HOUSE COMMITTEE ON NATURAL RESOURCES
TEXAS HOUSE OF REPRESENTATIVES
INTERIM REPORT 2002

A REPORT TO THE
HOUSE OF REPRESENTATIVES
78TH TEXAS LEGISLATURE

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Committee On
Natural Resources

November 1, 2002

David Counts
Chairman

P.O. Box 2910
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The Honorable James E. "Pete" Laney
Speaker, Texas House of Representatives
Members of the Texas House of Representatives
Texas State Capitol, Rm. 2W.13
Austin, Texas 78701

Dear Mr. Speaker and Fellow Members:

The Committee on Natural Resources of the Seventy-Seventh Legislature hereby submits its interim report including recommendations and drafted legislation for consideration by the Seventy-Eighth Legislature.

Respectfully submitted,

David Counts, Chairman

Tracy O. King

Robert L. "Robby" Cook

Frank Corte Jr.

Harvey Hilderbran

Ruben Hope Jr.

Ron Lewis

Robert Puente

Gary L. Walker

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INTRODUCTION

At the beginning of the 77th Legislature, the Honorable James E. "Pete" Laney, Speaker of the Texas House of Representatives, appointed nine members to the House Committee on Natural Resources ("the committee"). The committee membership included the following: Representatives David Counts (Chairman), Tracy O. King (Vice-Chairman), Robert "Robby" Cook, Frank Corte Jr., Harvey Hilderbran, Ruben Hope Jr., Ron Lewis, Robert Puente, and Gary L. Walker.

During the interim, the committee was assigned two charges by the Speaker:

> 1. Gather information about the security of the waters in Texas, including groundwater, lakes and streams. Review government regulations and business practices to determine whether legislation is needed to protect our water resources, including the human and wildlife populations that depend on them, and to detect, interdict and respond to acts of terrorism.
>
> 2. Actively monitor all agencies and programs under the oversight jurisdiction of the committee, including (a) implementation of S. B. 2, 77th Legislature, relating to the development and management of the water resources of the state, (b) implementation of S. B. 312, 77th Legislature, relating to the continuation of the Texas Water Development Board, ©) the actions of the Texas Water Advisory Committee, (d) water permitting for environmental needs, and (e) the development of groundwater management areas by the Texas Water Development Board. The committee should review the condition of groundwater conservation districts found to be not operational by the state auditor.

The committee undertook both charges as a committee of the whole and no subcommittees were appointed. The committee has completed its hearings and investigations and issued the following final report.

The committee wishes to express appreciation to the federal and state agencies, local governments, public and private interests, and concerned citizens who testified at the hearings for their time and efforts on behalf of the committee.

HOUSE COMMITTEE ON NATURAL RESOURCES

INTERIM STUDY CHARGES AND SUBCOMMITTEE ASSIGNMENTS

COMMITTEE OF THE WHOLE

CHARGE: Gather information about the security of the waters in Texas, including groundwater, lakes and streams. Review government regulations and business practices to determine whether legislation is needed to protect our water resources, including the human and wildlife populations that depend on them, and to detect, interdict and respond to acts of terrorism.

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WATER SECURITY

WATER SECURITY

INTRODUCTION

After September 11th, state, federal, and local governments began to assess their ability to respond to various types of terrorist attacks and to investigate legislation that has been introduced or adopted to address the threat of terrorism. In Texas, Governor Rick Perry created the Governor's Task Force on Homeland Security to study the state's preparedness for acts of terrorism and make recommendations for improving responses and mitigating the effects of such acts. Throughout the nation, states have been establishing or modifying definitions of terroristic threats and false reports to facilitate the prosecution of those who take part in such acts. States are addressing the issues of wiretapping, public disclosure laws, and fraudulent forms of identification.[1]

The emergency management plans of states and the federal government are being scrutinized and modified to ensure an effective response to a terrorist act. Coordinating efforts and communication between the many agencies and entities that would be involved in a response to an attack is one of the most effective means to minimize damage and loss of life. Increasing the security of airports, seaports, nuclear power plants, water systems and oil pipelines have been examined as well as whether appropriate procedures and safeguards are in place to respond to acts of bioterrorism and cyberterrorism. There has also been a focus on ensuring that law enforcement and health providers have the equipment, personnel, and training necessary to respond in the event of a terrorist attack.[2]

BACKGROUND

Emergency Response in Texas

The state's existing emergency organization has and will continue to execute homeland security activities. The Governor has overall responsibility for preparing for and responding to all threats to the state, which include acts of terrorism. The Emergency Management Council (council) based within the Division of Emergency Management (DEM) of the Department of Public Safety is comprised of 32 state agencies and two volunteer organizations. The Council provides advice and assistance to the Governor in all matters relating to emergencies, and coordinates the use of state and federal resources.[3]

The State Emergency Operations Center is a 24-hour operation housed at the Division of Emergency Management in Austin, and, when needed, it brings together all or part of those 34 state agencies and organizations whose involvement in emergency response is coordinated in a "Team of Teams" effort. Twenty-one Disaster Districts, which are state regional emergency management authorities, are headed by Department of Public Safety (DPS) District Captains or Lieutenants. They work with local elected officials and responders during times of disasters. They also coordinate, at the local level, the employment of state and federal resources. The State-Level Counter-Terrorism Working Group is also housed under the Division of Emergency Management of the Department of Public Safety and was created in 1997 to address both foreign and domestic terrorism issues.[4]

The State of Texas has long been a national leader in terrorism preparedness. After the tragic Oklahoma City Bombing, DPS began preparation and has had a comprehensive counter-terrorism program in place since 1997.[5]

Water System Security

Before September 11th, Texas has been concerned about the security of the 6,646 public water systems and over 6,000 water reservoirs in the state. In 1997, presidential directive declared water systems to be part of the nations critical infrastructure. Prior to September 11th, and certainly since the beginning of modern water treatment in the early 1920s, water utilities have always been committed to protecting the public health through providing safe drinking water to their customers. The safety of the public drinking water supply in this country has been called the greatest factor and the last line of defense in protecting public health. This has always been a responsibility that water utilities successfully meet every day, 24 hours a day.[6]

As part of every utility's commitment to public safety and to meet Texas Commission on Environmental Quality (TCEQ) regulations here in Texas, utilities have for many years protected their facilities from intruders using various means such as fences, gates, security cameras and the like. Vandals and pranksters have always found a way to climb to the top of some rural, and sometimes not so rural, water tank, and express their support for their hometown football team, or their undying or unrequited love. However, even then, there were few examples of anyone ever trying to contaminate their own water supply. Despite this, the fact that crudely painted messages would appear on water tanks is clear evidence that some storage tanks are and always will be at risk.[7]

Since September 11th, and literally on that day, water utilities shifted into a higher level of security to protect their systems. Many utilities immediately put new security practices into place including armed guards, new access policies and a higher sense that the entire water system needed to be protected.[8]

Many utilities, particularly those who have greater financial resources, quickly began assessing their vulnerability to attack and began implementing measures to reduce their risk. These utilities are generally those found in the major cities. But even in medium and smaller systems, after September 11th, utility managers began the process of making sure their systems were more secure.[9]

AGENCY/ ASSOCIATION ROLES

Numerous federal and state agencies play a role in preparing for and responding to acts of terrorism. On the federal level, agencies such as the Federal Emergency Management Agency (FEMA) and the Environmental Protection Agency (EPA) have been active in helping states prepare for acts of terrorism by allocating monies and implementing guidelines.

On the state level, at least sixteen state and private agencies are involved in preparing for acts of terrorism. These entities include: local governments, the Texas Department of Health (TDH), Department of Public Safety (DPS), Texas National Guard, Texas Department of Criminal

Justice, Texas Forest Service, Texas Commission on Environmental Quality (TCEQ), Texas Department of Transportation (TXDOT), and the Salvation Army.

This report will provide an overview of the state agency with the largest role: the Texas DPS and their Division of Emergency Management, and the state agency most involved in the security of the state's water systems: the TCEQ.

Texas Department of Public Safety[10]

In 1997, DPS established a state level terrorism working group to address the full spectrum of terrorism preparedness. The primary tasks of this group were to determine the requirements for planning, training, equipment, and organizational structure needed to respond to acts of terrorism. Today, this working group provides the direction in the implementation of the majority of the recommendations provided by the Governor's Task Force on Homeland Security.

The State Emergency Response Team (SERT) is comprised of 23 agencies from the State Emergency Management Council. It was designed to respond to catastrophic natural disasters. This team has now been trained, organized, and equipped to respond to terrorism incidents as well. Team members have received extensive Incident Command System training and have used this system during three recent terrorism exercises. The SERT is prepared to respond to all Weapons of Mass Destruction events. This includes nuclear, biological, and chemical incidents. They are also prepared to respond to acts of terrorism that may involve Foreign Animal Diseases, and to multiple catastrophic fires associated with the extensive petroleum and chemical industry in Texas. When deployed to a local area, the SERT comes under the direction and control of the Disaster District Chairman (DPS Captain or Lieutenant).

Four Regional Counter-Terrorism working groups were established in early 1998, bringing together federal, state, and local law enforcement agencies and organizations to share information and situational awareness. These four established working groups cover the geographic regions of Texas. Prior to Sept.11th, these groups met quarterly with local law enforcement, fire, EMS, and emergency management personnel to share information. Since Sept.11th they have become vital to the coordination of law enforcement activities across the state.

