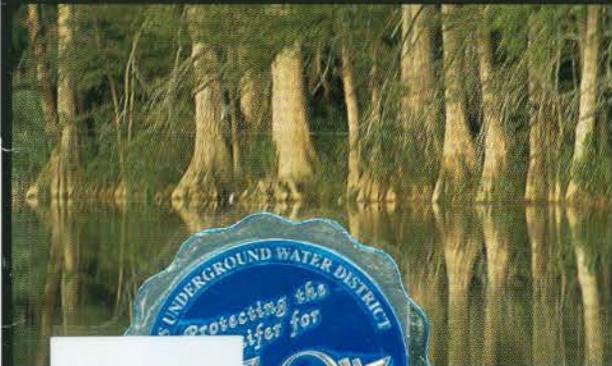
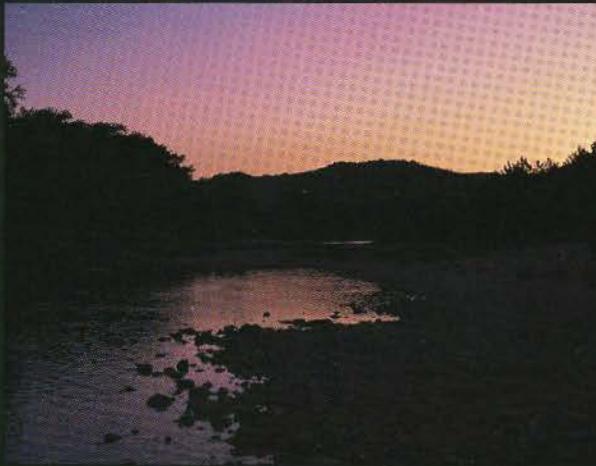
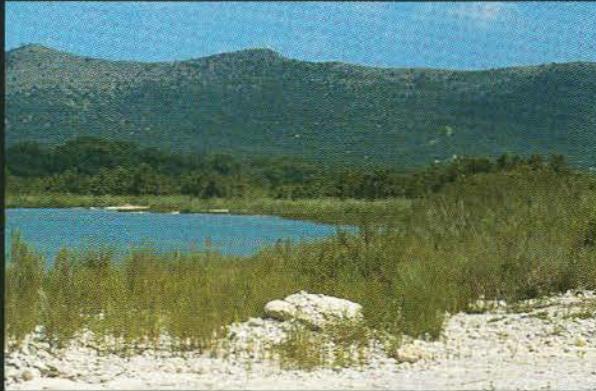


Edwards Underground Water District



**Created to
Conserve, Protect and
Preserve the Edwards Aquifer**

Edwards Underground Water District



Ground water is one of Texas' most valuable resources. About 70% of the water currently used in Texas is ground water. Recognizing the significance of this resource, the state took steps to provide for the protection of ground water through the enactment of the Underground Water Conservation Districts Act in 1949. The Act provided for the creation of underground water districts as a means of local self-government and management of water resources.

The state also enacted legislation establishing special law districts for the protection and conservation of ground water resources in particular regions. One such special law is the enabling statute of the Edwards Underground Water District (EUWD).

The Edwards Underground Water District was created in 1959 to conserve, protect and preserve the Edwards Aquifer.

One of the most productive aquifers in the southwestern United States, it currently supplies high-quality water to over one million people for municipal, industrial, agricultural and recreational purposes. Since its creation, the EUWD has been fulfilling its responsibilities by undertaking programs for monitoring water quality, enhancing aquifer recharge and encouraging conservation. The District has also led efforts to plan for water resources of the aquifer region.

The Aquifer



The Edwards (Balcones Fault Zone) Aquifer is the porous, honeycombed formations of the Edwards and associated limestones located in the south-central area of Texas. It is divided into three parts: the drainage area which includes the Edwards Plateau water table aquifer to the north, the recharge zone at the base of the plateau and the artesian/reservoir area.

Rainfall in the drainage area infiltrates the Edwards Plateau water table aquifer and forms spring-fed streams that flow downhill until the streams reach the recharge zone. The recharge zone is the cracked and broken boundary between the Edwards Plateau and associated limestones to the south. Water in the streams, as well as rain falling over the recharge zone, runs directly into the fractures and other Karst features such as caves and sinkholes and continues down into the artesian/reservoir area of the aquifer.

The Edwards Aquifer and its drainage area in the San Antonio region comprise about 8,000 square miles and include all or parts of 13 counties in south-central Texas. The recharge and artesian areas of the Edwards Aquifer underlie the six counties south and east of the Balcones escarpment. Those counties are Kinney, Uvalde, Medina, Bexar, Comal and Hays. The Aquifer underlies about 3,600 square miles, spans about 180 miles from west to east and varies from about 5 to 30 miles wide. The Aquifer receives most of its water from the drainage basins located on the Edwards Plateau in the catchment area. This catchment area is about 4,400 square miles. The Edwards Aquifer was designated a sole-source aquifer by the U.S. Environmental Protection Agency in 1977.

Some History



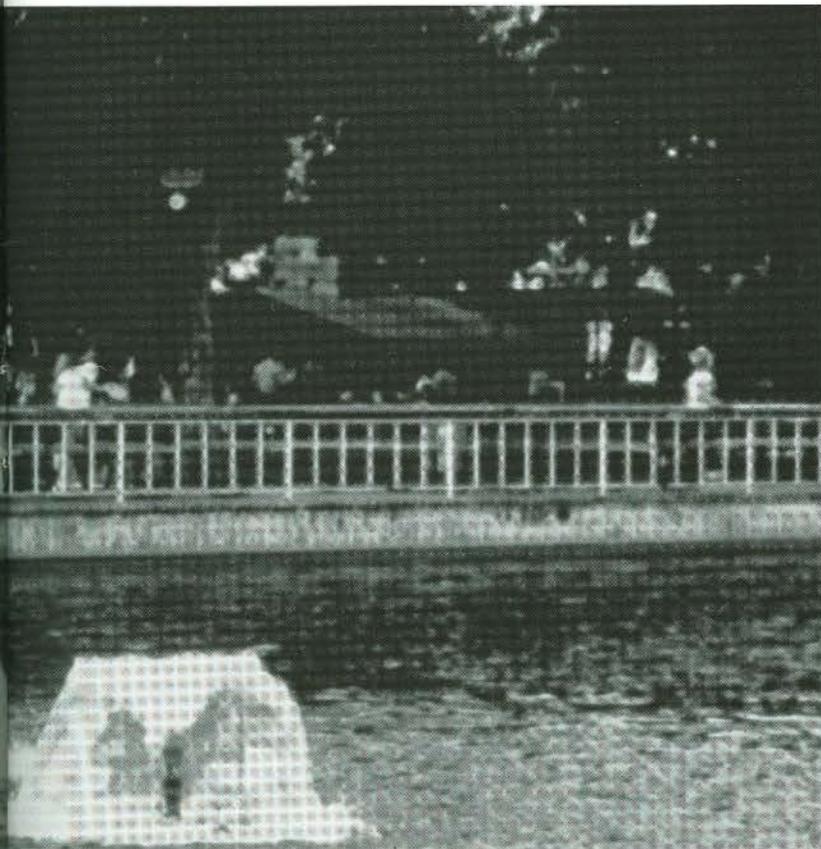
For centuries, people have settled in the six-county area of the San Antonio pool of the Edwards Aquifer because of the abundance of spring water. Water from the Edwards has supported civilization for more than 8,000 years and it continues to be the primary source of water for the area. Maintaining a clean and plentiful supply of the water that is stored by nature in the Aquifer is, and always will be, essential to the growth and prosperity of the Edwards area.

