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November 2000
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ACTIVITIES OF THE TEXAS GROUNDWATER PROTECTION COMMITTEE

REPORT TO THE 77TH LEGISLATURE

Prepared by the
Texas Groundwater Protection Committee

Activities of the Texas Groundwater Protection Committee Report to the 77th Legislature



Prepared by the
Texas Groundwater Protection Committee

SFR- 047/00
November 2000



Texas Groundwater Protection Committee

<www.tnrcc.state.tx.us/tgpc>

Committee Membership:

Texas Natural Resource Conservation Commission
Texas Water Development Board
Railroad Commission of Texas
Texas Department of Health
Texas Department of Agriculture
Texas State Soil and Water Conservation Board
Texas Alliance of Groundwater Districts
Texas Agricultural Experiment Station
Bureau of Economic Geology
Texas Department of Licensing and Regulation

Activities of the Texas Groundwater Protection Committee was developed and produced by the Texas Groundwater Protection Committee in fulfillment of requirements given in §26.405 of the Texas Water Code. While the information contained in the report represents the contribution of each individual participating agency and group, the report as a whole is the work of the Committee and does not necessarily reflect all of the views and policies of each participating organization. The effort was partially funded by the U.S. Environmental Protection Agency.

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EXECUTIVE SUMMARY

This report is prepared and submitted to the 77th Texas Legislature by the Texas Groundwater Protection Committee (TGPC). The TGPC has prepared the report in accordance with §26.405 of the Texas Water Code. It describes the TGPC's activities for the two preceding years and provides recommendations to improve groundwater protection for Legislative consideration.

The report discusses the TGPC's creation and mandate, membership, and federal involvement and coordination. TGPC activities for the preceding two calendar years include TGPC meetings and presentations, subcommittees and work groups activities, rules review, and public record maintenance. The continued development and implementation of the TGPC's educational outreach initiatives such as the Abandoned Well Closure guidance and video are presented. Findings from the annual joint groundwater monitoring and contamination reports for 1998 and 1999 are described. The status of the state management plan for the prevention of pesticide contamination of groundwater and the state's groundwater protection program are also discussed. The report also includes a summary of Legislative action taken on the TGPC's recommendations to the 76th Legislature.

The report also contains the TGPC's groundwater protection recommendations for Legislative consideration. While these recommendations represent the majority opinion of the membership of the Committee, they do not necessarily reflect the views and policies of each participating organization. More detailed information is contained in the discussions on each recommendation. The recommendations are not listed in priority order, but fall under two main categories, groundwater management and resource needs. The following nine issue areas have been identified.

- ▶ Groundwater Conservation District Creation
- ▶ Priority Groundwater Management Area Process Simplification
- ▶ Development of Pesticide Specific State Management Plans and Education Program
- ▶ Abandoned Water Well Plugging Fund
- ▶ Groundwater Education Program Needs
- ▶ Acquisition of Groundwater Quality Protection Zones
- ▶ Groundwater Availability Modeling Funding
- ▶ General Funding for Groundwater Data Collection and Research
- ▶ Brush Control to Increase Groundwater Yield

RECOMMENDATIONS TO THE 77TH LEGISLATURE

Groundwater protection has become an important concern of the general public and local, state, and federal agencies. High-quality groundwater resources are of vital importance to the state's economy and the public health and welfare. As required by §26.045 of the Texas Water Code, the Texas Groundwater Protection Committee submits the following groundwater protection recommendations for legislative consideration. While these recommendations represent the majority opinion of the membership of the Committee, they do not necessarily reflect the views and policies of each participating organization. More detailed information is contained in the discussions which follow. The recommendations are not listed in priority order, but fall under two main categories, groundwater management and resource needs.

Groundwater Management

- ▶ Groundwater conservation district creation continues to be clouded by outstanding issues such as the whether a district should include single counties or larger areas, and the fiscal integrity of proposed districts. When new districts are created, consideration should be given to developing multi-county districts, or single-county districts with shared aquifer management responsibilities, consistent with hydrogeologic management areas and local political will.
- ▶ Simplification of the procedures contained in Chapters 35 and 36 of the Texas Water Code are needed to streamline the district creation process and improve the timing of educational efforts within designated priority groundwater management areas. A further clarification of the criteria for determining party status for the evidentiary hearings is needed.

Resource Needs

- ▶ Additional resources will be needed during the next biennium to develop pesticide-specific state management plans and education programs for groundwater. Under a proposed federal rule scheduled for adoption in early 2001, the U.S. Environmental Protection Agency will cancel the use of at least four widely used pesticides if pesticide-specific state management plans are not developed and implemented within a two-year time frame. Loss of use of just one of these pesticides could result in a multi-million dollar adverse impact to the state's agricultural economy.
- ▶ Additional resources are needed to establish an abandoned water well plugging fund to be administered by the Texas Department of Licensing and Regulation.

- ▶ Additional resources are needed by the Texas Agricultural Extension Service to develop and carry out groundwater educational programs on groundwater conservation, wastewater reclamation, and closure of abandoned wells.
- ▶ Additional resources, through either grants or loans to groundwater conservation districts, are needed to purchase, at fair market value, either fee simple title or land development rights to significant groundwater quality protection zones from willing land owners.
- ▶ Additional resources are needed to support the Texas Water Development Board's (TWDB's) continued development, maintenance, and completion of Groundwater Availability Models for the state's major aquifers to provide critical information on the adequacy of groundwater supplies and to ensure project completion by 2004.
- ▶ Resources are needed for additional groundwater monitoring activities by TWDB and groundwater conservation districts, and for the expansion and upgrade of TWDB's groundwater monitoring operations.
- ▶ Additional resources are needed to support the Texas State Soil and Water Conservation Board's brush control efforts in areas where it is found to be cost effective and will increase long term availability of groundwater by increasing recharge of aquifers.

Groundwater Conservation District Creation

Issue:

Groundwater conservation districts provide for the conservation, protection, and recharge of the state's groundwater resources. They are the only regulatory mechanism available in areas where the need exists to modify the rule of capture in order to provide for equitable and efficient management of local groundwater resources. However, several issues, including whether a district's boundaries can be individual counties or should be larger areas for more effective management and the fiscal integrity of proposed districts, continue to cloud district creation.

Recommendation:

TGPC recommends that when groundwater conservation districts are created, consideration be given to developing multi-county districts, or single-county districts with shared aquifer management responsibilities, consistent with hydrogeologic management areas and local political will.

Background:

The creation and confirmation of groundwater conservation districts further defines and protects ownership and production rights in groundwater, and fosters improved stewardship of groundwater resources. Groundwater conservation districts enhance the ability of state agencies to inventory groundwater availability and water quality through the collection and dissemination of district generated groundwater data.

The TGPC supports consideration of the following concepts during the creation of locally supported Chapter 36 groundwater conservation districts:

- ▶ Priority groundwater management areas should be encouraged to form groundwater conservation districts;
- ▶ District boundaries should be determined in such a manner that will facilitate the efficient management of the groundwater resources. Where politically achievable, the boundaries should be derived from available scientific data regarding hydrogeologic boundaries of groundwater formations while also considering surface characteristics that could affect the management of groundwater; and,
- ▶ Where a single-county groundwater conservation district is the preferred and is the only politically achievable form of a district: 1) the area must provide adequate funding for a district to effectively manage the groundwater resources within the proposed district's boundaries, and 2) the district must assure there is a commitment to inter-local agreements with other districts to adopt similar management practices for a common groundwater resource.

Priority Groundwater Management Area Process Simplification

Issue:

The requirement for an evidentiary hearing in the priority groundwater management area designation process does not encourage stakeholder participation, adds significant time delays in a contested case, and is resource intensive for both the participating parties and affected state agencies. In addition, further streamlining of TNRCC authority and the process to create groundwater conservation districts in designated priority groundwater management areas would benefit both state and local entities. The district creation authority and procedure required for TNRCC implementation is unclear and the educational program involving the Texas Agricultural Extension Service (TAEX) occurs too late for the needs of local government and landowners to effectively carry out local district establishment options.

Recommendation:

The TGPC recommends that the Legislature amend Chapter 35 of the Texas Water Code to further streamline the priority groundwater management area designation process and clarify the criteria for determining party status for the evidentiary hearing. The TGPC recommends that the Legislature amend Chapters 35 and 36 of the Texas Water Code to clarify and improve the district creation process and the timing of educational efforts within designated priority groundwater management areas.

Background; Priority Groundwater Management Area Designation:

Senate Bill 1, the 75th Legislature, significantly improved and streamlined the priority groundwater management area (PGMA) process. Senate Bill 1 amended Chapter 35 of the Texas Water Code to allow the TNRCC to designate a PGMA by order instead of Administrative Procedure Act rulemaking requirements. Senate Bill 1 also added an educational component to the PGMA process. In addition, Senate Bill 1 amended Chapter 36 of the Texas Water Code to provide for the appointment of temporary directors in TNRCC-created districts in PGMA's.

Several problems are associated with conducting evidentiary hearings in the PGMA designation process. The level of resource commitment, procedural burden of becoming a party, and presentation of evidence through expert witness testimony associated with evidentiary hearings are major burdens to landowners, small businesses, and small organizations. Similar burdens are experienced by the participating state agencies. Chapter 35 of the Texas Water Code does not provide guidance to the TNRCC or the State Office of Administrative Hearings related to: 1) the criteria for obtaining public comments on the TNRCC Executive Director's report and recommendations; and, 2) demonstrating party status for the evidentiary hearing. The hearing process has added considerable time delays to an already lengthy PGMA designation schedule as a result of discovery requests and filing of legal motions, especially if more than a few parties are named.

The evidentiary hearing in the PGMA designation process does not encourage meaningful stakeholder participation, adds significant time delays in a contested case, and is resource intensive for both the participating parties and affected state agencies. The Administrative Procedures Act does not apply to the PGMA process as the Commission's designation decision is not appealable. The procedure for evidentiary hearings should be clarified specifically related to obtaining and responding to public comments and to the criteria for demonstrating party status.

Background; Groundwater Conservation District Creation in PGMA:

The PGMA process provided in Chapter 35 of the Texas Water Code should be a seamless process, continuing through PGMA designation to district creation. In practice, the process moves as intended up to the point of a TNRCC PGMA designation order. After this point, the procedure is vague and

implementation of the process halts for potential landowner actions. Statutory guidance is not clear on: 1) issues regarding the opportunity for local action to establish the needed management actions in the PGMA; 2) the appropriate timing of educational programming, and the authority; and, 3) the process whereby the TNRCC initiates and creates districts when local efforts have failed or have not been taken.

Chapter 35 provides a split in the PGMA process based upon the TNRCC's designation order. If the TNRCC's order finds that the PGMA should be added into an existing district, a definite procedure is given. However, if the TNRCC's designation order finds that groundwater district creation is needed in the PGMA, a vague district creation path is set forth. Under this path:

- ▶ landowners are provided an unspecified period of time to create a district;
- ▶ if local action is not taken, the TNRCC is required to identify the areas within the PGMA which have not created a district and "propose the creation of one or more districts";
- ▶ the TAEX educational program is initiated; and
- ▶ the TNRCC district creation proceeding is initiated according to Subchapter B, Chapter 36 of the Texas Water Code.

Under current statute, the authority, type of action, and triggers to initiate TNRCC district creation action are unclear. The TAEX educational program occurs too late in the PGMA process to be of value for locally-initiated district creation actions. Subchapter B of Chapter 36 of the Texas Water Code provides a landowner petition process which is not appropriate for TNRCC-initiated district creation actions.

The TGPC suggests that §35.012 of the Texas Water Code should be clarified by separating the distinctly different actions which are required in the PGMA process. The TGPC recommends that separate sections pertaining to the TNRCC's designation order, landowner actions in a PGMA, and TNRCC authority and process for creation of a district in a PGMA be clarified.

Development of Pesticide-Specific State Management Plans and Education Program

Issue:

Under a federal rule scheduled to be final in 2001, the use of specific pesticides with the potential to leach to groundwater will be prohibited if pesticide-specific management plans are not developed by the state. Resources are not currently available for the development and implementation of the required pesticide-specific management plans. Sufficient federal funding will not be available. The U.S. Environmental

Protection Agency (EPA) maintains that this program is voluntary and therefore not an unfunded mandate. Even as the EPA rule is finalized, federal funding levels, which are currently inadequate to support the full development and implementation of the plans, will not be increased. Loss of just one major use pesticide could result in a multimillion dollar adverse impact to the state's economy.

Recommendation:

TGPC recommends the Legislature address funding for the development and implementation of pesticide-specific state management plans. If Texas fails to submit the pesticide-specific state management plans to EPA for review within two years of EPA's adoption of the final rule, the use of these pesticides would be prohibited in Texas. The ban on these agriculturally important pesticides would negatively impact the state's economy by \$100 million to \$170 million per year.

Background:

On June 26, 1996, the EPA published proposed rules in the *Federal Register* on pesticides and groundwater state management plan regulation. This federal rule proposal will, when adopted, restrict the use of pesticides identified as probable or possible human carcinogens and can leach to groundwater. Because these are major-use pesticides (used on corn, sorghum, soybeans, wheat, peanuts, cotton, and other crops), the rule provides the opportunity to allow for the pesticide's continued use if a state develops and implements pesticide-specific management plans to protect groundwater. Pesticide-specific state management plans outline the approach the state will take to facilitate the use of a pesticide so that is protective of groundwater resources. These plans will include monitoring of groundwater quality and will define and encourage the use of voluntary best management practices. Voluntary best management practices will be encouraged through the development and distribution of educational materials relating to plan implementation and water resource protection. If groundwater contamination still occurs, mandatory best management practices may become necessary to allow continued use of the pesticide within the state. The proposed federal rule is anticipated to be issued in final form in 2001. Under the proposal, the state will have two years to develop and submit management plans for each pesticide. The EPA would then have nine months to approve or reject the state's proposed management plans. Upon approval, the state would have to implement the proposed management plans. Alachlor, atrazine, metolachlor, and simazine are the first four pesticides to be identified by EPA under this proposed rule, and there is a strong possibility that additional pesticides will be added to the federal list in the future.

Section 26.407 of the Texas Water Code tasks the Texas Natural Resource Conservation Commission (TNRCC) to develop management plans, with the advice of the TGPC, for agricultural chemicals (e.g., pesticides) that threaten groundwater. Specifically, these plans are for the protection and enhancement of water quality pursuant to federal statute, regulation, or policy, including management plans for the prevention of water pollution by agricultural chemicals and agents. This section was added to the Texas

Water Code in 1989 and was specifically intended to cover the plans required by the EPA under its proposed rule.

