

**Edwards Aquifer Authority
Water Quality Advisory Task Force**

Final Report of Recommendations

September 2004

**Prepared by:
The Water Quality Advisory Task Force Subcommittee**

**Approved by:
The Water Quality Advisory Task Force**

Final Report of Recommendations

The Water Quality Advisory Task Force Subcommittee (Subcommittee) discussed and developed Edwards Aquifer water quality protection issues and recommendations for consideration by the full Water Quality Advisory Task Force (WQATF). The full WQATF considered and adopted the Subcommittee's recommendations as their recommendations to the Edwards Aquifer Authority (Authority) board of directors as the Authority's role in water quality protection.

The recommendations presented in this report are the result of eight Subcommittee meetings held at the Authority. The Subcommittee developed the proposal using the following process:

1. Identifying core issues that would likely affect aquifer water quality.
2. Comparing the list of core issues to current regulations.
3. Establishing a "No Action" recommendation for core issues where current regulations appear to be adequate to protect aquifer water quality.
4. In areas where current regulations do not correspond with the subcommittee-identified core issues; the subcommittee discussed and developed recommended actions for the Authority.

In developing the aquifer water quality protection recommendations, the Subcommittee assumed that any that were implemented by the Authority will be coordinated with other entities (federal, state, county, and city/local) so that any regulatory overlap is minimized. Entities that currently have water quality protection regulations in the Edwards Aquifer region and with which the Authority would coordinate include:

- United States Environmental Protection Agency (USEPA)
- Texas Commission of Environmental Quality (TCEQ)
- City and County governments

Exhibit A presents a general summary of current major water quality programs.

During the recommendation development process, the Subcommittee prepared a table of water quality issues with a series of options for consideration as potential suggestions. Each Subcommittee member reviewed the table and selected a recommendation for each issue. Subcommittee members typically provided a range of responses from "Authority-no action" to "Authority should regulate...." After compiling Subcommittee members' responses and additional discussion, the Subcommittee reached a consensus on their recommendation for each of the identified issues. **Exhibit B** presents the Subcommittee's results of this process.

The core issues that the subcommittee determined to be adequately addressed by other agencies, or that the Authority could not regulate, were designated "no action" items. The "no action" items are listed below:

1. Prohibit non-native plants for landscaping in new developments on the Edwards Aquifer Recharge Zone and Contributing Zone.
2. Regulate the use of specific building materials (materials used for construction) on the recharge zone and contributing zone.
3. Regulate facilities that store hazardous materials by requiring that the materials be stored within an enclosure.
4. Regulate on-site sewage facilities annual operating permits to ensure proper maintenance for those facilities located on the recharge zone and contributing zone.
5. Prohibit the application of effluent irrigation on the contributing zone.

Within the recommendations presented in **Exhibit B**, two phrases are commonly used to recommend the Authority's future role. These two phrases are defined as follows:

- ***Authority to study the issue.*** The intent of this recommendation response is that the issue is deemed important, but needed further assessment to determine if the issue should be regulated by the Authority. This implies that the issue would be presented to the Authority Board of Directors to seek funds for further study. In addition, if the study concluded that the Authority should regulate then the Authority should proceed as such. However, it is also possible that the study would indicate that regulation would not be required, or could not be implemented, and therefore, no action would be required.
- ***Authority to regulate within the recharge zone and the contributing zone, but work with (or delegate to) local governments which request and have the ability to regulate.*** The intent of this recommendation response is that the issue should be regulated by the Authority over the entire recharge and contributing zone. However, the Subcommittee realizes that there are already local entities that currently have jurisdictional authority and programs in certain areas. Therefore, the proposed regulation would allow the Authority to delegate it to a local entity. This would be similar to the Texas Commission of Environmental Quality (TCEQ) Chapter 213 rules that contain provisions for delegation to local entities.

The subcommittee neither considered nor recommended any change to the Authority's jurisdictional boundaries. References in the recommendations to the recharge, transition, and contributing zones only refers to the portions of those zones located within the Authority's jurisdictional boundaries.

Exhibit A

Summary of major water quality protection
programs currently active in the
Edwards Aquifer Region

Federal- United States Environmental Protection Agency (USEPA).

1. Point Source restrictions: Point source pollutants are well regulated in many state and federal programs. Examples of federal programs include the *National Pollutant Discharge Elimination System (NPDES)*. The NPDES program falls under Section 402 of the Clean Water Act. Wastewater discharges regulated under the NPDES program include:
 - [Industrial wastewater](#)
 - [Storm water](#)
 - [Treated effluent from municipal sewage treatment plants](#) [also known as publicly owned treatment works (POTWs)]
2. National Primary Drinking Water Regulations (NPDWRs or primary standards): Provides legally enforceable standards that apply to public water systems. Primary standards protect public health by limiting the levels of contaminants in drinking water.
3. Drinking Water Act: Regulations that control contaminants in drinking water that primarily affects the aesthetic qualities relating to the public acceptance of drinking water. At considerably higher concentrations, these contaminants may have health implications as well as degrading aesthetics. The regulations are not federally enforceable but are intended as guidelines for the states.
4. Sole Source Aquifer designations: A tool to help protect drinking water supplies in areas with few or no alternative sources to the ground water resource, and where if contamination occurred, using an alternative source would be extremely expensive. The designation protects an area's groundwater resource by requiring that the USEPA review any proposed projects within the designated area that are receiving federal funds. All proposed projects receiving federal funds are subject to review to ensure that they do not endanger the water source.

State- Texas Commission of Environmental Quality (TCEQ).

The TCEQ's programs related to water quality over the Edwards Aquifer are implemented through two types of groundwater activities: groundwater protection and groundwater remediation. The agency administers programs to achieve the overall policy and goals that have been established either by state legislation or through federal delegation of programs to the state.