The Terrorism Working Group identified the need for a comprehensive plan to respond to any terrorist act within the State of Texas. After extensive coordination with the Federal Bureau of Investigation, the United States Attorney's Office, and the Federal Emergency Management Agency in 1998, DPS published the Terrorism Incident Response Annex to the Governor's State Emergency Management Plan in November 1998. It mandates the use of the Incident Command System as the management system that will be used during any response involving a terrorist weapon of mass destruction. It clarifies roles and responsibilities between state and federal law-enforcement agencies and was the first such plan published in the United States. It became the "well-spring" from which an overall terrorism preparedness program was developed in Texas. Today, local governments in Texas are required to have a similar plan.

In 1998, DPS adopted the Incident Command System (ICS) as the structure used to respond to

terrorism incidents. Since 1998, the Department has instituted an extremely successful training and education program. DPS has not only trained Department personnel, but federal and local first responders as well. Over 28 FBI Counter-Terrorism Agents in Texas, both U.S. Attorneys (Texas has 2), as well as numerous other federal agents have completed this program alongside our DPS Commissioned Officers. DPS has incorporated ICS training into their basic academy for all new troopers and now require it in the continuing education program for all commissioned officers within the Department.

DPS introduced a terrorism awareness-training program in 1998 by developing the Texas Terrorism Awareness Course. This course was fielded before any known course of its type was made available nationally. It was literally designed in-house from lessons learned from the Oklahoma City bombing. Since 1998, it has been revised twice and remains one of the most popular first responder courses offered by DEM.

The Texas Terrorism Exercise Program was established in 1998. This program focuses on the relationship between DPS and local law-enforcement incident commanders and has been tremendously successful across the state. Since its inception, it has produced outstanding results. By the end of this year, 44 jurisdictions will have benefitted from this program. The Department has encouraged the participation of the private sector such as the petro-chemical industry and private and public utilities. The increased interest and participation, especially since September 11th, has provided greater learning and preparedness opportunities for all exercise participants. This is particularly true with critical facility and infrastructure protection. Since September 11th, there has been a 246 percent increase in community participation. The ability to accommodate the increased interest is due to additional funding made available from the Office of the Governor.

DPS completed a statewide terrorism risk assessment in 2000. This effort resulted in the state's qualification for $11.7 million dollars from the Department of Justice. This money was distributed to 95 jurisdictions across the state for the purchase of response equipment. The risk assessment has enabled DEM to determine the current capabilities and future needs for many of the jurisdictions in the state. After September 11th, the DEM was immediately able to provide the federal government an assessment of the state's unmet needs. The Department is in the progress of updating the assessment and will have it completed in early October of this year.

At the end of 2000, the Department developed three terrorism-related handbooks. They are the Chem-bio Handbook, in English and Spanish, the Facility Security Handbook, and most recently, the School Safety Handbook. Over 15,000 copies of these handbooks have been distributed across the state to local emergency responders, law-enforcement, fire, and emergency management officials. DPS is in the process of distributing the School Safety Handbooks to over 1,040 School Districts, 7,519 separate public school campuses, and 159 Charter Schools. The Facility Security Handbook (the "Blue Book") has been in high demand from water utility managers across the state.
The Texas Terrorism website was established two weeks after the events of September 11th. This was four months prior to its scheduled completion date. The website has become a clearinghouse for vital information, which includes counter-terrorism points of contact for DPS. There have been more than a million hits on the site.

Since 1998, DPS has sponsored over 28 Terrorism Workshops and Symposiums across the state. These extremely well attended efforts have focused on preparedness. The most recent one, scheduled in 2000, and conducted in November 2001, had over 800 local responders and elected officials participate. The next statewide symposium is scheduled for January 2003 in Wichita Falls.

Since September 11th, DPS has continued to pursue these program initiatives by expanding the state's domestic preparedness. Texas' initial response to the attacks of Sept.11th was to provide funding for first responder training to increase the awareness and capacity for response to terrorist threats or events in Texas. Over 6,000 first responders have been trained, and 14 simulated emergency exercises have been conducted, with five still to be conducted this year. Inter-agency and multi-jurisdictional cooperation has significantly improved, and strategies that will allow interlocking areas of coverage for response to threats of terrorism through mutual aid agreements are being developed at the state, regional, and local levels.

DPS priorities and initiatives will continue to focus on the following:

Continued education and training with focus on expanding exposure of the terrorism program to teachers, public works, non-law enforcement personnel, and citizens.
Increased border security.
Improved development of the Citizen Corps and expanded involvement in Texas.
Increased deep-water port security.
Enhanced multi-discipline, two-way communication capability and flow at state, regional, and local levels.
Improved response capability and capacity for health response.
Enhanced state infrastructure security.
Improved technological capabilities, criminal history, and identification technologies.
Enhanced cyber-terrorism detection and prevention capability.
Enhanced bio-terrorism laboratories and research.
Interlocking regional response and mutual aid agreements.

Most recently, DEM/DPS played a significant role, in coordination with the Office of the Governor, in planning for the Texas First Responder Preparedness Program. This program will provide the state with the opportunity to enhance state and local first responders' capability to provide an overwhelming response to terrorism incidents in Texas. This program is but part of a wider, more comprehensive Texas Homeland Security Strategic Plan initiative.

Texas Commission on Environmental Quality[11]

In Texas, basic security enhancements for public drinking water systems have been in place for over 20 years due to TCEQ rules and regulations that require source water protection zones, all treatment and storage facilities to be equipped with intruder resistant fences, locked doors, gates, and hatches, and the requirement that all water systems must have disinfection treatment. Many states do not have these requirements.

After Sept 11th, TCEQ's Water Supply Division took immediate steps by forming a Critical

Facilities Team (CFT) to address the public drinking water system security issues. The first step taken was to develop a **"Security Evaluation Plan"** guidance. This was guidance for water systems to use as an enhancement tool for preventive and deterrent security measures. This plan laid out basic security steps for water systems, including creating heightened awareness and customer involvement. These last two strategies in particular involve little cost but provide huge benefits. Since water systems can vary greatly, the plan also encouraged the water system officials to use the document as a guide to develop their own customized plans to meet their specific needs.

However, it is realized that not all security breaches can be prevented. When preventive security measures fail, water systems must be able to know how to respond to and mitigate an incident or emergency. The key to success for a water system in responding to an emergency is for it to have a good emergency response plan, training, familiarity and good working relationships with first responders, and an effective communication plan in place.

The CFT developed an **"Emergency Response Plan"** guidance. This guidance document laid out steps a water system official should take if their security has been breached, how to respond, and how to develop their own communication plan, who to contact, and when.

Both the **"Security Evaluation Plan"** and the **"Emergency Response Plan"** were mailed out to all 6,650 public drinking water systems in Texas in early November. The CFT then conducted a risk assessment of the largest water systems, which comprised over 50 percent of the population in Texas. Of the 27 largest Texas water systems assessed, those determined to be at high risk were notified by TCEQ, public drinking water, and EPA officials on a conference call to alert them to their situation and recommend they take corrective actions.

The CFT also developed a detailed comprehensive **"Security Check List"** and mailed it out to all 4,550 community water systems in January. The team has also provided technical assistance both directly and through contractors and has conducted numerous outreach and training programs for water system operators and officials - most notably a teleconference with the American Water Works Association (AWWA) last November on Water System Security which had approximately 1,000 attendees at 14 downlink sites in Texas and 10 downlink sites in three other States (Louisiana, Arkansas, and Oklahoma).

The TCEQ, along with EPA Region VI and the Texas Section of the AWWA, jointly sponsored and produced a follow-up security teleconference on August 6, 2002, which focused on new information to help public water systems, especially the medium and small water systems, prepare to meet the security challenges they face today. It was attended by over 1,200 at 14 downlink sites in Texas and also in New Mexico, Oklahoma, Arkansas and Louisiana. This telecast featured video footage of a rural water system undergoing a vulnerability assessment, a rural water system undergoing a simulated emergency response with local fire and law enforcement first responders, discussion on risk communication and how to communicate with customers before, during and after an emergency, the concepts of the "Sandia Model" vulnerability assessment, and it unveiled a "Water Watchers" program similar to the "Neighborhood Watch" programs that promote public involvement. TCEQ provided grant funding to support this effort and to make video tapes of the telecast available, free of charge, to

all water systems requesting them.

American Water Works Association[12]

The American Water Works Association (AWWA) is the largest organization in the world dedicated to safe and sufficient supplies of drinking water. Members include water supply professionals who produce safe drinking water for millions of Americans or who are suppliers to the drinking water industry. The association is also involved in water resource protection and water conservation issues. AWWA also determines and sets the design standards for drinking water systems, from construction practices to the water meter in your front yard. Members also fund, along with support from the US EPA, the American Water Works Association Research Foundation. The research foundation performs the substantial body of research into drinking water safety, management and operations.

In North America, AWWA has over 57,000 members. Here in Texas, the Texas Section AWWA has 3,300 members. Members include the decisions makers in virtually every major water utility in the state and represent over 16 million customers in Texas.

Association of State Drinking Water Administrators[13]

Another important component in water system security development has been the Association of State Drinking Water Administrators (ASDWA). ASDWA is the professional association serving state drinking water programs. Formed in 1984 to address a growing need for state administrators to have national representation, ASDWA has become a voice for state primacy agents with Congress, the US EPA, and other professional organizations.

ASDWA's principal activities include:

- Representing states on Safe Drinking Water Act implementation issues;
- Keeping Congress informed on key issues related to drinking water, including appropriations, new legislation, contaminants of concern, and program efficiency and effectiveness; and
- Providing technical training opportunities to the states.

ASDWA members are the drinking water program administrators in all 50 States, all territories, and the District of Columbia. ASDWA is governed by a Board of Directors consisting of a state program administrator from each of the 10 Federal regions, the President, the President-Elect and the Past President. The ASDWA Executive Director and staff are located in Washington, D.C., and manage the daily activities of the association. ASDWA works closely with a large number of professional organizations whose activities contribute to the association's goals.