In 1989, the Texas Water Commission, TNRCC's predecessor agency, identified the Lower Rio Grande Valley (study area) to be highly vulnerable to potential groundwater contamination from the use of pesticides. In a 1993 study, the Texas Agricultural Experiment Station (TAES) examined the economic impact of withdrawing the use of atrazine on the study area. Alternative methods of controlling pests in this region were identified. Regional impacts on gross receipts (sales), variable costs, and net returns were determined. If atrazine use were canceled in the study area, corn and sorghum sales would decrease by approximately \$1.1 million.¹ Variable costs to produce corn, sorghum, and sugarcane would increase by almost \$2.2 million, leaving farmers in the region with a \$3.3 million loss in net income per year. These are direct farmer impacts. The TAES has conservatively estimated that this figure multiplied by three, or \$9.8 million, would represent the total direct economic impact on the state if the use of atrazine was withdrawn. If all four of the pesticides are canceled for use in Texas, the total economic impact on the state could range from \$100 to \$171 million.² This economic impact is based on the estimates from the 1993 TAES study, adding in the impact to other crops, such as sugarcane, citrus, peanuts and spinach, and extrapolates the 1993 TAES values to 1996-1997 crop values. An impact evaluation by a pesticide manufacturer estimates an even greater economic impact to the farming community, should the use of these pesticides be canceled in Texas.

Funding Requirements and Potential Sources:

Based on EPA estimates and state agency budget and workload projections, the Agricultural Chemical Subcommittee of the TGPC estimates that the state will need to budget between \$1.11 and \$1.36 million, or 13 to 16.5 FTEs per year, for implementing a program to develop four pesticide-specific management plans. Currently the TNRCC, as lead agency, has two federally funded FTEs for development of the generic state management plan that will be used as the basis for pesticide-specific plan implementation. An additional 11 to 14.5 FTEs will be needed by various agencies for the program as shown in Table 1. The state should not expect financial assistance from EPA to implement pesticide-specific management plans. The EPA has said that federal funding for this program is minimal and will remain so in the future. EPA maintains that this program is voluntary and therefore not an unfunded federal mandate.

¹All cost estimates have been projected to 2001 dollar values.

²Kelly Bryant, et. al., "Economic Impact of Withdrawing Specific Agricultural Pesticides in the Lower Rio Grande Valley," Technical Report 157, Texas Water Resource Institute, Texas A&M University, January 1993.

Table 1. State Pesticide-Specific SMP Budgetary Estimates (Annual)

Agency Name	Dollars (year 2001 \$s)	Additional Full Time Equivalents (FTE's)
TAES/TAEX	326,000	4 to 6
TSSWCB	160,000	0.5 to 1 per vulnerable area
TWDB	73,000 to 109,000	1 to 2
TDA	214,000	2.5
TNRCC	272,000 to 486,000	2
Others (TDH, TSPCB)	65,000	1
Totals	~1.1 to 1.36 million	11 to 14.5 FTE's

Other states (Arkansas, Florida, Maine, Minnesota, New Mexico, New York, Oklahoma, and Wisconsin) have provided a legislative funding mechanism for development and implementation of pesticide-specific management plans. These funding methods include pesticide registration fees, wholesale agriculture product fees, applicator licensing fees, water use fees, lottery, direct appropriations, tipping fees, environmental trust funds, check-off on income tax returns, EPA grants, water or other program funds from state general funds, and agricultural product sales tax.

Ultimately, a method that fairly distributes the cost of implementing the program will need to be identified. Stakeholders potentially affected should be involved.

Abandoned Water Well Plugging Fund

Issue:

Numerous state and local programs have identified abandoned water wells as having a significant, or potentially significant, negative impact on the quality of groundwater in the state. Resources are not currently available to provide assistance to landowners, groundwater conservation districts, and local governments to plug abandoned wells.

Recommendation:

The TGPC recommends that the Legislature provide positive incentive for landowner-initiated closure of abandoned water wells through the establishment of an abandoned well plugging fund. Further, TGPC recommends that the program be administered by the Texas Department of Licensing and Regulation.

Background:

Abandoned water wells remain at the top of the list of potential groundwater contamination sources, which landowners can identify and eliminate. Abandoned water wells not only serve as conduits or channels for contamination to reach groundwater, but large diameter wells can also be a hazard to human and animal life. Uncapped, non-cemented, deteriorated or uncased wells provide a direct path to groundwater from activities at the surface. Deteriorated wells completed in more than one water-bearing zone may allow poorer-quality water from one zone to commingle and impact the other(s). Abandoned municipal, industrial, irrigation wells and abandoned rig-supply, domestic or livestock wells, and unplugged test-holes pose threats to groundwater quality. Abandoned water wells exist in every county of the state and impact all of the state's aquifers.

The Abandoned Well Notification Program, administered by the TDLR utilizing Water Well Driller/Pump Installer Program Investigators, investigates, compiles, identifies, and processes abandoned water well notification and enforcement cases. The Texas Rural Water Association routinely identifies abandoned wells as having the potential to impact inventoried domestic wells. Groundwater quality degradation, due in part to abandoned water wells, has also been documented by groundwater conservation districts, the Bureau of Economic Geology, Texas Water Development Board studies, and the TNRCC's Wellhead Protection Program. Many groundwater conservation districts are already implementing well capping and plugging programs.

The exact number of water wells in the state is unknown. However, based on TWDB records, since 1965 (the initial date when well reports were required to be submitted to the state), 558,365 State of Texas Well Reports (for water wells) have been submitted (which is not 100% of the wells drilled). In Fiscal Year 2000, the TWDB received 21,803 State of Texas Well Reports (for water wells). It is conservatively estimated that 150,000 water wells drilled are abandoned and/or deteriorated. A study by the Bureau of Economic Geology shows the pervasiveness of abandoned wells. The BEG found that in Ellis County, 90 percent of the 811 hand-dug wells, inventoried as part of a field survey of property near the Superconducting Super Collider, had been abandoned. Many of these wells were constructed before 1930.³

³The Texas Journal of Science - Vol. 46, NO. 4, 1994, pp. 356-357.

The Texas Water Code §§32 and 33 requires landowners or other persons who possess an abandoned or deteriorated well to have the well plugged or capped under standards and procedures adopted by the TDLR (16 Texas Administrative Code § 76.1004). The Texas Water Code §§32 and 33 also authorizes the TDLR to assess administrative and civil penalties against persons who do not comply with the provisions of the chapter. However, these provisions provide little incentive for owners of abandoned wells to voluntarily plug abandoned wells.

Complying with the plugging provisions represents a financial burden to landowners, and unless state incentive is given, landowner-initiated plugging of abandoned wells is unlikely to occur on a broad basis. In addition, the TDLR has neither sufficient staff nor resources to independently search for and identify abandoned wells and bring administrative or civil proceedings against their owners. Educational efforts, such as the recently developed “*Landowner’s Guide to Plugging Abandoned Water Wells*” and associated video, may initiate some abandoned well plugging. However, a funding source to assist landowners with abandoned well plugging efforts would result in an increase in the number of well pluggings and thus decrease the threats to groundwater quality. Before fund disbursement, consideration should be given to known groundwater contamination in the abandoned or deteriorated wells to be plugged.

Following the TDLR’s plugging standards, it is estimated that it would cost approximately \$3,000 to properly plug a 6-inch diameter 400-foot well. Assuming this cost and well depth were about average, over \$450 million would be required to properly plug the conservative estimate of 150,000 abandoned and/or deteriorated wells.

Groundwater Education Program Needs

Issue:

The TGPC recognizes the central role played by education in management and protection of the State's water resources. New or expanded educational programs are needed to (1) to promote the conservation of groundwater, (2) promote wastewater reclamation and reuse to reduce groundwater depletion, and (3) promote the closure of abandoned wells to reduce groundwater contamination.

Recommendation:

The TGPC recommends that resources be provided to develop and carry out educational programs on groundwater conservation, wastewater reclamation, and closure of abandoned wells.

Groundwater Conservation

Background:

Groundwater is viewed by many as the last remaining underdeveloped water supply in the state. Most of Texas is underlain by one or more of nine major and 20 minor aquifers. About 60% of all water used in the state, and nearly 80% of agricultural irrigation comes from groundwater.

The state's policy that groundwater should remain under local control has led to a rapid expansion of groundwater conservation districts during the past few years. During the 75th Legislative Session, the Texas Agricultural Extension Service (TAEX) received funding to carry out education programs in priority groundwater management areas (PGMAs), but the need for these education programs, especially those related to water conservation, extends beyond the PGMAs.

Funding provided to TAEX in Senate Bill 1, 75th Legislature, for groundwater education was restricted for use only in designated PGMAs, but the need is far greater. For example, 50 groundwater conservation districts have already been formed, with another 13 under provisional status provided in Senate Bill 1911, 76th Legislature, and one unconfirmed district. There is concern that funding mechanisms for many districts are not sufficient in themselves to provide for broad-based groundwater education programs.

Additional funding for TAEX will allow expansion of educational programming to districts outside PGMAs. Educational programming of TAEX would be coordinated with members of the Texas Alliance of Groundwater Districts, TWDB, TNRCC, and TDA to ensure priority needs and areas are addressed. The proposed education program would inform stakeholders about the nature of groundwater in local areas, the process, benefits and responsibilities of groundwater districts, and water management strategies and technologies to conserve and stretch groundwater supplies.

Wastewater Reclamation and Reuse

Background:

Wastewater reuse is projected to account for about 3% of our total water supply by the year 2050. Wastewater can be reclaimed by wastewater treatment plants, on-site wastewater treatment systems, and greywater systems. Wastewater reuse could reduce equivalent demands for groundwater. Reduced groundwater pumpage also lessens the likelihood of groundwater contamination by salt water intrusion. Use of reclaimed wastewater presents special problems because of elevated concentrations of salt, nutrients, organic chemicals, and microbiological agents, all of which have the potential to contaminate groundwater in sensitive hydrogeological settings. Past efforts were effective in warning people about the hazards of wastewater. Now, an effective educational program is needed to remove the stigma associated with wastewater and encourage the public to embrace the use of reclaimed water. This can be

accomplished through the development and distribution of educational materials, demonstrations, and hands-on workshops designed to promote wastewater reclamation and reuse.

Water Well Closure

Background:

Abandoned water wells remain at the top of the list of potential groundwater contaminant sources. Uncapped or uncased wells provide a direct conduit to groundwater from activities at the surface. Numerous state and local programs have identified abandoned water wells as having a significant, or potentially significant, impact on the quality of groundwater in the state. The state's Source Water Protection Program, administered by the TNRCC, routinely identifies abandoned wells as having the potential to impact public water supplies. The potential for groundwater quality degradation, due in part to abandoned water wells, has also been documented: by groundwater conservation districts; in Bureau of Economic Geology and Texas Water Development Board studies; and, in the TNRCC's regional aquifer protection programs. It is conservatively estimated that there are 150,000 abandoned or deteriorated water wells in the state.

Abandoned water wells exist in every county of the state and impact all of the state's aquifers. Abandoned high-capacity municipal, industrial, and irrigation wells and abandoned rig-supply wells, domestic or livestock wells, and unplugged test holes pose existing and potential threats to groundwater quality. Many abandoned wells are old and improperly constructed and may have an inadequate or total absence of casing, uncemented surface casing, or may be left uncapped. Abandoned uncased, improperly cased, and gravel-packed wells completed in more than one water-bearing zone (or aquifer) may allow poorer-quality water from one zone to impact the other(s). In addition, poorer-quality surface water may impact aquifers by entering uncapped or unplugged well bores.

State law requires landowners or other persons who possess an abandoned or deteriorated well to have the well plugged or capped under standards and procedures adopted by the TDLR. However, there is little incentive for owners of abandoned or deteriorated wells to voluntarily comply with the plugging or capping provisions.

Through continued education efforts, such as the recently developed *Landowners Guide to Plugging Abandoned Water Wells* and the associated video, landowners can be made aware of the environmental risk and liability of abandoned wells, and the range of options available to address well closures.

Acquisition of Groundwater Quality Protection Zones

Issue:

As development increases statewide, it is becoming increasingly important to set aside environmentally sensitive areas to protect the state's groundwater resources. One effective form of groundwater quality protection is the acquisition of environmentally sensitive land that contributes recharge to aquifers.

Recommendation:

TGPC recommends the Legislature provide funding for the purpose of providing grants or loans to groundwater conservation districts to purchase at fair market value either fee simple title or development rights of significant groundwater quality protection zones from willing land owners.

Background:

Having funds dedicated to voluntary land acquisition would help alleviate landowner concerns that these environmentally sensitive aquifer recharge zones would be acquired by local governments through the use of regulation, condemnation, or eminent domain.

These funds could be made available as grants to districts on a matching basis for the purpose of pursuing voluntary agreements with landowners who are interested in selling either the fee title to some portion of their property or a conservation easement over some portion of their property. Grant funds could possibly be administered and distributed to the districts by the Texas Water Development Board. Districts would coordinate these acquisition efforts with TNRCC, Texas Parks and Wildlife Department, and TWDB. In addition, districts would work closely with existing and proposed land trusts and other conservation organizations (public and private).

Groundwater Availability Models (GAM) Funding

Issue:

Groundwater Availability Models (GAMs) provide reliable and timely information on groundwater availability to the citizens of Texas as they consider the adequacy of supplies over a 50 year planning period. The TWDB initiated GAM development with funding provided in the 76th Legislature for planning that began under Senate Bill 1, 75th Legislature. However, available funds only allowed the TWDB to begin the process of developing GAMs for 3 of the state's nine major aquifers in the state. Additional funding for Fiscal Year 2002 and beyond is needed to complete GAMs for the remaining major aquifers by 2004.

Recommendation:

The TGPC recommends the Legislature address funding for the continued development, maintenance, and completion of GAMs for major aquifers. Funding is needed to support GAM activities beyond current biennium appropriations and to ensure project completion by 2004.

Background:

During the last legislative session, the Legislature approved funding for the GAM program. The purpose of GAM is to provide reliable and timely information on groundwater availability to the citizens of Texas to ensure adequate supplies or recognize inadequate supplies over a 50 year planning period. Numerical groundwater flow models of the major aquifers in Texas will be used to make this assessment of groundwater availability. The expectation is that GAM will (1) include substantial stakeholder input, (2) result in standardized, thoroughly-documented, and publicly available numerical groundwater flow models, and (3) provide predictions of groundwater availability through 2050 based on current projections of groundwater usage and future demands during normal and drought-of-record conditions. GAM will provide the tools to support and enhance groundwater conservation district management plans and data.

The intent of the GAM program is to model all the major aquifers. These aquifers are the: (1) Ogallala, (2) Gulf Coast, (3) Edwards (Balcones Fault Zone), (4) Carrizo-Wilcox, (5) Trinity, (6) Edwards-Trinity (Plateau), (7) Seymour, (8) Hueco-Mesilla Bolson, and (9) Cenozoic-Pecos Alluvium. GAM development started on three aquifers (the Southern Ogallala, the Carrizo-Wilcox, and the Central Gulf Coast) in September 2000. The Texas Water Development Board is in the process of developing models for the Hill Country portion of the Trinity aquifer, the Gulf Coast aquifer in the lower Rio Grande Valley, and the Edwards Trinity (Plateau). The northern portion of the Ogallala aquifer in Texas, the Barton Springs segment of the Edwards aquifer (Balcones Fault Zone), and part of the Gulf Coast aquifer near Corpus Christi are being modeled as part of Senate Bill 1 water planning. The U.S. Geological Survey is developing a model for the Hueco-Mesilla Bolson and part of the Gulf Coast aquifer near Houston. The Edwards Aquifer Authority is developing a new model for the San Antonio segment of the Edwards aquifer. Funding will be used to complete GAM modeling on the remaining major aquifers.