1. The TCEQ's Chapter 213 Program (Edwards Aquifer Protection). The program regulates activities in the Edwards Aquifer Recharge, Transition, and Contributing zones in the following counties: Medina, Bexar, Comal, Kinney, Uvalde, Hays, Travis, and Williamson counties. The purpose of the program is to regulate activities having the potential for polluting the Edwards Aquifer and hydrologically connected surface streams in order to protect existing and potential

uses of groundwater and maintain Texas Surface Water Quality Standards. The activities addressed are those that pose a threat to Edwards Aquifer water quality.

2. The TCEQ's Chapter 317 Program. The program regulates domestic sewage collection, treatment, or disposal systems. The purpose of the program is to establish design criteria pursuant to existing state statutes pertaining to effluent quality necessary to meet state water quality standards. These criteria are intended to promote the design of facilities in accordance with good public health and water quality engineering practices.
3. Through rules and general permits, the TCEQ regulates many activities in the state that have the potential to affect groundwater quality. In developing statewide or area-specific rules, the state promulgates standards that are protective of groundwater quality. The resulting regulatory programs address such areas as the installation, registration, and removal of petroleum storage tanks (PSTs), waste management and disposal, and compliance monitoring. Many of the regulated activities are prohibited on the recharge or transition zones, but are allowed over the confined zone of the aquifer.
4. TCEQ regulatory programs that ensure the remediation of groundwater contamination require certain actions to be taken by those responsible for the contamination or by those responsible for cleaning it up. The required actions include remediation at permitted and nonpermitted waste disposal facilities, at leaking petroleum storage tank sites, and at designated superfund sites; and spill response. Other programs bring enforcement action against those who violate operating or construction standards and investigate complaints.
5. The state's policy affirms that groundwater quality should be restored if feasible. In its remediation programs, the TCEQ has developed an approach that focuses on the protection of groundwater for high quality uses, including human health, and addresses the cost of available remediation technologies. The Texas Risk Reduction Program (TRRP) is a comprehensive program that addresses the investigation of contaminated sites, establishes reasonable standards for notice, provides flexibility in calculating site-specific cleanup levels, and sets forth appropriate response actions to address the environmental contamination.

County and City Governments

On-Site Sewage Facility (OSSF):

Uvalde, Medina, Bexar, Comal, and Hays counties are Authorized Agents pursuant to Title 30 Texas Administrative Code (TAC) Chapter 285 and administer OSSF rules that are at least as stringent as the state rules (30 TAC Chapter 285).

The cities of Hill Country Village, Hollywood Park, Shavano Park, New Braunfels, and San Marcos are Authorized Agents pursuant to Title 30 Texas Administrative Code (TAC) Chapter 285 and administer OSSF rules that are at least as stringent as the state rules (30 TAC Chapter 285).

County- Bexar

Federal Phase II Storm Water Program: This program is required by the Clean Water Act portion of the National Pollution Discharge Elimination System (NPDES). The program is designed to reduce “non-point” source pollution from storm water runoff and is a follow-up to Phase I, which regulated municipalities greater than 100,000 population. SB953 (78th Legislative Session) granted Bexar County the authority to implement this stormwater regulatory program.

City- San Marcos

Land Development Regulations: Article 6 - Edwards Aquifer Protection Regulations. The purpose of these regulations is to prevent degradation of groundwater quality, regulate activities that can pollute the aquifer, protect areas where recharge potential is highest, and prevent decreases in groundwater recharge. The program applies to land in the recharge zone and transition zone within the city limits and ETJ.

City of New Braunfels

City of New Braunfels Ordinance Numbers 95-11 and 01-09 (Underground Storage Tank Regulation): Chapter 58 Article III prohibits the installation of any new underground storage tank system without tertiary protection in the city and its extraterritorial jurisdiction. This ordinance covers the Edwards Aquifer Recharge and Transition Zones within the City of New Braunfels.

City of New Braunfels Ordinance 2002-29 regulates private sewage disposal. Chapter 130, Article V, Division 3 specifies permitting, siting, design, and inspection of On-Site Sewage Facilities within the New Braunfels Utilities jurisdiction. There is specific language regulating the minimum lot size (one acre minimum size) for an OSSF on the Edwards Aquifer Recharge Zone.

City- San Antonio

City of San Antonio Ordinance 81491 (Water Quality Ordinance): Chapter 34, Article VI Pollution Prevention and Control, Division 6 Aquifer Recharge Zone and Watershed Protection defines the major components of the City’s Edwards Aquifer protection program. San Antonio Water System (SAWS) currently administers most elements of the program. Components of the program address: Water Pollution Abatement Plan (WPAP) review and approval, floodplain preservation areas, floodplain buffer zones, recharge feature protection and buffer zones, pollution prevention criteria, multi-category developments (grandfather clause), stormwater detention and treatment, and stormwater best management practices (BMPs).

Underground Storage Tank Program: This city program is administered by SAWS and includes a policy statement that indicates the installation of underground storage tanks and related systems (UST) within the Edwards Recharge Zone District (ERZD) is inappropriate. The policy statement further states that the use of USTs within the Edwards Transition Zone shall be allowed only conditionally. Because there are UST sites that were installed before city council banned USTs in the ERZD, a monitoring

and enforcement program was put in place to ensure the maintenance of each existing UST system and also to comply with rules and regulations that were designed to protect the public health, safety, and welfare. Program-related regulations provide a monitoring and enforcement program governing USTs within the ERZD and the Edwards Transition Zone.

City of San Antonio Zoning Permitted Uses Table (Inside City Limits): Chapter 35 of the City's Unified Development Code (UDC) prohibits certain new activities such as dry cleaning plants, auto repair, auto paint and body shops, and hazardous materials hauling or storage on the recharge zone.

Right to inspect property: SAWS, as an agency of the City of San Antonio, has the same power as the TCEQ to enter private property within the territorial jurisdiction of the city to make inspections and investigations of conditions related to water quality and the prevention of pollution (Texas Water Code §§26.014; 26.173).

Enforcement powers: SAWS may institute civil suits in the same manner as the TCEQ for violations of the state Edwards Aquifer regulations (Texas Water Code §7.351).

Exhibit B

Recommendations for Edwards Aquifer Water Quality Protection Issues

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research and Development

Initiate funding mechanisms for programs such as well abandonment.

