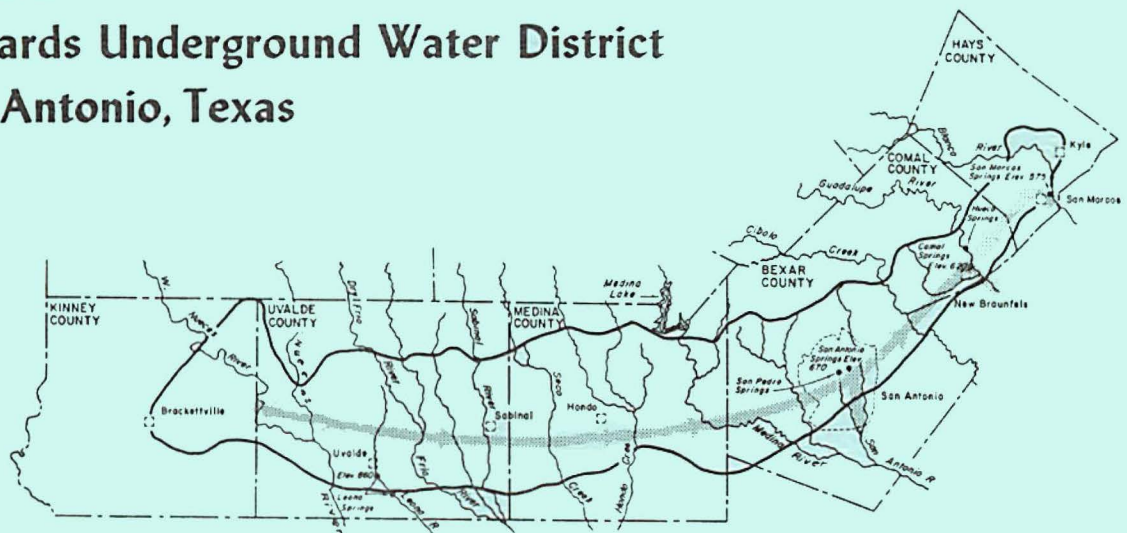


# Records of Ground-Water Recharge and Discharge for the Edwards Aquifer in the San Antonio Area, Texas, 1934-77

## Bulletin 37

Edwards Underground Water District  
San Antonio, Texas



Prepared in Cooperation with the U. S. Geological Survey  
and the Texas Department of Water Resources

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RECORDS OF GROUND-WATER RECHARGE AND  
DISCHARGE FOR THE EDWARDS AQUIFER IN THE  
SAN ANTONIO AREA, TEXAS, 1934-77

Compiled by

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U.S. Geological Survey

ABSTRACT

The average annual ground-water recharge to the Edwards aquifer in the San Antonio area, Texas, from 1934 through 1977 was about 589,200 acre-feet. A maximum annual recharge of 1,711,200 acre-feet occurred in 1958, and a minimum annual recharge of 43,700 acre-feet occurred in 1956.

A maximum annual discharge of 960,900 acre-feet occurred in 1977, and a minimum annual discharge of 388,800 acre-feet occurred in 1955. The maximum annual discharge by wells was 406,800 acre-feet in 1971.

## INTRODUCTION

Compilation of the records of ground-water recharge and discharge for the Edwards aquifer in the San Antonio area, Texas, is part of a continuing investigation by the U.S. Geological Survey in cooperation with the City Water Board of San Antonio, the Edwards Underground Water District, and the Texas Department of Water Resources.

The calculations of annual recharge are based on data collected from a network of stream-gaging stations and on assumptions that relate the runoff characteristics of gaged areas to ungaged areas. The basic approach (Puente, 1978) is a water-balance equation in which recharge within a stream basin is the difference between measured streamflow above and below the infiltration area of the aquifer, plus the estimated runoff within the infiltration area.

Annual discharge is compiled from: (1) Data collected by the Texas Department of Water Resources on pumpage for municipal, military, and industrial use; (2) calculations of pumpage for irrigation as determined from records of power consumption and irrigated acreage; and (3) U.S. Geological Survey records of springflow at points of discharge.