The purpose of this recommendation is to provide funding for continued completion, development, and maintenance of GAM beyond 2002. This continued development and maintenance will allow for refinement of aquifer characteristics such as hydraulic parameters, surface-groundwater interactions, recharge, pumping characteristics, and boundary conditions. This data will be used to provide active updates of GAM input data, new groundwater conservation district data, and provide new information to the Regional Water Planning Groups.

Funds will be used, in part, to support the transfer of GAM models and related technology to local/regional entities, such as groundwater conservation districts. One of the goals of the GAM program is to make interactive modules available over the Internet for end users to be able to run the models remotely. Ultimately, the development of GAM will be used to create the necessary link with the surface water availability models (WAM) being developed by TNRCC.

Summary:

- ▶ GAM will assist Groundwater Conservation Districts and Regional Water Planning Groups (RWPG) to plan future water supplies and develop more realistic drought management plans for areas dependant on groundwater.
- ▶ GAM will assist Regional Water Planning Groups in the evaluation of water management strategies for Senate Bill 1, 75th Legislature, water supply planning.
- ▶ GAM will be used to support priority groundwater management areas designation.
- ▶ GAM will be a public process and will include input from all levels of the public and private sector.
- ▶ Computer models of the major aquifers resulting from GAM are scheduled to be complete by September 2004.
- ▶ Each of the GAM models will be thoroughly documented and available to the public over the Internet.
- ▶ GAM will be completed by the Texas Water Development Board staff and its contractors.
- ▶ The GAM program will result in a greatly improved understanding of groundwater resources in the State.

General Funding for Groundwater Data Collection and Research

Issue:

TWDB conducts an active groundwater assessment program and maintains a substantial database of groundwater information on the state's nine major and twenty minor aquifers. The data collection effort is used to develop estimates for aquifer recharge rates, groundwater availability and usage, and groundwater demands for the next 50 years. These estimates are possible because of the TWDB data

collection operations, which consist of systematic groundwater level measurements and groundwater quality sampling. However, the data collection and groundwater research effort needs to be improved in order to ensure that the TWDB has the tools to adequately plan for the state's future groundwater needs and incorporate new information developed by Regional Water Planning Groups.

Recommendation:

The TGPC recommends funding additional groundwater monitoring activities by TWDB and groundwater conservation districts, and the expansion and upgrade of TWDB's groundwater monitoring operations. Additional financial support for existing groundwater conservation districts' groundwater monitoring and collection programs is also needed.

Background:

The purpose of the groundwater-monitoring program is to detect temporal changes in water levels and chemical quality and to document baseline conditions of groundwater occurring in Texas' aquifers. In order to make realistic estimates of groundwater availability and quality for future generations of Texans, it is imperative to have a sufficient number of wells in the groundwater-monitoring network. TWDB needs flexibility to focus monitoring in areas where groundwater is a critical resource. Critical resource areas include those areas (1) that rely primarily on groundwater as opposed to surface water, (2) where population is projected to increase markedly, and (3) where potential sources of groundwater contamination are present.

The groundwater level monitoring program is carried on in accordance with the TWDB *Water-Level Measuring Manual* and relies on a network of approximately 7,500 monitoring wells. In addition, water levels on more than 8,000 historical wells (from which data were collected annually in the past but have since been dropped from the program) and on over 55,000 miscellaneous wells are also on record. Annual water levels are measured during winter when groundwater pumping is minimal and, therefore, the water levels are most indicative of ambient conditions. Continuous water-level recorders are operated in areas where uninterrupted records of water-level changes are needed. Currently, TWDB has secured financing to install automated water level data collection devices in 48 wells beginning in Fiscal Year 2002. Additional funding could be used to install probes that also monitor water quality and expand the automated monitoring network to include up to 400 wells state-wide.

Brush Control to Increase Groundwater Yield

Issue:

The United States Department of Agriculture's Natural Resource Conservation Service estimates that brush in Texas uses approximately 10 million acre-feet (over three trillion gallons) of water annually. Control of brush offers a cost-effective means for significantly increasing the availability of both ground and surface water for the growing needs of Texans. The cost-effectiveness of brush control for increasing water yield is currently being studied by the Texas State Soil and Water Conservation Board (State Board) in eight watersheds, including the Edwards Aquifer watershed above the recharge zone.

Recommendation:

The TGPC recommends that the Legislature devote additional funds to the Texas State Soil and Water Conservation Board's brush control efforts in areas where it is found to be cost effective and will increase long term availability of groundwater by increasing recharge of aquifers.

Background:

Chapter 203 of the Texas Agricultural Code, establishes a state brush control program. The Texas State Soil and Water Conservation Board is designated as the agency responsible for administering the program and is given authority to delegate responsibility for administering certain portions of the program to local soil and water conservation districts.

In 1998, a year-long study determined that the North Concho River watershed had the potential for increased water yields from a comprehensive brush control program on the river's 950,000-acre watershed. Based on the results of this study, the 76th Texas Legislature appropriated over \$9 million to the State Board to: (1) implement a brush control program in the North Concho watershed and (2) conduct eight additional studies to determine the feasibility of brush control for increasing water yield in the Frio River, Nueces River, Pedernales River, Wichita River, Canadian River, Middle Concho River, Upper Colorado River, and Edwards Aquifer watersheds. These feasibility studies will be completed in late 2000 and presented to the 77th State Legislature for consideration for funding.

INTRODUCTION

Groundwater is a vitally important resource in Texas. It is a major source of the water used by Texans for domestic, municipal, industrial, and agricultural purposes. In 1997, Texans used about 15.4 million acre-feet of water, of which 9.4 million acre-feet, or 61 percent, was derived from groundwater sources. Almost 80 percent of groundwater use was for irrigation, with the remainder used for municipal supplies, rural and domestic consumption, rural livestock, electric utility, and industry. In 1997, approximately 40 percent of municipal water in Texas was obtained from groundwater sources.

The major and minor aquifers within the state furnish this vast groundwater resource. These aquifers underlie approximately 76 percent of the state's 266,807 square mile surface area. Major aquifers are defined as producing large quantities of water in a comparatively large area of the state, whereas minor aquifers produce significant quantities of water within smaller geographic areas or small quantities in large geographic areas. Minor aquifers are very important, as they may constitute the only significant source of water supply in some regions of the state. Nine major aquifers and 20 minor aquifers have been delineated within the state. Figures 1 and 2 illustrate the geographic distribution of the state's major and minor aquifers. The state's major and minor aquifers are composed of many rock types, including limestones, dolomites, sandstones, gypsum, alluvial gravels, and igneous rocks. Other undifferentiated, local aquifers may represent the only source of groundwater where major or minor aquifers are absent. These local aquifers, which provide groundwater that is utilized for all purposes, vary in extent from being very small to encompassing several hundred square miles.

Creation and Mandate

In March 1985, the Texas Department of Water Resources, predecessor to the Texas Natural Resource Conservation Commission (TNRCC) and the Texas Water Development Board (TWDB), received a grant from the U.S. Environmental Protection Agency (EPA) to improve coordination of groundwater protection activities undertaken by state agencies. In response to this federal mandate, the interagency Groundwater Protection Committee was established.

The Texas Groundwater Protection Committee (TGPC) was formally created by the 71st Legislature in 1989. The TGPC was created to bridge gaps among existing state water and waste regulatory programs in order to focus protection on the groundwater resource and to optimize water quality protection by improving coordination among agencies involved in groundwater activities. House Bill 1458 (codified as §§26.401 through 26.407 of the Texas Water Code) established the TGPC and outlined its powers, duties, and responsibilities. Upon creation, the TGPC effectively replaced and continued the efforts of the predecessor Groundwater Protection Committee.

The state's groundwater protection policy was adopted by the Legislature as part of the Act that created the TGPC. The policy sets out nondegradation of the state's groundwater resources as the goal for all state programs. The state's groundwater protection policy recognizes:

- ▶ the variability of the state's aquifers in their potential for beneficial use and susceptibility to contamination;
- ▶ the importance of protecting and maintaining present and potentially usable groundwater supplies;
- ▶ the need for keeping present and potential groundwater supplies reasonably free of contaminants for the protection of the environment and public health and welfare; and
- ▶ the importance of existing and potential uses of groundwater supplies to the economic health of the state.

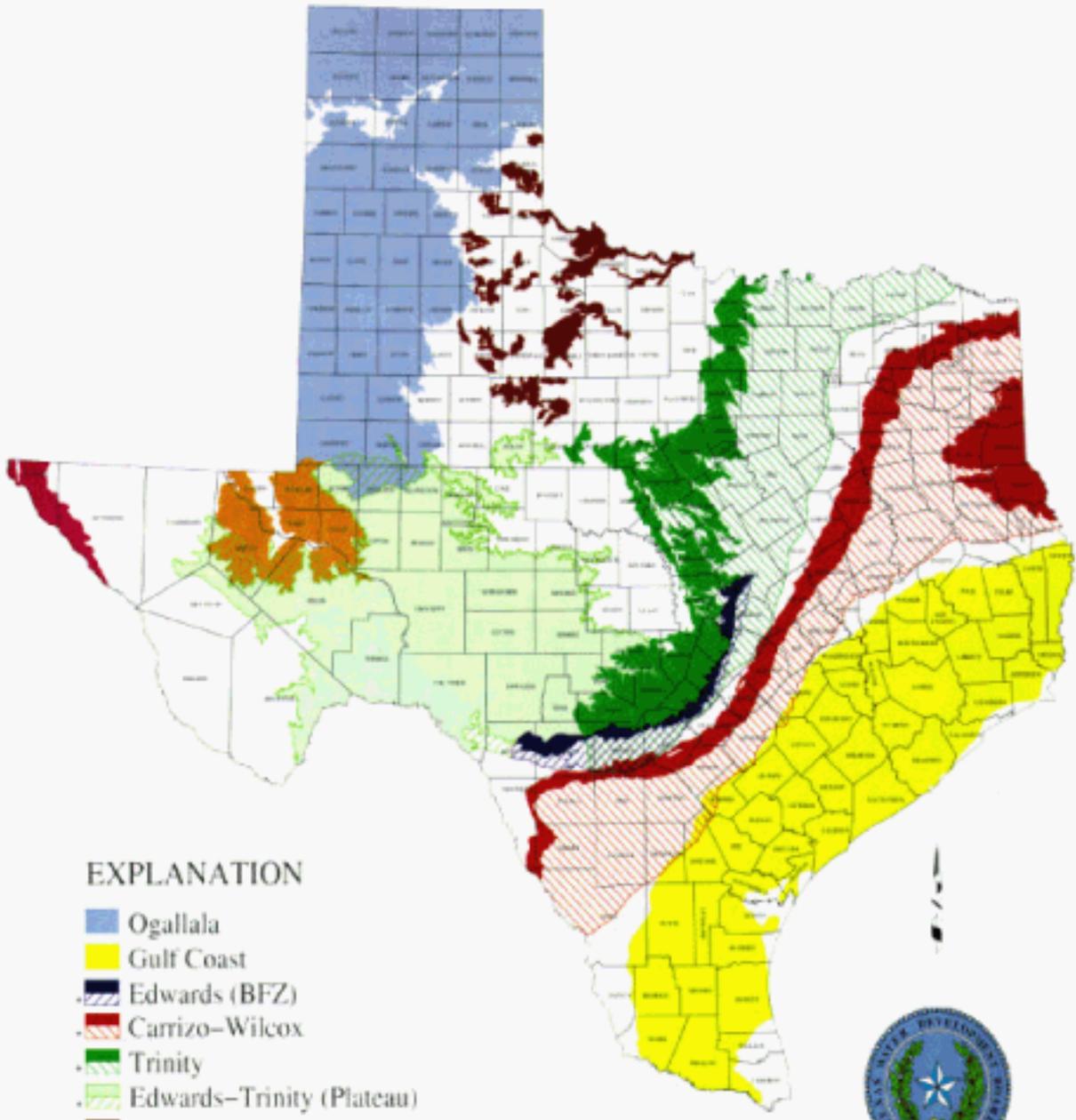
The policy states that discharges of pollutants, disposal of wastes, and other regulated activities be conducted in a manner that will maintain present uses and not impair potential uses of groundwater or pose a public health hazard. The use of the best professional judgment by the responsible state agencies in attaining the goal and policy is also recognized.

The TGPC actively seeks to implement this policy by identifying opportunities to improve existing groundwater quality programs and promote coordination between agencies. The TGPC also strives to identify areas where new or existing programs could be enhanced to provide additional needed protection. The major responsibilities of the TGPC are listed in Table 2.

Table 2. Major Responsibilities of the TGPC

<i>Improve Coordination Between State and Federal Agencies in the Area of Groundwater Protection</i>
<i>Develop, Implement, and Update a Comprehensive Groundwater Protection Strategy for the State</i>
<i>Study and Recommend to the Legislature New Groundwater Protection Programs, and File with the Governor, Lieutenant Governor, and Speaker of the House of Representatives a Biennial Report of the TGPC's Activities</i>
<i>Publish an Annual Monitoring and Contamination Report Describing the Current Status of Groundwater Monitoring Programs of Each Member Agency and Groundwater Contamination Cases Documented or Under Enforcement During the Calendar Year</i>
<i>Advise the Texas Natural Resource Conservation Commission on the Development of State Management Plans for the Prevention of Groundwater Contamination from Pesticides</i>