Define Issue and Background:

Currently the Edwards Aquifer Authority (Authority) has rules regarding well abandonment. These rules have been instituted to protect the Edwards Aquifer water quality. To fully comply with the Authority rules for well abandonment, additional costs may be required relative to the cost of previous well abandonment practices. It is possible that some wells are not being properly abandoned due to the additional cost required. These costs may be problematic for individuals with low income.

A funding mechanism should be created for low-income individuals to properly abandon Edwards Aquifer water wells that are no longer in use.

Current Regulatory Status:

Edwards Aquifer Authority Rules, Chapter 713 (Water Quality), Subchapter D (Abandoned Wells; Well Closures), contains regulations on well abandonment.

Reference:§ 713.303 (c).

There is currently no regulatory program in place to provide funds for proper well abandonment.

Subcommittee Recommendation:

The Authority and other agencies should assist in developing a well abandonment fund.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research and Development

Initiate funding mechanisms for programs such as well repair.

Define Issue and Background:

Currently the Authority has rules regarding well construction and maintenance. These specifications have been developed to protect Edwards Aquifer water quality. To fully comply with the Authority rules for well construction, additional costs may be required relative to the cost of previous well construction practices. It is possible that some wells are not being maintained or repaired due to the cost required. The additional costs may be problematic for individuals with low income.

A funding mechanism should be created for low-income individuals to properly maintain or repair Edwards Aquifer water wells.

Current Regulatory Status:

Edwards Aquifer Authority Rules, Chapter 713 (Water Quality), Subchapter C (Well Construction, Operation, and Maintenance), contains the regulations regarding well maintenance and repair.

Reference: § 713.201 Responsibility

In addition to complying with the requirements of 16 TEX. ADMIN. CODE Chapter 76, all well drillers, landowners and persons having an Edwards Aquifer well, drilled, deepened, or otherwise altered, shall adhere to the provisions of this chapter prescribing the location of wells and proper drilling, completion, operation, maintenance, capping, and plugging.

There is currently no regulatory program in place to provide funds for proper well maintenance and repair.

Subcommittee Recommendation:

The Authority and other agencies should assist in developing a well maintenance and repair program.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research and Development

Land acquisition in the Edwards Aquifer Recharge Zone and Contributing Zone.

Define Issue and Background:

According to the U.S. Environmental Protection Agency, the leading cause of source water degradation is nonpoint source pollution. Although agriculture is currently the greatest nonpoint source threat to drinking water quality nationwide, urban runoff is one of the fastest growing threats to Edwards Aquifer water quality. Land development can exacerbate existing urban pollution as it removes natural buffers that once trapped and filtered pollutants before they reached waterways crossing the Edwards Aquifer Recharge Zone. In order to address nonpoint source pollution, effective watershed management needs to be performed. Land acquisition in the recharge zone and contributing zone is an important step to protecting Edwards Aquifer.

Conservation easements can provide a similar level of protection for the recharge zone as does a fee for simple purchase. In general, a conservation easement is a covenant or restriction placed on a property and limits development, management or use of the land in perpetuity. Property owners may sell conservation easements on their property to protect their land from inappropriate development, while retaining private ownership.

Current Regulatory Status:

There is no regulatory program that requires land acquisition

Subcommittee Recommendation:

The Authority should assist and work with other agencies in developing programs such as land acquisition.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Education

Promote educational awareness of the issues that affect the water quality of the aquifer.

Define Issue and Background:

The objectives of educational awareness are to increase the awareness of issues that affect the water quality of the Edwards Aquifer, to communicate critical issues clearly and concisely through interviews and articles, and to increase pro-active efforts to build partnerships with the news media and schools throughout the region. These objectives are achieved by forming relationships with the news media in the region that routinely cover Authority activities, by providing a presence in the community that is outside of the regulatory nature of the Authority, and by being active in the region through workshops, community events and the Authority's Speakers Bureau. Authority staff is also ready to assist the public with requests for educational information on programs and projects and strives to provide excellent customer service. Authority staff will develop appropriate education materials regarding the Authority's Recharge Zone Protection Program. These materials may include pamphlets, guidance documents, and workshops to inform targeted groups about the Authority's rules and compliance with the rules. Target groups will include developers, engineering firms, real estate professionals, contractors, on-site sewage facility designers, and registered sanitarians.

Current Regulatory Status:

There is no regulatory program that facilitates educational awareness.

Subcommittee Recommendation:

- The subcommittee understands that the Authority currently has an educational program; however, the subcommittee believes this effort should be continued, and expanded.
- This educational awareness effort should include home owners as part of the targeted audience. A large number of home owners, living over the Edwards Aquifer Recharge Zone, may unknowingly be impacting the aquifer by use of lawn care products and other hazardous products and activities, such as automotive maintenance, etc..
- This educational awareness effort should include home builders as part of the targeted audience.
- This educational awareness effort should include the installation of highway signs that enhance citizen awareness of the location of the recharge zone.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research

Develop a methodology to determine areas that have a significant potential for contamination to enter the aquifer.

Define Issue and Background:

In order to make sound decisions about protecting the water quality of the Edwards Aquifer, there is a need for good science to be used to arrive at those decisions. The locations of significant recharge features and areas that readily recharge the aquifer need to be determined. In addition, there are locations in the Edwards Aquifer Transition Zone where surface water can recharge and impact the aquifer. These areas, on the transition zone, also need to be determined.

Current Regulatory Status:

There is no regulatory program that requires research support.

Subcommittee Recommendation:

The subcommittee understands that the Authority is currently involved with several research endeavors, and the subcommittee believes this effort should be continued and expanded. Funding participation from other agencies should be acquired as required.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research and Development

Support research that would investigate: long term impacts of development on the Edwards Aquifer Recharge Zone, Contributing Zone and Transition Zone, establish pollutant loading limitations with strategies to achieve the limitations, and modeling to develop actual impervious cover goals.

Define Issue and Background:

In order to make sound decisions in regards to protecting the water quality of the Edwards Aquifer, there is a need for good science to be used to arrive at those decisions. The interaction between surface water and groundwater of the aquifer is a very complex relationship and the processes involved need to be better understood.

