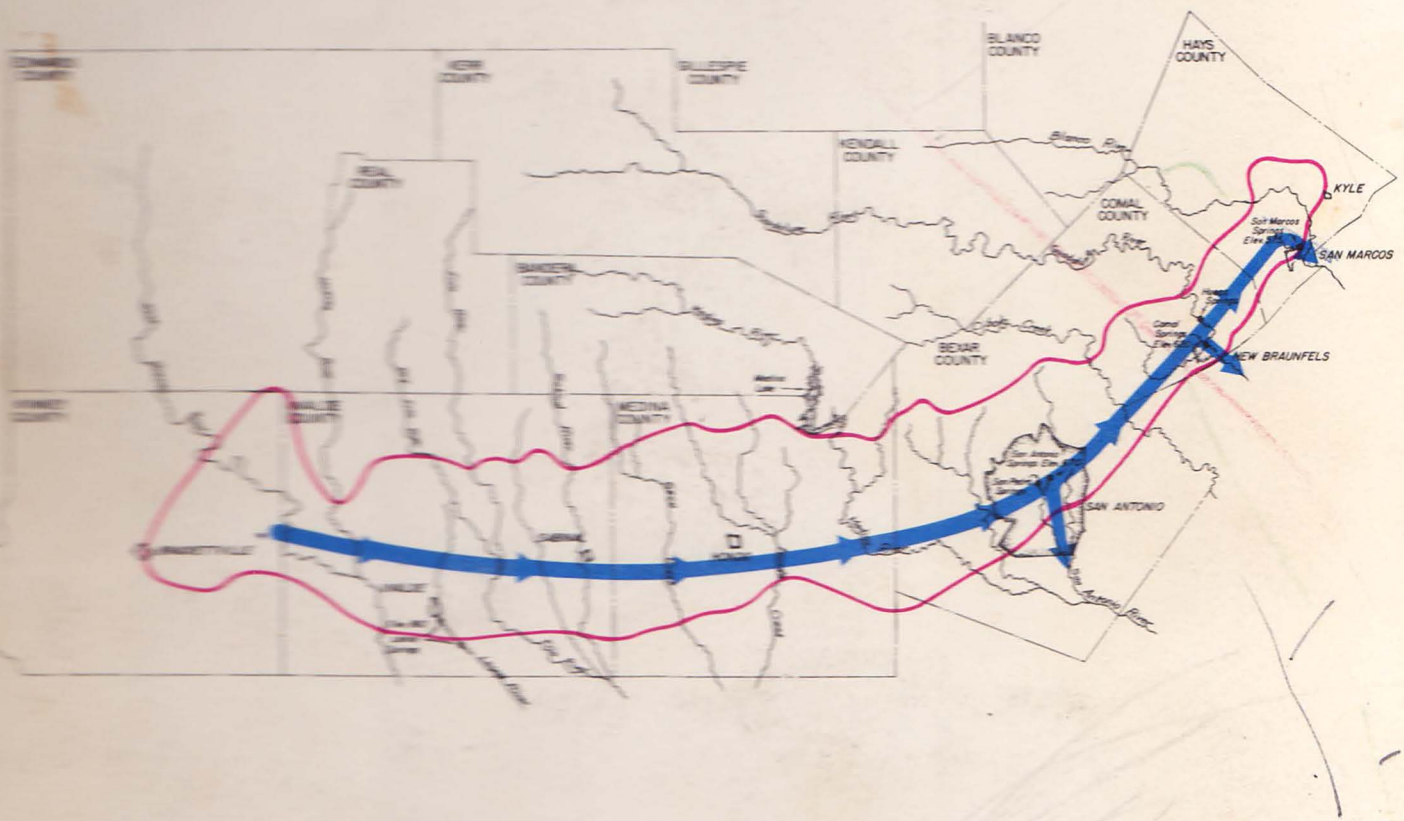
THE EDWARDS UNDERGROUND WATER DISTRICT



AND

EDWARDS UNDERGROUND RESERVOIR

FOREWORD

The basic technical data on the Edwards Underground Reservoir presented herein was obtained from the U. S. Geological Survey.

The analytical study of the recharge potential to the reservoir made by the U. S. Army Corps of Engineers in cooperation with the Edwards Underground Water District is the basis for determining the physical facts about what could be done to increase the water available for use throughout the Edwards Underground Water District area.

The cover sheet is from a drawing prepared by the San Antonio City Water Board for their publication, "Report on San Antonio's Water Problem", September 19, 1966.

EDWARDS UNDERGROUND WATER DISTRICT

DISTRICT OFFICE

1619 Tower Life Bldg.
San Antonio, Texas
CA 2-2871

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THE RESERVOIR

The Edwards Underground Reservoir is of vital importance to a large part of the area from Del Rio east to Kyle. The part of this reservoir with which the Edwards Underground Water District is concerned extends across Uvalde, Medina, Bexar, Comal and Hays Counties from Brackettville to Kyle; is about 175 miles long and from 5 to 30 miles wide; the average thickness of the limestone which makes up the underground reservoir is about 500 feet.