MAJOR AQUIFERS OF TEXAS



EXPLANATION

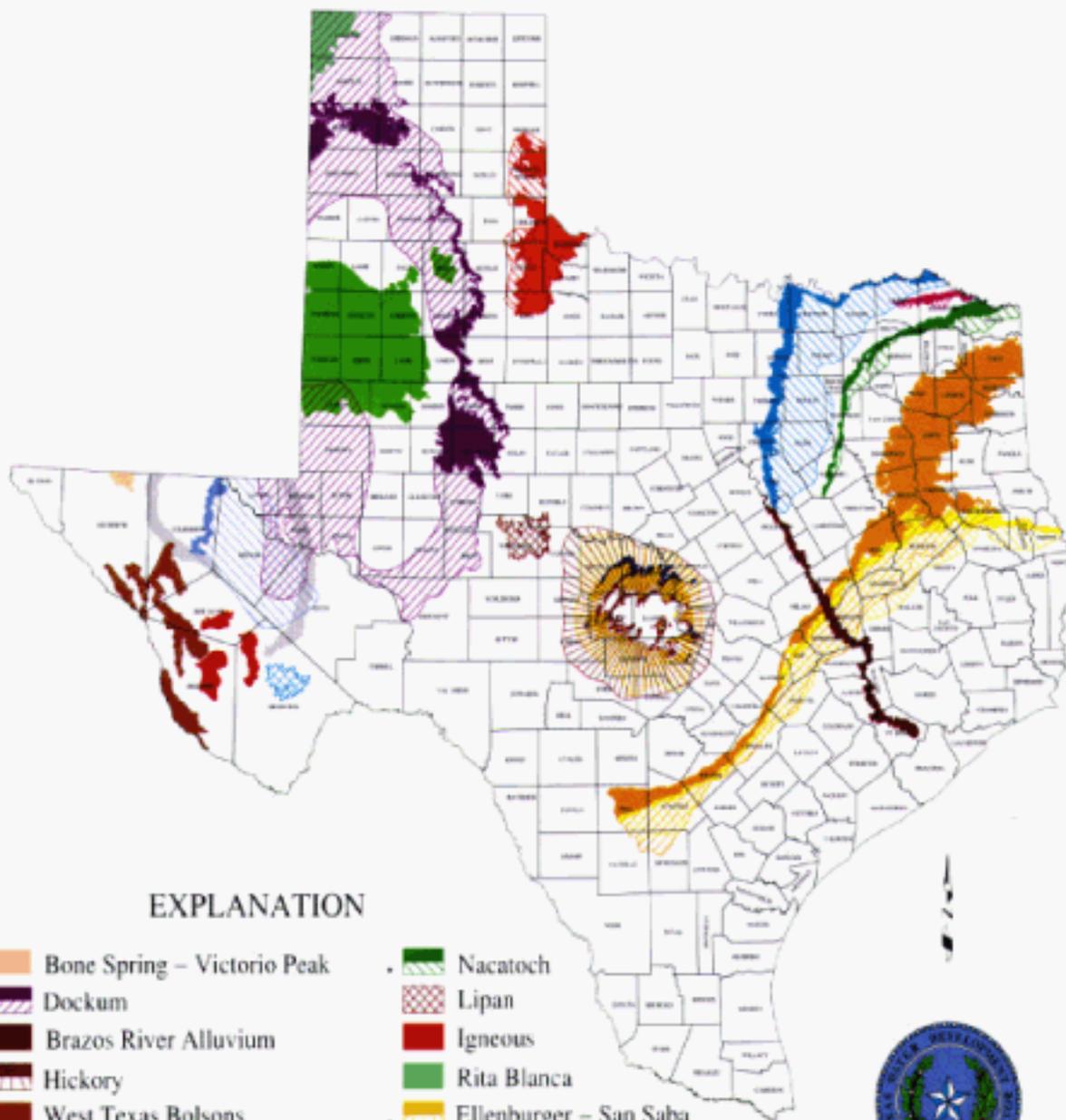
-  Ogallala
-  Gulf Coast
-  Edwards (BFZ)
-  Carrizo-Wilcox
-  Trinity
-  Edwards-Trinity (Plateau)
-  Seymour
-  Hueco-Mesilla Bolson
-  Cenozoic Pecos Alluvium

• **OUTCROP** (That part of a water-bearing rock layer which appears at the land surface.)

• **DOWNDIP** (That part of a water-bearing rock layer which dips below other rock layers.)



MINOR AQUIFERS OF TEXAS



EXPLANATION

- | | |
|-----------------------------------|--------------------------|
| • Bone Spring – Victorio Peak | • Nacatoch |
| • Dockum | • Lipan |
| • Brazos River Alluvium | • Igneous |
| • Hickory | • Rita Blanca |
| • West Texas Bolsons | • Ellenburger – San Saba |
| • Queen City | • Blossom |
| • Woodbine | • Marble Falls |
| • Edwards – Trinity (High Plains) | • Rustler |
| • Blaine | • Capitan Reef Complex |
| • Sparta | • Marathon |

• OUTCROP (That part of a water-bearing rock layer which appears at the land surface.)
 • DOWNDIP (That part of a water-bearing rock layer which dips below other rock layers.)



January 1984

TGPC Membership

The Texas Water Code, §26.403, identifies the agencies listed in Table 3 for TGPC membership. The TNRCC is designated as the lead agency, with the Executive Director designated as the TGPC’s chairman. The Executive Administrator of the Texas Water Development Board is designated as the TGPC’s vice chairman. A representative of the Water Wells Drillers and Pump Installers Program of the Texas Department of Licensing and Regulation was added to the TGPC’s membership by the 76th Legislature.

Table 3. Texas Groundwater Protection Committee Membership

<i>Executive Director of the Texas Natural Resource Conservation Commission</i>
<i>Executive Administrator of the Texas Water Development Board</i>
<i>Representative selected by the Railroad Commission of Texas</i>
<i>Commissioner of Health of the Texas Department of Health</i>
<i>Deputy Commissioner of the Department of Agriculture</i>
<i>Executive Director of the Texas State Soil and Water Conservation Board</i>
<i>Representative selected by the Texas Alliance of Groundwater Districts</i>
<i>Director of The Texas Agricultural Experiment Station</i>
<i>Director of the Bureau of Economic Geology of the University of Texas at Austin</i>
<i>Representative of the Department of Licensing and Regulation</i>

The Water Code allows each member of the TGPC to designate a personal representative of the member’s agency to represent the member on the TGPC. The current TGPC members and their designated representatives are listed in Appendix 1.

The regulatory protection of groundwater is primarily the responsibility of the TNRCC. Certain groundwater-related regulatory activities are under the jurisdiction of the Railroad Commission of Texas, the Texas Department of Agriculture, the Texas Department of Health, the Texas State Soil and Water Conservation Board and the Texas Department of Licensing and Regulation. The Texas Water Development Board has monitoring authorities in regard to groundwater but does not possess the statutory authority to regulate activities that may contaminate groundwater. The Texas Alliance of Groundwater Districts, as an organization, has no regulatory or enforcement authority, but individual groundwater districts have limited authorities for action with regard to groundwater contamination. The Texas Agricultural Experiment Station and the Bureau of Economic Geology conduct research activities related to

groundwater. A brief description of groundwater-related responsibilities, protection programs, and research conducted by the agencies represented on the TGPC follows.

Texas Natural Resource Conservation Commission

The TNRCC conducts various groundwater protection programs that focus on both prevention of contamination and remediation of existing problems through education, permitting, and enforcement. As the state lead agency for water resources, the TNRCC administers both state and federally mandated programs, including the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the Clean Water Act; the Safe Drinking Water Act; and the development of state management plans for groundwater under the Federal Insecticide, Fungicide, and Rodenticide Act. The TNRCC also conducts state mandated programs for groundwater management in priority areas and creation review and enforcement responsibilities related to groundwater conservation districts.

The TNRCC's groundwater protection programs are primarily located in the Offices of Compliance and Enforcement (OCE); Environmental Policy, Analysis, and Assessment (OEPAA); and Permitting, Remediation and Registration (OPRR). Divisions with groundwater protection responsibilities include:

- ▶ Compliance Support Division, OCE -- responsible for professional licensing and the on-site wastewater program;
- ▶ Enforcement Division, OCE -- responsible for ensuring that groundwater resources are protected through enforcement activities related to the municipal solid waste, industrial and hazardous waste, petroleum storage tank, agricultural and watershed management, wastewater, water utilities, and public water supply programs;
- ▶ Field Operations Division, OCE -- responsible for the field investigation of contamination complaints and the inspection of permitted and nonpermitted facilities as well as the Edwards Aquifer Protection program, oversight of the delegated authorized on-site wastewater agents, and inspection of on-site systems;
- ▶ Technical Analysis Division, OEPAA – responsible for groundwater-related technical support for planning programs, the priority groundwater management area program, the pesticides management plan for groundwater program, the implementation of nonpoint source pollution programs and staff support for the Texas Groundwater Protection Committee;
- ▶ Policy and Regulations Division, OEPAA -- coordinates rulemaking and water policy development process and chairs the Texas Groundwater Protection Committee;

- ▶ Registration, Review and Reporting Division, OPRR – responsible for facilities registration, reporting, technical standards, and the Petroleum Storage Tank facility cleanup reimbursement program;
- ▶ Remediation Division, OPRR -- responsible for conducting remedial investigations and corrective actions based upon a health risk ranking, managing both federal and state Superfund activities, administering the Voluntary Cleanup Program, coordinating spill response and requiring groundwater monitoring and ensuring remediation at contaminated sites;
- ▶ Waste Permits Division, OPRR -- responsible for preventing groundwater contamination through the waste disposal facility permitting program: the Class I, Class III and Class V Underground Injection Control programs; responsible for monitoring activities associated with the collection, handling, storage, processing, and disposal of municipal solid waste, and providing groundwater protection recommendations for various activities of the energy industry regulated by the Railroad Commission of Texas; and,
- ▶ Water Permits and Resource Management, OPRR -- responsible for the surface and groundwater quality management through permitting activities related to concentrated animal feeding operations and municipal and industrial wastewater treatment, the development and implementation of water quality standards, the monitoring of public water systems for compliance with state drinking water standards, and implementation of the Source Water Assessment Program.

Railroad Commission of Texas

The Surface Mining and Reclamation Division of the Railroad Commission of Texas (RCT) is authorized to enforce laws and regulations consistent with the Texas Surface Coal Mining and Reclamation Act and the Texas Uranium Surface Mining and Reclamation Act. Groundwater information is required in the regulations, as are monitoring plans for pre-mining and post-mining conditions. Groundwater investigations and monitoring by the Surface Mining and Reclamation Division is conducted in response to citizen complaints of adverse impacts from surface mining activities.

The RCT's Oil and Gas Division is responsible for protecting groundwater from activities related to the drilling, exploration, and production of oil, gas, and geothermal resources, the underground storage of hydrocarbons, and the solution mining of brine. The regulations of the Oil and Gas Division for the well drilling, completion, and plugging focus on the protection of groundwater resources. The RCT administers the EPA-delegated Underground Injection Control Program under the Safe Drinking Water Act for Class II injection wells associated with oil and gas activities, Class III brine-mining injection wells, and Class V disposal wells related to the oil and gas industry. The RCT regulates the handling, storage, treatment, and disposal of oil and gas wastes. The RCT responds to spills from pipelines under its jurisdiction and to other

emergencies related to the production and transportation of oil and gas. The RCT responds to citizen complaints regarding alleged groundwater contamination from oil and gas activities and to allegations of unauthorized activities that may endanger groundwater.

Texas Department of Agriculture

The Texas Department of Agriculture has lead authority for pesticide regulation in the state of Texas. Recognizing pesticides as potential groundwater contaminants, and having primary responsibility to prevent unreasonable risk to humans or the environment from the use of pesticides, the TDA performs studies and analyses aimed at assessing health, ecological, and environmental effects of various pesticides. This analysis is performed by the agency's Pesticide Impact Evaluation activity in order to ensure compliance with federal laws and regulations relating to the use of pesticides and protection of groundwater resources. The TDA accomplishes this by independently substantiating and validating claims of pesticide contamination relating to human health and the environment.

Texas Department of Health

The Texas Department of Health's Bureau of Radiation Control (BRC) regulates radioactive materials in Texas under the authority of the federal Atomic Energy Act of 1954 as amended. As needed, the BRC will sample groundwater as a result of an incident, complaint, or situation that leads the BRC to believe there may be groundwater contamination.

Texas State Soil and Water Conservation Board

The Texas State Soil and Water Conservation Board (TSSWCB), under Title 7 Chapters 201 and 203 of the Texas Agriculture Code, is charged with the overall responsibility for administering and coordinating the state's soil and water conservation program with the state's soil and water conservation districts. Section 201.016 gives the agency responsibility for planning, implementing, and managing programs and practices for abating agricultural and silvicultural nonpoint source pollution. Currently, the agricultural/silvicultural nonpoint source management program includes problem assessment, management program development and implementation, monitoring, education, and coordination.

Texas Water Development Board

The Texas Water Development Board (TWDB) collects data on the state's aquifers, including the occurrence, availability, quality, and quantity of groundwater and the current and projected demands on

groundwater resources. This is done through the statewide groundwater level measurement program, groundwater quality sampling program, and groundwater studies.

The purpose of the groundwater quality sampling program is to monitor changes, if any, in the quality of groundwater over time and to establish as accurately as possible the baseline quality of groundwater occurring naturally in the state's aquifers. The groundwater quality monitoring program is accomplished in accordance with procedures established in the TWDB's *Field Manual for Ground-Water Sampling*, in supplemental samples analyzed on Hach instruments, and by obtaining data collected by other entities such as groundwater conservation districts, the U.S. Geological Survey, and other state and federal agencies.

The TWDB is also responsible for the State Water Plan, a guide for the orderly development and management of the state's water resources to further economic development. With passage of Senate Bill 1, 75th Legislature, the TWDB has developed a regional water planning process over 16 regional water planning areas with regional water planning groups coordinating local efforts. The planning groups will develop a regional water plan for their area to be incorporated into the State Water Plan. The use of Groundwater Availability Models (GAMs) provide reliable, area-specific groundwater resources information for use in the planning process. In addition, the TWDB makes low-interest loans to local governments for the planning, design, and construction of water supply, wastewater treatment, flood control, and agricultural water conservation projects.

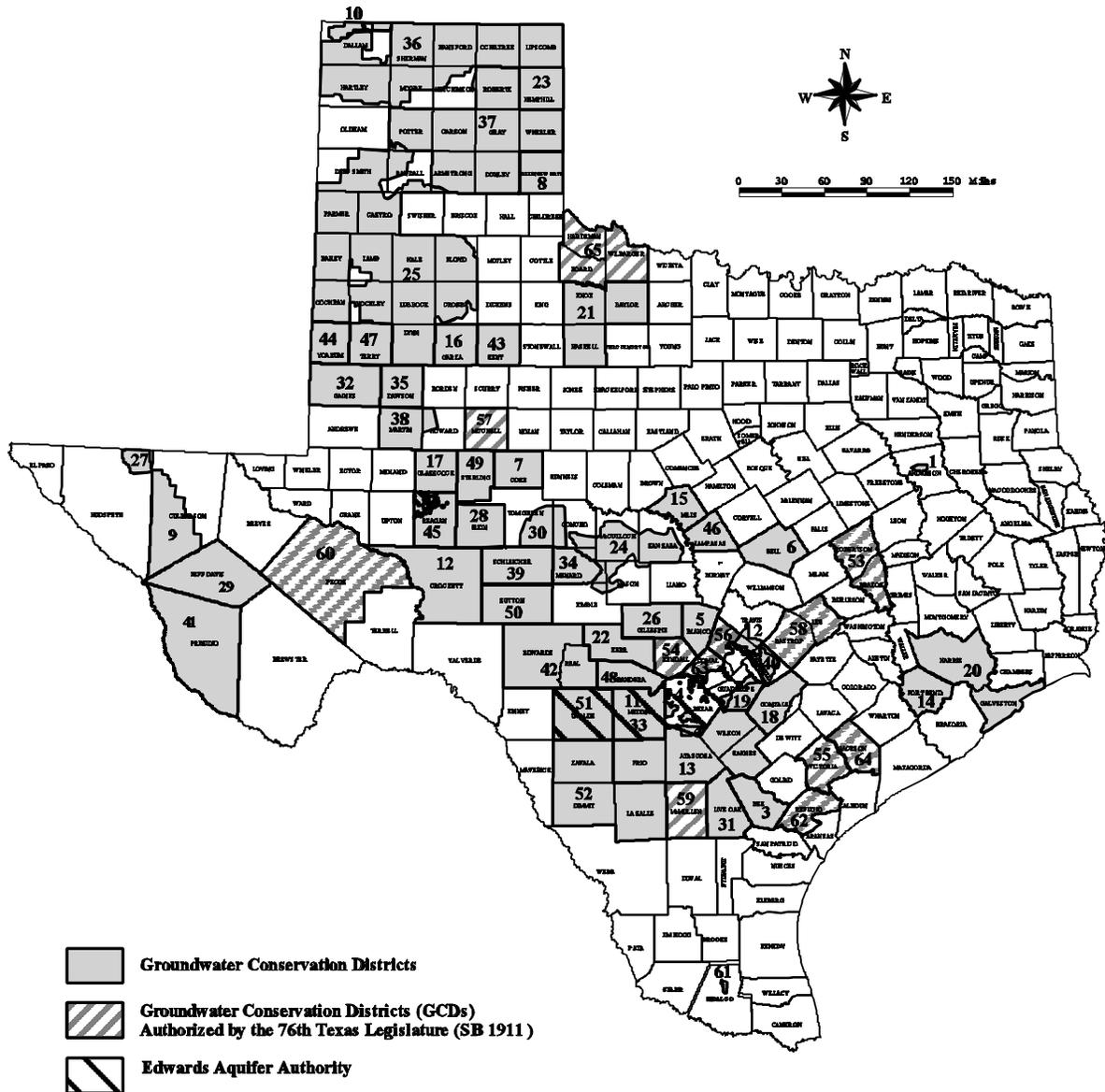
Texas Alliance of Groundwater Districts

The Alliance is the umbrella organization composed of groundwater conservation districts within the state (Figure 3). Its membership is restricted to groundwater conservation districts, which have the powers and duties to manage groundwater as defined set out in Chapter 36 of the Texas Water Code. The districts were created by the Legislature or by the Texas Natural Resource Conservation Commission with the purpose and responsibility of preserving and protecting groundwater. The districts are local or regional in their jurisdiction and have, for the most part, elected boards of directors. Among their legislatively granted authorities is the power to monitor groundwater quality, permit non exempt water wells, develop management plans and conduct groundwater studies. Districts also have the authority to bring civil court proceedings for injunctive relief against an entity causing groundwater contamination.