Current Regulatory Status:

There is no regulatory program that requires research support.

Subcommittee Recommendation:

The subcommittee understands that the Authority is currently involved with several research endeavors; however the subcommittee believes this effort should be continued and expanded. Funding from other agencies should be acquired as appropriate.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research

Establish a database of existing rules and regulations that impact the groundwater of the Edwards Aquifer region.

Define Issue and Background:

Currently there are many rules and regulations that are administrated by many local governmental agencies (city, county and state) that affect the Edwards Aquifer region. Many of these rules are different and require different reporting formats. There are areas in which some rules apply and there are other areas where the rules do not apply. A single database that would contain all regulations and their corresponding protection areas would ensure that effective decision making could occur.

Current Regulatory Status:

There is no regulatory program that requires all regulations to be compiled.

Subcommittee Recommendation:

- Establish a database of existing rules and regulations that affect the groundwater of the Edwards Aquifer region.
- Determine areas that are currently protected and areas that are not currently protected.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research

Continue to monitor water quality in the impacted areas of the Edwards Aquifer.

Define Issue and Background:

The water quality of the Edwards Aquifer is generally very good. However, there are areas of the aquifer that have been impacted, mostly near the transition zone. These impacts to the groundwater are a result of “man-made” contaminants entering the aquifer. For example, wastewater from septic tanks in the recharge zone can carry diseases into the aquifer through the limestone’s fissures and cracks. Underground hydrocarbon and hazardous materials storage tanks have also been recognized as a significant threat to the aquifer. Additional groundwater sampling is required to assist with the determination of the source of the contaminants.

Current Regulatory Status:

The Texas Commission on Environmental Quality (TCEQ) has numerous regulatory programs to address contamination of waters of the state. In addition, there are federal drinking water standards that define the permissible amount of contaminants in drinking water.

Subcommittee Recommendation:

Authority should assist in the development of programs and work with other agencies to fund programs such as studying areas of water quality impacts.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research and Development

Develop methodologies for improved design of stormwater detention basin filtering systems and increase stormwater volume capacity.

Define Issue and Background:

Filtration systems are Best Management Practices (BMPs) for stormwater management. The filter systems treat polluted stormwater runoff by filtering the runoff through sand or other media. Filtration systems can be used to treat stormwater runoff from new developments and from existing developments. Filtration systems provide water quality benefits by removing stormwater runoff pollutants such as sediments, nutrients (nitrogen and phosphorus), organic material, and heavy metals. Filters, however, do not control the volume or peak flow rate of stormwater runoff. Their main benefit is removing pollutants from stormwater and protecting downstream water quality.

Extended detention basins have outlets designed to detain the stormwater runoff from a storm for some minimum period of time (e.g., 48 hours). During this time particles and associated pollutants are allowed to settle to the bottom. The basins can also be used to provide flood control by sizing them to accommodate additional flood water runoff.

Current Regulatory Status:

30 TAC Chapter 213

Subcommittee Recommendation:

Authority to develop methodologies for improved stormwater detention basin design.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Research and Development

Develop methodologies to determine sustainable development.

Define Issue and Background:

Expanding human requirements and economic activities are placing ever increasing pressures on land resources, creating competition and conflicts and resulting in suboptimal use of both land and land resources. Examining all uses of land in an integrated manner, makes it possible to minimize conflicts, to make the most efficient trade-offs, and to link social and economic development with environmental protection and enhancement, thus helping to achieve the objectives of sustainable development. In other words, development is essential to satisfy human needs and improve the quality of human life. At the same time, development must be based on the efficient and environmentally responsible use of all of society's scarce resources - natural, human, and economic.

Current Regulatory Status:

None.

Subcommittee Recommendation:

Authority to study the issue and develop methodologies to determine sustainable development.

In order to fulfill this requirement, it will be essential to enhance scientific understanding, improve long-term scientific assessments, strengthen scientific capacities in many research areas and ensure that the sciences are responsive to emerging needs.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate permit procedures for quarries in regards to storage and use of nitrogen containing compounds on the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing Zone.

Define Issue and Background:

One of the existing impacts to the Edwards Aquifer is elevated nitrate levels. Typical nitrate concentrations found in surface water upstream of the recharge zone is generally less than 1 mg/L. Nitrate concentrations in groundwater in the area of the recharge zone is generally 1 mg/L, nitrate concentrations in groundwater below (down dip) the recharge zone is generally 2 mg/L. Therefore, as water is tracked from above to below the recharge zone, the nitrate concentrations increase.

Nitrates are common components of explosives used in the quarry industry. In addition, the quarries tend to be located on the recharge zone. Therefore, storage of nitrogen compounds on the recharge zone is a concern. The storage of nitrate on the recharge zone should be designed to reduce the possibility of nitrates entering the aquifer.

Current Regulatory Status:

Code of Federal Regulations, Title 29, Volume 5, Chapter XVII, Part 1910, contains storage requirements for explosives and blasting agents.

30 Texas Administrative Code, Chapter 290 Subchapter F has established a maximum concentration of total nitrates in drinking water at 10 mg/L.

Subcommittee Recommendation:

Authority to study the issue.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Develop an investigation response program for investigation of water quality problems on the Edwards Aquifer Recharge Zone and Contributing Zone.

Define Issue and Background:

Once a potential for contamination to the Edwards Aquifer water quality has been reported, it is vital that the situation be investigated to determine if a real environmental concern is warranted. Currently, the Texas Commission on Environmental Quality (TCEQ) is responsible for the investigation of water quality concerns in the Edwards aquifer region, however, the TCEQ simply does not have the time or staff to oversee all investigations related to the aquifer region water quality.

Currently, the Authority has no formal response program in place for responding to water quality impacts. However, the Authority works jointly with TCEQ and SAWS in response to significant water quality impacts that come to the attention of the Authority. In addition, the Authority has a small budget set aside to pay for laboratory analysis of water samples to assist in the determination of water quality impacts.