The recharge area to the reservoir (the area where this ground-water bearing formation comes to the surface) is a strip (Balcones fault zone) of faulted and porous limestone where water goes underground into the reservoir. Southward-flowing streams that cross the Balcones fault zone lose a large part of their water to the underground reservoir, and rain falling directly on this faulted zone adds to the recharge. The streams that contribute most of the water drain that area of the Edwards Plateau below a line generally from the city of Rocksprings to the city of Blanco. The Edwards Plateau, the Balcones fault zone, the District area, and the southern boundary of the underground reservoir are shown on the general information map on page 2.

The major source of water comes from the western streams, such as the West Nueces, Nueces, Dry Frio, Frio, Sabinal and Medina Rivers, and the creeks in Uvalde and Medina Counties. The Guadalupe River is the only stream in the area which loses no water to the reservoir.

Annual flow of water into the reservoir from 1934 to 1965 has been as little as 44,000 acre-feet in 1956, and as much as 1,700,000 acre-feet in 1958. An acre foot of water is the amount of water to cover an area of one acre one foot deep, or approximately 326,000 gallons. The annual average recharge through 1965 was about 500,000 acre-feet. Usage from the reservoir in 1965 was 256,100 acre-feet. Spring discharge was 322,800 acre-feet.

The drought which ended in 1957 was the worst ever known in this area. Water levels in wells reached an all-time low. Medina Lake was dry. All springs except San Marcos Springs went dry. Rainfall was high from 1957 through 1961, and the reservoir recovered the losses brought about by the drought in a period of less than two years.

Water entering the reservoir moves slowly southward across the reservoir and then east and northeast toward the natural

discharge points at Comal Springs at New Braunfels, and San Marcos Springs at San Marcos. Other "leaks" from the reservoir are the Leona River Springs near Uvalde, the San Antonio and San Pedro Springs in San Antonio, and the many wells that are allowed to flow (such as the Salado Creek Well at Ft. Sam Houston in San Antonio). Because ground formations through which water cannot "leak" lie above and below the limestone in the underground part of the reservoir, the water is under pressure and rises close to the surface in many wells and flows from others when they are drilled into the reservoir.

Water is pumped out by hundreds of wells from Brackettville to Kyle. The reservoir is the only source of water for the cities of Uvalde, Knippa, Sabinal, D'Hanis, Hondo, Castroville, LaCoste, San Antonio, New Braunfels, San Marcos, Kyle and other smaller communities. Irrigation, industrial, domestic, stock and other uses also are dependent on water from the reservoir.

DISCHARGE--ACRE-FEET PER YEAR

Date	Springs	Municipal & Industrial	Irrigation	Domestic Stock Ranchers, etc.	Total
1962	321,000	166,300	73,000	28,800	589,100
1963	239,600	173,600	75,400	27,800	516,400
1964	213,800	162,400	72,800	26,400	475,400
1965	322,800	161,100	68,000	27,000	578,900

The discharge during 1962, 1963 and 1965 was more than the average recharge because the reservoir water level was high enough to produce a large amount of springflow. Discharge and recharge vary considerably from year to year, but the long-term average discharge cannot exceed the long-term average recharge without drying up all springs and using up the water in storage below the level of the springs. In other words, only about 500,000 acre-feet of water per year is available for long-term discharge through wells and springs under natural recharge conditions.

THE DISTRICT

In 1959 the Texas Legislature created the Edwards Underground Water District for the purpose of "protecting, conserving, and recharging the underground reservoir."

The District consists of all of Uvalde County, most of Medina and Bexar Counties and a small part of Comal and Hays Counties, and covers about the same area the Texas Board of Water Engineers (now the Texas Water Rights Commission) had previously designated as the Edwards Underground Reservoir.

A fifteen member Board of Directors, three from each County area, an Engineer-Manager and Assistant Secretary, with a central office in the Tower Life Building, San Antonio, Texas constitutes the business set-up of the District. A 2¢ tax per $100 property valuation provides the funds for operation.

The U. S. Geological Survey carries on the continuing work of making studies of the amount of water that goes into and out of the reservoir, its movement through the reservoir, and the quality.

Directors were elected in 1959, started operation in January 1960, and in July of that year decided to spend no money on construction until an over-all study of what could be done had been made. Early in 1961 an agreement was made with the U. S. Army Corps of Engineers to make a study in cooperation with the District to see exactly what could be done to make more water available for use from the reservoir.