The first settlements in the area were located near natural spring outlets which served as their major sources of water. The first well was actually dug into the Edwards Aquifer in 1865. Wells became major suppliers of water after 1900 when the population of the area increased to approximately 100,000. During the past 40 years, many areas within the Edwards region have changed from predominantly rural to more urban environments. The Edwards Underground Water District was created as a result of an event well-remem-



bered by most south Texans—the seven-year drought of the 1950's. The drought period commenced with deficient rainfall in 1950 and worsened through 1956. The annual rainfall at San Antonio was 17.56 inches in 1953, falling to 13.7 inches in 1954. By 1955, the water in the reservoir had dropped 33 feet below its level in 1950. Most of the springs fed from the underground reservoir had ceased to flow. By July 1956, the head springs of the San Antonio River and the San Pedro Springs in San Antonio, as well as the Comal Springs in Landa Park at New Braunfels, had ceased to flow. The rainfall for 1956 was 14.31 inches. The drought finally broke in 1957 when 48.3 inches of rain fell, but the lesson as to the necessity for preserving and recharging the reservoir had been learned.

During the drought years, the Nueces River Conservation and Reclamation District devised a *Master Plan* which included a proposal to bridge over, by concrete-lined canals, the Nueces River and its tributaries where they cross the Balcones Escarpment—the Edwards



Recharge Zone. Fears caused by this plan and the virtual cessation of the flow of the Comal Springs were the main incentives for the formation of the EUWD.

In early 1955, the South Texas Chamber of Commerce established the Edwards Underground Water Committee, with Paul W. Jahn of New Braunfels serving as Chairman. Other members were J. H. Blackaller, San Antonio; Arthur H. Rothe, Hondo; Paul Rogers, San Marcos; and Grady Mahaffey, Uvalde. Their task was to study and make recommendations with reference to the conservation of the underground water in the Edwards and associated limestones. At a meeting in Laredo of the Chamber on October 23-24, 1955, a resolution was adopted urging immediate actions be taken to consider the organization of an Underground Water Conservation District with taxing powers. Wilbur L. Matthews, the San Antonio attorney who handled the rewriting of the act creating the San Antonio River Authority, was asked to examine the legal issues and advise the

Committee. Mr. Matthews undertook the charge without compensation and was responsible for drafting the initial legislation to create the District. The legislation failed to pass in 1957 but a revised bill was successfully passed in 1959.

The revised bill provided for a Board of Directors consisting of fifteen members, three to be elected by a majority vote in each of the five counties within the boundaries of the EUWD: Uvalde, Medina, Bexar, Comal and Hays.

The bill passed both houses of the legislature on April 8, 1959, without a dissenting vote. It was signed by the Governor and became effective on April 28, 1959. An election was held in July 1959. The first meeting was held on August 12, 1959. On January 16, 1960, the Board employed Col. McDonald Weinert as Engineer and General Manager of the District.

First Steps



The first action of the Board of Directors of the newly formed EUWD was to identify the need for a comprehensive study of the recharge potential of the Edwards Aquifer. One of the first major studies done by the District was in cooperation with the Corps of Engineers from 1961 to 1965 to learn more about the Aquifer system. The study also proposed a plan of operation to provide for augmentation of natural recharge, which could be conducted and financed within the EUWD's tax structure. The Corps of Engineers' study results indicated that recharge of the Aquifer could be increased through proposed reservoirs which would help control floodwaters, increase recharge of the Aquifer and provide recreational areas for residents.

Study indicated reservoirs would provide recreational areas for residents while augmenting natural recharge.

Also in 1961, the EUWD joined the San Antonio Water Board and the Texas Department of Water Resources (now the Texas Water Development Board) in a cooperative program to fund ongoing U.S.G.S. studies which include the collection, compilation and analyses of data to determine the storage capacity of the Aquifer; the recharge, circulation and discharge of ground water; and the quality of water in the Aquifer. Streamflow-gauging stations have been operated in the area of the Edwards Aquifer since 1915. Many gauges are located upstream and downstream from the recharge area of the Aquifer for use in determining the quantity of streamflow recharging the Edwards Aquifer.

Water Quality



Water quality data has been collected from springs, streams and wells in the Edwards Aquifer region since 1930. This data is used to determine the quality of recharge water and the quality of water moving through the Aquifer. About 100 wells and three springs are included in the water quality monitoring network. Hydrologic data and interpretive technical reports provide valuable information in understanding the hydrologic system as well as in planning and management decisions involving the Aquifer.

During the late '60s to early '70s, the EUWD Board of Directors became increasingly concerned about the potential for contamination of water in the recharge area of the Edwards Aquifer. A state requirement that all municipalities discontinue the burning of trash and garbage not later than July 1, 1969, forced the municipalities to seek sanitary landfill solid waste disposal sites. Subsequently, on March 18, 1969, the Directors unanimously adopted a resolution authorizing the Manager to take such action as was found appropriate to insure that proper authorities require permits for landfill sites for disposal of wastes in the Balcones Fault Zone within the geographical limits of the EUWD. The responsibility is currently discharged by the Texas Department of Health.