Current Regulatory Status:

30 TAC Chapter 350

(Texas Risk Reduction Program), not recharge zone related but for entire state.

Similar federal programs also exist.

Subcommittee Recommendation:

Authority staff to provide technical and regulatory assistance in the management of groundwater impacts to the Edwards Aquifer and other contamination that may result from spills within the Edwards Aquifer Region.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Develop regulations that transfer the ownership of water quality basins located on the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing zone to the public sector.

Define Issue and Background:

Water quality basins are currently owned by the property owner. These owners include: private owners, management/investment companies, and homeowner associations. Often, these owners do not understand how to maintain a water quality basin and, as a result, the basins receive no maintenance or inadequate maintenance. The basin then performs poorly and no longer treats stormwater as designed.

If ownership of the water quality basins were to be transferred to a public entity, the basins would be better maintained.

Current Regulatory Status:

30 Texas Administrative Code, Chapter 213 requirements for Best Management Practice (BMP) structures design, construction, maintenance, inspection, and licensing.

Subcommittee Recommendation:

Authority to consider studying the issue.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Education

Educate local, state, and federal emergency response teams about the Edwards Aquifer Recharge Zone and issues related to spills and fire protection.

Define Issue and Background:

Currently there are no fire protection codes, rules or regulations for firefighting procedures over the recharge zone. Typical firefighting procedures may be detrimental to aquifer water quality when applied over the recharge zone. Large commercial properties have water quality basins for storm water runoff containment. These basins typically contain approximately 20,000 to 50,000 gallons of storm water. Water that has been applied to a fire typically becomes highly impacted with various contaminants. Typical firefighting equipment at large structural fires can produce 200 to 1000 gallons per minute of water added to the fire. If all water added to the fire were to be contained within the water quality basin, the fire would have to be extinguished within one hour or the water quality basin would overflow. The untreated water used to fight the fire, along with any contaminants, would then flow directly onto the recharge zone and potentially impact aquifer water quality.

Current Regulatory Status:

None

Subcommittee Recommendation:

Authority to consider studying the issue.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate minimum qualifications for geologists performing geologic site assessments on the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing Zone.

Define Issue and Background:

30 TAC Chapter 213 (213 rules) requires that an applicant seeking approval for a regulated development submit a geologic assessment report that describes the site-specific geology. The report must identify all potential pathways for contaminant movement to the Edwards Aquifer. The geologic assessment report must be signed, sealed, and dated by the geologist preparing the report. The 213 rules define a geologist as, “A Texas licensed professional geoscientist who has training and experience in groundwater hydrology and related fields that enable the individual to make sound professional judgments regarding the identification of sensitive features located in the recharge zone or transition zone.” The 213 rules do not contain minimum qualifications for geologists, beyond what is required for the Texas professional geoscientist license. Continuing education programs including karst training should be required so that geoscientists preparing geologic assessments are qualified to identify significant karst features.

Current Regulatory Status:

The 30 TAC Chapter 213 defines a geologist as a “Texas licensed professional geoscientist” and the Texas Board of Professional Geoscientists, Administrative Rules of the Texas Board of Professional Geoscientists, 22 Texas Administrative Code, Part 39, Chapters 850 and 851 defines a professional geologist.

Subcommittee Recommendation:

Authority to study the issue (for example: continuing education program for geologists and specific karst training).

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate hazardous materials storage on the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing Zone.

Define Issue and Background:

Certain activities will be prohibited on the recharge zone due to the high potential for contamination to the aquifer. These activities include, but are not limited to, dry cleaning facilities, photo processing facilities, automotive repair and service shops, automotive body repair shops, metal plating, hazardous materials and hazardous waste storage and disposal, and any other facility the Authority deems to have a high potential for contamination to the aquifer. Further, all facilities storing chemicals, paint, paint thinner, herbicides, pesticides, fertilizers, and other hazardous material will be prohibited from storing those substances outside of an enclosure. Each commercial facility storing such materials will file the appropriate documentation for each substance with their Local Emergency Planning Commission (LEPC) and the local fire department. Fire protection plans that consider the sensitivity of the recharge zone will be required for facilities storing hazardous materials.

Current Regulatory Status:

Authority has rules (713.600) for above and below ground storage tanks on the recharge zone and 30 TAC Chapter 334 are the underground storage tank rules (entire state).

Other state and federal rules apply, but not directly related to the recharge zone and contributing zone.

Subcommittee Recommendation:

Authority to regulate within the recharge zone and the contributing zone, but work with (or delegate to) local governments who request and have the ability to regulate.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate proposed golf courses. Golf courses should be required to prepare, submit, and implement a natural resource management plan that includes a water quality protection plan.

Define Issue and Background:

Proposed golf courses will be required to prepare, submit and implement a natural resource management plan that includes a water quality protection plan. The proposed natural resource plan will detail the schedule and manner in which pesticides and herbicides will be applied, what chemical(s) are proposed for use, and how the golf course will protect potential recharge water before it percolates into the subsurface. Additionally, the owner/operator/manager of the proposed golf course must submit a monitoring plan that details the compliance monitoring program and corrective action plan. Authority staff will be provided results of monitor sampling events on at least a semi-annual basis, but more frequently if Authority staff deems necessary.

Current Regulatory Status:

30 TAC Chapter 213

Subcommittee Recommendation:

Authority to regulate within the recharge zone and the contributing zone, but work with (or delegate to) local governments who request and have the ability to regulate.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate proposed land developments on the Edwards Aquifer Recharge Zone by requiring application forms and supporting documentation.

Define Issue and Background:

An application form and supporting documentation will be required of owners of land for all proposed land developments and activities on the Edwards Aquifer Recharge Zone within the Authority's boundaries. Submittal of the application to the Authority will be on a prescribed form. The submittal will be accompanied by supporting documentation as specified by the Authority regarding the development and proposed activities. Supporting documentation will include, but is not limited to, proof of ownership, detailed site map of the proposed development, geological site assessment (GSA), location of significant features, recharge feature preservation plan, all stormwater Best Management Practices (BMP) locations and designs, and calculations of impervious cover. Other than the GSA, a professional engineer shall seal the required items.

