifer (pipeline and water treatment)	$6,274,000	$2,509,600	40%
L	Bexar Metropolitan Water District	Bexar	19,21,25,26	Wells Ranch Project	$21,755,000	$7,614,250	35%
L	Bexar Metropolitan Water District	Bexar	19,21,25,26	Local Groundwater (Trinity Aquifer)	$20,382,000	$7,133,700	35%
L	Bexar Metropolitan Water District	Bexar	19,21,25,26	Local Groundwater (Carrizo-Wilcox Aquifer)	$2,675,000	$936,250	35%
M	Indian Lake	Cameron	27	Brackish Water Desalination	$123,850	$111,465	90%
M	Webb County Water Utility	Webb	21	Acquisition of Water Rights (pipeline and water treatment)	$972,047	$729,036	75%
M	Webb County Water Utility	Webb	21	Acquisition of Water Rights (pipeline and water treatment)	$43,734	$32,800	75%
M	Webb County Water Utility	Webb	21	Water Conservation (pipeline and water treatment)	$10,460	$7,845	75%
M	Santa Rosa	Cameron	27	Water Conservation	$11,809	$7,676	65%
M	Eagle Pass	Maverick	19	Advanced Water Conservation	$23,056	$5,764	25%
M	Los Fresnos	Cameron	27	Water Conservation	$39,365	$9,841	25%
M	Primera	Cameron	27	Advanced Water Conservation	$13,384	$1,338	10%
M	Rio Hondo	Cameron	27	Acquisition of Water Rights	$651,288	$32,564	5%
O	Wolfforth	Lubbock	28	Local Groundwater Development	$3,957,513	$1,899,606	48%
				TOTALS FOR 2010	**$2,722,313,298**	**$864,798,261**	
	PROJECTS IDENTIFIED FOR 2020						
C	Gainesville	Cooke	30	Cooke County Project (pipeline & water treatment)	$35,933,000	$35,933,000	100%
C	Gainesville	Cooke	30	Indirect Reuse (other infrastructure)	$8,564,000	$8,564,000	100%
C	Gainesville	Cooke	30	Bed And Banks Permit	$50,000	$50,000	100%
C	Greater Texoma Utility Authority (GTUA)	Grayson	30	Grayson County Project (pipeline & water treatment)	$215,365,000	$172,292,000	80%
C	Corsicana	Navarro	22	Water Treatment Plant Expansion	$9,882,000	$2,470,500	25%
C	Corsicana	Navarro	22	Water Treatment Plant Expansion	$15,528,000	$3,882,000	25%
C	Fort Worth	Tarrant	9,10,12	New Water Treatment Plant	$57,915,000	$14,478,750	25%
C	Fort Worth	Tarrant	9,10,12	Water Treatment Plant Expansion	$124,681,000	$31,170,250	25%
C	Fort Worth	Tarrant	9,10,12	Facility Improvements Reuse Sources (pipeline)	$130,010,400	$32,502,600	25%
C	Fort Worth	Tarrant	9,10,12	Water Treatment Plant (new reuse sources)	$42,702,000	$10,675,500	25%
C	Ennis	Ellis	22	Ennis Reuse	$27,127,000	$5,425,400	20%
C	Lewisville	Denton	9,12	Water Treatment Plant Expansion	$13,552,000	$1,355,200	10%
C	Kaufman	Kaufman	2	Expanded Municipal Conservation	$22,543	$2,254	10%
C	Dallas	Dallas	2,8,9,16,23	Lake Palestine Connection (pipeline)	$414,447,000	$16,577,880	4%
D	R P M Water Supply Corporation	Van Zandt	2	New Wells	$574,243	$287,121	50%

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Senate District(s)	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
D	Waskom	Harrison	1	New Wells	$455,466	$227,733	50%
D	County-Other	Van Zandt	2	New Wells	$1,138,599	$569,299	50%
F	San Angelo	Tom Green	28	Desalination (pipeline and water treatment plant)	$40,590,000	$20,295,000	50%
F	Andrews	Andrews	31	Desalination	$4,678,300	$1,871,320	40%
G	Round Rock	Williamson	5	Regional Surface Water Supply (pipeline)	$101,336,000	$10,133,600	10%
H	Montgomery County Municipal Utility District#9	Montgomery	3,4	New Contracts From Existing Sources	$7,628,628	$7,628,628	100%
H	Montgomery County Municipal Utility District#8	Montgomery	3,4	New Contracts From Existing Sources	$6,606,914	$3,303,457	50%
L	Guadalupe Blanco River Authority	Guadalupe	25	LGWSP Capacity For GBRA Needs	$793,072,000	$396,536,000	50%
M	Indian Lake	Cameron	27	Advanced Water Conservation	$2,812	$2,531	90%
M	Eagle Pass	Maverick	19	Brackish Water Desalination	$855,828	$213,957	25%
M	Primera	Cameron	27	Brackish Water Desalination	$63,189	$6,319	10%
M	Primera	Cameron	27	Acquisition of Water Rights (pipeline and water treatment)	$593,758	$59,376	10%
M	Rio Hondo	Cameron	27	Water Conservation	$2,812	$141	5%
N	Corpus Christi	Nueces	20	USCOE Nueces Feasibility Projects (pipeline)	$105,428,000	$10,542,800	10%
O	Farwell	Parmer	31	Local Groundwater Development	$619,608	$254,039	41%
O	Sundown	Hockley	28	Local Groundwater Development	$753,720	$248,728	33%
O	Morton	Cochran	31	Local Groundwater Development	$922,944	$230,736	25%
				TOTALS FOR 2020	**$2,161,101,764**	**$787,790,119**	
	PROJECTS IDENTIFIED FOR 2030						
C	Van Alstyne	Grayson	30	Supplemental Wells	$441,184	$441,184	100%
C	Fairfield	Freestone	5	Conveyance (pipeline & water treatment)	$5,478,000	$5,204,100	95%
C	Anna	Collin	30	Supplemental Wells	$586,826	$381,437	65%
C	East Cedar Creek Fresh Water Supply District	Henderson	3	New Water Treatment Plant	$7,976,000	$4,785,600	60%
C	Walnut Creek Special Utility District	Parker	30	Conveyance Project (pipeline)	$23,925,000	$11,962,500	50%
C	Bells	Grayson	30	Supplemental Wells	$331,826	$132,730	40%
C	Fort Worth	Tarrant	9,10,12	Water Treatment Plant Expansion	$231,097,000	$57,774,250	25%
F	San Angelo	Tom Green	28	Develop Hickory Aquifer Supplies	$91,582,000	$45,791,000	50%
G	Johnson County Rural Special River Authority	Johnson	22	TRA Dallas County Reuse (pipeline)	$79,257,000	$39,628,500	50%
G	Brazos River Authority	Johnson	22	Allen's Creek (reservoir)	$51,012,000	$25,506,000	50%
H	Rosenberg	Fort Bend	17,18	Allen's Creek Reservoir	$7,593,841	$1,898,460	25%
M	Los Fresnos	Cameron	27	Brackish Water Desalination	$1,221,551	$305,388	25%
M	Primera	Cameron	27	Acquisition of Water Rights (pipeline and water treatment)	$26,422	$2,642	10%
N	Corpus Christi	Nueces	20	Garwood Pipeline and Off-Channel Reservoir Storage	$81,117,000	$8,111,700	10%
O	Lorenzo	Crosby	28	Local Groundwater Development	$276,408	$138,204	50%
				TOTALS FOR 2030	**$581,922,058**	**$202,063,695**	
	PROJECTS IDENTIFIED FOR 2040						

Table 4: Projects Identified by Regional Planning Groups for State Funding in 2006 Regional Water Plans

Planning Region	Primary User	County	Senate District(s)	Project	Total Capital Costs	Portion of Capital Costs Identified for State Funding	% of Total Capital Costs Identified for State Funding
B	Bowie	Montague	30	Wastewater Reuse (pipeline & water treatment)	$895,000	$760,750	85%
C	Walnut Creek Special Utility District	Parker	30	New Water Treatment Plant	$7,976,000	$3,988,000	50%
C	Corsicana	Navarro	22	Expanded Municipal Conservation	$34,486	$8,622	25%
C	Lewisville	Denton	9,12	New Water Treatment Plant	$21,740,000	$2,174,000	10%
C	Dallas	Dallas	2,8,9,16,23	Wright Patman Reallocation of Flood Pool (pipeline)	$572,036,000	$22,881,440	4%
E	Tornillo WCID	El Paso	19,29	New Well	$500,000	$350,000	70%
K	Smithville	Bastrop	18	Expansion of Carrizo-Wilcox Aquifer	$479,332	$383,466	80%
L	Canyon Regional Water Authority (CRWA)	Comal	25	Hays/Caldwell Carrizo Project	$32,592,000	$19,555,200	60%
L	Lockhart	Caldwell	18	Hays/Caldwell Carrizo Project	$13,036,800	$7,039,872	54%
M	Webb County Water Utility	Webb	21	Expand Existing Groundwater Wells	$9,134	$6,850	75%
N	Corpus Christi	Nueces	20	Nueces Feasibility Projects Off-Channel Reservoir	$248,919,000	$24,891,900	10%
N	Corpus Christi	Nueces	20	Nueces Feasibility Projects - Seawater Desalination	$155,028,000	$15,502,800	10%
O	Idalou	Lubbock	28	Local Groundwater Development	$596,508	$447,381	75%
				TOTALS FOR 2040	**$1,053,842,260**	**$97,990,281**	
	PROJECTS IDENTIFIED FOR 2050						
C	Corsicana	Navarro	22	Conveyance Project (pipeline)	$12,643,000	$3,160,750	25%
C	Dallas	Dallas	2,8,9,16,23	Lake Fastrill (reservoir)	$569,170,000	$22,766,800	4%
G	Brazos River Authority	Johnson	22	Little River Reservoir (off channel)	$96,512,000	$48,256,000	50%
G	Brazos River Authority (BRA)	Johnson	22	Conjunctive Use (Lake Granger Augmentation)	$303,288,000	$60,657,600	20%
I	R P M Water Supply Corporation	Henderson	3	New Wells - Carrizo Wilcox Aquifer	$58,283	$29,142	50%
K	Bastrop	Bastrop	18	Expansion of Other Aquifer	$457,814	$457,814	100%
O	Petersburg	Hale	28	Local Groundwater Development	$265,452	$212,362	80%
				TOTALS FOR 2050	**$982,394,549**	**$135,540,468**	
	PROJECTS IDENTIFIED FOR 2060						
L	San Marcos	Hays	25	Hays/Caldwell Carrizo Project	$45,628,800	$11,407,200	25%
N	Corpus Christi	Nueces	20	Lake Texana/Construction On The Lavaca River	$149,185,000	$14,918,500	10%
				TOTALS FOR 2060	**$194,813,800**	**$26,325,700**	
				ALL DECADE TOTALS	**$7,696,387,729**	**$2,114,508,524**	
Source: Water for Texas: 2007 "Infrastructure Financing Survey"							

Appendix M

Testimony of

John Ma
Vice President
Goldman, Sachs & Co.

to the

Texas State Senate Natural Resources Committee
Houston, Texas
August 8, 2006

Ladies and gentlemen, members of the committee,

My name is John Ma, and I am a vice president in Goldman Sachs' investment banking division, in our municipal finance and infrastructure banking group; I am based in New York City. Thank you for having me here today.

Today I wanted to discuss an alternative approach to financing infrastructure assets, including water and waste water systems, that is gaining increased focus and attention among state and local governments across the US.

This approach is broadly called public-private partnerships, or PPP, or more simply "P3". In this approach, state or local governments receive a significant upfront payment from a private equity investor or operator in return for the right to operate and maintain an infrastructure asset such as a toll road or water system, over the period of a long-term lease. The investor, in addition to raising debt against the asset, also injects a significant amount of their own equity capital to help fund these deals. By efficiently and effectively financing, operating and maintaining the asset, the investor/operator yields a return over the life of the concession. States and municipalities are able to generate significant upfront proceeds to invest in other needs, and shift the operating risk and future capital requirements of the water system to the private concession operator.

In the US water sector, public private partnerships have existed for many years in different forms. At its simplest level, some municipalities contract with private operators to run certain parts of the day-to-day operations of their water system for a fixed fee, where the risks and rewards remain fully with the municipality. Other broader partnerships involve longer term Operate & Maintain contracts, where private operators manage almost all aspects of a municipal water system. Through incentive clauses in their contracts, the private operator might share in some of the rewards and bear some of the risks of operating the water system. However, the traditional involvement of private operators has usually been done within the confines of the tax-exempt municipal financing markets. Contracts have tended to extend no longer than 20 years, with returns to the private operators limited, in order to preserve the overall tax-exempt status.

The PPP approach I will discuss today however, involves the investment of true private equity, typically with taxable debt financing. The duration of the long-term concessions often extend from 50 years or longer, with true risk shifting to the private investor.

The PPP market, and private equity, can be a very effective financing tool for assets like toll roads and water systems. They are asset intensive, involving long-lived assets, with generally strong and stable cash flow. This allows private equity investors to raise significant levels of debt financing. They are what equity investors call "long duration assets" – meaning for a pension fund or insurance company, they can get an attractive return over a long period of time, matching their long-term liabilities. These assets also allow for tax purposes the deduction of depreciation and interest expense, which can further augment their cash flows.

As a result of this profile, there is significant interest these days on Wall Street for infrastructure related assets. Investors are focused on a range of assets that they regard as "infrastructure" – meaning stable, long-term assets, with a non-competitive, protected aspect to the business. Toll roads, port operations, and water systems are among these types of assets. The private investment capital is coming largely from pension funds and insurance companies searching for steady, predictable cash flows. On Wall Street, the private investment arms of Goldman Sachs as well as other investment banks and private equity investors have raised or are raising billions of dollars to invest in these assets.

In my remarks today, I will try to highlight some of the potential benefits and issues related to a P3 approach, as well as some of the public policy considerations behind such an approach.

First , I'd like to give a little more context and background on the P3 Approach here in the US, and talk about a couple of situations where Goldman Sachs has been involved as an advisor to state and municipal governments:

One example is the State of Indiana, which recently found itself faced with a $2.8 billion deficit in its 10-year transportation plan. After determining that the maximum potential tax-exempt proceeds would be insufficient to fund its plan, the State retained Goldman Sachs to execute a P3 concession bidding process, which concluded with the acceptance of a $3.8 billion bid in exchange for a 75-year lease of the Indiana Toll Road. Those proceeds will be used to fully fund Indiana's transportation plan, accelerate several other projects that will upgrade and enhance Indiana's infrastructure, generate significant new construction and manufacturing jobs, and lower the State's future debt issuance and interest costs.

Similarly, Goldman Sachs also advised the City of Chicago on the $1.8 billion 99 year concession lease of the Chicago Skyway, which was announced in 2005. In Chicago, the City used the proceeds to pay down existing debt, establish a $500 mm "Rainy Day" fund, allocate $375 mm to the annual operating budget, and fund several social service programs.

It happened that in both these transactions, the winning bidder was a consortium of MacQuarie, an infrastructure operator based in Australia, and Cintra, an experienced toll road operator based in Spain.

It is important to note that the inherent value that can be realized through this PPP process is often beyond what can be realized by the municipality in the tax-exempt debt market. The municipal or tax-exempt debt markets rely primarily on historical growth and financial performance to determine the borrowing levels for a public infrastructure asset. Equity investors in PPP projects, however, are willing to pay for the expected value of future cash flows from steady revenue-producing assets such as a toll road, and they are often comfortable taking a more optimistic view on the future performance of established assets. They take into account factors such as population growth and potential rate increases tied simply to expected rates of GDP growth or inflation. Importantly, private equity investors are typically able to utilize depreciation benefits from a tax perspective to improve the projects cash flows. This helps offset the fact that they are issuing taxable debt at higher rates.

The private investor most often bids in conjunction with an experienced operator that will manage the operations. Ultimately, a private operator is more likely to be able to hold down expenses and manage the asset more efficiently simply due to economies of scale and experience. They can bring to bear their pool of experienced operators, technology, and best practices.

Benefits of Public Private Partnerships for States and Local Governments

I wanted to highlight the potential benefits of Public Private Partnership approach in the water sector. Those include:

1. **Transfer of Risk**: In the water sector, this approach has the effect of shifting operating risk to the private operator: These risks include the rate of customer connection and usage growth driving total revenue. On the operating expense side, they bear the risk on staffing levels and other operating expense including gas/electricity expense. The concessionaire commits to maintain water losses within pre-determined bands and specified levels of output, thereby

committing themselves to future repair and maintenance and other capital commitments. Typically the private operator will ask for some cost sharing however if capital expenses exceed a certain level.

Given the dynamic world we live in, with energy prices rising and generally ageing water infrastructure in need of repair and overhaul, transferring these risks to a private operator can be very valuable indeed.

2. **Adherence to Strict Operating Standards**: The municipality can carefully craft the terms of the concession agreement to achieve strict operating standards that meet the municipality's public policy goals. If the concessionaire does not comply with the standards, ultimately the municipality can take the asset back by canceling the concession after some cure period. Both the Indiana Toll Road and the Skyway transactions have 300-page operating standards that address, in great detail, the manner in which the roads will be operated and maintained. In the water sector, a carefully crafted concession agreement will ensure adherence to detailed environmental and health and safety compliance standards

3. **Limited rate increases** - Rate increases are generally constrained and limited in these concession agreements. The concession agreements provide a mechanism for the concessionaire to achieve rate increases, but usually no more than at the rate of inflation (CPI) plus 1-3 percent.

4. **Control and Ownership of the Assets**: When talking about public private partnerships, a great deal of discussion usually centers on a municipalities reluctance and concern over the perceived loss of control. However, it is important to emphasize that ownership of infrastructure assets remains with the municipality. Since the municipality remains the owner, this inherently enables them to retain a greater degree of oversight of the ongoing maintenance and operations. In addition, the municipality determines a detailed list of operating standards that the

concessionaire is required to follow. The municipality has the right to terminate the lease upon failure to meet any of these standards, which also allows the municipality further control:

5. **Flexibility with Use of Proceeds**: The municipality could utilize the up-front proceeds to accelerate needed infrastructure projects. The true value of the ability to utilize the proceeds of a PPP for any use determined by the municipality is in contrast to the strict limitations of tax regulations for the use of any proceeds from a tax exempt bond deal. Through a PPP, the municipality is able to utilize the proceeds for a variety of uses that could range from accelerating planned transportation projects to funding social service programs. The City of Chicago retained a portion of the proceeds from the lease of the Skyway for a "rainy-day" fund that ultimately aided in the ratings upgrade of the City – and that will lower future financing costs.

6. **Greater Up-front Proceeds**: A public private partnership allows the municipality to capture greater upfront value than a municipal bond transaction, given that the municipality is paid based upon the growth of future cash flows of its infrastructure assets, as compared to focusing on historical cash flow in the debt market. As opposed to the traditional approach of raising municipal debt to finance the costs, the P3 approach looks to private capital

Concerns & Public Policy Issues

What are the typical concerns and issues related to a public-private partnership or concession?

I have highlighted some of the important ones already, including the impact of rate increases, operating and environmental & safety standards. Other concerns that get expressed include: why are we selling a long-term concession and monetizing what would otherwise provide us with cash flows on our own for years to come? On that one, I would note that each situation needs to be evaluated on a case by case basis, but as Indiana and Chicago has taught us, the private investors ability to put equity into a deal and their own views on growth often lead to much higher upfront payments that could ordinarily be achieved via the traditional debt finance markets. Add to that the fact that much of the capital spending risk and operating risk is being shifted to the private operator.

Concession agreements are very flexible arrangements that can be custom crafted to suit a municipalities public policy objectives.

Other concerns involve whether jobs are naturally lost when concessions are created. The answer to that is not necessarily. Public policy concerns about job preservation can be written into concession agreements. Many operators, if they believe there is overstaffing, often achieve their staffing targets via natural attrition or retirement over a long period of time.

Finally, some people have expressed concerns that they view these deals as selling our key infrastructure assets to foreign operators. Now, in response to that, I would say that while Chicago and Indiana toll road deals involved a consortium of Australian and Spanish operators, not all deals involve foreign operators necessarily. There is strong and rising interest among US based investors. More importantly, these concessions are not a sale. It is important to remember that the state or municipal governments retain ultimate ownership.

Conclusion – Are PPPs the Future of Infrastructure Finance?

The need for alternative funding to repair and replenish the nation's infrastructure has given rise to the increased prevalence of public private partnerships in the United States today. There are pools of private capital that are available for this very purpose. Public-private partnerships are truly mutually beneficial – municipalities are able to monetize assets for up-front cash payments to fund future projects or inject additional capital in others while private owners, operators and investors are able to access the steady stream of cash flows produced by infrastructure assets.

The marriage of private operating efficiencies and incentives with essential public assets can only enhance our nation's transportation infrastructure.

As budgets become increasingly constrained and funding sources harder and harder to come by, it is likely that PPPs will become a prominent fixture in the infrastructure finance landscape. The growth in the PPP market in the past year has been exceptionally strong and there is every reason to believe that it will continue in the future. Public private partnerships are a very real and practical solution to many of our local municipalities' transportation funding crises. Although a PPP may not be appropriate for every project or municipality, it provides a valuable alternative to the current financing options that are available.

TEXAS SENATE STAFF SERVICES
RJM:cn/318/NRRTJM080806T1S2/090806
SENATE NATURAL RESOURCES
COMMITTEE - HOUSTON
EXCERPT: ROY TORKELSON TESTIMONY
AND JOHN MA TESTIMONY
AUGUST 8, 2006
TAPE 1, SIDE 2

(Senator Averitt in the Chair)

CHAIRMAN : And Kevin brought up a point that, you know, this, these programs require someone to analyze and assess the price risk, and we thought it'd be a good idea to have some folks from a different perspective, kinda give us some insights on what the folks in, at Wall Street think we need to be working on and what, what the perception of how we're, the state's water projects might be, so we invited a couple of fellows from New York City.

: (Laughter)

CHAIRMAN : Roy Torkelson and John Ma. And we're very, very appreciative of you making the trip from New York to come be with us this morning. And, the question I'm gonna ask both of y'all after you, you can address as you see fit, would be, what do we need to be doing to generate Wall Street's interest in participating in our water projects and, and gaining confidence in our projects here in Texas. And, so, welcome, and thank you for the record. If you would, state your name and who you represent.

TORKELSON : Sure. Without prior preparation, thank you very much, Senator, in terms of who goes first or second, so--

CHAIRMAN : (That's your)--

TORKELSON : --appreciate that, and to the Members of the Committee, thank you very much for the opportunity to come before you. One of the things we, or at least I do, like very much is questions. We'll try to give you a sense of where things are and be available to you and your staff members in the future, should you want to take any matter forward. We enjoy working in the public policy arena to try to help solutions. Obviously, you might say for economic benefit, but not always true. Many of us come out of a public service background as well. So, just by background for myself, I spent 23 years in New York state government, eight of them in the Central Budget Office (sic), 15 in the Environmental Conservation Department (sic) of New York. That's a combination of a natural resource function and an environmental regulatory function. So, a nice, proper, healthy tension at all times between development and regulation. My job there was as a deputy commissioner to manage the agency which I did over those 15 years. In that process, enjoyed not only doing the financial side and the management side, but also created, with a team of people, as a result of a study of the entire state, the legislative framework for creating water and sewer authorities, or public authorities, in order to allow all municipalities, either individually or collectively, to enter the bond market for water and sanitation purposes on a revenue bond basis, which is based upon fees, as opposed to taxation. Because there were dramatic needs in the state and the state did not understand what it had to do, relative to the capital needs of these municipalities. Turns out that the financial capacity of all the municipalities we studied very intensively over a series of years, five years, in fact, was that the, the revenue base in those municipalities was more than sufficient to meet their demands at that particular time. As opposed to coming up with free grant programs--(verbiage lost due to changing of the tape)--

END OF TAPE

EXCERPT CONTINUES ON TAPE 2

(Senator Averitt in the Chair)

TORKELSON : --(New York) City Municipal Water Finance Authority and the Buffalo Municipal Water Finance Authority and helped catalyze the creation of several others throughout the state. Second, as a result of that experience, anoth--another interesting thing took place historically, which was the federal government, which had been s--subsidizing or supporting clean water programs, or wastewater systems, from 1972, decided that they should discontinue that during the '80s. And a body of us, including, and I will compliment your state and the Texas Water Development Board, both Kevin and his predecessors, were very instrumental in lobbying the United States Congress in order--

CHAIRMAN : So, you've worked with Kevin--

TORKELSON : --yes, I have.

CHAIRMAN : --(inaudible, overlapping conversation).

TORKELSON : I, I must admit I have, yes.

CHAIRMAN : Okay, an--and let me (interrupt).

TORKELSON : Both--both as a government person and as a banker, so.

CHAIRMAN : Okay, w--before we go any further, I must ask you to state your name and who you represent.

TORKELSON : Oh, I apologize, Roy Torkelson. I am a special advisor, independent contractor to JPMorgan. I work in the Public Finance Department. I cover the United States for water sanitation, environmental finance, state revolving funds, pool financing. I do project finance, which is where private developers want to access the tax-empt market for environmental and other types of projects, roads, power, you name it. I also, in, work with the United States government, have for a n--number of grants through the State Department, and The World Bank work in emerging market countries to develop water and sanitation financing programs on a pool basis, or a revolving fund basis, currently working in India, Vietnam, Manila, Mexico, and we just have a group over in Montenegro right now. So, that's independent from JPMorgan. That's part of my own work background. I apologize for that.

CHAIRMAN : N--n--no, you're fine, you're fine.

TORKELSON : Thank you. You did ask me to do that. The, the, the effort from moving from free grant money to forming revenue-based programs in New York led to a very interactive process with, with your state to not allow the federal government to walk away from the support for what they were mandating, mandates which our states collectively have agreed with, is public health and the environment. And so we basically architected, with Congress, the State Revolving Fund legislation for clean water. In 1987, it was passed by Congress as a veto override of the President's veto. In New potential tax-exempt proceeds that they could ra--or raise through the debt market would be insufficient for that 2.8 billion-dollar gap. The state essentially retained Goldman Sachs at that point to execute a P3 concession bidding process. And that process happened fairly quickly over roughly half a year, and it concluded with the acceptance of a 3.8 billion-dollar bid, in exchange for a 75-year lease of the Indiana toll road. And so those 3.8 billion dollars in proceeds will be used to fully fund Indiana's transportation plan, and to also accelerate several other projects that they would use to upgrade and enhance their own state infrastructure. It'll generate construction and new manufacturing jobs, and because of the positive credit rating agency view of the transaction, it'll lower their future debt issuance cost. So, that's one example. The second, if you go back to 2004, and to 2005, Goldman Sachs also advised the City of Chicago on the 1.8 billion-dollar, 99-year lease of their Chicago Skyways toll road. And again, this was announced in early 2005. And in Chicago, the city used the proceeds to pay down existing debt against the road, and then establish a 500 million-dollar rainy day fund, and then it were--still able to allocate roughly 375 million to the annual operating budget to fund several social service programs. So back to my initial point, the proceeds that you're able to raise by extending a long-term concession are very flexible and would allow a state or municipality, within some restrictions--

: Uh-huh.

MA : --paying off debt first, primarily, they're able to reinvest in, in other related projects. Now, it happened in both these transactions, the winning bidder of these, these road concessions were a consortium made up of a company called Macquarie, which is an infrastructure operator based in Australia, and Cintra, which is an experienced toll road operator that's based in Spain. And the two of those companies paired up, in both these instances, Chicago and Indiana, to acquire the long-term leases. But I'd, I'd emphasize that today, really given some of the attention around those two deals, there's a great deal of investment capital coming from around the globe, including, you know, US and Wall Street-based investment funds--

: Right.

MA : --looking at these deals.

: (Yeah.)

MA : I don't know if you had anything else to add on that point.

TORKELSON : No, it's, it's a, it's a continuing interest, practically every place we go as bankers, every single governmental entity wants to know more about it, how it might work. There's a lot of attractiveness. Sometimes it's motivated by deficits within operating budgets, other times it's people are looking and struggling for ways to make improvements within the over--they're not deficit-driven, but perhaps improvement-driven. So, in fact, I'm leaving here because we're on a concession for a toll road (laughter), that I have to go to in Florida tonight. So, it is happening around the country, and I think Macquarie, if I'm not mistaken, probably has over 125 people they've hired, probably within the last year. You're gonna be hearing from 'em. Every, everybody we know is stopping at their office, they're stopping at every public ent--now, the question for you all is to get to know this more from a policy perspective. Are there things you need to be cautious about, and I think, John, you can talk about some of the pros and cons and the benefits. The best part about this, some of you may be thinking about old examples of privatization where a water company comes in and buys a municipal. And then all of a sudden, they go bankrupt, and then you have a, an issue of supplanting. Here, the concession owner is in for the long-term and they are responsible for the operation, and the process and the capital construction. So, they would hire the various experts to do that, and if a company went out of business, the municipal wouldn't have to worry about, oh, my gosh, that roomfull of documents I just did, you know, now I have to go back and read them all and figure out who I get to replace. Gee, maybe I just oughta go back and do this myself, kind of thing. It's a little bit different, so I, so some of the examples that were negative, that have been in the, sort of the, the history of this kind of initiative, this is a little different, perhaps a little better. Again, no panaceas. You know, back to something you're struggling with. Ultimately, users pay. So, it is still a cost down to those who ultimately use or the service and you can't get away from that. So, the issue here is, is this a better mousetrap, does it help better in a certain kind of way, and I think the jury's out a little bit, but I think the rest of the world operates a little bit this way. And, we're just beginning to learn a little bit about that. John, I, I didn't, oh, I'm sorry, Senator.

CHAIRMAN : Senator Barrientos has a question.
BARRIENTOS : Well, when you conclude.
MA : Okay.
: Okay.
MA : Well, let me talk a little bit then about through this P3 process, you know, what, what is the inherent value that you can realize through a process like this and why is it different than simply raising debt through the, again, the tax-exempt municipal bond market. Part of the explanation is the municipal or tax-exempt bond market typically looks at historic growth and historic financial performance in determining how much debt they'd be willing to land against a public infrastructure asset. But equity investors in these projects are willing to look to the expected future value of the cash flows from a revenue-producing asset like a toll road and so they're often comfortable taking a more optimistic view on the future

performance of established assets. They also take into account factors simply such as population growth and potential rate increases tied to inflation, or GDP growth. And so just that small amount of growth allows them to take, again, a much more optimistic view on the value of the asset. Secondly, private-equity investors are typically able to utilize depreciation benefits from a tax perspective and it helps improve the projects' cash flows. And so again, on the, under the tax-exempt market, there, there isn't that ability to take tax-depreciation benefits, or take interest-cost deductions. And so again, through these financing structures, this, this helps improve the cash flow for a project under a private operator. It's also important to note that the private investor often bids in conjunction with an experienced water system operator like an American Water that would manage the operations. And again, the private operator is more likely to be able to hold down expenses and manage the asset efficiently, simply due to their economies of scale. So, for example, they have pools of experienced operators to actually run the, the assets day to day. They're very familiar with the latest technology and just best practices for running a water system. And so, so those are some of the efficiencies that a private operator brings to bear.

TORKELSON : Just jump in a bit. There are some projects I'm working on where we would allow, b--because we should, the public sector to bid as an operator. As there are public sector entities that have and can be competitive with the private sector, but they would have to go through a bid process just like the rest of the private sector. So, for example, on the tolls, some toll roads, some DOTs are very efficient. Some water public works people can be very efficient. So, you know, it's an interesting twist, but it's, it's also an opportunity for the public sector to potentially participate. But they would have to do it under a bid.

MA : Now, in terms of th--the benefits, just to give you a little more detail on that. Here are some of the potential benefits of this, of this P3 approach. The first I would mention is just transfer of risk. In the water sector, operating risk goes to the private operator, and what these risks entail include the rate of customer connections and usage growth, which would drive revenue growth going forward. And on the operating expense side, they will bear the risk of whatever the appropriate staffing levels are that are needed, and other operating expenses like simple gas and electricity expense. The concessionaire also commits to maintain water losses, or just the efficiency level of the system within predetermined bans and specified levels of output. So, if there is capital expenditures that need to go into the system to upgrade it and repair it, within a certain ban, that dollar is on them going forward. And finally, just on the compliant side, obviously water, an important resource, and just safety and compliance issues, as those rules sometimes change, or becomes more expensive to keep the water system in compliance with those, those rules, all that risk, again, goes to the private operator, rather than have the state or municipality bear that cost. The second is just adherence to strict operating standards. Th--there's often just some inherent concern on the part of states and municipalities saying if I'm gonna give a 75 or 99-year lease of a toll road or a water asset to a private operator, are they gonna operate it up to the standards that we expect. And on that front, the municipality in these concession agreements can carefully craft the concession agreement to very explicitly lay out what the operating standards are that they expect from the private operator. So, for example, in the Indiana Toll Road and Skyway transaction, they had 300-page plus operating documents that the concessionaire agreed to run the roads by going forward. So, you know, things like snow removal, and sanding and things along those lines--

CHAIRMAN : We deal with that all the time down here.

MA : Right.

: (Laughter)

: Three hundred-page documents, or.

: (Laughter)

MA : On the snow, particularly. But in the water, in the--

: (Laughter)

MA : --you know, water assets are complex businesses, and so carefully crafted concession agreements, you would spend a lot of time just writing out exactly what are the operating standards you would expect the private operator to adhere to. The third thing is rate increases. And on rate increases, again, for these infrastructure deals, there's often a concern on the part of people, you know, states, local governments on, by handing over control, am I'm gonna face very high rate increases, or unlimited rate increases. The truth is in these deals that rate increases are generally fairly constrained and limited by the terms of the concession agreement. So, up front, for example, in these toll road deals, the states were agreeing to the private operators, you can raise tolls by only a certain amount in the next handful of years, and theirs were very specifically laid out. And after that period of time, they, they, the rate increases can often be capped at the rate of inflation or the rate of GDP growth. So, you're not looking necessarily at the doubling of rates in just two-years' time or--

: Uh-hum.

MA : --having the private operator to have unlimited power to raise rates, they're very formulaically constrained, and so, I think that can give you some assurance that you're not, you know, suddenly facing, facing huge rate increases.

CHAIRMAN : The, the Indiana toll road was a toll road that was already in existence and then purchased, or, or--

TORKELSON : Correct.

MA : Correct.
CHAIRMAN : --okay.
TORKELSON : Brown, we call 'em brownfields--
: Yeah.
TORKELSON : --versus greenfields new construction, so.
MA : An--and the fourth, I say benefit or issue that often gets talked about on these P3 arrangements is, concern that the state or municipality's losing control or ownership of the asset. And again, just to be clear, these concession agreements, while they're very long-term in nature, they are that, they're a lease agreement, and so, ultimate ownership is never transferred. And it's really just a long-term lease agreement and there's provisions built into the concession agreements where, if the private operator does not adhere to the operating standards, then ultimately through, after cure mechanisms and so forth, if they don't adhere to the standards, then ownership and operations of the asset can be taken back by the municipality at that point. So again, those, it's often a, a concern that needs to get addressed. And then last thing, in the terms of benefits, I'd just say it again, the fact that there's often the opportunity for the state or municipality to garner a significant up-front proceeds because of the equity investment that the private operator's making and the fact that they are going out to the taxable debt rural to raise a lot of project finance debt against these assets. They're able to generate significant up-front proceeds that are flexible for the state or municipality than use for, for other projects. In terms of concerns in, in public policy issues, I've highlighted several of the important ones already, which is what would be the impact of potential rate increases and how do you maintain some cap or control over that. How do you make sure that the private operator adheres to operating and environmental and safety standards, so those are the primary important ones. The, the other concern I'd say that often circulates in the debates around these types of deals is, people ask, why are we selling a long-term concession and monetizing basically what would have been a steady stream of revenues to us over the long period of time. And on that, really, y--you have to look and weigh the financial benefits of getting the dollars up front versus realizing them yourselves over the period of several years on a case-by-case basis. But, in each situation that, that we've been involved in, Indiana and Chicago for example, the private-e--equity investors were able to put, again, a lot of equity dollars into the deal and through the, the private bank and bond markets raise a significant amount of debt based on this view of growth going forward that often led to, again, significant and higher, much higher up-front payments that would've ordinarily been able to be achieved through the traditional tax-exempt, debt-financing markets. And so, this is why we talk about it these days and there's excitement about this alternative as, again, I'll emphasize just another alternative, as you think about how to finance

your water assets. Two other things I'll mention quickly, concerns are sometimes expressed over what happens to jobs involved with the asset. Is the private operator gonna come in and does this naturally mean cutting jobs. And again, I'll go back to the concession agreement which are, can be negotiated, and designed, and crafted to ensure against job losses. The private operators, because if they're gonna hold this asset over 75 or 99 years, often have a very, I'll call it patient or flexible view about that, that if the municipality wants to ensure a certain level of staffing or job levels, they'll agree to that, because over the long-term through a natural attrition or retirement, they'll get to what they view as the right staffing levels. And then the last thing is, there is debate or concern about viewing these deals as selling some of our nation's key infrastructure assets to foreign operators. Now again, in Chicago and Indiana, these foreign operators were an Australians and Spanish companies paired together. But nowadays, particularly with all the interest around the deals that have been done and now new money coming in looking for investment opportunities, there's rising interest among US-based investors, and the, the, the investment dollars are really global in nature, so, that's point one. Second point on this is that, again, concessions are not a sale of the asset. They're not total privatizations, and it's important to remember that the state or municipal government retains ultimate ownership and control. So with that, I'll conclude and open to questions.

CHAIRMAN : Senator Barrientos.

BARRIENTOS : Mr. Chairman, I've got about 50 questions, but I'm not gonna ask them.

: (Laughter)

BARRIENTOS : But, in--in--instead of taking too much time from the Committee right now, if you could write this down for us, I'm trying to understand and you mentioned some of this. If water infrastructure is, is that attractive to lenders, and they rarely default, and there's plenty of money available, why would accessing to a private concession be attractive. You mentioned some of that while ago, but I'd like 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12.

TORKELSON : Yeah, okay.

MA : Well, le' me (sic), le' me start. Water assets, our view, is attractive, and they're eminently financeable in the tax-exempt market, but for any g--certain given asset, you have to analyze the cash flows and the capital required around a certain asset. There would be a limit in the tax-exempt market. And so the attraction of the equity, or P3 approach would be that a private operator would come in and say, wow, the system is generating a, well, just to make up a number, a hundred million in revenues this year, and the tax-exempt market is looking to how the asset performed over the last three to five years to, to put a cap on how much debt they'd be willing to lend. The private equity investor might say, look in this county, population growth is running at 4 percent, and so, even without a rise in rates, that hundred is gonna go to a 104 next year and then pass, that'll be, whatever, a 108 or more. And so, by looking ahead, the private-equity investor says, look, I can, I can do better than that. I'm willing to invest some of my own equity dollars, and with the equity dollars going in, the debt markets then get further confidence and say, wow, and a private operator's coming in, putting in their own dollars to invest in this, and I'm gonna give you more debt as a result. And so, sometimes, in these cases, against very case by case, you're able to raise more money through this concession process.

BARRIENTOS : Case by case.

: That so.

BARRIENTOS : So, you're presuming that a private operator's gonna be more efficient than a public one, is that true?

MA : Not necessarily. And that's why I emphasize case by case. The--the--the private investor really needs to come in and do a fair amount of analysis to, to look at the asset. You know, it could be a situation where the population might be flat or in decline, and it needs a lot of, lot of capital to go in, and in those instances, maybe the dollars that they would come up with would be no better than what the tax-exempt market would, would come up with, in terms of financing. So, again, I just wanna emphasize, it's, it's one, it's one alternative. It's very promising in--

: (I bet.)

MA : --some situations.

BARRIENTOS : And, and I think that we should, for our constituents, look at, at all aspects, all facets. In my experience, in the House and the Senate, that has not necessarily been true of the private enterprise coming in being more efficient. In our prison systems, for example, and also in our health and human services, especially. And I would wonder what's gonna happen now with Cintra, etcetera, etcetera. But, finally, interesting to know, what does Goldman Sachs and, and JPMorgan get out of this. For example, you, in the Indiana item, you put together a 3.8 billion-dollar bid. What do you folks get out of it?

MA : Well, in, in Indiana and Chicago, we played advisor to the, the city and the state, respectively. And so, we got an advisory fee from the city and state out of, out of the transaction.

BARRIENTOS : Okay.

TORKELSON : If I could jump in on just one point--

MA : Sure.

TORKELSON : --that you mentioned if I, if I may. Couple of things. The government sector, if it's got a tax base debt for its water and sanitation, frequently has trouble getting authorization through voter referenda in order to make improvements that are necessary or mandated.

Second, if they support operations out of that general fund budget, they further tend to do deferred maintenance. Even where revenue or enterprise funds exist, the pressure sometimes to not go forward without consensus in certain ways, to make improvements that are necessary is part of the reason that some of the problems exist a--around the country for improvements in water and sanitation, particularly only driven in this country h--by heavy enforcement, whereas in other countries, the enforcement isn't there. The private sector, under these regimes, basically with those as, as mentioned, these long-term rate, sorta caps and agreements, fundamentally the government is understanding that improvements will be made within those, those particular matters. I'd say second, I managed a state agency, for example, I managed 26 state maintenance facilities. I could maintain my fleet of vehicles better and at less cost than Hertz or, or Avis. So I was ready to go up against anybody as a manager. And I think what's happening here is, it's not de facto that the private sector is better than the public sector, it's, it's now, it depends on each individual case, and we, we need to look at that.

BARRIENTOS : That's right--

TORKELSON : Right.

BARRIENTOS --an--and I think for us, you, you mentioned voter-approval factor. We have to admit right up front that voter approval and the constituents are our bosses.

TORKELSON : Yes, they are. Always.

BARRIENTOS : Thank you, Mr. Chairman.

CHAIRMAN : Any other questions? Let me ask, Mr. Torkelson, you identified--

TORKELSON : Yes.

CHAIRMAN : --one barrier at the congressional level, the difference between taxable, tax-exempt--

TORKELSON : Uh-hum.

CHAIRMAN : --deals, are there, are y'all aware of anything that's, State of Texas has barriers that we, we might take a look-see to see. Are y'all aware of anything here in our state that would, would inhibit lookin' at these kinds of projects, financing 'em?

TORKELSON : At, at the private, private, P3?

CHAIRMAN : Uh-hum.

TORKELSON : We found that a number of states, not all, have statutes that actually are privatization statutes. I don't know if you have one. That may be something you wanna take a look at from a template perspective, what other states have done. Virginia's very active in this area, for example. I just did a, a--a transaction with a private sector company. They have privatized their entire information technology systems under a state agency that pulled it all together. Kind of interesting. They've done transportation, they have education and so forth. And, so there is some experience around that might be helpful for you as policymakers to see the advantage not being the first one out of the gate is to see how it's worked and what didn't work, or what was, what needs to be improved. So, that, that is a recommendation. I, I don't know, particularly, 'cause I haven't studied your statutory base to be able to make that comment, but I just think about it in that context for you. Okay.

CHAIRMAN : Typically, we're 49th or 50th out of the gate.

TORKELSON : I don't think so.

: (Laughter)

TORKELSON : I think--

: But, but we're always open to studying somethin'.

TORKELSON : When it comes to studying your water needs, you're number one, and one of the most impressive things I, I, I saw back in the '80s was, I, I couldn't believe that a state was willing to tackle that kind of a monster issue, very contentious issue, and very costly issue. But, I applaud you for continuing to do that.

CHAIRMAN : Every once in a while we get one right.

TORKELSON : Okay.

: (Laughter)

CHAIRMAN : Seriously, very good. Are there any other questions, Members? Very good testimony, fascinating testimony. And we thank you both very much for making the long trip, to help us with our problems.

MA : Well, thank you, Senator.

TORKELSON : Well, thank you for having us.

MA : Thank you, Senators.

END OF EXCERPT

Public/Private Partnerships and Success Stories
Christopher Malinowski, Texas Water Division Manager, PBS&J

Good morning. My name is Chris Malinowski and I am Division Manager for PBS&J, a nation-wide environmental and transportation engineering firm. I am also a Director for Harris County MUD 367, which is just a few minutes drive from here.

This morning I would like to discuss with you some ideas on public-private partnerships as a way to fund new water and wastewater infrastructure here in Texas. The points to be made are meant to focus on how new infrastructure can be built and funded through private equity sources. It is not meant to promote the public operations versus private operations debate that has occurred over the last couple of decades.

As we have heard already, and will probably hear throughout the day, there is an enormous demand for new water and wastewater infrastructure in Texas – potable water storage reservoirs and treatment plants, transmission and distribution systems, wastewater collection systems, and treatment and reuse plants. As a result of the continued population growth into the foreseeable future, these demands will only increase as this predicted growth continues to escalate. Unfortunately, we've generally run out of the all clean, close, cheap water. Developing new sources and processes to meet these future water needs will be more complex and will simply cost more. To this we must add the costs to refurbish our existing municipal systems, some now nearing the limits of their design life, whose maintenance and upkeep were sometimes ignored for budgetary expedience or other political constraints.

The estimated capital requirements for this infrastructure are simply beyond the capacity of the State of Texas to supply it readily. State and federal financial resources are limited. State revolving funds are generally at their limits, and raising taxes is simply not in the political cards. Federal money will be acutely limited in the near-term as a result of the country's international commitments and its own budgetary constraints. All this forecasts a drought of public financing available for water infrastructure.

I would like to share a few ideas that you might consider in attempting to fund these new projects.

Prior to working for PBS&J, I worked many years for a company that operated water and wastewater facilities for both municipal and industrial utilities. In doing so for nearly 20 years, I have seen many public-private partnerships that have, and have not, worked.

Those that have been a success tend to fall in one of the following categories:

1) Certain utilities lack the technical skills necessary to operate and maintain their existing assets in a manner that complies with local, state, and federal laws. Examples of this are the hundreds of MUDs around the state, or small communities where the public works director tends to be a one man show for streets, utilities, and other functions.
2) Certain utilities need to invest in a new facility, such as a water treatment plant, and may not necessarily have enough expertise in-house to either get the plant online or to operate it over the long term.

3) Certain utilities take advantage of a private company's expertise in a certain area to save operating costs or capital costs.

I assume that many of you are familiar with the first of these three categories, in which a private company operates and maintains the utilities of a municipality or public agency, so I will not spend much time on this subject. I would only caution that this is not a cure all for all situations. It can, and has proved valuable in many situations, but is has also caused problems when it has been applied in the wrong situation.

The second category, where a utility need a new facility but may lack a certain expertise is one where private companies can help.

One example is the Bexar Metropolitan Water District in San Antonio. In the mid-1990's Bexar Met needed a new water source to supply its growing service area. Most of their new demand was in an area where TDS in the aquifer made it too expensive to treat. Instead, they decided to build the first surface water treatment in San Antonio. But they had no experience in designing treatment plants, and had no operators that could operate one. They turned to a private company to implement the plant and operate it for a period of 10 years. This company put the plant in service within 15 months and is operating the plant to this day.

A municipality does not necessarily have to reach out to a private company to accomplish this feat. As you know, the State of Texas endorses regional approaches to water and wastewater issues. Many of these regional projects have been implemented by other governmental agencies. The North Harris County Regional Water Authority, for example, has been successful in converting the northern part of Harris County to surface water. In other parts of the state, river authorities such as the Brazos River Authority, Lower Colorado River Authority, and the Guadalupe Blanco River Authority have been very successful in implementing regional water and wastewater projects. The water users have shown a willingness to pay the cost of these projects, since trying to do it alone would have resulted in much higher costs.

For many of these projects, there are private companies that want to put equity into water and wastewater projects. For this to work, it must be a win-win scenario for both the private company and the water/wastewater utility. Having worked on many private operations deals, I can tell you that this only works well on specific projects. The ideal project on which to involve private equity is a stand-alone facility such as a water plant, wastewater plant, or transmission line which is to be newly built.