Citizens throughout Bexar and the eastern counties continued to be concerned that there was not enough protection for the Edwards Aquifer from unregulated development. Through 1970, the EUWD, in concert with other agencies, developed draft proposals for construction of sewage plants and collections systems in the recharge zone. The problem of proliferation of septic tanks in urban areas

was studied and suggestions for action to prevent health hazards were prepared. Maps of the recharge zone of the Edwards Aquifer were prepared and advisory proposals for construction of sewage plants and use of septic tanks were made available in the five-county area.

The decision to establish a formal regulatory process for protecting the Edwards Aquifer was the result of a review and discussion by the responsible regional agencies from 1968 through 1972, which in turn generated the rules and regulations that have been used to protect the Aquifer from potential threats to water quality. The EUWD, along with the Texas Water Development Board and the Texas Water Quality Board (now the Texas Water Commission), drafted proposed rules for development over the Aquifer Recharge Zone in September 1969. These proposed rules established restricted zones and requirements for disposal of wastes. They also designated EUWD as the agent of the state to perform the administrative functions related to the rules.

After considerable debate throughout the EUWD area, changes were proposed by the EUWD and other governmental units. Various review committees were formed and, after many revisions and redrafts, the first rules for development over the Edwards Aquifer Recharge Zone were passed by the Texas Water Quality Board on July 31, 1970. The rules were originally established to protect the





recharge zone and deal with the regulation of septic tanks, sewer lines and construction. However, the rules have since been adjusted and improved to address additional issues such as the transport, storage and use of hazardous materials and water pollution abatement planning. The EUWD's concern has been for future changes in technology and any additional threats to water quality that would result. These concerns are directed to the Texas Water Commission at annual hearings at which expert testimony is presented on recommended rule changes.

The Texas Water Commission (TWC) Rules, as they are commonly known, are officially codified as Title 31, Texas Administrative Code, Chapter A, Subchapter 313 Edwards Rules of the Texas Water Commission. Under Subchapter 33, the EUWD is authorized to:

- Provide maps on which the Recharge Zone and Transition Zone have been located, which correspond with maps located in the offices of the Executive Director of the Texas Water Commission (TWC).
- Assist the licensing authorities upon request for assistance in carrying out provisions of these rules.

- Conduct such geological investigations as are necessary to continually update the boundaries of the Recharge Zone and Artesian Zone.
- Monitor the quality of the water in the reservoir.

In August 1976, the District published the U.S.G.S. and the Texas Water Development Board report on water quality in the Edwards Aquifer from the period 1968 to 1975. It indicated that there was no degradation of the quality of the water in the reservoir. Additionally, the City of San Antonio retained a Boston engineering firm, Metcalf and Eddy, to conduct a separate water quality study. The results of the study reported similar findings of no degradation to the reservoir.

Another study was undertaken in 1976 to determine the pollution potential of hydrocarbon transmission lines crossing the recharge zone. In recognition of the need for more information on possible pollution from septic tanks in the Recharge Zone, a major study was also conducted in 1978 to develop a model evapotranspiration system as an alternative to septic tanks. This study resulted in recommended design criteria for evapotranspiration disposal systems, although the costs were found to be prohibitive.

In September 1986, the Board adopted a resolution declaring a non-degradation policy concerning the water quality of the Edwards Aquifer. It authorized the General Manager to implement actions to:

- Develop legislation to provide legislative authority to make and enforce rules for the protection of ground water quality.
- Provide technical assistance to cities where needed to enable adoption of ordinances for water quality protection including limitations of commercial activities that use hazardous materials.

- Protect sensitive areas such as sinkholes and caves from contamination and maintain them as local recharge points.
- Encourage the adoption of rules to regulated activities using, producing, transporting or storing hazardous materials within the Edwards Aquifer Recharge Zone and Transition Zone.

During 1987, the mayor of San Antonio, The Honorable Henry G. Cisneros, convened a special City Council Committee on Water Quality. The committee focused its review and recommendations on the quality controls presently in place to protect the Edwards Aquifer, particularly as they related to establishing parameters for urban development over the Recharge Zone. The District provided technical assistance, expert testimony and administrative support to the Council Committee during its proceedings. Among the Committee's final recommendations was that the EUWD should implement sensitive area mapping.

Other water quality issues addressed by the EUWD include:

- 1979—Successful passage of legislation amending the District Act to provide authority to monitor water well construction.
- 1983—Development of an Emergency Spill Response Plan.
- 1984—Joint sponsorship by the EUWD, City Water Board, Texas Department of Water Resources and U.S.G.S. of a study to examine the bad-water line that forms the southern boundary of the Edwards Aquifer. (The purpose of the study was to take the first steps to determine if the bad-water line would change due to low water levels in the Aquifer.)
- Currently—Ground-water contamination investigations in Bexar and Uvalde counties.

- Initiation of the development of a geographic information system (GIS) to enable the storage, analysis and display of a wide variety of geographic information required to monitor the actual impact of human activities on the quality and quantity of the water in the Edwards Aquifer.

The EUWD, in accordance with the requirements set forth in its enabling statute, undertakes additional pollution prevention measures. It maps all development, sewer lines, recharge and flood control facilities, caves, sinkholes and stream beds in the Recharge Zone and tabulates all sewer system connections. Ongoing projects include:

- Detection of subsurface voids with geophysical instruments.
- All-inclusive computer database for land development in the Edwards Recharge and Transition Zones.
- Gas station leak detection compliance inspections.
- Development monitoring including water pollution abatement plan (WPAP) application review and geologic investigations.

Projects include a comprehensive computer database for land development in the Edwards Recharge and Transition Zones.

Water Quantity

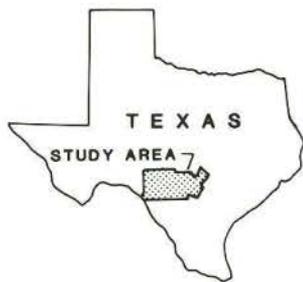


The streams crossing the fault zone of the Edwards Aquifer contribute most of their base flow and a part of their flood flows to the underground Aquifer. This recharge can be enhanced by identifying suitable locations and constructing retention dams to retard the flood waters.