Current Regulatory Status:

30 TAC Chapter 213

Subcommittee Recommendation:

Authority to request delegation from the Texas Commission of Environmental Quality (TCEQ) Chapter 213 rules program within the recharge zone and the Contributing zone.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate application of pesticides, herbicides, and fertilizers on the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing Zone.

Define Issue and Background:

On household lawns and gardens, homeowners can try natural alternatives to chemical fertilizers and pesticides and apply no more than the manufacturer's recommended dosage. Natural predators, composting, and the use of native plants can reduce or entirely negate the need for chemicals. Xeriscape can also help limit chemical applications to lawns and gardens. If chemicals are needed around the home, they should be stored properly to prevent spillage and access by children.

Current Regulatory Status:

None.

Subcommittee Recommendation:

Authority to study the issue.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate (expand) point source restrictions on the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing Zone.

Define Issue and Background:

Point Source discharges of pollution originate from municipal, commercial, and industrial facilities, bypasses and overflow from municipal sewage systems, unpermitted and illegal dischargers, and water production from oil and gas operations.

The term point source is also defined very broadly in the Clean Water Act through 25 years of litigation. It means any discernible, confined and discrete conveyance, such as a pipe, ditch, channel, tunnel, conduit, discrete fissure, or container. By law, the term "point source" also includes concentrated animal feeding operations, which are places such as "feed lots" where animals are confined and fed. By law, agricultural stormwater discharges and return flows from irrigated agriculture are not "point sources."

Water pollution degrades surface waters making them unsafe for drinking, fishing, swimming, and other activities. As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In addition, a discharge to a sinkhole is considered a point source.

Current Regulatory Status:

Point Source restrictions are well regulated in many state and federal programs. *National Pollutant Discharge Elimination System (NPDES)* is one such federal program. The NPDES program falls under Section 402 of the Clean Water Act. Wastewater discharges regulated under the NPDES program include:

- [Industrial wastewater](#)
- [Storm water](#)
- [Treated effluent from municipal sewage treatment plants](#) [also known as publicly owned treatment works (POTWs)]

Federal laws provide EPA and Texas Commission on Environmental Quality (TCEQ) / Watershed Management Division with various methods of taking enforcement actions against violators of permit requirements. For example, EPA and TCEQ agencies may issue administrative orders which require facilities to correct violations and assess monetary penalties. The laws also allow EPA and TCEQ to pursue civil and criminal

actions that may include mandatory injunctions or penalties, as well as jail sentences for persons found willfully violating requirements and endangering the health and welfare of the public or environment. Equally important is how the general public can enforce permit conditions. The facility monitoring reports are public documents, and the general public can review them. If any member of the general public finds that a facility is violating its NPDES permit, that member can independently start a legal action, unless EPA or the TCEQ has taken an enforcement action.

The state of Texas has an Underground Injection Control (UIC) program (30 TAC Chapter 331) and the purpose of the program is to implement the provisions of the Injection Well Act, Texas Water Code, Chapter 27, as it applies to the commission. The implementation shall be consistent with the policy of this state to: maintain the quality of fresh water in the state to the extent consistent with the public health and welfare and the operation of existing industries, taking into consideration the economic development of the state; prevent underground injection that may pollute fresh water; and require the use of all reasonable methods to implement this policy.

Subcommittee Recommendation:

Authority to study the issue.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate on-site sewage facilities (septic systems) on the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing Zone.

Define Issue and Background:

Research in recent years has revealed the presence of nutrients, pathogenic constituents and human and animal pharmaceuticals and personal care products (PPCPs) (and their bi-products) in surface water and groundwater (Kolpin and others, 2002). The Authority does not currently test for the presence of PPCPs in the Aquifer. The source of these chemicals can be effluent from wastewater treatment plants (Publicly Owned Treatment Works or POTWs) and the smaller on-site sewage facilities (OSSFs). Research has indicated that many of the nutrients and chemicals and some pathogens are not completely removed by standard wastewater treatment processes. For this reason, they persist in effluent from these systems. Treated sewage effluent can enter the environment through discharges to streams and from direct application onto or into the ground, thereby migrating to groundwater.

The control of nutrient and pathogen loadings to surface and groundwaters can begin with the proper design, installation, inspection, and operation of POTWs and OSSFs. (These systems are designed for the treatment of biologic waste and are generally not designed to treat chemical or industrial effluent.) POTWs are regulated by the TCEQ and require a discharge permit along with monitoring and performance standards. OSSFs are generally used for residential and small businesses and are also regulated by the State which usually has a Designated Representative (DR) in each city and/or county. OSSFs are generally grouped into conventional systems (septic tanks and lateral lines) or alternative designs (most commonly lower pressure dosing and aerobic systems). The intent of OSSF systems is to provide a level of treatment of septic waste and to remove the effluent in a manner that prevents or minimizes the possibility of human contact. Generally, these systems are designed to prevent the occurrence of untreated septic waste on the ground surface; however, it is difficult to assess the impact of OSSF system effluent on groundwater quality.

All OSSF systems have location and design requirements. Alternative designs may also have a maintenance requirement. Standard systems have maintenance recommendations. Malfunctioning or overflowing OSSFs can release large amounts of bacteria and nutrients into the environment, contaminating nearby surface waters and groundwater.

Current Regulatory Status:

30 TAC Chapter 285

Bexar County, County Rules

City of San Antonio, Chapter 34, Article V

City of Hill Country Village, City Ordinances uses state rules

City of Hollywood Park, City Ordinances uses state rules,

City of Shavano Park, City Ordinances uses state rules,

Comal County, County Rules, Section 9 and 10

City of New Braunfels, City Ordinances uses state rules, Chapter 130, Article V

Hays County, County Rules, Section 8

City of San Marcos, Chapter 86, Article 3

Medina County, County Rules

Uvalde County, County Rules uses state rules.

Subcommittee Recommendation:

Authority to study the issue of regulating while continuing to monitor the impact on water quality of on-site sewage facilities on the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing Zone.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Prohibit the application of effluent irrigation on the Edwards Aquifer Recharge Zone.