WHAT WE HAVE LEARNED TO DATE

Natural recharge puts most of the water which reaches the Balcones fault zone into the ground. Structures which add water to the reservoir without control over the time and/or amount, do not make more water available for use when the large springs are flowing. When water levels are high enough for springs to flow, such structures chiefly add to that flow. However, increase of the average annual recharge will make more water available for use after water levels have been lowered and spring-flow decreases. Furthermore, the State Water Plan states that the continued sustained flow of Comal and San Marcos Springs is important to the State, and proposes to insure that they will not cease flowing. Developing an area plan for coordinated use of surface and ground water is a part of the State Water Plan.

The U. S. Army Corps of Engineers in cooperation with the District has completed a study of the recharge potential to the reservoir in connection with all other water problems in the upper part of the Nueces, San Antonio and Guadalupe River Basins, and finds that a system of reservoirs above the recharge areas

on the streams west of Bexar County can increase the average annual recharge by a total of about 100,000 acre-feet. For example, the average annual recharge on the Nueces, Frio and Sabinal Rivers can be increased by a total of 68,200 acre-feet per year by construction of dams at Montell, Concan and Sabinal sites. The report recommends that surface water be used to supplement the underground supply, and that pumpage from the reservoir be no more than the amount that is available to recharge the reservoir in order that water levels will not be drawn down too far, risking the movement of poor quality water into the good water areas. The State Water Plan proposes to plan for integrated use of surface and ground water with the added objective of maintaining the flow of Comal and San Marcos Springs.

Additional surface water can be developed in the area above the recharge zone at Dam No. 7 on the Guadalupe River, and at the Cloptin Crossing site on the Blanco River just north of Wimberley. Areawide cooperative effort is essential if all available water supplies are to be fully utilized.

FUTURE PLANS

A color-sound film entitled, "The Edwards Story", and a color silent supplement with titles, have been produced and are available to any group wishing to view them. The film is educational and shows where and how the water enters the reservoir, movement through the ground, and all uses and discharges from the reservoir between Brackettville and Kyle.

As a continuing part of our efforts to learn more about the water in the reservoir, movement through the reservoir and uses from it, we will continue the data gathering and evaluation program with the U. S. Geological Survey. Bulletins on water quality, recharge, and discharge will be published each year.

A policy of cooperating with all Soil Conservation Districts where proposed improvements will add to the natural recharge has been adopted. Each project will be judged on its merits, and financial participation by the District will be based on the value of the increased water made available.

The District is a co-sponsor on the Seco Creek Watershed Project in Medina, Uvalde and Bandera Counties.

Due to consideration of recharge benefits, the Leona Creek Watershed Project in Uvalde County is being reconsidered by

the Soil Conservation Service and the District will co-sponsor this project.

Ways in which the District might assist the San Antonio River Authority in the construction of the Salado Creek Project in Bexar County are being sought.

A tentative State Water Plan is now under consideration. The following excerpts indicate what the area problem is and how it can be met:

"The San Antonio Area"

"The principal water supply to San Antonio is a complex underground-water formation called the Edwards Aquifer. In addition to supplying the municipal, industrial, and military installation water requirements of the city of San Antonio, and of other municipal areas in southwest Texas, the Edwards supplies irrigation development west (and south) of San Antonio, and supports the spring flow from San Marcos Springs and Comal Springs at New Braunfels.

There is tremendous value to the State in maintaining underground hydrologic conditions required to assure the flow from Comal and San Marcos Springs. The flow of these springs not only provides significant recreational opportunities, but, also the pool receiving the flows of San Marcos Springs has developed a fascinating ecology of flora and fauna, which is a tourist attraction and a scientific treasure. Its loss would be irreparable.

Additionally, the city of San Antonio uses water from the Edwards Aquifer to enhance the flow of the San Antonio River through the city. There is exceptional value to the entire state in the excellent use which the city is making of the flow of the river, and the Texas Water Plan contemplates the continuance of the aesthetic and real values derived from a firm supply of clean water for this purpose.

Increasing water requirements in the area served from this ground-water source makes it essential that additional supplies of water be provided to meet all of these needs. Supplemental water could come from the Nueces River and its tributaries, the Guadalupe River, and the Blanco River. When these have been committed to their capacity, the next dependable source of supply is the Colorado River.

The Plan proposes that the State, in cooperation with local agencies in the area overlying the Edwards Aquifer, develop an integrated supply and distribution system, utilizing water from the Colorado and Nueces River Basins, the yield from Cloptin Crossing Reservoir, a portion of the yield from Canyon Reservoir (if this becomes available), and the yield from the Edwards Aquifer in excess of that required to maintain adequate spring flows. Such a system will produce greater benefits than is possible if these sources are developed and managed individually."

The Edwards Underground Water District endorses the proposal in the State Plan that an integrated supply and distribution system be developed for surface and ground water use in the area over-lying the Edwards Aquifer.

The Edwards Underground Water District commends the Texas Water Development Board for the development of an excellent plan to be used as a broad, flexible guide for the orderly development of the State's water resources.