Generally, a key issue raised regarding private finance is the cost of debt – why should private financing be pursued when governments can borrow more cheaply? If a government entity is going to finance the project, it will likely do so with traditional tax-exempt bond financing. There are, however, limits to how much leverage that can be achieved with this type of financing. Because it is 100% debt, it is priced very conservatively and tightly structured. Using a private company offers the potential to bring equity into a transaction, which would not occur in a typical municipal bond financing. This has the effect of reducing the long-term cost of the debt, bringing it more in line with typical tax-exempt bond rates.

Private investment can also reduce annual amortization costs by offering a much long-term financing horizon. Where traditional tax-exempt municipal bonds are usually limited to 30 years, some private investments are structured over as much as 75 to 99 years. Private ownership of infrastructure also allows the owner to take the financial benefits of depreciation and other tax incentives that are simply unavailable under conventional tax-exempt municipal financing. If we look to what is happening in the highway industry, the private equity companies investing in tollroads in Texas and elsewhere are causing people to re-evaluate their thoughts on what the private sector can do with its investment.

Currently, for a private company to obtain tax-exempt debt for a public-use water or wastewater project, it must use private activity bonds (PABs). This PAB process in Texas is administered by the Texas Bond Review Board. Substantial improvements have been made over the last several years in making these funds more available for water/wastewater projects.

Due to the normal process of obtaining PABs, private water and wastewater projects must be evaluated for both taxable and tax-exempt financing scenarios. This could result in a variance of 30% of the life cycle cost of a project.

Certain ideas that might improve the process include:

- Allocate a certain portion of Sub-Ceilings 2 and 6 of the PABs for water and wastewater projects that serve communities.
- Allow a certain amount of these water/wastewater PABs to be issued for a category of projects, such as water treatment, or energy-saving initiatives at water plants. Specific projects might then be awarded by a central agency in a manner that would allow the applicant to know almost immediately if the tax-exempt money is awarded to the project.

If you remember back to the three categories of successful public private partnerships, the third one was one in which utilities take advantage of a private company's expertise in a certain area to save operating costs or capital costs. These projects do not have to be large in size, nor high profile, for them to provide benefit to the utility. Two areas where significant impact can be made is in energy savings and water loss reduction.

Water and wastewater systems are faced with energy costs that are increasing at dramatic rates. These increases are forcing many water/wastewater utilities to cut costs in other areas in their operations, and in some cases delay capital projects.

Water loss, or unbilled water, is another issue for many utilities, especially those who are older and have delayed maintenance on their system. Increases in lost water require utilities to produce and pump more water, which in turn drives up their costs.

Many municipal utilities have been inundated with proposals to save costs in these two areas. It is sometimes difficult to decide what is a good deal. Because of this, some utilities decide to do nothing, because it is difficult to weed through all of the different types of proposals.

For example, we have just finished a project for a certain client for which we were paid $25,000 and were able to save them over $150,000 per year in energy costs at one wastewater treatment plant. However, it has been extremely difficult to get approval to replicate this success at any of their other facilities because of all of the competition of utility manager's attention.

There have been successes across the country in reducing "lost water". There are private companies that will work completely for free to find "lost water", which also translates into lost revenue, for a share of what they find. They have been successful in large cities across the country in finding billing errors, replacing inefficient meters, and detecting areas with a large amount of leakage.

One idea that might help utilities in saving costs is to legislate a procedure that would 1) incentivize private companies to propose cost saving ideas, 2) force utilities to act on the ideas, and 3) provide a procedure for the utility to determine the best deal. One mechanism might be one that is currently being used at TxDOT. Currently, private entities can make unsolicited proposals for improving highways, in return for tolling agreements. TxDOT is then required to solicit competing bids from other interested parties. The same procedure could be implemented for utilities in the energy savings / water loss categories, with a certain minimum annual savings for the project.

As an aside from public-private partnerships, I would like to briefly broach the subject of new funds for water and wastewater projects. As we all know, the topic of transfer of water between river basins has been a hot topic over the years. Among the many concerns is the issue of how the local region can benefit if and when it would export its water out of its basin.

One possible solution could be the implementation of a transport fee for all water leaving the river basin. This would apply to both raw and treated water. This would not be a one time fee, but rather a revenue source year after year for the local area. The main questions then would become, who collects the money and what is it used for? That topic is well beyond my expertise, but it probably should be administered by any impartial governmental entity that would ensure its fair distribution over the entire river basin. Funds would ideally go to water and wastewater projects throughout the area, and could be in the form of grants or as seed money for series of bonds.

I thank you for the opportunity to address you today. I am available to answer any questions that you might have.

Appendix
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Testimony Before Senate Natural Resource Committee
July 14, 2006

Martin C. Rochelle and Brian L. Sledge
Lloyd Gosselink Blevins Rochelle & Townsend, P.C.
Attorneys at Law

Review of Surface Water and Groundwater Law and Policy in Texas

1. Legal Foundations

- Historical overview

  Adopted in 1917, Tex. Const. art XVI § 59 (Conservation Amendment) empowers the Legislature to regulate both surface water and groundwater.

  Surface Water:

  Historical evolution of surface water law, from riparianism to appropriation. Adjudication Act of 1967 served to merge various claims of water rights into appropriations.

  Groundwater:

  Legal foundation of groundwater in Texas really begins in 1904 with case of Houston and Central Railway Co. v. East, where the Texas Supreme Court adopted the English common law Rule of Capture.

  Largely unregulated until advent of groundwater conservation districts in 1949.

- Ownership and Nature of Right

  Surface Water:

  Water Code 11.021 -- State Water -- the water of every watercourse, stream, river, lake, etc.

  State owns the corpus of surface water, while appropriators hold a usufructuary right (a right to use the water).

  Groundwater:

  Water Code 36.001(5)—"Groundwater means water percolating below the surface of the earth."

  Rule of Capture, Rule of Absolute Ownership, Torts Law, and Property Law

Clearly, landowner owns groundwater once it is captured, and has right to attempt capture, subject to regulation by the State.

Some disagreement on whether the landowner has a vested right to the groundwater under his land prior to capture, or just a vested right to attempt capture, subject to regulation by the State. See Water Code 36.0015.

2. Governmental Regulation

- <u>Permitting</u>

  Surface Water:

  Administered by the TCEQ and its predecessor agencies. The prior appropriation doctrine applies: "first in time is first in right."

  Water Code 11.121 -- Permit Required. The TCEQ administers a program for reviewing and issuing water rights.

  Water Code 11.134 -- Action on Application. A number of factors TCEQ must consider in order to grant or deny a water right.

  Groundwater:

  Administered by local groundwater conservation districts – Water Code 36.0015.

  Water Code 36.115 -- No person shall drill, operate, or alter a water well without a permit.

  Permit required and regulations to be based on spacing, surface acres owned, or use (including impacts to adjoining wells, existing and historic use)— Water Code 36.113 and 36.116.

  Some use-based doctrines similar to prior appropriations doctrine for surface water.

  Water Code 36.113(d)-- A number of factors a GCD must consider before granting or denying a permit.

  Water Code 36.1132 -- District must issue permits up to the point that the total volume of water equals managed available groundwater (Akin to full appropriation?)

  Water Code 36.205 -- Districts may assess fees for water permitted or produced.

- Amendments

  Surface Water:

  Water Code 11.122 -- Amendments. Changes in purpose, place of use, diversion rates, storage volumes, diversion amounts, and any other changes to a right require TCEQ approval through an amendment. Some amendments, including those that increase the rate or volume of diversion, require notice and hearing; others that have no potential for impacting third party interests do not.

  Groundwater:

  Water Code 36.113 -- Permits for Wells; Permit Amendments. Districts may require a permit amendment for a change in the withdrawal or use of groundwater. GCD has discretion in whether to require a hearing. 36.114.

- Exemptions from Permitting

  Surface Water:

  Water Code 11.142 (a) -- Domestic and livestock exemption

  Water Code 11.142 (b) -- Fish and wildlife exemption

  Water Code 11.142 (b) -- Commercial or non-commercial wildlife management

  Water Code 11.142 (c) -- Petroleum drilling / exploration exemptions

  Water Code 11.142 (d) -- Surface coal mining

  Water Code 11.1421 -- Mariculture activities exemption

  Water Code 11.1422 -- Historic cemeteries exemption

  Groundwater:

  Domestic and livestock exemption--36.117(b)(1)

  Petroleum drilling / exploration exemption s--36.117(b)(2)

  Surface coal mining -- 36.117(b)(3)

  Activities for which a GCD determines no permit is required -- 36.114(a)

3. Hydrologic and Other Practical Considerations

- Supplies and Usage

  Surface Water:

  Supplies projected in SWP are insufficient to meet future needs.

  Current total statewide water use is approximately 40% surface water.

  Prospects for new surface water supplies uncertain.

  Groundwater:

  Current total statewide water use of around 17 million AFY is approximately 60% groundwater, which is produced from the nine major and 20 minor aquifers across the state.

  Irrigated agriculture account for some 80% of groundwater production. SWP makes it clear that present and anticipated pressure on groundwater supplies will render the resource insufficient to accommodate some irrigation and municipal uses by 2050.

  Few prospects for new supplies, save and except limited recharge projects and desalination of brackish groundwater.

- Supply Renewability

  Surface Water:

  Surface water is fairly renewable through rainfall.

  Groundwater:

  Because recharge to aquifers varies drastically across the state, groundwater in some aquifers is not readily renewable such that the aquifers are being slowly mined to depletion; others recharge rapidly.

4. External Variables on Resource Production

- Governmental Policies

  Surface Water:

  Surface water impoundments and diversions are highly regulated by TCEQ under the prior appropriation system.

Groundwater:

Groundwater supplies in may areas of the state are wholly unregulated. Uncertainty in the powers of groundwater districts and the reliability of the permitted right.

- Transmission and Delivery Infrastructure

Surface Water:

Surface waters must be delivered to the place of use using either a system of pipelines and pumping facilities or by use of the beds and banks of streams.

State Water Plan assesses future costs of water supplies to be driven significantly through water pipeline costs.

Groundwater:

While some groundwater projects involve significant delivery systems which necessitate pipelines or beds and banks transfers, because aquifers provide natural infrastructure conduits for the movement of groundwater, most groundwater diversions are in near proximity to the place of use.

- Treatment Infrastructure

Surface Water:

Surface water diversions for municipal uses come with significant treatment costs to meet drinking water standards.

Groundwater:

Groundwater is often potable in its natural state when brought to the surface.

- Energy Costs

Surface Water:

Surface water diversions may require less lift and therefore less energy costs than some groundwater withdrawals. However, energy costs may be substantial when transporting surface waters to the place of use.

Groundwater:

Aquifer drawdowns due to excessive pumping result in significant additional energy costs to produce groundwater. Given the use of groundwater by many *agricultural users, increased energy costs often result in conversions from irrigated to dry-land farming.*

5. Transfers and Movement of Water

- <u>Legal Impediments to Water Transport and Movement</u>

  Surface Water:

  Water Code 11.085 (s) -- the junior priority provision

  Water Code 11.085 (l)(2) -- the undefined "highest practicable level achievable" water conservation standard

  Water Code 11.134 (b)(3) -- the undefined "public welfare" standard, and the gray areas related to "consistency" between applications and regional and state water planning

  Water Code 11.122 (b) -- the water rights amendment process

  Water Code 11.042 -- the gray areas related to bed and banks permitting

  Water Code 11.147, 11.150, 11.151, 11.152 -- the appropriate method for addressing and protecting flows for the environment

  Groundwater:

  Water Code 36.122 -- District may require a permit to export groundwater, but may not be more restrictive on exporters than on in-district users, save and except assessment of an export fee that is statutorily capped.

  Groundwater transfers are much less restrictive than interbasin transfers of surface water, post-SB1, which has led to groundwater marketing efforts and a dramatic increase in pressure on groundwater supplies.

- <u>Export Fees</u>

  Surface Water:

  No fees for exporting surface water, although Water Code 11.085 does suggest that compensation to the Basin of Origin may be identified in an interbasin transfer application.

  Groundwater:

GCD may assess fee for a permit to export groundwater, which may be negotiated between the permittee and the GCD or capped by a statutory formula tied to the GCD's tax rate or in-district water fee rate.

- <u>Marketability of Water Rights</u>

  For both surface and groundwater, certainty in the process, the amount of water, and the ability to easily change the location of diversion or production of the water are key to a functioning market. In Texas, this certainly only exists in the Rio Grande and the Edwards Aquifer Authority, which are also the only two well-functioning water markets in the state.

  Surface Water:

  Could be a market to transfer surface water if there was a regulatory foundation that allowed for market forces to work efficiently.

  Groundwater:

  Uncertainty in the nature of the permitted right is the biggest impediment to groundwater transfers under current law.

6. Planning

- <u>Local/Regional Planning</u>

  Surface Water:

  Water Code 16.053 -- Regional Water Plans

  Groundwater:

  Water Code 36.1071 – GCD Management Plans

  Water Code 36.108 – Joint Planning in Management Area: Future Desired Conditions and Managed Available Groundwater

  Relationship to Regional Water Plans, GCD Management Plans, and GCD Rules

- <u>State-wide Planning</u>

  Water Code 16.051 -- State Water Plan TWDB assimilation of regional plans and resolution of any conflicts between them.

  Surface Water:

Permit issuance from TCEQ and TWDB funding contingent upon project being consistent with RWPs and SWPs.

Groundwater:

No consistency requirement for GCD permit issuance.

7. Reuse

- <u>Direct and Indirect Reuse</u>

  Surface Water:

  Water Code 11.042 -- Delivering Water Down Bed and Banks. Transfers of water through bed and banks is regulated.

  Water Code 11.046 -- Return Surplus Water. Direct reuse explicitly allowed without water rights implications; indirect reuse subject to water rights permitting.

  Groundwater:

  Different treatment afforded groundwater-based effluent in Water Code 11.042 than to surface water-based effluent in Water Code 11.046. "Existing" and "future" groundwater-based effluent treated differently.

8. Pricing

For both surface and groundwater, price has evolved over time from simply the cost to produce and move the water in areas with excess supplies to thousands of dollars per acre foot in areas of full appropriation.

Surface Water:

Not a ready market, except on the Rio Grande. Water rights currently being sold there at around $2000/AF.

Groundwater:
Not a ready market, except in the Edwards Aquifer. Water rights currently being sold there at around $3000-4000/AF.

Huge discrepancies in groundwater (mostly not fully appropriated) and surface water (mostly fully appropriated) costs. 36.205 fees compared to cost of purchasing surface water rights.

9. Water Quality

- <u>Sources of Regulation</u>

  Surface Water:

  Water Code Ch. 26 -- Water Quality Control. Regulates point source discharges to waters in the state, including discharges to groundwater and surface water, and no-discharge irrigation projects.

  Groundwater:

  Water Code Ch. 26 -- Water Quality Control.

  Water Code 36.101 -- A district may make and enforce rules... to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir or its subdivisions in order to ... <u>prevent degradation of water quality</u>....

  Water Code 36.116 -- In order to minimize as far as practicable the drawdown of the water table or the reduction of artesian pressure, to control subsidence, to prevent interference between wells, <u>to prevent degradation of water quality</u>, or to prevent waste, a district by rule may regulate (the spacing or production of wells.)

- <u>TMDL Process</u>

  Surface Water:

  Clean Water Act 303 -- Water Quality Standards and Implementation Plans. Applies to surface waters that are not meeting designated uses per WQSS.

  Groundwater:

  No similar process for groundwater.

Appendix O

ATTACHMENT A

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To:	Commissioners' Work Session	Date:	February 25, 2005
Thru:	Lydia Gonzales-Grotmatzky, Deputy of Legal Dan Eden, Deputy of Permitting		
From:	Todd Chenoweth, Manager, Water Rights Permitting Robin Smith, Attorney, Environmental Law Division		
Subject:	Reuse Issues in Water Rights Permitting.		

Issue Consideration of issues relating to reuse of water in water rights permitting.

Background and Current Practice In water rights permitting, "reuse" is the use of surface water which has already been beneficially used once under a water right, or the use of groundwater which has been used. 30 Texas Administrative Code (TAC) § 297.1(44). There are two types of reuse: indirect reuse and direct reuse. Indirect reuse is the reuse of water, usually effluent, which is placed back into the river or stream. This generally occurs when a wastewater treatment plant discharges effluent into a stream and either the discharger or another person or entity diverts the effluent further downstream to use again. A bed and banks authorization under Texas Water Code Section 11.042 is required for the use of the watercourse to transport water for reuse. In contrast, direct reuse occurs when effluent from a wastewater treatment plant is piped directly to a place where it is used. "Return flows" are another word for effluent or other water which is used and then returned to the river or stream. 30 TAC § 297.1 (43).

As municipalities have increasingly looked to their effluent as an additional water resource, the Commission and the Legislature have endeavored to specify and interpret the law related to reuse. Challenges arise, in part, because in the past the Commission has issued some permits based on the existence of return flows being in the river. In the adjudication process, some claims were established based on return flows being in the stream. Also in the past, some bed and banks authorizations (to allow use of the river to transport water for reuse) were issued with a priority date and some were not.

In 1997, the Legislature enacted Senate Bill 1, which amended Section 11.042 and Section 11.046 of the Texas Water Code. These amendments resolved some issues, such as providing for the Commission to protect existing water rights and the environment in permitting reuse. However, not all issues were resolved. Since the passage of SB 1, new issues have developed related to how the Commission should permit the use of a watercourse to transport water for reuse.

A major issue is the conflict between Tex. Water Code §§ 11.041 and 11.046. Section 11.046(c) states that once surface water diverted under a permit is returned to the stream, absent any provisions in a water right to the contrary, it becomes state water again subject to appropriation by others. However, Section 11.042(b) and (c), allow the owner of the groundwater-based return flows, or the water right holder or discharger of surface-water-based return flows, to obtain a bed and banks permit to transport this water to a place of reuse. Thus conflicts between appropriators and those who wish to indirectly reuse effluent are inevitable.

In general, most issues arise when someone is requesting a bed and banks to reuse historically discharged return flows. If return flows have not been historically discharged to a watercourse at the time the application is filed, staff will usually not have to perform an analysis of harm to water right holders or the environment because water right holders and the environment will not have relied on these flows being in the river.

Questions

1) Is the authorization to take return flows under Section 11.042(b) or (c) a new appropriation? Does the reuse authorization carry a priority date?

Section 11.042(b) and (c) govern putting water in a watercourse to transport the water to a place of diversion. However, these subsections do not specify what type of authorization the bed and banks permit is or what the priority date of the authorization should be. A priority date can placed on the authorization to protect existing water rights or to protect the applicant from future reuse applicants. Both subsections state that special conditions may be added to protect existing water rights and the environment.

Options: A. A bed and banks authorization under Section 11.042 is a new appropriation under Section 11.121, and therefore would be assigned a new priority date. A new appropriation requires the applicant to meet all of the tests of Section11.134, including water availability. What if the applicant requests reuse under Section 11.042, and also requests the water under Section 11.121?

B. A request to reuse water under Section 11.042 is not a new appropriation, and the priority date would be the date of the original appropriation. Section 11.134 does not apply.

C. A request to reuse water under Section 11.042 is not a new appropriation but the priority date may be a new priority date if this is necessary to protect existing water rights. Section 11.134 does not apply.

D. If the request is also under Section 11.121 (and no water is available under Section 11.121), the request is for a new appropriation and the priority date would be the date of the original appropriation. Section 11.134 applies.

E. If the request is also under Section 11.121 (and no water is available under Section 11.121), the request is not a new appropriation and the priority date would be the date of the reuse application. Section 11.134 does not apply.

F. Effluent that originates as surface water would be a new appropriation, but effluent derived from privately owned groundwater would not be a new appropriation.

Preferred Option: A request to reuse water solely under Section 11.042 is not a new appropriation and other water rights will be protected by a new priority date. Section 11.134 does not apply.

2. How is water availability determined for a bed and banks permit?

Options: A. If a bed and banks permit is considered to be a new appropriation, staff performs a

ATTACHMENT A

"Permitting" water availability determination as is done for other new appropriations.

B. If the bed and banks permit is not considered to be a new appropriation, staff performs a simple "no injury analysis." This is not a determination of water availability, but an analysis of impairment to other water right holders.

C. If the bed and banks permit is not considered to be a new appropriation, staff performs a "Permitting" water availability determination as is done for other new appropriations with the addition of the return flows to the Water Availability Model (WAM).

D. If the applicant requests an authorization solely under Section 11.042(b) or (c), to reuse historically discharged return flows, staff performs a "no injury" analysis rather than an analysis of the reliability of the requested amount of water. Existing water rights would be protected by giving the diversion of return flows a new priority date. The "current conditions" run of the WAM, which includes return flows, would be used. Diversion of the requested reuse would be modeled and the reliability reported. However, the reliability of the requested diversion would not be held to a standard (e.g., 75/75) in order to recommend approval of the requested water right.

E. If applicant requests authorization under Sections 11.121 and 11.042, staff performs a water availability analysis using the WAM's "full authorization" run that includes the applicant's return flows. The re-diversion of the reuse water would be modeled with a new priority date.

Preferred Options: Options D and E because legal staff does not believe that Section 11.042 is meant to be a new appropriation, but some type of analysis must be done to protect existing water right holders and the environment.

3. Who can apply for an indirect reuse permit?

Water Code Section 11.046(c) states that, unless stated otherwise in the permit, once water has been diverted under a permit, used and returned to the stream, it is available for appropriation by others.

Section 11.042(b) states that a "person" may obtain authorization to reuse "the person's existing return flows." The section also provides that "a person wishing to divert and reuse future increases of return flows derived from privately owned groundwater" must obtain prior approval before the increase occurs.

Section 11.042(c) states that "a person who wishes to convey and subsequently divert water in a watercourse" must obtain the prior approval of the commission.

Current rule 30 TAC § 297.42(g)] provides that a water right may be granted based on return flows or discharges, provided that the permit contains an express provision that the water available is dependent on potentially interruptible return flows or discharges. This rule could lead to double permitting of some effluent-based water rights. Should the person (not the water right holder or the discharger) that gets a new permit based on the existence of effluent be entitled to the protection given existing water right holders in Sections 11.042(b) and (c)?

Options: A. Under Section 11.042(b) or (c), only the discharger can get a permit to indirectly reuse effluent unless it has contracted its right to reuse the effluent to another party.

B. For effluent based on surface water, the ownership of the effluent remains with the surface water right holder unless it has contracted its right to reuse of the effluent to another party.

C. Either the discharger or the water right holder can receive the bed and banks permit – the one who applies for the permit first and gets its application deemed administratively complete first will receive the water.

D. For groundwater reuse, only the person who owns the groundwater can request a reuse authorization under Section 11.042(b).

E. A third person may obtain a bed and banks authorization for anyone's effluent.

F. A third person can obtain a bed and banks authorization for return flows only if it has a contract for the return flows.

Preferred Option: Options C, D, and F. Based on the language of the statute, either the water right holder, a discharger, or a third person with a contract may obtain a bed and banks authorization under Section 11.042(c). Only the owner of the groundwater effluent may obtain a bed and banks authorization under Section 11.042(b).

4. **What is the required notice for a bed and banks applications for historically discharged return flows?**

Under 30 TAC §295.161, bed and banks applications involving surface water return flows, and generally require notice to all water right holders downstream of the discharge point. For bed and banks permits based on new or increases in discharge of groundwater or groundwater-based effluent, notice is only provided to water right holders between the discharge point and the rediversion point.

Generally, a bed and banks authorization for new discharges of effluent would not harm existing water rights or the environment because the water has not been in the river before.

However, there can be both downstream and upstream impacts from reuse of historically discharged return flows, both groundwater and surface water, to existing water right holders. One of the requirements for bed and banks permits is protection of existing water right holders.

Water right holders upstream of the discharge point may be affected because the downstream water right holders now have to make more frequent "calls" on the upstream water since the effluent that they had historically relied on is no longer there. Water right holders downstream of the new diversion point for the effluent may be affected when the interjacent water right holders have less water in the stream and start to take water that had historically flowed to those downstream water rights.

An additional issue relates to whether the bed and banks is reviewed as a new appropriation, thereby triggering notice requirements applicable to a new appropriation.

Options: A. Provide notice as presently required in Section 11.161 – notice to downstream water rights only for historically discharged return flows.

B. Require full basin notice for all applications for historically discharged return flows.

Preferred Option: Change the rule to require full basin notice for all applications for historically discharged return flows.

5. In a water shortage, what are the relative rights of water right holders to the effluent in the stream?

ATTACHMENT A

Options: A. Bed and banks authorizations should not be given priority dates.

B. If the water is considered state water then it should be taken in the order in which applications are filed to reuse that water and the bed and banks authorization should be given that priority date.

C. Surface water based effluent reuse bed and banks permit should have the original priority date of the diversion from the stream because it still belongs to the appropriator.

D. For groundwater, if the indirect reuse water is considered private water that has not lost its character as private water, and the state has merely given permission to transport the groundwater, then no other water right holder should be able to exercise a priority call against that groundwater.

E. If the groundwater is considered state water then it should be taken in the order in which applications are filed to reuse that water and the bed and banks authorization should be given that priority date.

F. Both surface and groundwater bed and banks authorizations should be given priority dates of the filing of the reuse applications to protect other water rights.

Preferred Options: B, D and F. Once the return flows are released to the stream they become state water, but they may be taken under Section 11.042. Groundwater is not private water when it is released to the watercourse. Therefore, all reuse permits for historically discharged water (surface and groundwater) should be given a new priority date based on the date of filing the reuse application to protect other water rights.

6. Can a wastewater treatment plant sell its effluent to downstream customers without a bed and banks or other reuse permit?

Options: A. A wastewater treatment plant can sell the water that has not been discharged yet because it still is in its <u>possession</u>. However, once the purchaser comes in for a bed and banks permit, the permit is subject to special conditions designed to protect the environment or to protect existing water rights that may have relied on the historical discharge. As a result, the purchaser may not be able to get a bed and banks authorization for the full amount of water it purchased.

B. The wastewater treatment plant to get a bed and bank authorization first. However, without knowing who their customers will be, the wastewater plan can not identify re-diversion points and therefore no complete channel loss calculations can be made.

Preferred Option: B. Even though the treatment plant doesn't know its rediversion points, it can obtain an amendment to specify channel losses when those customers are known.

<u>The following two issues are primary legal issues in an application presently pending at SOAH; this is the City of Irving's application to reuse water in the Trinity Basin</u>

Can persons apply for reuse permits for future discharges?

Section 11.042(b) provides that persons "wishing to divert and reuse future increases of return flows derived from privately owned groundwater must obtain authorization to reuse increases in return flows before the increase." There is no similar provision in Section 11.042(c).

Options: A. Any permit for reuse based on future discharges is speculative due to uncertainty that the discharges will occur.

B. If the reuse is a new appropriation, there is no water available until the discharge occurs.

C. Limit issuance of reuse permits for future discharges to the situations where there is knowledge that increases in discharges will occur. The future reuse authorization could be limited to the amount of return flow for the underlying water right or the amount of TPDES permitted discharge.

Can an applicant get an authorization for indirect reuse without knowing its discharge and diversion points?

Options: A right holder can apply for an indirect reuse permit under Section 11.042(c) for their own wastewater without specifying discharge and re-diversion points.

B. Before the reuse water can be diverted, require the indirect reuse water right holder to apply for an amendment to the permit that specifies discharge points, channel losses, and re-diversion points.

C. Require applicant for indirect reuse to obtain an appropriation under 30 TAC §297.42(g) or a bed and banks permit, and specifying discharge and re-diversion points.

ATTACHMENT B

TEXAS WATER RIGHTS AND WASTEWATER REUSE

PREPARED BY THE REUSE COMMITTEE OF THE TEXAS WATER CONSERVATION ASSOCIATION

Introduction

Generally, about sixty percent (60%) of all water diverted from Texas' rivers and streams or groundwater pumped for municipal purposes enters the state's watercourses as discharges of treated effluent from wastewater treatments plants. Once considered a threat to surface water supplies, due in part to actual or perceived water quality concerns, the value of this treated effluent is now clearly recognized. This is evidenced by a much heightened interest in reuse projects to meet current and future increased municipal demands. Further, the concept of reuse is included in nearly every SB1 regional plan. Treated wastewater effluent discharged into Texas' rivers also helps meet downstream water needs, including those of the environment and agriculture. These competing interests in return flows have crystallized the need to resolve many legal issues involving reuse.

The purpose of this white paper is to: (1) provide some basic legal background and context concerning reuse of wastewater under current Texas law; (2) identify disputed issues with existing law in Texas that may warrant legislative clarification; (3) summarize the various arguments offered on both sides of these issues, without offering an opinion as to the merits of these arguments; (4) and discuss potential consequences of various policy alternatives. The issues discussed in this paper include:

(1) Under current law, is the use of wastewater effluent after discharge to a stream a use of "state water" subject to the laws of prior appropriation or is it subject to a different regulatory scheme?

(2) Does current law allow effluent derived from different sources of water to be treated differently for purposes of evaluating a request to reuse this effluent?

(3) Does current law provide for different treatment of effluent derived from "future" and "existing" return flows, regardless of the source?

(4) Who can obtain indirect reuse rights?

(5) To what extent should protection be afforded to the environment in reuse permitting decisions?

While this paper attempts to identify discrete issues for discussion, it must be stressed that few of the issues identified above can be handled discretely. Indeed, many of these issues are so intertwined that resolution of one issue can and will impact how other issues will need to be considered and resolved. Moreover, while the disputes over indirect reuse are often characterized as a fight between municipalities or dischargers versus senior water rights holders and the environment, the reality is <u>much</u> more complex. Ownership, geographic distribution, sources of water supply, historical reliance on return flows in water rights permitting, and priority of water rights within each river basin vary greatly statewide. Thus, any decisions on the issues set forth in this paper are certain to result in different impacts, "winners," and "losers," depending on the specific facts of each basin and the interests involved. The question is often not whether reuse will occur, but by whom. The ability to engage in indirect or direct reuse translates directly to an ability by some water providers to delay development of additional water supplies while at the same time forcing others to look for alternative water supplies sooner rather than later when the availability of return flows for their use is diminished.

Background – The difference between direct and indirect reuse

Direct reuse

Direct reuse is the use of wastewater effluent that involves delivery of effluent via pipelines, storage tanks and other necessary infrastructure directly from the wastewater treatment plant to others before discharging the effluent into a watercourse.[1]

In Texas today, it is undisputed that a surface water right holder may directly reuse and fully consume effluent, subject only to the limitations contained in the underlying water right from which the effluent was derived.[2] Where contracts or other laws have clearly transferred ownership of that effluent to another, such as the wastewater treatment provider, the direct reuse rights may lie with the owner of the effluent. This approach is generally consistent with a water right holder's right to fully consume the water granted under its water right, subject only to the limitations expressed within the "four corners" of the water right. This approach is also generally consistent with how wastewater treatment providers operate today. Owners of wastewater treatment plants generally have a wastewater discharge (TPDES) permit from the state that allows them to discharge treated effluent to a watercourse. TPDES permits are not viewed as imposing a "duty" or obligation on the wastewater treatment plant owners/operator to continue to discharge effluent at a particular location or in a particular quantity. Rather, these permits restrict the circumstances under which *any* discharge *may* occur, if at all.

Obtaining authorization for direct reuse under today's regulatory scheme is fairly streamlined. Typically, only certain water quality authorizations must be obtained from TCEQ to do this kind of reuse.[3] A water right holder may directly reuse the unconsumed water in a relatively unfettered manner so long as the reuse is accomplished for the purposes and in the location of use provided in the underlying water right from which the effluent is derived. Although the direct reuse of effluent reduces the amount of flow in the watercourse that is available downstream for use by other water rights holders and the environment, additional water rights authorizations are typically not required and thus, these impacts to other water rights and the environment are not addressed.

Some owners of wastewater treatment plants have relied on existing law and invested considerable funds in implementing and planning for expanded direct reuse projects. In some cases, wastewater treatment operators are required or have chosen to operate under a "no discharge" permit, which requires them to directly reuse all of the effluent. In most instances, however, direct reuse projects are relatively small in scale. Moreover, there remain practical, technical, political, and fiscal limitations on the ability to implement large direct reuse projects.

[1] *See* 30 TEX. ADMIN CODE § 297.1(44).

[2] TEX. WATER CODE § 11.046(c).

[3] *See* TEX. ADMIN. CODE ch. 210.

Human consumption of treated wastewater effluent has yet to gain widespread social acceptance in Texas. The use of treated wastewater for landscape irrigation in areas of heavier human use (e.g. parks and school grounds) has been met with resistance in some areas even though the effluent must be treated to a high standard. Thus, in some cases, high quality potable water is still used for some purposes even though treated effluent could be used under today's rules. This limited implementation of direct reuse projects means that the availability of return flows to meet downstream needs has not yet been significantly impacted. However, it is believed that, as treatment technology advances and treatment costs decrease, and as water becomes more scarce and the cost of developing and delivering new supplies increases, direct reuse of treated effluent (even for human consumption) will become more attractive and feasible over time.

Indirect Reuse

Treated wastewater that is not directly reused and is instead discharged to a watercourse is "return flow."[4] The subsequent downstream diversion and use of wastewater return flows is commonly referred to as "indirect reuse." Indirect reuse substitutes transportation via a state watercourse for the pipeline, and accompanying capital cost, associated with traditional direct reuse projects. The ability to use the stream as the "pipeline" may also provide the added benefit of reducing costs of treating the diverted water, as the mixing and transportation process in the watercourse actually provides additional natural treatment. Like direct reuse, indirect reuse ultimately reduces the amount of flow in the watercourse that is available for use by other water rights holders and the environment. This effect, of course, is most evident downstream of the point where the indirect reuse occurs. Upstream of the indirect reuse point, the return flows continue to provide some instream flow benefit. In contrast to the clear authority to engage in direct reuse without water rights permitting implications, the ability to engage in indirect reuse is less clear. There are currently pending before TCEQ a large number of water rights applications seeking indirect reuse authorization, nearly all of which have been protested. In some cases, these permits applications derive from projects contained in regional water plans. Many of the issues posed in those protests are more fully discussed in the following Issues section of this paper.

ISSUES DISCUSSION

(1) Under current law, is the use of wastewater effluent after discharge to a stream "state water" subject to the laws of prior appropriation or is it subject to a different regulatory scheme?

With regard to surface waters, Texas generally follows the prior appropriation doctrine to authorize use of this state water. Under this principal, available water is permitted for use on a "first in time, first in right" basis. Except in very limited circumstances, a permit is required to use state water. One aim of this permitting process is to ensure that available water supplies are

[4] 30 TEX. ADMIN. CODE § 297.1(43).

not overcommitted. Indeed, an application for a new appropriation may only be granted upon a finding that: (a) the application meets the statutory requirements, (b) water is available, and (c) the proposed appropriation is for a beneficial purpose, does not impair existing water rights, is not detrimental to the public welfare, is consistent with the state and regional water plans, addresses water conservation concerns, and includes proper consideration of environmental needs.[5]

One of the most basic disputes in the fight over indirect reuse is whether wastewater return flows are subject to this or some other regulatory scheme. As discussed below, the source of this dispute is rooted in language contained in two statutes, both of which were modified in 1997 by Senate Bill 1: Water Code § 11.046 and Water Code § 11.042.

Bed and Banks Authorization of Reuse

Those who advocate that wastewater return flows are not subject to the permitting requirements that apply to new appropriations focus on Texas Water Code § 11.042[6] – the "Bed and Banks" statute. These applicants argue that section 11.042 changed preexisting law to provide an independent basis for granting indirect reuse authorizations outside the established prior appropriations permitting scheme.

Section 11.042 contemplates the issuance of permits for the delivery of certain waters down the bed and banks of a watercourse under three separate circumstances. Subsection (a) provides the statutory guidelines for delivery of stored waters from reservoirs using the bed and banks of a watercourse and is not at issue here. Subsection (b) provides a statutory basis for delivery of effluent derived from groundwater, and is discussed more fully under Issue (2) in this paper. Many argue that subsection (c) provides the basis for indirect reuse authorizations of surface-water derived effluent. It states:

> Except as otherwise provided in Subsection (a) of this section, a person who wishes to convey and subsequently divert water in a watercourse or stream must obtain the prior approval of the commission through a bed and banks authorization. The authorization shall allow to be diverted only the amount of water put into a watercourse or stream, less carriage losses and subject to any special conditions that may address the impact of the discharge, conveyance, and diversion on existing permits, certified filings, or certificates of adjudication, instream uses, and freshwater inflows to bays and estuaries. Water discharged into a watercourse or stream under this chapter shall not cause a degradation of water quality to the extent that the stream segment's classification would be lowered. . ..

Many applicants for indirect reuse authorization argue that "water" in section 11.042(c) includes all types of water (including surface-water derived effluent) except those specifically addressed in other sections of section 11.042 and that section 11.042(c) removes indirect reuse from the process for permitting new appropriations. They further argue that no priority date should attach to indirect reuse, or that, if a priority date must be assigned, it should be the same priority date

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[5] *See* TEX. WATER CODE ANN. § 11.134(b).

[6] *See also* 30 TEX. ADMIN. CODE § 297.16.

that is associated with the underlying water right from which the return flows derive. Applicants also argue that the protections embedded in section 11.042(c) are sufficient to protect the environment and all existing water rights holders. Others argue that section 11.042(c) actually represents a limitation on one's private property right to reuse effluent that did not previously exist.

Further, because a water right holder is entitled to consumptively use or directly reuse 100% of the water granted under an appropriative right (unless otherwise expressly limited in the permit[7]), and because all requests for new appropriations in recent years have been evaluated assuming that the waters under these existing rights will be fully consumed (i.e. there will be no return flows), many argue that a bed and banks permit is the proper mechanism for granting legal rights to indirect reuse of effluent.

<u>Indirect Reuse Permits As New Appropriations</u>

Those arguing that any legal claim to wastewater return flows must be sought through the ordinary water rights permitting process largely rely on preexisting law and Water Code § 11.046. This statute, which also provides the clear authority for direct reuse, provides in pertinent part that:

> Once water has been diverted under a [water right] and then returned to a watercourse or stream ... it is considered surplus water[8] and therefore subject to reservation for instream uses or beneficial inflows or to appropriation by others unless expressly provided otherwise in the permit, certified filing, or certificate of adjudication.

Supporters of this position argue that this language codifies the common law, which held that an appropriator had no claim to water that had escaped his land, particularly once it drained into a natural watercourse.[9] They argue that wastewater return flows are "considered surplus water" under section 11.046(c) and thus should be treated as available for use by other downstream water rights holders or subject to permitting only as a new appropriation.

Since section 11.042(c) uses the term "water" and not "effluent" or "return flows," some offer that this section applies to other sources of water proposed to be transferred through state watercourses, such as groundwater or imported surface water (often referred to as "developed water"). This interpretation, they contend, gives meaning to the term "water" used in section 11.042(c) without the apparent conflict between this section and the provisions of section

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7 *See* TEX. WATER CODE ANN. § 11.046.

8 *See* TEX. WATER CODE § 11.002(10); 30 TEX. ADMIN. CODE § 297.1(53).

9 In *City of San Marcos v. Texas Comm'n on Envt'l Quality*, 128 S.W.3d 264 (Tex. App. – Austin 2004, pet. denied), the court ruled that, prior to Senate Bill 1 amendments to the Water Code, no common law right existing by which a city might claim ownership of its wastewater effluent following its discharge into a state watercourse. Instead, a new appropriation was required. *See also* WELLS A. HUTCHINS, THE TEXAS LAW OF WATER RIGHTS 155 (1961). *See also* Ronald A. Kaiser, *Texas Water Marketing in the Next Millennium: A Conceptual and Legal Analysis*, 27 TEX. TECH L. REV. 181 (1996); *South Texas Water Co. v. Bieri*, 247 S.W.2d 268, 272-73 (Tex. Civ. App. – Galveston 1952, writ ref'd n.r.e.).

11.046(c), and without requiring a dual permitting requirement to secure a new appropriation under section 11.046(c) and a bed and banks authorization under section 11.042(c).

Consequences of Different Approaches to Permitting Indirect Reuse

The implications of how indirect reuse of surface water-derived effluent is permitted, if at all, could have enormous implications with regard to who might ultimately obtain such rights, the value of those rights for providing a quantifiable, reliable water supply that can be appropriately protected from use by others, and how potential impacts on other water users and the environment might be addressed. As mentioned earlier, this choice is not always between cities and river authorities or upstream and downstream interests. If anything, the choice may best be characterized as one between: (1) entities seeking to increase their legally available water supply beyond that which they currently hold by contract or water right in a manner that, in many cases, may be more cost-effective or politically acceptable (or both) than a new water supply contract, reservoir project, or costly pipeline, and (2) existing water rights holders or environmental interests who have relied upon or wish to preserve future availability of return flows to meet their own needs, environmental flow needs, or the needs of downstream senior rights who would otherwise make calls upstream to junior rights for the passage of inflows.

Some of the more specific consequences of a "bed and banks" approach to indirect reuse of surface water-based effluent under section 11.042 include:

(1) Protections afforded existing water rights and environmental needs may be less than that statutorily required for a new appropriation. For example, assignment of no priority date or a priority date of the underlying water right renders off-limits those return flows from claims by existing water rights that may have relied on the availability of those return flows to improve reliability of their rights.

(2) Use of section 11.042 as an indirect reuse authorization mechanism would require development of a detailed accounting system to track discharges and diversions of return flows that fall outside the priority system of allocating waters in a watercourse;

(3) Removing return flows from the available "pool" of water available to satisfy determined environmental needs, if any, could result in an inability to meet any such needs, cause the burden to be borne by other water rights holders, or increase the cost of meeting any such needs.

(4) Indirect reuse could significantly extend the water supply available to the entity receiving the authorization.

(5) The State retains some right to evaluate and address the impact of indirect reuse on the environment and other water rights. (The extent of this right is the subject of other issues discussed in this paper.)

By comparison, the types of specific consequences that some suggest result if indirect reuse is treated as a new appropriation under section 11.046 include:

(1) In many basins, the water in the watercourses, even after including return flows, can be fully allocated to existing water rights (at least up to the reliability standard required to permit such use). In these and other cases, determined environmental water needs of the stream or bay systems may exceed the amount of water remaining for appropriation. New permits for indirect reuse could probably not be issued in these basins.

(2) Even if water is found to be available, the water right will receive a junior priority date. Under the "first in time, first in right" approach, this means that these water rights are more likely to be reduced or cut off in times of severe drought.

(3) Increased development of direct reuse projects is likely to occur if other water supply strategies cannot be identified.

(2) Does current law allow effluent derived from different sources of water to be treated differently for purposes of evaluating a request to reuse this effluent?

Groundwater-based effluent

Section 11.042(b), also enacted in 1997, provides a separate mechanism for addressing the indirect reuse of effluent derived from groundwater. Specifically, section 11.042(b) reads:

> A person who wishes to discharge and then subsequently divert and reuse the person's existing return flows derived from privately owned groundwater must obtain prior authorization from the commission for the diversion and the reuse of these return flows. The authorization may allow for the diversion and reuse by the discharger of existing return flows, less carriage losses, and shall be subject to special conditions if necessary to protect an existing water right that was granted based on the use or availability of these return flows. Special conditions may also be provided to help maintain instream uses and freshwater inflows to bays and estuaries. A person wishing to divert and reuse future increases of return flows derived from privately owned groundwater must obtain authorization to reuse increases in return flows before the increase.[10]

Effluent derived from Imported or Stored Waters

While section 11.042(b) singles out groundwater-derived effluent for specific regulatory treatment, section 11.042(c) does not identify the source(s) of the "water" to which it refers, thereby leaving open for argument the issue of whether or how effluent derived from other water supplies is to be treated, if at all, under section 11.042(c).

[10] This language essentially tracks the decision by Texas Natural Resource Conservation Commission (TNRCC) (predecessor to the TCEQ) in the *City of San Marcos* case, in which the City of San Marcos sought a bed and banks authorization to convey groundwater-derived effluent for subsequent diversion and use downstream under the statutes that existed prior to the adoption of SB 1 and section 11.042(c).

Because imported waters from another basin, and the effluent derived from them, are sources of supply that would not have ordinarily been available to meet downstream environmental needs or those of downstream water rights holders in the receiving basin, some argue different and perhaps less onerous treatment is appropriate, especially in light of already existing barriers to interbasin transfers.

A few have also argued that effluent derived from waters that are first stored in an in-basin reservoir are waters that would not have been available to the environment or downstream water rights but for the initial efforts of the entity that constructed the reservoir to capture and store the source water. Others suggest that there is no difference between reuse of effluent derived from in-basin surface water previously stored in a reservoir and effluent derived from in-basin surface water diverted under a run-of-river permit.

As discussed above under issue (1), many generally recognize there may be a valid basis for distinguishing between supplies that are derived in-basin versus out-of-basin supplies or groundwater. This may be particularly appropriate for new or increased levels of return flows from these water supplies, where no existing water right holder or the environment has come to rely upon those return flows. Indeed, because imported waters are required to go through a rigorous interbasin transfer permitting process that in part addresses impacts to environmental flows and senior rights in the basin of origin, it is arguably already burdened by significant restrictions. Many argue that imposing additional requirements to meet environmental needs in the receiving basin on top of these other requirements represent a punitive requirement on interbasin transfers that have been identified as necessary to meet growing water supply needs.

(3) Does current law provide for different treatment of effluent derived from "future" and "existing" or "historical" return flows, regardless of the source?

While the terms "existing return flows" and "future increases in return flows" are terms that are only contained within the statute that deals with groundwater-based return flows (section 11.042(b)), both the nature of the distinction to be made with regard to groundwater-based return flows and whether any such a distinction can or should be made by regulators when other sources of supply are involved continues to foster considerable debate. Confusion seems to arise around the use of the terms "existing" and "future" return flows, which contributes to the debate. The term "historical" is used by many as synonymous with "existing" return flows. Some use the term "historical" or "existing" return flows to mean only those return flows that have been actually discharged, whereas others use the term to include return flows that derive from existing water rights whether or not they have ever actually been discharged. Similarly, to some, the term "future" return flows means return flows that have never actually been discharged regardless of whether the return flows derive from an existing permitted in-basin or imported surface water supply or groundwater. Lastly, others use this term to refer only to return flows that derive from water supply sources that have yet to be permitted or, in the case of groundwater, developed.

Regardless of the terminology, the issue comes down to whether increases in actual discharges of return flows above current or historical levels is "new" water to the system that could or should be treated as outside the prior appropriation system. The argument in support of this approach is that no water right holder or the environment has ever relied on the actual presence of return flows to satisfy their day-to-day needs. Others dispute this contention, arguing that such assumptions have underlain significant investments in the purchase of water rights, execution of contracts, and construction of infrastructure. Moreover, some argue that past water rights permitting decisions have included express or implicit assumptions about future increases of return flows derived from existing water rights and that this type of reliance on predicted return flow levels should be respected. It is important to recognize that definitive proof of these kinds of assumptions is often elusive. While those assumptions, if any, have only occasionally been stated expressly in agency orders, permits, or other contemporaneous documents, in many (if not most) other instances, any such assumptions may have been included in the evaluation of the water right or contract requirements in accordance with the common practices of the experts at that time and may not be fully documented, if at all. In some cases, certain existing water rights holders have undoubtedly enjoyed an increase in the reliability of their water rights due to the presence of return flows, but clear reliance on the presence of these return flows in the permitting process is often difficult to document. If past permitting reliance is to be honored, defining the appropriate level of proof and the assignment of the burden of proof on this issue is something the Legislature may want to address. These concerns seem to be present not only where in-basin return flows are at issue, but also in situations where the discharge of effluent derived from either groundwater or imported surface water has already occurred for some time and is projected to increase over time.

(4) Who can obtain indirect reuse rights?

Disputes also arise over whether existing law allows TCEQ to give preference to particular types of applicants for indirect reuse authorizations. Some have suggested that holding the underlying water right should provide some preference under current law, whereas others have argued that ownership of the wastewater treatment plant confers a preference under current law. Others have argued that current law does not necessarily establish any preference but that good policy would support giving preference to the water right holder or the discharger, but not third parties with no identifiable ownership interest in the wastewater or underlying water right. As set forth below, the approach *may* depend on the statute under which indirect reuse applications are considered. As such, clarification of the Legislature's intent on this issue may be necessary.