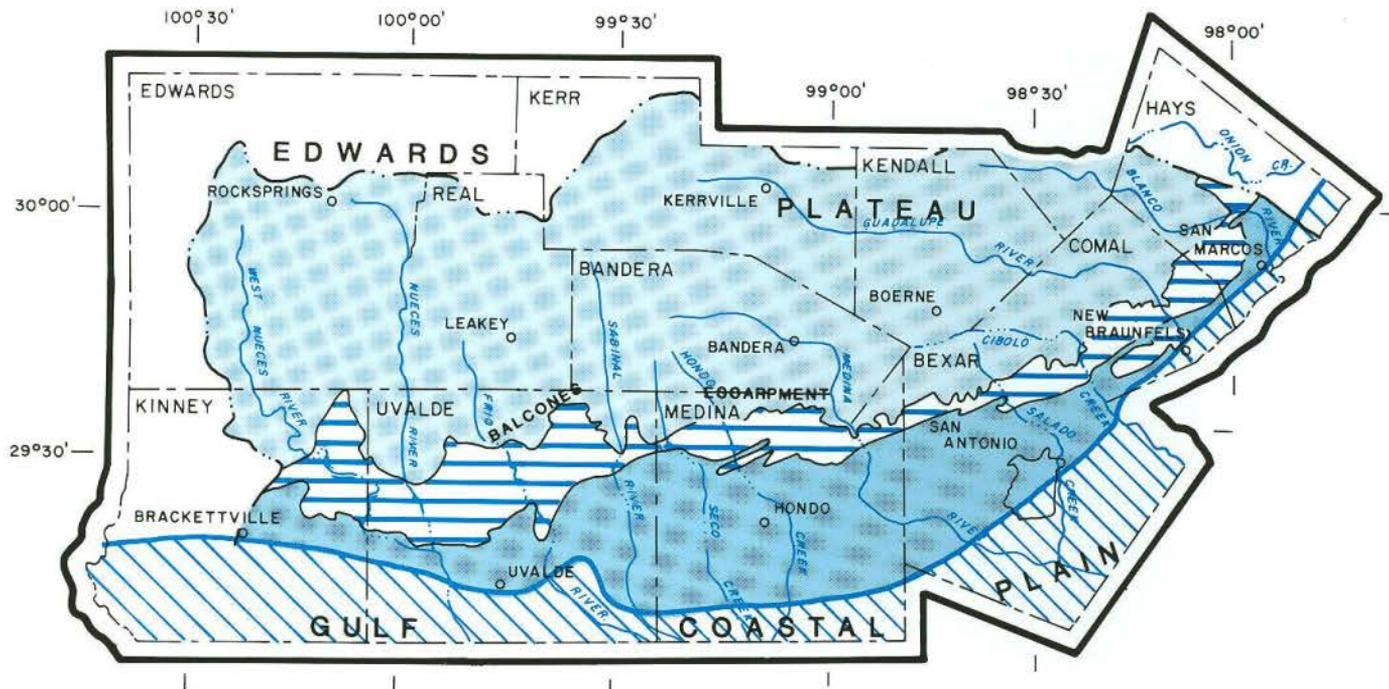
Sites are chosen based upon the existence of excess flood water. In other words, some storm water escapes the Recharge Zone and the site must allow rapid infiltration. Several dams have been constructed to increase the recharge. Some of these facilities have been constructed as part of flood control and soil conservation programs. The policy of the District has always been to identify and develop programs that have other benefits in addition to increasing recharge. One project that was built prior to the District's existence was the Medina Dam, which has been estimated to provide approximately 40,000 acre feet per year.

In 1962, the District entered into a cooperative agreement with the San Antonio River Authority to participate in the construction of the Salado Creek Watershed Project for the value of 3,000 acre feet of incidental recharge. In 1966, the Board adopted a policy of financing participation in any Soil Conservation Service or other project which would increase natural recharge. The Board committed to pay at least the value of the incidental increased recharge.

A state water plan released in 1966 stated that ground and surface water are so inter-related in the three river basins connected by the Edwards Aquifer that they must cooperate and develop a plan for the conjunctive use of



Edwards Aquifer and Catchment Area



- ARTESIAN AREA WITHIN FRESH WATER ZONE—Edwards Aquifer primarily under artesian conditions.
- APPROXIMATE RECHARGE ZONE WITHIN FRESH WATER ZONE—Edwards Aquifer is under water-table conditions.
- "BAD-WATER" LINE—Separates fresh water zone to the north from the saline water zone to the south.
- SALINE WATER ZONE
- CATCHMENT AREA
- DRAINAGE DIVIDE
- INTERMITTENT REACH OF STREAM

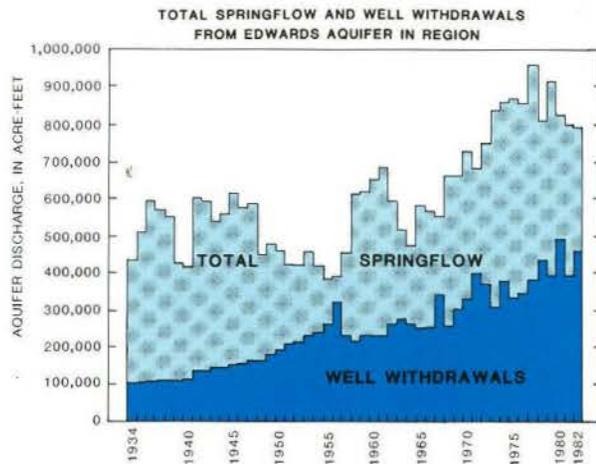
both surface and ground water. As part of a planned program to increase recharge, the District undertook the construction of four recharge dams in Medina County during the period of 1972 to 1982 at a total cost of \$1.8 million. It is estimated that an average of approximately 5,000 acre feet is added to the Aquifer annually via these dams.

The influence of natural forces on the water supply began to be seen in 1980. From 1960 to 1979, there were only three years with less than average annual rainfall. The rainfall in 1980, 1982 and 1983 was less than average. Then, in the winter of 1983, the region experienced a period of freezing weather that damaged much of the landscape vegetation in the area. The early months of 1984 were especially dry and this, coupled with the residents' attempts to recover their land-

scapes with watering, caused water levels in the Edwards Aquifer to drop significantly in April and May.