Collaboration among the ASDWA Membership, ASDWA's Security Committee, the US EPA and EPA Drinking Water Academy and the National Rural Water Association resulted in the development of a document entitled "Security Vulnerability Self-Assessment Guide for Small Drinking Water Systems." Development of this tool was needed for the small water systems to use as a modification of the much more complex "Sandia Model" that is used by the larger water

systems.

VULNERABILITY ASSESSMENTS & THE SANDIA MODEL[14]

In early 2001, the AWWA Research Foundation contracted with Sandia National Laboratories in New Mexico to design a Vulnerability Assessment process for water utilities. Sandia was considered the best source for this information because of their lead in critical infrastructure protection strategies for high-risk operations including the Nuclear Power and Chemical industries. It is significant to note that this was not the first time AWWA had addressed the issue of water system security. In fact, since 1955, AWWA had developed a number of research documents and materials to help water utilities better secure their systems. This early work included research into what bio contaminants could be weaponized and used to contaminate water systems. So, the recent Sandia project was, at the time, an extension of many years of work on water system security.

Shortly after September 11th, Sandia National Laboratories was able to complete their work, and by December 2001, AWWA had started training water systems and consultants in water system Vulnerability Assessments based on the Sandia model. One of the first trainings was held near Dallas. A new set of additional Sandia based trainings are currently ongoing nationwide.

The Sandia model is currently designed for large water systems. This was done initially on the basis of expert opinion that larger water systems presented the most potential harm to the largest populations if they were attacked. This opinion was also held by the EPA in their initial attempt to provide greater security to the greatest population base as fast as possible after September 11th.

The basic principle of the Sandia model, or any other vulnerability assessment model, is to create a prioritized risk assessment of a systems infrastructure, and then develop the means to mitigate someone's ability to impact the system. Simply put, you would first determine what parts of the system are truly at risk and then create systems and policies to reduce the risk.

This strategy focuses on reducing the risk not preventing it. Water systems, unlike nuclear power plants and other at-risk facilities, are not self-contained within the confines of a fixed, easily defensible area. Water systems, like electric power grids, push their resources out of the confined secure space of their primary facility. Water *systems* by their very nature include water lines constructed to reach out to each customer. In that process, certain facilities such as water tanks, pump stations and the like, are generally exposed to public view.

By using the Sandia model or similar models, the process of determining relative risk helps utilities examine where they should direct their resources. In some cases, particularly with small systems, those resources for hardening facilities are very limited.

The Sandia model was originally designed for larger utilities. In its current form, the Sandia model is a relatively complex process designed with specific large system goals in mind. The AWWA research foundation has recently contracted with Sandia National Laboratories to develop a Vulnerability Assessment Process for medium and small utilities.

On November 9, 2001, the Texas Section AWWA presented one of the first training programs on assessing vulnerability to all water utilities in the state. This was accomplished with input from the TCEQ in the production of a statewide teleconference that originated in Austin and was seen at thirteen downlink sites in Texas. Questions at the teleconference included:

> What are the threats to public water systems?
> Where are systems vulnerable?
> How can utilities assess their own vulnerability?
> What new security protocols are regulatory agencies going to require, if any?
> How do utilities plan for the worst-case scenario?
> What CAN and SHOULD utilities tell the public and press about security procedures?
> And what should utilities tell, AND NOT TELL, the press and the public if their water system is breached?

This teleconference was seen by nearly 800 water utility managers and operators in Texas and was also seen by 300 attendees in Oklahoma, Arkansas and Louisiana.

In June of this year, President Bush signed The Bio Terrorism Act, now known as Public Law 107-188. This legislation mandates that all water utilities serving customers of 3,300 or more perform Vulnerability Assessments and integrate them into their new or updated Emergency Response Plans. These assessments must be completed and filed with the EPA on a staggered basis based on utility size and each utility must also certify that is has completed its Emergency Response Plan.

Utilities with 100,000 customers or more must complete their Vulnerability Assessments by March 31, 2003. Systems with a customer base between 50,000 but less than 100,000 must complete their assessments by December 31, 2003, and systems with a customer base of 3,300 but less than 50,000 must complete their assessment by June 30, 2004. Those below 3,300 customers are not required to perform a vulnerability assessment. However, all water systems no matter what their size, are encouraged, to the best of their ability, to take all necessary steps to harden their systems. However, no matter what the size of the utility, funding of these assessments and implementation of changes remains an issue.

Subsequent to the signing of this new legislation and based on previous success with the November 2001 teleconference, the US EPA Region 6 approached the TCEQ and the Texas Section AWWA to develop a teleconference targeting medium and small utilities to assist them in the preparation of their vulnerability assessments. This satellite teleconference was presented on August 6, 2002, and was down linked at 29 sites in Texas, New Mexico, Oklahoma, Arkansas and Louisiana.

The program successfully worked through the requirements of a Vulnerability Assessment and walked attendees through an actual utility to illustrate how to assess vulnerability and harden their systems. In addition, the program provided utilities with more specific information on the development of Emergency Response Plans and how to work with first responders in advance of an emergency.

This program was seen by nearly 1,200 attendees and will be distributed at no cost to any utility in the 5-state region that requests a copy.

POTENTIAL THREATS TO WATER SYSTEMS[15]

The five categories of threats that water systems face today are: perceived threats, physical threats of the infrastructure, cyber threats, chemical and biological threats, and radioactive threats.

Of these, the one of greatest concern is the biological, or more specifically, microbial threats. Some of the so-called bugs of danger are: parasitic coxidia (cryptosporidium), spore producing bacteria such as Anthrax, bio-toxins produced by algae, bacteria, fungi, and plants (good example is Botulism), and military developed agents. (There are now processes under way to encapsulate bacteria that would hinder or prevent disinfection.)

Adequate disinfection protects us from many of these agents but over 36,000,000 people in the United States are served water that has no disinfection or filtration at all. However, none of these unprotected systems are located in Texas. Bio-toxins are a concern because they cannot be filtered out of the water like bacteria can be.

ACTUAL RISKS TO WATER SYSTEMS[16]

The message has been successfully delivered that while water utilities have certain risks inherent in their systems, because of the thousand of water systems nationwide and their relative independence from each other, and, because of the everyday commitment of water suppliers to ensure the safety of the water delivered to the public, many experts agree it would be somewhat difficult to cause a *major* health impact on the nation's public water supply.

However, a successful act of terrorism on a water system is not impossible. One reason is that many systems are old and were never designed with security issues in mind. Another reason is that many systems are isolated and not under constant supervision. That is why vulnerability assessments are so critical.

Some parts of a water system are more vulnerable than others, and it has been said that it would take 'truckloads and truckloads' of a contaminant placed in source water to cause harm. Most, but certainly not all, of these contaminants would be either detected or rendered harmless in the treatment process. However, there is still a risk of harm to the system.

In fact, the greatest risk may now be to parts of the system such as storage tanks or pump stations which are beyond the secure confines of a treatment plant. But, while the risk is greater, utilities of all sizes are taking the steps necessary to harden their systems to make it even more difficult to impact a water system.

Since September 11th, many now believe a physical attack designed to disrupt a system, as opposed to the introduction of some contaminant into the water system, would be the easiest way to strike. In addition, some experts believe a multi-pronged attack, known as a swarming attack,

would have an even more significant impact. This type of attack could possibly include disrupting the water system in a community and then starting numerous fires.

So which systems are more at risk? Large or small? There are two schools of thought. One says to have a similar impact on the public that the events of September 11th had, then an attack on a large system would be likely. However, most large systems have the resources and the system redundancy to better secure their systems and detect and mitigate an attack, and many have already implemented new security programs to protect their operations.

The greater risk is in smaller, more remote systems with limited resources. The system that has one water source, one treatment facility, one single distribution line that stretches considerable distance into a rural area, and serves a limited number of customers that are some distance from each other is at the most risk.

POSSIBLE TECHNOLOGICAL SOLUTIONS[17]

In the area of detection of contaminants in public drinking water systems, there are no detection systems currently available that can detect the broad spectrum of chemical and biological warfare hazards that a terrorist might use. To be successful, an adequate warning system must have a broad spectrum rather than specific because it is impossible to know in advance which agent might be used against the public. Also, any detection must be very rapid and have a low rate of false positive and false negative alerts. There are various promising new technologies, such as Lab-on-a-Chip, that will probably and eventually provide a solution to this problem.

With current technology, the only practical approach is to monitor routine "indicator" parameters in which a change in concentration measured in "real time" could signal the presence of possible hazards. (Some of these routine parameters are TOC, pH, Conductivity, D.O., Chlorine residual, turbidity and pressure.)

Also, due to the need for timely results, field monitoring kits should be used by smaller water systems where on-line monitoring is not available or economically feasible. The key is for the water system to develop a significant amount of baseline data through routine monitoring so that a change may be reliably associated with a danger or at least the need for further investigation.

This is seen as the only practical means to provide water security monitoring in the short-term until advanced analytical technology can catch up with the threats we face today.

FUNDING[18]

Funding is essential for our water systems to adequately address these threats. In January, the President signed a Department of Defense Emergency Appropriations to provide $89 million dollars in funding to EPA. The initial focus was on providing funding to help the large water systems, those serving 100,000 population or greater, conduct their vulnerability assessments. Approximately 400 of these systems nationwide serving over 50 percent of the United States population applied for and received up to $115,000 each to conduct these assessments. This totaled about $53 million dollars of the grant and was passed straight through from EPA to the

water systems. Thirty-three water systems applied in Texas and all but one met EPA's criteria and were awarded the grants in July. The one that did not meet the criteria was San Angelo, and they just missed the population requirement by 2 thousand or 3 thousand.