If surface–water derived return flows are treated as "surplus water" under section 11.046(c), available for appropriation by "others," then it appears fairly clear that *anyone* may file such an application, regardless whether the applicant has any ownership interest in the facilities that are discharging the effluent or whether the applicant has an ownership interest in the underlying water right or contract for the water supply from which the effluent was derived. In that instance, TCEQ would presumably evaluate competing applications for the same water based on the type of use and merit of each application.

Subsection 11.042(c), which some argue provides the sole basis for allowing the indirect reuse of surface-water derived return flows, refers to granting a "person" the right to "convey and subsequently divert water," without regard to whether the "person" also needs to be the discharger of the water, the owner of the underlying surface water right from which the return flows are derived, or a person with a contract to either purchase the return flows from the discharger or the underlying surface water from which the effluent is derived. Indeed, some have suggested that *any* person or entity can seek a right under section 11.042(c) even if no contractual or ownership interest with respect to the return flows or underlying water supply exists.

Section 11.042(b), which addresses indirect reuse of groundwater-based effluent, allows that "a person who wishes to discharge and then subsequently reuse the person's existing return flows..." to obtain a permit. This suggests that only the discharger of the return flows may obtain such authorization. By contrast, with regard to future increases in return flows derived from groundwater-based effluent, the same subsection (11.042(b)) provides only that "a person who wishes to divert and reuse" these return flows needs a permit, perhaps suggesting that the same person seeking the permit need not also be the discharger, since the same phrase "discharge and...reuse" is not used. As with section 11.042(c), some point to this different terminology for future increases in return flows to contend that any person can obtain indirect reuse rights to future groundwater-derived return flows even if no contractual or ownership interest with respect to the return flows or underlying groundwater exists.

(5) To what extent should protections be afforded to the environment in reuse permitting decisions?

The benefits that return flows may offer in supplying water to help meet environmental needs in many river basins is undisputed. The ongoing debate of how best to provide water to meet environmental needs of our rivers and bay systems has been further highlighted as the potential and need for the full use, and reuse, of water rights increases over time. Regardless of the permitting approach used - whether through a new appropriation or a bed and banks authorization, or both - the effect of reuse on the environment is a significant issue. Indeed, these approaches generally allow TCEQ to consider environmental flow needs in their assessment of the proposed reuse and include appropriately protective conditions. The question then is the level of protection that is appropriate where reuse is concerned. One factor to consider in incorporating appropriate limitations in any reuse authorization may be the extent to which return flows are or may be relied upon to meet identified environmental flow needs when considered along with the responsibility of other water rights holders in the basin to provide for environmental flows. Actual discharges of effluent and past assumptions with respect to expected increases in return flows over time, if any, may be relevant. Additionally, the extent to which artificially created environments made possible by historical return flows should be protected, should be considered. Prior to the growth of cities and their resulting wastewater discharges, many streams in Texas, including some that were not considered perennial streams, had historical low flows well below current low flows. Fully protecting these artificial baseflows by limiting the amount of return flows that can be reused may not be prudent in light of the state's needs for additional water supplies. On the other hand, if an environment has been created, even through artificial means, the counterargument that many perennial streams in the state have been dammed up and diverted in a manner that did not take into account water for environmental flows suggests that some trade-off is appropriate. Future return flows that have not been relied upon to meet environmental needs may warrant different treatment.

ATTACHMENT C

COMMITTEE SUBSTITUTE FOR SENATE BILL 3
By ARMBRISTER

Committee Substitute
Section by Section Analysis

ARTICLE 1. ENVIRONMENTAL FLOWS

SECTION 1.01 - 1.02, pp 1- 2
Amends Sec. 5.506, Water Code, to add emergency suspension of environmental set asides by TCEQ to make water temporarily available for other uses during emergencies.

Provides notice to TPWD notice and opportunity to comment on suspension of environmental set asides.

SECTION 1.03, p 2
Amends Sec. 5.701(j) to eliminate permit application fees for water dedicated to environmental flows that are deposited into the Texas Water Trust.

SECTION 1.04, pp 2 - 3
Adds Sec. 11.002(15) to define "environmental flow regimes" to include amounts of water needed to support a sound ecological environment that differs by location and includes seasonal and yearly fluctuations.

Adds Sec. 11.002(16) to define "environmental flow standards" to include requirements the TCEQ determines, by rule, necessary to protect instream flows and freshwater inflows and habitats. Regimes are based solely on science. Adds Sec. 11.002(16) to define "Flows Commission" and "Science Advisory Committee" to the Flows Commission.

Adds Sec. 11.002(19) definition of "environmental flow analyses" to include the application of scientifically derived process for predicting ecosystem response to changes in freshwater inflow or instream flows.

SECTION 1.05, p 3
Amends Sec. 11.023 to condition the purposes for which surface water may be appropriated to water that has not been set aside downstream [SECTION 1.17, p 24, Sec. 11.1471(a)(2)] for instream flows or freshwater inflows to bays and estuaries.

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SECTION 1.06, pp 3- 6
Amends Sec. 11.023 to add legislative findings to the Water Code to include:

> Temporary suspension of environmental conditions of permits during emergencies is an essential part of the State's environmental flows policy;
>
> A new process needed to address environmental flow issues to provide certainty in water management and development and to protect the state's streams, rivers, and bays and estuaries;
>
> Set asides should be established in basins that have water to be appropriated and that a variety of approaches are needed in basins where unappropriated water is not available to be set aside for environmental purposes;
>
> Existing tools developed by the state to determine freshwater inflow needs for bays and estuaries need improvement and the state's instream flows program requires extensive review and examination, once fully developed;
>
> Adaptive management is needed for determination and implementation of environmental flow requirements due to improvements in science, projections of beneficial uses and local issues;
>
> Recommendations for environmental flow needs should be developed based on consensus of balances interests and on a regional basis;
>
> Pressures on water resources require determination of environmental flow standards and how they will be incorporated into regional planning and water permitting; and
>
> More effective water rights administration and enforcement is needed in most areas of the state to protect environmental flows.

SECTION 1.07, p 6
Amends Sec. 11.0236 to retitle the Study Commission on Water for Environmental Flows to the Environmental Flows Commission

SECTION 1.08 pp 6 - 9
Amends Sec. 11.0236, Water Code, to permanently establish an Environmental Flows Commission, in place of the temporary Study Commission on Water for Environmental Flows.

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Changes the membership of the Environmental Flows Commission from 15 to 9 members to include 3 members appointed by the governor that are members of the governing bodies of the TCEQ, TWDB and TPWD; 3 senators appointed by the Lieutenant governor; and 3 representatives appointed by the Speaker of the House. Members representing river or municipal water supply authorities and resource protection entities have been eliminated.

Flows Commission Members serve at the will of the person that made the appointment with vacancies to be appointed by the authority making initial appointment for the vacated position.

Adds recognition of the importance of environmental flows for public and private lands and water management as high priorities for the Flows Commission to consider.

Adds requirement for Flows Commission to consider appropriate methods for voluntarily converting reasonable amounts of existing water rights temporarily or permanently for environmental flows.

Allows the Flows Commission to adopt rules, procedures and policies to implement its responsibilities and authority. Changes requirement to adopt rules from mandatory to permissive.

Eliminates abolishment of the Flows Commission on September 1, 2005.

SECTION 1.09, pp 9 - 18
Adds new Section 11.02361, Water Code, TEXAS ENVIRONMENTAL FLOWS SCIENCE ADVISORY COMMITTEE, to reestablish a science advisory committee, Texas Environmental Flows Science Advisory Committee (SAC), to: objectively advise and make recommendations to the Flows Commission on issues related to the science of environmental flow protection and to provide direction, coordination and consistency relating to state methodologies used to study environmental flows; the environmental flows programs of the TCEQ, TWDB, and TPWD; and the work of the basin specific science teams (Bay/Basin Expert Science Teams).

Membership of the SAC will be determined by the Flows Commission and will consist of 5 to 9 members that are experts with diverse technical expertise related to the evaluation of environmental flow needs.

Provides for five year terms for SAC members with vacancies filled by the co-chairs of the flows commission for unexpired terms.

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Requires state agency written responses to SAC recommendations provided by the Flows Commission on a frequency determined by the Flows Commission. The written responses are to include actions taken by the agencies in response to the recommendations and any reasons for not implementing a recommendation.

Adds new Section 11.02362, Water Code, DEVELOPMENT OF ENVIRONMENTAL FLOW REGIME RECOMMENDATIONS to provide for a process to determine environmental flow needs and to incorporate provisions for environmental flows into TCEQ permitting decisions.

By November 1, 2005, Flows Commission to define extent of river basins and bay systems for development of environmental flow regimes and recommendations for standards. Development of regimes and standards for river basins and bay systems are required to be in the following priority order and schedule:

1. Trinity and San Jacinto Rivers and Galveston Bay
   Sabine and Neches Rivers and Sabine Lake

   Flows Commission appoints stake holders committee by November 1, 2005.

   Each stakeholders committee appoints expert science team by March 1, 2006.

   Each expert science team makes environmental flow regime recommendations to the stakeholders committee, Flows Commission, and TCEQ by March 1, 2007.

   Each stakeholders group makes comments and recommendations based on expert science teams recommended flow regime to the TCEQ by September 1, 2007.

   TCEQ adopts environmental flow standards by September 1, 2008.

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2. Colorado and Lavaca Rivers and Matagorda and Lavaca Bays
   Guadalupe, San Antonio, and Aransas Rivers and Copan, Aransas, and San Antonio Bays

   September 1, 2006 - Flows Commission appoints stake holders committee

   Remainder of schedule to be determined by the Flows Commission with input from stakeholder committee expert science teams, TCEQ, TPWD and TWDB.

3. Nueces River and Corpus Christi and Baffin Bays
   Rio Grande, Rio Grande estuary, and Lower Laguna Madre
   Brazos River and its associated bay and estuary system

   September 1, 2007 - Flows Commission appoints stake holders committee

   Remainder of schedule to be determined by the Flows Commission with input from stakeholder committee, expert science teams, TCEQ, TPWD and TWDB.

Flows Commission to determine schedule for development of flow regimes and standards for non-priority river basins and bay systems in coordination with the TCEQ, TPWD, TWDB and relevant stakeholder committees and expert science teams.

Schedules may be altered by Flows Commission, independently or upon request.

Permits voluntary consensus based efforts to develop information on ways to meet environmental flow needs in areas the Flows Commission has not developed a schedule for development of recommendations or adoption of standards.

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Flows Commission to appoint stakeholders committee for each scheduled river basin and bay system of at least 17 members to include representatives of:

- agricultural water users;
- recreational water users, including recreational anglers and water recreation related businesses;
- municipalities;
- soil and water conservation districts;
- industrial water users;
- commercial fishermen;
- public interest groups;
- regional water planning groups;
- groundwater conservation districts;
- river authorities and other conservation and reclamation districts with jurisdiction over surface water; and
- environmental interests.

Stakeholders committee members serve 5-year terms with remaining members appointing any vacancy.

Stakeholders committee meeting required to be open to the public.

Stakeholders committees appoint expert science teams within 6 months of establishment. A person can serve on more than one expert science team.

Expert science team members serve 5-year terms with stakeholders committees appointing any vacancy.

Science Advisory Committee appoints one of its members to serve as a liaison to each expert science team.

The TCEQ, TPWD, and TWDB provide technical assistance including information on the State's bay and estuary and instream flow studies to each expert science team and may serve as non-voting members of the expert science team.

Expert science team meetings to be open to the public, where reasonably practicable.

Expert science teams develop environmental flow analyses and a recommended environmental flow regime for their river basin and bay system through a process designed to reach consensus using all available science without regard to the need for water for other uses.

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Expert science teams submit analyses and recommendations to their stakeholders committees, the Flows Commission and TCEQ. Stakeholders committees and the Flows Commission can not change expert science team recommendations.

Stakeholders committees consider the expert science teams' analyses and recommendations along with other factors, including present and future water needs for other uses to develop recommendations on environmental flows and strategies to meet the flow needs. The stakeholders committees recommendations are submitted to the Flows Commission and TCEQ. Stakeholders committees to operate on a consensus basis to the maximum extent possible.

After submitting its recommendations, stakeholders committee, with assistance from their expert science teams are to prepare an adaptive management schedule and work plan to the Flows Commission for their approval. The work plan must establish a periodic review of flow regime recommendations, standards, and strategies at a minimum of once every 10 years; identify monitoring, studies, and activities; and establish a schedule for validation or refinement of recommendations, standards, and strategies.

The Flows Commission, with input from their Science Advisory Committee, review and provide comments to the TCEQ on analyses and environmental flow regimes recommendations within 6 months of receipt of the recommendations.

ATTACHMENT C

SECTION 1.10, p 18 - 19
Amends Sec. 11.0237 (a) and (b) are conforming changes.

SECTION 1.11, p 19
Amends Sec. 11.082 (b) clarifies that the TCEQ can seek civil penalties for illegal taking, diverting, or appropriating state water in areas outside of a water master program.

SECTION 1.12, p 19 - 20
Adds new Sec. 11.0841(c) provides civil remedy to TPWD over water rights held in the Water Trust and can act in the same manner as other water right holders to protect water set aside for environmental purposes.

SECTION 1.13, pp 19 – 20
Amends Sec. 11.0842(a) to clarify that the TCEQ can seek administrative penalties for illegal diversions state water in areas outside of a water master program.

SECTION 1.14, p 20 - 21
Amends Sec. 11.0843(a) are conforming changes.

SECTION 1.15, pp 20
Amends Sec. 11.134(b) requires the TCEQ to consider environmental flow standards adopted by rule when granting water rights.

SECTION 1.16, pp 21 – 24
Amends 11.147(b), (d) and (e) and adds (e-1) to:

Require the TCEQ, when issuing a water right permit, to include conditions in the permit that are necessary to maintain freshwater inflows to bay and estuaries.

Require all new permits to include a provision (re-opener), through and expedited amendment process, to increase environmental flows permit conditions by no more than a cumulative 12.5% of the environmental flow requirement considering priority dates and diversion locations of other water rights in the same basin that are subject to adjustment.

SECTION 1.17, pp 24 – 27
Requires TCEQ to adopt rules for Environmental Flow Standards and Set-sides including an amount of unappropriated water, if available, needed to meet standards, to the extend practicable considering human water needs.

ATTACHMENT C

Requires TCEQ, in adopting standards, to consider the following:

geographical extent of the river basin and bay system adopted by the Flows commission;

schedule for adoption of the standards established by the Flows Commission;

environmental flow analyses and regime recommendation and strategies from the expert science teams and stakeholders committee;

specific characteristics of the river basin and bay system;

economic factors;

human water needs in the river basin and bay systems;

all available scientific information including that received from the Science Advisory Committee; and

any other appropriate information.

Requires environmental flow standards to consist of a schedule of flow quantities, with seasonal and yearly fluctuation that may vary geographically.

Prohibits the TCEQ from appropriating water that would impair the adopted environmental set-aside and all new permits or amendments to permits that include an increase the amount of water appropriated must contain conditions that will protect the amount of water set-aside for environmental purposes.

Provides that environmental flow set-asides will have a priority date of the date TCEQ receives flow regime recommendations from the expert science team and the set-aside will be included in TCEQ's water availability models in the same manner as other water rights.

Provides authority to TCEQ to alter the set-aside through rule making as part of the periodic review under the adaptive management process.

SECTION 1.18, p 27
Changes heading of Sec. 11.148 EMERGENCY SUSPENSION OF PERMIT CONDITIONS to add AND EMERGENCY AUTHORITY TO MAKE AVAIALBLE WATER SET ASIDE FOR ENVIRONMENTAL FLOWS.

ATTACHMENT C

SECTION 1.19, p 27 - 28
Adds Sec. 11.148(a-1) and amends 11.148(b) and (c) to provide for emergency suspension of environmental set asides by TCEQ to make water temporarily available for other uses during emergencies.

Provides notice to TPWD notice and opportunity to comment on suspension of environmental set asides.

SECTION 1.20, pp 28
Amends Sec. 11.1491(a) to require reports prepared by TCEQ and TPWD on the evaluation of B&E studies related to permit conditions related to bays and estuaries to be provided to the Flows Commission, its Science Advisory Committee, and application stakeholders committees and expert science teams.

SECTION 1.21, pp 28 – 29
Amends Sec. 11.239(g) to eliminate watermaster fees for water rights placed in the Texas Water Trust for at least 20 years.

SECTION 1.22, p 29
Amends Sec. 11.404(e) to eliminate court appointed watermaster fees for water rights placed in the Texas Water Trust for at least 20 years.

SECTION 1.23, pp 29 – 31
Adds new Sec. 11.4531 to establish a Water Master Advisory Council for TCEQ (executive director) appointed watermasters (same provision as court appointed watermasters)

SECTION 1.24, p 31 - 32
Amends Sec. 11.454 to provide TCEQ (commissioner) appointed watermasters with the same duties and authority as court appointed watermasters.

SECTION 1.25, pp 32
Amends Sec. 11.454 to provide TCEQ (commissioner) appointed watermasters with the same fee authority as court appointed watermasters to be deposited to the watermaster fund to be used for watermaster operations.

SECTION 1.26, pp 32 – 33
Adds new Sec. 15.4063 to provide a funding mechanism in the research and planning fund to compensate members of the Flows Commission's science advisory committee and provides for ability to utilize other funds for such purposes.

ATTACHMENT C

SECTION 1.27, pp 33 - 34
Amends Sec. 15.7031(c) and adds Sec. 15.7031(e) requires the TCEQ to consult with the Flows Commission when considering placement of water rights in the Texas Water Trust and allows input from the stakeholders committees and expert science teams.

Eliminates need for a permit amendment when placing water rights in the Texas Water Trust for instream flows, water quality, fish and wildlife habitat, bay and estuary inflows, or other environmental uses.

SECTION 1.28, pp 34
Amends Sec. 16.059(d) to extend timeframe for state instream flow studies from 2010 to 2014.

SECTION 1.29, pp 34 - 36
Amends Sec. 26.0135(h) to eliminate fees related to water quality programs for water rights placed in the Texas Water Trust for at least 20 years.

SECTION 1.30, p 36
Repeals Sec. 11.0236(d), (k), (l), and (m) related to SB 1639, 78th Legislature, provisions for Flows Commission and Science Advisory Committee including reports to the legislature.

Repeals Sec. 11.0237(c) to continue prohibition on issuing new permits for environmental flows.

Repeals Sec. 11.1491(b) to eliminate TCEQ, TPWD, and TWDB appointment of advisory councils for bays and estuaries.

SECTION 1.31, p 36
Abolishes Study Commission on Water for Environmental Flows established in SB 1639, 78th Legislature.

SECTION 1.32, pp 36 - 37
Provides for appointment of Environmental Flows Commission members by the Governor, Lt. Governor, and Speaker of the House with terms expiring on February 1, 2008.

Provides for appointment of the Texas Environmental Flows Science Advisory Committee, basin and bay areas stakeholder committees and expert science teams and appropriate watermaster advisory committees.

ATTACHMENT C

SECTION 1.33, p 37
Requires all permits for new appropriations and amendments to existing water rights that increase the amount of water appropriated are pending with the TCEQ on the effective date of the act are subject to the provisions in the act.

Appendix P

TEXAS WATER RIGHTS AND WASTEWATER REUSE

PREPARED BY THE REUSE COMMITTEE OF THE TEXAS WATER CONSERVATION ASSOCIATION

Introduction

Generally, about sixty percent (60%) of all water diverted from Texas' rivers and streams or groundwater pumped for municipal purposes enters the state's watercourses as discharges of treated effluent from wastewater treatments plants. Once considered a threat to surface water supplies, due in part to actual or perceived water quality concerns, the value of this treated effluent is now clearly recognized. This is evidenced by a much heightened interest in reuse projects to meet current and future increased municipal demands. Further, the concept of reuse is included in nearly every SB1 regional plan. Treated wastewater effluent discharged into Texas' rivers also helps meet downstream water needs, including those of the environment and agriculture. These competing interests in return flows have crystallized the need to resolve many legal issues involving reuse.

The purpose of this white paper is to: (1) provide some basic legal background and context concerning reuse of wastewater under current Texas law; (2) identify disputed issues with existing law in Texas that may warrant legislative clarification; (3) summarize the various arguments offered on both sides of these issues, without offering an opinion as to the merits of these arguments; (4) and discuss potential consequences of various policy alternatives. The issues discussed in this paper include:

(1) Under current law, is the use of wastewater effluent after discharge to a stream a use of "state water" subject to the laws of prior appropriation or is it subject to a different regulatory scheme?

(2) Does current law allow effluent derived from different sources of water to be treated differently for purposes of evaluating a request to reuse this effluent?

(3) Does current law provide for different treatment of effluent derived from "future" and "existing" return flows, regardless of the source?

(4) Who can obtain indirect reuse rights?

(5) To what extent should protection be afforded to the environment in reuse permitting decisions?

While this paper attempts to identify discrete issues for discussion, it must be stressed that few of the issues identified above can be handled discretely. Indeed, many of these issues are so intertwined that resolution of one issue can and will impact how other issues will need to be considered and resolved. Moreover, while the disputes over indirect reuse are often characterized as a fight between municipalities or dischargers versus senior water rights holders and the environment, the reality is <u>much</u> more complex. Ownership, geographic distribution, sources of water supply, historical reliance on return flows in water rights permitting, and priority of water rights within each river basin vary greatly statewide. Thus, any decisions on the issues set forth in this paper are certain to result in different impacts, "winners," and "losers," depending on the specific facts of each basin and the interests involved. The question is often not whether reuse will occur, but by whom. The ability to engage in indirect or direct reuse translates directly to an ability by some water providers to delay development of additional water supplies while at the same time forcing others to look for alternative water supplies sooner rather than later when the availability of return flows for their use is diminished.

Background – The difference between direct and indirect reuse

Direct reuse

Direct reuse is the use of wastewater effluent that involves delivery of effluent via pipelines, storage tanks and other necessary infrastructure directly from the wastewater treatment plant to others before discharging the effluent into a watercourse.[1]

In Texas today, it is undisputed that a surface water right holder may directly reuse and fully consume effluent, subject only to the limitations contained in the underlying water right from which the effluent was derived.[2] Where contracts or other laws have clearly transferred ownership of that effluent to another, such as the wastewater treatment provider, the direct reuse rights may lie with the owner of the effluent. This approach is generally consistent with a water right holder's right to fully consume the water granted under its water right, subject only to the limitations expressed within the "four corners" of the water right. This approach is also generally consistent with how wastewater treatment providers operate today. Owners of wastewater treatment plants generally have a wastewater discharge (TPDES) permit from the state that allows them to discharge treated effluent to a watercourse. TPDES permits are not viewed as imposing a "duty" or obligation on the wastewater treatment plant owners/operator to continue to discharge effluent at a particular location or in a particular quantity. Rather, these permits restrict the circumstances under which *any* discharge *may* occur, if at all.

Obtaining authorization for direct reuse under today's regulatory scheme is fairly streamlined. Typically, only certain water quality authorizations must be obtained from TCEQ to do this kind of reuse.[3] A water right holder may directly reuse the unconsumed water in a relatively unfettered manner so long as the reuse is accomplished for the purposes and in the location of use provided in the underlying water right from which the effluent is derived. Although the direct reuse of effluent reduces the amount of flow in the watercourse that is available downstream for use by other water rights holders and the environment, additional water rights authorizations are typically not required and thus, these impacts to other water rights and the environment are not addressed.

Some owners of wastewater treatment plants have relied on existing law and invested considerable funds in implementing and planning for expanded direct reuse projects. In some cases, wastewater treatment operators are required or have chosen to operate under a "no discharge" permit, which requires them to directly reuse all of the effluent. In most instances, however, direct reuse projects are relatively small in scale. Moreover, there remain practical, technical, political, and fiscal limitations on the ability to implement large direct reuse projects.

[1] *See* 30 TEX. ADMIN CODE § 297.1(44).
[2] TEX. WATER CODE § 11.046(c).
[3] *See* TEX. ADMIN. CODE ch. 210.

Human consumption of treated wastewater effluent has yet to gain widespread social acceptance in Texas. The use of treated wastewater for landscape irrigation in areas of heavier human use (e.g. parks and school grounds) has been met with resistance in some areas even though the effluent must be treated to a high standard. Thus, in some cases, high quality potable water is still used for some purposes even though treated effluent could be used under today's rules. This limited implementation of direct reuse projects means that the availability of return flows to meet downstream needs has not yet been significantly impacted. However, it is believed that. as treatment technology advances and treatment costs decrease, and as water becomes more scarce and the cost of developing and delivering new supplies increases, direct reuse of treated effluent (even for human consumption) will become more attractive and feasible over time.

Indirect Reuse

Treated wastewater that is not directly reused and is instead discharged to a watercourse is "return flow."[4] The subsequent downstream diversion and use of wastewater return flows is commonly referred to as "indirect reuse." Indirect reuse substitutes transportation via a state watercourse for the pipeline, and accompanying capital cost, associated with traditional direct reuse projects. The ability to use the stream as the "pipeline" may also provide the added benefit of reducing costs of treating the diverted water, as the mixing and transportation process in the watercourse actually provides additional natural treatment. Like direct reuse, indirect reuse ultimately reduces the amount of flow in the watercourse that is available for use by other water rights holders and the environment. This effect, of course, is most evident downstream of the point where the indirect reuse occurs. Upstream of the indirect reuse point, the return flows continue to provide some instream flow benefit. In contrast to the clear authority to engage in direct reuse without water rights permitting implications, the ability to engage in indirect reuse is less clear. There are currently pending before TCEQ a large number of water rights applications seeking indirect reuse authorization, nearly all of which have been protested. In some cases, these permits applications derive from projects contained in regional water plans. Many of the issues posed in those protests are more fully discussed in the following Issues section of this paper.

ISSUES DISCUSSION

(1) Under current law, is the use of wastewater effluent after discharge to a stream "state water" subject to the laws of prior appropriation or is it subject to a different regulatory scheme?

With regard to surface waters, Texas generally follows the prior appropriation doctrine to authorize use of this state water. Under this principal, available water is permitted for use on a "first in time, first in right" basis. Except in very limited circumstances, a permit is required to use state water. One aim of this permitting process is to ensure that available water supplies are

4 30 TEX. ADMIN. CODE § 297.1(43).

not overcommitted. Indeed, an application for a new appropriation may only be granted upon a finding that: (a) the application meets the statutory requirements, (b) water is available, and (c) the proposed appropriation is for a beneficial purpose, does not impair existing water rights, is not detrimental to the public welfare, is consistent with the state and regional water plans, addresses water conservation concerns, and includes proper consideration of environmental needs.[5]

One of the most basic disputes in the fight over indirect reuse is whether wastewater return flows are subject to this or some other regulatory scheme. As discussed below, the source of this dispute is rooted in language contained in two statutes, both of which were modified in 1997 by Senate Bill 1: Water Code § 11.046 and Water Code § 11.042.

Bed and Banks Authorization of Reuse

Those who advocate that wastewater return flows are not subject to the permitting requirements that apply to new appropriations focus on Texas Water Code § 11.042[6] – the "Bed and Banks" statute. These applicants argue that section 11.042 changed preexisting law to provide an independent basis for granting indirect reuse authorizations outside the established prior appropriations permitting scheme.

Section 11.042 contemplates the issuance of permits for the delivery of certain waters down the bed and banks of a watercourse under three separate circumstances. Subsection (a) provides the statutory guidelines for delivery of stored waters from reservoirs using the bed and banks of a watercourse and is not at issue here. Subsection (b) provides a statutory basis for delivery of effluent derived from groundwater, and is discussed more fully under Issue (2) in this paper. Many argue that subsection (c) provides the basis for indirect reuse authorizations of surface-water derived effluent. It states:

> Except as otherwise provided in Subsection (a) of this section, a person who wishes to convey and subsequently divert water in a watercourse or stream must obtain the prior approval of the commission through a bed and banks authorization. The authorization shall allow to be diverted only the amount of water put into a watercourse or stream, less carriage losses and subject to any special conditions that may address the impact of the discharge, conveyance, and diversion on existing permits, certified filings, or certificates of adjudication, instream uses, and freshwater inflows to bays and estuaries. Water discharged into a watercourse or stream under this chapter shall not cause a degradation of water quality to the extent that the stream segment's classification would be lowered. . ..

Many applicants for indirect reuse authorization argue that "water" in section 11.042(c) includes all types of water (including surface-water derived effluent) except those specifically addressed in other sections of section 11.042 and that section 11.042(c) removes indirect reuse from the process for permitting new appropriations. They further argue that no priority date should attach to indirect reuse, or that, if a priority date must be assigned, it should be the same priority date

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[5] *See* TEX. WATER CODE ANN. § 11.134(b).

[6] *See also* 30 TEX. ADMIN. CODE § 297.16.

that is associated with the underlying water right from which the return flows derive. Applicants also argue that the protections embedded in section 11.042(c) are sufficient to protect the environment and all existing water rights holders. Others argue that section 11.042(c) actually represents a limitation on one's private property right to reuse effluent that did not previously exist.

Further, because a water right holder is entitled to consumptively use or directly reuse 100% of the water granted under an appropriative right (unless otherwise expressly limited in the permit[7]), and because all requests for new appropriations in recent years have been evaluated assuming that the waters under these existing rights will be fully consumed (i.e. there will be no return flows), many argue that a bed and banks permit is the proper mechanism for granting legal rights to indirect reuse of effluent.

<u>Indirect Reuse Permits As New Appropriations</u>

Those arguing that any legal claim to wastewater return flows must be sought through the ordinary water rights permitting process largely rely on preexisting law and Water Code § 11.046. This statute, which also provides the clear authority for direct reuse, provides in pertinent part that:

> Once water has been diverted under a [water right] and then returned to a watercourse or stream ... it is considered surplus water[8] and therefore subject to reservation for instream uses or beneficial inflows or to appropriation by others unless expressly provided otherwise in the permit, certified filing, or certificate of adjudication.

Supporters of this position argue that this language codifies the common law, which held that an appropriator had no claim to water that had escaped his land, particularly once it drained into a natural watercourse.[9] They argue that wastewater return flows are "considered surplus water" under section 11.046(c) and thus should be treated as available for use by other downstream water rights holders or subject to permitting only as a new appropriation.

Since section 11.042(c) uses the term "water" and not "effluent" or "return flows," some offer that this section applies to other sources of water proposed to be transferred through state watercourses, such as groundwater or imported surface water (often referred to as "developed water"). This interpretation, they contend, gives meaning to the term "water" used in section 11.042(c) without the apparent conflict between this section and the provisions of section

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[7] *See* TEX. WATER CODE ANN. § 11.046.

[8] *See* TEX. WATER CODE § 11.002(10); 30 TEX. ADMIN. CODE § 297.1(53).

[9] In *City of San Marcos v. Texas Comm'n on Envt'l Quality*, 128 S.W.3d 264 (Tex. App. – Austin 2004, pet. denied), the court ruled that, prior to Senate Bill 1 amendments to the Water Code, no common law right existing by which a city might claim ownership of its wastewater effluent following its discharge into a state watercourse. Instead, a new appropriation was required. *See also* WELLS A. HUTCHINS, THE TEXAS LAW OF WATER RIGHTS 155 (1961). *See also* Ronald A. Kaiser, *Texas Water Marketing in the Next Millennium: A Conceptual and Legal Analysis*, 27 TEX. TECH L. REV. 181 (1996); *South Texas Water Co. v. Bieri*, 247 S.W.2d 268, 272-73 (Tex. Civ. App. – Galveston 1952, writ ref'd n.r.e.).

11.046(c), and without requiring a dual permitting requirement to secure a new appropriation under section 11.046(c) and a bed and banks authorization under section 11.042(c).

Consequences of Different Approaches to Permitting Indirect Reuse

The implications of how indirect reuse of surface water-derived effluent is permitted, if at all, could have enormous implications with regard to who might ultimately obtain such rights, the value of those rights for providing a quantifiable, reliable water supply that can be appropriately protected from use by others, and how potential impacts on other water users and the environment might be addressed. As mentioned earlier, this choice is not always between cities and river authorities or upstream and downstream interests. If anything, the choice may best be characterized as one between: (1) entities seeking to increase their legally available water supply beyond that which they currently hold by contract or water right in a manner that, in many cases, may be more cost-effective or politically acceptable (or both) than a new water supply contract, reservoir project, or costly pipeline, and (2) existing water rights holders or environmental interests who have relied upon or wish to preserve future availability of return flows to meet their own needs, environmental flow needs, or the needs of downstream senior rights who would otherwise make calls upstream to junior rights for the passage of inflows.

Some of the more specific consequences of a "bed and banks" approach to indirect reuse of surface water-based effluent under section 11.042 include:

(1) Protections afforded existing water rights and environmental needs may be less than that statutorily required for a new appropriation. For example, assignment of no priority date or a priority date of the underlying water right renders off-limits those return flows from claims by existing water rights that may have relied on the availability of those return flows to improve reliability of their rights.

(2) Use of section 11.042 as an indirect reuse authorization mechanism would require development of a detailed accounting system to track discharges and diversions of return flows that fall outside the priority system of allocating waters in a watercourse;

(3) Removing return flows from the available "pool" of water available to satisfy determined environmental needs, if any, could result in an inability to meet any such needs, cause the burden to be borne by other water rights holders, or increase the cost of meeting any such needs.

(4) Indirect reuse could significantly extend the water supply available to the entity receiving the authorization.

(5) The State retains some right to evaluate and address the impact of indirect reuse on the environment and other water rights. (The extent of this right is the subject of other issues discussed in this paper.)

By comparison, the types of specific consequences that some suggest result if indirect reuse is treated as a new appropriation under section 11.046 include:

(1) In many basins, the water in the watercourses, even after including return flows, can be fully allocated to existing water rights (at least up to the reliability standard required to permit such use). In these and other cases, determined environmental water needs of the stream or bay systems may exceed the amount of water remaining for appropriation. New permits for indirect reuse could probably not be issued in these basins.

(2) Even if water is found to be available, the water right will receive a junior priority date. Under the "first in time, first in right" approach, this means that these water rights are more likely to be reduced or cut off in times of severe drought.

(3) Increased development of direct reuse projects is likely to occur if other water supply strategies cannot be identified.

(2) Does current law allow effluent derived from different sources of water to be treated differently for purposes of evaluating a request to reuse this effluent?

Groundwater-based effluent

Section 11.042(b), also enacted in 1997, provides a separate mechanism for addressing the indirect reuse of effluent derived from groundwater. Specifically, section 11.042(b) reads:

> A person who wishes to discharge and then subsequently divert and reuse the person's existing return flows derived from privately owned groundwater must obtain prior authorization from the commission for the diversion and the reuse of these return flows. The authorization may allow for the diversion and reuse by the discharger of existing return flows, less carriage losses, and shall be subject to special conditions if necessary to protect an existing water right that was granted based on the use or availability of these return flows. Special conditions may also be provided to help maintain instream uses and freshwater inflows to bays and estuaries. A person wishing to divert and reuse future increases of return flows derived from privately owned groundwater must obtain authorization to reuse increases in return flows before the increase.[10]

Effluent derived from Imported or Stored Waters

While section 11.042(b) singles out groundwater-derived effluent for specific regulatory treatment, section 11.042(c) does not identify the source(s) of the "water" to which it refers, thereby leaving open for argument the issue of whether or how effluent derived from other water supplies is to be treated, if at all, under section 11.042(c).

[10] This language essentially tracks the decision by Texas Natural Resource Conservation Commission (TNRCC) (predecessor to the TCEQ) in the *City of San Marcos* case, in which the City of San Marcos sought a bed and banks authorization to convey groundwater-derived effluent for subsequent diversion and use downstream under the statutes that existed prior to the adoption of SB 1 and section 11.042(c).

Because imported waters from another basin, and the effluent derived from them, are sources of supply that would not have ordinarily been available to meet downstream environmental needs or those of downstream water rights holders in the receiving basin, some argue different and perhaps less onerous treatment is appropriate, especially in light of already existing barriers to interbasin transfers.

A few have also argued that effluent derived from waters that are first stored in an in-basin reservoir are waters that would not have been available to the environment or downstream water rights but for the initial efforts of the entity that constructed the reservoir to capture and store the source water. Others suggest that there is no difference between reuse of effluent derived from in-basin surface water previously stored in a reservoir and effluent derived from in-basin surface water diverted under a run-of-river permit.

As discussed above under issue (1), many generally recognize there may be a valid basis for distinguishing between supplies that are derived in-basin versus out-of-basin supplies or groundwater. This may be particularly appropriate for new or increased levels of return flows from these water supplies, where no existing water right holder or the environment has come to rely upon those return flows. Indeed, because imported waters are required to go through a rigorous interbasin transfer permitting process that in part addresses impacts to environmental flows and senior rights in the basin of origin, it is arguably already burdened by significant restrictions. Many argue that imposing additional requirements to meet environmental needs in the receiving basin on top of these other requirements represent a punitive requirement on interbasin transfers that have been identified as necessary to meet growing water supply needs.

(3) Does current law provide for different treatment of effluent derived from "future" and "existing" or "historical" return flows, regardless of the source?

While the terms "existing return flows" and "future increases in return flows" are terms that are only contained within the statute that deals with groundwater-based return flows (section 11.042(b)), both the nature of the distinction to be made with regard to groundwater-based return flows and whether any such a distinction can or should be made by regulators when other sources of supply are involved continues to foster considerable debate. Confusion seems to arise around the use of the terms "existing" and "future" return flows, which contributes to the debate. The term "historical" is used by many as synonymous with "existing" return flows. Some use the term "historical" or "existing" return flows to mean only those return flows that have been actually discharged, whereas others use the term to include return flows that derive from existing water rights whether or not they have ever actually been discharged. Similarly, to some, the term "future" return flows means return flows that have never actually been discharged regardless of whether the return flows derive from an existing permitted in-basin or imported surface water supply or groundwater. Lastly, others use this term to refer only to return flows that derive from water supply sources that have yet to be permitted or, in the case of groundwater, developed.

Regardless of the terminology, the issue comes down to whether increases in actual discharges of return flows above current or historical levels is "new" water to the system that could or should be treated as outside the prior appropriation system. The argument in support of this approach is that no water right holder or the environment has ever relied on the actual presence of return flows to satisfy their day-to-day needs. Others dispute this contention, arguing that such assumptions have underlain significant investments in the purchase of water rights, execution of contracts, and construction of infrastructure. Moreover, some argue that past water rights permitting decisions have included express or implicit assumptions about future increases of return flows derived from existing water rights and that this type of reliance on predicted return flow levels should be respected. It is important to recognize that definitive proof of these kinds of assumptions is often elusive. While those assumptions, if any, have only occasionally been stated expressly in agency orders, permits, or other contemporaneous documents, in many (if not most) other instances, any such assumptions may have been included in the evaluation of the water right or contract requirements in accordance with the common practices of the experts at that time and may not be fully documented, if at all. In some cases, certain existing water rights holders have undoubtedly enjoyed an increase in the reliability of their water rights due to the presence of return flows, but clear reliance on the presence of these return flows in the permitting process is often difficult to document. If past permitting reliance is to be honored, defining the appropriate level of proof and the assignment of the burden of proof on this issue is something the Legislature may want to address. These concerns seem to be present not only where in-basin return flows are at issue, but also in situations where the discharge of effluent derived from either groundwater or imported surface water has already occurred for some time and is projected to increase over time.

(4) Who can obtain indirect reuse rights?

Disputes also arise over whether existing law allows TCEQ to give preference to particular types of applicants for indirect reuse authorizations. Some have suggested that holding the underlying water right should provide some preference under current law, whereas others have argued that ownership of the wastewater treatment plant confers a preference under current law. Others have argued that current law does not necessarily establish any preference but that good policy would support giving preference to the water right holder or the discharger, but not third parties with no identifiable ownership interest in the wastewater or underlying water right. As set forth below, the approach *may* depend on the statute under which indirect reuse applications are considered. As such, clarification of the Legislature's intent on this issue may be necessary.

If surface–water derived return flows are treated as "surplus water" under section 11.046(c), available for appropriation by "others," then it appears fairly clear that *anyone* may file such an application, regardless whether the applicant has any ownership interest in the facilities that are discharging the effluent or whether the applicant has an ownership interest in the underlying water right or contract for the water supply from which the effluent was derived. In that instance, TCEQ would presumably evaluate competing applications for the same water based on the type of use and merit of each application.

Subsection 11.042(c), which some argue provides the sole basis for allowing the indirect reuse of surface-water derived return flows, refers to granting a "person" the right to "convey and subsequently divert water," without regard to whether the "person" also needs to be the discharger of the water, the owner of the underlying surface water right from which the return flows are derived, or a person with a contract to either purchase the return flows from the discharger or the underlying surface water from which the effluent is derived. Indeed, some have suggested that *any* person or entity can seek a right under section 11.042(c) even if no contractual or ownership interest with respect to the return flows or underlying water supply exists.

Section 11.042(b), which addresses indirect reuse of groundwater-based effluent, allows that "a person who wishes to discharge and then subsequently reuse the person's existing return flows..." to obtain a permit. This suggests that only the discharger of the return flows may obtain such authorization. By contrast, with regard to future increases in return flows derived from groundwater-based effluent, the same subsection (11.042(b)) provides only that "a person who wishes to divert and reuse" these return flows needs a permit, perhaps suggesting that the same person seeking the permit need not also be the discharger, since the same phrase "discharge and...reuse" is not used. As with section 11.042(c), some point to this different terminology for future increases in return flows to contend that any person can obtain indirect reuse rights to future groundwater-derived return flows even if no contractual or ownership interest with respect to the return flows or underlying groundwater exists.

(5) To what extent should protections be afforded to the environment in reuse permitting decisions?

The benefits that return flows may offer in supplying water to help meet environmental needs in many river basins is undisputed. The ongoing debate of how best to provide water to meet environmental needs of our rivers and bay systems has been further highlighted as the potential and need for the full use, and reuse, of water rights increases over time. Regardless of the permitting approach used - whether through a new appropriation or a bed and banks authorization, or both - the effect of reuse on the environment is a significant issue. Indeed, these approaches generally allow TCEQ to consider environmental flow needs in their assessment of the proposed reuse and include appropriately protective conditions. The question then is the level of protection that is appropriate where reuse is concerned. One factor to consider in incorporating appropriate limitations in any reuse authorization may be the extent to which return flows are or may be relied upon to meet identified environmental flow needs when considered along with the responsibility of other water rights holders in the basin to provide for environmental flows. Actual discharges of effluent and past assumptions with respect to expected increases in return flows over time, if any, may be relevant. Additionally, the extent to which artificially created environments made possible by historical return flows should be protected, should be considered. Prior to the growth of cities and their resulting wastewater discharges, many streams in Texas, including some that were not considered perennial streams, had historical low flows well below current low flows. Fully protecting these artificial baseflows by limiting the amount of return flows that can be reused may not be prudent in light of the state's needs for additional water supplies. On the other hand, if an environment has been created, even through artificial means, the counterargument that many perennial streams in the state have been dammed up and diverted in a manner that did not take into account water for environmental flows suggests that some trade-off is appropriate. Future return flows that have not been relied upon to meet environmental needs may warrant different treatment.

Appendix
Q

APPENDIX Q - Environmental Flows Executive Order And Committee Membership

Executive Order RP50 - October 28th, 2005

Relating to the creation of an environmental flows advisory committee to address requirements for instream flows for Texas rivers and streams and requirements for freshwater inflows into Texas bay and estuary systems.

BY THE
GOVERNOR OF THE STATE OF TEXAS
Executive Department
Austin, Texas
October 28, 2005

WHEREAS, Texas is blessed with abundant water resources including more than 191,000 river miles flowing through 23 major river basins, 9 major and 21 minor aquifers, 7 major estuaries, several minor estuaries, and 3,300 miles of bay and estuary lagoon shoreline; and

WHEREAS, water resources fuel economic development of the state and there is a need to provide certainty in water management and development, including its permitting, to ensure adequate water supplies are available for essential beneficial uses; and

WHEREAS, management strategies addressing environmental flow needs should be based on sound science and emphasize stakeholder involvement, public input, and consideration of local issues; further, such strategies should encourage a variety of market approaches and other voluntary measures, including voluntary land stewardship; and

WHEREAS, Section 11.0235, Texas Water Code recognizes the importance of maintaining the biological soundness of the state's rivers, lakes, bays, and estuaries to the public's economic health and general well-being, and expressly requires the Texas Commission on Environmental Quality ("Commission"), while balancing all other interests, to consider and provide for the freshwater inflows necessary to maintain the viability of the state's bay and estuary systems in the commission's regular granting of permits for the use of state waters; and

WHEREAS, the National Research Council of the National Academy of Sciences conducted a review of the State's Instream Flow Program and made important recommendations in its March 2005 report regarding the proposed State methodology and related considerations; and

WHEREAS, the Study Commission on Water for Environmental Flows ("Study Commission") established under Sec. 11.0236, Texas Water Code, which expired on September 1, 2005, laid important groundwork for establishing a method to integrate the vital issues of economic development and the protection of instream flows and freshwater inflows to bays and estuaries with specific recommendations in a December 2004 report;

NOW, THEREFORE, I, Rick Perry, Governor of Texas, by virtue of the power and authority vested in me by the Constitution and laws of the State of Texas, do hereby order the following:

Creation of Advisory Committee. The Environmental Flows Advisory Committee ("Committee") is hereby created to examine relevant issues and make recommendations for commission action and legislation on methods for making future decisions to protect instream flows and freshwater inflows, while integrating such needs with human needs, including methods to address allocation of flows during drought conditions, using the December 2004 report of the Study Commission as a starting point.

Composition. The Committee shall consist of nine members appointed by the Governor. Three members shall be the respective presiding officers of the Texas Commission on Environmental Quality, Texas Water Development Board, and Texas Parks and Wildlife Commission with the other six members to be chosen from among river authorities; municipalities; environmental, agricultural, industrial, and hunting and fishing interests or others with expertise in environmental flows issues; and the public.

The Governor may designate a member of the Committee to serve as chair of the Committee.

Advisory Councils and Agency Support. As the Committee deems necessary to carry out its duties, the Committee may appoint:

- three or four local or regional stakeholder advisory councils prioritized by basin/bay system; and
- a science advisory council of five members to provide technical expertise.

The commission, Texas Water Development Board, and the Texas Parks and Wildlife Department shall provide staff support for the Committee.

Recommendations and Report. The Committee shall develop recommendations to establish a process that will achieve a consensus-based, regional approach to integrate environmental flow protection with flows for human needs.

The Committee shall submit a full report, including findings and legislative recommendations, to the Governor, Lieutenant Governor, and Speaker of the House of Representatives no later then December 31, 2006. Subsequent work of the Committee may be addressed in supplementary reports as appropriate.

This executive order supersedes all previous orders on this matter that are in conflict or inconsistent with its terms. Unless extended, this order shall expire on September 1, 2007.

Given under my hand this the 28th day of October, 2005.

RICK PERRY
Governor

ATTESTED BY:

ROGER WILLIAMS
Secretary of State

GOVERNOR'S ENVIRONMENTAL FLOWS ADVISORY COMMITTEE

COMMITTEE MEMBERSHIP

E.G. Rod Pittman of Lufkin will serve as an ex-officio member and has been designated chair of the committee. Pittman is chairman of the Texas Water Development Board. He is a member of the Loan Star Servicing Corporation and the Loan Star Funding Group. Pittman is also a trustee of the Pineywoods Foundation and the Kurth Memorial Library. He serves on the district finance committee and the pastor parish relations committee at First United Methodist Church of Lufkin. Pittman received a bachelor's degree from Texas A&M University.