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station (TAES) is the official agricultural research agency in Texas. Headquartered at Texas A&M University, the TAES promotes food and fiber production that emphasizes water conservation and the protection of natural resources. Broad goals of the TAES groundwater research program are to protect, preserve, and efficiently use water resources, and to develop sustainable

GROUNDWATER CONSERVATION DISTRICTS



DISCLAIMER

This map was generated by the Texas Water Development Board. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate. Boundaries for groundwater conservation districts are approximate and may not accurately depict legal descriptions.

Groundwater Conservation Districts

- 1 Anderson County UWCD
- 2 Barton Springs/Edwards Aquifer CD
- 3 Bee GCD *
- 4 Bexar Metropolitan Water District
- 5 Blanco-Pedernales GCD *
- 6 Clearwater UWCD
- 7 Coke County UWCD
- 8 Collingsworth County UWCD
- 9 Culberson County GCD
- 10 Dallam County UWCD No. 1
- 11 Edwards Aquifer Authority
- 12 Emerald UWCD
- 13 Evergreen UWCD
- 14 Fort Bend Subsidence District
- 15 Fox Crossing Water District
- 16 Garza County Underground and Fresh WCD
- 17 Glasscock County UWCD
- 18 Gonzales County UWCD
- 19 Guadalupe County GCD
- 20 Harris-Galveston Coastal Subsidence District
- 21 Haskell/Knox UWCD
- 22 Headwaters UWCD
- 23 Hemphill County UWCD
- 24 Hickory UWCD No.1
- 25 High Plains UWCD No.1
- 26 Hill Country UWCD
- 27 Hudspeth County UWCD No.1
- 28 Irion County WCD
- 29 Jeff Davis County UWCD
- 30 Lipan-Kickapoo WCD
- 31 Live Oak UWCD
- 32 Llano Estacado UWCD
- 33 Medina GCD
- 34 Menard County UWCD
- 35 Mesa UWCD
- 36 North Plains GCD
- 37 Panhandle GCD
- 38 Permian Basin UWCD
- 39 Plateau UWC and Supply District
- 40 Plum Creek Conservation District
- 41 Presidio County UWCD
- 42 Real-Edwards Conservation and Reclamation District
- 43 Salt Fork UWCD
- 44 Sandy Land UWCD
- 45 Santa Rita UWCD
- 46 Saratoga UWCD
- 47 South Plains UWCD
- 48 Springhills Water Management District
- 49 Sterling County UWCD
- 50 Sutton County UWCD
- 51 Uvalde County UWCD
- 52 Wintergarden GCD

**Groundwater Conservation Districts (GCDs)
Authorized by the 76th Texas Legislature
(SB 1911)**

- 53 Brazos Valley GCD
- 54 Cow Creek GCD
- 55 Crossroads GCD
- 56 Hays Trinity GCD
- 57 Lone Wolf GCD
- 58 Lost Pines GCD
- 59 McMullen GCD
- 60 Middle Pecos GCD
- 61 Red Sands GCD
- 62 Refugio GCD
- 63 Southeast Trinity GCD
- 64 Texana GCD
- 65 Tri-County GCD

* Districts not confirmed as of October 5, 2000.
Other confirmed districts adapted from the TNRCC Report SFR-13,
"Underground Water Conservation Districts, Report to the 74th
Legislature."

agricultural production systems. Groundwater programs of the TAES stress the development of management strategies and technologies to support sustainable agriculture. TAES groundwater quality research focuses on safe chemical use; the control, fate, and transport of agricultural chemicals; and the remediation of contaminated groundwaters. Research by TAES and other agencies is used by the Texas Agricultural Extension Service in the development of educational programs.

Bureau of Economic Geology

The Bureau of Economic Geology is a research entity of the University of Texas at Austin and functions as the state geological survey. Extensive advisory, technical, and informational services relating to the geology and groundwater resources of Texas are provided by the Bureau. In addition, the Bureau conducts basic and applied research projects in energy and mineral resources and in hydrogeology, groundwater resources, and geochemistry. Some projects are conducted jointly with other units of the University of Texas as well as with state, federal, and local agencies, industry associates, and foreign companies.

Texas Department of Licensing and Regulation

The Water Well Drillers and Pump Installers Program along with the Water Well Drillers Advisory Council have the responsibilities of determining qualifications for licensure of all persons drilling water wells and enforcing standards of conduct and well completion through the revocation or suspension of licenses and assessment of administrative penalties. The program investigates all alleged violations of Chapters 32 and 33 of the Texas Water Code and Department rules, 16 Texas Administrative Code Chapter 16 (Water Well Drillers and Pump Installers Rules), consumer complaints filed against water well drillers, pump installers. The program also inspects water wells to insure compliance with water well construction standards.

Federal Involvement and Coordination

Since 1985, EPA grants administered under Section 106 of the Clean Water Act promoted and funded coordination of groundwater protection activities of federal and federally-delegated regulatory programs, and the development of a groundwater protection strategy.

The TGPC actively coordinates with federal agencies on groundwater protection issues that affect the state. The TGPC has taken leadership initiative with federal agencies on the development of a comprehensive state groundwater protection program and the development of pesticide management plans for the prevention of groundwater contamination. In addition, the TGPC has regularly provided national level input to federal agencies on groundwater protection and program issues through the Ground Water Protection Council (an association of state groundwater and underground injection control program

directors) and the State FIFRA Issues Research Evaluation Group (a group formed by state agricultural regulatory officials and EPA to discuss and evaluate pesticide matters affecting states), and other state and federal stakeholder and regulatory guidance groups.

The TGPC also works closely with the U.S. Geological Survey (USGS), the federal agency with responsibilities that include national level geologic mapping and hydrologic studies. Staff of the USGS have participated in various TGPC-sponsored projects, providing groundwater expertise and opportunities for state input in federally sponsored research.

TGPC ACTIVITIES 1999–2000

Actions on Recommendations to the 76th Legislature

The 76th Legislature, directly or indirectly, addressed two of the five recommendations forwarded by the TGPC in December, 1998 (TGPC, 1998c). Three TGPC recommendations were not addressed: funding for pesticide-specific state management plan development and implementation, streamlining the district creation process in the priority groundwater management area process and providing resources to develop and carry out education programs on wastewater reclamation and closure of abandoned water wells.

The TGPC recommended a revision of §36.117 of the Texas Water Code which exempts certain wells from groundwater conservation district jurisdiction. The recommendation set out two objectives: (1) simplify the language so it could be easily understood and (2) revise or eliminate the exemptions in order to facilitate local decision-making. The TGPC recommended that exemptions from district permitting authority be set locally through district rulemaking procedures. Although, the full scope of the recommendation was not addressed, House Bill 340 which deleted the exemption for jet wells was enacted. This modification removed some redundancy in the statutory language.

The TGPC's recommendation to amend TGPC membership to add the Water Well Drillers and Pump Installers Program was carried as legislation and passed. House Bill 1848 amended the TGPC's enabling law to provide that a representative of the Water Wells Drillers and Pump Installers Program of the Texas Department of Licensing and Regulation selected by the Department's Executive Director serve as a member of the TGPC. The Texas Water Well Drillers Board was one of the original members of the Texas Groundwater Protection Committee when it was established in 1989. However, subsequent agency reorganizations placed the Water Well Drillers and Pump Installers Program in the Texas Department of Licensing and Regulation, which was not a TGPC member.

Meetings and Presentations

In accordance with §26.404 of the Texas Water Code, the TGPC is subject to the Administrative Procedures and Texas Register Act and open meetings and open records law. In addition to the public notification of meetings in the *Texas Register*, a notice of meeting, including the proposed meeting agenda, are provided to all individuals on the TGPC's mailing list. Meeting notices are also posted on the TGPC's Internet homepage.

As required by §26.404, the TGPC met quarterly during the 1999–2000 biennium for a total of eight regular meetings. Regularly scheduled items on the TGPC’s agenda include subcommittee reports, presentations and round table discussions, business, information exchange, announcements, and public comment.

During the biennium, various agencies and groups gave presentations to the TGPC on new or improved groundwater related activities and initiatives. The presentations serve to broaden interagency awareness and coordination. Presentations to the TGPC during the 1999–2000 biennium included the following.

- ▶ The Texas Natural Resource Information System of the TWDB provided an overview of the state’s Strategic Mapping Initiative which included current capabilities and proposed improvements.
- ▶ The TWDB provided an overview of the report on changes in groundwater management policies developed by the Consensus Groundwater Stakeholders Group.
- ▶ The TNRCC provided an overview and status of the agency’s proposed rules for the Texas Risk Reduction Program.
- ▶ The TNRCC provided an overview of the agency’s On-site Wastewater Program.
- ▶ A joint presentation was provided on the TWDB’s Groundwater Availability Modeling Project and the TNRCC’s Water Availability Modeling Project.
- ▶ The U.S. Geological Survey presented a Progress Report for the South Texas National Water Quality Assessment (NAWQA) Program.
- ▶ The U.S. Geological Survey presented an overview and status of the Groundwater Component of the Source Water Assessment Program, part of a TNRCC-funded project.

Subcommittees and Work Groups

Subcommittees and work groups are created at the call of the chairman, and with the approval of the TGPC. The subcommittees address specific groundwater-related issues, areas of program development and keep the TGPC apprised of ongoing issues and projects. The subcommittees report and provide recommendations to the TGPC at its regularly scheduled meetings. At its meetings, the TGPC considers the findings and recommendations of the subcommittees, and after holding discussion, takes action as it finds appropriate. The public is encouraged to fully participate on and serve in the subcommittee process. The subcommittees and task forces listed in Table 4 were used by the TGPC during the 1999–2000 biennium.

Table 4. Active Subcommittees, 1999–2000 Biennium

<p><i>Agricultural Chemicals Subcommittee, consisting of:</i></p> <p><i>State Management Plan Task Force</i></p> <p><i>Education Task Force</i></p> <p><i>Site Selection Task Force</i></p> <p><i>Data Evaluation and Interpretation Task Force</i></p> <p><i>Best Management Practices Task Force</i></p>
<p><i>Data Management Subcommittee</i></p>
<p><i>Groundwater Nonpoint Source Subcommittee</i></p>
<p><i>Joint Groundwater Monitoring and Contamination Report Subcommittee</i></p>
<p><i>Legislative Report Subcommittee</i></p>
<p><i>Abandoned Well Closure Task Force</i></p>

Agricultural Chemicals Subcommittee

The Agricultural Chemicals Subcommittee was created to coordinate the development of the generic state management plan (SMP) for pesticides in groundwater and the subsequent pesticide-specific state management plans. The subcommittee meets quarterly and is composed of representatives from interested agencies serving on the full TGPC, the Texas Agricultural Extension Service, and the Structural Pest Control Board. A technical advisory group of interested parties, including federal agencies, other state agencies, producer groups, environmental groups, and the agricultural chemical industry has served the subcommittee to provide expertise and perspective during the development of the generic SMP.

The Agricultural Chemicals Subcommittee has designated five work groups: the State Management Plan Task Force, the Educational Task Force, the Site Selection Task Force, the Data Evaluation and Interpretation Task Force, and the Best Management Practices Task Force.

- ▶ The State Management Plan Task Force is responsible for writing and revising generic and pesticide-specific state management plans.
- ▶ The Education Task Force is responsible for developing SMP-related educational information and materials and coordinating educational outreach through public presentations, displays, applicator certification curriculum development, and brochures.
- ▶ The Site Selection Task Force is responsible for identifying and delineating vulnerable geographic areas for conducting pesticide-specific groundwater monitoring. The Site Selection Task Force also

plans groundwater monitoring strategies, and, if contamination is discovered, determine sampling strategies for determining the extent of contamination.

- ▶ The Data Evaluation and Interpretation Task Force, if monitoring reveals contamination, evaluates the quality of the data and interpret the available information to determine the probable source and cause of the contamination. The task force also coordinates the state's response, under the SMP, to groundwater contamination.

- ▶ The Best Management Practices Task Force is responsible for developing the preventive component of the generic SMP and identifying pesticide-specific and area-specific best management practices that can be used to prevent or curtail pesticide contamination of groundwater.

Data Management Subcommittee

The Data Management Subcommittee is charged with improving the sharing of data between levels of government, the academic community, and the private sector. The subcommittee's initial goals were to develop ways of linking and sharing groundwater data and to develop standards to facilitate the sharing of information. Representatives of 10 state, federal, and local agencies, and the private sector spent over two years developing the *Texas Ground-Water Data Dictionary* (TGPC, 1996b). The data dictionary provides groundwater professionals in Texas with specific guidelines to implement recent state and federal requirements and describes a standardized framework for collecting and storing information on groundwater in the state.

The Data Management Subcommittee has been charged with designing and facilitating a formal committee process for the coordination and integration of groundwater data collection. In addition, the subcommittee coordinates the assessment of the groundwater quality of the state's aquifers as an integral part of the state's comprehensive groundwater protection program. The subcommittee provides recommendations for the continuing improvement of groundwater data collection and assessment for the state's groundwater protection programs.