Define Issue and Background:

Research in recent years has revealed the presence of nutrients, pathogenic constituents, and human and animal pharmaceuticals and personal care products (PPCPs). (The Authority does not currently test for the presence of PPCPs in the Aquifer.) The source of these chemicals can be effluent from wastewater treatment plants and the smaller on-site sewage facilities (OSSFs). Research has indicated that these chemicals are not removed by common wastewater treatment processes. For this reason, they persist in effluent from these systems. Treated sewage effluent can enter the environment through discharges to streams and groundwater.

Karst terrains are noted for rapid and direct infiltration of surface water to groundwater because of thin soils and the presence of enlarged fractures and caves and, therefore, provide little protection of groundwater quality. The US EPA has reported that karst aquifers are the most vulnerable of all aquifer types (May 10, 2000. Federal Register). Because of the potential for rapid infiltration of effluent used in large scale irrigation systems, prohibition of the application of effluent would be protective of the groundwater in the aquifer.

Current Regulatory Status:

30 TAC Chapter 285

30 TAC Chapter 213

Subcommittee Recommendation:

- Authority to prohibit the application of effluent irrigation on the Edwards Aquifer Recharge Zone.

- Authority to study the issue of prohibiting the application of effluent irrigation on the contributing zone.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate wastewater pipeline and lift station construction and maintenance standards on the Edwards Aquifer Recharge Zone and Contributing Zone.

Define Issue and Background:

Both wastewater pipelines and lift stations route raw sewage through a wastewater plumbing system to wastewater treatment facilities. However, if the plumbing systems are not carefully designed and inspected, the systems are subject to failure. A failure of the pipeline can cause large volumes of concentrated sewage waters to enter directly into the aquifer. Lift stations can become overwhelmed with storm water runoff or have a pump or electrical failure, resulting in overflow, again causing a release of sewage waste. Lift stations need to be designed to handle the storm water volumes in case of power loss. Regulation of the pipeline and lift station construction to consider the vulnerability of the aquifer would assist in ensuring proper wastewater systems are being built over the recharge and contributing zones.

Current Regulatory Status:

30 TAC Chapter 317 *Design Criteria for Sewerage Systems*,

30 TAC Chapter 213

City of New Braunfels, Chapter 130, Article V

City of San Marcus, Chapter 86, Article 3

Subcommittee Recommendation:

Authority to study the issue of regulation of wastewater pipeline and lift stations construction and maintenance standards on the Edwards Aquifer Recharge Zone and Contributing Zone.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate the management of stormwater pollution (storm water retention basins) by Best Management Practices (BMPs) on the Edwards Aquifer Recharge Zone and Contributing Zone. The management should include monitoring performance standards for water quality basins to decrease pollutant loading on the Edwards Aquifer Recharge Zone and Contributing Zone.

Define Issue and Background:

Stormwater pollution, especially in developed urban areas is one of the leading causes of water quality degradation in U.S. rivers, lakes, streams, and other surface waters. The significance of storm water runoff in affecting water quality in the United States has become an increasing concern in recent years, as further improvements are made in controlling other point sources such as municipal sewage and industrial waste. EPA conducted a broad analysis of storm water runoff characteristics in its *Nationwide Urban Runoff Program* between 1979 and 1983. The study indicated several trends:

- alterations in hydraulic characteristics of streams receiving runoff such as higher peak flow rates, increased occurrences of downstream flooding, and reduced baseflow levels;
- changes in receiving stream morphology such as increased rates of sediment transport and deposition, increased shoreline erosion, stream channel widening, and increased stream bed scouring;
- aquatic habitat impacts leading to changes in fish and macroinvertebrate populations and loss of sensitive species; and
- public health and recreation impacts such as increased risk of illness due to contact with contaminated water bodies, and contamination of drinking water supplies.

To abate stormwater impacts to the aquifer, the following activities should occur:

- Storm water retention basins on the recharge zone should be inspected during construction to ensure compliance with the proposed regulations.
- Inspections should be required when recharge features are being sealed.
- BMP performance bonds should be required so that non-performing BMPs can be remediated if abandoned.
- Temporary BMPs should adhere to standard practices as specified in the Texas Natural Resource Conservation Commission's Technical Guidance Manual on Best Management Practices, RG-348, and installed prior to any soil disturbance.
- Require performance standards and monitoring requirements for new and existing storm water retention basins.
- Implement a program to require operation and maintenance permits to ensure long term maintenance of BMPs.

Current Regulatory Status:

30 TAC Chapter 213

Subcommittee Recommendation:

Authority to regulate within the Recharge Zone and the Contributing Zone, but work with (or delegate to) local governments who request and have the ability to regulate.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate pollutant loading limits for new construction on the Edwards Aquifer Recharge Zone and Contributing Zone through a combination of impervious cover limits and performance standards.

Define Issue and Background:

Many studies have demonstrated that increases in impervious cover increase the amount of stormwater runoff and increase the amount of stormwater pollutant loading (Center for Watershed Protection, 1998 and Chang et al., 1994). Impervious cover includes rooftops, sidewalks, concrete-lined drainage channels, parking lots, residential streets, and roadways. A Maryland Department of the Environment, Stormwater Manual, titled “Why Stormwater Matters,” succinctly paraphrases the concern with impervious cover in an environmentally sensitive area as follows: “Impervious surfaces accumulate pollutants deposited from the atmosphere, leaked from vehicles, or wind-blown from adjacent areas. During storm events, these pollutants quickly wash off, and are rapidly delivered to downstream waters.” Some common pollutants found in urban stormwater runoff include nutrients, suspended solids, organic carbon, bacteria, hydrocarbons (oil, grease, constituents of gasoline, chlorinated solvents), trace metals, pesticides, herbicides, chlorides, thermal impacts, trash, and debris. Within the recharge zone, surface waters rapidly recharge the aquifer. The pollutant loading from stormwater to the Edwards Aquifer from areas of increased impervious cover needs to be considered in regulatory programs because a large percentage of aquifer recharge is from stormwater.