Joseph B.C. Fitzsimons of Carrizo Springs, who will serve as an ex-officio member, is chairman of the Texas Parks and Wildlife Commission. He is a rancher and a private practice attorney of natural resource law. Fitzsimons is a member of the Texas Bar Association, fellow of the Texas Bar Foundation, director and vice president of the Texas Wildlife Association, and founding director of the Natural Resources Foundation of Texas. He is a member of Carrizo Springs United Methodist Church, and volunteers for the Dimmit County 4-H, the Dimmit County Youth Rodeo Association, and Boy Scout Troop #809. Fitzsimons received a bachelor's degree from Lewis and Clark College and a law degree from the University of Texas at Austin.

Kathleen Hartnett White of Valentine, who will serve as an ex-officio member, is the chairman of the Texas Commission on Environmental Quality. She is a member of the Texas and Southwestern Cattle Raisers Association, the American Hereford Association, the National Cattlemen's Beef Association and the Jack Russell Terrier Club of America. White serves as a board member of the Texas Water Foundation, the Texas Natural Resource Foundation and the Jack Russell Terrier Club of America Research Foundation. She received her bachelor's degree and master's degrees from Stanford University, and a law degree from Texas Tech University.

Lori J. Ryerkerk of Beaumont is the refinery manager for the ExxonMobil Beaumont Refinery. She is chairman of the refinery managers committee of the Texas Oil and Gas Association, serves on the board of directors of the Beaumont Chamber of Commerce and is a board of advisors trustee for CHRISTUS St. Elizabeth Hospital. Ryerkerk serves on the board of directors for the Texas Energy Museum, the United Way and the Symphony of Southeast Texas. She also serves on the board of directors for the Foundation of Southeast Texas and Goodwill Industries and on the advisory board for the Lamar University School of Engineering. She received a bachelor's degree from Iowa State University.

Jeff Taylor of Houston is a deputy director within the Public Works and Engineering Department for the City of Houston. Taylor is a member of the American Water Works Association and the National Drinking Water Advisory Council. He is also a member of the National Association of Clean Water Agencies and the Association of Metropolitan Sewerage Agencies. Taylor received a bachelor's degree from Rice University.

Jerry Lynn Clark of Buna is the executive vice president and general manager of the Sabine River Authority of Texas. He serves on the board of directors of the Texas Water Conservation Association and is a member of the National Water Resources Association. Clark received a bachelor's degree from Lamar University.

Richard Chalkley Bartlett of Carrolton is vice chairman of the board of Mary Kay, Inc. Bartlett is the recipient of the 2005 Texas Legends Award of the National Fish and Wildlife Foundation. He is a member of the NatureServe board, an honorary trustee of The Nature Conservancy of Texas and a member of the Nature Conservancy's national President's Conservation Council. Bartlett is a member of the boards of the Aldo Leopold Foundation, Center for Big Bend Studies and the Chihuahuan Desert Research Institute. Bartlett also serves as chairman of the National Environmental Education and Training Foundation board of directors and is past chairman of the Texas Parks and Wildlife Commission Outreach and Education Advisory Committee. He serves on the board of directors of the National Council for Science and the Environment as well as the advisory council of the University of Texas at Austin Environmental Science Institute. Bartlett received a bachelor's degree from the University of Florida.

David K. Langford of Comfort serves as the vice president emeritus of the Texas Wildlife Association, where he led the organization as CEO from 1990-2002. Langford is a member of the Texas and Southwestern Cattle Raisers Association, the Texas Farm Bureau and the Society for Range Management. He is also a professional nature photographer and a life member of the Texas Wildlife Assoociation; a professional member of the Boone and Crockett Club; a member of the American Society of Media Photographers; and a board member of the Sand County Foundation. Langford received a bachelor's degree, with honors, from the University of Texas and also attended Texas A&M University.

Ben F. Vaughan IV of San Antonio is an associate professor of economics at Texas Lutheran University. He is a member of the American Economic Association, the Coastal Conservation Association of Texas and the University of Texas Marine Science Institute Advisory Council. Vaughan is also a member of the board at St. Luke's School. Vaughan received his bachelor's and master's degrees from Stanford University and a doctorate in economics from the University of California Berkeley.

Appendix R

CHAPTER 2 : COMMITTEE RECOMMENDATIONS

The Committee members submitted recommendations, including rationale statements which were considered for inclusion in this report. The recommendations in this chapter were approved by the majority of the Committee members; Appendix F includes all recommendations considered by the Committee, including rationale statements as submitted. For better readability, House Committee Substitute of Senate Bill 3, Article 1, 79th Legislative Session is referred to as Senate Bill 3, Article 1 in these recommendations. Where appropriate, reference to specific Senate Bill 3, Article 1 sections is noted in the right-hand column.

Rec #	Recommendation	SB3 Article 1 Section
1	Create incentives to attract Texas Water Trust deposits.	1.03 & 1.21
2	The provisions proposed in Article 1 of Senate Bill 3 relating to the Texas Water Trust should be given a chance to work.	1.03 & 1.21
3	Encourage the legislature to propose legislation that provides market incentives to protecting environmental flows, as opposed to mandates or subsidies.	1.06
4	The market-based approach used for trading water rights in other western states should be investigated further to see how effective these methods might be in Texas.	1.06
5	Upon creation of the individual basin and bay area stakeholders committees, each group should establish a basin and bay expert science team as soon as reasonably practicable. The team should serve as local experts in matters associated with the science of environmental flows for their respective study area.	1.09
6	The basin and bay area stakeholders committee and respective expert science team should work collaboratively on a recommended bay/basin specific environmental flow regime with a goal of submitting a single report to the TCEQ, which includes the basin and bay expert science team report as an attachment.	1.09
7	Require that each basin and bay area stakeholders committee appoint a liaison for each of the regional planning groups that have overlapping boundaries with the respective basin and bay area stakeholders committee.	1.09
8	A basin and bay area stakeholders committee should be part of the initial process with input from a scientific standpoint.	1.09
9	A statewide science oversight committee should be included in the process.	1.09

10	Establish an Environmental Flows Committee composed of eleven members as follows: • Presiding officer of the TWDB • Presiding officer of the TCEQ • Presiding officer of the TPWD • Six members appointed by the Governor • Chair (or their appointed representative) of the Senate Natural Resources Committee • Chair (or their appointed representative) of the House Natural Resources Committee Members appointed by the Governor should be knowledgeable regarding issues associated with environmental flows and represent areas of expertise in business industry, cities, agriculture, environmental, water interests, and local interests. The Environmental Flows Committee should be sunset at a certain date as determined by the legislature with a continuing function left to the discretion of the Texas Legislature. The Environmental Flows Advisory Committee recommends that the legislature determine the voting status of legislative members of the Environmental Flows Committee.	1.09
11	Each basin and bay area stakeholders committee should include up to 17 members, including representative members as identified in proposed TWC Subsection 11.02362(f). Because of the variety of interests in each bay/basin, it is recommended that the Environmental Flows Committee could name additional stakeholders to ensure adequate representation of environmental and industry groups while maintaining a fair and equitable balance of interests on each basin and bay area stakeholders committee.	1.09
12	The Environmental Flows Committee should appoint the Texas Environmental Flows Science Advisory Committee composed of not less than five nor more than nine members, with expertise as outlined in proposed TWC Subsection 11.02361(b).	1.09
13	Maintain the schedule for appointing the basin and bay stakeholders committee as presented in proposed TWC Subsection 11.02362(f), with establishment of stakeholder groups within six months of bill enactment, allowing for extensions of deadlines by the Environmental Flows Committee for cause.	1.09

14	A more realistic timeframe should be set for the performance of studies in Galveston Bay and Sabine Lake. The dates in §1.09 of Senate Bill 3, Article 1 should be modified as follows: (1) In proposed TWC Subsection 11.02362(a), the date for defining the geographical extent of each river basin and bay system should be changed to November 1, 2007. (2) In proposed TWC Subsection 11.02362(c)(1), the date for appointing the basin and bay area stakeholders committee should be established as November 1, 2007. (3) In proposed TWC Subsection 11.022362(c)(2), the date for establishing the basin and bay expert science team should be changed to March 1, 2008. (4) In proposed TWC, Subsection 11.02362(c)(3), the date for the basin and bay expert science team to finalize the environmental flow recommendation and submit it to the basin and bay area stakeholders committee, the Environmental Flows Committee, and the TCEQ should be changed to March 1, 2009. (5) In proposed TWC, Subsection 11.02362(c)(4), the bay/basin area stakeholder committee shall have six months after receipt of the environmental flow regime recommendation to submit its recommendation to the TCEQ. (6) In proposed TWC Subsection 11.02362(c)(5), the TCEQ should be given one year from the time it receives the comments and recommendations from the basin and bay area stakeholders committee to adopt environmental flow standards as provided by Subsection 11.1471. (7) These deadlines can be extended by the Environmental Flows Committee for cause.	1.09
15	In recognition of the importance of adaptive management, as presented in Senate Bill 3, Article 1, the approach used for environmental flow analyses, TWC Section 11.02362(p), development of environmental flow regimes and subsequent adoption of environmental flow standards should include an adaptive management step for periodic reviews and updates for applicable environmental flow strategies.	1.09
16	The Environmental Flows Committee should use the TWDB's established program for identifying watershed boundaries for the state's riverine and estuarine systems as a starting point when designating bay/basin systems for study.	1.09

17	The Environmental Flows Committee, with input from the Texas Environmental Flows Science Advisory Committee, should review the environmental flow analyses and environmental flow regime recommendations submitted by each basin and bay expert science team to the TCEQ. Comments should be submitted not later than six months after the date of receipt of the analyses and recommendations.	1.09
18	The Environmental Flows Committee with assistance from the Texas Environmental Flows Science Advisory Committee should provide a definition of "sound ecological environment" as guidance for the basin and bay stakeholder committees and basin and bay expert science teams.	1.09
19	The TCEQ approval of the dedication of water rights into the water trust should be combined with TCEQ approval of any amendment of the underlying water right to add instream use or to change the use purpose of use to instream use. Notice to water right holders in the basin should be required, allowing 30 days from the date of the notice for those persons to make public comment. A contested case hearing on the amendment is not required.	1.10
20	Provide clear language that existing water rights may add instream use or convert to instream use as a purpose of use and that instream use rights be enforced consistently with other water rights, pursuant to the Texas prior appropriation doctrine. Encourage the voluntary conversion of existing water rights to meet environmental flow needs.	1.10
21	Revise Section 1.12 of Article 1, Senate Bill 3 as follows: The TPWD has: (1) the rights of an owner of a water right that is held in the Texas Water Trust, including the right to file suit in civil court to prevent the unlawful use of such a right to prevent the violation of the terms of the instream use of the water right while held in the Trust.	1.12
22	Clarify language regarding Texas Water Trust deposits as credits against adjustment of a water right to meet environmental flow standards. For the credit to be effective in providing water to meet the particular environmental flow standard, the provision should clarify that the Trust deposit must be in the affected water body or segment of the holder's water right.	1.16
23	Revise Section 1.16 of Article 1 as follows: The adjustment...(3) must be based on appropriate consideration of any volunteer contributions to the Texas Water Trust or water right amendments to quantify an instream use that contribute towards meeting the environmental flow standards. Any water right owner making such a donation or permit amendment shall be entitled to appropriate credit of such benefit against water right pursuant to subdivision.	1.16

24	Provide adequate funding for implementation of environmental flow legislation, the state's freshwater inflow studies program, and state agencies for technical work that supports the Environmental Flows Committee, Texas Environmental Flows Science Advisory Committee and basin and bay area stakeholders committee processes.	1.26
25	Any funding mechanism proposed to evaluate the current science and continue additional science as needed should be fair and equitable.	1.26
26	Support voluntary land stewardship practices as one of the state's primary water policy tenets and craft legislation that codifies land stewardship practices to benefit the water in the state.	Article 2
27	Encourage responsible land management practices that protect water sources by creating and promoting programs that provide incentives for private landowners.	Article 2
28	Simplify procedures for Texas Water Trust deposits by: (1) eliminating the need for an amendment before a water right is placed into the Texas Water Trust; (2) directing the TWDB to set out a simplified application and approval procedures; and (3) eliminate the need for input from the Environmental Flows Committee, the basin and bay stakeholder committees, and the basin and bay expert science team.	n/a
29	Raise awareness of the Texas Water Trust.	n/a
30	Add phased deadlines for instream flow studies under TWC Section 16.059 and extend the deadline for final completion of instream flow studies from December 31, 2010 to December 31, 2016.	n/a
31	TPWD, TCEQ and TWDB should be required to provide a combined progress report on their activities related to the Instream Flow and Freshwater Inflow programs on a biannual basis to the Environmental Flows Committee and the legislature.	n/a
32	The Environmental Flows Committee, with assistance from the Texas Environmental Flows Science Advisory Committee, should provide a definition of instream use for environmental purposes as guidance for the basin and bay stakeholder committees and basin and bay expert science teams.	n/a

In addition to the recommendations above, the Committee decided unanimously to adopt the recommendation of the Science Advisory Committee. These eight recommendations are presented below. The full Science Advisory Committee report is presented in Appendix E.

1. If the EFAC determines that a definition for a "sound ecological environment" should be incorporated into legislation, then it is recommended that the following be considered:

   A sound ecological environment is one that:

   - sustains the full complement of native species in perpetuity,
   - sustains key habitat features required by these species,
   - retains key features of the natural flow regime required by these species to complete their life cycles, and
   - sustains key ecosystem processes and services, such as elemental cycling and the productivity of important plant and animal populations.

2. More extensive review and guidance by stakeholders and the scientific community should be incorporated into the Texas Instream Flow Studies Program.

3. The TCEQ, TWDB and the TPWD should engage as soon as possible the services of qualified professionals to review currently available instream environmental flow assessment tools and to develop one or more desk-top methodologies specifically applicable to Texas river and stream conditions.

4. The significant shortcomings exhibited by the TWDB's State Methodology and the TPWD's "verification" process that are used to develop freshwater inflow recommendations for the state's bays and estuaries must be addressed, and the basic environmental flows process previously set forth in Article 1 of Senate Bill 3 as it was considered by the 79th Texas Legislature in 2005 provides an appropriate means for addressing these shortcomings.

5. The TCEQ, TWDB and the TPWD should engage as soon as possible the services of qualified professionals to review existing bay and estuary inflow assessment tools and available data and to develop one or more alternative or supplemental methodologies that could be employed with results from the State's ongoing bay and estuary work as part of the overall process of establishing appropriate interim levels of freshwater inflow requirements for bays and estuaries.

6. The TCEQ, TWDB and the TPWD should take extensive measures to assure that input from stakeholders and water interests are fully incorporated into the State's environmental

August 1, 2006

Memorandum

To: Dr. Barney Austin

From: David K. Langford, TWA and EFAC

Re: ***Chapter 2. EFAC RECOMMENDATIONS***

Recommendation 8: Craft language that establishes the support of voluntary land stewardship practices as one of the state's primary water policy tenets and craft legislation that codifies land stewardship practices to benefit the water in the state.

Rationale: Voluntary land stewardship affects rainfall where it hits the ground, allowing water managers to focus on supply as well as demand. Making the most of rainfall through a variety of land stewardship practices is one of the most cost-efficient water management options available; currently, the vast majority of land stewardship occurs at no cost to the state. Plus, the effects of voluntary land stewardship complement perfectly any other water management strategies the state might implement because voluntary land stewardship helps ensure that both the quantity and quality of the state's water is improved. Finally, voluntary land stewardship not only affects water quality and quantity, it provides a host of other societal benefits including improving wildlife habitat and conserving open space land.

Langford 'long version'

SB3 Recommendations from EFAC members
- grouped by category and with additional information

Land Stewardship

Recommendation 8: Include language on land stewardship

"....incorporating the voluntary land stewardship language from Article 2 of CSSB 3....Without private-land water and land stewardship, environmental flows in Texas streams and rivers to our bays would be significantly reduced." [Bartlett]

"The Committee should consider inserting language found in Senate Bill 57 of the First Called Special Session of the 79th Legislature that amended Water Code Sections 1.003, 11.0235 and 26.003 and added Section 1.004 to provide a definition of and findings and policy regarding voluntary land stewardship." [Fitzsimons]

"Incorporate the voluntary land stewardship language from Article 2 of CSSB 3: Because voluntary land stewardship plays such an integral role in sustaining environmental flows, it is important that nay future legislation recognize that role. Article 2 of CSSB 3 contained consensus language that was adopted unanimously. If we can incorporate this, or improved, language into our recommendations, our committee will have helped ensure that land stewards can continue to make a difference for water and the citizens of Texas." [Langford]

Additional Information:

Land Stewardship language in CSSB 3, 79th Legislative Session:

Article 2. Water Conservation and Planning.

Section 2.01. Section 1.003, Water Code is amended to read as follows:

SECTION 1.003. PUBLIC POLICY. It is the public policy of the state to provide for the conservation and development of the state's natural resources, including:

(1) the control, storage, preservation, and distribution of the state's storm and floodwaters and the waters of its rivers and streams for irrigation, power, and other useful purposes;

(2) the reclamation and irrigation of the state's arid, semiarid, and other land needing irrigation;

(3) the reclamation and drainage of the state's overflowed land and other land needing drainage;

(4) the conservation and development of its forest, water, and hydroelectric power;

(5) the navigation of the state's inland and coastal waters; [~~and~~]

(6) the maintenance of a proper ecological environment of the bays and estuaries of Texas and the health of related living marine resources; and

(7) the voluntary stewardship of public and private lands to benefit the water in the state, as defined by Section 26.001.

SECTION 2.02. Subchapter A, Chapter 1, Water Code, is amended by adding Section 1.004 to read as follows:

Subchapter A, Chapter 1, Water Code, is amended by adding Section 1.004 to read as follows:

Sec. 1.004. FINDINGS AND POLICY REGARDING LAND STEWARDSHIP. (a) The legislature finds that voluntary land stewardship enhances the efficiency and effectiveness of this state's watersheds by helping to increase surface water and groundwater supplies, resulting in a benefit to the natural resources of this state and to the general public. It is therefore the policy of this state to encourage voluntary land stewardship as a significant water management tool by providing assistance to landowners to conduct those activities.

(b) "Land Stewardship," as used in this code, is the voluntary practice of managing land to conserve or enhance suitable landscapes and the ecosystem values of the land. Land stewardship includes land and habitat management, wildlife conservation, and watershed protection. Land stewardship practices include runoff reduction, prescribed burning, managed grazing, brush management, erosion management, reseeding with native plant species, riparian management and restoration, and spring and creek-bank protection, all of which benefit the water resources of this state.

SECTION 2.04. Subsection (b), Section 11.0235, Water Code is amended to read as follows:

(b) Maintaining the biological soundness of the state's rivers, lakes, bays, and estuaries is of great importance to the public's economic health and general well-being. The legislature encourages voluntary water and land stewardship to benefit the water in the state, as defined by Section 26.001.

<u>SECTION 2.12. Section 26.003, Water Code, is amended to read as follows:</u>

Sec. 26.003. POLICY OF THIS SUBCHAPTER. It is the policy of this state and the purpose of this subchapter to maintain the quality of water in the state consistent with the public health and enjoyment, the propagation and protection of terrestrial and aquatic life, and the operation of existing industries, taking into consideration the economic development of the state; to encourage and promote the development and use of regional and areawide waste collection, treatment, and disposal systems to serve the waste disposal needs of the citizens of the state; <u>to encourage the voluntary stewardship of public and private lands to benefit the water in the state;</u> and to require the use of all reasonable methods to implement this policy.

Land Stewardship language in Senate Bill 57 of the First Called Special of the 79th Legislature is the same as CSSB 3, 79th Legislative Session above.

Land Stewardship Benefits Water

"Saving the water and the soil must start where the first raindrop falls." Lyndon B. Johnson, 1947

Before Lyndon B. Johnson was a politician, he was a child of the land. Growing up in the Texas Hill Country amid grazing goats, sheep, cattle and sparkling, clear springs, he inherently understood the relationship between sky, land and water. Like most Texans, LBJ felt a strong kinship to the land, because, since the days of the Republic, our lives and livelihoods have been shaped by the diverse landscape that characterizes our home.

In recent years though, fewer people have enjoyed the benefits of growing up on the land. Farms and ranches have given way to cities and suburbs, severing the direct, physical ties to the land and nature's cycles. Consequently, a lack of understanding of how natural processes on the land influence water has developed in our state.

Ground and surface water supplies originate with the rain that falls on the land and is captured by complex, large-scale ecological processes involving many variables including plants, animals, soils, and geology. When these processes function optimally, floods are reduced, aquifers are replenished, and water is released more slowly and steadily into springs, streams, rivers, lakes and eventually our bays and estuaries. If the land is healthy, the quality and quantity of water – both surface and groundwater – available to our citizens reflects that condition. When the natural processes are working well across millions of acres of open, rural land, the contribution to the state's water supply can be tremendous, "creating" more water for all Texans.

Moreover, when conscientious land stewards ably manage their resources (as they do every day), they are ranching water just as surely as they are ranching cattle or wildlife. Unfortunately, this contribution is often overlooked or misunderstood. Well-managed land is the greatest water supply-enhancement device on the planet. With adequate and appropriate vegetative cover, land is Mother Nature's sponge. In Texas, open space land covers almost 150 million acres. A sponge of this magnitude cannot be overlooked when the objective is making the most of every drop that falls from the sky.

We must include voluntary land stewardship – on a grand scale – as one of the cornerstone solutions for water issues in Texas because it is complementary, cost-effective, sustainable, efficient, environmentally sensitive, multi-faceted and governable. By harnessing the power of the free market and providing incentives to private landowners, we can help ensure that these land stewards continue to voluntarily do good things for water in Texas. Their efforts are vitally important because the presence of voluntary land stewardship – enhancing the catchment and supply-enhancement power of the land – helps maximize the effectiveness of all other water management strategies.

Finally, and perhaps most importantly, voluntary land stewardship allows policy makers and water managers to consider water at its origins, not just at its destination. The only way Texas' water policy will be truly comprehensive is when supply – where the first raindrop falls on the land – is emphasized in policy with the same degree of enthusiasm as demand.

From: "David K. Langford" <dkl@texas-wildlife.org>
To: "Barney Austin" <Barney.Austin@twdb.state.tx.us>
Date: 8/17/2006 7:38:22 AM
Subject: Fw: another recommendation, short and long versions combined.

Barney, I want to make sure you got this additional one from me. I don't remember if I sent it or not. The first land stewardship recommendation is that we encourage L/S in policy and law. This second recommendation is that we encourage the actual development of L/S programs. If you are grouping these ... my two can go together in the land stewardship section. Many thanks, DKL

Recommendation: Encourage responsible land management practices that protect water sources by creating, promoting, and funding programs that provide financial incentives for private landowners.

Rationale: Voluntary land stewardship plays an integral role in sustaining environmental flows. Without private land stewardship, environmental flows in Texas streams and rivers, especially those necessary to our bays and estuaries, would be significantly reduced. Yet Texas loses millions of acres of watershed lands each year to fragmentation. According to a 2003 Texas A&M study, land fragmentation leads to water quality problems caused by increased erosion and run-off. Better use of financial incentives, such as the USDA's Farm & Ranch Protection Program, the Grasslands Reserve Program, or the Texas Farm & Ranch Lands Conservation Program, would enable land stewards to stay on the land and continue to provide the public benefits of water quantity and quality.

Background Information:

According to a 2003 Texas A&M study, Texas Rural Lands: Trends and Conservation Implications for the 21st Century, (http://landinfo.tamu.edu/projects/aft/rldocl.pdf), and presented at our June 2006 meeting by Dr. Neal Wilkins, approximately 1,000 new farms and ranches have been established in Texas each year since 1970. At the same time, the total area devoted to agricultural uses declined by almost 3 million acres. The result is part of a trend known as land fragmentation: 33,000 more farms and ranches on 3 million fewer acres. The study concluded that,"Rural lands in Texas are undergoing a fundamental change, one that has implications for . the conservation of our natural resources." To address this problem, TAMU researchers recommended a purchase of development rights program, through which landowners sell their development rights but stay on and continue to manage the land as before.

Purchase of development rights programs have been used in other parts of the country to address water quality and quantity issues. For example, the Skaneateles Lake Watershed Agricultural Program (SLWAP) is a cooperative effort between the state extension service, local and state agencies, and farmers within the watershed. The mission of the program, which was established in 1994, is to reduce the risk of nonpoint source pollution from agricultural operations in order to preserve the water quality of Skaneateles Lake. By 2000, the program had resulted in a reduction in soil erosion of 2,700 tons per year. (http://www.epa.gov/safewater/protect/casesty/skaneateles.html)

August 2, 2006

Memorandum

To: Dr. Barney Austin, barney.austin@twdb.state.tx.us

From: Richard C. Bartlett

Cc: All EFAC Members

Subject: ***EFAC Recommendations, Art. 1, SB3***

Recommendation: Maintain the original deadline for the Environmental Flows Commission to appoint the first set of Bay/Basin Stakeholder (November 30, 2007). Add language that would allow no more than a 30-day extension as a contingency.

Rationale:

Although the Process Subcommittee headed by Chairman White recommended a later date, I now believe extending this deadline beyond a brief "contingency" period would be a mistake. Firm dates, mandated by legislation, drive the entire process, which could easily be dragged out to the detriment of achieving the environmental flows objectives. As a former Fortune 500 company president, I can assure you that all progress towards any goal requires discipline with respect to achievements against timelines.

Recommendation: Add phased deadlines for instream flow studies under Section 16.059.

Rationale:

Chairman Pittman's recommendation to extend the instream flow studies completion date from 2010 to 2016 is understandable, given TWDB's lack of funding for such studies. However, it would seem that some priority studies could be completed before 2016, so a better approach might be to propose a phased schedule, rather than delay all priority studies until 2016. This would inspire more confidence from the legislature that any appropriated funding for such studies will be used efficiently.

Recommendation: Reword the language discussing the "collaborative effort between the (Bay/Basin) stakeholder group(s) and the science group(s) with a single submission to TCEQ." This statement is subject to misinterpretation, and may result in TCEQ's not seeing the specific recommendations of the Bay/Basin Science Advisory Committee.

Rationale:

Although there can be a "single submission" to TCEQ, this submission must be comprehensive, and specifically include the Bay/Basin Science Committee's work. TCEQ may well be in a position of striking a balance between the science and stakeholder perspectives, under the guidelines provided for in Article 1. This was an absolutely critical part of the original consensus, which we have all agreed to maintain. Of course, TCEQ will also have available to it the opinion of the statewide Science Advisory committee, as well as its own science staff, both of which may be called upon to assure that the "single submission" does in fact achieve the goal.

Recommendation: Add the Chairmen of both the House and Senate Natural Resource Committees to the proposed Environmental Flows Interim Commission as ex-officio members.

Rationale:

This would give the Commission an "automatic" liaison to both this key Committee, which would thereby facilitate the work of the Commission, its legislative reporting process, funding issues, et al.

Recommendation: Plainly indicate the "adaptive management" module linked to TCEQ on the diagram showing how the environmental flows process will work.

Rationale:

At our last EFAC meeting, it became clear that there is some resistance to the concept of adaptive management within certain regional water planning groups. We must not enter into this extended process without this basic concept being incorporated and acted upon ---*forever*. The environmental flows and all other water needs in Texas will never *not* be under terrific pressure in any conceivable future scenario. The only way to meet all the conflicting water needs of both our population and the ecological health of our 80,000 miles of rivers and streams is by committing to a process that can respond to change.

PRELIMINARY WATER TRUST RECOMMENDATIONS (Subject to review and resubmission by Subcommittee chaired by Joseph Fitzsimons)

Comment: The lease, purchase, and donation of water rights for purposes of enhancing river flows in the Western U.S. have been steadily increasing over the past two decades, as testimony to EFAC has made clear. Although most of the funding has come from federal and state agencies, environmental organizations have become increasingly active in water markets and trusts. In most situations, private organizations work in partnership with state agencies as active participants in the acquisition of senior water rights for conversion to instream flow rights.

The only deposit of a water right so far into the statutory Texas Water Trust is the Bramblett transaction, which required converting 1,236 acre-feet irrigation right to an instream right, and then transfer of that instream right to the Texas Water Trust managed by TPWD.

The EFAC Water Trust Subcommittee should recommend improvements to Art. 1, SB3 that will facilitate the increased use of Water Trusts held by both TPWD and private organizations. Most Texas river systems have most of their flow consumed by irrigation and urban use and from other human activities. One way to accomplish significant restoration of flows in Texas rivers is through federal, state, and private purchases of large volumes of existing water rights and their conversion to instream flow rights.

A key to accomplishing this in the private sector is to assure that a donor receives the appropriate federal tax credit. Simply donating the water right to TPWD (or a qualified private trust) would allow a federal income tax deduction for its value. But simply depositing the water right into the Trust would not earn the deduction because the ownership does not change upon deposit.

All parameters for instream use of a water right should be considered when amending existing permits to add that use. Automatically adding instream use as a type of water use to a permit for other types of water use does not necessarily specify how much water will be used instream, over what distances of stream, or over what season, and leaves questions about how the instream water use will be administered or enforced along with other rights. However, it is extremely important to keep open the options for those water rights owners willing to have their water be used for instream flows (like in the dry year most of Texas is enjoying in 2006) to add instream use as an authorized purpose, without having to donate it to the state or a private trust. This would give us a much larger pool of instream use rights.

The process for permanently changing the ownership of a water right when an instream use is amended into an existing permit so as to qualify for a tax deduction *should be kept as straightforward as possible.* Because simply depositing a water right into the Texas Water trust does not change its ownership, the addition of instream parameters to existing permits outside to Trust should be encouraged and not disfavored.

In instream parameters are to be permanently or temporarily added to an existing permit upon the deposit of a water right into the Trust, the approval of all of those parameters and the deposit into the Trust should be consolidated into *one approval* for "one stop shopping."

The above steps to encourage the voluntary conversion of water rights to instream use in Texas may be taken without any changes in Article 1, but should be ratified or amended by the Water Trust Subcommittee for submission to the full EFAC.

Recommendation: Revise Section 1.16 of Article 1 as follows: *The adjustment…(3) must be based on appropriate consideration of any volunteer contributions to the Texas*

Water Trust or water right amendments to quantify an instream use that contribute towards meeting the environmental flow standards. Any water right owner making such a donation or permit amendment shall be entitled to appropriate credit of such benefit against water right pursuant to subdivision.

Rationale:

This would have the effect of not limiting the flow improvement that can be recognized in any water right reopener or adjustment to flow standards, to flow improvement via the Texas Water Trust.

Recommendation: Revise Section 1.27 of Article 1 as follows: *The terms or other quantifications of instream use approved by the Commission shall be equivalent to a permit amendment while the water right is held in the Texas Water Trust. After the water right is withdrawn in whole or in part from the trust, the terms of the instream use shall expire and the use of the water right or portion of the water right withdrawn must be in accordance with the original terms of the water right*

Rationale:

This would avoid separate TCEQ approval of the deposit of a water right into the Trust from any TCEQ approval of the amendment of its permit needed to specify all parameters of the instream use of the right. This would enable meaningful specification of the instream use, in the same approval for any deposit into the Trust.

Recommendation: Revise Section 1.12 of Article 1 as follows: *The TPWD has: (1) the rights of an owner of a water right that is held in the Texas Water Trust, including the right to file suit in civil court to prevent the unlawful use of such a right to prevent the violation of the terms of the instream use of the water right while held in the Trust.*

Rationale:

This wording makes it clear that TPWD can enforce the terms of any dedication of water rights to the Trust for instream use as if the terms were included in a permit amendment, and as if TPWD owned the water rights. The EFAC members should note that the existing TPWD enforcement language in Art 1, SB 3 was negotiated language in reaching our hard earned consensus. The Water Rights Subcommittee should consult with the TWCA if this revision is deemed essential to TPWD enforcement.

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Lori Ryerkerk
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Refining & Supply

MEMORANDUM

TO: E.G. Rod Pittman, Chairman, Environmental Flows Advisory Committee
Kathleen Hartnett White, Chairman, TCEQ

CC: Dr. Barney Austin, Director, Surface Water Resources Division

FROM: Lori Ryerkerk Lori Ryerkerk

DATE: August 4, 2006

RE: Recommendations for Article I

Per your request at our last Environmental Flows Advisory Committee ("EFAC") meeting on July 19, I have outlined the following recommendations to the Legislature with regard to Article I from Senate Bill 3 (R, 79).

1. *Recommend that the Texas Legislature evaluate the necessity of an Environmental Flows Commission ("EFC").*

Rationale: The purpose of the proposed EFC is to conduct public hearings and study public policy implications for balancing the demands of state water resources. In Article I, the proposed EFC is instructed to specifically address the following: 1) ways that the ecological soundness of the state's river, bay and estuary systems will be ensured in the water rights administration and enforcement and water allocation processes; and 2) appropriate methods to encourage persons voluntarily to convert reasonable amounts of existing water rights to use for environmental flow protection temporarily or permanently.

Texas already has a state agency, the Texas Commission on Environmental Quality ("TCEQ"), established and equipped to carry out the functions intended for the EFC as proposed in Article I. Ultimately, in all the suggested processes for an EFC discussed to date, TCEQ has final rulemaking authority with respect to any proposed environmental flow standards that will be subject to public comment and stakeholder involvement. Furthermore, the science necessary to determine proposed environmental flow standards for the state's river, bay and estuary systems is currently being conducted and, to the extent necessary, can continue to be mandated in any legislation that is eventually proposed. Opting not to create an EFC while ensuring coordination between the three governing state agencies through a Memorandum of Understanding, legislating that continued science be conducted as necessary, and continuing to place sole rulemaking authority with the TCEQ (that is based on the science developed) could simultaneously streamline and fast-track the process of establishing environmental flow standards and will ultimately be a better use of the state's resources.

2. *In the event the Legislature decides that an EFC is necessary, I recommend streamlining and simplifying the process and restructuring the composition of the proposed Basin and Bay Stakeholder Committees.*

Rationale: As proposed, the process in Article I would eventually require the involvement of over 390 Texans to serve on the Basin and Bay Stakeholder Committees alone. This does not include the Texans that will be asked to participate in the EFC, the Texas Environmental Science Advisory Committee, as well as, in the proposed local science committees. Creating a workable and efficient structure to coordinate between these committees seems almost impossible, and any process that is eventually proposed should be as efficient as possible with respect to coordination, funding and time constraints. I also support Kathleen White's recommendation that any EFC created should have a sunset date upon adoption of the rules pertaining to environmental flows.

Furthermore, the composition of the proposed Basin and Bay Stakeholder Committees does not adequately represent the diversity of industry groups that are critical to this process and to the state's economy. I offer the following suggestions for restructuring the committees:

- Establish representation per basin/bay based on permit holders. For example, not all representatives listed in Article I are present in every basin/bay. In order for representation of each basin/bay to be optimal, narrowly tailor the structure of the committees based on which permitted entities are using the basin/bay.

- Create a more equal balance of representation between permit holders and public interest groups. For example, each committee could be represented by 6 permit holders representing industry, municipalities, etc. and 6 non-permit holders intended to represent the public.

- To the extent that industry representation is required, where applicable, there should be one required industry representative from each of the following four categories: 1) refineries; 2) chemical manufacturing; 3) electric generators; and 4) paper products/timber.

- Consider having current members of the Regional Water Planning Groups serve on the committees.

- In the interest of maintaining efficiency of time and resources, cap the size of the committees to a smaller number, as opposed to having a 17-member Basin and Bay Stakeholder Committee for every basin/bay.

3. *Establish the Science Advisory Committee's definition of "sound ecological environment" for the purpose of providing structure to the state's instream flow program and giving context to the individual instream flow studies.*

Rationale: In its Preliminary Report dated June 12, 2006, the Science Advisory Committee ("SAC") noted that the rationale behind establishing and maintaining data collection and conducting studies of the state's bays, estuaries, rivers and streams is for the purpose of determining appropriate levels of flows necessary to a support a "sound ecological environment." However, there is not a statutory definition of this term, and there should be one established in order to maintain consistency between all the different groups, lawmakers and regions involved in this process. This recommendation is consistent with the National Academies of Sciences 2005 Report titled, "The Science of Instream Flows: A Review of the Texas Instream Flow Program." Specifically, the Report stated the following: "A clear definition of 'sound ecological environment' will provide structure to the state's instream flow program and give context to the individual instream flow studies."

First, I recommend the Legislature adopt an environmental flows policy that clearly places human needs ahead of the needs of the environment. Second, I recommend the Legislature adopt the SAC's conservative definition of "sound ecological environment," which states the following: "A sound ecological environment is one that: sustains the full complement of native species in perpetuity; sustains key habitat features required by these species; retains key features of the natural flow regime required by these species to complete their life cycles, and sustains key ecosystem processes and services, such as elemental cycling and the productivity of important plant and animal populations."

4. *Any funding mechanism proposed to evaluate the current science and continue additional science as needed should be fair and equitable.*

Rationale: It is evident in testimony provided by many interested parties, including the Texas Water Development Board, that any additional science that is undertaken will require a significant amount of funding. To the extent a funding mechanism is included in any legislation eventually proposed, any fees assessed to promote the science required by environmental flows legislation should be fair and equitable. For example, the Legislature could impose an equally nominal, yet adequate, tap fee on all residential, commercial and industrial users in order to obtain the funding necessary to complete the scientific studies. As opposed to the fee structure originally proposed in Article III of S.B. 3, the Legislature should propose only a balanced fee structure. The Legislature should not propose a disproportionate tax that would unjustly make industrial, commercial and/or municipal users fund the scientific studies while exempting other sectors, such as residential and agricultural users, from paying the fee.

5. *Encourage the Legislature to propose legislation that provides market incentives to protecting environmental flows, as opposed to mandates or subsidies.*

Rationale: Consistent with the original charge to the EFC, the Legislature should continue to develop market incentives that encourage Texans to voluntarily convert existing water rights to use for environmental flow protection. This could be accomplished through tax incentives or credits given for environmental flow donations through the Texas Water Trust or other such mechanisms, the intent of which would ultimately preserve all existing water rights while promoting an economical, fair and market-based solution to maintaining the state's necessary environmental flows. In all cases, bias should be given to equitable treatment and use of market forces to the highest degree possible.

August 7, 2006

Dr. Barney Austin
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231

Re: Revised Senate Bill 3 Article 1 Recommendations

Dear Dr. Austin:

In response to your July 21, 2006 email and Chairman Rod Pittman's July 27, 2006 letter to Environmental Flow Advisory Committee (Committee) members, submitted below are revised recommendations to refine Article 1 of Senate Bill 3. Cited bill language refers to the House Committee version of Article 1 (CSSB 3). Recommendations 10-17 have been forwarded to the Water Trust Subcommittee members for their consideration as well.

1. <u>Recommendation:</u> Provide funding for the state's freshwater inflow studies program.

Rationale: CSSB 3, Section 1.06 amending Water Code Section 11.0235(d-3) finds that the state must improve the foundation of freshwater inflow work accomplished by the state, however the bill does not provide any supporting funding for additional work. If additional freshwater inflow studies, assessments and updates are necessary, adequate funding must be provided.

2. <u>Recommendation:</u> Provide funding for state agencies for technical work that supports the Flows Commission and Science Advisory Committee and bay and basin area stakeholder processes.

Rationale: CSSB 3, Section 1.26 adding Water Code Section 15.4063 authorizes the use of money in the research and planning fund for compensating the Texas Environmental Flows Science Advisory Committee (SAC), for funding contracts with entities to provide technical assistance to the SAC and basin and bay science teams, to compensate science team members and to fund administrative costs for conducting stakeholder and science team meetings. This provision does not direct funding for the state agencies; however, EFAC members have expressed the expectation that the state will be providing a high level of support for groups participating in developing environmental flow regimes.

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3. <u>Recommendation:</u> Review membership of the Environmental Flows Commission.

Rationale: CSSB 3, Section 1.08 amending Water Code Section 11.0236 sets out the membership of the Environmental Flows Commission. Concerns and questions have been raised regarding the makeup of the membership including whether to have legislator members and whether appropriate interests (such as water development, local government, agriculture, recreation, commercial fishing, public interest, environmental protection and industry) are represented in the membership. Ensuring that the membership can carry out the goals of the Flows Commission charges is critical to the success of the Commission.

4. <u>Recommendation:</u> Review the membership of the basin and bay area stakeholder committees.

Rationale: CSSB 3, Section 1.09 amending Water Code Section 11.02362(f) provides that basin and bay area stakeholder committees must have at least 17 members. In order to keep the committee membership to a reasonable size, the Committee should consider placing an upper cap on the number of members. The proposed membership covers 11 named interests for representations; a membership of 11 may be a more manageable than a group of 17.

5. <u>Recommendation:</u> Define "technical assistance" of the state agencies to the bay and basin area expert science teams and stakeholder committees.

Rationale: CSSB 3, Section 1.09 amending Water Code Section 11.02362(k) requires TCEQ, TPWD and TWDB to provide technical assistance to each bay and basin expert science team. The proposed legislation does not define the "technical assistance" role of the agencies in the process of developing the bay and basin expert science team's environmental flow analysis and recommended environmental flow regimes. In order to provide adequate assistance, agencies need to understand the expected level of staff support and resources that must be committed to this work.

Additionally, it must be recognized that TPWD has a statutory responsibility to protect the state's fish and wildlife resources and to make recommendations for fish and wildlife protection in water rights permitting. (See Texas Parks & Wildlife Code Section 12.024 and Water Code Section 11.147.) The proposed language should not be seen as limiting TPWD's role to only technical suggestions; TPWD will continue to present its opinions on environmental flow protection during the opportunities available in TCEQ rulemaking and water rights permitting.

6. <u>Recommendation:</u> **Shorten the timeframe for the Environmental Flows Commission comments to TCEQ regarding environmental analyses and flow regime recommendations.**

Rationale: CSSB 3, Section 1.09 amending Water Code Section 11.02362(q) provides that the flows commission shall, if appropriate, submit comments on the environmental analyses and flow regime recommendations to the commission no later than six months after the receipt of the analyses and recommendations. Relative to the timeframes upon which the analyses and recommendations must be drafted, six months appear to be a disproportionate amount of time in an otherwise expedited process.

7. <u>Recommendation:</u> **Expand TCEQ authority in adjusting environmental flow permit provisions and issuing permit amendments.**

Rationale: CSSB 3, Section 1.16 adding Water Code Section 11.147(e-1) provides that the TCEQ may not adjust an environmental flow condition of an amendment other than a condition that applies only to the increase in the amount of water to be stored, taken or diverted authorized by the amendment. This provision should be expanded to include permit amendments that increase the diversion rate. This change would be consistent with the current Water Code Section 11.122(b).

8. <u>Recommendation:</u> **Expand TCEQ authority in issuing permit amendments.**

Rationale: CSSB 3, Section 1.17 adding Water Code Section 11.1471(d) provides that the TCEQ may not issue an amendment that increases the amount of water to be stored, taken or diverted if the issue of the amendment would impair an environmental flow set-aside and that any amendments issued that increased the amount of water to be stored, taken or diverted must contain appropriate conditions to ensure protection of the set-aside. This provision should be expanded to include permit amendments that increase the diversion rate. This change would be consistent with the current Water Code Section 11.122(b).

9. <u>Recommendation:</u> **Develop statutory definition of instream use for water rights permitting purposes.**

Rationale: "Instream use" is the term commonly applied to water rights that are authorized to protect environmental flows, however, there is no statutory definition of instream use in Texas Water Code Chapter 11. A definition of the term by TCEQ rule can be found at 30 Texas Administrative Code Section 297.1(23) and may be appropriate for a statutory definition.

10. Recommendation: Raise awareness of the Texas Water Trust.

Rationale: In its nine years of existence, the Trust has been utilized only twice, with both of the deposits being guided by TPWD. The fact that water right holders can seek the assistance of TPWD to facilitate the paperwork required to process the associated water right amendments and deposit their water rights into the trust should be clarified.

Information regarding the Trust may be found in the Texas Water Code and on the TCEQ and TPWD websites, but no outside advertising or public awareness campaign has been created to publicize the Trust. A campaign should be developed to target those water right holders who are attracted the idea of dedicating their water rights to meet environmental needs.

11. Recommendation: Create incentives to attract Texas Water Trust deposits.

Rationale: With the growing demand for water and the rising cost of securing water rights, the Trust has few assets to compete with other market players. For the Trust to function better than it has historically, financial incentives need to be provided to water right holders willing to dedicate their water rights for environmental needs. Possible funding sources for incentives may include donations, state water use fees, supplemental environmental project funds collected during water related enforcement proceedings or a fee on persons who use state water for recreation and who would benefit by increased protection of fish and wildlife. Trust funding may allow qualified trustees, such as Texas Parks and Wildlife Department, to buy or lease water rights for deposit in the Trust.

12. Recommendation: Simplify procedures for Texas Water Trust deposits by: (1) eliminating the need for an amendment before a water right is placed into the Water Trust; (2) directing the TWDB to set out a simplified application and approval procedures; and (3) eliminate the need for input from the Environmental Flows Committee, the bay/basin stakeholders, and the bay/basin expert science team.

Rationale: The current dual process of amending a water right for conversion to instream uses through TCEQ approval and applying to the TWDB for deposit into the Texas Water Trust is ambiguous and unwieldy. Language put forward in CSSB 3, Section 1.27(e) eliminates the need for an amendment to a water right before it can be placed into the Trust; this provision streamlines placement of water rights into the Trust and should be retained in any new bill. A rulemaking directive to TWDB to set out a simplified Trust deposit application and approval procedures may be necessary. In order to maintain accurate records of water rights, upon deposit of a water right in the Trust, the TCEQ would perform the ministerial act of re-issuing the water right permit to reflect the deposit and the authorization to use the water for environmental needs.

CSSB 3, Section 1.27(c) provided that, before a water right could be placed into the Water Trust, consultation with the Environmental Flows Committee, and an opportunity for input by the bay/basin stakeholders and the bay/basin expert science team was required. The present approval of water rights going into the Trust by the TCEQ serves the same purpose, and therefore the process set out in CSSB 3 1.27(c) can be streamlined.

13. <u>Recommendation:</u> Clarify language regarding Texas Water Trust deposits as credits against adjustment of a water right to meet environmental flow standards.

<u>Rationale:</u> CSSB 3, Section 1.16 provides that any water right holder making a contribution to the Texas Water Trust that contributes toward meeting an environmental flow standard is entitled to appropriate credit of such benefits against adjustment of the holder's water right pursuant to Subsection (e-1)(1). For the credit to be effective in providing water to meet the particular environmental flow standard, the provision should clarify that the Trust deposit must be in the affected water body of the holder's water right.

14. <u>Recommendation:</u> Provide clear language that existing water rights may add instream use or convert to instream use as a purpose of use and that instream use rights have equal standing with other water rights. Encourage the voluntary conversion of existing water rights to meet environmental flow needs.

<u>Rationale:</u> Plain language can eliminate any confusion regarding instream use permits and their equal standing with water rights for other purposes. Public policy statements expressing the state's support for voluntary conversions of existing water rights to environmental flow purposes may provide assurance to water right holders that their actions are beneficial to the state and appreciated for protecting the state's natural resources. Language is needed to support the facilitation, protection and enforcement of instream use permits to the maximum extent possible, including the retention of original priority dates.

15. <u>Recommendation:</u> Provide clear language that water rights may be leased for instream uses without the need for a water right amendment.

<u>Rationale:</u> Leasing water rights for periods critical to environmental needs may be an attractive option for certain water right holders. In order to keep leasing transactions simple but still allow a water right to be put to instream uses, a permitting exemption or an expedited process should be authorized to temporarily add instream use as a purpose of use for the leased water.

16. <u>Recommendation:</u> **Expand the concept put forward in CSSB 3, Section 1.16 regarding credit toward meeting environmental flow standards via an adjustment to permit conditions to include and allow credit for voluntary conversions of appropriate existing water rights to environmental flow protection purposes.**

<u>Rationale:</u> The language put forward in CSSB 3, Section 1.16 entitles a water right holder making a contribution to the Texas Water Trust to receive credit toward meeting an environmental flow standard imposed through an adjustment to permit conditions. To encourage non-Trust instream use water rights (that achieve the same goal of the Trust in providing water for environmental needs), this concept should be amended to allow a water right holder making a permanent voluntary conversion to instream use of an appropriate existing water right to receive credit toward meeting an environmental flow standard imposed through an adjustment to permit conditions. If the voluntary instream use conversion is part of a multi-use water right, the instream use portion must be clearly quantified and committed solely to instream use purposes.