EPA sent all applications to TCEQ's Public Drinking Water for review and comments before awarding any grant dollars. The next step was to award $5 million dollars to states to help coordinate counter-terrorism activities. (Texas received $291,200 dollars of this share.) This was recently followed up with an additional $17 million dollars to states to assist the small and medium water systems in conducting their vulnerability assessments. (Texas received $876,700 dollars of this share.) Both these grants will be combined into one at $1.16 million dollars for Texas, and the attractive component is that these funds do not require any state match funds.

Additional funding that is in process is the second FY02 appropriations of $50 million dollars for states that the President just signed on August 2. However, these funds must be designated as an emergency by both Congress and the President before they can be released to EPA. These funds are for small and medium water system vulnerability assessments and emergency response planning and will be available through September 30, 2003. The bill provided for $160 million dollars to conduct these assessments, but this has not yet been appropriated. In addition, EPA has budgeted an additional $20 million dollars in their budget for FY03 for water system security purposes. There are also provisions in the DWSRF funds to allow for security enhancement loans.

The problem with the DWSRF is that it is a long-term process, but any applicants can use up to 49.9 percent of their funding for security enhancements. The only requirement is that it be approved and that 50.1 percent of their funding must be applied to the original intended use plan tasks. The Bio-terrorism Act also significantly increased federal penalties for tampering with a public water system. In the Safe Drinking Water Act Title XIV Section 1432 it: increased imprisonment for tampering with a public water system from 5 years to 20 years and increased the fine from $20,000 dollars to $100,000 dollars.

DPS PROPOSED PROGRAMS[19]

According to DPS, there are six fundamental elements to the state's continued success with terrorism preparedness. The first is the continuation of an aggressive training and exercise program. Second, DPS must continue to re-evaluate the state's risk assessment since threats are constantly changing. Third, the Department must strive to improve coordination between all state and federal programs. Fourth, the continuous updating of all state and local unmet needs must be evaluated. Fifth, the continued support of the implementation of the recommendations of the Governor's Task Force on Homeland Security is needed. Finally, there is a need to continue to have the Department's commitment to the pursuit of the prevention of terrorist acts as the foundation of all their initiatives.

Below is a Homeland Security Package from DPS that tremendously enhances the state's ability to detect, deter, respond, and recover from acts of terrorism. This provides the umbrella of preparedness across the full spectrum of potential threats necessary to protect all critical facilities

of Texas to include those over 6,400 public water systems and over 6,000 public reservoirs. These are also the recommendations from the Governor's Task Force on Homeland Security.

TEXAS DEPARTMENT OF PUBLIC SAFETY

FY04-05

HOMELAND DEFENSE PROJECTS

SPECIAL CRIMES:

Counter Terrorism Bureau

The Department has recently charged the Special Crimes Service with the primary criminal investigative and intelligence gathering responsibility for terrorism and signature crimes generally associated with terrorist activity.

In order to accommodate an expanded terrorism role, resource adjustments were made by the Special Crimes Service in FY2002. This adjustment was necessary in order to provide adequate manpower to investigate threats against the state's infrastructure and protect the citizens of this state from terrorist activities. Although this adjustment of resources was necessary, it has reduced enforcement efforts toward other required Special Crimes Programs. Therefore, a plan outlining minimum manpower needs has been developed to meet the needs of Texas.

Federal funding will increase the agency's ability to provide the investigative resources necessary to effectively facilitate the investigations of terrorists and terrorist activities within the state. Concerns were recently expressed, by the Texas Governor's Task Force on Homeland Security, for the protection of Texas resources and critical infrastructure from attack. Specific recommendations were made by the task force that involved the Department of Public Safety's abilities to:

Increase intelligence gathering capabilities in order to detect, deter, and respond to terrorism.
Establish a centralized point of contact for the gathering, sharing, and dissemination of intelligence information involving critical infrastructure services and assets.

A counter-terrorism Bureau within the Special Crimes Service will be established to fight domestic and international terrorism. Counter-terrorism training will be conducted. Training will also be provided in high tech computer equipment investigation.

Cost Estimates/Breakdown:

FTE's	FY04	FTE's	FY05	
Total	**56**	**$6,675,080**	**56**	**$4,505,688**

Method of Financing: Federal Funds

SPECIAL CRIMES:

1-800 Call Center

Texas possesses massive infrastructure resources in electric, gas, telecommunications transportation and other relevant infrastructure. The Governor's Task Force on Homeland Security recommended a 1-800 Call Center and E-mail address to allow the public t o report to a centralized intelligence gathering contact point, any suspicious activity on behavior related to possible terrorist activity directed toward Texas infrastructures.

Cost Estimate/Breakdown:

FTE's	FY04	FTE's	FY05	
Personnel and Related Costs	6	$ 347,709	6	$ 303,341
Emergency Power Generator		$ 500,000		

Method of Financing: Federal Funds

EMERGENCY MANAGEMENT SERVICE:

Homeland Defense Programs would add 57 FTE's to greatly enhance the ability of the Emergency Management Service (EMS) to carry out emergency preparedness, response, recovery, and mitigation programs throughout the state. Forty-five of the added staff would; carry out homeland defense preparedness programs and state-local emergency response coordination, assist cities and counties in developing emergency plans and procedures, provide a broad range of emergency management training in local facilities, and aid local governments in designing, conducting, and evaluating emergency drills and exercises. The remaining 12 FTE's would provide additional disaster recovery and hazard mitigation support for local governments throughout the state.

50 of the 57 proposed new FTE's would be stationed at DPS field offices around the state, including five Regional Liaison Officers (RLOs), five trainers, five emergency planners, nine planner/trainers, six Public Assistance officers, one Individual Assistance officer, three Hazard Mitigation officers, two auditors and 14 administrative support personnel.

The remaining seven personnel would be stationed in Austin to provide additional statewide emergency management support. These FTE's include two terrorism preparedness specialists, a natural resource specialist, an emergency public information officer and three administrative technicians.

Cost Estimate/Breakdown:

FTE's	FY04	FTE's	FY05	

Salaries-Non-commissioned	57	$ 1,679,131	57	$ 1,679,131
Operating		766,194		766,194
Capital		$ 971,717		
Total	**57**	**$3,417,042**	**57**	**$2,445,325**

Method of Financing: Federal Funds

CAPITOL SERVICES:

The Department assumed the responsibilities of the Capitol Service in 1991. Since that time the responsibilities of the Capitol Service have changed significantly and numerous responsibilities have been added. The Capitol Service is now responsible for all police and security service within the Capitol Complex with the exception of a few privately owned residence and business properties. These responsibilities include security of the state capitol building, security of all other state buildings, police patrols, criminal investigations, and all parking and traffic management within the Capitol Complex. Since September 11, 2001, the security responsibilities for the state capitol building and other state buildings within the Capitol Complex have increased significantly. Much of this added security is manpower intensive.

Cost Estimate/Breakdown:

FTE's	FY04	FTE's	FY05	
Salaries				
Commissioned	12	$ 652,589	12	$ 653,597
Non-commissioned	20	473,199	20	473,199
Operating		185,475		99,475
Capital		458,912		
Total	**32**	**$1,770,175**	**32**	**$ 1,226,271**

Method of Financing: Federal Funds

FINDINGS AND RECOMMENDATIONS

The committee offers the following findings and recommendations to the 78th Texas Legislature:

FINDING #1: The security of both small and large water systems in Texas is of the utmost importance. An attack on a water system of any size could cause widespread casualties and create a loss in public confidence in the safety of our drinking water supplies. Drinking water plants face a variety of threats including biological, chemical, radioactive, cyber, and

infrastructure. Distribution systems are especially vulnerable to contamination.

Building and maintaining coordinated efforts between water system operators, state and local emergency management agencies, emergency responders, health care facilities, state drinking water programs and federal agencies will be critical to protecting our drinking water supply.

RECOMMENDATION #1: The Legislature should continue to recognize the importance of protecting the state's small and large water supplies from terrorist activities. This includes promoting consistent and coordinated statewide response procedures for the state's water supply systems and ensuring that the state is the first level response to suspected acts of terrorism or vandalism.

FINDING #2: In the Bio-Terrorism Act, vulnerability assessments were considered sensitive enough to warrant their exclusion from disclosure under the Federal Freedom of Information Act. The EPA is mandated in the legislation to protect these documents from any disclosure. However, concerns still remain under Texas Public Information Laws that utility vulnerability assessments or Emergency Response Plans are not necessarily protected from public disclosure on demand. A balance must be achieved between protecting these vulnerability assessments while still recognizing the public's right to know.

RECOMMENDATION #2: The Legislature should amend Chapter 553 of the Texas Government Code to exempt from public disclosure documents which, if disclosed, could compromise the security of public water supplies, including vulnerability assessments, emergency preparedness and response actions, the location of particular facilities, and personal information on personnel with security responsibilities.

FINDING #3: Most water systems will need financial and technical assistance in evaluating their vulnerabilities, installing and upgrading security enhancements and responding to these threats. Medium and small utilities are facing an especially challenging task regarding funding. The EPA is planning to provide grant funding to states to assist small and medium utilities with vulnerability assessments and emergency response plans. And, if current plans progress, non-profits will be eligible for funding for training programs for utilities. However, recently, President Bush rejected part of the FY 2002 emergency supplemental bill.

Water industry experts estimate that $450 million dollars will be needed nationwide to provide vulnerability assessments for the public water systems covered by Public Law 107-188. About $53 million dollars has already been made available and directed to the largest water systems. As the EPA provides states additional funding, the potential loss of additional funding will have an impact on providing assistance in completing vulnerability assessments.