It was at this time that it became apparent that continued declines in the Edwards Aquifer would lead to hardships on many residents of the EUWD and that action was necessary to reduce the impact of declining water levels. Regional cooperation was necessary to solve long-term water resource problems. That cooperation was in jeopardy and would not occur unless area residents recognized that all users of Edwards Aquifer water have to conserve during periods of drought.

Out of this need, Operation Water Conservation (OWC) was organized in May 1984 by the EUWD and the City of San Antonio. The purpose was to involve the communities and



other water users in a regional effort to conserve water. It involved a region-wide water conservation program of public information and awareness. The project was both unique and successful, resulting in an average of 10% reduction in water use region-wide.

Another action initiated in 1984 by the EUWD Board was the authorization of \$1 million for the City of San Antonio's share of an agreement to conduct necessary engineering and environmental studies of surface water reservoir sites by the San Antonio and Guadalupe-Blanco River Authorities.

The EUWD was also responsible for the following measures:

- 1979—Completion of a study by the Bureau of Reclamation on both surface and ground water development for the San Antonio-Guadalupe River Basins. (The results of the study were the focus of regional forums held in the five EUWD counties in 1982.)
- 1982—Creation of the Surface Water Development Fund, which indicated a shift in emphasis of the EUWD from recharge projects to surface water projects as a mechanism of preserving the Edwards Aquifer. The fund would provide for development of surface water use within the EUWD including, but not limited to, surface water studies, acquisition of land and rights-of-way and purchase of water rights.

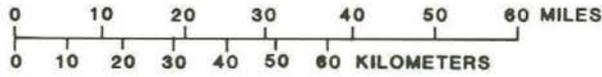
- 1983—The successful passage of amending legislation to require application to the EUWD for a permit for transfer of water produced within the EUWD boundaries to users outside the District.

- 1983—Appointment of a Water Conservation Task Force whose original members included Directors Oliver O. Haas, known in Comal County as "Mr. Water," Fay Sinkin, Bruce Foster, Frances Emery and Leslie Pepper.

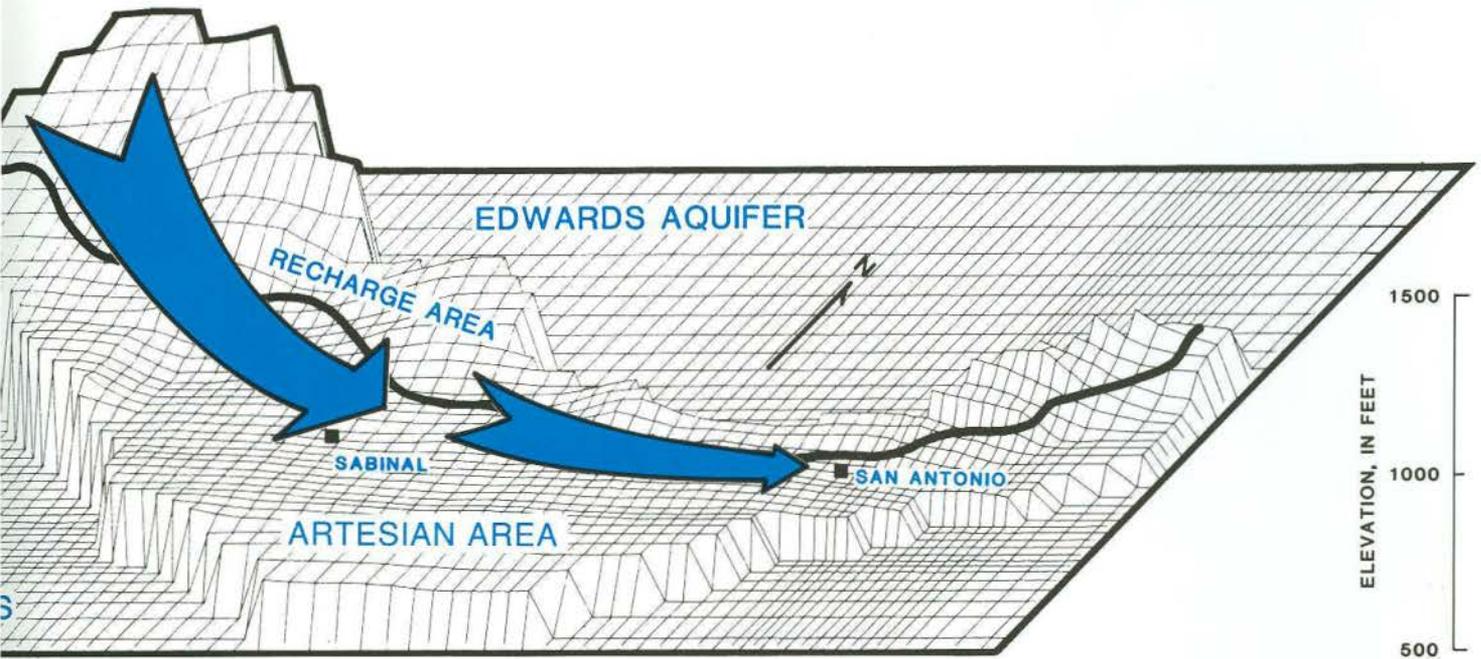
- 1985-86—Initiation of a weather modification/rainfall enhancement program to enhance rainfall possibilities from unstable moist air masses moving inland from the Gulf of Mexico. The program goal was to increase rainfall in the target area by 10% to 15%. Data analysis completed in 1986 resulted in recommended termination of the program due to restrictive suspension criteria established by the state, substantially reducing the potential effectiveness of the program.

- 1988—Establishment by the Board of Directors of an aggressive goal of 17% reduction in water use region-wide. Their initiatives to accomplish this goal included the convening of a Water Conservation Summit for Public Officials, establishment of Water Conservation Task Forces in each county and implementation of a leak detection program of technical assistance including a leak detection van and trained staff.