Groundwater Nonpoint Source Subcommittee

The purpose of the Groundwater Nonpoint Source Subcommittee, chaired by the TSSWCB, is to facilitate and formalize the groundwater nonpoint source (NPS) program in Texas and to provide support and guidance for the groundwater NPS management policy of the state. The subcommittee coordinates and provides input for the NPS Annual Report to the EPA; coordinates, updates, and guides the state NPS assessment of groundwater conditions and NPS management strategy for groundwater resources; facilitates

the review and submission of NPS project proposals for the annual EPA Clean Water Act, Section 319 (h) funding cycle; and provides input related to groundwater to the TSSWCB and the TNRCC for their management plans.

Joint Groundwater Monitoring and Contamination Report Subcommittee

This informal subcommittee is utilized to prepare the TGPC's annual groundwater monitoring and contamination report. Representatives of each member agency annually provide information and data to the TNRCC for inclusion in the reports. The TNRCC compiles and reviews the content and initiates publication efforts.

Legislative Report Subcommittee

The Legislative Report Subcommittee is biennially charged with facilitating the TGPC's efforts in publishing the legislative report required by §26.405 of the Texas Water Code. The subcommittee is specifically charged to review the draft report's contents, revise the scope of the report as needed, and develop, for full-TGPC approval, groundwater protection recommendations for legislative consideration.

Abandoned Well Closure Task Force

The Abandoned Well Closure Task Force was created as an educational outreach initiative. The purpose of the task force is to develop the necessary procedures, educational, and technical information required to promote the landowner-initiated closure or plugging of abandoned water wells; develop a curriculum for well-closure presentations or workshops; and design well-closure seminars and demonstrations to be conducted throughout the state. The task force is composed of the TGPC member agencies and the Texas Agricultural Extension Service, U.S. Department of Agriculture's Natural Resource Conservation Service, Texas Farm Bureau, Water Well Drillers Advisory Council, and Texas Rural Water Association.

Rules Review Plan

The TGPC rules are contained in Title 31, Texas Administrative Code, Chapter 601, and address the preparation of the joint groundwater monitoring and contamination report and the maintenance of public files. A copy of the rules is provided in Appendix 2. In accordance with the General Appropriations Act, Article IX, §167, 75th Legislature, 1997, Rider 167 requires state agencies to develop and implement a rules review plan for the periodic review and readoption of an agency's rules under the Administrative Procedures Act. The TGPC has completed the review and readoption of all regulations promulgated by the

committee. The TGPC adopted a Rules Review Plan at its August 24, 2000 meeting. A copy of the Rules Review Plan is provided in Appendix 3. The plan commits the TGPC to review its rules within four years of its previous review completed in September 1998. The TGPC may review its rules as part of its routine rulemaking before its scheduled review date if it is necessary to propose amendments to Chapter 601.

Public Records

The TNRCC administers the activities of the TGPC in accordance with §26.403 of the Texas Water Code. The TNRCC's Technical Analysis Division maintains a mailing list of TGPC members, designated and alternate members, subcommittee members, agency staff, and interested parties for meeting notification and correspondence. The TNRCC provides meeting information through the *Texas Register* for public notification, maintains audio tapes of TGPC meetings, drafts meeting records for TGPC meetings, and maintains meeting and correspondence files for the TGPC and its subcommittees. The TGPC's publications are available through the TNRCC's Agency Communications Division. Information is also made available to the public through the TNRCC/TGPC Internet Homepage. Information regarding groundwater monitoring programs and groundwater contamination incidents are maintained individually by the participating agencies and districts.

EDUCATIONAL OUTREACH

State Management Plan for Pesticides in Groundwater

The TGPC through the Agricultural Chemicals Subcommittee's Education Task Force published an informational brochure (TGPC, 1995b). The brochure is designed to provide general information to the public about the state's efforts to develop pesticide management plans (PMP). The state's generic PMP, *the Texas State Management Plan for the Prevention of Pesticide Contamination of Groundwater*, received concurrence from EPA, and was published in the late 2000. In addition, a set of slides and an outlined presentation have been prepared to familiarize special interest groups and the general public with the development and implementation of the generic state management plan.

Abandoned Well Closure Activities

Recognizing the dangers to human health and groundwater quality that abandoned water wells pose, the TGPC established and charged the Abandoned Well Closure Task Force with developing educational materials to promote the low-cost, landowner-initiated closure (capping or plugging) of abandoned water wells. State law makes landowners responsible for plugging abandoned wells and, therefore liable for any water contamination or injury due to such wells.

The task force initiated efforts in 1997 to develop a technical guidance document to assist landowners in plugging abandoned water wells. The technical guidance document, entitled *Landowner's Guide to Plugging Abandoned Water Wells*, was published and distributed to member agencies in April 1999. The guidance document is also available on the TGPC homepage. The task force in cooperation with the Texas Agricultural Extension Service (TAEX) and with TNRCC and EPA funding designed and produced a video cassette in 2000 highlighting landowner closure of abandoned water wells. This instructional video cassette has been included in the TAEX educational series, Tex-A-Syst. The videotape has been distributed to member agencies and TAEX field personnel. Copies are also available from the Water Well Drillers and Pump Installers Program of the TDLR. Both audio and video public service announcements were also developed for use with the guidance document and video.

Currently, the task force is implementing an educational outreach plan. The plan calls for the task force to develop educational materials to complement the technical guidance document. Such material may include brochures on the dangers of abandoned water wells, possible sources of match-money for closing abandoned wells and other educational approaches such as the development of closure demonstrations, video cassettes, or public service announcements. The plan also serves to identify the target audience of the outreach efforts, the cooperating regional and local education personnel, and outline curriculum and educational materials.

TGPC Internet Homepage

The TGPC's homepage, created in 1998, is maintained on the TNRCC's Internet server at: **www.tnrcc.state.tx.us/tgpc/**. The TGPC's homepage provides links to the member agencies' homepages and recent TGPC publications. The site also provides general information about the TGPC, the subcommittees, records of TGPC meetings, the TGPC's Groundwater Classification System, TGPC rules, meeting announcements and locations, and opportunities for the public to provide comments or seek inclusion on the TGPC's mailing list.

Quarterly Regulatory Update

The TGPC member agencies use the quarterly meetings to share and discuss current and ongoing rule development relating to the protection of groundwater quality. Agencies which are proposing new rules or are amending existing rules generally provide a description of the rule, its purpose and a rule development time line. This allows the other agencies the opportunity to ask specific questions about the rule under development and about their opportunities to provide comments on the rule. Discussions are held in an open forum and the public is provided the opportunity to participate.

ANNUAL GROUNDWATER MONITORING AND CONTAMINATION REPORTS

Section 26.406 of the Texas Water Code requires the TGPC to publish an annual groundwater monitoring and contamination report. The annual report is required to:

- ▶ describe the current status of groundwater monitoring activities conducted by or required by each agency at regulated facilities or associated with regulated activities;
- ▶ contain a description of each case of groundwater contamination documented during the previous calendar year;
- ▶ contain a description of each case of contamination documented during previous periods for which enforcement action was incomplete at the time of issuance of the preceding report; and
- ▶ indicate the status of enforcement action for each case of contamination which is listed.

The TGPC produced and published two monitoring and contamination reports during the previous two years: *Joint Groundwater Monitoring and Contamination Report-1998* (TGPC, 1999b) and *Joint Groundwater Monitoring and Contamination Report-1999* (TGPC, 2000). The reports describe the status of groundwater monitoring programs and groundwater contamination cases documented or under enforcement by the participating agencies for the calendar year entitled. Groundwater protection program descriptions for each contributing agency or organization are included. The reports also contain individual groundwater contamination case descriptions, listed by county, for each contributing agency with regulatory groundwater protection authority. The individual case descriptions provide the enforcement status for each case.

Groundwater Monitoring

The groundwater protection programs of the participating agencies generally fall within one of three categories:

- ▶ regulatory agencies requiring or conducting groundwater monitoring to assure compliance with guidelines and regulations for the protection of groundwater from discharges of contaminants;
- ▶ agencies or entities conducting groundwater monitoring to assess ambient or existing groundwater quality conditions and to track changes in water quality over time; and
- ▶ agencies or entities conducting research activities related to groundwater resources and groundwater conservation.

Each regulatory agency that requires or conducts groundwater monitoring to assure compliance with guidelines and regulations to protect groundwater from discharges of contaminants has its own monitoring

program requirements and procedures. The criteria used to assess the need for groundwater monitoring vary among the regulatory entities. The latest report for 1999 describes 14 programs in three agencies monitoring changes in groundwater quality for permit and operational requirements at approximately 14,000 facilities statewide. Data indicate that an estimated 48,000 monitor and water wells are being used for groundwater monitoring purposes at these facilities. The majority (greater than 98 percent) of the facilities being monitored are under the jurisdiction of the TNRCC, with the remainder under the jurisdiction of the Railroad Commission of Texas and the Texas Department of Health

Agencies or entities including the Texas Water Development Board, the member districts of the Texas Alliance of Groundwater Districts, and the U.S. Geological Survey (USGS) conduct groundwater monitoring to assess ambient or existing groundwater quality conditions and to track changes in water quality over time. Some monitoring programs are developed for water quality assessment studies that target specific geographic areas, specific contaminants or constituents, or specific activities. Contamination cases discovered by these agencies or entities through groundwater studies or groundwater sampling programs are referred to the regulatory agency with appropriate jurisdiction. Texas Water Development Board monitoring programs address ambient groundwater quality and assess the occurrence of particular constituents. The Texas Water Development Board monitored 703 sites in 1999. Supplementing TWDB's effort were 1,062 additional chemical analyses obtained from cooperating entities such as the USGS and university research programs. In addition, approximately 900 water wells are routinely monitored for ambient groundwater quality and changes over time by the member districts of the Texas Alliance of Groundwater Districts.

Groundwater Contamination

Groundwater contamination, as defined by the TGPC (TGPC Rules Chapter 601, Appendix 2) for inclusion in the annual report, is the detrimental alteration of the naturally occurring physical, thermal, chemical, or biological quality of groundwater reasonably suspected of having been caused by the activities of entities under the jurisdiction of the state agencies. The TGPC recognizes that groundwater contamination may result from many sources, including:

- ▶ agricultural activities;
- ▶ commercial and business endeavors;
- ▶ current and past oil and gas production and related practices;
- ▶ domestic activities;
- ▶ industrial and manufacturing processes; and
- ▶ natural sources that may be influenced by, or may result from, human activities.

The contamination cases identified in the annual report are primarily those where contaminants have been discharged to the surface, to the shallow subsurface, or directly to groundwater from activities such as the storage, processing, transport, or disposal of products or waste materials.

There were 8,062 documented groundwater contamination cases addressed in the annual report for 1999. Approximately 98.2 percent of the documented cases were under the jurisdiction of the Texas Natural Resource Conservation Commission. The remainder of the cases were under the jurisdiction of the Railroad Commission of Texas, with approximately 1.6 percent, and the groundwater conservation districts that make up the Texas Alliance of Groundwater Districts, with less than 1 percent.

Table 5 lists the documented groundwater contamination cases reported by each agency with enforcement jurisdiction. The total number of cases documented during 1998 and 1999 by each agency and program are listed. The percentage of the total number of documented cases attributable to each agency and program are also given for 1998 and 1999. The net change and percentage change from 1998 to 1999 for each agency and program is also shown. The number of cases for 1999 includes 102 cases carried forward from the 1998 report, that did not appear with the same file name or number in the 1999 data reported by TNRCC program areas, and therefore, may be duplicate cases. These cases have been maintained in a separate data file, and will be addressed in the preparation of the 2000 Joint Groundwater Monitoring and Contamination Report. For the TNRCC, the table reflects the organizational structure that was in place at the end of 1998, and the corresponding structure for 1999. The two are similar except for the caseload of one program area that was divided during a reorganization effective October 1, 1999.

As Table 5 illustrates, the reports for 1998 and 1999 have continued to document the large number of groundwater contamination impacts from petroleum storage tanks. In 1999, there were 65,102 facilities containing registered storage tanks. Approximately 95 percent of the regulated storage tanks contain petroleum products, with the remainder containing regulated hazardous substances. As reported by the TNRCC, the number of documented groundwater contamination cases resulting from petroleum storage tank system failures rose from 6,341 in 1998 to 6,504 in 1999. These cases represent 83.1 percent of the total number of documented contamination cases in 1998 and 80.7 percent of the total cases in 1999. While the number of documented contamination cases from storage tanks is very high, it can be directly linked to the large number of regulated facilities and the monitoring requirements in effect for these systems.

The most common contaminants reported in 1999 included gasoline, diesel fuel, and other petroleum products due to the large number of petroleum storage tank related cases. Less common contaminants reported included gasoline constituents, organic compounds (such as phenol, trichloroethylene, carbon tetrachloride, dichloroethylene, and naphthalene), pesticides (such as alachlor, atrazine, bromacil, dicamba, and prometon), creosote constituents, solvents, heavy metals, and sodium chloride.

Table 5. Groundwater Contamination Cases by Jurisdictional Agency, 1998–1999

Agency/Program	Total No. of Cases		Net Change	Percentage Change (total cases)	Percentage of Total	
	1998	1999	1998–1999	1998–1999	1998	1999
Texas Natural Resource Conservation Commission						
Remediation Division - Corrective Action Section	501	532	31	6.19	6.6	6.6
Remediation Division - Petroleum Storage Tank Section	6341	6504	163	2.6	83.1	80.7
Remediation Division - Superfund Cleanup Section	58	58	0	0	0.8	0.7
Remediation Division - Superfund Site Assessment and Management Section	35	25	-10	-28.6	0.5	0.3
Remediation Division - Voluntary Cleanup / Innocent Owner Program	33	129	96	290.9	0.4	1.6
Remediation Division - Voluntary Cleanup Program	333	511	178	53.5	4.4	6.3
Technical Analysis Division - Water Quality Planning and Assessment Section		38				0.5
Water Permits and Resource Management Division - Water Quality Assessment Section	47	9	0	0	0.6	0.3
Water Permits and Resource Management Division - Public Drinking Water Section	30	59	29	96.7	0.4	0.7
Waste Permits Division - MSW Permits Section	25	23	-2	-8.0	0.3	0.3
Enforcement Division	99	23	-76	-76.7	1.3	.3
Field Operations Division	11	4	-7	-63.6	0.1	<0.1
Subtotal	7513	7915	402		98.5	98.2
Railroad Commission of Texas	94	127	33	35.1	1.3	1.6
Texas Alliance of Groundwater Districts	20	20	0	0	0.3	0.3
Total	7627	8062	435		100	100

As required by §26.046 of the Texas Water Code, the report indicates the status of enforcement action for each instance of groundwater contamination. For purposes of the report, enforcement action includes any agency action which accomplishes or requires the identification, documentation, monitoring, assessing, or remediation of groundwater contamination. In general, regulatory programs are structured to achieve the desired degree of environmental protection and mitigation with the lowest possible level of agency oversight, and while the status of a contamination case may remain at an agency action level for a long period of time, physical activities related to the assessment and remediation may change often. The comparison of the level of agency action and the status or level of contamination assessment and mitigation allows a one-to-one correspondence between an agency's response (enforcement status) and the completion of the discrete phases in the progression of contamination investigation (activity status).