17. <u>Recommendation:</u> **The market-based approach used for trading water rights in other western states should be investigated further to see how effective these methods might be in Texas.**

<u>Rationale:</u> As the state's supply of unappropriated water decreases, the trading of water rights through markets will likely increase. An active water market that fairly values water may be a vehicle to identify and acquire water rights for environmental flow purposes. Voluntary water market transactions in states such as Oregon, Washington and Colorado have led to improved environmental flows. Studying the experiences of other states can assist Texas as its water markets grow.

Thank you for your attention to this matter. Should you require additional information or have any questions, please contact Colette Barron, TPWD attorney, at 512 389 8899.

Sincerely,

JBC Fitzsimons

Joseph B.C. Fitzsimons
Chairman

JBCF:CB:ch

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Sabine River Authority of Texas

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August 3, 2006

Mr. E. G. "Rod" Pittman, Chair
Texas Water Development Board
P. O. Box 13231
Austin, Texas 78711

Re: Second Round Comments to Environmental Flow Advisory Committee ("EFAC")

Dear Rod:

The EFAC decided to have members submit comments on changes or elements that we think should be included in the legislation this committee recommends and to provide a rationale for each of those suggestions. The following are the comments that I would like to make in that regard.

Recommendation: The process should include a statewide oversight committee made up of both stakeholders and representatives of the three agencies.

Rationale: Representation from a balanced perspective outside of elected and appointed officials is crucial to the process of developing meaningful standards for environment flows. Stakeholders should be included in the process in order for this process to work, and to be credible in the eyes of environmental and regulated communities.

Recommendation: A statewide science oversight committee should also be included in the process.

Rationale: Much like our science advisory committee, the statewide oversight committee will need advisors to provide technical assistance as well as oversight of the science developed for the process by the Bay/Basin groups and the state agencies to ensure consistency.

Recommendation: A basin stakeholder committee should be part of the initial process with input from a scientific standpoint.

Rationale: The process has always been based on a bottom-up process, much like the regional water planning process. The process must include independent science and technical input either from a basin science committee or a consultant hired by the stakeholder group. Independent, scientific input is vital to the process. This basic stakeholder process should also culminate in a Texas Commission on Environmental Quality ("TCEQ") rulemaking which would establish environmental flow regimes and set asides for every bay basin complex. The current case-by-case permitting scheme does not allow for this type of crucial stakeholder and scientific input.

Recommendation: It is imperative that the legislature provide continued funding to make sure this process continues to work in a positive manner.

Rationale: All of the processes required by this legislation—the stakeholder processes, scientific support, and rulemaking processes, will require funding if this environmental flows process is to work.

Recommendation: A more realistic timeframe should be set for the performance of studies in the Galveston Bay and Sabine Lake Studies.

It is proposed that the dates in § 1.09 of Article 1 of Senate Bill 3 be modified as follows:

(1) In proposed Water Code Subsection 11.02362(a), the date for defining the geographical extent of each river basin and bay system should be changed to November 1, 2007.

(2) In proposed Subsection 11.02362(c)(1), the date for appointing the Bay and Basin Area Stakeholder Committee should be established as November 1, 2007.

(3) In proposed Subsection 11.022362(c)(2), the date for establishing the Bay Basin Expert Science Team should be changed to March 1, 2008.

(4) In proposed Water Section Code, Subsection 11.02362(c)(3), the date for the Bay and Basin Expert Science Team to finalize the environmental flow recommendation and submitting it to the Bay and Basin Area Stakeholder Committee, the Flows Commission, and the TCEQ should be changed to a goal of March 1, 2009.

(5) In proposed Water Code Subsection 11.02362(c)(4), the Bay and Basin Area Stakeholder Committee shall have six months after receipt of the environmental flow regime recommendation to submit its recommendation to the TCEQ.

(6) In proposed Water Code Subsection 11.02362(c)(5), the TCEQ should be given one year from the time it receives the comments and recommendations from the Bay and Bay Areas Stakeholder Committee to adopt environmental flow standards as provided by Subsection 11.1471.

Rationale: Every effort should be made to begin the process of formulating an environmental flow and regime in recommendation for the first priority bay and basin systems (Galveston Bay and Sabine Lake). A goal is more appropriate than setting a deadline for the formulation of the environmental flow regime and recommendation by the Bay Basin science committee. At this point, nobody really knows how to formulate an environmental flow regime and recommendation. With respect to the fresh water inflow issue, Texas Parks and Wildlife Department and Texas Water Development Board ("TWDB") have made freshwater inflow recommendations for both Sabine Lake and Galveston Bay, but the recommendations are in the nature of an optimum value rather than an inflow regime that can be used in water rights permitting. The Texas Instream Flow Program ("TIFP") is in its infancy. A second draft of the technical overview document was released in May. At this point, the document has a lot of the field measurement techniques described but the process of integrating the data collected into an instream flow recommendation has not been developed. From the comments of agency staff at a recently held workshop, it is not clear how the TIFP established by Senate Bill 2 would relate to an environmental flow program if legislation similar to Senate Bill 3, Article 1 is adopted. In summary, there is a lot of uncertainty, not just regarding the numbers and the environmental flow regimes that will be developed, but considerable effort will need to be employed to develop the methodology for calculating fresh water inflow and instream flow values that will be useful in setting environmental flow standards.

Recommendation: The Senate Bill 2 instream flow program should be integrated with the environmental flow program.

Rationale: It is currently not clear how the ongoing Senate Bill 2 instream flow program will integrate with the environmental flow program. As proposed in Article 1 of Senate Bill 3, the environmental flows process would result in the promulgation of environmental flow standards for Bay/Basin Systems. These Bay/Basin standards would be derived through a combination of policy decisions by a Bay/Basin Stakeholder Committee to establish management objectives for a Bay/Basin and technical evaluations by a Bay Basin technical committee to decide the flows needed to support the management objectives. This combination of technical and policy information would be the input to the TCEQ's promulgation of a Bay/Basin environmental flow standard.

The Senate Bill 2 instream flow program has a lot of similarities to the process in Article 1 of Senate Bill 3. There will be a stakeholder process to establish the management objectives for a stream segment. Technical evaluations will then be used to synthesize an instream flow recommendation. There does not seem to be any reason for doing virtually the same thing twice. For example, there will be a Senate Bill 2 flow stakeholder group and an environmental flow Bay/Basin stakeholder group. If they recommend the same management objectives for a stream reach, obviously the same result could have been reached by only having one of the stakeholder groups. If the two stakeholder groups adopt incompatible management objectives for the same stream reach, how will the conflict be resolved? Does the recommendation of the second stakeholder group to address the issues prevail? If that is the case, the efforts of the first stakeholder group are wasted.

A more efficient path would be to better integrate the Senate Bill 2 instream flow program into the proposed legislation that was formerly Article 1 of Senate Bill 3. The stakeholder groups and the technical groups could then be consolidated where appropriate. The objectives of the Senate Bill 2 instream flow program should be made consistent with the environmental flow process. Namely, the instream flow program should be focused on determining the instream flows necessary to support the management objectives of a particular stream segment. These would be incorporated in the environmental flow standard.

Recommendation: The provisions proposed in Article 1 of Senate Bill 3 relating to the Texas Water Trust should be given a chance to work.

Rationale: At the Environmental Flow Advisory Committee Meetings and in the first round of written suggestions, many of the comments pertain to the Texas Water Trust. I believe the provisions proposed in Article I of Senate Bill 3 regarding the Water Trust will have a beneficial effect. The proposed language alleviates the necessity of obtaining an amendment to use water rights deposited in the Water Trust for environmental purposes. There is a provision that allows Texas Parks & Wildlife Department ("TPWD") to enforce a water right that is deposited into the Water Trust. The proposed language also exempted water rights deposited in the Water Trust from all of the fee provisions in the Water Code. These provisions were the result of a consensus-based approach and should be given a chance to work before wholesale revisions are adopted.

Thank you, again, for the opportunity to make comments. I would be happy to discuss these suggestions with you or your staff at the earliest opportunity, if you see the need. If you have any questions, please call me at (409) 746-2192.

Sincerely,

Sabine River Authority of Texas

Jerry Clark

Jerry Clark
Executive Vice President and
General Manager

<u>Recommendation</u>: **Provide adequate funding for implementation of environmental flow legislation.**

<u>Rationale</u>: In order for any legislation to be successfully implemented, the stakeholder process, scientific peer review, technical evaluations and agency support all require adequate funding to support the process.

<u>Recommendation</u>: **Extend the deadline for completion of Senate Bill 2 instream flow studies from December 31, 2010 to December 31, 2016.**

<u>Rationale</u>: Since passage of Senate Bill 2, authorizing the instream flow program, there have been a number impediments to full implementation, most notably the lack of funding provided. The desire to fully integrate stakeholders in the process and rigorous peer review of the methodology developed, while adding integrity to the program, have resulted in further delays. Delaying the due date for completion of priority studies (Texas Water Code, Section 16.059(d)) to December 31, 2016, would allow the agencies and stakeholders sufficient time to complete their work.

<u>Recommendation</u>: **Texas Parks and Wildlife Department, Texas Commission on Environmental Quality and Texas Water Development Board to provide progress reports on their activities related to the Instream Flow and Freshwater Inflow programs on a biannual basis.**

Rationale: For any process established related to environmental flows, it is important that they have the latest information from the state agencies on the progress made on the instream flow and bays and estuaries freshwater inflow studies. Regular updates of this information would ensure that any established committee or the agencies' legislative oversight committees remain fully apprised of all environmental flow activities in the state.

TEXAS WATER DEVELOPMENT BOARD

July 27, 2006

Mr. Richard (Dick) Chalkley Bartlett
Vice Chairman, Mary Kay, Inc.
16251 Dallas Parkway
Addison, Texas 75001

Dear Mr. Bartlett:

This letter is to follow-up on Dr. Barney Austin's email of July 21, and to transmit to you my recommendations, formatted as requested. At last Wednesday's Environmental Flows Advisory Committee meeting, you were asked to re-send your recommendations for improving CSSB3 in the format provided in the expanded report outline. The format is to include a brief statement of your specific recommendation followed by a sentence or two describing the rationale for the recommendation. I would like to use this format because I feel it will give the legislature a better understanding of our recommendations and why we are making each one. In addition, it will help prevent this committee from struggling to reach agreement on statutory language when the legislature can have legislation drafted on the recommendations it chooses.

Please send all your recommendations in the format requested to barney.austin@twdb.state.tx.us by August 4, 2006. Recall that Chairman White will be compiling the process-related recommendations and that Chairman Fitzsimons is currently working on recommendations related to the Water Trust. Feel free to include process and Trust related recommendations that you do not believe have been incorporated or considered by these subcommittees.

I have included my three formatted recommendations as an attachment to this letter. Dr. Austin will provide each of us with all submittals he receives. The primary purpose of our August 28 meeting is to discuss and agree upon which recommendations to include in the final report.

Sincerely,

E G Pittman

Rod Pittman
Chairman

Attachment

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: E.G. Rod Pittman, Chairman
Environmental Flows Advisory
Committee

Date: August 11, 2006

Thru:

From: Kathleen Hartnett White, Chairman
Texas Commission on Environmental Quality

Subject: Recommendations for Senate Bill 3, Article 1

As a follow up to the July 19, 2006, meeting of the Environmental Flows Advisory Committee, I submit the attached recommendations for consideration by the Committee for possible inclusion in the final report scheduled to be submitted to the Governor, Lieutenant Governor, and Speaker of the House, by December 31, 2006. The recommendations are based on discussions which took place among the Subcommittee members established to review the environmental flow evaluation process as presented in Article 1 of Senate Bill 3, and on subsequent discussions among the full advisory committee on July 19th. The Subcommittee's recommendations aim to streamline the process for establishing environmental flow regimes and standards as set out in Article 1 of Senate Bill 3.

The Subcommittee recommended that any environmental flow commission created through legislative action be structured similar to the EFAC with the addition of the presiding officers of the Senate and House Natural Resources Committees as ex-officio members. There was also general agreement that the bay/basin stakeholder groups should form the Bay-Basin Science Committees to assist with the environmental flow analyses and eventual environmental flow regime recommended by the Bay-Basin stakeholders groups.

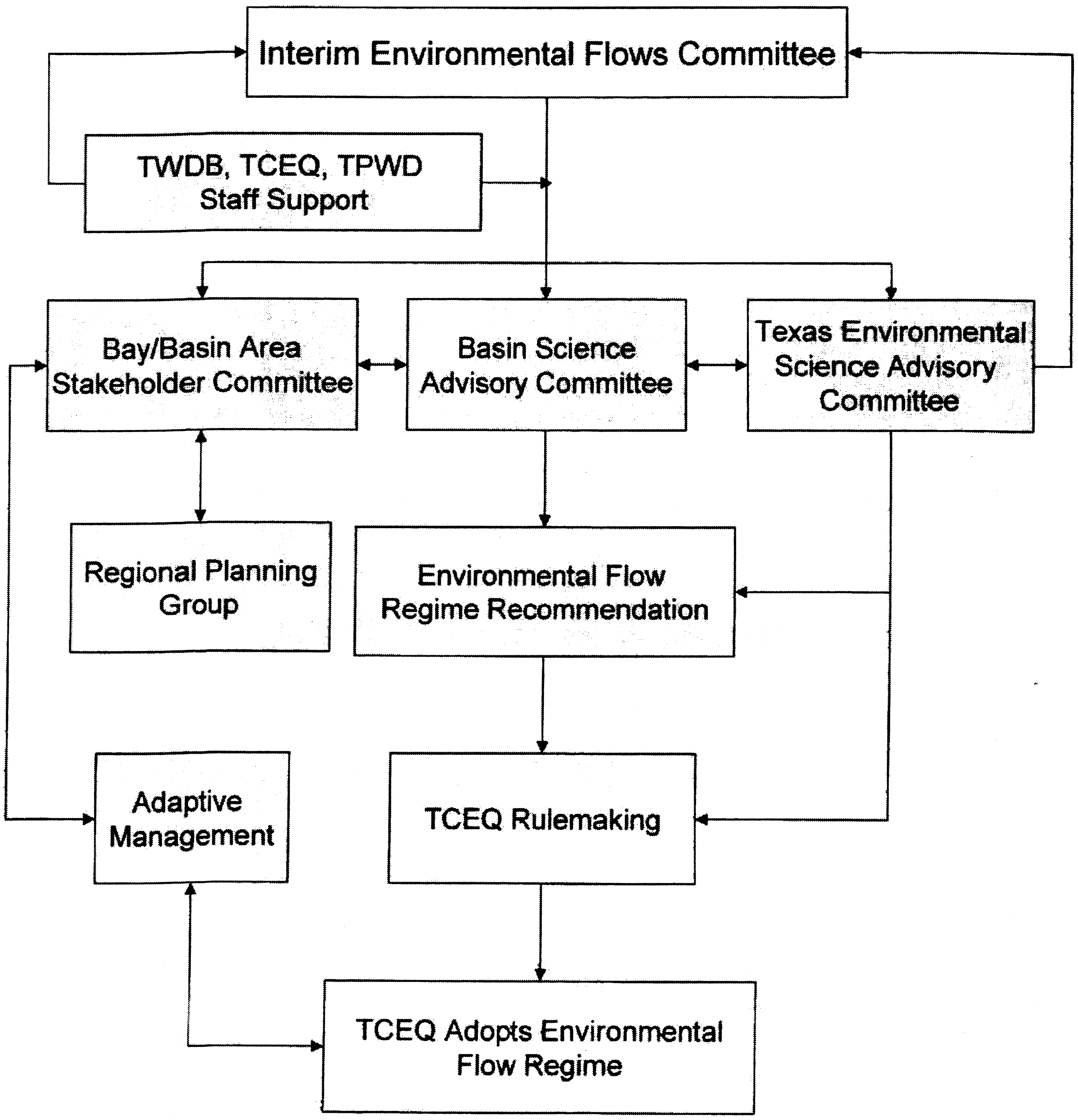
The Subcommittee agreed in principle with the composition of the stakeholder groups as outlined in the Article 1. However, during discussion of this topic at the July 19th meeting, it was suggested membership of the stakeholders groups include more flexibility to ensure broad representation in the environmental flow evaluation process.

It was also suggested and agreed to, that liaisons between the bay/basin stakeholder groups and appropriate regional planning groups be established to ensure coordination for the continuing water planning efforts and environmental flow studies.

Finally, based on discussions at the July 19th meeting, I've included a revised flow chart for the Article 1 environmental flow process, which captures the recommendations prepared by the Subcommittee and other EFAC members. Should the EFAC agree in principle with the concept as presented in the chart, additional narrative can be added to clarify the proposed refinements for the final committee report.

I believe these recommendations will build on the framework provided in Article 1 as originally proposed and provide more clarity to the process of identifying environmental flows needs for our State's riverine and estuarine systems.

ALTERNATIVE ENVIRONMENTAL FLOWS PROCESS



Subcommittee Recommendations

Recommendation: Establish an Interim Environmental Flows Committee (IEFC) composed of nine (eleven) members composed as follows:

- **Presiding officer of the TWDB**
- **Presiding officer of the TCEQ**
- **Presiding officer of the TWDB**
- **Four (Six) members appointed by the Governor**
- **Chair (or their appointed representative) of the Senate Natural Resources Committee**
- **Chair (or their appointed representative) of the House Natural Resources Committee**

Members appointed by the Governor should be knowledgeable regarding issues associated with environmental flows and represent areas of expertise in business industry, cities, agriculture, environmental, water interests, and local interests.

The IEFC should be established for a two-year period, with a continuing function left to the discretion of the Texas Legislature.

Rationale: Establishment of the environmental flows committee would provide the mechanism for creation, administration and oversight of the state science advisory panel and the bay/basin stakeholder groups. By establishing the flows committee on an interim basis, the TX Legislature would be provided the opportunity to evaluate the progress of the initiatives and to determine if there is a need to continue the committee and make adjustments as needed.

Recommendation: The environmental flows committee should appoint the state science advisory panel composed of not less than five nor more than nine members, with expertise as outlined in Section 11.02361(b) of Senate Bill 3, Article 1 (C.S.S.B.).

Rationale: The state advisory panel will provide expert advice to the flows committee on matters relating to technical issues associated with environmental flows, and will provide scientific oversight for the bay/basin studies to ensure consistency among the many efforts.

Recommendation: The Subcommittee recommends using the TWDB's established program for identifying watershed boundaries for the state's riverine and estuarine systems.

Rationale: The TWDB currently delineates watershed boundaries for their on-going water monitoring and studies programs, and for state water planning purposes. By using the existing information and methods for bay/basin delineation, the flows committee can minimize any duplication of efforts, reduce the need for resources, and ensure consistency between their efforts and those of the state resource agencies charged with planning, monitoring, and the study of the state's surfacewater resources.

<u>Recommendation:</u> The Subcommittee recommends accepting the schedule for appointing the bay/basin stakeholder committees as presented in Section 11.02362 of Senate Bill 3, Article 1, subparagraph (f) (C.S.S.B.), with a goal of establishing stateholder groups for the top priority areas within six months of bill enactment.

<u>Rationale:</u> Considerable discussions and deliberations took place when setting the schedule for creation of the bay/basin stakeholder groups, and were based on many criteria, including but not limited to, the level of activities (i.e. permitting, development, wetland impacts…), and environmental issues associated with the specific bay or basin. Rather than set a date certain for a specific action, it was suggested that a date be establish as a target, with a goal of achieving that step of the process.

<u>Recommendation:</u> Upon creation of the individual bay/basin stakeholder groups, the Subcommittee recommends each group establish an expert science team as soon as reasonably practicable. The team should serve as local experts in matters associated with the science of environmental flows for their respective study area.

<u>Rationale:</u> Recommendations for developing specific bay/basin environmental flow regimes should be based on a sound scientific approach, using the best available information. The process should be a collaborative effort between the stakeholder group and the science team to ensure the stakeholders' goals are supported by sound technical analysis and the best available science.

<u>Recommendation:</u> The Subcommittee recommends the bay/basin stakeholder group and respective expert science team work collaboratively on the bay/basin specific environmental flow regime recommendation with a goal of submitting a consensus report to the TCEQ.

<u>Rationale:</u> Section 11.02362, Senate Bill 3, Article 1 (C.S.S.B.) calls for the bay-basin expert science teams independently to "…submit its environmental flow analyses and flow regime recommendations…" to the stakeholder group, environmental flows commission and the TCEQ. The Subcommittee recommends a more collaborative approach. The stakeholder group and the expert science team should work together on a single submission.

<u>Recommendation:</u> The Subcommittee recommends that each bay/basin stakeholder group include, at a minimum, representative members as identified in Senate Bill 3, Article 1, and Section 11.02362(f). The Subcommittee also recommends a provision

be included to name additional stakeholders, a the discretion of the IEFC, and as deemed appropriate and necessary to ensure all interests are represented and will contribute to achieving the overall goals of the group.

Rationale: Each bay/basin within the state is unique and exhibit characteristics that may vary from region to region. To ensure that all issues are represented and addressed during the development of the environmental flow analyses and subsequent environmental flow regime recommendations, the membership of the bay/basin groups may require additional local resources to achieve overall consensus.

Recommendation: In recognition of the importance of adaptive management, as presented in Senate Bill 3, Article 1, Section 11.02362(p), the Subcommittee recommends the approach used for environmental flow analyses, development of environmental flow regimes and subsequent adoption of environmental flow standards, include an adaptive management step for periodic reviews and updates for applicable environmental flow strategies.

Rationale: The concept of "adoptive management" assumes that continual improvement in environmental flow analysis and continual expansion of data may warrant modification in recommended environmental flow regime and regulatory adopted environmental flow standard. To ensure a means for "adoptive management" modifications, the Article 1 process should include a feedback loop which provides water resource planners and managers with the best available information for informed decision-making.

Recommendation: Require that each bay/basin stakeholder group appoint a liaison for each of the regional planning groups which have overlapping boundaries with the respective bay/basin group.

Rationale: To ensure coordination between water resource planning and the development of strategies to meet environmental flow recommendations, lines of communication must be established between the two (or more) groups.

Environmental Flows Advisory Water Trust Subcommittee Recommendations

Introduction

It is clear that the state needs to raise awareness of the Texas Water Trust. In its nine years of existence, the Trust has been utilized only twice, with both of the deposits being guided by the Texas Parks and Wildlife Department (TPWD). The fact that water right holders can seek the assistance of TPWD to facilitate the paperwork required to process the associated water right amendments and deposit their water rights into the trust should be clarified.

Information regarding the Trust may be found in the Texas Water Code and on the Texas Commission on Environmental Quality (TCEQ) and TPWD websites, but no outside advertising or public awareness campaign has been created to publicize the Trust. A campaign should be developed to target those water right holders who are attracted the idea of dedicating their water rights to meet environmental needs.

Additionally, the market-based approach used for trading water rights in other western states should be investigated further to see how effective these methods might be in Texas. As the state's supply of unappropriated water decreases, the trading of water rights through markets will likely increase. An active water market that fairly values water may be a vehicle to identify and acquire water rights for environmental flow purposes. Voluntary water market transactions in states such as Oregon, Washington and Colorado have led to improved environmental flows. Studying the experiences of other states can assist Texas as its water markets grow.

Texas Water Trust Recommendations

1. Recommendation: Create incentives to attract Texas Water Trust deposits.

Rationale: With the growing demand for water and the rising cost of securing water rights, the Trust has few assets to compete with other market players. For the Trust to function better than it has historically, financial incentives need to be provided to water right holders willing to dedicate their water rights for environmental needs. Possible funding sources for incentives may include donations, state water use fees, supplemental environmental project funds collected during water related enforcement proceedings or a fee on persons who use state water for recreation and who would benefit by increased protection of fish and wildlife. Trust funding may allow qualified trustees, such as Texas Parks and Wildlife Department, to buy or lease water rights for deposit in the Trust.

All barriers to the Trust should be eliminated. The process to deposit a right into the Trust should be free of any fees. For a deposit in perpetuity, all fees associated with maintaining and enforcing a water right should be waived. For a temporary deposit, all fees associated with maintaining and enforcing a water right should be deferred; when the right is removed from the Trust, all deferred fees shall be due.

In order to build confidence in the Trust and to assure that donated funds are invested only in maintaining environmental flows, it should be made clear that deposits in perpetuity cannot be removed from the Trust or reclaimed by the state for appropriation for other purposes.

2. <u>Recommendation:</u> Simplify procedures for Texas Water Trust deposits by: (1) eliminating the need for an amendment before a water right is placed into the Water Trust; (2) directing the Texas Water Development Board (TWDB) to set out a simplified application and approval procedures; and (3) eliminate the need for input from the Environmental Flows Committee, the bay/basin stakeholders, and the bay/basin expert science team.

Rationale: The current dual process of amending a water right for conversion to instream uses through TCEQ approval and applying to the TWDB for deposit into the Texas Water Trust is ambiguous and unwieldy. Language put forward in CSSB 3, Section 1.27(e) eliminates the need for an amendment to a water right before it can be placed into the Trust; this provision streamlines placement of water rights into the Trust and should be retained in any new bill. A rulemaking directive to TWDB to set out a simplified Trust deposit application and approval procedures may be necessary. In order to maintain accurate records of water rights, upon deposit of a water right in the Trust, the TCEQ would perform the ministerial act of re-issuing the water right permit to reflect the deposit and the authorization to use the water for environmental needs.

CSSB 3, Section 1.27(c) provided that, before a water right could be placed into the Water Trust, consultation with the Environmental Flows Committee, and an opportunity for input by the bay/basin stakeholders and the bay/basin expert science team was required. The present approval of water rights going into the Trust by the TCEQ serves the same purpose, and therefore the process set out in CSSB 3 1.27(c) can be streamlined.

3. <u>Recommendation:</u> Clarify language regarding Texas Water Trust deposits as credits against adjustment of a water right to meet environmental flow standards.

Rationale: CSSB 3, Section 1.16 provides that any water right holder making a contribution to the Texas Water Trust that contributes toward meeting an environmental flow standard is entitled to appropriate credit of such benefits against adjustment of the holder's water right pursuant to Subsection (e-1)(1). For the credit to be effective in providing water to meet the particular environmental flow standard, the provision should clarify that the Trust deposit must be in the affected water body of the holder's water right.

Related Instream Use Permit Recommendations

While not specific to Texas Water Trust legislation, environmental flow permitting issues are closely associated with meeting the Trust's goal to provide opportunities for participation in environmental flow protection through the use of existing water rights. The following recommendations may encourage Texas Water Trust deposits and other voluntary conversions of existing water rights to environmental flow water rights.

Appendix
S

Texas Water Development Board
Report 362

Water Conservation Implementation Task Force

Water Conservation
Best Management Practices Guide

November 2004

2.9 Landscape Irrigation Conservation and Incentives

A. Applicability

This BMP is intended for use by a municipal water user group ("utility") with a substantial percentage of customers using automated landscape irrigation systems and is targeted to customers who have automated irrigation systems. If data on the number of customers with irrigation systems are lacking or absent, the summer peak/winter average ratio can be used as an evaluation tool to determine whether to proceed with this BMP. A ratio of 1.6 or greater indicates the potential for substantial water savings with implementation of this BMP. For maximum water-use efficiency benefit, the utility should adhere closely to the measures described below.

B. Description

Landscape irrigation conservation practices are an effective method of accounting for and reducing outdoor water usage while maintaining healthy landscapes and avoiding run-off. Using this BMP, the utility provides non-residential and residential customers with customer support, education, incentives, and assistance in improving their landscape water-use efficiency. Incentives include rebates for purchase and installation of water-efficient equipment. Four approaches are outlined below. Successful implementation of this BMP will be accomplished by performing one or a combination of the approaches listed.

1) ETo-Based Water Budgets
If the utility chooses the water budget approach, the utility also develops reference evapotranspiration ("ETo")-based water-use budgets equal to no more than 80 percent of ETo per square foot of irrigated landscape area for customers participating in its Landscape Irrigation Conservation Program. More aggressive landscape conservation programs can utilize stress coefficients lower than 80 percent.

   Evapotranspiration is the combined amount of the water transpired by plants and the water evaporated from the soil. ETo is defined as the estimate of evapotranspiration that occurs from a standardized reference crop of well-watered, clipped, cool-season grass. The amount of supplemental irrigation water needed is the shortfall between plant water need (which is a fraction of ETo) and precipitation.

   The statewide Texas Evapotranspiration Network (http://texaset.tamu.edu/) should be consulted for historical evapotranspiration data, historical precipitation, and methodology for calculating reference evapotranspiration and allowable stress. (Communities located in the North Plains areas may find local historical data on potential evapotranspiration at: http://amarillo2.tamu.edu/nppet/whatpet.htm.

2) Water-Use Surveys, Metering, and Budgeted Water Use

If the utility chooses the survey approach, the utility develops and implements a plan to promote landscape water-use surveys to industrial/commercial/institutional ("ICI") and residential accounts with mixed-use meters. The water-use surveys, at a minimum, include: measurement of the landscape area; measurement of the total irrigable area; irrigation system checks and distribution uniformity analysis; review of irrigation schedules or development of schedules as appropriate; and provision of a customer survey report and information packet. When cost-effective, the utility should offer the following: landscape water-use analyses and surveys; voluntary water-use budgets; installation of dedicated landscape meters; acceptance of site conservation plans; and follow-up to water-use analyses and surveys.

At the start and end of the irrigation season, irrigation systems should be checked, and repairs and adjustments made as necessary. Notices should be included in bills to remind customers of seasonal maintenance needs. For accounts with water-use budgets, the utility should provide notices with each billing cycle showing the relationship between budgeted water usage and actual consumption. When soil conditions allow, and landscape managers are familiar with the use and maintenance of soil moisture sensors, water budgets can be allocated based upon soil moisture status, thereby providing a closer estimate of actual evapotranspiration.[3]

Many utilities require dedicated irrigation meters for all commercial and/or industrial accounts with automatic irrigation systems or if the lot is above a minimum size. For municipalities with ordinance-making powers, this can be accomplished by ordinance. Otherwise, dedicated meters may be implemented as a new customer policy.

3) Landscape Design

If the utility chooses the landscape design approach, the utility provides information on climate-appropriate landscape design and efficient irrigation equipment and management for new customers and change-of-service customer accounts (*See* the Landscape Design and Conversion Programs BMP for more detail). To serve as a model, the utility should install climate-appropriate, water-efficient landscaping at water agency facilities and landscape meters where appropriate. Municipalities with ordinance-making powers should consider adopting ordinances that require all new apartment complexes and commercial buildings to install a water conserving landscape. This can often be accomplished by amending an existing commercial landscape ordinance.

4) Minimum Standards and Upgrades

If the utility chooses the landscape standards approach, the utility should require new commercial and industrial customers to install separate irrigation meters and consider retrofitting current commercial and industrial customers with irrigation meters. The utility should consider this requirement for new residential customers installing automatic irrigation systems. For municipalities with ordinance-making powers, this can be accomplished by ordinance. Otherwise, this may be implemented as a new customer policy.

Irrigation system design and maintenance components and landscape design may be systematically upgraded through use of municipal ordinance-making powers where possible. Minimum water efficient design features can be mandated for new construction, while existing systems or landscapes are offered incentives to upgrade. Rainwater sensors, soil moisture sensors, irrigation controllers, pipe specifications, and hydrozone specifications are all potential elements of an irrigation systems ordinance. Total turf grass areas, buffer zone plant material, and hydrozones are all potential elements of landscape design ordinances. Buffer or median areas represent additional savings when all landscaped areas less than five feet in any dimension are restricted to drip or other surface or subsurface (non-spray) irrigation system or no irrigation system.

C. *Implementation*

The utility should consider offering the Landscape Irrigation Program to customers with large landscapes first as a means of rapidly increasing cost-effectiveness and water savings. Marketing the Program to the customer via bill inserts will allow the utility to target the largest summer peak users first. The utility should consider also approaching local weather announcers, radio gardening show hosts, and newspaper columnists for assistance in notifying the public about the program. Public/private partnerships with non-profits such as gardening clubs, Cooperative Extension offices and/or with green industry businesses such as landscape and irrigation maintenance companies are potential avenues to market the program and leverage resources.

Incentives can include rebates for irrigation audits and systems upgrades, recognition for water-efficient landscapes through signage and award programs, and certification of trained landscape company employees and volunteer representatives who can promote the Program. Utility staff can also be trained to provide irrigation audits which can include resetting irrigation controllers with an efficient schedule.

Approximately one year after conducting an irrigation audit, the utility should consider conducting a customer-satisfaction survey. The objective of the customer-satisfaction survey is to determine the implementation rate of recommended modifications and to gauge customer satisfaction with the program.

The initial step in assisting customers with landscape irrigation systems is a thorough evaluation of the existing landscape area and irrigation systems. This includes:

1) A list of landscape areas, measurements, plant types, irrigation system hydrozones, and controller(s);
2) A list of existing irrigation policies or procedures including maintenance and irrigation schedules;
3) A distribution uniformity analysis on irrigated turf areas;

4) A review of water bills with attention to the ratio of summer to winter use; and
5) An initial report summarizing the results of the evaluation.

The water customer who participates in this program needs to maintain and operate its irrigation systems in a water-efficient manner. Maintenance programs include pre-irrigation system checks, adjustment of irrigation timers when necessary, installation of rain sensors, and regular review of irrigation schedules and visual inspection of the irrigation system. When landscape management companies are utilized, contracts should include a required report showing regularly scheduled maintenance and seasonal adjustments to irrigation systems controllers. A more advanced form of contracting would be to build into the contract a dollar amount based on 80 percent of ET and require the contractor to pay for any water use above that amount. The utility should consider implementing a notification program to remind customers of the need for maintenance and adjustments in irrigation schedules as the seasons change.

When appropriate, the utility should consider offering the following services:

1) Training in efficiency-focused landscape maintenance and irrigation system design;
2) Financial incentives (such as loans, rebates, and grants) to improve irrigation system efficiency and to purchase and/or install water efficient irrigation systems;
3) Financial incentives to replace high-water use plants with lopw water use ones;
4) Rebates and incentives to purchase rain sensors or soil-moisture sensors; and
5) Notices at the start and end of the irrigation season alerting customers to check irrigation systems and to make repairs and adjustments as necessary.

The utility should need to ensure that landscape irrigation system specifications are coordinated with local building codes.

Evaluations and/or rebate processing could be done by the utility staff or be outsourced. If a utility chooses to perform the evaluations using in-house staff, they may take advantage of irrigation evaluation training programs provided by the Texas A&M School of Irrigation or the Irrigation Association.

An outsourcing option for the non-residential sector is to use or recommend a water-based performance contractor. Performance contracting is a financing technique that uses cost savings from reduced utility (water and sewer) consumption to repay the cost of installing water conservation measures. This technique allows for the development of a water-savings program without significant up-front capital expenses on the part of the customer. Instead, the costs of water-efficiency improvements are borne by either the contractor or a third party lender who recoups cost and shares water savings profits with the user.

D. Schedule

1) Realize the Scope of this BMP within ten years of the date implementation commences.

2) Develop ETo-based water-use budgets for all accounts with dedicated irrigation meters by the end of the second year from the date implementation commences.
3) Develop and implement a plan to target and market landscape water use surveys to ICI accounts with mixed-use meters by the end of the first year from the date implementation commences.
4) Develop and implement a customer incentive program by the end of the first year from the date implementation commences.
5) Follow up with the participating customer approximately one year after a water use survey has been conducted and/or a rebate processed.

E. Scope

To accomplish the goals for this BMP, the utility should do the following:

1) Landscape Irrigation System Management Programs
   a. Within one year of implementation date, develop and implement a plan to market water-use surveys to ICI accounts with mixed-use meters;
   b. Within one year of implementation date, develop and implement a customer incentive program;
   c. Within two years of implementation date, develop ETo-based water-use budgets for 90 percent of ICI accounts with dedicated irrigation meters;
   d. Within ten years contact and offer landscape water-use surveys to 100 percent of ICI accounts with mixed-use meters;
   e. Within ten years complete landscape water-use surveys for at least 15 percent of ICI accounts with mixed-use meters.
   f. Within ten years contact and offer landscape water-use surveys to 100 percent of residential accounts with summertime monthly use of greater than four times annual average; and
   g. Within ten years complete landscape water-use surveys for at least 15 percent of residential accounts with summer monthly use of greater than four times annual average.

2) Ordinance Approach
   In the first twelve (12) months: Plan a program, including stakeholder meetings as needed. Consider offering rebates for all or a portion of the time this program is in place. For example, offer rebates for only the first five years to encourage customers to take advantage of rebates and retrofit early in the program. Develop a plan for educating real estate agents, landscape companies, and irrigation installers about this requirement. Plan a follow-up inspection program after retrofit. Develop and pass ordinance. Implement ordinance and tracking plan for number of units retrofitted.

   In the 2nd year and all subsequent years: Continue implementation; continue outreach program for real estate agents, landscape companies, and irrigation system installers; and continue verification inspections.

F. *Documentation*

To track this BMP, the utility should gather the following documentation:

1) Number of dedicated irrigation meter accounts;
2) Number of dedicated irrigation meter accounts for which water budgets have been developed;
3) Aggregate water use for dedicated landscape accounts with budgets;
4) Aggregate budgeted water use for dedicated landscape accounts with budgets;
5) Number of mixed-use accounts;
6) Number of surveys offered and number of surveys accepted and completed;
7) Number, type, and dollar value of incentives, rebates, and loans offered to and accepted by customers;
8) Estimated water savings achieved through customer surveys; and
9) Estimated landscape area converted and water savings achieved through low water landscape design and conversion program.

G. *Determination of Water Savings*

Landscape surveys as described in this document are assumed to result in a 15 percent reduction in water demand for landscape uses by surveyed accounts. The utility should provide estimates of water savings from landscape irrigation survey programs based upon actual metered data. The water budget calculation is as follows:

80 percent ETo calculation: I = (ETo x Kc x AS) where I is the irrigation amount to be applied for a given period (daily, twice weekly, weekly, etc.), in inches or centimeters

ETo is the measured reference evapotranspiration over the irrigation period
Kc is a turf coefficient for turf grasses, and can be found at http://texaset.tamu.edu/
AS is allowable stress of 0.8 (or less if the landscape manager wishes)
For those wishing to convert inches of irrigation to gallons, multiply landscape area by 0.62. Irrigation Volume (gals.) = I (in.) x LA (sq ft) x 0.62

When applying irrigation, the equation should be modified to gain greater water savings by accounting for precipitation: I = (ETo x Kc x AS) – Pe where P is precipitation in inches or cm. In calculating an irrigation amount, it is important to consider effective precipitation (Pe). Effective precipitation is less than natural precipitation since some rainfall runs off or percolates below the root zone. The amount of effective precipitation will vary with region and rainfall trends. Each rainfall event will have a unique characteristic, and a good source for estimating Pe is the county office of the Texas Cooperative Extension Service.

H. *Cost Effectiveness Considerations*

Surveys can be performed by utility staff or by contractors. The labor costs range from $50 to $100 for a SF irrigation survey and start around $100 and go up from there for an ICI irrigation survey, depending on the efficiency in scheduling the surveys, the size of the landscape, and the scope of the survey.

There may be other one-time costs such as purchase of leak detection equipment and meters. Marketing and outreach costs range from $5 to $15 per survey. Administrative and overhead costs range from 10 to 20 percent of labor costs.

I. *References for Additional Information*

1) *Landscape Irrigation Scheduling and Water Management.* Water Management Committee of the Irrigation Association, September 2003. http://www.irrigation.org/PDF/IA_LIS_AND_WM_SEPT_2003_DRAFT.pdf
2) *Turf and Landscape Irrigation Best Management Practices*, Water Management Committee of the Irrigation Association, September 2003. http://www.irrigation.org/PDF/IA_BMP_SEPT_2003_DRAFT.pdf
3) *Waste Not, Want Not: The Potential for Urban Water Conservation in California,* Pacific Institute, November 2003. http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf
4) *Handbook of Water Use and Conservation*, Amy Vickers, Waterplow Press, May. 2001.
5) *ET and Weather Based Controllers CUWCC Web Page.* http://www.cuwcc.org/Irrigation_Controllers.lasso
6) *Smart Water Technology Initiative Web Page.* http://www.irrigation.org/swat1.asp
7) *Soil moisture instrumentation: Sensors & strategies for the 21st century*, Richard Mead, in Irrigation Journal, Sept/Oct 1998.
8) *San Antonio Water System Conservation Program.* http://www.saws.org/conservation/
9) *WaterWise Council of Texas.* http://www.waterwisetexas.org/
10) *Texas Evapotranspiration Network.* http://texaset.tamu.edu/
11) North Plains areas of Texas may find local historical data on potential evapotranspiration at: http://amarillo2.tamu.edu/nppet/whatpet.htm.

2.10 Water Wise Landscape Design and Conversion Programs

A. Applicability

This BMP is intended for a Municipal Water User Group ("utility") that has 20 percent or more residential customers that have landscapes consisting of high water use landscape materials that consume more than 20,000 gallon per month or use more than twice as much water in the summer as in the winter. Under this BMP, the utility would offer financial assistance as an incentive to customers to convert to a water wise landscape. Utilities impacted by repeated drought may also consider this BMP as a means of reducing outdoor water demand overall in their service area as a step toward long-term change of water use patterns. Once a utility decides to adopt this BMP, the utility should follow the BMP closely in order to achieve the maximum water efficiency benefit from this BMP.

B. Description

The utility offers financial incentives for landscape conversion to a water wise landscape or requires by ordinance that all new landscapes incorporate water wise principles. Water wise landscaping involves not only plant selection but also follows optimum landscaping principles listed below. Financial incentive programs that promote water wise landscaping contain an educational component involving the seven principles of water wise landscaping. Water wise landscaping material often consumes whatever quantity of water the customer supplies, so careful follow up is necessary to ensure that excess irrigation does not take place. Incentives should be designed to be rescinded if water use returns to previous levels or exceeds the projected water budget for the new landscape.

For new customers and change-of-service customer accounts, the utility should provide information on water wise landscape design and efficient irrigation equipment and management (*See* the Landscape Irrigation Systems Conservation and Incentives BMP for more detail on efficient irrigation equipment and management). The utility should install water wise landscaping at water agency facilities. Encouraging the use of rainwater capture and limiting irrigation to the quantity of water captured are also included.

Some cities with ordinance-making powers have adopted ordinances to define water-conserving landscapes to be installed in buffer areas, new commercial buildings, new homes, and apartment complexes. Any ordinance for new homes should incorporate requirements for water wise principles, specifically requiring only water efficient landscaping materials to be used. Irrigated turf areas can be reduced or eliminated in this BMP. Limiting turf areas can be accomplished by any number of means including reducing turf as a percent of total landscaped area, restricting irrigation systems to a portion of the landscaped area, encouraging shade tolerant species under trees, or encouraging the use of turfgrasses which have low water use rates.

In the typical landscape, turfgrass occupies the largest area and, when managed incorrectly, receives the largest amount of irrigation. Installing practical turf areas and irrigating only the turf in high impact, highly visible areas of the landscape, achieve water savings. Practical turf areas mean locating turfgrass in areas of the landscape where it provides the most functional benefit, such as recreational areas or on slopes to prevent erosion. In the case of irrigation of sloped turf grass areas adjacent to a sidewalk and needed for erosion control, the use of drip or subsurface irrigation and not sprinklers is recommended.

Grasses available for use in Texas lawns vary significantly in water requirements. This BMP may require limiting irrigated turf area within the landscape and/or requiring the lowest water use turfgrass adapted to the region and use in the landscape. Shrub beds, low water use groundcover, or hardscape in the landscape design should replace irrigated turfgrass in areas that are long and narrow or small and odd-shaped. Turfgrass requirements for new construction should include specifications for soil depth.

Soil improvement is an effective method for reducing irrigation water usage while maintaining healthy soils. Soil improvement programs on high visibility areas can demonstrate to the public the effectiveness of this method. For most landscapes, compost applications of 1/4 to 1/2 inch annually on turf areas, and one inch annually on flower beds are recommended. Compost is most beneficial when applied in the fall.

Water Wise Landscape programs follow the seven principles of Xeriscape™, from the Texas A&M Horticulture Website (*See*, Section I, References for Additional Information, 2), listed below and explained in greater detail in resources listed in the reference section:

- Planning and design
- Soil analysis and improvement
- Appropriate plant selection
- Practical turf areas
- Efficient irrigation
- Use of mulches
- Appropriate maintenance.

C. Implementation

Initially, the utility should consider offering the Water Wise Landscape Design and Conversion Program to customers with educational missions such as schools, universities, botanical gardens, and museums with large public landscapes. A focus on buffer areas and small landscaped areas that are inefficient to irrigate has also proven effective in some communities. The utility should consider also approaching local weather announcers, radio gardening show hosts and newspaper columnists for assistance in notifying the public about the program. Public-private partnerships should be pursued with gardening clubs, Cooperative Extension offices, landscape designers, maintenance companies and nurseries.

Calculation of rebates for landscape conversion or as incentives for new landscape installation should be based on careful consideration of the net present value of the water saved versus the size of rebate that helps motivate customers to install such a landscape. For new construction, another type of incentive would be a discount on the water capital recovery fee.

Careful design of the program is necessary to prevent overwatering after the water wise landscape is installed. Signed agreements with customers receiving rebates can assist the utility in recovering funds if water use does not decline after installation of the water wise landscape. Incentives including rebates should be rescinded if water use returns to previous levels within two years.

Awards programs can both reward the customer who has converted the landscape and help motivate others in the community to convert to low water use landscaping materials.

D. Schedule

1) The scope of this BMP, should be realized within ten years of the date implementation commences.
2) Develop and implement a plan to target and market landscape conversions to Industrial/Commercial/Institutional ("ICI") & Residential accounts with dedicated meters by the end of the first year from the date implementation commences.
3) Develop and implement a plan to target and market landscape conversions to all accounts by the end of the second year from the date implementation commences.
4) Develop and implement a customer incentive program by the end of the first year from the date implementation commences.

E. Scope

1) <u>Rebate and Incentive Approach</u>
   a. Within one year of implementation date, develop and implement a plan to market low-water requiring landscape design and conversion program;
   b. Within one year of implementation date, develop and implement a customer incentive program.
   c. Rescind incentives, including rebates, if water use returns to previous levels within two years.

2) <u>Ordinance Approach</u>
   In the first twelve (12) months: Plan a program including stakeholder meetings as needed. Consider offering rebates for all or a portion of the time this program is in place. For example, offer rebates for five years and publicize this so customers will take advantage of rebates and retrofit early in the program. Develop a plan for educating realtors and landscape companies about this requirement. Plan a follow up inspection program after retrofit. Develop and pass ordinance. Implement ordinance and tracking plan for number of units retrofitted.

   In the second year and after: Continue implementation and outreach program for realtors and landscape companies. Continue verification inspections.

F. Documentation

To track this BMP, the utility should gather the following documentation:

1) Number of dedicated irrigation meter accounts;
2) Number, type, and dollar value of incentives, rebates, and loans offered to and awarded to customers;
3) Estimated water savings based on customer surveys; and
4) Estimated landscape area converted and water savings achieved through low water landscape design and conversion program.
5) Customer water use records prior to and after conversion of the landscape. This data is best compared in years of similar rainfall and after sufficient time has passed for the landscape to establish itself.

G. Determination of Water Savings

Provide estimates of water savings from landscape conversions based upon actual metered data.

H. Cost-Effectiveness Considerations

The primary costs to implement this BMP are the incentives or rebates to customers for conversion to water wise landscape. Current incentives for landscape conversion range from $0.05 to $1.00 per square foot in Texas. Depending on program design and whether pre and postconversion inspections are required, staff labor cost should range from $50 to $100 per conversion.

Marketing and outreach costs range from $20 to $50 per conversion. Administrative and overhead costs range from 10 to 20 percent of labor costs.