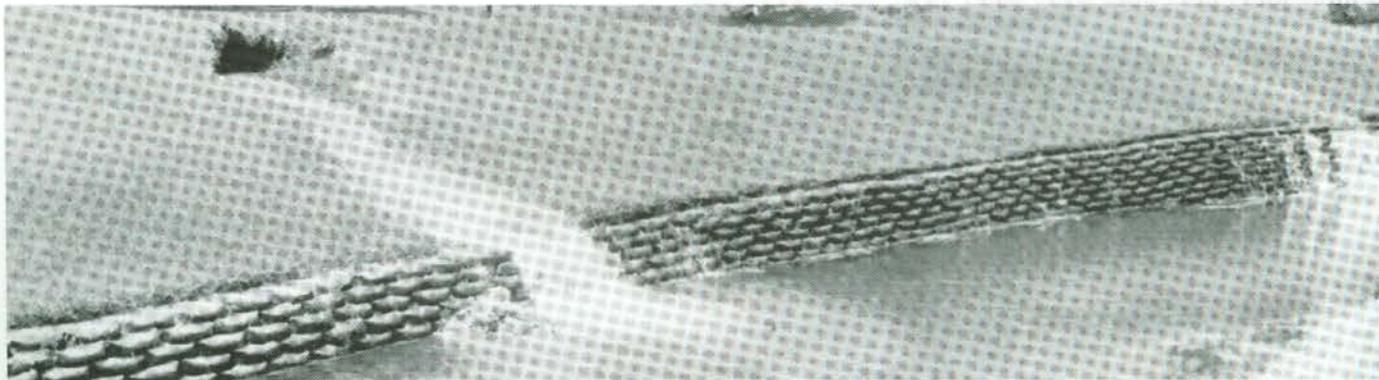
WATER LEVELS



Ground Water Movement



- 1988—Initiation of a feasibility study on the purchase of Medina Lake for recharge use.
- Currently—Initiation of an aggressive program to close abandoned and substandard wells for the purpose of preventing pollution or injury to the Aquifer or to persons and livestock. The EUWD directs its efforts to any well which is in an area of current development or which was formerly in domestic use.



Public Education



The Directors believed that a well-informed public would be more responsive to the problems and actions of the EUWD.

The EUWD realized that one of its most important jobs was to inform the public about the underground water supply. The Directors believed that the general public would be much more willing to cooperate if they were well informed about the problems and actions of the EUWD. Early in 1960, information maps and data sheets on the Aquifer were prepared and distributed to the general public. In May 1960, Hays County director Robert Knispel gave a map and data sheet to his sister, a public school teacher. After using the map in her geography class, she reported a positive response from her students who had carried the information home to their parents. The significance of reaching consumers through their children was not lost on the EUWD Directors. Major educational initiatives have since been targeted at the elementary and secondary levels of the school system.

In one of the most comprehensive educational efforts to date, the EUWD, in cooperation with Southwest Texas State University, developed a textbook, *Water, Water Conservation and the Edwards Aquifer*, for use in junior high school science classes throughout the EUWD. Over 18,000 copies of the textbook have been distributed to schools, libraries and universities.

A colorful educational map poster, "Water Resources of the Edwards Aquifer Region," was designed and distributed for use at the middle and high school levels. The poster describes the geographic features of the Edwards Aquifer region, with a shaded relief map and geologic cross-section, as well as informational graphs on population, water use and recharge.

A recent educational program was developed especially for the elementary school level called *Splash*, a series of lessons and activities focusing on water and the Edwards Aquifer. Two booklets, designed for grades 1-3 and 4-5, respectively, include activities such as scientific experiments, word games, board games and math problems designed to stimulate the young student's interest in the importance of water. *Splash* has been made available to all elementary schools in the EUWD.

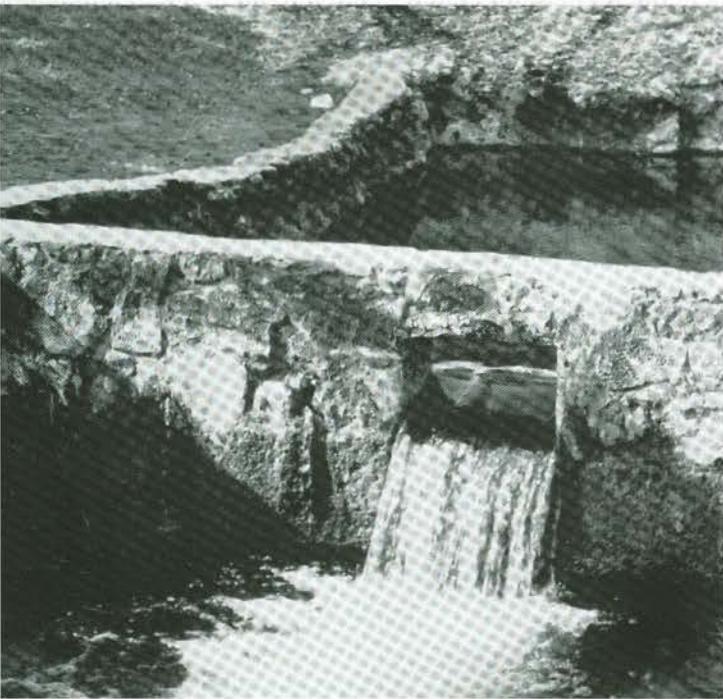
The EUWD also uses a portable, freestanding educational exhibit, "The Aquifer That Shaped South Central Texas," to promote community awareness. The exhibit is a combination of interactive exercises which provide hands-on educational experience in water management decision-making.

In an effort to encourage agricultural conservation, the District has engaged in a program to promote irrigation water efficiency through use of a concept which originated in the High Plains District in northern Texas. The EUWD purchased and equipped trailers for the purpose of measuring irrigation efficiency for individual farmers. This information has been helpful in promoting water conservation in irrigated agriculture.

The District has also been responsible for the development of innovative conservation programs for urban areas. The first xeriscape garden completed in the state was instigated and primarily funded by the District. This garden was developed as a tool to educate the public and landscape industry on the benefits of water conservation through the use of native plants and proper watering techniques, based on the xeriscape concept.

Other public education programs of the EUWD include:

- 1964—Production of "The Edwards Story," a 16mm educational film. It has been revised and updated several times and received the Texas Water Quality Board Chairman's Award in 1977.
- 1986—Development and distribution of a water well design and construction manual to provide the layperson with information on water wells and generally accepted drilling procedures for Edwards Aquifer wells.
- 1986-88—Exhibition of a demonstration landscape at the annual San Antonio Homebuilders Parade of Homes.
- 1986-87—Cosponsorship of the 1st and 2nd Annual Xeriscape Conferences in Texas, attended by professionals from the landscape industry and government.
- 1986-87—Presentation of an extensive public information program on the results of the Regional Water Study in which over 100 presentations were made throughout the five-county area.
- 1987—Presentation of an educational exhibit on the animal life of the Edwards Aquifer in cooperation with the San Antonio Zoo.
- 1987—Sponsorship of a community theater project involving middle school students to write and participate in theater productions on water.
- 1988—Development and distribution of a *Water Conservation Working Handbook* to water purveyors and public entities in the EUWD area.
- Currently—Distribution of 400,000 specially designed bookcovers with water conservation tips to elementary schools within the District.
- Currently—Script and film development by the Witte Museum for a general purpose film on the Edwards Aquifer.
- Currently—Presentations by EUWD staff to schools, professional and business organizations on the Edwards Aquifer and related topics.