In the meantime, resources for medium and small utilities for vulnerability assessments are limited to available funds. Even if this funding is restored, utilities still may not be able to meet security needs. As a result, more financial strain may develop on a local level and potential increases in water rates to fund security improvements could become a reality.

RECOMMENDATION #3: The Legislature should consider exploring the use of other federal

monies to address additional water security needs. For example, set aside monies may be available for technical assistance through the use of the Safe Drinking Water Act (SDWA). This money could be used to provide hands on technical assistance to water systems to prepare vulnerability assessments and develop and implement recommendations for improved security based on the assessment.

The Legislature should also ensure that monies that have already been allocated to the state for water security are used primarily for vulnerability assessments and emergency response planning.

FINDING #4: While many volunteer organizations such as fire departments are well trained for the day-to-day emergency calls that their firefighters respond to, many smaller fire departments do not have adequate hazardous materials training or the appropriate resources to respond to water systems that may experience a breach. This issue is even more acute if there are substantial releases of hazardous chemicals such as chlorine or the introduction of an unknown contaminant into a water system.

Fire departments around the state are becoming more aware of their needs and water utilities are realizing that they must work with their fire departments as part of their Emergency Response Planning and vulnerability assessments.

Organizations representing fire departments in the state are currently working on proposed legislation that would assist local fire departments in upgrading their own operations. This would be accomplished through the creation of more Emergency Service Districts through local elections and would not require additional state funding. This process could allow many volunteer departments and Rural Fire Prevention Districts the opportunity to ultimately self-fund additional training and acquire additional equipment necessary to respond to security breaches.

RECOMMENDATION #4: The Legislature should support the efforts of organizations working to self-fund security training programs and upgrade their own operations. This effort could include creating more Emergency Service Districts to provide local funding options.

OVERSIGHT

OVERSIGHT

INTRODUCTION

The committee was charged with the oversight of several key issues and the implementation of important legislative initiatives. Specifically, the committee was charged with actively monitoring: (a) implementation of S. B. 2, 77th Legislature, relating to the development and management of the water resources of the state, (b) implementation of S. B. 312, 77th Legislature, relating to the continuation of the Texas Water Development Board, ©) the actions of the Texas Water Advisory Committee, (d) water permitting for environmental needs, and (e) the development of groundwater management areas by the Texas Water Development Board. The committee was also charged with reviewing the condition of groundwater conservation

districts found to be not operational by the state auditor.

SENATE BILL 2 IMPLEMENTATION

Texas Water Development Board Update

Senate Bill 2 (S.B. 2) has several key provisions at the Texas Water Development Board (TWDB) which included: establishing two new financial assistance programs; requiring a survey of local governments, regional authorities and other political subdivisions to determine how water projects in the State Water Plan would be paid for and what role the state should have in financing those projects.

Specifically, the legislation required the TWDB to conduct several studies and projects including: an Infrastructure Financing Report; Groundwater Availability Modeling; Groundwater Management Area designation; Instream Flow Studies; and a Water Use Survey.

S.B. 2 Financial Assistance Programs at the TWDB included: the Water Infrastructure Fund which included $50 million dollars in General Obligation Bond Authorization, and the Rural Water Assistance Fund which provides $25 million dollars in Private Activity Bond Cap.

In conducting the Regional Water Planning Group Survey required by S.B. 2 the TWDB had several goals which included: determining how local governments, regional authorities, and other political subdivisions propose to pay for water infrastructure projects identified in the approved regional water plans; and determining what role the regional planning groups propose for the state in financing projects identified in the plan, giving particular attention to proposed increases in the level of state participation in funding for regional projects.

S.B. 2 also required the TWDB to provide an Infrastructure Financing Report to the 78th Texas Legislature. To meet this requirement, the TWDB considered the survey reports submitted by the planning groups and consulted with potentially impacted groups and other interested persons regarding the information reported and the recommendations made by the planning groups; and submitted a report to the Legislature by October 1, 2002, which consists of the planning groups' reports and the TWDB's analysis and recommendations regarding those reports.

S.B. 2 also required the TWDB to provide for Groundwater Availability Modeling (GAM) in order to provide reliable, timely data on groundwater availability to the citizens of Texas to ensure adequacy of supplies or recognition of inadequacy of supplies throughout the 50 year planning horizon.

The GAM process at the TWDB will incorporate, at all levels, input from the public and private sector through a variety of technical advisory groups, public meetings, and technical forums. GAM will be based on a standardized approach using state-of-the-art, universally accepted, numerical groundwater flow models and computer capabilities. The process will not be technician dependent to reproduce results or run new simulations in the future. All models and results will be available via the TWDB website to any interested organization or individuals. GAM will also evaluate relationships between groundwater systems and the protection of

environmental resources, and facilitate the development of more realistic drought management plans for areas dependent on groundwater.

GAM is especially timely due to increased interest in reliable groundwater availability information for both near and long-term planning. Also, the improvements to computer software and hardware allow us to do today from our desk what was not even envisioned when most of the available groundwater models were developed.

S.B. 2 also requires the TWDB to coordinate instream flow studies. All major studies are scheduled to be completed by 2010. A Memorandum of Understanding with the Texas Environmental Quality Commission and the Texas Parks and Wildlife was completed to obtain this objective, and data collection efforts on selected priority instream flow studies are underway.

The water use survey rules required by S.B. 2 from the TWDB were adopted in December 2001, and the 2002 Water Use Survey was the first conducted under the new requirements.

Texas Commission on Environmental Quality Update

The TCEQ has initiated and adopted rule changes to implement provisions of S B 2. The public was afforded an opportunity to participate in the process. The changes include adding authorities to 30 TAC 292; amending 30 TAC 288, 295 and 297; making changes to domestic and wildlife and wildlife management exemptions; and adopting changes to 30 TAC 293 and 294 to implement groundwater changes. The Commission considered and approved the applications of numerous Water Supply Corporations to be certified as regional providers, and the agency delegated authority to the Executive Director to review and approve the applications of Water Supply Corporations seeking to be certified as regional providers for tax exemption purposes.

The Commission adopted rules to implement Articles 9 and 10 of S.B. 2 dealing with the ability of a municipality to request the revocation of a public utility's CCN and water utility rate and governance issues.

Alternative Dispute Resolution and Groundwater Conservation Districts[20]

The committee also heard testimony concerning the use of alternative dispute resolution (ADR) for groundwater conservation districts. With increased concerns throughout Texas about the availability of water in certain areas and with the development of the water market, there is a concern that groundwater conservation districts may become involved in extended and costly litigation regarding permit applications or management plans.

At the request of Chairman David Counts, representatives of the Center for Public Policy Dispute Resolution ("CPPDR") gave a presentation to the committee on the use of ADR in the water permitting and planning processes. CPPDR's mission is to promote the appropriate use of ADR by Texas governmental and public interest entities and to provide ADR education, research and services to state and local government, the University of Texas community and the public.

For nearly ten years, CPPDR has frequently acted as a resource to legislative committees, state agencies and other governmental bodies on matters involving ADR.

CPPDR's presentation discussed both the benefits and obstacles in the use of ADR in water planning and permitting. The benefits are numerous, with a principle benefit to a groundwater conservation district being the early and efficient resolution of many types of conflicts in the permitting process while saving the district's adjudication resources for those contested permit applications that truly need to be litigated. CPPDR's presentation also discussed the obstacles to using ADR, which primarily include lack of education, guidance and resources and lack of qualified third party neutrals (mediators and facilitators).

CPPDR made several recommendations for legislative action promoting the use of ADR in water permitting and planning. One recommendation was a statutory directive supporting the use of ADR in water planning and permitting. One option would be to amend the Texas Water Code to give groundwater conservation districts the authority to require the parties to a contested permit application to use mediation before having a hearing. A groundwater conservation district's order directing parties to use mediation would be supplemental to a party's right to a hearing on a disputed permit application.

The potential cost of litigating a permit application or policy decision can be very damaging to a groundwater conservation district. Groundwater conservation districts have the authority under the Texas Government Dispute Resolution Act ("GDR Act"), Texas Government Code §§ 2009.001 and 2009.051, to develop and use ADR procedures in appropriate circumstances. ADR procedures developed under the GDR Act supplement and do not limit other dispute resolution procedures available for use by a governmental body and may not be applied in a manner that would deny a person a right to a hearing. Pursuant to Texas Water Code Section 36.101(b), a groundwater conservation district may adopt rules governing procedures before its board. These rules could include procedures for mediating permitting and planning disputes.

The benefits of ADR that were presented to the committee include:

ADR can be more cost-effective and take less time than adjudicative or adversarial processes;
ADR promotes early resolution of potentially adversarial issues and disputes that are based on misunderstanding;
ADR promotes better communication among the parties in a conflict;
ADR encourages creative, technically superior outcomes;
ADR gives parties more control over the outcome;
because parties perceive the process as fair, ADR gives parties the incentive to support their own final decision; and
use of ADR will allow governmental bodies responsible for resolving disputes to preserve scarce adjudication resources for those cases that really need to be tried.

Despite these benefits there are multiple barriers to the use of ADR in water planning and permitting which were presented to the committee. These obstacles include:

lack of knowledge and leadership about ADR processes;

lack of guidance or resources to develop an ADR program and rules;
a shortage of qualified mediators and facilitators in certain regions of the state (especially in less densely populated areas);
compressed time schedules after a conflict has been identified; and
insufficient incentives for parties to use ADR.