Table 6 presents the activity status of documented groundwater contamination cases during 1999. The table indicates the total number of documented cases by the agency and division or program with jurisdictional authority and indicates the activity status for the cases. Once groundwater contamination has been confirmed, either the regulated entity or the agency will address a groundwater contamination incident following a general sequence of actions until the investigation concludes no further action is necessary.

All of the 8,062 cases listed in the 1999 report have documented groundwater contamination, or were reported as having documented contamination in previous reports. The activity status for each case is identified in the report's tables. As Table 6 indicates, "no activity" has occurred in 67 reported cases that are awaiting confirmation of contamination. Contamination is confirmed (validated) in 1,512 cases. The largest number of cases (4,241) are involved in ongoing investigations. Additionally, 343 cases are in corrective action planning. Action has been implemented in 549 cases, and 368 cases have an activity status of "monitor action." No further action is necessary for 1,064 cases that are designated as "action completed." No activity status was given for an additional 7 cases in which information was lacking concerning the 1999 activity status at the site.

Historically, the number of new groundwater contamination cases documented each year is greater than the number of cases in which action was completed during the same year. This trend has held since the committee began publishing the report in 1989. The number of new cases had annually decreased up to 1994, but increased in 1995, 1996, 1997, 1998 and 1999. These increases are chiefly attributed to increased release detection activity in the TNRCC's Petroleum Storage Tank (PST) program. However, significant increases in the number of cases has been noted for TNRCC's voluntary cleanup program, and an increase in the number of cases from the Railroad Commission of Texas. The number of cases where action has been completed has annually increased (with exception in 1994, and a slight decline in 1997).

For 1998, the number of cases where action has been completed more than doubled over 1997 levels, and for 1999 another increase, though not as dramatic, was reported. The increase is attributed to reimbursement deadlines in the Petroleum Storage Tank program that prompted a flurry of remediation activity in 1998. Action on these cases was considered complete when the desired remedy was achieved or when no further regulatory action was required. There were 1,306 new cases listed in the 1999 report, down slightly from the 1,365 new cases listed in 1998.

Table 6. Documented Groundwater Contamination Cases by Agency/Activity Status, 1999

Agency/Division/Program	Total Cases (1999) ¹	New Cases (1999) ²	Activity Status Code ³							
			0	1	2	3	4	5	6	None
Texas Natural Resource Conservation Commission										
Remediation Division - Corrective Action Section	532	36	18	26	207	125	132	99	14	5
Remediation Division - Petroleum Storage Tank Section	6504	925	0	1314	3751	115	293	169	862	0
Remediation Division - Superfund Cleanup Section	58	0	0	4	15	7	13	16	3	0
Remediation Division - Superfund Site Assessment and Management Section	25	0	1	8	1	0	2	0	6	0
Remediation Division - Voluntary Cleanup / Innocent Owner Program	129	98	0	103	4	17	2	1	2	0
Remediation Division - Voluntary Cleanup Program	511	174	41	11	208	51	61	38	101	0
Technical Analysis Division - Water Quality Planning and Assessment Section	38	0	0	26	12	0	0	0	0	0
Water Permits and Resource Management Division - Water Quality Assessment Section	9	0	0	0	3	0	4	6	0	0
Water Permits and Resource Management Division - Public Drinking Water Section	59	29	0	1	0	1	0	6	51	0
Waste Permits Division - MSW Permits Section	23	2	0	0	8	3	2	6	2	0
Enforcement Division	23	2	1	5	4	4	4	3	2	0
Field Operations Division	4	0	0	0	2	0	0	0	0	2
Subtotal	7915	1266	61	1498	4215	323	513	344	1043	7
Railroad Commission of Texas/Oil and Gas Division	127	40	0	10	18	19	35	24	21	0
Texas Alliance of Groundwater Districts	20	0	6	4	8	1	1	0	0	0
Total	8062	1306	67	1512	4241	343	549	368	1064	7

Notes: 1. Total number of groundwater contamination cases documented or under enforcement during calendar year 1999.
 2. Number of new cases documented or under enforcement during calendar year 1999.
 3. Activity Status Codes: (Each case may have more than one activity status code included in the table) 0—No Activity; 1—Contamination Confirmed; 2—Ongoing Investigation; 3—Corrective Action Planning; 4—Corrective Action Implementation; 5—Monitoring Action; 6—Action Completed; None—No Status Code Available

STATE MANAGEMENT PLAN FOR PESTICIDES IN GROUNDWATER

Proposed Federal Rule

On June 26, 1996, the EPA published a proposed rule in the Federal Register on pesticides and groundwater state management plan regulation. The EPA has determined that, due to their groundwater contamination potential, some pesticides commonly used nationwide may pose an unreasonable adverse effect on the environment, and should be banned unless effective local management measures are developed and implemented through state pesticide-specific management plans. Under the proposal, states will have two years to develop and submit management plans, and the EPA would then have six months to approve or reject the state's proposed management plans. Upon approval, the state would have to implement the proposed management plans.

Under its authority granted by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the EPA proposed a draft rule for the development and implementation of management plans as a condition for the legal sale and use of specifically identified pesticides. This proposed rule would restrict the use of these pesticides that have been identified as probable or possible human carcinogens and have been shown to leach to groundwater. Alachlor, atrazine, metolachlor, and simazine are the first four pesticides to be identified under this proposed rule. When the final rule issued and becomes effective, these pesticides will be prohibited for sale and use within a state that does not have an EPA-approved pesticide-specific state management plan (SMP). The rule if adopted would potentially affect a large segment of the state's agricultural economy relying upon these pesticides. The proposed federal rule is expected to be issued in a final form in late 2000 or early 2001.

Under the proposed rule, to preserve the continued use of the EPA-listed pesticides, a state will need to develop pesticide-specific SMPs that address the potential for groundwater contamination for each pesticide. The EPA is asking states to develop two different kinds of SMPs: a generic plan and pesticide-specific plans. Both types contain 12 components defined by the EPA, which are listed in Table 7. Even though the development of a generic SMP is voluntary, it serves an important function in laying out the basic framework for managing pesticide use in a state. A generic SMP can also serve as a basis for the development of the pesticide-specific SMPs. The pesticide-specific SMPs will contain specific actions necessary to prevent groundwater contamination by the identified pesticide.

Table 7. Twelve Components of State Management Plans

<i>Statement of Philosophy</i>
<i>Agency Roles and Responsibilities</i>
<i>Legal Authority</i>
<i>Resources</i>
<i>Geographic Planning</i>
<i>Monitoring</i>
<i>Preventative Measures</i>
<i>Response to Groundwater Contamination</i>
<i>Enforcement</i>
<i>Public Awareness and Participation</i>
<i>Information Dissemination</i>
<i>Records and Reporting</i>

Texas State Management Plan for the Prevention of Pesticide Contamination of Groundwater

Plan Development

The Texas Natural Resource Conservation Commission (TNRCC) is charged by state law to develop management plans for agricultural chemicals, with the advice of the TGPC, to address chemicals such as pesticides that may threaten groundwater quality. Specifically, these plans are developed for the protection and enhancement of water quality pursuant to federal statute, regulation, or policy, and include management plans for the prevention of water pollution by agricultural chemicals and agents. Section 26.407 of the Texas Water Code was enacted in 1989 and addresses the plans required by the EPA under its proposed rule.

At the request of TNRCC, the TGPC developed the Texas State Management Plan for Prevention of Pesticide Contamination of Groundwater (TGPC, 1996d). This plan, as a generic SMP for the state, will serve to guide the development of pesticide-specific SMPs as needed. The plan was developed as a joint effort of the agency members of the Agricultural Chemicals Subcommittee (ACS). The plan received input from agricultural producer, manufacturer and environmental interest groups. The TGPC effort considered

the guidance provided by the EPA's "Ground-Water Protection Strategy" and the "Final Guidance for Pesticides and Ground-Water State Management Plans". It is an update of the Texas State Management Plan for Agricultural Chemicals in Ground Water, published by the TGPC in 1991.

The goal of the Texas State Management Plan for Prevention of Pesticide Contamination of Groundwater is to protect the existing quality of groundwater and to prevent the degradation of state groundwater resources. This goal does not mean zero-contaminant discharge, but rather that the normal use of pesticides be conducted in a manner that will maintain present groundwater uses and not impair potential uses of groundwater or pose a public health hazard. All usable and potentially usable groundwater resources are subject to the same protection afforded by the state's nondegradation policy goal.

The SMP describes the general policies and regulatory approaches the state will use to protect groundwater resources from risk of contamination by pesticides. The document describes a generic coordinating mechanism among all responsible and participating agencies during the implementation of the SMP and provides for specific responses when it is deemed necessary to develop a pesticide-specific SMP. The SMP reflects the state's philosophy toward groundwater protection and recognizes the importance of agricultural resources to the state's economy. The seven major principles that govern the development of the SMP are listed in Table 8.

Table 8. Major Principles Governing State Management Plan Development

<i>Agricultural pesticides are beneficial and important to the production of food, fiber supply, and the economy of the state.</i>
<i>State and local governments should be the first line of groundwater protection, with this effort being complemented by federal expertise and information.</i>
<i>The use of pesticides, while important for protection of public safety and health, should not impair any use of groundwater or cause a public health hazard.</i>
<i>Drinking water supplies, including groundwater resources used to supply private wells, should be protected.</i>
<i>Groundwater quality monitoring by state agencies, local government, and other interested parties can be directed, as funds allow, to areas determined by the state to be vulnerable to nonpoint source contamination.</i>
<i>Pesticide use and Best Management Practices (BMPs) should be tailored to prevent contamination of groundwater from pesticides</i>
<i>Education and voluntary implementation of BMPs should be the primary emphasis of the plan.</i>

The TGPC submitted the draft *Texas State Management Plan for Prevention of Pesticide Contamination of Ground Water* (TGPC, 1996d) to Region 6 of the EPA for review in March, 1996. Agricultural

Chemicals Subcommittee representatives provided a formal response to the EPA's comments on the draft SMP in October, 1997 outlining the proposed changes to the SMP agreed to with EPA. A final draft of the generic *Texas State Management Plan for Prevention of Pesticide Contamination of Groundwater* (TGPC, May, 1998) was submitted to EPA in June, 1998 for their concurrence.

In 1999, however, EPA identified additional issues requiring further changes to the generic SMP. Changes were negotiated in 2000, and the TGPC approved a revised generic SMP. In addition to TGPC approval, the participating agencies with formal responsibilities in the SMP provided letters of commitment and confirmation for their roles in the SMP to the TNRCC. The Executive Director of the TNRCC formally transmitted the revised generic SMP to EPA in May, 2000. A letter acknowledging concurrence with the Texas generic SMP was received in June, 2000 from the Regional Administrator of EPA's Region 6 Office.

Groundwater Monitoring Plan for Atrazine

One of the twelve SMP components is groundwater monitoring for identified pesticides in vulnerable areas of the state. The Agricultural Chemicals Subcommittee (ACS) recognizes this component as an essential element in the Texas SMP to determine where pesticides impacts to groundwater occur. The ACS has pursued various groundwater monitoring projects in the past few years in order to develop and test different aspects of a pesticide monitoring plan. These projects have focused on atrazine, a major-use pesticide in Texas, with the potential to contaminate groundwater. A key issue identified early in the monitoring process was a lack of adequate resources, for both manpower for the sampling effort and the high cost of laboratory analysis for pesticides.

The ACS has used several innovative methods to address resource issues. Soil and aquifer vulnerability analyses are employed to identify susceptible areas where the specific pesticide of concern is being used. Pesticide vulnerability analysis utilizes the SPIM (Soil Pesticide Interaction Matrix) procedure developed by the TAEX and an aquifer vulnerability analysis developed by TNRCC. Monitoring efforts are then focused in these areas, thus saving resources that would have been needed for a state-wide effort. In order to lower the cost of laboratory analysis, the monitoring plan uses a new, low cost field analytical method (Immuno-Assay) as a screening tool. Only the samples with significant concentrations of atrazine are sent to the laboratory for confirming analysis. Coordination with other organizations during their data collection efforts provides a savings in manpower for sample collection and for analytical work.

The Brazos River Bottom area of east central Texas was selected as the first test monitoring location because the area is suspected to be vulnerable to groundwater contamination and because the area was known to have relatively shallow wells completed in the water table aquifer. Further vulnerability analyses identified areas in the western portion of the southern high plains area, the northwestern-most portion of the northern high plains area in the panhandle of northwest Texas, and in the lower Rio Grande Valley (Hidalgo County) as susceptible to pesticide contamination of groundwater. Sampling reconnaissance for shallow wells in Hidalgo County took place in August, 1998, but only five acceptable wells could be

located or accessed for sampling. Reconnaissance and monitoring efforts were conducted in Bailey County in the southern high plains area in November, 1998 and May, 1999. Monitoring efforts in 2000 were focused on areas in the panhandle as a result of pesticide detections in several wells reported by the TNRCC Public Drinking Water Monitoring Program. This latest monitoring effort was significantly enhanced through a cooperative sampling effort between the TWDB and the High Plains Underground Water Conservation District No.1, with TNRCC conducting the screening analyses for atrazine. Through August of 2000, approximately 430 wells were sampled and analyzed for atrazine. The analyses indicated 20 detects of atrazine, all at levels below the drinking water maximum contaminant level (MCL). The sampling of previous years includes 200 sampling events for 135 wells. Of these analyses, 5 samples from 3 different wells had concentrations greater than the drinking water MCL .

Response to Contamination

The state's response to a confirmed pesticide contamination of groundwater is outlined in the generic *Texas State Management Plan for Prevention of Pesticide Contamination of Groundwater* (TGPC, 2000). The determination of the appropriate response considers a number of key issues: whether the contamination is from a point or nonpoint source; the extent of the contamination; the level of contamination, either above or below the drinking water MCL or health advisory level (HAL); the travel time from the application of the pesticide at or near the soil surface until it reaches the water table; and, whether the source of contamination was the result of present usage of the pesticide or usage under previous labels, which allowed greater levels of use.

A careful assessment is necessary to answer these questions and determine what if any changes in usage (such as the application of best management practices) will diminish the contamination. The responses to be made under specific conditions are outlined in the generic SMP and will set out in more detail in an pesticide-specific SMP under a final EPA rule.

Three contamination response investigations have been conducted during the previous two years to address atrazine detections under the generic SMP in public water supply wells in the panhandle. Atrazine was first detected in several wells through the Public Drinking Water Monitoring Program. Atrazine concentrations were measurable but below the drinking water MCL in all but 3 wells. Affected public water supply systems took appropriate actions and delivered drinking water that was well within public health standards. The results of the investigations indicate that two of the cases are likely due to point sources of atrazine contamination, such as in one situation where an improperly closed abandoned water well may have served as an atrazine migration pathway. The remaining case is possibly nonpoint source in origin, where the source of atrazine may be agricultural fields or tailwater collection ponds. Recommendations have been developed by the ACS related to the suspected point source activities, and educational and other appropriate regulatory activities have been initiated. Additional work is planned to further assess the nonpoint sources suspected of contributing to the last case.