Regional Water Planning



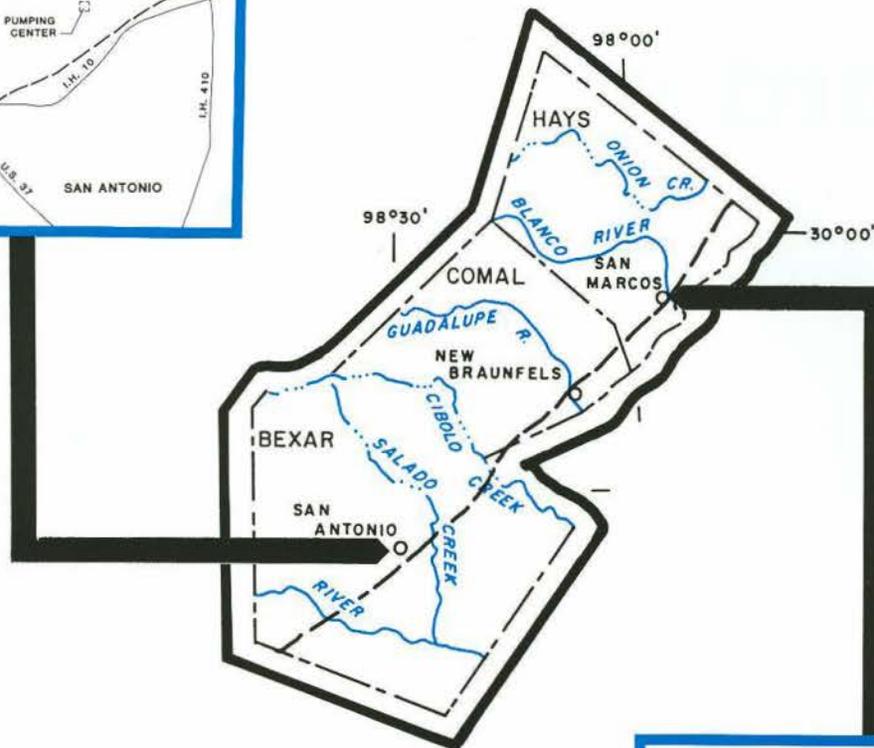
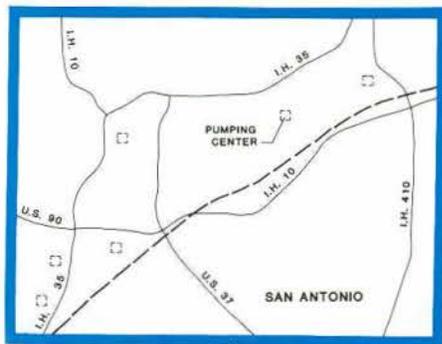
Achieving regional solutions to water problems through a consensus of all water users has always been a primary goal of the EUWD. Following the release of the U.S. Department of Interior's Bureau of Reclamation study of the San Antonio-Guadalupe River Basins, regional forums were held in the five counties from July through September 1982 to discuss the results. In that study, the Bureau estimated the water needs in the area could triple by the year 2020 and irrigation water needs were expected to increase by two-thirds. The major issues over the past 30 years in which the water supply had been studied and debated were summed up as:

- How should the Aquifer be managed?
- Who pays for development of alternate sources and who benefits?
- What role does growth play in water development policy decisions?
- What range of solutions are available and what are the key benchmarks for optimal decision-making?

Following the forums in 1983, the Board of Directors and San Antonio City Council moved forward to initiate a Regional Water Study. The objectives of the Regional Study were to provide sufficient information and recommendations about regional water resource issues and alternatives that would:

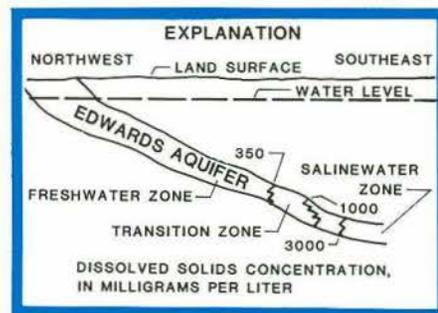
- Enable reasonable people to make responsible decisions concerning public and private investments in the water resources of the region.
- Insure that those decisions are consistent with regional economic development and environmental integrity.
- Inspire long-term confidence in these decisions.

Following completion of the study in 1986, the District and Council appointed a 50-member Citizen Advisory Group and embarked on a region-wide public information program. After receiving the recommendations of the Advisory Group, a Joint Committee on Water Resources was appointed by both governing bodies. Its membership was com-



prised of the decision-makers—EUWD Directors, San Antonio City Council members and representatives of the San Antonio, Guadalupe-Blanco and Nueces River Authorities. Their work throughout early 1987 resulted in successful passage of amending legislation authorizing the EUWD to develop and enforce a Drought Management Plan.

After a brief hiatus, the Joint Committee on Water Resources resumed its work to develop a Regional Water Plan in late 1987. This work continued through July 1988, when the completed draft of the plan was released. Proposed legislation implementing the draft plan is currently undergoing revisions. It is intended for submission to the Legislature in 1989.



Change

On January 21, 1989, voters in Medina and Uvalde counties elected to withdraw from the Edwards Underground Water District. Although now comprised of Bexar, Comal and Hays counties, the EUWD supports programs and research throughout the region and continues to perform its legislative mandate of protecting the Edwards Aquifer.

Board of Directors



Kenneth G. Ikels
Chairman



Lynda Billa Burke
Vice-Chairman



Jerri W. Martin
Secretary



Frances D. Emery



Robert C. Hasslocher



S. Craig Hollmig

General Manager



Gordon M. Clarke

The EUWD Board of Directors appointed Gordon M. Clarke as General Manager in March 1989. A registered professional engineer in Texas, Clarke retired as full colonel after 27 years in the U.S. Army Corps of Engineers. He served as District Engineer of the Corps' Galveston District from 1985-87. A graduate of the United States Air Force Academy, Clarke received his master's degree in Civil Engineering from Texas A & M University. Most recently Clarke served as Director of the Northeast Service Center of the San Antonio City Water Board.