S.B. 312 IMPLEMENTATION

The major provisions of S.B. 312, the Texas Water Development Board (TWDB) Sunset bill, included a Rural Community Water and Wastewater Loan Program, Colonia Self-Help Program, Capital Spending Plan, and a Joint Study with the Texas State Soil and Water Conservation Board on water conservation.

The Rural Community Water and Wastewater Loan program is a pilot program to provide loans to rural communities at interest rates below the market. The loans can be provided to a rural community with a population of less than 5,000. To date, TWDB has not made any commitments for loans, which can be used for water and/or wastewater projects, but has the capacity to provide a total of $520,000 in assistance in the 2002-03 biennium.

The Colonia Self-Help program provides grants to non-profit organizations for expenses related to water and wastewater projects in colonias. Under this program, a non-profit organization coordinates and manages a self-help program in which local community members participate in project activities, such as providing labor, to reduce costs. The Legislature did not appropriate any funding for this program for fiscal years 2002 and 2003.

TWDB is developing a Capital Spending Plan, to be submitted to the Legislature on January 1, 2003. The plan will identify water funding needs in the State and set forth a basis for allocating state-supported funding to address those needs.

TWDB and the Texas State Soil and Water Conservation Board have prepared "An Assessment of Water Conservation in Texas," for distribution to the Legislature in January 2003. The report will include an assessment of both agricultural and municipal water conservation issues, programmatic and funding issues, and will provide recommendations for specific legislative action.

TEXAS WATER ADVISORY COUNCIL

The Texas Water Advisory Council (TWAC) was created in S.B. 2, 77th Texas Legislature, to act as an advisory body to legislators and key decision makers concerning surface and groundwater issues in Texas. Legislative members of the TWAC include: Senator Robert Duncan, Chair (successor to former Senator J.E. "Buster" Brown), Senator David Bernsen, Representative David Counts, Representative Ron Lewis, and Representative Gary Walker. State agency members include: Texas Department of Agriculture Commissioner Susan Combs, Texas Land Commission David Dewhurst, Texas Commission on Environmental Quality Commissioner Kathleen Hartnett White, Texas Water Development Board member Jack Hunt, and Texas Parks and Wildlife Commissioner Joseph Fitzsimmons. Public members include:

James Box, Manuel Ibanez, and Ruth Schiermeyer.

The TWAC met four times during the interim and heard testimony on both groundwater and surface water issues. The council will issue a report containing recommendations to the 78th Texas Legislature. For further information, contact the Texas Senate Committee on Natural Resources staff at (512) 463-0390.

WATER PERMITTING FOR ENVIRONMENTAL NEEDS

Background

Texas is blessed with an abundance of water in the form of springs, streams, rivers, estuaries, and other aquatic resources. This includes over 191,000 miles of rivers and streams that create a network that supports numerous species of aquatic organisms. Like veins and arteries that flow through the human body, these aquatic systems provide life-giving nutrients and oxygen to plants and animals and also provide many benefits to man. These streams bisect the landscape and replenish wetlands, bottom lands and eventually provide freshwater to our bays and estuaries. They also support municipalities, industries, and provide countless recreational opportunities including boating, paddlesports, hunting, fishing, birdwatching, and many important non-consumptive uses. The importance of water in rivers and streams is often not fully understood, and, in some cases, this lack of knowledge leads to bigger problems when man changes its free-flowing nature.[21]

When surface water is diverted or stored upstream, it is recognized that an environmental effect will be noticed downstream. In relation to the state's bays and estuaries, this effect can be dramatic and impact both the economic and ecological viability of the area.

Surface Water Permitting in Texas

In Texas, rivers, streams and all surface water is owned by the state and distributed through an appropriations process. Statutory authority for this process is granted to the Texas Commission on Environmental Quality (TCEQ)[22] in Texas Water Code §11.022, which states that:

> "The right to the use of state water may be acquired by appropriation in the manner and for the purposes provided in this chapter. When the right to use state water is lawfully acquired, it may be taken or diverted from its natural channel."[23]

Water permits in Texas are issued in order of their application or using a first-in-time, first-in-right appropriations doctrine. In other words, all new permits are issued based on what has already been appropriated in the past. The term "over appropriated" is also often used in describing the issuance of surface water permits in Texas. This term simply means more permits have been issued on paper than water that exists in the river or stream. During times of drought or low-water levels, the permits granted at an earlier date will be given the water allocated in the appropriation before the later permit. Hence, the earlier permit has seniority over the later one.

Texas water law also only allows the appropriation of water for certain uses. Specifically, Texas

Water Code §11.023 , provides that water may be appropriated, stored, or diverted for: domestic and municipal uses; agricultural and industrial uses; mining; hydroelectric power; navigation; recreation and pleasure; public parks; game preserves; and any other beneficial use.[24]

Preferences are given under the water permitting system to domestic uses, followed respectively by municipal, agricultural and industrial.[25] Users in this category apply for a permit through the TCEQ where it is generally reviewed simultaneously for technical impact and administrative completeness. After this process is complete, notice of the permit is posted and the agency takes public comment on it. The TCEQ can issue permits for varying time periods including: in perpetuity, for life terms, and for temporary uses.[26]

Exemptions

Exemptions to the prior appropriation doctrine exist in several areas of the state and under certain circumstances. For example, water in the Rio Grande Valley is appropriated under a purpose of use doctrine where uses such as municipal take precedence over uses such as agricultural. Further, exemptions exist for livestock and domestic users under Texas Water Code §11.142[27] and certain exemptions apply to users that live near a river or watercourse. Finally, under certain conditions, exemptions are also granted for emergencies.

Environmental Flows

The amount of water needed in rivers, streams, and coastal bays to support fish and wildlife populations is commonly referred to as "environmental flows."[28] For example, it is generally accepted that a certain amount of fresh water inflow is needed to support healthy bays and estuaries. If too much fresh water is diverted upstream and prevented from reaching the bays, an impact will be apparent on the fish and wildlife populations in the coastal areas.

Environmental flows are also a consideration in inland rivers and streams across the state. The water needed to support fresh water ecosystems that are not bays and estuaries is generally referred to as being an instream flow.

The importance of maintaining sufficient instream flows in 15 major rivers and freshwater inflows to the seven major estuaries along the coast is needed to support the best inland and coastal fisheries in the nation.[29] Protecting, maintaining, and, sometimes, restoring these flows is important to segments of the Texas economy, particularly in rural areas.[30] Flowing streams and productive estuaries generate income from commercial and sport fishing, hunting, and tourism. They also reduce erosion in bays and provide nutrients to fish and wildlife that live in these ecosystems.[31] Other benefits to water quality occur from the assimilation of huge volumes of wastewater discharges and other pollution.[32] In fact, when the TCEQ issues new water rights permits or amends old permits, the agency considers the ratio of wastewater discharges to amount of flow in the stream or river.

The amount of water needed for instream flow varies greatly depending on the region of the state. The difference in amount of rainfall and wildlife make the need for instream fresh water vary tremendously. For example, many of the rivers in East Texas have ample water to be

appropriated and adequate instream flows are being more easily maintained. However, in North and Central Texas, most of the water is over appropriated at the current time leaving little room for more environmental flows.

In addition to various needs, the wildlife and habitat that depend on environmental flows depend on varying amounts at different times of the year. These seasonal variations are part of a natural ecological occurrence, but they present further issues when water permits are being designed to minimize the effects on the environment.

Environmental Flows and Water Permitting

Texas began considering appropriating water under a management system before the turn of the century in legislation concerning the management of surface water in 1889 and 1895.[33] Texas began issuing permits in 1914, and 60 years of permitting ensued without consideration for environmental flows. During this period, much of the available surface water in Texas was appropriated. Today, permits continue to be issued and many of the rivers and streams in Texas are over appropriated (meaning more water rights exist on paper than are available in the river or stream).[34]

In 1975, legislation requiring the state to consider impacts on the Texas bays and estuaries was implemented, and the state also began data collection on these parts of the ecosystem. However, the biggest change concerning environmental flows and permitting occurred in 1985. In 1985, a change in state law required the TCEQ to consider the impacts to environmental flows on a case-by-case basis when it issues *new* water rights permits and for some types of permit amendments.[35] If it chooses, the TCEQ may impose conditions on new water rights in consideration of environmental flows. Generally, examples of conditions imposed in the past include: release schedules of water from reservoirs and diversions conditioned on the amount of flows in the river at a given time. A specific example includes: a permit issued in 1976 to the City of Corpus Christi and the Nueces River Authority for a reservoir contingent on a certain amount of water being provided to the bays and estuaries through spillways and timed releases.

In considering whether a condition should be attached to a permit amendment, the TCEQ applies the "no injury" rule as set out in Texas Water Code §11.122(b). The code states that an amendment shall be authorized (unless it increases the amount of water or rate of diversion) if the change "will not cause adverse impact on other water right holders or the environment on the stream of greater magnitude" than the permit which was already in use. The key issues arise concerning ways in which the adverse impact should be determined. Some interest groups support the current "four corners" test in Texas Water Code §11.122(b), while others would require public discussion concerning the adverse impacts in each case.

Reviewing specific conditions to provide for environmental flows in new and amended permits is a key component to the protection of the state's bays, estuaries, rivers and streams. However, the downside to this approach is that the burden for protecting the state's fish and wildlife populations may fall disproportionately on new permit holders. In addition, the system does not provide for correcting problems on over appropriated rivers and streams since new permits are unlikely to be issued under these conditions.

San Marcos River Foundation Permit Application

In 2001, the San Marcos River Foundation (SMRF), a private environmental organization, made an application to the TCEQ for 1.3 million acre feet of water per year to be used exclusively to provide for environmental flows in the Guadalupe River. The TCEQ determined that the organization was entitled to submit the application and would review it under its current rules. The determination to allow submission of this application was made from language in Texas Water Code §11.023 which lists "any other beneficial use" as one of the uses for which water may be appropriated. Further, certain TCEQ rules also state that instream flows are a beneficial use. Currently, the TCEQ has issued a draft permit for this application, and the permit is open for public comment through October 23, 2002.