GROUNDWATER PROTECTION PROGRAM

Strategy Development, Implementation, and Update

As mandated by §26.404 of the Texas Water Code, the TGPC is responsible for developing and updating a comprehensive groundwater protection strategy for the state. The strategy must provide guidelines for the prevention of groundwater contamination, the conservation of groundwater resources, and the coordination of the groundwater protection activities of the agencies and organizations represented on the TGPC.

The *Texas Ground Water Protection Strategy* (GPC, 1988) was developed by the Groundwater Protection Committee, the TGPC's predecessor. The strategy is intended to be a flexible guide for state agencies and others in developing and implementing groundwater protection efforts. The development of the strategy was preceded and aided by *Texas Ground Water Protection Activities—1986* (GPC, 1986), which details the existing groundwater protection programs.

The strategy outlines goals, needs, and recommendations in six important areas: interagency coordination, hazardous and nonhazardous materials management, public water supply, rural water supply, research, and legislation. The strategy discusses the following elements for each of the six areas: status of existing programs, gaps or inadequacies in existing programs, areas of currently unaddressed groundwater issues, recommendations for changes or improvements in existing programs, and institution of new programs where needed. The final chapter of the strategy summarizes the important needs and goals for improvement of groundwater protection efforts.

In 1990, the TGPC updated the strategy to include contributions from the Texas Alliance of Groundwater Districts and the Texas State Soil and Water Conservation Board. Since 1990, the TGPC has made two additional efforts concerning the strategy. The TGPC developed the report *Texas Ground Water Protection Profiles* (GPC, 1991b) in 1991 at the request of the EPA. This report provided a profile of the state's groundwater protection program. The profile cataloged the current groundwater protection roles of each state agency and identified new efforts and improvements in the state's groundwater protection program. During 1992, the TGPC discussed and prepared comments and input on the EPA's efforts and guidance for the development of a state comprehensive groundwater protection program (CSGWPP). Member agencies attended an EPA round table discussion and provided subsequent input on the development of the EPA's CSGWPP guidance.

Development of a Comprehensive State Groundwater Protection Program

Final guidance for the development of a comprehensive state ground-water protection program (CSGWPP) was published by the EPA in December 1992. The EPA developed its concept of such a program and encouraged states to further their efforts in developing existing programs into a more comprehensive approach. CSGWPPs are intended to serve as a working guide for a partnership between EPA, the states, and local governments to achieve efficient protection of groundwater resources. The CSGWPP approach provides unique opportunities for the successful implementation of state-directed, resource-based groundwater protection programs. The EPA's guidance first calls for the development of a core protection program, a basic program from which states would work with the EPA over the next few years to build a fully integrated CSGWPP.

EPA's CSGWPP guidance, outlines six strategic activities. The six strategic activities foster more efficient and effective protection of groundwater through cooperative, consistent, and coordinated operation of all relevant federal, state, and local programs within the state. These six strategic activities are listed in Table 9.

Table 9. Six Comprehensive State Groundwater Protection Program Strategic Activities

<i>Establishing a Common Groundwater Protection Goal</i>
<i>Establishing Priorities to Direct Relevant Programs</i>
<i>Defining Authorities, Roles, and Resources</i>
<i>Implementing Programs to Accomplish the State's Goal</i>
<i>Coordinating Information Collection and Management</i>
<i>Improving Public Education and Participation</i>

Serving as the coordinator for the state's groundwater protection program, the TGPC prepared and submitted the *Texas Core Program Assessment* to the EPA in October 1993. The EPA provided comments on the *Texas Core Program Assessment* in February 1995, and noted that portions of the Texas assessment required more detail and clarification to adequately meet core criteria.

The TGPC is currently updating the core assessment through a major revision and reexamination of the federal criteria. The revised Texas core assessment will continue to be based on the state's groundwater protection goal and strategy. The new revision will address recent significant changes in groundwater-related programs such as the TNRCC's new Risk Reduction Rules for environmental cleanup and update the internal agency changes to incorporate legal, programmatic, and administrative changes to the state's groundwater protection program.

The revised draft core assessment was prepared by TNRCC staff during Fiscal Year 2000. The draft assessment was presented to the TGPC at its August, 2000 meeting. After TGPC and agencies' internal reviews, the final draft core assessment document is scheduled for TGPC discussion and consideration at its January, 2001 meeting. Upon completion, the revised Texas core assessment will be submitted to EPA for concurrence. The core program assessment will effectively update and replace the existing groundwater protection strategy.

The TGPC feels that the continued development of the core assessment is a worthy commitment for the state to pursue, and that the components of the Texas program should meet the EPA's criteria for a core CSGWPP. The core assessment provides the means for Texas to demonstrate, and for the EPA to endorse, the state's potential to be the primary decision-maker in groundwater protection efforts.

Benefits of a Comprehensive State Groundwater Protection Program

The Texas core assessment represents a continued commitment to work jointly with EPA to move toward a fully integrating CSGWPP. The attainment of a fully integrating CSGWPP means that groundwater protection efforts are coordinated and focused across all federal, state, and local programs. Coordination and focus are based on our state's understanding and decisions regarding the relative use, value, and vulnerability of the groundwater resources of Texas, including the relative threat of all actual or potential contamination sources. The adequacy criteria for a fully integrating CSGWPP provide flexibility in what the Texas program can encompass. The state would be able to tailor its CSGWPP to emphasize the decision-making responsibilities the state believes are most appropriate. The EPA has expressed a commitment to working with the state in a joint effort to gain additional decision-making responsibilities under various federal programs and achieve a fully-integrating CSGWPP.

Through extensive discussions with the states, the EPA has realized that inconsistencies and rigidities among federal groundwater-related programs result in inefficient expenditures of efforts and less cost-effective protection from a total resource-based perspective. The EPA has also realized that federal rigidity stems largely from ignorance or misconceptions regarding state groundwater protection capabilities as well as state needs, priorities, and approaches.

The EPA can provide flexibility to the state based on Texas meeting CSGWPP adequacy criteria. The EPA is using the CSGWPP approach as a catalyst to allow state flexibility while increasing consistency among individual protection programs meeting the adequacy criteria. At a minimum, the approach is intended to reduce the burden on the state in meeting numerous program criteria from several different programs. The EPA may also use the CSGWPP approach as a basis for suggesting appropriate changes to existing federal statutes and regulations to allow states greater flexibility to achieve comprehensive resource-based groundwater protection. Through the development of the CSGWPP, Texas will be able to better coordinate the use of its limited resources through increased program coordination.

TGPC PUBLICATIONS

Publications 1999-2000

Landowner's Guide to Plugging Abandoned Water Wells, 1999a: TNRCC Publication Number RG-347, April 1999.

Joint Groundwater Monitoring and Contamination Report—1998, 1999b: TNRCC Publication Number SFR-56/98, October 1999.

Texas Groundwater Protection Committee and the Texas Agricultural Extension Service, 2000a, *Well Plugging - Plugging Water Wells in Texas*; TAEX TEX-A-SYST Educational Video SP-71.

Joint Groundwater Monitoring and Contamination Report—1999, in print: TNRCC Publication, December 2000.

Texas State Management Plan for Prevention of Pesticide Contamination of Groundwater, in press: TNRCC Publication, December 2000.

Previous TGPC Publications

Joint Groundwater Monitoring and Contamination Report, 1990: TWC, Publication No. Z 94, April 1990.

Activities of the Texas Groundwater Protection Committee, Report to The 72nd Legislature, 1991a: TWC Report, January, 1991.

Joint Groundwater Monitoring and Contamination Report - 1990, 1991b: TWC, Publication No. Z 104, April 1991.

Texas State Management Plan for Agricultural Chemicals in Ground Water, 1991c: Agricultural Chemicals Subcommittee, June 1991.

Texas Ground Water Protection Profiles, 1991d: unpublished TWC Report, June 1991.

Joint Groundwater Monitoring and Contamination Report - 1991, 1992: TWC, Publication No. R 92-02, May 1992.

Activities of the Texas Groundwater Protection Committee, Report to the 73rd Legislature, 1993: TWC Report R93-01, January, 1993.

Joint Groundwater Monitoring and Contamination Report - 1992, 1993: TNRCC, Publication No. SFR-1, November 1993.

Joint Groundwater Monitoring and Contamination Report - 1993, 1994: TNRCC, Publication No. SFR-6, May 1994.

Texas Groundwater Protection Educational Brochure, 1994a: Texas Natural Resource Conservation Commission (TNRCC) Publication Number GI-88, November 1994.

Activities of the Texas Groundwater Protection Committee, Report to the 74th Legislature, 1994b: TNRCC Publication Number SFR-14, December 1994.

Joint Groundwater Monitoring and Contamination Report—1994, 1995a: TNRCC Publication Number SFR-20, April 1995.

Texas State Management Plan for the Prevention of Pesticide Contamination of Groundwater (Educational Brochure), 1995b: TNRCC Publication Number GI-141, June 1995.

Joint Groundwater Monitoring and Contamination Report—1995 1996a: TNRCC Publication Number SFR-36, April 1995.

Texas Ground-Water Data Dictionary, 1996b: TNRCC Publication Number AS-109, August, 1996.

Texas Groundwater Program Directory, 1996c: TNRCC Publication Number GI-226, October 1996.

Activities of the Texas Groundwater Protection Committee, Report to the 75th Legislature, 1996: TNRCC Publication Number SFR-47, December 1996.

Joint Groundwater Monitoring and Contamination Report—1996, 1997: TNRCC Publication Number SFR-56, June 1997.

Texas State Management Plan for the Prevention of Pesticide Contamination of Groundwater, 1998a: Draft TNRCC Publication, June 1998.

Joint Groundwater Monitoring and Contamination Report—1997, 1998b: TNRCC Publication Number SFR-56/98, June, 1998.

Activities of the Texas Groundwater Protection Committee, Report to the 76th Legislature, 1998c: TNRCC Publication Number SFR-047/98, November 1998.

Publications of the TGPC's Predecessor, the Ground Water Protection Committee

Texas Ground Water Protection Activities—1986, 1986: TWC Report Z-79, October 1986.

Texas Ground Water Protection Strategy, 1988: TWC Report Z-80, January 1988.

APPENDIX 1.

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APPENDIX 2.

TEXAS GROUNDWATER PROTECTION COMMITTEE RULES

Title 31. NATURAL RESOURCES AND CONSERVATION

Part XVIII. TEXAS GROUNDWATER PROTECTION COMMITTEE

Chapter 601. GROUNDWATER CONTAMINATION REPORT

Subchapter A. GENERAL PROVISIONS RELATING TO PUBLIC FILES AND JOINT REPORT

§601.1. Purposes of Rules.

The purpose of these sections is to implement duties and responsibilities assigned to the committee under the Texas Water Code, §26.406, concerning the maintenance by certain state agencies of public files containing documented cases of groundwater contamination and the publication by the committee, in conjunction with the commission, of annual groundwater monitoring and contamination reports and to establish general policies of the committee to guide such implementation.

§601.2. Applicability.

These rules specifically apply to each state agency or organization having membership on the committee. The committee is composed of the Texas Natural Resource Conservation Commission, the Texas Department of Health, the Texas Department of Agriculture, the Railroad Commission of Texas, the Texas Water Development Board, the Texas Alliance of Groundwater Districts, the Texas Agricultural Experiment Station, the Bureau of Economic Geology of the University of Texas at Austin, and the State Soil and Water Conservation Board.

§601.3. Definitions.

The following words and terms, when used in this chapter, shall have the following meanings unless the context clearly indicates otherwise.

- (1) Act -- House Bill 1458 (71st Session) codified as Texas Water Code §§26.401-26.407.
- (2) Commission -- Texas Natural Resource Conservation Commission.
- (3) Committee -- Texas Groundwater Protection Committee.

(4) **Documented groundwater contamination**--A case of groundwater contamination where an agency has an established procedure for making a determination based on the quality of groundwater and the information pertinent to making the determination is maintained by the agency under §601.4 (b) of this title (relating to Public Files).

(5) Enforcement action --Any action of the agencies, identified in §601.2 of this title (relating to Applicability), which accomplishes or requires the identification, documentation, monitoring, assessing, or remediation of groundwater contamination.

(6) Groundwater --Water below the land surface in a zone of saturation.

(7) Groundwater contamination --The detrimental alteration of the naturally occurring physical, thermal, chemical, or biological quality of groundwater. Furthermore, groundwater contamination, for purposes of inclusion of cases in the public files and the joint groundwater monitoring and contamination report, shall be limited to contamination reasonably suspected of having been caused by activities or by entities under the jurisdiction of the agencies identified in §601.4 (b) of this title (relating to Public Files), except in the case of an underground source of drinking water granted an aquifer exemption by the commission with concurrence from the United States Environmental Protection Agency in accordance with 40 Code of Federal Regulations, Parts 144, 145, and 146, and 30 TAC Chapter 331 (relating to Underground Injection Control); and affecting groundwater which contains a concentration of:

(A) less than or equal to 10,000 milligrams per liter (mg/liter) of dissolved solids; or

(B) greater than 10,000 mg/liter if it is:

(i) currently extracted for beneficial use such as domestic, industrial, or agricultural purposes; or

(ii) hydrologically connected with, and with the potential for contaminant movement to, a surface water body or another zone of groundwater which has a concentration of less than or equal to 10,000 mg/liter of dissolved solids.

§601.4. Public Files.

(a) Subject to the limitations provided by the Texas Water Code, §§26.401-26.407 (the Act), and the Open Records Act, Texas Civil Statutes, Article 6252-17a, information collected, assembled, or maintained by the committee and the agencies having responsibilities related to protection of groundwater under the Act is public record open to inspection and copying during regular business hours.

(b) Each agency having the responsibilities related to the protection of groundwater under the Act shall maintain a public file of all documented cases of groundwater contamination that are reasonably suspected of having been caused by activities regulated by the agency.

§601.5. Joint Groundwater Monitoring and Contamination Report.

In conjunction with the Texas Natural Resource Conservation Commission, the committee shall publish not later than April 1 of each year a joint groundwater monitoring and contamination report covering the activities and findings of the committee made during the previous calendar year. The report must:

(1) describe the current status of groundwater monitoring programs conducted by or required by each committee agency or organization at regulated facilities or in connection with regulated facilities;

(2) contain a description of each case of groundwater contamination documented during the previous calendar year and of each case of groundwater contamination documented during previous years for which enforcement action was incomplete at the time of issuance of the preceding report; and

(3) indicate the status of enforcement action for each case of groundwater contamination that is included in the report.

APPENDIX 3.

TEXAS GROUNDWATER PROTECTION COMMITTEE RULES REVIEW PLAN

The Texas Groundwater Protection Committee submits the following plan for review of its rules in accordance with House Bill 1, 75th Legislature, 1997, Article IX, §167 and Chapter 2001, Government Code, §2001.039.

The Committee has completed the review and readoption of all regulations promulgated by the Committee (Title 31, Natural Resources and Conservation, Part 18, Chapter 601, Groundwater Contamination Report). This process was completed in September 1998.

The Committee will again review Chapter 601 of Title 31, within four years of completion of the previous review of that chapter. However, the Committee may review Chapter 601 as part of its routine rulemaking before its scheduled review date if it is necessary to propose amendments to the chapter. The timeline for review of Chapter 601 is as follows:

Chapter 601: Groundwater Contamination Report--January 2002

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