William Finck
Treasurer



Harry Bishop



Jo Ann DeHoyos



Jack R. Ohlrich



Charles F. Rodriguez



Jesse Zuniga

Assistant General Manager



Russell L. Masters

Russell L. Masters has served as Assistant General Manager of the District since 1981. Prior to joining the EUWD, Masters was Chief of the Water Quality Planning Division of the San Antonio River Authority and Water Resource Planner for the Alamo Area Council of Governments. He is a graduate of Texas Lutheran College and the University of Texas at San Antonio's Master of Science program. In addition to his District responsibilities, Masters also serves on various local and regional committees dealing with a variety of issues including ground water, hazardous materials and regional development.

Edwards Underground Water District

Comal County



Comal County is located in the northeast part of the EUWD area, bounded by Bexar County to the south and Hays County to the north. Only the southeastern portion of the county, which overlies the fresh water portion of the Edwards Aquifer, is included within the EUWD boundaries.

Comal County consists of both rural and urban areas including the principal city of New Braunfels. New Braunfels is well known for its German culture and tourist attractions, such as Schlitterbahn, the Annual Wurstfest, the Comal River fed by the naturally occurring Comal Springs, Krause's Restaurant and the famous bakery of German pastries, Naegelin's.

New Braunfels began as a settlement of 6,000 German settlers led by Prince Carl of Solms-Braunfels who first arrived on Good Friday of 1845 at a site along the Comal River. The German settlers purchased the land from a local family and established the settlement which they named New Braunfels.

Currently, Comal County's primary employment sectors include manufacturing plants which produce textiles, apparel, furniture, meat products, minerals, electrical manufacturing and concrete products. Personal services and tourist business are also important to the economy. Comal County is also the site of about 195,000 acres of farm land.

Bexar County



All but the southernmost part of Bexar County is within the boundaries of the EUWD. It is primarily an urban area, encompassing the city of San Antonio, the ninth largest city in the United States and the third largest in Texas, and 22 smaller, suburban cities. San Antonio is best known for its cultural diversity and tourist attractions, such as Sea World, the Alamo and its four sister Spanish Missions, Brackenridge Park and Zoo, the Riverwalk and the internationally known Conservatory at the Botanical Center.

Spanish explorers discovered the San Antonio River and San Pedro Springs, which flow from the Aquifer, as early as 1535. In the early 1700's the area started to attract more settlers. A trading post was established near San Antonio Springs in 1714 by a Frenchman named St. Denis.

In the early 1730's, the settlers constructed a system of irrigation ditches called acequias. The water that flowed from the river and through the acequias was used for irrigation, drinking and to power grinding mills. Residents of the San Jose Mission even enjoyed a swimming pool that was filled with water from the acequias. These were used by settlers in the San Antonio area for over 150 years.

During the 1800's, Belgian farmers discovered the favorable climate and abundant water supply in the San Antonio River Valley. They



came to Texas and established small vegetable farms along the San Pedro Acequia. The farmers used water from the acequias until about 1920, when they drilled a well to the Edwards Aquifer.

The farmers shared water from the community well for a while, but the farms and families grew and became more productive. The increased demand for water in the 1920's caused disagreement among farmers about water use, so they began drilling individual wells.

Currently, the primary and major employment sectors of San Antonio and Bexar County include the military, local government, utilities, communication and transportation, grocery, food and retail chains, electrical machinery, equipment and supplies, hospitals, schools, finance, construction and real estate and contract construction. Bexar County is also the site of about 500,000 acres of farm land.

Hays County



Hays County is located in the upper northeast corner of the EUWD area, bounded by Comal County to the south. The south-central and southwestern areas of the county, which overlie the fresh water part of the Edwards Aquifer, are included within the EUWD boundaries.

Hays County also consists of both rural and urban areas with San Marcos as its largest city. San Marcos is best known as the home of Southwest Texas State University (SWTSU), which is also the site of the Edwards Aquifer Research and Data Center. It is also known for its recreational and tourist attractions, such as Aquarena Springs and the San Marcos River fed by the naturally occurring San Marcos Springs.

Evidence of early civilizations that depended on water from the Aquifer have been discovered at several sites around San Marcos Springs. Archeologists believe that inhabitants may have lived at these sites as early as 6,000 B.C. In 1709, a group of Franciscan Monks discovered a clean, swift river, which flowed from springs. The springs at the head of the river were discovered on Saint Mark's Day, so they named the river San Marcos. Currently, primary and major employment sectors include the county, SWTSU, manufacturing plants which produce electrical machinery, equipment and supplies and printing and distribution. There is also a segment of the population that commutes to Austin for employment. Hays County is a major tourist center and retirement area. It is also the site of about 210,000 acres of farm land.

A Mission of Stewardship

The creation of the Edwards Underground Water District in 1959 was a manifestation of the region's concern for the protection and preservation of the Edwards Aquifer.

The Edwards Aquifer remains one of the nation's unique ground water resources, as well as this region's most valuable natural resource.

For twenty-nine years, the EUWD has been the vehicle providing local management of the Edwards Aquifer by:

- Maintaining a program of data collection considered to be one of the best for an underground water supply.
- Identifying the potential threats and associated risks to water quality.
- Providing expert testimony to the regulatory process and monitoring the implementation and enforcement of the regulatory procedures so that potential threats and risks can be controlled and minimized.
- Identifying and funding the development and construction of surface water recharge projects that result in increased recharge at a cost that does not exceed benefit.
- Identifying and funding research programs in reuse, range management and brush control and irrigation technologies that can enhance water conservation.
- Fostering a water conservation ethic among future water users through public education initiatives.
- Facilitating the development of a regional water plan to provide for the effective management of the water resources in the Edwards Aquifer region.

The Edwards Underground Water District, under the leadership of the Board of Directors, continues its mission of stewardship of the Edwards Aquifer "... to conserve ... to preserve and protect ... to prevent waste and pollution ... to develop comprehensive plans ... to publish plans and information ... to increase recharge ..." for present and future generations.

Edwards Underground Water District

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