I. References for Additional Information

1) *EARTHKIND™ Environmental Landscape Management*, http://aggie-horticulture.tamu.edu/earthknd/earthknd.html 2004.
2) *Handbook of Water Use and Conservation*, Amy Vickers, Waterplow Press, May 2001.
3) *Water Savings from a Turf Rebate Program in the Chihuahuan Desert*, El Paso Water Utilities, City of El Paso Water Utility, 2003.
4) *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, Pacific Institute, November 2003. http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf
5) *Xeriscape Handbook*, American Waterworks Association, Denver, 1999.
6) *Xeriscape Plant Guide*, American Waterworks Association, Denver, 1996.
7) *Xeriscape Color Guide - 100 Water-wise Plants for Gardens and Landscapes*, American Waterworks Association, Denver, 1998.

8) *City of Austin Landscape Regulations.* http://www.amlegal.com/austin_nxt/gateway.dll/Texas/Austin/code00000.htm/volume00157.htm/title00158.htm/chapter00160.htm?f=templates$fn=altmain-nf.htm$3.0#JD_25-2-981
9) *City of Austin Environmental Criteria Manual: Section 2 Landscape.* http://www.amlegal.com/austin_nxt2/gateway.dll?f=templates&fn=default.htm&vid=alp:austin_environment
10) *California Model Landscape Ordinance 1993.* http://www.owue.water.ca.gov/docs/WaterOrdIndex.cfm
11) *Austin Green Gardening Program* (http://www.ci.austin.tx.us/greengarden/)
12) *City of Corpus Christi Xeriscape Landscaping.* http://www.cctexas.com/?fuseaction=main.view&page=1047
13) *San Antonio Water System Conservation Program.* http://www.saws.org/conservation/h2ome/landscape/
14) *Texas Cooperative Extension for El Paso County.* http://elpasotaex.tamu.edu/horticulture/xeriscape.html
15) *WaterWise Council of Texas.* http://www.waterwisetexas.org/

2.11 Athletic Field Conservation

A. Applicability

This BMP is intended for all Municipal Water User Groups ("utility") which manage irrigated athletic field(s) and/or serve a customer with irrigated athletic field(s). Athletic fields often involve a visible use of water during the day, which comes under scrutiny by the public and water resource managers both because of large water demand to maintain an athletic field, and because of the perception that the water use may be excessive. The specific measures listed as part of this BMP can be implemented individually or as a group. Utilities may already be implementing one or more these elements and they may want to adopt additional elements outlined in this document.

Once a utility decides to adopt this BMP, the utility should follow the BMP closely in order to achieve the maximum water efficiency benefit from this BMP.

B. Description

Athletic field conservation is an effective method of reducing system water demands. The athletic field manager implements a watering regimen that uses only the amount of water necessary to maintain the viability of the turf and maintain the turf adequately to maintain the health of users. Water is only applied to areas that are essential to the use of the field.

The utility provides the customer, by staff or a third party, a large landscape water-use survey and develops reference evapotranspiration ("ETo")-based water-use budgets equal to no more than 100 percent ETo per square foot of landscape area. The survey includes the following elements: measurement of landscape area; measurement of total irrigable area; irrigation system checks and distribution uniformity analysis; and review or development of monthly irrigation schedules. If landscape use is determined to exceed 20 percent of total water use by the customer, the athletic facility should install a dedicated landscape meter. Alternatively the utility may allow customers to perform their own survey by properly trained staff and provide documentation of the survey to the utility. Proper athletic field management emphasizes precise nutrient management, soil preparation techniques, and regular watering as compared to simply using more water to ensure a dense turf.[1,2,3]

At a minimum, the athletic field BMP should require the replacement of all manual controlled or quick couple irrigation systems with automatic irrigation systems and controllers. The automatic controllers should be able to shut off flow when a sudden pressure loss occurs from a broken system. It is important that access to such controllers be limited to the authorized landscape manager or be designed to shut off flow automatically if the irrigation system is activated manually. The authorized landscape manager should be trained in good soil management and cultural practices such as proper aeration, nutrient management, mowing and soil testing as well as in irrigation management. The utility implementing this BMP should consider offering training for athletic field managers or co-sponsoring training with qualified agronomy program(s). Documentation of cultural practices and soil management measures should be included in a successful program. Although expensive, replacement of natural turf grasses with artificial turf is becoming more popular in some areas of Texas.

When cost-effective, the athletic field user should be required to provide methods for achieving enhanced water conservation through computer controlled irrigation systems ("CCIS") or similar technology. In order to achieve maximum efficiency a CCIS should include at least the following components: computer controller ("digital operating system"), software, interface modules, satellite field controller, soil moisture sensors, and weather station. A CCIS should be designed so as to prevent overwatering, flooding, pooling, evaporation, and run-off of water, and should prevent sprinkler heads from applying water at a rate exceeding the soil holding capacity. School districts or park systems with a number of remotely located athletic fields should consider a CCIS with satellite systems. Subsurface irrigation systems are also becoming more reliable and are an option. The utility may choose to offer incentives for athletic field management in direct relation to the size and sophistication of the system.

It is recommended and encouraged to use reclaimed, reused, and/or recycled water by athletic fields, however, such use must meet TCEQ water quality standards for treated effluent and human contact. When utilizing reclaimed water or water with high levels of total dissolved solids ("TDS") or hardness, the water budget will need to be adjusted to permit leaching of salts below the root zone of the turfgrass. Consultation with local extension agents can assist athletic field managers in properly managing the use of lower quality water for irrigation.

Soil improvement is an effective method for reducing irrigation water usage while maintaining healthy soils. Soil improvement programs on high visibility areas such as athletic fields can demonstrate to the public the effectiveness of this method. For athletic fields, compost applications of 1/4 to 1/2 inch annually are recommended. Compost is most beneficial when applied in the fall.

C. Implementation

The utility should consider stakeholder information meetings. Working with stakeholder groups is important to achieving "buy in" from the athletic field managers. Also a number of voluntary environmental management programs exist in which athletic fields may already be participating. There are two approaches to be considered: an incentive or voluntary approach and an ordinance or other enforceable requirement approach.

1) <u>Incentive or Voluntary Compliance Approach</u>
The utility may provide staff or contract with a third party to provide a water audit of the athletic field. The water-use surveys, at a minimum, include measurement of the irrigated turf areas; determination if hydrozones within the irrigation system are proper for the type of turf present; irrigation system checks and distribution uniformity analysis; review of irrigation schedules or development of schedules as appropriate; and provision of a customer survey report and information packet.

If indicated by survey results and if cost-effective, the utility may offer incentives to the athletic field user for upgrading of irrigation systems, installing or upgrading controllers, changing hydrozones to eliminate irrigation of areas that do not receive high foot traffic, or reducing the amounts of potable water used on the athletic fields. For athletic field managers that agree to manage water efficiently, variance procedures may assist them with watering schedules on large systems with many hydrozones. Utilities may consider assisting athletic field managers in developing an individualized conservation plan, which accounts for turf type, soils, and irrigation system constraints.

When cost-effective, the utility should offer workshops by trained professionals on pesticide and soil and nutrient management for optimal water use efficiency. To ensure that water savings goals are met, the utility should be explicit about the efficiency expectations of voluntary programs.

2) <u>Ordinance or Enforceable Requirements Approach</u>

a. For utilities with ordinance-making powers, in the first twelve (12) months plan develop, and pass an ordinance, including stakeholder meetings as needed. Develop a plan for educating customers, especially those directly affected by the requirements of the ordinance. Plan customer follow-up compliance and education after ordinance passage. Implement ordinance and tracking plan for violations, compliance notifications, and enforcement.

After ordinance passage (in the 2nd year and on), continue implementation and outreach program for customers. Continue compliance education and initiate enforcement programs. Enforcement can include citations with fines for repeat offenders. Or,

b. For utilities that lack ordinance-making powers, in the first twelve (12) months plan a program including stakeholder meetings as needed. Develop a plan for educating customers, especially those directly affected, about the requirements of an athletic field conservation program. Plan follow-up compliance and education program. Implement water conservation program and tracking plan for violations and compliance notifications. Consider passing excess-use rates as a disincentive to athletic fields that do not stay within a budgeted amount of water (*See* Conservation Pricing BMP).

D. Schedule

1) The utility should adopt an incentive program, an ordinance or rules within twelve (12) months of commencing this BMP.

2) The utility should implement the incentive plan or commence enforcement upon adoption of the ordinance or rule.

E. Scope

To accomplish this BMP, the utility should adopt athletic field conservation policies, programs or ordinances consistent with the provisions for this BMP specified in Section C.

F. Documentation

To track the progress of this BMP, the utility should gather and have available the following documentation:

1) Copy of incentive plan or athletic field conservation ordinances or rules enacted in the service area;
2) Copy of compliance or enforcement procedures implemented by utility, if applicable;
3) Records of enforcement actions including public complaints of violations, and utility responses, if applicable;
4) Number of customers completing the incentive plan;
5) Tracking mechanism developed to determine customer water use before and after implementation of BMP;
6) Water savings attributable to changes implemented; and
7) Costs of incentive plan(s) or ordinance if applicable.

G. Determination of Water Savings

Estimating total water savings for this BMP may be difficult, however, water savings can be estimated from each water-wasting measure eliminated through the actions taken under this BMP. For the replacement of inefficient equipment, the water savings are the difference in use between the new or upgraded equipment and inefficient equipment. For landscape water waste, the savings can be calculated based on estimated savings from each water waste incident. For an irrigation survey, water savings can be expected in the range of 15 percent to 25 percent for athletic fields that do not have a CCIS and where the efficiency measures recommended by the results of the survey are implemented. Switching to artificial turf, reuse or other nonpotable alternatives can save up to 100 percent of the potable water supply used in irrigation. These savings should be determined by measuring water use before and after the conversion to the new water supply.

H. Cost-Effectiveness Considerations

The labor costs for irrigation survey of an athletic field range from $250 to more than $1000 for an irrigation survey depending on the efficiency in scheduling the surveys, the size of the facility, and the scope of the survey. Surveys can be performed by utility staff or by contractors.

Marketing and outreach costs range from $5 to $15 per survey. Administrative and overhead costs are in the range of 10 to 20 percent of labor costs. Costs for upgrades to irrigation systems and controllers can be much more extensive depending upon the scale of changes needed. Costs for incentive programs for system upgrades will need to be evaluated on a case-by-case basis.

I. *References for Additional Information*

1) *Athletic Fields and Water Conservation*, Texas Agricultural Extension Service. http://soilcrop.tamu.edu/publications/pubs/b6088.pdf
2) *Maintaining Athletic Fields*, J. A. Murphy. http://www.rce.rutgers.edu/pubs/pdfs/fs105.pdf
3) *Managing Healthy Sports Fields: A Guide to Using Organic Materials for Low-Maintenance and Chemical-Free Playing Fields*, by Paul D. Sachs, John Wiley & Sons, January 2004.
4) *Managing Bermudagrass Turf: Selection, Construction, Cultural Practices, and Pest Management Strategies*, L. B. McCarty, Grady Miller, John Wiley & Sons, July 2002.
5) *Irrigation System Design and Management Courses*, Irrigation Technology Center, Texas A&M. http://irrigation.tamu.edu/courses.php
6) *Water Management Stretches Irrigation Water,* E. K. Chandler. http://www.txplant-soillab.com/page32.htm

2.12 Golf Course Conservation

A. Applicability

This BMP is intended for all Municipal Water User Groups ("utility") that serve a golf course customer. Golf courses often involve a visible use of water, which comes under scrutiny by the public and water resource managers both because of large water demand to maintain the course, and because of the perception that the water use may be excessive. Golf courses are often good candidates for reuse water or other alternative sources of water. The specific measures listed as part of this BMP can be implemented individually or as a group. Utilities may already be implementing one or more of the elements of this BMP and they may want to adopt additional elements outlined below.

Once a utility decides to adopt this BMP, the utility should follow the BMP closely in order to achieve the maximum water efficiency benefit from this BMP.

B. Description

Golf course conservation is an effective method of reducing water demands. Under this BMP, the utility requires each golf course to develop a conservation plan that includes the elements described in this section. The golf course manager conducts a landscape and irrigation survey to determine water needed to efficiently irrigate the course. A water budget should be developed using reference evapotranspiration ("ETo"). The manager implements a watering regimen that uses only the amount of water necessary to maintain the viability of the course. In addition to commercially available information from irrigation controller equipment companies, the Texas Evapotranspiration Network (http://texaset.tamu.edu/) has information to assist golf course managers and utility planners with proper management of large turf areas. Golf course managers should be encouraged to limit their water use to areas essential to the use of the golf course. An example of a use that has been eliminated on some golf courses is irrigation of the roughs.

The golf course plan utilizes methods of achieving enhanced water conservation such as a Computer Controlled Irrigation Systems ("CCIS") or similar technology. In order to achieve maximum efficiency a CCIS should include at least the following components: computer controller ("digital operating system"), software, interface modules, satellite field controller, soil sensors, and weather station. A CCIS should be designed so as to prevent overwatering, flooding, pooling, evaporation, and run-off of water and should prevent sprinkler heads from applying water at an intake rate exceeding the soil holding capacity. The golf course plan provides an analysis of the cost-effectiveness of utilizing a CCIS.

If potable water is used and if non-potable water is available, the golf course converts to use of non-potable water as soon as is practicable. The golf course plan should include projected implementation dates to convert to alternative water supplies. Use of reclaimed, reused, and/or recycled water by golf courses must meet TCEQ water quality standards for treated effluent and human contact.

Soil improvement is an effective method for reducing irrigation water usage while maintaining healthy soils. Soil improvement programs on high visibility areas such as golf courses can demonstrate to the public the effectiveness of this method. For golf courses compost applications of 1/4 to 1/2 inch annually on turf areas and one inch annually on flower beds are recommended. Compost is most beneficial when applied in the fall.

C. Implementation

The utility should consider stakeholder information meetings. Working with stakeholder groups will be important to achieving "buy in" from golf course businesses. Also a number of voluntary environmental management programs exist in which golf courses may already be participating. There are two approaches to be considered to implement the golf course conservation plan described in Section B: an incentive or voluntary approach and an ordinance or other enforceable requirement approach.

1) Incentive or Voluntary Compliance Approach
The utility may provide staff or contract with a third party to provide a water audit of the golf course. The water-use surveys should, at a minimum, include measurement of the irrigated turf areas; measurement of the greens, tee boxes and fairways; determination whether hydrozones within the irrigation system are proper for the type of turf present; irrigation system checks and distribution uniformity analysis; review or development of irrigation schedules; and provision of a customer survey report and information packet.

If indicated by survey results and if cost-effective, the utility may offer incentives to the golf course user for upgrading irrigation systems, installing or upgrading controllers, changing hydrozones to eliminate irrigation of rough, or reducing the amount of fairway watering.

When cost-effective, the utility should offer golf course management and staff workshops by trained professionals on pesticide and nutrient management for optimal water-use efficiency. An advantage to working with programs like the Audubon Cooperative Sanctuary Program ("ACSP") for Golf program is that the third party can assist in implementation at no cost to the utility. To ensure that water-savings goals are met, the utility should be explicit about the efficiency expectations of voluntary programs.

2) Ordinance or Enforceable Requirements Approach
   a. For utilities with ordinance-making powers, in the first twelve (12) months plan, develop, and pass an ordinance that requires development and implementation of the golf course conservation plan, including stakeholder meetings as needed. Develop a plan for educating customers, especially those directly affected by the requirements of the ordinance. Plan customer follow-up compliance and education after ordinance passage. Implement ordinance and tracking plan for violations, compliance notifications, and enforcement.

In the second year and on (after ordinance passage): Continue implementation and outreach programs for customers. Continue compliance education and initiate enforcement programs. Enforcement can include citations with fines and service interruption for repeat offenders.

b. For utilities that lack ordinance-making powers, in the first twelve (12) months plan a program including stakeholder meetings as needed. Develop a plan for educating customers, especially those directly affected, about the requirements of a golf course conservation plan. Develop follow-up compliance and education program. Implement water conservation program and tracking plan for violations and compliance notifications. Consider passing excess-use rates as a disincentive to golf courses that do not stay within a budgeted amount of water (*See* Conservation Pricing BMP).

D. Schedule

1) The utility should adopt an incentive program or an ordinance or rules within twelve (12) months of commencing this BMP.
2) The utility implements the incentive plan or commences enforcement upon adoption of the ordinance or rule.

E. Scope

To accomplish this BMP, the utility adopts golf course conservation policies, programs or ordinances consistent with the provisions for this BMP specified in Section C.

F. Documentation

To track the progress of this BMP, the utility should gather and have available the following documentation:

1) Copy of incentive plan or golf course conservation ordinances or rules enacted in the service area;
2) Copy of compliance or enforcement procedures implemented by utility, if applicable;
3) Records of enforcement actions including public complaints of violations and utility responses, if applicable;
4) Water savings from implemented changes; and
5) Number of customers completing the incentive plan.

G. *Determination of Water Savings*

Estimating total water savings for this BMP may be difficult, however, water savings can be estimated from each water-wasting measure eliminated through the actions taken under this BMP. For an irrigation survey, water savings can be expected in the range of 15 percent to 25 percent for courses without a CCIS that choose to implement the efficiency measures recommended by the results of the survey. There will be additional savings from the education of customers about golf course watering efficiency, which will be difficult to calculate but will encourage public goodwill toward the golf course water user and the utility. Switching to reuse or other non-potable alternatives can save up to 100 percent of the potable water supply used in irrigation. These savings are determined by measuring water use before and after the conversion to the new water supply.

H. *Cost-Effectiveness Considerations*

The one-time labor costs for producing golf course conservation plan guidelines and meeting with golf course stakeholders are dependent upon the level of staffing, the number of meetings, and time allotted to the planning process. Costs for annual review of golf course water use and conservation plan updates should be less than $100 per plan.

Marketing and outreach costs range from $5 to $15 per plan. Administrative and overhead costs are approximately 10 to 25 percent of labor costs. The costs to the golf course facility for an irrigation system survey and CCIS or other systems upgrades or switching to reuse water are highly variable. Costs are dependent upon the efficiency in scheduling the surveys, the size of the course, and the scope of the survey. Surveys can be performed by golf course staff or by contractors.

I. *References for Additional Information*

1) *Audubon Cooperative Sanctuary Program (ACSP) for Golf.* http://www.audubonintl.org/programs/acss/golf.htm
2) *Environmental Principles for Golf Courses in the United States*, United States Golf Association, 1996. http://www.usga.org/green/download/current_issues/print/environmental-principles.html
3) *Golf Course Irrigation: Environmental Design and Management Practices*, James Barrett, et al., Wiley & Sons Publishers, 2003.
4) *Irrigation Information Packet*, Golf Course Superintendents Association of America. http://www.gcsaa.org/resource/infopacks/pdfs/irrigation.pdf
5) *Turf Management for Golf Courses, 2nd Edition*, James B. Beard, United States Golf Association, 2002.
6) *U.S. Air Force Golf Course Environmental Management Program*, Air Force Center for Environmental Excellence, San Antonio, Texas. http://www.afcee.brooks.af.mil/ec/golf/default.asp
7) *Wastewater Reuse for Golf Course Irrigation*, edited by James T. Snow, United States Golf Association, 1994.

3.13 Industrial Landscape

A. Applicability

This BMP is intended for industrial water users that irrigate landscape areas or use a significant amount of water in outdoor irrigation. Water conservation in the landscape can reduce water demands overall, reduce peak stress on water delivery systems, save energy, and reduce fuel and water costs. Landscape irrigation also offers the opportunity for water reclamation and reuse or useful disposal of water sometimes considered waste, such as air conditioning condensate.

For industrial water users, reducing water used for irrigation as an efficiency measure has the benefits of reduced water bills and landscape maintenance costs. Studies have shown that many plants that have undergone the stress of water constraints become more drought resistant and require less irrigation. Once an industrial water user decides to adopt this BMP, the water user should follow the process closely to achieve maximum water efficiency and other benefits this BMP offers. This BMP is not intended for cases where irrigation water is applied to mining reclamation projects, landfill closeouts, or other similar revegetation projects, but those projects should be done in an efficient manner with attention to water conservation.

B. Description

Under this BMP, the industrial water user with an irrigated landscape area will conduct a landscape water-use survey of its site and facilities. The water-use survey should at a minimum include measurement of the landscape area; measurement of the total irrigable area; irrigation system checks and distribution uniformity analysis; and review or development of irrigation schedules. In addition, the survey should identify currently irrigated areas where irrigation could be discontinued because such areas are not highly visible or the plant materials in these areas do not need supplemental irrigation. The survey should also identify areas in which return flow reuse, stormwater reuse, and use of treated wastewater effluent for irrigation might be environmentally, legally, and agronomically feasible.

If the water user has an automated irrigation system to irrigate turf grass, it will develop reference evapotranspiration (ETo)-based water-use budgets equal to a maximum of no more than 80 percent of reference evapotranspiration per square foot of irrigated landscape area. The statewide Texas Evapotranspiration Network (http://texaset.tamu.edu/) should be consulted for historical evapotranspiration data and methodology for calculating reference evapotranspiration and allowable stress. As the website indicates, those desiring greater water savings can utilize stress coefficients lower than 80 percent. If irrigated landscape area exceeds one (1) acre, the water user should install a dedicated irrigation meter or submeter.

Some industrial users have found that ceasing all irrigation and allowing native groundcovers to grow amidst an existing turf grass landscape is an effective means of reducing water use. Others have used rainwater harvesting, condensate reuse, cooling tower blowdown, RO reject water or stormwater recovery to irrigate landscape areas. These approaches could be considered a substitute means to accomplish the water saving goals of this BMP.

At the start and end of the irrigation season, irrigation systems should be checked and repaired and adjustments made as necessary. For companies with landscape managers on staff, training in landscape maintenance and irrigation system design should be required. In accordance with Texas law, individuals responsible for installing irrigation systems must be licensed by the State of Texas.

Large managed landscapes and commercial operations should prepare a written irrigation management site plan that clearly identifies responses and priorities during water-limited situations such as various stages of drought. The plan should be part of a comprehensive landscape management plan that addresses other management practices such as mowing, fertilizing, etc. On large sites, written landscape plans that include specifications for soil preparation, plant materials, irrigation design, mulch, and maintenance instructions are particularly important.

A landscape conservation program might also incorporate systematic upgrades to reduce water use, including irrigation system components, design and maintenance programs, and landscape design. Rainwater sensors, irrigation controllers, pipe specifications, and hydrozone specifications are all potential elements of an irrigation systems upgrade.

Landscape design emphasizing low-water-use plants should also be considered. Plants appropriate to the region in which they are being planted and with documented low water requirements should be given priority in the landscape design. All designs should be based on the seven principles of WaterWise landscaping (also known as Xeriscape principles).[1] Careful follow-up is essential to ensure that water is not applied in excess of plant needs. In addition to the references noted below, many landscape management companies in Texas now offer water-efficient landscape design and maintenance services.

Landscape design for new construction should use low-water-use plants appropriate to the region of Texas. For large landscape areas, an evapotranspiration (ET) controller or soil moisture sensors should be installed in order to use real-time input to determine plant water stress and needs. A new irrigation system will include a rain sensor shutoff mechanism and use drip or low-pressure irrigation heads in hydrozones where appropriate in order to achieve maximum water efficiency.

Soil improvement is an effective method for reducing irrigation water usage while maintaining healthy soils. Soil improvement programs on high visibility areas can demonstrate to the public the effectiveness of this method. For most landscapes, compost applications of 1/4 to 1/2 inch annually on turf areas and one inch annually on flower beds are recommended. Compost is most beneficial when applied in the fall.

[1] Water Wise Landscape programs follow the seven principles of Xeriscape™, from the Texas A&M Horticulture Website (2), listed below and explained in greater detail in resources listed in the reference section:
1. Planning and design; 2. Soil analysis and improvement; 3. Appropriate plant selection; 4. Practical turf areas; 5. Efficient irrigation; 6. Use of mulches; and 7. Appropriate maintenance.

C. *Implementation*

The initial step is an efficiency evaluation of the existing landscape area and irrigation systems. Recommended changes to the irrigation system will come from the evaluation report. The evaluation should include:

1) a list of landscape areas, measurements, plant types, irrigation system hydrozones, controller(s);
2) a list of existing irrigation policies including maintenance and irrigation schedules;
3) a distribution uniformity analysis on irrigated turf areas; and
4) an initial report summarizing the results of the evaluation.

Based on the results of the evaluation, the water user develops and implements a program to maintain and operate its irrigation systems in a water-efficient manner. Maintenance programs include seasonal system checks, adjustment of irrigation timers when necessary, installation of rain sensors, and regular review of irrigation schedules. Internal reporting should be done to confirm that regular seasonal maintenance of the irrigation systems is achieved. When landscape management companies are utilized, contracts should include a required report showing regularly scheduled maintenance and seasonal adjustments to irrigation systems controllers.

In its landscape management programs, the water user should consider installation of climate-appropriate water-efficient landscaping; installation of an ET-based irrigation controller; and dual metering. Another measure to consider is the training of personnel in landscape maintenance, irrigation system maintenance, and irrigation system design. Implementation of Integrated Pest Management strategies can also result in reduced use of pesticides and fertilizers, thereby reducing the amount of water required.

For users that do not have an ET-based controller collecting real-time data, evapotranspiration data is available for numerous parts of the state from the Texas Evapotranspiration Network (Network). This Network will expand over time, as more weather stations are added. If the water user is located in a part of the state not covered by the Network, then it can use the methodology on the Network Website (http://texaset.tamu.edu/) and weather data available from federal agencies such as the National Oceanic and Atmospheric Administration ("NOAA") or the United States Geological Survey ("USGS"). While this BMP sets 80 percent ETo as the minimal allowable stress ("AS") to achieve water conservation, lower irrigation amounts are achievable by reducing the AS coefficient further. A preferred alternative approach is to utilize the methods for reducing irrigation quantities as outlined in this BMP and on the Network, but collect evapotranspiration data on site by purchasing a weather station.

If significant changes to irrigation systems or landscape design are implemented, these should be planned with a licensed irrigation professional or a professional landscape designer for optimal water savings. Ceasing irrigation of the landscape and allowing native groundcovers to flourish or converting to an alternative water source are also acceptable means of implementing this BMP.

D. *Schedule*

If the water user chooses this BMP, the following is a recommended schedule:

1) The irrigation systems evaluation should be completed in a timely manner. Efficiency evaluations of very large or complex systems should be completed within the first twelve (12) months of implementing this BMP. This is a reasonable time period to complete a thorough evaluation.
2) Develop ETo-based water-use budgets for all landscape zones no more than two years after the implementation start date.
3) Within two years of the implementation start date, install a dedicated landscape meter if landscape use is determined to exceed one (1) acre.
4) If irrigation systems upgrades are indicated or new landscape designs are planned, the changes should be initiated immediately after the landscape report is concluded and be completed within twelve (12) months.
5) The Landscape BMP shall be fully implemented within two years of the start date. If determined to be necessary for very large or complex facilities, the schedule can be extended. BMPs should be initiated in the second year and continued until the targeted efficiency is reached.

E. *Scope*

To accomplish this BMP:

1) Industrial water users with several facilities with the same or very similar landscape irrigation systems should conduct a landscape evaluation following the schedule outlined in Section D.
2) Industrial water users with several facility sites with very different landscape irrigation systems at the various sites should follow a progressive implementation schedule, implementing the BMP successively until all facilities have been audited and conservation measures implemented.
3) Cost-effectiveness considerations may result in partial implementation of this BMP at one or several of a large number of facilities.

F. *Documentation*

To track the progress of this BMP, the industrial water user gathers and maintains the following documentation and can utilize industry accepted practices:

1) Summary report of the initial landscape survey;
2) Estimated ETo-based budget and annual water savings using the method described in Section G below;
3) Records of monthly landscape water use, personnel training, and changes to equipment and performance specifications;
4) Demonstrated water use reduction in targeted landscapes; and
5) Data on program progress, water savings, and expenditures.

G. Determination of Water Savings

Estimated water savings should be based on the assumption that a landscape survey and resulting programs will result in a 15 percent reduction in the amount of water used for landscape purposes. Calculating savings can be more accurately achieved after implementing the BMP.

Water savings calculation: $S = I_{(h)} - I_{(BMP)}$

Where S is savings in acre-feet/year
$I_{(h)}$ is annual irrigation average prior to implementing BMP
$I_{(BMP)}$ is annual irrigation after implementing BMP

80 percent ETo calculation: $I = ETo \times Kc \times AS$

Where I is the irrigation amount to be applied for a given period (daily, twice weekly, weekly, etc.) in inches or centimeters
ETo is the measured reference evapotranspiration over the irrigation period
Kc is a turf coefficient for turf grasses, and can be found at http://texaset.tamu.edu/
AS is allowable stress of 0.8 (or less if the landscape manager wishes)

When applying irrigation, the equation should be modified to gain greater water savings, by accounting for precipitation: $I = (ETo \times Kc \times AS) - P$
Where P is precipitation in inches or cm.

H. Cost-Effectiveness Considerations

The industrial water user should determine the cost effectiveness to implement each identified replacement or upgrade to its landscape irrigation equipment and procedures, utilizing its own criteria for making capital improvement decisions. Many operating procedures and controls that improve the water use efficiency should be implemented simply as a matter of good practice. A cost effectiveness analysis under this BMP should consider capital equipment costs and changes in staff and labor costs.

I. References for Additional Information

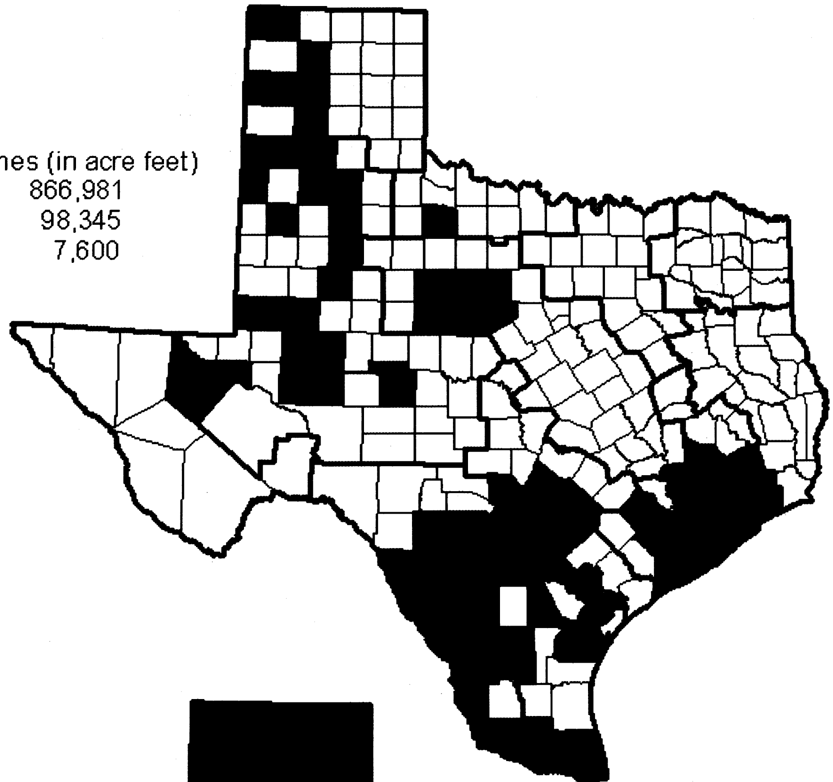
1) *A Water Conservation Guide for Commercial, Institutional and Industrial Water Users*. New Mexico Office of the State Engineer, July 1999. http://www.seo.state.nm.us/water-info/conservation/pdf-manuals/cii-users-guide.pdf
2) *EARTHKIND™ Environmental Landscape Management* http://aggie-horticulture.tamu.edu/earthknd/earthknd.html 2004.
3) *Landscape Irrigation Scheduling and Water Management,* Water Management Committee of the Irrigation Association, September 2003. http://www.irrigation.org/PDF/IA_LIS_AND_WM_SEPT_2003_DRAFT.pdf

Regional Water Plans with Conservation Management Strategies

2001

2050 Strategy Volumes (in acre feet)

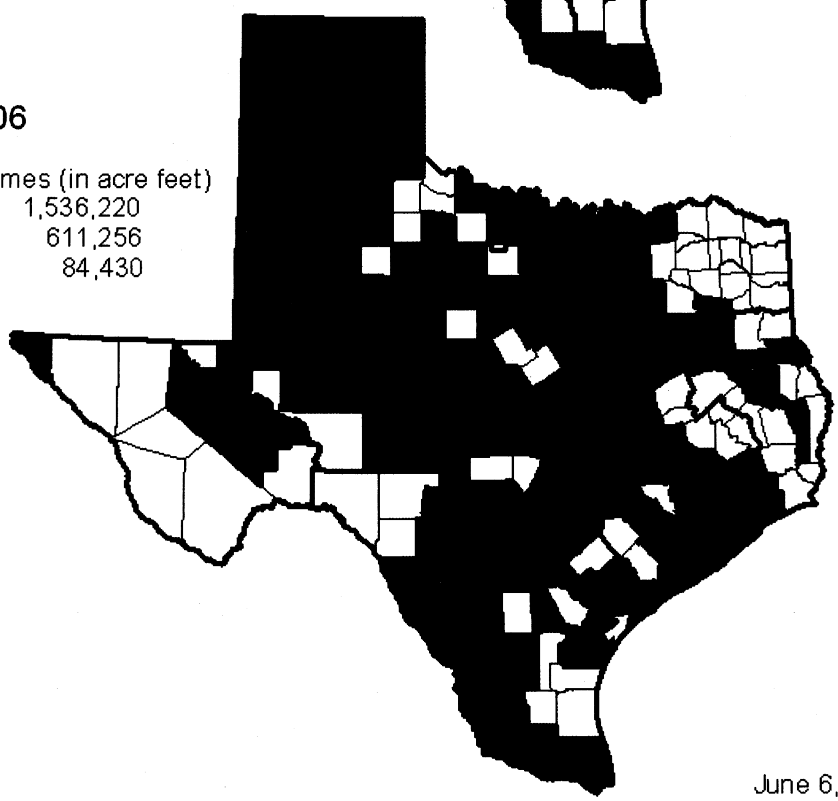
Agricultural	866,981
Municipal	98,345
Industrial	7,600



2006

2060 Strategy Volumes (in acre feet)

Agricultural	1,536,220
Municipal	611,256
Industrial	84,430



June 6, 2006

2007 State Water Plan Timeline

2006			
January 1/5/06 – Submittal of Adopted Regional Water Plans to TWDB Work Session to develop policy recommendations	**February** Work Session to develop TWDB policy recommendations Stakeholder meeting on next round of planning for approval	**March** Work Session to develop TWDB policy recommendations Regional Water Plans presented for approval	**April** Regional Water Plans approved
May Regional Water Plans approved	**June** Consider staff recommendation for 2006-2011 Regional Water Planning process	**July** Work session to develop TWDB policy recommendations	**August** Board consideration of publication of draft 2007 State Water Plan
September Hold public meetings across the state on the draft 2007 State Water Plan	**October** Public hearing in Austin on draft 2007 State Water Plan Revise draft 2007 State Water Plan in response to public comments	**November** Board consideration of adoption of final 2007 State Water Plan	**December** 2007 State Water Plan to printer

2007			
January 2007 State Water Plan distributed to Governor, Lieutenant Governor, Speaker of the House, and Legislature – January 5, 2007	**February** Legislative briefings	**March** Legislative briefings	**April** Legislative briefings

Appendix
T

Drought Preparedness Council

STATE DROUGHT PREPAREDNESS PLAN

For additional copies of this pamphlet, contact:

Preparedness Section
Governor's Division of Emergency Management
Texas Department of Public Safety
P.O. Box 4087
Austin, Texas 78773-0223

Telephone: 512/424-2450
Facsimile: 512/424-2444

STATE OF TEXAS
DROUGHT PREPAREDNESS PLAN

APPROVAL AND IMPLEMENTATION

This plan is hereby approved for implementation and supersedes all previous editions.

July 22, 2005	**Jack Colley**
Date	**State Drought Manager** **Texas Drought Preparedness Council**

RECORD OF CHANGES

CHANGE	DATE OF CHANGE	INITIALS AND DATE ENTERED

Explanation of Terms

A. Acronyms

AGD	Adjutant General's Department
CDBG	Community Development Block Grant
CEOS	Committee on Earth Observation Satellites
CER	Corporate Expansion and Recruitment
CMI	Crop Moisture Index
DPC	Drought Preparedness Council
DRIP	Drought Information Resource Packet
EO	Earth Observation
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
FSA	Farm Service Agency
GDEM	Governor's Division of Emergency Management
GIS	Geographical Information System
GSC	General Services Commission
GUI	Graphical User Interface
HUD	Housing and Urban Development
IBWC	International Boundary and Water Commission
KBDI	Keetch-Byram Drought Index
NASS	National Agricultural Statistics Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resources Conservation Service
NWS	National Weather Service
ORCA	Office of Rural Community Affairs
OSC	Office of State Climatologist
PDD	Public Disaster Declaration
PDSI	Palmer Drought Severity Index
PET	Potential Evapotranspiration
PSA	Public Service Announcement
RD	Rural Development
RRC	Railroad Commission
SITREP	Situation Report
SPI	Standard Precipitation Index
TAEX	Texas Agricultural Extension Service
TAGD	Texas Alliance of Groundwater Districts
TASS	Texas Agricultural Statistics Service
TCCS	Texas Center for Climate Studies
TCDP	Texas Community Development Program
TCEQ	Texas Commission on Environmental Quality
TDA	Texas Department of Agriculture
TDED	Texas Department of Economic Development and Tourism
TDHCA	Texas Department of Housing and Community Affairs
TDSHS	Texas Department of State Health Services
TFS	Texas Forest Service
TNRIS	Texas Natural Resources Information System
TPWD	Texas Parks and Wildlife Department
TSSWCB	Texas State Soil and Water Conservation Board
TWDB	Texas Water Development Board
TWMC	Texas Water Monitoring Congress
TxDOT	Texas Department of Transportation
TxLEWS	Texas Livestock Early Warning System
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

USGS	United States Geological Survey
USPHS	United States Public Health Service
VOAD	Voluntary Organizations Active in Disasters
VT	Vegetation and Temperature Condition Index
WAM	Water Availability Modeling

B. Definitions

1. Meteorological Drought: This type of drought is often defined by a period of substantially diminished precipitation duration and/or intensity that persists long enough to produce a significant hydrologic imbalance. The commonly used definition of meteorological drought is an interval of time, generally of the order of months or years, during which the actual moisture supply at a given place consistently falls below the climatologically- appropriate moisture supply.

2. Agricultural Drought: Occurs when there is inadequate precipitation and/or soil moisture to sustain crop or forage production systems. The water deficit results in serious damage and economic loss to plant or animal agriculture. Agricultural drought usually begins after meteorological drought but before hydrological drought and can also affect livestock and other agricultural operations.

3. Hydrological Drought: Refers to deficiencies in surface and subsurface water supplies. It is measured as streamflow, and as lake, reservoir, and groundwater levels. There is usually a time lag between a lack of rain or snow and less measurable water in streams, lakes, and reservoirs, making hydrological measurements not the earliest indicators of drought.

4. Socioeconomic Drought: This drought occurs when physical water shortages start to affect the health, well being, and quality of life of the people, or when the drought starts to affect the supply and demand of an economic product.

5. Standard Precipitation Index (SPI): The SPI was designed to quantify the precipitation deficit for multiple time scales. These time scales reflect the impact of drought on the availability of the different water resources.

6. Palmer Drought Severity Index (PDSI): The PDSI is a "meteorological" drought index and responds to weather conditions that have been abnormally dry or abnormally wet. The Palmer Index provides decision-makers with a measurement of the abnormality of recent weather for a region, an opportunity to consider current conditions in a historical perspective, and a spatial and temporal representation of historical droughts.

7. Crop Moisture Index (CMI): The Crop Moisture Index (CMI) is an index that uses a meteorological approach to monitor week-to-week crop conditions. It was designed to evaluate short-term moisture conditions across major crop producing regions. It is based on the mean temperature and total precipitation for each week within a Climate Division, as well as the CMI value from the previous week-to-week crop conditions.

8. Keetch-Byram Drought Index (KBDI): The Keetch-Byram Drought Index is a drought index specifically used for fire potential assessment. The numeric value of the index, ranging from 0 to 800, is an estimate of the amount of precipitation (in 100ths of an inch) needed to bring the soil back to saturation. The KBDI is directly correlated to fire danger; as the index increases, the vegetation is subjected to increased moisture stress.

9. Vegetation and Temperature Condition Index (VT): The VT is a numerical index, being used for estimation of vegetation health and monitoring drought, changes from 0 to 100 characterizing change in vegetation conditions from extremely poor (0) to excellent (100).

TABLE OF CONTENTS

STATE DROUGHT PREPAREDNESS PLAN

ATTACHMENTS

ANNEX

STATE OF TEXAS
DROUGHT PREPAREDNESS PLAN

I. AUTHORITY AND REFERENCES

A. AUTHORITY

The State Drought Preparedness Plan is prepared under the auspices of HB-2660, Section 2, Subchapter C, Chapter 16 of the Texas Water Code

B. REFERENCES

1. Public Law 84-99, Code 400 (Water Assistance) and Public Law 95-51
2. Government Code: TITLE 4 EXECUTIVE BRANCH, Subtitle B (Law Enforcement And Public Protection), Chapter 411 (Department of Public Safety of the State of Texas); Chapter 418 (Emergency Management); Subtitle F (Commerce And Industrial Development); Chapter 481 (Texas Department of Economic Development and Tourism Office)
3. Government Code: TITLE 10 GENERAL GOVERNMENT, Subtitle G (Economic Development Programs Involving Both State and Local Governments), Chapter 2306 (Texas Department of Housing and Community Affairs)
4. Education Code: Chapter 88 (Agencies and Services Of The Texas A & M University)
5. Health and Safety Code: TITLE 2 HEALTH and TITLE 9 SAFETY
6. Natural Resources Code: TITLE 8 ACQUISITION OF RESOURCES, Chapter 183 (Conservation Easements); TITLE 12 WETLANDS, Chapter 221 (Wetland Mitigation)
7. Parks and Wildlife Code: TITLE 2 PARKS AND WILDLIFE DEPARTMENT and TITLE 3 PARKS
8. Transportation Code: TITLE 6 ROADWAYS
9. Water Code: TITLE 1 GENERAL PROVISIONS; TITLE 2 WATER ADMINISTRATION, Subtitle A (Executive Agencies), Subtitle C (Water Development), and Subtitle E (Groundwater Management)
10. TAC Title 4 Agriculture: Part 1 (Texas Department Agriculture), Part 12 (Texas Forest Service)
11. TAC Title 10 Community Development: Part 1 (Texas Department of Housing and Community Affairs), Part 5 (Office of the Governor, Economic Development and Tourism Development), Part 6 (Office of Rural Community Affairs)
12. TAC Title 25 Health Services: Part 1 (Texas Department of State Health Services)
13. TAC Title 30 Environmental Quality: Part 1 (Texas Commission on Environmental Quality)
14. TAC Title 31 Natural Resources and Conservation: Part 2 (Texas Parks and Wildlife Department), Part 10 (Texas Water Development Board), Part 17 (Texas State Soil and Water Conservation Board)
15. TAC Title 37 Public Safety and Corrections: Part 1 (Texas Department of Public Safety)
16. TAC Title 43 Transportation: Part 1 (Texas Department of Transportation)

II. BACKGROUND

A. Drought is a recurring event in Texas. Since it is frequently widespread and can cover several regional climatic areas, the State may incur inconsistent levels of drought intensity from one region to another on a statewide basis. Texas has suffered notable periods of drought since the 1930s with extended periods of drought having affected the State during 1933-1935, 1938-1940, 1950-1957, 1962-1967, 1988-1990, 1996, and 1998-2002.

B. Drought conditions in 1996 affected Texas, causing greater economic losses to agriculture than any previously recorded one-year drought event. Two years later, the drought of 1998, which was relatively short in duration, caused agricultural impacts with total losses estimated to be just over $6 billion, or slightly higher than those recorded in 1996. In June of 1999, drought conditions returned to the State and have continued into 2000 showing increasing evidence in many areas during June and July.

C. To emphasize the need for Texas to have a proactive approach to drought planning, Governor George W. Bush, in May of 1999, signed legislation (HB 2660) that formed the Drought Preparedness Council (DPC). The member agencies were requested to support drought management efforts, emphasizing drought monitoring, assessment, preparedness, mitigation, and assistance. This law required that the State Drought Preparedness Council develop a comprehensive State Drought Preparedness Plan that provides for (1) systematic data collection, analysis, and dissemination of drought-related information; (2) an organizational structure that defines the duties and responsibilities and assures information flow among all levels of government; (3) an inventory of state and federal programs related to drought emergencies; (4) a mechanism to improve the timely and accurate assessment of drought impact; and (5) provision of accurate and timely information to the media.

D. Numerous drought plans from various states were reviewed, and interviews were conducted with drought-related experts from both state and federal agencies. These interviews and analyses revealed that many previous drought plans provided "triggering" mechanisms or thresholds that were intended to initiate specific actions by various agencies, but when these thresholds were reached or exceeded, the prescribed response was rarely implemented in a timely or effective manner. By using an integrated approach to drought planning, the State Drought Preparedness Plan will serve as a viable and flexible approach to prepare for and mitigate the problems of drought in the State of Texas.

III. PURPOSE

A. The purpose of this plan is to provide Texas with a framework for an integrated approach to minimize the impacts of drought on its people and resources. This plan outlines both long-term and short-term measures that are to be used to prepare for, respond to, and mitigate the effects of drought. To accomplish these goals, the State Drought Preparedness Plan:

1. Identifies the local, state, federal and private sector entities that are involved with state drought management and defines their responsibilities.

2. Defines a process to be followed in addressing drought-related activities, including monitoring, impact assessment, and response.

3. Identifies long and short-term activities that can be implemented to prevent and mitigate drought impacts.

4. Acts as a catalyst for creation and implementation of local drought planning and response efforts.

B. The State Drought Preparedness Plan is intended to complement the State Water Plan and on-going water resource planning efforts identified in local and regional Water Conservation Plans and Drought Contingency Plans. The Texas Water Code and State Water Plan are important items of discussion in any water planning effort, and it is anticipated that measures and actions outlined in these documents will be incorporated into existing or future water and drought planning efforts.

C. In designing the action items of the State Drought Preparedness Plan, every effort has been made to use existing partnerships and lines of communication as well as input of local Texas stakeholders in providing feedback as to the effectiveness of planned or implemented mitigation measures.

D. The timely dissemination of drought-related information plays an important role in assuring the effectiveness of the State Drought Preparedness Plan. A targeted effort has been made to develop an information dissemination system using target customer lists for e-mail and fax communication systems. Existing agency informational brochures have been combined with Internet web sites to communicate drought information to the public. These efforts are designed to assure the timely delivery of needed data to both the state's decision-makers and to the general public.

E. Because of the ever-changing staffs of state, federal, and local governments, and the need to periodically evaluate and revise the State Drought Preparedness Plan, two important decisions as to the Plan's format have been made to achieve these goals:

1. To guarantee flexibility in the plan's content, a loose-leaf format has been chosen as opposed to a bound document. The loose-leaf format will allow for the modification of the original plan with the least amount of cost and delay.

2. To allow access of the plan's content to the largest possible audience, without the need for massive document publication costs, the entire State Drought Preparedness Plan has been placed on the Drought Preparedness Council web site at: http://www.txwin.net/dpc. Timely updates on the status of drought in Texas are posted at the web site in hopes that this process will allow the greatest flexibility for the review, modification, and use of data in the plan.

IV. ASSUMPTIONS

A. Drought is a complex physical and social process of widespread significance. Although drought sometimes affects the entire State, it frequently is a regional problem due to the vast geography and varying climatic conditions within the State. Despite the frequency and economic damage caused by drought, the term drought remains difficult to define, and there are no universally accepted parameters because:

1. Drought, unlike floods, is not a distinct event in that it has no clearly defined beginning or end, thereby complicating attempts to define it.