Historically, the TCEQ has not issued permits for the purpose of environmental flows. Instead, application for a water right has been made when water is needed for conversion to an active use such as storing or diverting water. In other words, permits have been issued for the taking and use of a water right for a specific purpose such as generating hydroelectric power or irrigating farmland. Issuing a permit for leaving or reserving water in the stream or river is a different principle. Effectively, the TCEQ would be issuing a permit for the "non-use" of water. Concededly, the statutory framework of Texas Water Code, Section 11.023 does provide that water permits can be issued for "any beneficial use;" however, it does not provide that a water right can be issued for a beneficial non-use or a reservation of water.

The SMRF application is requesting water for a permit that will not be put to a use; instead, it will be left in the river and stream for environmental purposes. Most importantly, if issued, the TCEQ will have to consider the SMRF permit in issuing any new water rights in that basin in the future. However, the SMRF permit would not impact current water rights held in that basin as it would be junior to those rights since it would be issued later in time.

Testimony before the Joint Committee on Water Resources also indicated that the SMRF does not intend to hold this water right in their name if it is granted. Instead, the foundation intends to donate the right to the Texas Water Trust.[36]

Texas Water Trust[37]

Senate Bill 1, 75th Texas Legislature created another mechanism to advance fish and wildlife conservation. This legislation created a mechanism for reserving water rights for environmental use in the Texas Water Trust (Trust).

One intent of the Trust was to provide a way to permanently retire some water rights so that attempts could be made to dedicate water for environmental purposes, especially in fully allocated streams. The Trust would allow a way for those rights to be set aside so that environmental stakeholders would have confidence that water would be in the stream or river segment for environmental needs.[38]

The Texas Water Code describes the Texas Water Trust as follows:

(a) The Texas Water Trust is established within the water bank to hold water rights dedicated to environmental needs, including instream flows, water quality, fish and wildlife habitat, or bay and estuary inflows.

(b) The [Water Development] board in consultation with the Parks and Wildlife Department and the [Commission on Environmental Quality] commission, shall adopt rules governing the process for holding and transferring water rights.

©) The dedication of any water rights placed in trust must be reviewed and approved by the commission, in consultation with the board and the Parks and Wildlife Department.

(d) Water rights may be held in the trust for a term specified by contractual agreement or in perpetuity.[39]

Water rights may be deposited for a time-limited term or in-perpetuity into the Trust and are not subject to cancellation for the period of deposit.[40] Administratively, the Trust is a part of the Texas Water Bank, which is also administered by the Texas Water Development Board (TWDB). Revised Water Bank rules[41] were adopted in January 1998 covering the Board's operation of the Trust.[42]

The Texas Parks and Wildlife Department (TPWD) is charged with identifying and prioritizing water bodies where instream flows are in need of protection. The agency is also charged with acting as an advocate for use of the Trust in order to secure environmental flows.[43] The TPWD has also been a leader in efforts to develop an interagency workgroup to establish operating procedures for the various agencies concerning the Trust.[44]

The TCEQ has the authority to approve all water rights amendments and deposits to the Trust. The TCEQ has indicated that it will not waive fees for the Trust deposits, unless the depositor signs an agreement with the TPWD granting that agency the authority to make water rights calls while on deposit in the Trust. Fees are also waived by statute if the depositor contracts with or dedicates the water rights to the Trust in the name of the TWDB.[45]

The Texas Department of Agriculture (TDA) also actively monitors the activities of the Trust and provides input to the other agencies.

Since its creation in 1997 through SB1, the Trust has not been utilized as a mechanism for preserving water rights for environmental purposes. A water right was offered by the TPWD (2000) for deposit into the Trust to provide an early test of the procedures established by the various agencies, but the permit application has been withdrawn at this time.

One primary barrier to the effective usage of the Trust is the willingness of water rights holders to donate valuable rights. Even if the water right is not in use, most water rights holders recognize the monetary value of this resource and purchasing water rights for donation can be an expensive option.

Cancellation

Texas Water Code §11.338 provides for the lawful cancellation of water rights in Texas. The TCEQ currently has the authority to cancel water rights under certain conditions, such as abandonment. In these circumstances, water rights could be cancelled and dedicated to the Texas Water Trust to be held for environmental purposes. However, the burden on the state to prove that a water right is not being used is high, and, it is safe to conclude, that the water rights cancellation process is not a current viable mechanism to use for the enforcement of water rights permits.

Enforcement

> *"Quite frankly, it is becoming a little difficult at times to administer the water laws of this state."*
> Comment by Jeff Saitas in his capacity as Executive Director of the TCEQ urging the committee to statutorily address critical water policy and enforcement issues.[46]

The authority for enforcement of surface water rights in Texas is with the TCEQ. Due to resource and funding constraints, the primary tool used for enforcement is the "honor system." Water rights holders are expected to comply with the terms of their permit and not withdraw more water than they have been appropriated. The agency will investigate complaints regarding the misuse of water permits.

In times of adequate rainfall, this system is fairly effective and the agency does not receive a large number of complaints concerning abuse of water permits. However, Texas is frequently under drought conditions, and the honor system becomes significantly less effective during these critical periods. The most difficult obstacle in investigating water rights violations is determining how much water a user is actually withdrawing at a given time. Water meters are not widely used in Texas, and it becomes impossible to establish whether a user is in violation.

Another prevalent surface water enforcement issue concerns the unlawful diversion of water by users that live along rivers, streams, and tributaries. For the most part, the state lacks adequate resources to patrol miles of Texas rivers in search of violators. Some river authorities operate enforcement programs for illegal diversions such as helicopter patrols and monitoring systems. However, these programs are not consistent statewide and do not begin to address this issue in a comprehensive way.

Texas Watermaster Program[47]

In some areas of the state, the TCEQ operates watermaster programs. The TCEQ's watermaster programs ensure compliance with water rights by monitoring stream flows, reservoir levels, and water use. They also coordinate diversions in the basins which are managed by their programs. The watermaster regulates reservoirs as needed to prevent the wasting of water or its being used in quantities beyond a user's right.
Before diverting, a water right holder must notify the watermaster of the intent to divert at a specific time and the specific amount of water to be diverted. Assuming that the water is

available and that the water right holder has not, or will not, exceed the annual authorized appropriation of water, the watermaster then authorizes the diversion and records this against the right. The two watermaster programs include staff "deputies" who daily, weekly, or monthly make field inspection of authorized diversions to insure compliance with the water right (e.g., that the diversion rate is not exceeded).

If a water right holder does not comply with his water right or the rules of the TCEQ, the executive director may direct the watermaster to adjust the control works to prevent the owner from diverting, taking, storing, or distributing water until he complies. As provided by the Texas Water Code, the TCEQ collects fees from all water right holders within the watermaster's jurisdiction in order to pay for the expenses of the watermaster's operations and duties. An account is maintained for each water right owner based on each type of authorized use under the water right. The total assessment per account is comprised of two fees: a base fee charged on each account and a use fee charged on the total number of acre-feet of water the owner is authorized to divert per annum for each authorized use. The current base fee is $50.00 per account and generally does not change from year to year. The use fee rate is calculated each year and is based on the proposed operating budget for each watermaster program.

Watermaster programs are created through the authority created in Texas Water Code §11.325. Under this section, water divisions may be created from time to time as the need arises. The role of the water divisions is to provide protection to the holders of water rights and economical supervision to the state. The executive director of the TCEQ may appoint a watermaster to an established water division. The TCEQ may also authorize the executive director to appoint a watermaster upon receipt of a petition of 25 or more holders of water rights in a river basin or segment of a river basin. This requires a hearing before the TCEQ where persons may present testimony and evidence either in support of or against the petition.

Water Availability Modeling[48]

The TCEQ is required by the Texas Water Code §11.134(b)(2) to only grant an application for a new or increased appropriation if there is sufficient unappropriated water available in the source of supply. Available unappropriated water is the amount of water remaining in a water course or other source of supply after taking into account all existing water rights of record. Since, as a matter of hydrology, the amount of water available varies over time and also varies by location on the watercourse, this computation is complex.

To perform the required analysis, staff utilizes computerized Water Availability Models (WAMs). At the present time WAMs have been developed for 22 river basins in Texas. A water supply model is under development for the Rio Grande that will be completed by December 31, 2003.

The objective of the WAMs is to create fully documented reservoir and river basin models for all river basins within Texas. The models are used and maintained for each basin to facilitate the evaluation of existing permits, approval of permit applications, and development or review of overall management plans. For permitting, the principal results from the water availability analyses are the reliability of existing water rights and monthly estimates of unappropriated

water that would be available for diversion or storage.

The are several components to the WAMs. These components include: naturalized streamflows, geographical information system (GIS) grid coverages and GIS tools for spatial analysis of the stream networks, the Water Rights Analysis Package, and a database.

Naturalized streamflows are the flows that would have occurred in the absence of human activities such as reservoir development, diversions, and return flows. Naturalized flows are used so that historical diversions, impoundments, and returns do not affect the water availability analysis. Naturalized flows at primary control points are based on historical hydrologic records, adjusted to remove the impact of human activities. The flows are used as input to the water availability model, which simulates the operation of existing water rights considering their location, characteristics, and priority under Texas water law. Naturalized streamflows were developed for selected control points for each month over the historical period of record. The locations where naturalized streamflows were developed are called primary control points, and basically describe the spatial configuration of the river basin.