Groundwater monitoring systems are developing and rapid infiltration of storm water is readily apparent in groundwater monitoring systems. The ability to dilute contaminants of the aquifer is believed to be large, but the occurrence of water quality problems in the recharge and transition zones indicate that this is insufficient to protect water quality. Therefore, the potential for degradation is real and regulatory measures are required to maintain the generally high water quality of the aquifer.

Current Regulatory Status:

Areas with current Regulations (for impervious cover)

City of San Marcos (COSM) (*Chapter 94, Article 6*)

City of San Antonio (COSA) (*Chapter 34, Article VI and Ch. 35, Article III*)

TCEQ – indirectly through 30 TAC Chapter 213

Areas without current Regulations

Entire recharge zone outside of Bexar County and San Marcos

Subcommittee Recommendation:

Authority to regulate pollutant loading rates and monitor the results within the Recharge Zone and the Contributing Zone through a combination of impervious cover limits and performance standards, but work with (or delegate to) local governments who request and have the ability to regulate.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Develop regulations such that impervious cover may be increased, if mitigation land is purchased within the same sub-watershed as the proposed development on the Edwards Aquifer Recharge Zone and Contributing Zone. The increased pollutant loading rates would be required to not adversely impact the Edwards Aquifer.

Define Issue and Background:

In cases where a developer desires an increase in impervious cover for a property, the purchase of mitigation property in the same sub-watershed can be considered by the Authority as an alternative that will maintain low pollutant loading.

The land to be purchased would be required to be located within the same sub-watershed as the proposed development. The ratio of land to be purchased relative to the land to be developed would need to be determined in relation to the actual on-site pollutant loading characteristics of each property.

Current Regulatory Status:

City of San Marcos (COSM) (*Chapter 94, Article 6*)

City of San Antonio (COSA) (*Chapter 34, Article VI and Ch. 35, Article III*)

Subcommittee Recommendation:

Authority to study this issue and, if feasible, to regulate within the Recharge Zone and the Contributing Zone, but work with (or delegate to) local governments who request and have the ability to regulate.

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Water Quality Issues and Recommendations

Primary/ Core Issue:

Regulation

Regulate Buffer Zones (stream setbacks and sensitive features) on the Edwards Aquifer Recharge Zone and Contributing Zone.

Provide buffer zones adjacent to minor waterways, intermediate waterways, major waterways, and significant recharge features.

Define Issue and Background:

Greenbelts and natural watercourses must be preserved to the greatest extent possible. Greenbelts may be used as water quality buffer zones when adjacent to the natural watercourses. Water quality buffer zones will be considered as a minimum green space buffer around floodplains of 60 to 100 feet, based on slope, with an average project buffer of 100 feet. Preservation of the natural vegetation is preferred; however, low water use landscaping and/or sod will also be acceptable. Buffer zones should not be bypassed by concrete-lined drainage ditches that channel stormwater directly to stream beds.

Current Regulatory Status:

None

Subcommittee Recommendation:

Authority to regulate within the Recharge Zone and the Contributing Zone, but work with (or delegate to) local governments who request and have the ability to regulate.

Attachment C

Water Quality Advisory Task Force Members

Group	Name	Agency/Organization/Firm	Address City Provided To Edwards Aquifer Authority
Chairman	John Sharp	Ryan Company	Austin, TX
Citizens	Steve Long	N/A	Hondo, TX
	Nettie Patricia Hinton	N/A	San Antonio, TX
	Jerry Green	N/A	San Antonio, TX
	Paul Edwards	N/A	Uvalde, TX
	Donze Lopez	N/A	San Antonio, TX
	Edward Badouh	N/A	San Antonio, TX
Technical	Dr. Enos C. Inniss	University of Texas at San Antonio	San Antonio, TX
	Dr. Weldon Hammond	University of Texas at San Antonio	San Antonio, TX
Environmental	Jerry Morrisey	Sierra Club	San Antonio, TX
	Eiginio Rodriguez	Smart Growth Coalition	San Antonio, TX
	Gary Amaon	Texas Nature Conservancy	San Antonio, TX
	Darby Riley	Environmental Activist	San Antonio, TX
Development	Gene Dawson, Jr., P.E.	Pape-Dawson	San Antonio, TX
	Russ Johnson	Bracewell & Patterson	San Antonio, TX
	Steve Hanan	Hanan Development Co.	San Antonio, TX
Governmental	Commissioner Jay Millikin	Comal County,	New Braunfels, TX
	Clayton Binford	Medina County	
	Commissioner Rodney Reagan	Uvalde County	Uvalde, TX
	Laurie Anderson, P.E.	Hays County	
	Rebecca Q. Cedillo	Bexar County	San Antonio, TX
	Mayor Gary Middleton (Alternate – Jerry James)	City of Victoria	Victoria, TX
Purveyors	Leonard Young (Alternate – Scott Halty)	San Antonio Water System	San Antonio, TX
	Mike Albach	Bexar Metropolitan Water District	San Antonio, TX
	Paula DiFonzo	New Braunfels Utilities	New Braunfels, TX
	Carol Barrett	City of San Marcos	San Marcos, TX

Attachment C (continued)

Water Quality Advisory Task Force Members

Group	Name	Agency/Organization/Firm	Address City Provided To Edwards Aquifer Authority
Non-voting Resources	Mary Ambrose	Texas Commission on Environmental Quality	Austin, TX
	Bill West	Guadalupe-Blanco River Authority	Seguin, TX
	Samuel Sanchez, R.S.	Metropolitan Health District	San Antonio, TX
	George Ozuna	United States Geological Survey	San Antonio, TX
	Dr. Larry D. McKinney	Texas Parks & Wildlife Department	Austin, TX
	Greg Rothe, P.E.	San Antonio River Authority	San Antonio, TX
	Steven Pratt, P.E., CAPM (Alternate - Clay Chesney)	United States Environmental Protection Agency	Dallas, TX
	Phillip Wright	Natural Resource Conservation Service	Hondo, TX

Shaded portions of table indicate a WQATF Subcommittee member