2. The definition of drought varies with its impact on individuals, thus influencing the perception of drought depending upon whom it affects and how they are affected.

B. While the effects of drought on the environment cannot be avoided in many cases, the adverse effects of drought caused by human intervention in drought prone areas can be avoided.

C. The most commonly used definitions of drought are based on meteorological, agricultural, hydrological, and socioeconomic effects.

V. CONCEPT OF OPERATIONS

A. GENERAL

1. The potential impacts of drought on the State of Texas are many of a varied nature and can affect a wide range of economic, environmental, and social concerns. The relative vulnerability or risk exposure of these activities to the effects of drought usually depends on the types of water demands, how these demands are met, and the corresponding water supplies available to meet these demands.

2. Those human and natural resource activities which depend solely on rainfall and soil moisture, such as dryland farming, ranching, and some environmental water uses, are most at risk from drought. These activities can suffer discernible effects even with droughts of short duration.

3. Still at relatively high risk, but somewhat less exposed, are systems that depend upon stream flows such as run-of-the-river irrigation; aquatic, wetland, and riparian environmental communities; and recreational water uses.

4. Many urban and agricultural water users that rely upon surface water reservoir supplies or on aquifers not rapidly influenced by climatic or pumping conditions, are less likely to experience drought impacts.

5. The level of risk, which includes vulnerability and hazard, has been considered in the design of the structure of the State Drought Preparedness Plan and is integrated into the preparedness, response, recovery, and mitigation activities therein.

B. DROUGHT MONITORING AND DATA COLLECTION

1. Both drought monitoring and the ability to predict the current and future stages of drought development is key to the State Drought Preparedness Plan. To supply real-time climate, streamflow, aquifer, and reservoir information for water-planning professionals, a network of data-gathering sites, operated by various state and federal agencies, has been established. Taking a proactive approach to drought management requires continuous monitoring of factors indicating the onset and extent of drought conditions. This approach serves to lessen the element of surprise and allows time for planning and implementing drought mitigation strategies. Monitoring activities are increased as conditions warrant, and they continue as long as drought conditions persist. Monitoring provides continuous feedback to decision-makers and helps determine the short-term planning for assessment and response actions.

2. The National Weather Service (NWS) collects and analyzes data from numerous weather stations in Texas. These sites collect data on precipitation, temperature, and snowfall, and the results are integrated into various prediction indices. This data is also available in a real-time and long-term record format from the National Climatic Data Center at: http://www.ncdc.noaa.gov/.

3. The National Oceanic and Atmospheric Administration (NOAA) provides drought-related information through the Committee on Earth Observation Satellites (CEOS) Disaster Management Support Group which provides information that supports natural and technological disaster management by fostering improved use of existing and planned earth observation (EO) satellite data. A drought management web site is at: http://disaster.ceos.org/newdrought.htm.

4. The Office of the State Climatologist for Texas (OSC) is housed in the College of Geosciences at Texas A & M University and maintains close links with the National Climatic Data Center and the Southern Regional Climate Center. The OSC retains a large database covering Texas and southern states, and regularly publishes reports and monographs and undertakes research on historical climate, climate prediction, and other aspects of climatology. The Texas Climatic Bulletin and related weekly and monthly reports are available at: http://www.met.tamu.edu/met/osc/osc.html.

5. The U.S. Geological Survey (USGS) operates gauging stations at about 350 streamflow sites, about 150 major reservoirs, and about 50 wells in Texas. Current, recent, and historical data and analysis for these stations, and historical data for many other stations, are reported online at: http://tx.usgs.gov/.

6. The Texas Water Development Board (TWDB) monitors major water storage reservoirs, operated by various state, federal, and private entities and also aquifers in the State, and provides a monthly summary of the storage status of these reservoirs and aquifers at: http://www.twdb.state.tx.us/publications/reports/waterconditions/watercon.htm.

7. The Texas Commission of Environmental Quality (TCEQ) maintains a Water Systems Under Water Use Restriction Map at: http://www.tceq.state.tx.us/permitting/waterperm/pdw/location.html. This map reflects the Public Water Supply "Watch" list which is a database containing public water systems that are experiencing drought-related water supply problems and have mandated water restrictions using trigger points contained in their Drought Contingency Plans. This enables water systems to better manage supplies during periods of drought and prevent customer outages. Public water suppliers are required to notify the TCEQ when mandatory water restrictions are placed on customers. The "Watch" list is updated regularly to provide current information and contains the water supplier's name, county, phone number, water source, date of restriction notice, population, number of connections, priority, and water restriction stage. The priority classification system is (1) Emergency, (2) Priority, (3) Watch, or (4) Resolved. The list also contains information regarding the reason for the restrictions as well as short and long-term solutions.

8. The Texas Agricultural Statistics Service (TASS) operates under a cooperative agreement between the Texas Department of Agriculture (TDA) and the United States Department of Agriculture's National Agricultural Statistics Service (NASS). TASS publishes current and historical statistics on agricultural commodities and activities for the State of Texas on their Internet web site at: http://www.io.com/~tass/. Weekly reports on pasture, range, soil moisture and individual crop (sorghum, corn, cotton, wheat, rice, peanut) conditions are generated by Texas Agricultural Extension Service (TAEX) County Extension agents, summarized by districts, and reported by Texas Agricultural Statistics Service (TASS) and TAEX. The current system does not report individual county conditions. TASS and TAEX report the weekly summaries at the state level, and the report is incorporated into the National Agricultural Statistics summary. A goal of this plan is to make individual county information on drought impact by commodity available weekly at the county level.

C. DROUGHT ASSESSMENT OPERATIONS

The Drought Preparedness Council is directed by HB 2660 to collect, analyze, and disseminate drought information. The assessment process is as follows:

1. Applicable Council member agencies will develop/collect information using climatic regions in accordance with the NOAA climactic regional delineation. Texas has been divided into ten (10) separate NOAA climatic regions, each representing a particular area of the State that has relatively similar climatic conditions (see Attachment 1). Work is underway to develop smaller subgroups for these climatic regions.

2. The assessment will employ five "levels of concern" (i.e., from minimal concern to maximum threat (a range of numeric values for "level of concern" will be reported for a climate region when conditions vary significantly within that region):

   a. Level 1 – Advisory

   b. Level 2 – Watch

   c. Level 3 – Warning

   d. Level 4 – Emergency

   e. Level 5 – Disaster

3. In addition, three "functional assessment indices" have been developed for three specific types of drought (i.e., *climatological drought, agricultural drought,* and *water availability drought*). Each "assessment index" consists of two to five sub-indices. (An explanation of these sub-indices can be found in Attachments 2-4.) The three functional assessment indices, coupled with their related sub-indices, are shown below. The agencies shown adjacent to the index name are the agencies responsible for obtaining and using the information on each index.

   a. <u>Climatological Assessment Index</u> – Texas Water Development Board (TWDB)

      (1) Standard Precipitation Index (SPI) – TWDB

      (2) Keetch-Byram Drought Index (KBDI) – TFS

      (3) Vegetation and Temperature Condition index (VT) – TWDB

      (4) Crop Moisture Index (CMI) – TWDB

      (5) Palmer Drought Severity index (PDSI) – TWDB

   b. <u>Agriculture Assessment Index</u> – Texas Agricultural Extension Service (TAEX)

      (1) Soil Moisture Index – TAEX

(2) Crop Condition Index – TAEX

(3) Pasture and Range Condition Index – TAEX

(4) Livestock Sales Index – TDA

(5) U.S. Department of Agriculture (USDA) Drought Declarations – TDA*

* While TDA maintains the updated information for this index, GDEM administratively processes the agricultural drought declaration request for approval by the Governor.

c. Water Availability Assessment Index – TWDB

(1) Reservoir Levels – TWDB

(2) Streamflow Data – TWDB

4. For each of the ten climatic regions in Texas, the three index managers will compile the information derived from their sub-indices and develop an overall "level of concern" for their particular assessment index (see Figure 1 where Region 3 is at a "Warning" stage for the Climatological Assessment Index, a "Disaster" stage for the Agriculture Assessment Index, and a "Watch" stage for the Water Availability Assessment Index).

Figure 1: Assessment Values

	CLIMATOLOGICAL **INDEX**	AGRICULTURE **INDEX**	WATER AVAILABILITY **INDEX**
Region 1			
Region 2			
Region 3	**3**	**5**	**2**
Region 4			
Region 5			
Region 6			
Region 7			
Region 8			
Region 9			
Region 10			

5. It should be noted that it is the opinion of the Drought Preparedness Council that the climatic regions in Texas are so large that drought indices developed across regions of this magnitude will routinely mask smaller, regional drought problems and emerging drought conditions. It is the goal of the Council to enhance drought monitoring by greatly reducing the scale upon which drought is reported. Lack of reliable, historical, and real-time weather data on a small scale currently limits the resolution to a smaller, more useful scale.

6. The "levels of concern" values, by major assessment index and climatic region, will be presented to the Council. The State Drought Manager, in concert with the Council member agency representatives, will then decide if any specific actions are necessary as a consequence of the drought assessment values portrayed. These "level of concern" values will be incorporated into the monthly Drought Situation Report (SITREP), which will be posted on the Drought Preparedness Council web site.

7. Some of the actions the Council might consider taking are:

a. Convening the Drought Preparedness Council meetings on a more frequent basis.

b. Providing supplemental and special reports regarding significant drought effects.

c. Initiating drought awareness and conservation campaigns.

d. Reviewing each assessment value to make meaningful appraisals and projections of need.

e. Communicating drought concerns to the Regional Water Planning Groups, state leaders, and federal representatives.

f. Coordinating initial interagency recommendations and initiating necessary actions.

g. Recommending implementing legislative actions and agency responsibilities to respond to specific drought-related effects.

h. Coordinating media releases to coincide with specific actions each agency is taking to respond to the impacts of drought.

i. Issuing special reports and disseminating appropriate guidance to affected climatic regions.

j. Supporting a Gubernatorial declaration/proclamation for a drought emergency in a particular county(s) or climatic region.

D. ACTIONS BY PHASES FOR EMERGENCY MANAGEMENT

1. The role of drought assessment and response in Texas is designed to be proactive and to assist existing state, federal, and local agencies in carrying out their designated missions for assisting drought-affected customer groups. For any hazard, be it natural or manmade, Texas uses an emergency management process or cycle to cope with the situation. This cycle consists of four parts:

   a. Mitigation: This includes an assessment of the risk of drought in a particular area or region, and activities and programs that attempt (both on a short-term or long-term basis) to either eliminate or reduce the causes and effects of drought, especially on water-dependent systems.

   b. Preparedness: These activities include all aspects of documentation, planning, training, exercising, researching, and monitoring that lead to preparing for a period of drought and developing actions on how best to respond to the drought when it occurs.

   c. Response: Prompt, concerted, and coordinated actions required when drought conditions occur which are of such significance that they adversely affect the health and safety of individuals and/or the viability and vitality of state agricultural and other economic interests.

   d. Recovery: Activities and programs that support immediate remedial measures to return drought-impacted systems from minimal capabilities to normal conditions.

2. For the purposes of this plan, the emergency management steps of "mitigation" and "preparedness" will be combined since many of the aspects of "preparedness," such as education and training, are also found in the "mitigation" techniques used by various Drought Preparedness Council member agencies.

   a. **MITIGATION AND PREPAREDNESS**

      (1) The entire strategic effort is initiated by the evaluation mechanisms discussed in Section VI.D. ("Drought Assessment Operations") of this plan and is coordinated with the various levels of drought stages. These actions include items that are to be accomplished as a result of on-going drought and actions that are to be taken before a drought event to promote a more proactive atmosphere between affected parties. It is felt that this proactive approach will produce a more effective means of mitigating the effects of drought on the population and natural and economic resources of Texas.

      (2) The proposed actions be carried out by the respective state, federal, and local agencies emphasize the acceleration or targeting of agency resources to affected parties and encourage

existing agencies to develop strong partnerships between these agencies, their customers, and the general population of Texas. These efforts may challenge the management of many agencies to look beyond their current service or regulatory role and identify new partnerships and opportunities that will be of the greatest benefit to the State of Texas in minimizing the effects of drought.

(3) **Governor's Division of Emergency Management (GDEM)**

(a) Provides training and educational programs focusing on the preparation of Emergency Management Coordinators to respond to natural and human-caused disasters.

(b) Maintains a "Potential Drought Assistance Programs" directory of federal agencies and their programs that may be available to assist communities during drought and other natural disasters declared and undeclared.

(c) Maintains a "Drought Assistance Reference Guide for State Agencies" to facilitate identified state agencies' drought assistance policies.

(d) Through the "State Hazard Analysis" document, provides a systematic analysis of the hazards facing communities or jurisdictions to include historical information on droughts and dust storms.

(e) Maintains and updates this plan as a comprehensive document providing information to assist the Drought Preparedness Council member agencies in mitigating the effects of drought.

(f) Coordinates actions to eliminate or reduce long-term risk to life and property from natural or man-made disasters through the Emergency Management Council and emergency support function (ESF) representatives for Hazard Mitigation (i.e., the State Hazard Mitigation Team as identified in the State of Texas Emergency Management Plan.

(g) Develops the State Hazard Mitigation Plan along with an annex that addresses possible mitigation activities and funding following a Public Disaster Declaration (PDD) for drought.

(4) **The Texas Agricultural Extension Service (TAEX)**

(a) Provides educational efforts and services related to agricultural crop production systems, range management, risk management, and urban landscape and urban water use. These educational programs are designed to make field crops, forage, landscapes, and urban homes more efficient in utilizing water or less prone to drought and heat stress. Educational programming utilizes a variety of formats including one-on-one contact, pubic meetings, demonstrations, web sites (http://agnews.tamu.edu/drought), radio, television, electronic, and printed news releases.

(b) In cooperation with the Texas Agricultural Experiment Station (TAES), develops the Crop Yield Estimator, a computer model under development for estimating the yield potential of crops based on stored soil moisture and rainfall projections. This model will aid the producer in the decision of what inputs are needed to maximize the return or minimize the loss on investment in the event of dry weather.

(c) Manages the Potential Evapotranspiration (PET) Networks to provide a method to estimate the water use by field crops and turf grass. These networks provide irrigators with a method to precisely determine the quantity of water needed to meet the water requirements of a crop or turf. Drought damage to crops begins when reserves of water held in the soil are depleted, and evaporative demand exceeds the ability of limited soil reserves to supply water. In periods of high evaporative demand (high temperatures, high winds, low humidity), water requirements increase, and crop damage can and does occur at higher levels of available soil moisture. Using PET estimates, irrigation managers utilize local water use and rainfall data to set their irrigation frequency and rates. PET values are estimated for different environments in Texas and are posted electronically by TAEX.

(d) In cooperation with TAES, develops the Texas Livestock Early Warning System (TxLEWS) as a model for predicting range conditions through the analysis of plant materials eaten by livestock. This method provides an understanding of the type, quality, and quantity of forage available for livestock. As the drought progresses, livestock will eat less desirable plants. Presence of these plant materials in their diet indicates the onset of a drought, allowing ranchers to minimize the pricing risk in destocking the range as well as minimizing long-term damage to native range species. This indicator can be more accurate than other remote monitoring techniques.

(e) Provides educational materials, posted on the web site: http://texaserc.tamu.edu/, to assist urban clientele and agricultural producers affected by a drought.

(f) Provides TAEX specialists, located on Campus and in regional centers across the State, to provide technical assistance and information to agents and their clientele on resource management approaches for mitigation.

(g) Through the Texas A&M College of Agriculture, the Drought Strategies Task Force develops information and strategies for use by the public to mitigate drought.

(h) Provides educational and demonstration programs, such as Water MEDIC, to teach urban residents to efficiently irrigate landscape and turf around their homes through water auditing and efficient irrigation techniques.

(i) Operates irrigation schools to train agricultural and urban irrigators to use the latest irrigation technologies to more efficiently manage water resources.

(j) Provides educational programs on water use in the home to teach urban residents to more efficiently use water resources.

(k) Conducts programs such as the 4-H Water Camp and school programs to make youth aware of water and drought-related issues.

(l) Produces educational programs in weed and brush control to reduce the impact of drought and increase water yield from rainfall.

(m) In cooperation with TAES, conducts research in biotechnology and molecular biology with a goal to develop more drought and heat-tolerant species, varieties, and hybrids of crops and forage.

(n) In cooperation with TAES, utilizes breeding programs in crops and forages that have a long history of developing more heat and drought-tolerant cultivars.

(o) Conducts educational programs and field demonstrations to keep farmers up-to-date on crop and forage varieties tolerant to drought.

(p) Researches and demonstrates no-till and conservation tillage which, when coupled with new transgenic crop hybrids, are reducing water requirements in crop production.

(q) Educates on the selection of drought-tolerant landscape plants for reducing water demand outdoors while having good consumer acceptance.

(r) Conducts research and educates farmers and ranchers in good fertilizer management and soil fertility techniques that reduce the profound impact drought has on crop and forage systems.

(s) Provides educational programs on crop insurance and risk management to prepare farmers and ranchers for the economic risk associated with drought.

(5) **The Texas Alliance of Groundwater Districts (TAGD)**

(a) Was created as a group of conservation districts as provided for by Chapter 36 of the Texas Water Code. Groundwater Conservation Districts are the state's preferred method of groundwater management planning.

(b) Partners with the State Drought Preparedness Council to share ideas to develop groundwater management plans for mitigating the effects of drought.

(6) **The Texas Department of Agriculture (TDA)**

(a) Identifies a TDA Drought Coordinator and corresponding staff to field inquiries from farmers, ranchers, agribusinesses, county/state officials, the general public and media on drought and resources availability.

(b) Contacts agriculture commissioners in other states to establish procedures for acquiring hay from other areas, as necessary.

(c) Raises the public awareness as to the effect drought is or can have on agriculture.

(d) Provides, through the Texas-Israeli Exchange Grant Program, research knowledge on drought-tolerant plants and animals and on water use, information that can be used to help Texas producers in surviving times of drought.

(e) Provides for the gathering of agricultural drought-related information from the Texas Agricultural Statistics Service, the TDA Market News, the Texas Cooperative Extension Service, the U.S. Department of Agriculture (USDA), and the USDA Farm Service Agency (FSA), and disseminates this information through press releases and radio stories to local, state, and regional media, farm press, and agricultural organizations. Information is also distributed through TDA's Internet web site at: http://www.agr.state.tx.us/.

(f) Makes the necessary contacts with state and federal offices and officials to ensure Texas farmers and ranchers are kept at the forefront of drought planning and assistance.

(g) As an ex officio member of all 16 Regional Water Planning Groups, provides agricultural representation in statewide water planning and management.

(h) Provides assistance to state and federal drought planning efforts, especially in regards to how to properly prepare and respond to drought as it relates to the Texas agriculture industry.

(i) Keeps the agricultural industry and public informed of the latest drought information and the assistance available through press releases, radio stories, the TDA web site, the Drought Information Resource Packet (DRIP), and drought tours and workshops.

(j) Maintains updated drought information on its Internet web site to assist farmers, ranchers, and agribusinesses in making informed decisions in regards to the drought.

(k) Assists rural communities in economic development efforts to retain current business and, if possible, expand the local economy for continued growth and success to reduce the economic impact of drought.

(l) Works with irrigation and water districts, TWDB, and other groups to secure funding for water infrastructure upgrades and rural economic development.

(7) **The Texas Department of Economic Development and Tourism (TDED)**

(a) Maintains the Economic Development Clearinghouse providing information about drought-related issues http://www.edinfo.state.tx.us/.

(b) Through the Office of Rural Community Affairs (ORCA), disseminates information on federal, state, and local issues affecting the rural communities in Texas.

(c) By employing the Corporate Expansion and Recruitment (CER) program, serves businesses that want to expand existing Texas operations as well as out-of-state businesses interested in relocating or expanding in Texas.

(d) Increasing statewide awareness that TDED is the lead economic development agency in the State and serves as the conduit for all inquiries for presentations regarding agency services and programs.

(e) Through the Texas Capital Fund Infrastructure Development Program, provides grant funds to non-entitlement communities for public infrastructure such as first-time construction of water/sewer, drainage channels, and ponds

(f) Through the Texas Capital Fund Main Street Improvements Program, fosters and stimulates the development of small businesses by providing financial assistance for non-entitlement cities (designated by the Texas Historical Commission as a Main Street City) for such purposes as acquiring land needed for water and wastewater facilities.

(8) **The Department of State Health and Human Services (DSHS)**

(a) Develops plans and policies that support efforts to improve individual and community health.

(b) Conducts health and medical assessments/surveillance in communities affected by drought conditions.

(c) Evaluates the accessibility, quality, and effectiveness of personal and population-based health services such as hospitals and EMS systems.

(d) Provides technical medical information as required.

(e) Assists local governments in providing health and medical information to the public regarding the potential for disease and methods to combat the drought threat.

(f) Assists local governments and others in conducting inspections to ensure the safety of drinking water.

(g) Assists local governments in vector control, veterinary care, and the handling of stray animals, pets, and livestock that may be adversely affected by drought conditions.

(9) **Office of Rural Community Affairs (ORCA)**

(a) Disseminates information about the Community Development Block Grant (CDBG) program under the heading of the Texas Community Development Program (TCDP) addressing drought-related activities.

(b) Monitors possible funding sources that may have application to drought-related activities.

(c) Awards Community Development Funds on a competitive basis to address housing and public facility needs such as water, sewage, or drainage needs (when a disaster coincides with the Community Development Fund application cycle).

(d) Awards Texas Small Town Environment Program grants to communities to purchase the materials needed to solve water and sewer problems by installing new transmission lines or replacing nonfunctional lines at reasonable engineering and management costs.

(e) Disseminates floodplain management and other materials at workshops where mitigation issues are discussed.

(10) **The Texas Forest Service (TFS)**

(a) Develops Best Management Practice plans for landowners so as to promote proper land management, which includes maintaining Streamside Management Zones (SMZ) and tree-planting efforts.

(b) Provides weather evaluation products to include short, medium, and long-range weather predictions; daily Keetch-Byram Drought Index (KBDI) forecasts; assessment updates; and fire-behavior forecasts.

(c) Provides technical assistance, guidance, and training to TFS personnel, forest industry, and private owners in forest pest management.

(d) Updates the Texas Wildfire Protection Plan focusing on disaster prevention activities related to a drought's impact upon the timber industry.

(e) Uses media outlets (such as public service announcements (PSAs) on the radio, television interviews, and billboard advertisements) to keep the public informed of a current emergency situation and possible mitigation procedures.

(f) Conducts applied research on major forest pests and transfers new pest management technology to the field.

(11) **The Texas Commission on Environmental Quality (TCEQ)**

(a) Maintains drought information pages on the agency's web site, with links to other agencies' sites and other drought information resources.

(b) Oversees the development and operation of community water systems including the processing of petitions to create new systems. Maintains a database of public water suppliers including water source, service area, population, system capacity, and water quantity and water quality measures.

(c) Maintains a Watch List of community water systems that have implemented voluntary or mandatory water use restrictions.

(d) Maintains and distributes the Drought Reference Manual for public water systems and water suppliers.

(e) Assists community water systems' preparation of required drought contingency plans.

(f) Assists major surface water users' preparation of required water conservation plans.

(g) Permits new surface water diversions and impoundments, and administers water rights in accordance with the prior appropriation doctrine. Provides pre-application project planning and coordination for surface-water use projects, ensuring that the client knows all technical and administrative requirements.

(h) Mails out, to areas not governed by the Commission's Watermaster Program, forms for utilities to report the amount of surface water used (or "diverted" from the source of supply) for each month of the previous year.

(i) Uses the newly developed Texas Water Availability Modeling (WAM) System to protect existing water rights and the environmental needs of a river basin as well as to provide information for developing water supply alternatives. WAM consists of a database of water rights, water uses, and streamflows; geographic information system (GIS) tools for streamflow analysis; the water-availability model; and a graphical user interface (GUI). The models are based on stakeholder input and other expertise to facilitate the water-planning efforts of planners in better accounting for all needs and uses in a river basin.

(j) Develops and distributes the TCEQ Drought Activities Report, summarizing input from the Agency's regional offices and water programs.

(k) Analyzes trends in groundwater fields and usage to communicate future problems of public water systems.

(l) Follows-up the completion and implementation of Drought Contingency Plans.

(12) **The Texas Parks and Wildlife Department (TPWD)**

(a) Based on biologists' assessments, predicts what changes in wildlife populations might be expected at specific seasons of the year based upon effects of previous droughts and the timing and severity of a current drought.

(b) Through the Resource Protection Division, maintains data collection devices in several coastal estuaries and a database of fish-kill events.

(c) Communicates mass media activities to stimulate media coverage of drought and water-related issues.

(d) Develops and maintains the Texas Outdoor Recreation Plan (TORP) which applies strategic planning principles in the conduct of research, with emphasis on support of the Texas State Park System, and encourages appropriate use of resources for outdoor recreation in concert with the protection of cultural and natural resources and private property rights.

(e) Provides information to land managers to provide for and mitigate the effects of drought on wildlife by installing wildlife watering systems, managing for habitat essential to wildlife, keeping deer and livestock numbers within the carrying capacity of the land, and reducing livestock numbers quickly during a drought so that the native habitat will continue to support wildlife.

(13) **The Texas State Soil and Water Conservation Board (TSSWCB)**

(a) Works with landowners, farmers, and ranchers to develop resource management plans that include water conservation and drought mitigation practices.

(b) Implements practices to increase irrigation efficiency through its water quality and conservation programs.

(c) Administers the Texas Brush Control Program, through local soil and conservation districts, which includes a strategy for managing brush in critical areas and the designation of areas of critical need in the State where brush is contributing to a substantial water conservation problem.

(14) **The Texas Water Development Board (TWDB)**

(a) Performs as the lead agency for coordinating the regional water planning process and incorporating the regional water plans into the comprehensive State Water Plan. This plan describes current and prospective water uses; identifies water supplies; matches these supplies to water uses; identifies needed water-related management measures, facility needs, and costs; addresses environmental concerns; and offers program and policy recommendations to better manage the State's water resources.

(b) Serves as the State of Texas' water resource planning and financing agency to plan for ways to provide water for future Texans even during the drought of record. This effort includes a comprehensive projection of future water demands and needs, quantification of existing and new developable sources, and identification of areas that may not be able to meet projected needs over the next 50 years.

(c) Maintains a comprehensive drought-monitoring database that includes monitoring of climatic and hydrological conditions. This includes real-time monitoring of lake levels and critical groundwater levels, as well as collecting National Weather Service and National Drought Mitigation Center indices and materials.

(d) Through its Conservation staff, works closely with all water interests and utilities in Texas to present and distribute information regarding water conservation and drought management. This includes conducting water conservation and drought management workshops and presentations for water utility managers and other interest groups, and also distributing water-conservation publications.

(e) Maintains an active web page for both the Agency and the Drought Preparedness Council.

(f) Through the Texas Natural Resources Information System (TNRIS), acts as the State's clearinghouse for natural resources data. Digital data available through TNRIS pertains to water resources, geology, the Census, and other natural resources spatial data.

(g) Facilitates the operation of the Texas Water Monitoring Congress (TWMC), which provides a forum for agencies with water data-collection responsibilities. The TWMC works to identify issues of concern, develops recommendations to resolve or improve these concerns, and promotes the awareness of the need for good water resource information.

(h) Through the State Water Plan, addresses strategic courses of action for obtaining viable economical water management results.

(i) Provides financial assistance, through grants for regional planning, for the purchase of water conservation-related equipment for local irrigation and underground water conservation districts in order to promote agricultural conservation through the installation of water-efficient irrigation equipment.

(j) Provides financial assistance to plan, provide and conserve water resources through grants and loans for regional planning, for water supply projects, and for agricultural water conservation programs.

(15) **The Texas Department of Transportation (TxDOT)**

(a) Sponsors research to improve the safety and efficiency of the transportation system, which often results in the conservation of natural resources when planning projects.

(b) Conducts environmental impact analysis for highway projects.

(c) Researches products for vegetation management, and develops integrated vegetation management plans.

(d) Conducts erosion control activities for roadways and special projects.

(e) Conducts landscaping activities that promote indigenous plant growth.

(f) Implements design activities that minimize effects on groundwater usage or obstruction.

(g) Focuses on preventing erosion and protecting high quality wetland habitats.

(16) **The Office of the State Climatologist for Texas (OSC)**

(a) Provides climate information and assessments to requesting state agencies.

(b) Maintains historical database records for Texas climate.

(c) Produces weekly and monthly Texas Climate Bulletins.

(d) Conducts research on drought and drought prediction.

(e) Provides information to the public on drought, drought prediction, and climate variabilitiy.

b. **RESPONSE**

(1) The responses to particular drought effects in a geographical area are determined and initiated by agency representatives in each committee. These response actions have either been planned well in advance of a drought situation, or in the case of unforeseen situations, will be the result of intense analysis of available problem data by each respective agency. Additional or emergency assistance needs that cannot be met by Council member agency resources are passed to the Governor's Division of Emergency Management through the State Drought Manager for further action.

(2) **Governor's Division of Emergency Management (GDEM)**

(a) Coordinates short-term, immediate responses to water shortages through Emergency Management Council agency representatives of the various emergency support functions such as the ESF for Food and Water, the ESF for Resource Management, the ESF for Military Support, etc. as identified in the State of Texas Emergency Management Plan.

(b) Coordinates emergency drinking water response actions in locating alternative sources of water and financing of response activities as outlined in Annex A to this plan (i.e., the "Emergency Drinking Water Contingency Annex").

(3) **The Texas Agricultural Extension Service (TAEX)**

(a) Produces a weekly newsletter for news media outlets and for posting to the Internet web site at: http://agnews.tamu.edu/drought.

(b) Using agricultural communication specialists, subject matter specialists, and county agents, prepares printed communications for mass distribution of news stories, audiotapes for radio stations, and video for television news releases to communicate drought-related information.

(c) Using subject matter specialists and county extension agents, provides interviews with print and broadcast media to keep the public informed on drought-related information.

(d) Keeps the public informed of the drought impact on agriculture through weekly reports of county agents on crop and livestock conditions.

(e) Prepares periodic economic drought impact assessments of drought-affected areas to inform the public about the estimated amount of economic damage from drought.

(f) Gives users information on various water uses to reduce the impact of drought on livestock.

(g) Tests water samples and forage and feed samples for drought-related toxins.

(h) Conducts educational programs and produces printed materials to assist ranchers in identifying toxic weeds and in developing grazing management strategies to lessen the impact of these species in the times of drought.

(i) Distributes hay, through a collaboration between county extension agents and TDA; also informs ranchers on alternate feed sources and coordinates transportation to haul hay to feed herds during periods of drought.

(j) Educates farmers and ranchers on provisions of crop insurance programs and government relief programs available to sustain their operations during drought.

(k) Plans to give precise estimates of areas affected by drought through programs under development such as global positioning, Advanced Very High Resolution Radiometry (AVHRR) from satellite images and Next Generation Weather Radar (NEXRAD) data to give precise estimates of areas affected by drought

(l) Is developing a web site to give weekly updates at the county level of crop, livestock, and soil moisture conditions.

(m) Presents educational programs on alternative feed sources for ranchers during drought.

(n) Through the Texas A&M "Aggie" Horticulture Network, maintains a "Plant Answers Drought Information Hotline" web site containing suggestions for the homeowner/gardener regarding the wise use of water during a drought situation. The site is at: http://aggie-horticulture.tamu.edu/plantanswers/drought/drought.html.

(4) **The Texas Alliance of Groundwater Districts (TAGD)**

Each of the water suppliers in a groundwater district is responsible for its response to drought in accordance with its drought contingency plan.

(5) **The Texas Department of Agriculture (TDA)**

(a) Provides regular updates to the citizens of Texas on current drought conditions, drought assistance, and the condition of Texas agriculture through press releases to media, radio spots, the Agency web site, and media interviews.

(b) Provides the agricultural industry, Texas counties, the State, and federal entities information on available assistance through other agencies and groups using the Drought Resource Information Packet (DRIP).

(c) Assists livestock producers in locating available hay and pasture supplies and transportation resources/capabilities (both within and outside the State) through the Hay and Grazing Hotline at: (877) 429-1998.

(d) Contacts and coordinates with the heads of agriculture departments in other states to assist Texas producers in times of crisis, such as the need for hay and pasture supplies.

(e) Supports legislation and efforts (research, loan opportunities, and infrastructure improvements) to enhance the ability of agriculture to obtain adequate water supplies, especially in time of drought.

(f) Provides testimony on the economic impact of drought to Texas agriculture, and recommends methods to assist the State's agriculture producers in responding to drought such as enhanced brush control and other technical aid.

(g) Assists in finding aboveground sources of water (see Emergency Drinking Water Contingency Annex).

(h) Requests the Texas Department of Transportation's approval on mowing and baling highway rights-of-way.

(i) Requests USDA to expedite approval on Texas counties pending Secretarial approval for drought declarations and/or USDA-FSA programs, such as the Livestock Assistance Program and/or emergency grazing and haying on Conservation Reserve Program acreage.

(6) **The Texas Department of Economic Development and Tourism (TDED)**

Maintains a listing of state agency toll free numbers that could be used to assist those in need of drought-related disaster information.

(7) **The Department of State Health and Human Services (DSHS)**

(a) Investigates and identifies community health hazards and potential problems.

(b) Links individuals with a need for health services to appropriate providers.

(c) Determines the scope of need during drinking water emergencies (see Emergency Drinking Water Contingency Annex).

(d) Assists TCEQ in testing the quality of water.

(8) **Office of Rural Community Affairs (ORCA)**

(a) Coordinates through appropriate channels when a water utility district or locality requests monetary assistance to address a problem water system.

(b) Administers Texas Community Development Program (TCDP) funds that focus on finding new water sources (e.g., drilling a new well, connecting to another water source by means of supply lines, etc.).

(9) **The Texas Forest Service (TFS)**

(a) Advises the public of the potential fire danger, mitigates the possibility of fire when possible, and actively suppresses fires if they exceed the control of local fire response organizations.

(b) Provides support in the form of implementing the infrastructure to the Incident Command System (ICS) during situations that do not directly involve fire.

(c) Organizes and supervises forest pest suppression projects on non-federal lands.

(10) **The Texas Commission on Environmental Quality (TCEQ)**

(a) Administers an expedited review of proposed system upgrades and alternative water supplies for drought-impacted community water systems.

(b) Provides the public water systems database to assist in the identification of water supply alternatives and potential system interconnections.

(c) Assists community water systems in exploring alternative sources of water for non-potable uses (reuse).

(d) Administers an expedited review of drought-related water right applications.

(e) Responds to consumer calls regarding water outages and drought-related problems.

(f) Explores alternative means of water delivery during outages.

(g) Assesses the duration of emergency water delivery requirements (see Emergency Drinking Water Contingency Annex).

(h) Supervises and conducts water quality analysis for potability (see Emergency Drinking Water Contingency Annex).

(i) Determines alternative water supply venues, and conducts environmental impact analysis of supply (Emergency Drinking Water Contingency Annex).

(11) **The Texas Parks and Wildlife Department (TPWD)**

(a) Provides recommendations to the Texas Water Control Board (TWDB) for scheduling of instream flows and freshwater inflows to Texas estuaries for the management of fish and wildlife resources.

(b) Communicates information relative to water resource issues both within the Agency and to other state agencies such as TWDB and the TCEQ.

(12) **The Texas State Soil and Water Conservation Board (TSSWCB)**

Provides technical and financial assistance to landowners, farmers, and ranchers through its regional offices and soil and water conservation districts for developing and implementing conservation plans and practices.

(13) **The Texas Water Development Board (TWDB)**

(a) Provides technical assistance to water utilities and water authorities regarding the implementation of drought plans, the location of alternate sources of water, and the provision of emergency loans associated with drought response measures.

(b) Administers the Texas Water Bank that facilitates the transfer, sale, or lease of water and water rights throughout the State.

(c) Administers the Texas Water Trust where water rights are held for environmental flow maintenance purposes.

(d) Assists in identifying alternative sources, transportation, and distribution of water; diversion of water from current sources; and bridging of existing water systems including needs assessment, determining appropriate methods for financing emergency drinking water operations, and researching and evaluating the employment of desalinization systems (see Emergency Drinking Water Contingency Annex).

(14) **The Texas Department of Transportation (TxDOT)**

(a) Repairs state highways that are damaged by drought conditions.

(b) Administers the mowing and bailing of hay on the right-of-way to support agriculture during drought conditions.

(c) Issues permits for overweight vehicles, which could include vehicles delivering water or responding to other drought-related emergency situations.

(d) Assists in finding methods for transporting and distributing water during periods of emergency (see Emergency Drinking Water Contingency Annex).

c. **RECOVERY**

(1) The primary objective of recovery is to maintain, as far as possible, the resources affected by drought, and to assist in the return and restoration of those resources after drought, taking into consideration resource maintenance and long-term sustainability.

(2) Particular short and long-term restorative or relief actions, funding, and guidance will be available depending upon the extent and type of need and will be addressed by specific agencies represented on the Council.

(3) **Governor's Division of Emergency Management (GDEM)**

(a) May administer the funding of federal long-term drought relief and associated drought disaster consequences under the authority of a Presidential Disaster Declaration and in accordance with the Stafford Act.

(b) Processes a request from a county judge for a federal (USDA) Agricultural Disaster Declaration.

(4) **The Texas Agricultural Extension Service (TAEX)**

(a) Provides programs to reduce family stress from financial concerns resulting from drought.

(b) Provides education on range, pasture, and crop management for ranchers and farmers in lands affected by drought.

(c) Provides risk management programs to assess the financial condition of individual agricultural enterprises and give alternatives for operators to evaluate in drought recovery.

(5) **The Texas Alliance of Groundwater Districts (TAGD)**

Each of the underground water conservation districts is responsible and will assist landowners and groundwater right owners for acquiring additional water resources during a time of drought.

(6) **The Texas Department of Agriculture (TDA)**

(a) Updates and distributes a Drought Resource Information Packet (DRIP) for county judges, agricultural producers, and agri-businesses that provides a comprehensive overview of the impacts of drought, available drought assistance programs, and who to contact for assistance.

(b) Sends letters to the Texas Banking Commissioner and the Federal Deposit Insurance Corporation (FDIC) Regional Director asking that bank regulators be flexible when working with agricultural lending institutions when Texas agricultural producers are in a disaster situation.

(c) Plays an active role when changes are being considered in Texas Agriculture Finance Authority's (TAFA) disaster loan programs, such as the Linked Deposit Program, which assists producers in drought-declared counties who have suffered agricultural losses in refinancing existing debt and by providing assistance for the financing of water conservation equipment and projects.

(d) Provides the resources and staff to answer inquiries on drought and drought assistance, and refers inquiries to proper sources for programs and technical assistance.

(7) **The Texas Department of Economic Development and Tourism (TDED)**

Coordinates the use of Texas Community Development Program (TCDP) funds after their release by the Texas Department of Housing and Community Affairs.

(8) **The Department of State Health and Human Services (DSHS)**

Mobilizes state and local stakeholders to solve remaining community health issues and develop health and medical-related mitigation strategies.

(9) **Office of Rural Community Affairs (ORCA)**

(a) Identifies up to $350,000 in available grant funds for eligible cities or counties specifically to obtain a permanent source of water after the Governor has issued a drought declaration for a particular county(s).

(b) Administers Disaster Relief / Urgent Need Funds to assist communities in recovering from natural disasters and water and sewer urgent needs or recent origin.

(c) Administers Colonia Funds to assist colonia areas recover from natural disasters and water and sewer urgent needs (if the disaster coincides with the Colonia Fund application cycle).

(d) Assists in identifying and financing the long-term solution to a locality's water needs (see Emergency Drinking Water Contingency Annex).

(10) **The Texas Forest Service (TFS)**

Reviews actions taken during an emergency situation and the results of those actions to determine if the steps taken were sufficient to achieve desired goals within desired limits (e.g., costs, time, property saved, property lost, etc.).

(11) **The Texas Commission on Environmental Quality (TCEQ)**

(a) Follows-up with drought-impacted community water systems to restore operations and ensure that drought-driven system improvements and modifications are in compliance with applicable rules and standards.

(b) Maintains increased surveillance and monitoring of community water systems that experienced drought-related problems.

(12) **The Texas Parks and Wildlife Department (TPWD)**

(a) Lends technical assistance with fisheries management issues.

(b) Provides expertise with the management of nuisance aquatic vegetation.

(13) **The Texas State Soil and Water Conservation Board (TSSWCB)**

Manages program and practices for abating agricultural and silvicultural non-point source pollution and conserving water.

(14) **The Texas Water Development Board (TWDB)**

(a) Provides loans to local governments for water supply projects, water quality projects including wastewater treatment, flood control projects, agricultural water conservation projects, and groundwater districts.

(b) Provides quick funding through the Small Community Emergency Loan Program to address the unforeseen circumstances that threaten the viability of a community's utility system.

(c) Determines long-term status of water supplies and capacities.

(15) **The Texas Department of Transportation (TxDOT)**

Provides support to maintain recovery activities for drought-related emergencies.

VI. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

A. DROUGHT PREPAREDNESS COUNCIL (DPC)

1. In an effort to coordinate the preparedness and response to drought throughout Texas, the Texas Legislature in SB-1, and later by revision in HB-2660, created the Texas Drought Preparedness Council. This organization (see Attachment 1) is the coordinating group that advises the State Drought Manager and member agencies on implementation of drought-related activities in the State of Texas. The Council consists of designated lead state drought response agencies as follows:

   a. Department of State Health and Human Services (DSHS)
   b. International Boundary and Water Commission (IBWC)
   c. Office of Rural Community Affairs (ORCA)
   d. Office of the State Climatologist of Texas (OCS)
   e. Texas Agricultural Extension Service (TAEX)
   f. Texas Commission of Environmental Quality (TCEQ)
   g. Texas Department of Agriculture (TDA)
   h. Texas Department of Economic Development and Tourism (TDED)
   i. Texas Department of Public Safety (DPS) (through GDEM)
   j. Texas Department of Transportation (TxDOT)
   k. Texas Forest Service (TFS)
   l. Texas Parks and Wildlife Department (TPWD),
   m. Texas State Soil and Water Conservation Board (TSSWCB)
   n. Texas Water Development Board (TWDB)
   o. Texas Department of Housing and Community Affairs (TDHCA)
   p. Texas Alliance of Groundwater Districts (TAGD)

2. The State Drought Preparedness Council also assumes the lead role in intergovernmental drought response coordination and media information releases, and acts as a liaison between various groups involved with drought planning to include participating federal agencies which are:

   a. Farm Service Agency (FSA)
   b. Federal Emergency Management Agency (FEMA)
   c. Housing and Urban Development (HUD)
   d. National Weather Service (NWS)
   e. Natural Resources Conservation Service (NRCS)
   f. Rural Development (RD)
   g. United States Army Corps of Engineers (USACE)
   h. United States Bureau of Reclamation (USBR)
   i. United States Fish and Wildlife Service (USFWS)
   j. United States Forest Service (USFS)
   k. United States Geological Survey (USGS)
   l. United States Public Health Service (USPHS)

3. The State Drought Preparedness Council consists of four committees and a special task force for reviewing and implementing drought-related assessments and operations. These entities are:

   a. Drought Planning and Coordinating Committee

      (1) The Drought Planning and Coordinating Committee conducts drought response planning and is responsible for developing and modifying the State Drought Preparedness Plan. This committee, through its member agencies, recommends specific revisions for a defined state response to a drought-related disaster. Throughout the planning and revisions, this committee ensures effective coordination among local, state, and federal agencies.

(2) The Drought Planning and Coordinating Committee consists of experts from all of the represented state agencies on the Drought Preparedness Council (listed above) as well as from the following federal agencies: FEMA, HUD, NRCS, USACE, USBR, USFS, and USGS.

b. Drought Monitoring and Water Supply Committee

(1) The Drought Monitoring and Water Supply Committee is responsible for monitoring all available climatologically data, soil moisture readings, reservoir storage levels, selected aquifer levels, and other pertinent information necessary to analyze the current status level of drought conditions in the State of Texas. This group of professionals assesses climatologically, meteorological, and hydrological information to provide evaluations as to the current and future status of drought in the State; advises Council members as to the current status level of drought in the State; and, as necessary, employs needed "triggers" to implement further actions as identified in this plan.

(2) The Monitoring and Water Supply Committee consists of experts from GDEM, IBWC, NWS, OSC, RD, TAEX, TCEQ, TDA, TFS, TPWD, TWDB, USACE, USFS, USGS, and USPHS.

c. Drought Technical Assistance and Technology Committee

(1) The Technical Assistance and Technology Committee coordinates with regional water planning groups on drought-related issues in their regional water plans. This committee maintains a database of water suppliers and provides a means of communicating and disseminating vital information during possible emergency conditions. Also, the Committee coordinates technical and financial assistance and outreach for drought contingency planning for drought-impacted communities.

(2) The Technical Assistance and Technology Committee consists of experts from FSA, GDEM, HUD, NRCS, ORCA, TAEX, TCEQ, TDA, TFS, TPWD, TSSWCB, TWDB, TxDOT, USACE, USBR, USFS, and USPHS.

d. Drought Impact Assessment Committee

(1) The Impact Assessment Committee is comprised of professionals who focus on public reporting of drought monitoring and water supply conditions in Texas. They assess and report potential impacts of water shortages on the public's health, safety, and welfare. Additionally, they monitor and assess the current and potential impacts of impending or ongoing drought upon the state's economy, agricultural, and natural resources.

(2) The Impact Assessment Committee consists of experts from DSHS, GDEM, NRCS, NWS, TAEX, TAGD, TCEQ, TDA, TDED, TFS, TPWD, TWDB, USACE, USFS, USFWS, USGS, and USPHS.

e. Drinking Water Task Force

(1) The Drinking Water Task Force is activated by the Council to coordinate the actions of its members and other organizations to respond to an immediate and temporary need of providing emergency drinking water to a community once it becomes evident that community has, or soon will have, exhausted its supply of or access to potable drinking water. The activities of this entity are described in the attached Emergency Drinking Water Contingency Annex (see Annex A).

(2) The Drinking Water Task Force consists of experts from TCEQ, DSHS, TDA, DPS/GDEM, TWDB, TxDOT, ORCA, the Texas National Guard/Adjutant General's Department (AGD), the Texas General Services Commission (GSC), Health and Human Services Commission (HHSC), the Texas Railroad Commission (RRC), the Texas Voluntary Organizations Active in Disaster (TxVOAD), and the United States Army Corps of Engineers (USACE).

B. ASSIGNMENT OF RESPONSIBILITIES

1. Each of the agencies and organizations assigned to the Drought Preparedness Council works together to find better methods of identifying and monitoring drought situations; advising the public and economic entities on various methods for best coping with drought; and determining appropriate actions necessary to respond to a major, widespread drought when it occurs.
2. Specific actions of the Drought Preparedness Council member agencies can be found in "Section VI, Concept of Operations," under the applicable paragraphs (E.2.a - E.2.c) related to the emergency management cycle functions of mitigation, preparedness, response, and recovery.
3. If a drought situation degrades to the point where a community suddenly needs potable drinking water on an emergency basis, the State Drought Preparedness Council can immediately turn to the State Emergency Management Council for support under the Emergency Support Function (ESF) for Food and Water to determine how best to solve the problem. Since the State Drought Manager is also appointed as the State Coordinator for Emergency Management, this transfer can be easily affected.
4. Should the drinking water situation be one with some lead-time, the Emergency Drinking Water Contingency Annex of this plan can then be implemented.

VII. DIRECTION AND CONTROL

A. In periods of drought, the effectiveness of the State Drought Preparedness Plan hinges on the timely dissemination of clear and precise information to the public.