GROUNDWATER MANAGEMENT AREAS

S.B. 2, 77th Texas Legislature charged the Texas Water Development Board (TWDB) with designating Groundwater Management Areas (GMAs) for the State of Texas. GMAs are designated to facilitate joint planning among Groundwater Conservation Districts (GCDs) that share the same aquifer or portion of an aquifer. GMAs also provide a geographic framework for the Texas Commission on Environmental Quality (TCEQ) to consider when creating any new GCDs through the landowner petition process. Specifically, GCDs which are created by the TCEQ must fall entirely within a GMA, but districts created by the legislature are not restricted by these boundaries. GMAs are required to cover all the major and minor aquifers of the state but have no management authority.

In drafting the boundaries for GMAs, the TWDB considered guidance from the statute, input from TWDB Board members; input from GCDs, regional water planning groups, and other interests; and input from the public. The designation of groundwater management areas was primarily based on hydrologic boundaries, but county lines and roads were considered in cases where no apparent hydrolic boundaries existed.

As part of the rule making process, on August 21, 2002, the Board authorized publication in the Texas Register of a proposed GMA map and proposed rule. The most current Groundwater Management Area (GMA) map is available on the TWDB web site at: www.twdb.state.tx.us. The page contains the originally proposed maps, the revised version, and a comparative map reflecting where changes have occurred. The Texas Water Development Board adopted the proposed GMAs at their meeting on November 13, 2002, Stephen F. Austin Building, 1700 N. Congress, Room 118 Austin, Texas.

GROUNDWATER CONSERVATION DISTRICT AUDITS

One year from the date the TWDB certifies a district’s management plan as "administratively

complete," a district becomes eligible for audit. Statute required existing districts to submit their plans by September 1998. The audits were then performed in stages. To date, three phases of audits have been completed. The Gonzales County Underground Water Conservation District was the first district to submit its management plan in February of 1998. The State Auditor's Office audited the district in a pilot project for groundwater district audits in the Spring of 1999.

In October 2001, the State Auditor's Office completed Phase Two of its audits of groundwater conservation districts. The following districts were part of this audit: Collingsworth County Underground Water Conservation District; Dallam County Underground Water Conservation District No. 1; the Edwards Aquifer Authority; Evergreen Underground Water Conservation District; Fox Crossing Water District; Hickory Underground Water Conservation District No. 1; Hill Country Underground Water Conservation District; Medina County Groundwater Conservation District; North Plains Groundwater Conservation District; Real-Edwards Conservation and Reclamation Water District; Saratoga Underground Water Conservation Districts; Springhills Water Management District; and Uvalde County Underground Water Conservation District.

In August of 2002, the State Auditor's Office completed Phase Three of its audits of groundwater conservation districts. One of the nine groundwater conservation districts they audited--Permian Basin Underground Water Conservation District--did not achieve a majority of the objectives in its groundwater management plan. Therefore, this district was assessed as not operational. The State has no assurance that this district is adequately conserving, preserving, and protecting the groundwater it administers.

The remaining eight districts audited have achieved a majority of the objectives in their groundwater management plans and were assessed as operational. These districts are implementing their plans to adequately conserve, preserve, and protect the groundwater they administer. These eight districts are: Anderson County Underground Water Conservation District; Glasscock Groundwater Conservation District; Jeff Davis County Underground Water Conservation District; Plateau Underground Water Conservation and Supply District; Sandy Land Underground Water Conservation District; Santa Rita Underground Water Conservation District; Sutton County Underground Water Conservation District; and the Wintergarden Groundwater Conservation District.

The key findings and facts of the audit were:

> Permian Basin Underground Water Conservation District did not fully achieve any of the five objectives in its groundwater management plan.
>
> Anderson County Underground Water Conservation District achieved four of the seven objectives in its groundwater management plan. It partially achieved two objectives.
>
> Glasscock Groundwater Conservation District achieved all 3 of the objectives in its groundwater management plan and all 14 of the objectives in its district action plan.
>
> Jeff Davis County Underground Water Conservation District achieved 20 of the 21

objectives in its groundwater management plan.

Plateau Underground Water Conservation and Supply District achieved six of the nine objectives in its groundwater management plan.

Sandy Land Underground Water Conservation District achieved seven of the nine objectives in its groundwater management plan.

Santa Rita Underground Water Conservation District achieved five of the nine objectives in its groundwater management plan.

Sutton County Underground Water Conservation District achieved five of the nine objectives in its groundwater management plan.

Wintergarden Groundwater Conservation District achieved three of the five objectives in its groundwater management plan.

ENDNOTES

1. "Terrorism: How States Have Responded," Office of House Bill Analysis, Texas House of Representatives, March 2002. (Excerpt includes entire paragraph.)

2. Id.

3. Testimony of Jack Colley, State Coordinator for the Division of Emergency Management, Texas Department of Public Safety, Public Hearing, House Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire paragraph.)

4. Id.

5. Id.

6. Written Testimony of Mike Howe, Texas American Water Works Association, Public Hearing, House Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire paragraph.)

7. Id.

8. Id.

9. Id.

10. Testimony of Jack Colley, State Coordinator for the Division of Emergency Management, Texas Department of Public Safety, Public Hearing, House Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire section.)

11. Testimony of Buck Henderson, Texas Commission on Environmental Quality, Public Hearing, Texas House of Representatives Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire section.)

12. Written Testimony of Mike Howe, Texas American Water Works Association, Public Hearing, House Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire section.)

13. Testimony of Buck Henderson, Texas Commission on Environmental Quality, Public Hearing, Texas House of Representatives Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire section.)

14. Written Testimony of Mike Howe, Texas American Water Works Association, Public Hearing, House Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire section.)

15. Testimony of Buck Henderson, Texas Commission on Environmental Quality, Public Hearing, Texas House of Representatives Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire section.)

16. Written Testimony of Mike Howe, Texas American Water Works Association, Public Hearing, House Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire section.)

17. Testimony of Buck Henderson, Texas Commission on Environmental Quality, Public Hearing, Texas House of Representatives Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire section.)

18. Id.

19. Testimony of Jack Colley, State Coordinator for the Division of Emergency Management, Texas Department of Public Safety, Public Hearing, House Committee on Natural Resources, Wichita Falls, Texas, August 27, 2002. (Excerpt includes entire paragraph.)

20. Written Comments of Margaret M. Menicucci, Center for Public Policy Dispute Resolution, The University of Texas School of Law, Submitted to the House Committee on Natural Resources, August 2002. (Excerpt includes entire section.)

21. The Interim Committee on Water Resources Development and Management Interim Report to the 76th Legislature: Implementation of Senate Bill 1, January 1999.

22. Formerly the Texas Natural Resource Conservation Commission (TNRCC).

23. Tex. Water Code Ann. § 11.022 (Vernon 2000).

24. Tex. Water Code Ann. § 11.023 (Vernon Supp. 2002).

25. Testimony of Jeff Saitas, Executive Director, Texas Commission on Environmental Quality, Public Hearing of the Joint Committee on Water Resources, Austin, Texas, December 13, 2001.

26. Id.

27. Tex. Water Code Ann. § 11.142 (Vernon's Supp. 2002).

28. "Issue Paper 1: Environmental Flow Protection-A Question of Texas Heritage," Texas Living Waters Project (sponsored by the National Wildlife Federation, Sierra Club, Environmental Defense and Texas Center for Policy Studies).

29. The Interim Committee on Water Resources Development and Management Interim Report to the 76th Legislature: Implementation of Senate Bill 1, January 1999.

30. "Issue Paper 1: Environmental Flow Protection-A Question of Texas Heritage," Texas Living Waters Project (sponsored by the National Wildlife Federation, Sierra Club, Environmental Defense and Texas Center for Policy Studies).

31. Id.

32. The Interim Committee on Water Resources Development and Management Interim Report to the 76th Legislature: Implementation of Senate Bill 1, January 1999.

33. Testimony of Dean Robbins, Texas Water Conservation Association, Public Hearing Joint Committee on Water Resources, Austin, Texas, December 13, 2001.

34. Id.

35. "Issue Paper 1: Environmental Flow Protection-A Question of Texas Heritage," Texas Living Waters Project (sponsored by the National Wildlife Federation, Sierra Club, Environmental Defense and Texas Center for Policy Studies).

36. Testimony of Myron Hess, Texas Wildlife Federation, Public Hearing Joint Committee on Water Resources, Austin, Texas, December 13, 2001.

37. The Interim Committee on Water Resources Development and Management Interim Report to the 76th Legislature: Implementation of Senate Bill 1, January 1999.

38. The Interim Committee on Water Resources Development and Management Interim Report to the 76th Legislature: Implementation of Senate Bill 1, January 1999.

39. Tex. Water Code Ann. § 15.7031 (Vernon 2000).

40. Texas Water Development Board Presentation to the Joint Committee on Water Resources, Public Hearing, February 27, 2002.

41. Texas Water Development Board Rule 359.

42. Texas Water Development Board Presentation to the Joint Committee on Water Resources, Austin, Texas, Feb. 27, 2002.

43. Texas Water Development Board Presentation to the Joint Committee on Water Resources, Austin, Texas, Feb. 27, 2002.

44. Id.

45. Id.

46. Testimony of Jeff Saitas, Executive Director, Texas Commission on Environmental Quality, Joint Committee on Water Resources Public Hearing, Austin, Texas, December 13, 2001.

47. Texas Commission on Environmental Quality website: See http://www.tnrcc.state.tx.us/enforcement/fod/wmaster/wmaster1.html#how

48. Texas Commission on Environmental Quality website. See: http://www.tnrcc.state.tx.us/permitting/waterperm/wrpa/wam.html