B. To accomplish this objective, the following communications guidelines have been established.

1. Official release of drought response or recovery information will generally originate from the Office of the Governor via Governor's Division of Emergency Management, with technical oversight being provided by member agencies of the Drought Preparedness Council.
2. Drought press releases from the Office of the Governor will use appropriate distribution lists to target media outlets, legislative delegates, and Emergency Management Council and Drought Preparedness Council agency contacts.
3. Other state agencies and organizations that are not members of one of the above Councils are encouraged to redirect drought-related information obtained from the Office of the Governor to their respective client bases.
4. Drought status and response information, developed by the Drought Preparedness Council, will be posted to the Council's web site, and links to that web site shall be established from all applicable member agencies on the Council.
5. The Drought Preparedness Council will be responsible for the review and dissemination of existing drought-related public service announcements for use by the press, radio, and television media in drought-affected areas.
6. A comprehensive annual or biennial report will be prepared to summarize the period's drought activities undertaken by the Drought Preparedness Council. This report will include the drought activity summaries submitted by each participating state agency, assessment and response activities taken by that agency over the preceding months, a list of drought management objectives for the upcoming year, actions taken to mitigate drought impacts, a summary of the successes realized by each agency during the reporting period, and future endeavors.

VIII. ADMINISTRATION AND SUPPORT

A. RECORDS

1. The State Drought Preparedness Council is provided administrative support through GDEM under the direction of the State Emergency Management Coordinator who is also designated as the State Drought Manager.

2. Records will be maintained of all Drought Preparedness Council meetings, and the minutes from each meeting will be posted on the State Drought Preparedness Council web site at: http://www.txwin.net/dpc/.

B. REPORTS

1. A monthly Drought Situation Report (SITREP) will be prepared and disseminated each month on the Drought Preparedness Council web site. This report will provide information on and assess drought and water supply conditions in the State; will advise the regional water planning groups on drought-related issues; and will recommend, as appropriate, provisions for a defined state response to a major drought-related emergency.

2. A Drought End-of-Year Report (or in some cases a Drought Biennium Report) will be prepared for the Legislature and will provide details concerning drought-related issues, education, prevention, responses, and other accomplishments or setbacks during the reporting period.

3. Three additional pamphlets/documents are published and revised on an a periodic basis as follows:

   a. "Drought Assistance Reference Guide for State Agencies" - This document provides information on the drought-related mission of each State of Texas agency, lists drought emergency response resources maintained by each agency, and provides points of contact for drought assistance from each agency---providing of course that established procedures outlined in the State of Texas Emergency Management Plan are followed.

   b. "Potential Drought Relief Programs" – This pamphlet provides basic information about federal programs that Texans may find beneficial in relieving the effects of drought. This document describes each program in general, outlines specific eligibility requirements for the program, and provides a contact agency from which to obtain more specific details and learn the application procedures.

   c. "Drought Assistance Directory for Public Officials and Drinking Water Utilities" – This directory, which is prepared in coordination with the Texas Commission of Environmental Quality (TCEQ), the Texas Water Development Board (TWDB), and the Governor's Division of Emergency Management (GDEM), is developed to assist local government efforts in preventing, mitigating, and responding to drought-related public water supply problems and emergencies in a particular community.

4. When appropriate, GDEM, in conjunction with TCEQ, will send letters to all drinking water suppliers as well as all county judges and mayors throughout Texas regarding the need to conserve water in drought situations and to educate the public on water conservation techniques and procedures.

IX. PLAN DEVELOPMENT AND MAINTENANCE

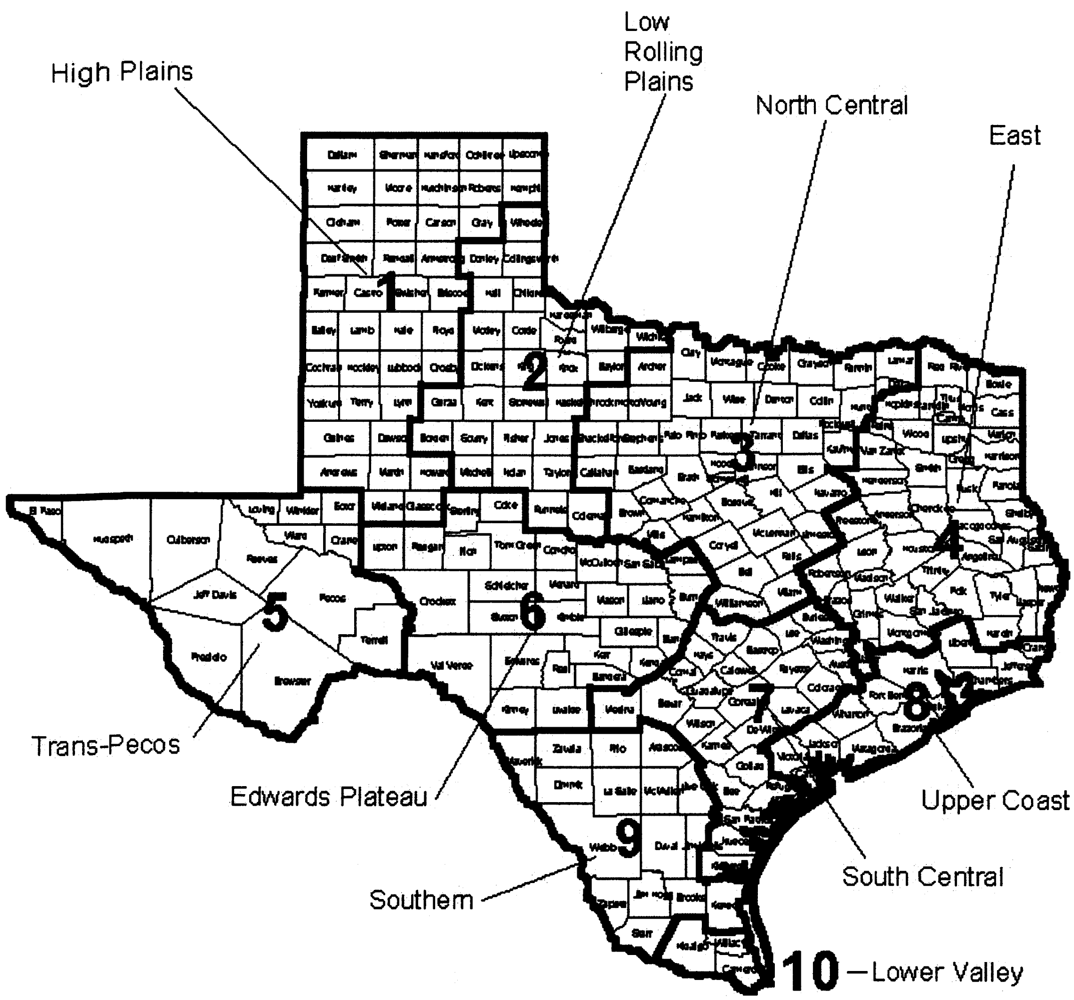
A. Drought Preparedness Council member agencies and organizations will be responsible for reviewing this plan and providing revisions as appropriate. Recommended changes to the plan should be forwarded to the Governor's Division of Emergency Management (GDEM), which will, in turn, prepare the revised document and coordinate the revisions with the assembled Council for approval.

B. This plan will be reviewed, at a minimum, on an annual basis and revised if appropriate.

C. Agencies and organizations assigned responsibilities in this plan are responsible for developing and maintaining standard operating procedures, as applicable, covering those responsibilities.

Attachment 1

CLIMATIC REGIONS



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<u>Attachment 2</u>

Organizational Chart

DROUGHT PREPAREDNESS COUNCIL

***Chair*: State Drought Manager, Texas Department of Public Safety – Governor's Division of Emergency Management (GDEM)**

- Advises the Governor on significant drought conditions
- Reports to the Legislature regarding significant drought conditions in the State
- Liaison with federal agencies

Council Member Agencies: Texas Agricultural Extension Service (TAEX), Texas Department of Agriculture (TDA), Texas Department of Economic Development (TDED), Department of State Health and Human Services (DSHS), Texas Department of Housing and Community Affairs (TDHCA), Texas Forest Service (TFS), Texas Commission on Environment Quality (TCEQ), Texas Parks and Wildlife Department (TPWD), Texas State Soil and Water Conservation Board (TSSWCB), Texas Water Development Board (TWDB), Texas Department of Transportation (TxDOT), Texas Alliance of Groundwater Districts (TAGD), Office of Rural Community Affairs (ORCA), Office of the State Climatologist Office (OSC)
Federal Agency Participants: United States Army Corps of Engineers (USACE), Federal Emergency Management Agency (FEMA), Housing and Urban Development (HUD), National Weather Service (NWS), United States Bureau of Reclamation (USBR), United States Forest Service (USFS), United States Geological Survey (USGS), United States Public Health Service (USPHS), International Boundary and Water Commission (IBWC), Natural Resources Conservation Service (NRCS), Rural Development (RD), Farm Service Agency (FSA), United States Fish and Wildlife Service (USFWS)

Drought Planning and Coordinating Committee

*GDEM	TPWD
TWDB	TDED
TCEQ	DSHS
TSSWCB	TDA
TDHCA	TFS
TAEX	TxDOT
FEMA	USFS
HUD	USACE
USGS	USBR
NRCS	TAGD
ORCA	OSC

- Conduct drought response planning and prepare State Drought Preparedness Plan
- Recommend specific revisions for a defined state response to drought-related disasters
- Ensure effective coordination among state, local, and federal agencies in drought-response planning

Drought Monitoring and Water Supply Committee

*TWDB	TDA
TCEQ	TAEX
TPWD	TFS
GDEM	NWS
USFS	USGS
USPHS	USACE
IBWC	TAGD
RD	OSC

- Assess and report on meteorological conditions and forecasts
- Assess and report on hydrological conditions and forecasts
- Assess and report water supply conditions and forecasts
- Make recommendations concerning when to activate State Drought Response Plan

Drought Technical Assistance and Technology Committee

*TWDB	TAEX
TCEQ	TxDOT
TSSWCB	TDA
TPWD	ORCA
GDEM	USACE
USBR	USFS
USPHS	HUD
NRCS	FSA

- Advise regional water planning groups on drought-related issues in the regional water plans
- Maintain database of water suppliers and provide a means for communicating possible emergency conditions
- Coordinate technical and financial assistance and outreach for drought contingency planning to drought impacted communities

Drought Impact Assessment Committee

*TCEQ	TAEX
DSHS	TFS
TDA	TDED
TPWD	TWDB
GDEM	USFS
USPHS	NWS
USACE	USGS
TAGD	USFWS
NRCS	

- Public reporting of drought monitoring and water supply conditions
- Assess and report potential impacts of water shortages on the public's health, safety, and welfare
- Assess and report potential impacts of water shortages on economic development
- Assess and report the potential impacts of water shortage on agricultural and natural resources

** Denotes Chair Agency*

Attachment 3

Climatological Assessment Values

A. Standardized Precipitation Index (SPI)

1. The Standardized Precipitation Index (SPI) is used for quantifying the precipitation departure from "normal" over multiple time scales. These time scales reflect the impact of drought on the availability of the various water resources. A drought event is defined as any time the SPI is continuously negative and reaches an intensity where the SPI is -1.0 or lower. The drought event ends when the SPI becomes positive. Each drought event therefore has a duration defined by its beginning and end, and an intensity for each month that the event continues, as shown in the table below.

SPI Values for Drought		
SPI Values	Drought Category	% Time in Category
0.0 to -0.99	Mild Drought	34.1%
-1.0 to -1.49	Moderate Drought	9.2%
-1.5 to -1.99	Severe Drought	4.4%
-2.00 or less	Extreme Drought	2.3%

2. Also, this table shows the percent of time that the SPI is in each of the drought categories based on an analysis of available station data. Because the SPI is standardized, these percentages are usually expected from a "normal distribution" of the SPI. The 2.3% of SPI values within the *Extreme Drought* category is a percentage that is typically expected for an *extreme* event. In contrast, the Palmer Index reaches its *extreme* category more than 10% of the time across section of the Great Plains. This standardization allows the SPI to determine the rarity of a current drought as well as the probability of the precipitation necessary to end the current drought.

B. Keetch-Byram Drought Index (KBDI)

1. A soil/duff drought index that ranges from 0 (no drought) to 800 (extreme drought) and is based on a soil capacity of 8 inches of water. Factors in the index are maximum daily temperature, daily precipitation, antecedent precipitation, and annual precipitation.

0 – 200 Low Fire Danger	Soil and fuel moisture is high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
200 – 400 Moderate Fire Danger	Fires more readily burn and will carry across an area with no "gaps". Heavier fuels will still not readily ignite and burn. Also, expect smoldering and resulting smoke to carry into and possibly through the night.
400 - 600 High Fire Danger	Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
600 – 800 Extreme Fire Danger	Surface litter and most of organic layer is consumed. 1000-hour fuels contribute to intensity. Stumps will burn to the end of roots underground. Any dead snag will ignite. Spotting from snags is a major problem if close to line. Expect dead limbs on trees to ignite from sparks. Expect extreme intensity on all fires making control efforts difficult. With winds above 10 miles per hour, spotting is the rule. Expect increased need for resources for fire suppression. Direct initial attack is almost impossible. Only rapid response time to wildfire with complete mop-up and patrol will prevent a major fire situation from developing.

2. Should any part of the state of Texas experience extended periods of fair, windy weather, the implementation of countywide bans on outdoor burning may be advised as a wildfire prevention tool in that area. The TFS recommends that local governments consider a KBDI of 500 and above for imposition of burn bans.

C. **Satellite Vegetation Health Index**

This is a numerical index or vegetation condition, which ranges from 0 (extremely poor) to 100 (excellent) based on a combination of chlorophyll and moisture content monitored by plant color and temperature. The satellite images are color-coded maps of vegetation condition (health) estimated by the Vegetation and Temperature Condition Index (VT). The VT is a numerical index, which changes from 0 to 100 characterizing change in vegetation conditions from extremely poor (0) to excellent (100). The VT reflects indirectly a combination of chlorophyll and moisture content in the vegetation and also changes in thermal conditions at the surface. This new approach combines the visible, near infrared, and thermal radiances in a numerical index characterizing vegetation health. This approach is extremely useful in detecting and monitoring such complex and difficult-to-identify phenomenon as drought. The VT values below 35 are used for identifying vegetation stress that is an indirect drought indicator. The VT is very useful for early drought detection, assessing drought area coverage, duration, and intensity, and for monitoring drought impacts on vegetation and agricultural crops.

D. Palmer Drought Severity Index (PDSI)

1. The Palmer Drought Severity Index (PDSI) is a "meteorological" drought index that responds to weather conditions that have been abnormally dry or abnormally wet. The PDSI is calculated based on precipitation, temperature, and Available Water Content (AWC) of the soil. The Palmer Index varies from +6.0 to -6.0 with a classification scale indicating relative meteorological and hydrological development cycles. Table 1 reflects the range and extent of the PDSI classification system:

Table 1: PDSI Classification System	
4.00 or more	**Extremely wet**
3.00 to 3.99	**Very wet**
2.00 to 2.99	**Moderately wet**
1.00 to 1.99	**Slightly wet**
0.50 to 0.99	**Incipient wet spell**
0.49 to –0.49	**Near normal**
-0.50 to –0.99	**Incipient dry spell**
-1.00 to -1.99	**Mild drought**
-2.00 to -2.99	**Moderate drought**
-3.00 to -3.99	**Severe drought**
-4.00 or lower	**Extreme drought**

2. The preliminary PDSI is calculated nationwide on a weekly basis and this data can be found at http://www.cpc.ncep.noaa.gov. The data for Texas is extracted and maps showing the preliminary PDSI are created by TWDB staff and are posted on the Texas Water Information Network web site. Texas has 10 National Weather Service Climatic Divisions, with more than 25,000 square miles in each division. Current drought reporting is based on these NWS Climatic Divisions. It is the goal of this plan to develop reporting and information systems on smaller reporting regions so that a more realistic picture of drought as it develops, rather than reporting drought impact after it has inflicted large-scale damage.

E. Crop Moisture Index ("CMI")

1. Most crops are in the field only a fraction of the year, with this time ranging from about 90 days for sunflower to as much as 250 days for wheat. The potential for drought damage varies vastly with crop growth stage, which is governed by planting date and environmental conditions. As Texas has great differences in climate between the 10 climatic divisions, crop maturity and potential damage from drought on a given calendar date varies greatly with location, crop and seasonal conditions.

2. A Palmer derivative, the CMI reflects moisture supply in the short term across major crop-producing regions and is not intended to assess long-term droughts. The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions across major crop producing regions. It is based on the mean temperature and total precipitation for each week within a Climate Division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations.

Climatological and Hydrological Evaluation Table

DROUGHT SEVERITY CLASSIFICATION		RANGES					
DPC STAGE	DESCRIPTION	POSSIBLE IMPACTS	SPI	KBDI	VT INDEX	CROP MOISTURE INDEX	PDSI
Advisory	Abnormally Dry	Going into drought: short-term dryness slowing planting and growing crops or pastures; fire risk above average. Coming out of drought: lingering water deficits; pastures or crops not fully recovered	0 to -.99	300-399	36-45	-1.0 to -1.9	-1.0 to -1.9
Watch	First-Stage Drought	Damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, water shortages developing or imminent, voluntary water use restrictions requested	-1.0 to –1.49	400-550	26-35	-2.0 to -2.9	-2.0 to -2.9
Warning	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed	-1.5 to -1.99	551-650	16-25	-3.0 to -3.9	-3.0 to -3.9
Emergency	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions	-2.0 or less	650-700	6-15	-4.0 to -4.9	-4.0 to -4.9
Disaster	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies	-2.0 or less	>700	1-5	-5.0 or less	-5.0 or less

Source: TWDB Regional Climatic and Hydrologic Indicators (Modified from U.S. Drought Monitor, 2000)

3. Each Index range shown here is a relative guide only, first order determination is the responsibility of the Drought Monitoring and Water Supply Subcommittee. This information along with the Water Supply Availability, Agricultural Indicators, and Water Utility Indicators will determine the drought stage. Because the ranges of the indicators do not correlate directly, the final drought category tends to be based on what the majority of the indicators shown. The SPI, KDBI, and VT are considered more accurate and are weighted heavily than the preliminary PDSI and CMI. This classification is to be used only as a guide for determining drought stages in each region. Further modification of this task of the Drought Evaluation Process will be modified when more precise, accurate, and localized drought monitoring products are available.

4. Drought Indices Listing

   SPI – Standardized Precipitation Index
   KBDI – Keetch–Byram Drought Index
   CMI – Crop Moisture Index
   VT – Satellite Vegetation Health Index
   PDSI – Preliminary Palmer Drought Severity Index

5. Most preliminary drought indices are available weekly; however, the SPI is available monthly.

Attachment 4

Agricultural Assessment Values

A. The overall Agricultural Index will reflect the impact of drought on the agricultural industry based upon observations of soil moisture, crop conditions, range and pasture conditions by Texas Agricultural Extension Service (TAEX) county agents and specialists. While livestock sales are independent of drought, much of the economic damage to this industry from drought comes from forced liquidations of stock associated with lack of forage and water. The Texas Department of Agriculture (TDA) will monitor livestock sales and note abnormal increases in sales volume during drought conditions to weight the Agriculture Index. Drought declarations by the U.S. Department of Agriculture (USDA) occur after significant economic damage has been done by drought. This indicator will enter into the later stages of agricultural drought.

B. It is understood that this index is subjective and will require interpretation by the Drought Preparedness Council to arrive at an overall score of the current impact of drought on agriculture and its related industries. No one index can accurately reflect the impact of drought to such a large and diverse industry. The Agricultural Index is intended to provide timely, concise and useful information to the public and policy makers regarding the status of drought in the state.

C. The Agricultural Index will be established by evaluation and a weighted summation of five variables. These include:

1. Soil moisture conditions
2. Crop conditions
3. Pasture and range conditions
4. Livestock sales
5. USDA drought declarations

D. The soil moisture conditions component of the Agricultural Index will be developed using data provided by TAEX county agents. County agents develop a weekly report, which is shared with the Texas Agricultural Statistics Service, and gives their professional estimate of soil moisture conditions within their county. Ratings are made as very poor, poor, fair, good, or excellent. Moisture conditions will be summarized across the reporting district and a composite score will be developed.

E. Crop conditions are reported in much the same manner, with agents ranking each of the major crops produced in their counties as very poor, poor, fair, good or excellent condition. Pasture and range conditions are included on the same report, using the same qualitative scale. Conditions of each crop are summarized separately across the reporting district. From this, a composite "Crop Conditions" index will be developed. The pasture and range conditions index will reflect the results of a compilation of the district- wide summary.

F. As part of the Agricultural Index, the Texas Department of Agriculture will be working in cooperation with the USDA-TDA Market News, the TAEX, and the USDA Farm Service Agency (FSA) to provide agricultural conditions as they relate to drought for evaluation.

G. Livestock sales, reported weekly, at 26 Texas auction barns are publicized by USDA-TDA Market News. These reports show the weekly cattle sales compared with the previous week and previous year. They also provide information on age and size of cattle being sold. TDA and USDA-TDA Market News will be able to provide a summary of the number of livestock sales (number of receipts) showing an abnormal increase of younger and lighter cattle being sold. That can reflect an area's forage situation and the lack of feedstuffs. Some of the auction barns include sheep and goat sales.

H. Another element that will be considered under the Agricultural Index will be the number of USDA Secretarial Disaster Designations due to drought within a climatic region. These disaster designations are based on a USDA Flash Situation Report completed on a county level and summarizing the type of disaster and estimates crop and livestock losses and other agricultural damages. The County Judge also sends a letter of request, along with the Flash Report, to the Governor asking for an agricultural disaster declaration. If warranted, the Governor will request USDA assistance from the U.S. Secretary of Agriculture. The county FSA office prepares a Damage Assessment Report outlining the extent of agricultural losses and submits the report to USDA for determination. The declaration may be approved if, as a result of a natural disaster within a county, a request is made within 90 days of the incident, the incident is "weather-related," and there is at least a 30 percent countywide production loss of crops. The U.S. Secretary of Agriculture decides whether the request for a declaration should be granted. Since drought does not recognize county lines, counties that are contiguous to the approved county (primary county) are also declared disaster counties, including counties across state lines.

I. Based on the fact that agricultural drought losses have already occurred by the time the disaster designation is approved, this index will not be weighted as heavily during consideration as the preceding agricultural indexes.

J. Agricultural Drought Declarations Map Index

DPC STAGE	OBSERVATION
Advisory	5 percent of all counties within a NOAA Climatic Region have been approved for a USDA Drought Declaration.
Watch	20 percent of all counties within a NOAA Climatic Region have been approved for a USDA Drought Declaration.
Warning	40 percent of all counties within a NOAA Climatic Region have been approved for a USDA Drought Declaration.
Emergency	60 percent of all counties within a NOAA Climatic Region have been approved for a USDA Drought Declaration.
Disaster	80 percent of all counties within a NOAA Climatic Region have been approved for a USDA Drought Declaration.

K. USDA-FSA Drought Flash Reports and county drought declarations are used to report a drought disaster at the federal level. These reports are not released until disaster conditions are at hand, and are thus not predictive of drought, nor do they report severe conditions less than those considered being disaster.

L. The USDA-FSA state office and Governor's Division of Emergency Management both retain official copies of county Flash Reports and disaster requests, if the need for additional county drought losses should arise for evaluation purposes.

Attachment 5

Water Availability Assessment Values

DROUGHT SEVERITY CLASSIFICATION		RANGES		
DCP STAGE	DESCRIPTION	POSSIBLE IMPACTS	PERCENT OF RESERVOIR CONSERVATION STORAGE CAPACITY WITHIN REGION	STREAMFLOW PERCENT EXCEEDANCE WITHIN REGION
Advisory	Abnormally Dry	Going into drought: short-term dryness slowing planting and growing crops or pastures; fire risk above average. Coming out of drought: lingering water deficits; pastures or crops not fully recovered.	<70	70-79
Watch	First-Stage Drought	Damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, water shortages developing or imminent, voluntary water use restrictions requested	<60	80-89
Warning	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed	<40	90-94
Emergency	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions	<20	95-98
Disaster	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies	<10	0-1

A. Percent of Reservoir Conservation Storage Capacity:

Conservation storage is the portion of water stored in a reservoir that can be later released for useful purposes such as municipal water supply, power, or irrigation. Conservation storage is defined by the TWDB, as is the volume of water between the conservation pool elevation and that of the lowest intake. Percent of Reservoir Conservation Storage Capacity is calculated by dividing the actual water volume storage by the total conservation storage capacity. This is calculated by NOAA climatic region.

B. Streamflow as Percent Exceedance:

1. To measure streamflow, the method used by the TWDB is Percent Exceedance, computed with 30-day mean flows. Percent Exceedance is the expected percent of time (or probability) that flows of a given magnitude will be exceeded, and it is based on statistical analysis of historical records. For example, a one percent exceedance at 100 cfs implies that one percent of the time the flows will be larger than 100 cfs, or that 99 percent of the time they will be smaller. There are 29 reporting index stations used to calculate this index. Percent Exceedance ranges in the Table above are modified from the U.S. Drought Monitor.

2. Percent Exceedance is classified by the TWDB as:

30-day mean flows	Percent Exceedance
High	5 percent – 30 percent
Near normal	30 percent – 70 percent
Low	70 percent – 95 percent
Very low	95 percent – 100 percent

3. Water Supply Availability Indicators are used to estimate the available water supplies within specific region. Water supplies in reservoir storage within a region might be made available to other regions, either by conveyance downstream or by interbasin transfer..

Attachment 6

Future Planning and Coordination Recommendations

The Drought Preparedness Council, as a relatively new coordinating body, has developed the following recommendations for future drought-related operations and activities:

A. Drought Monitoring

1. Modernize the statewide environmental monitoring and forecasting system by installing a geographically distributed automated network similar to the Texas MesoNet System.
2. Enhance methods of passing drought-related information to those who are vulnerable to drought.

B. Impact Assessment

1. Coordinate the efficient and timely assessment of impacts related to various water uses.
2. Develop timely economic impact assessment tools.
3. Enhance the coordinated statewide response to drought.

C. Research and Educational Programs

1. Encourage the continued use of educational programs for drought awareness.
2. Support ongoing research into methods for improving drought monitoring, assessment, and mitigation.
3. Enhance use of the media for informing the public about drought management options and activities.

D. Drought Mitigation Strategies

1. Increase the educational emphasis given to forest and range management practices for the minimizing of drought impacts.
2. Establish stronger economic and other incentives for private investments in water conservation.
3. Improve water conveyance infrastructure efficiencies in agricultural, municipal, and industrial uses.
4. Encourage water-efficient land use and development practices.
5. Encourage coordinated drought response activities, particularly water use restrictions, among neighboring water systems.

Attachment 7

Useful Drought-Related Web Sites

"Aggie" Horticulture: http://aggie-horticulture.tamu.edu/tamuhort.html

Climate Prediction National Centers for Environmental Prediction:http://www.cpc.ncep.noaa.gov/

Committee on Earth Observation Satellite Drought Management:
http://www.ceos.org/pages/DMSG/index.html

Economic Development Clearinghouse: http://www.edinfo.state.tx.us/

Federal Emergency Management Agency (FEMA): http://www.fema.gov/

Governor's Division of Emergency Management (GDEM): http://www.txdps.state.tx.us/GDEM

International Boundary and Water Commission (IBWC): http://www.ibwc.state.gov/

National Climate Data Center (NCDC): http://www.ncdc.noaa.gov/

National Weather Service (NWS): http://www.nws.noaa.gov/

Natural Resources Conservation Service (NRCS): http://www.nrcs.usda.gov/

Office of Rural Community Affairs (ORCA): http://www.orca.state.tx.us/

Office of the State Climatologist: http://www.met.tamu.edu/osc.

State of Texas Drought Preparedness Council: http://www.txwin.net/dpc/

Texas Agricultural Extension Service (TAEX): http://agprogram.tamu.edu/

TAEX Resource Center: http://texaserc.tamu.edu/

Texas Agricultural Statistics Service: http://www.nass.usda.gov/tx/

Texas Department of Agriculture (TDA): http://www.agr.state.tx.us/

Texas Department of Economic Development and Tourism (TDED): http://www.tded.state.tx.us/

Department of State Health and Human Services (DSHS): http://www.dshs.state.tx.us/

Texas Department of Housing and Community Affairs (TDHCA): http://www.tdhca.state.tx.us/

Texas Department of Transportation (TxDOT): http:/www.txdot.state.tx.us

Texas Drought Links: http://agnews.tamu.edu/drought/

Texas Forest Service (TFS): http://txforestservice.tamu.edu/

Texas Commission of Environmental Quality (TCEQ): http://www.tceq.state.tx.us/

TCEQ Public Water Supply Systems Map: http://www.tceq.state.tx.us/

Texas Parks and Wildlife Department (TPWD): http://www.tpwd.state.tx.us/

Texas State Soil and Water Conservation Board (TSSWCB): http://www.tsswcb.state.tx.us/

Texas Water Development Board (TWDB): http://www.twdb.state.tx.us/

TWDB Reservoir Conservation Storage:
http://www.twdb.state.tx.us/publications/reports/waterconditions/watercon.htm

U. S. Army Corps of Engineers (USACE): http://www.swf-wc.usace.army.mil/

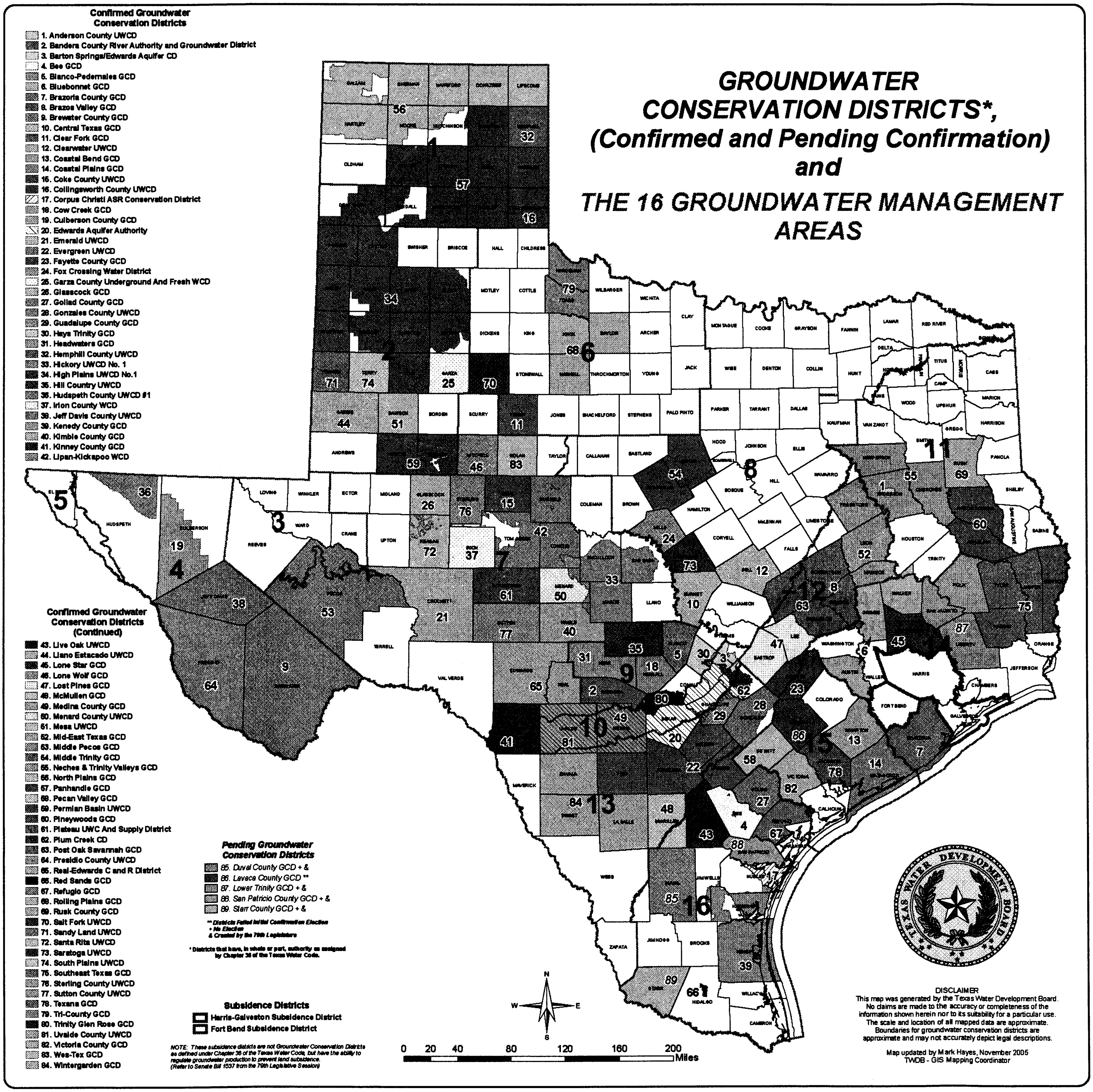
U. S. Bureau of Reclamation (USBR): http://www.usbr.gov/main/index.html

U. S. Department of Agriculture (USDA): http://www.rurdev.usda.gov/tx/

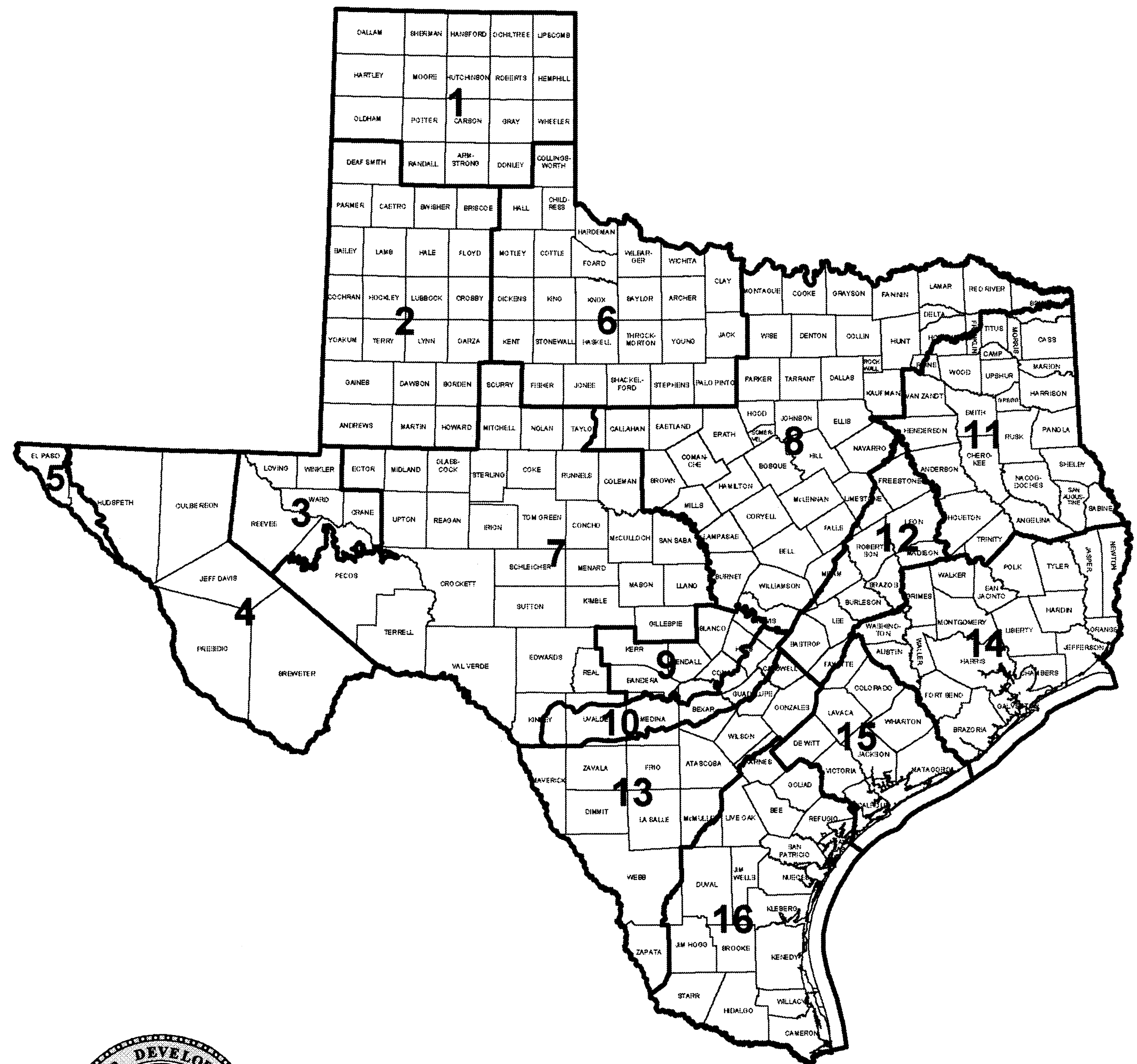
U. S. Forest Service (USFS): http://www.fs.fed.us/r8/

U. S. Geological Survey (USGS): http://www.tx.usgs.gov/

Appendix U


GROUNDWATER CONSERVATION DISTRICTS*, (Confirmed and Pending Confirmation) and THE 16 GROUNDWATER MANAGEMENT AREAS
Confirmed Groundwater Conservation Districts
1. Anderson County UWCD
2. Bandera County River Authority and Groundwater District
3. Barton Springs/Edwards Aquifer CD
4. Bee GCD
5. Blanco-Pedernales GCD
6. Bluebonnet GCD
7. Brazoria County GCD
8. Brazos Valley GCD
9. Brewster County GCD
10. Central Texas GCD
11. Clear Fork GCD
12. Clearwater UWCD
13. Coastal Bend GCD
14. Coastal Plains GCD
15. Coke County UWCD
16. Collingsworth County UWCD
17. Corpus Christi ASR Conservation District
18. Cow Creek GCD
19. Culberson County GCD
20. Edwards Aquifer Authority
21. Emerald UWCD
22. Evergreen UWCD
23. Fayette County GCD
24. Fox Crossing Water District
25. Garza County Underground And Fresh WCD
26. Glasscock GCD
27. Goliad County GCD
28. Gonzales County UWCD
29. Guadalupe County GCD
30. Hays Trinity GCD
31. Headwaters GCD
32. Hemphill County UWCD
33. Hickory UWCD No. 1
34. High Plains UWCD No.1
35. Hill Country UWCD
36. Hudspeth County UWCD #1
37. Irion County WCD
38. Jeff Davis County UWCD
39. Kenedy County GCD
40. Kimble County GCD
41. Kinney County GCD
42. Lipan-Kickapoo WCD
Confirmed Groundwater Conservation Districts (Continued)
43. Live Oak UWCD
44. Llano Estacado UWCD
45. Lone Star GCD
46. Lone Wolf GCD
47. Lost Pines GCD
48. McMullen GCD
49. Medina County GCD
50. Menard County UWCD
51. Mesa UWCD
52. Mid-East Texas GCD
53. Middle Pecos GCD
54. Middle Trinity GCD
55. Neches & Trinity Valleys GCD
56. North Plains GCD
57. Panhandle GCD
58. Pecan Valley GCD
59. Permian Basin UWCD
60. Pineywoods GCD
61. Plateau UWC And Supply District
62. Plum Creek CD
63. Post Oak Savannah GCD
64. Presidio County UWCD
65. Real-Edwards C and R District
66. Red Sands GCD
67. Refugio GCD
68. Rolling Plains GCD
69. Rusk County GCD
70. Salt Fork UWCD
71. Sandy Land UWCD
72. Santa Rita UWCD
73. Saratoga UWCD
74. South Plains UWCD
75. Southeast Texas GCD
76. Sterling County UWCD
77. Sutton County UWCD
78. Texana GCD
79. Tri-County GCD
80. Trinity Glen Rose GCD
81. Uvalde County UWCD
82. Victoria County GCD
83. Wes-Tex GCD
84. Wintergarden GCD
Pending Groundwater Conservation Districts
85. Duval County GCD + &
86. Lavaca County GCD **
87. Lower Trinity GCD + &
88. San Patricio County GCD + &
89. Starr County GCD + &
** Districts Failed Initial Confirmation Election
+ No Election
& Created by the 79th Legislature
* Districts that have, in whole or part, authority as assigned by Chapter 36 of the Texas Water Code.
Subsidence Districts
Harris-Galveston Subsidence District
Fort Bend Subsidence District
NOTE: These subsidence districts are not Groundwater Conservation Districts as defined under Chapter 36 of the Texas Water Code, but have the ability to regulate groundwater production to prevent land subsidence. (Refer to Senate Bill 1537 from the 79th Legislative Session)
0 20 40 80 120 160 200 Miles
N
W E
S
TEXAS WATER DEVELOPMENT BOARD
DISCLAIMER
This map was generated by the Texas Water Development Board. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate. Boundaries for groundwater conservation districts are approximate and may not accurately depict legal descriptions.
Map updated by Mark Hayes, November 2005
TWDB - GIS Mapping Coordinator

Groundwater Management Areas in Texas



TEXAS WATER DEVELOPMENT BOARD

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DISCLAIMER

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Map prepared by Mark Hayes, Mapping Coordinator, TWDB (Mark.Hayes@twdb.state.tx.us) 512-936-0828

Appendix
V

SENATE COMMITTEE ON NATURAL RESOURCES

SENATOR KIP AVERITT, Chairman
SENATOR CRAIG ESTES
Vice Chairman
SENATOR GONZALO BARRIENTOS
SENATOR ROBERT DUNCAN
SENATOR TROY FRASER

THE STATE OF TEXAS

SENATOR JUAN "CHUY" HINOJOSA
SENATOR MIKE JACKSON
SENATOR JON LINDSAY
SENATOR FRANK MADLA
SENATOR KEL SELIGER
SENATOR TODD STAPLES

October 27, 2006

The Honorable Eloy Vera
County Judge
Starr County
401 North Britton Avenue, Suite 203
Rio Grande City, Texas 78582-2620

Dear Judge Vera:

I am writing to apprise you of recent changes in state law that may impact water supplies in your county, and to suggest ways that you can get involved. Please share this letter with your Commissioners Court.

In 2005, the Texas Legislature passed House Bill (HB) 1763, which was designed to provide a more coordinated planning and management framework for groundwater conservation districts (GCD) that share a common groundwater resource.

As you may know, the state is divided into 16 groundwater management areas (GMA). Under HB 1763, GCDs located within the same GMA are charged with jointly establishing the desired future conditions of the aquifers located within that GMA. The conditions established by the GCDs are to be used throughout the state for planning purposes by regional water planning groups and by GCDs as they manage their groundwater resources.

To view a map delineating the state's GMAs and GCDs, please visit the following website:

www.twdb.state.tx.us/mapping/maps/pdf/GCDwithGMA.pdf

If you represent an area that has no GCD, the planning decisions for the future of your local groundwater supplies are being made by the GCDs located within your GMA. I encourage you to contact representatives of the GCDs in your GMA and participate in their deliberations on the future of groundwater supplies in your area.

P.O. Box 12068 • Austin, Texas 78711
(512) 463-0390 • FAX (512) 463-6769 • Dial 711 For Relay Calls

If you represent an area governed by a GCD, I encourage you to hold your GMA deliberations in a public forum and invite local officials not represented by a GCD to play an active role in the process. As water is an existence-of-life issue that affects every Texan, it is very important that the GMA deliberation process be open and include all affected parties.

For those of you who represent an area with no GCD and are interested in pursing the legislative creation of such a district, I encourage you to visit with leaders of neighboring counties regarding the possibility of a multi-county or regional GCD. Experiences in other areas of the state have shown that economies of scale can be achieved through the formation of a larger, regional GCD.

If you have any questions related to the issues raised in this letter, please contact the Senate Committee on Natural Resources. I look forward to working with you as we continue our efforts to ensure a clean, adequate supply of water for future generations of Texans.

Sincerely,

Kip Averitt Robert Duncan

Kip Averitt Robert Duncan

Appendix
W

SENATE COMMITTEE ON NATURAL RESOURCES

December 20, 2006

Mr. J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231

Dear Mr. Ward:

I want to begin by thanking you for the help provided by you and your staff during our interim committee hearings. The testimony provided has been very helpful as we work on our interim charges. As a part of that hearing process, I am looking at the potential impact of House Bill (H.B.) 1763 passed during the 79th Regular Session.

As you know, H.B.1763 seeks to bring about coordinated planning and management of water resources by groundwater conservation districts (GCDs) located over common aquifers or regions of groundwater resources. I am concerned that H.B. 1763 may have inadvertently incentivized the creation of single-county GCDs.

I would like to know your thoughts on this issue: Does H.B. 1763 encourage the creation of single-county GCDs? If so, what are your recommendations for addressing this issue? I look forward to working on any recommended adjustments with the Texas Water Development Board and the authors of the bill.

Thank you for your assistance, and I look forward to receiving your written response. If you have any questions, please do not hesitate to contact me.

Sincerely,

Kip Averitt

CC: Sen. Duncan
Rep. Robby Cook

P.O. Box 12068 • Austin, Texas 78711
(512) 463-0390 • FAX (512) 463-6769 • Dial 711 For Relay Calls

Appendix X

TEXAS WATER DEVELOPMENT BOARD

November 8, 2006

The Honorable Kip Averitt
Chairman
Senate Committee on Natural Resources
P.O. Box 12068
Austin, TX 78711-2068

Dear Chairman Averitt:

On behalf of staff at the Texas Water Development Board, let me offer our appreciation for the dedication and leadership you are already demonstrating as Chairman of the Senate Committee on Natural Resources. We are confident that you and your committee will work to resolve many of the challenging yet important natural resource issues facing Texas today. The unintended consequences resulting from the passage of House Bill 1763, as passed during the 79th Regular Session, is a good example of one of the challenging issues facing you and your committee.

In your letter of October 17, 2006, concerning House Bill 1763 you ask two questions. Our responses are below.

Question #1
Does House Bill 1763 encourage the creation of single-county groundwater conservation districts?

Response
House Bill 1763 indirectly encourages the creation of single-county groundwater conservation districts. House Bill 1763 allows each district in a groundwater management area a vote during the determination of desired future conditions. Therefore, if two counties are considering forming a district, they would get one vote if they formed one multi-county district and they would get two votes (one for each county) if they formed separate single-county districts. Mr. Walt Sears, Jr., General Manager of the Northeast Texas Municipal Water District has told us that this is factoring in decisions in northeast Texas on whether or not to create single-county or multi-county districts. Initially, interests in Camp, Cass, Marion, Morris, and Upshur counties were considering creating one multi-county district. However, after learning that they would only receive one vote as part of joint planning as described in House Bill 1763, they are now considering single-county districts. Under the current law, a single multi-county district receives one vote while five single-county districts receive, collectively, five votes.

This is also factoring into decisions related to the size of potential districts in north central Texas in the Dallas-Fort Worth area.

The reason these potential districts are concerned about the number of votes is because the votes are used to set desired future conditions in the groundwater management area. Additional votes mean that it is less likely for other districts to set the desired future conditions in the potential districts once they are created.

Question #2
What are our recommendations for addressing this issue?

Response
One possible solution to your second question on how to address this issue is to give multi-county districts multiple votes. One way this could be done would be by implementing the following:

1. Each district confirmed before September 1, 2007, is guaranteed at least one vote;
2. A district receives an extra vote for each additional county where the district contains at least 50 percent of the geography of that county; and
3. Any new districts confirmed after September 1, 2007, would have to be larger than 50 percent of the geography of a county to receive a vote.

The first provision allows the existing partial county groundwater conservation districts to retain their votes even though they do not cover most of a county. The second provision gives multi-county districts additional votes if they include the majority of a county and will likely encourage the creation of multi-county districts which are generally more efficient and effective than single-county districts. The third provision, in conjunction with the first provision, prevents someone from forming multiple districts in a single county to maximize votes.

As always, we are happy to assist you and the committee in any way we can. Please contact me at 463-7850 if you have any questions or comments.

Respectfully,

J. Kevin Ward
Executive Administrator

c: The Honorable Robert L. Duncan, Texas Senate
The Honorable Robert L. Cook, Texas House of Representatives
Board Members, Texas Water Development Board