The hydrologic features in the San Antonio area are shown on figure 1, and the drainage basins and data-collection sites are shown on figure 2. Previous reports on recharge and discharge for the Edwards aquifer are given in the list of references.



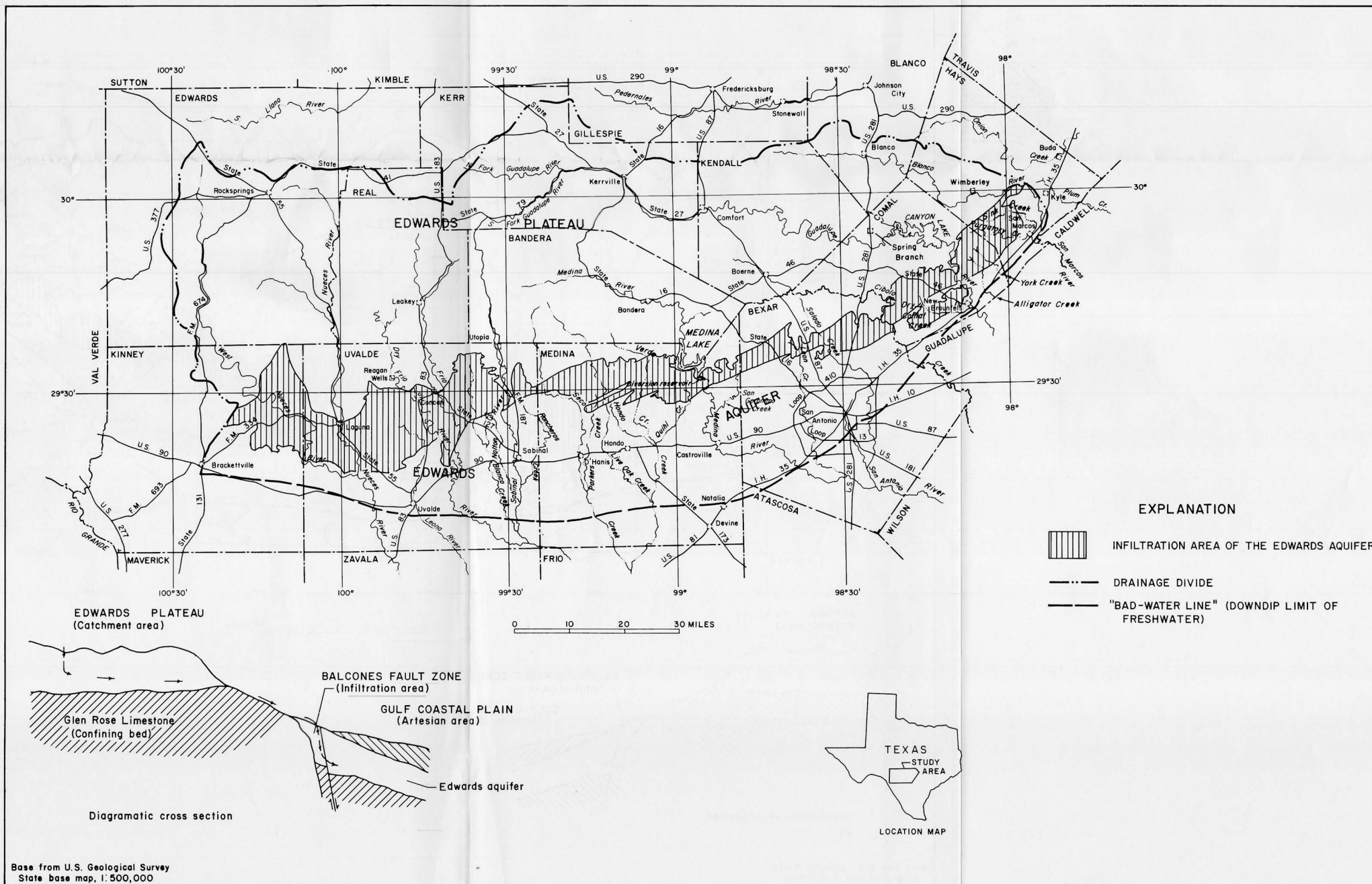
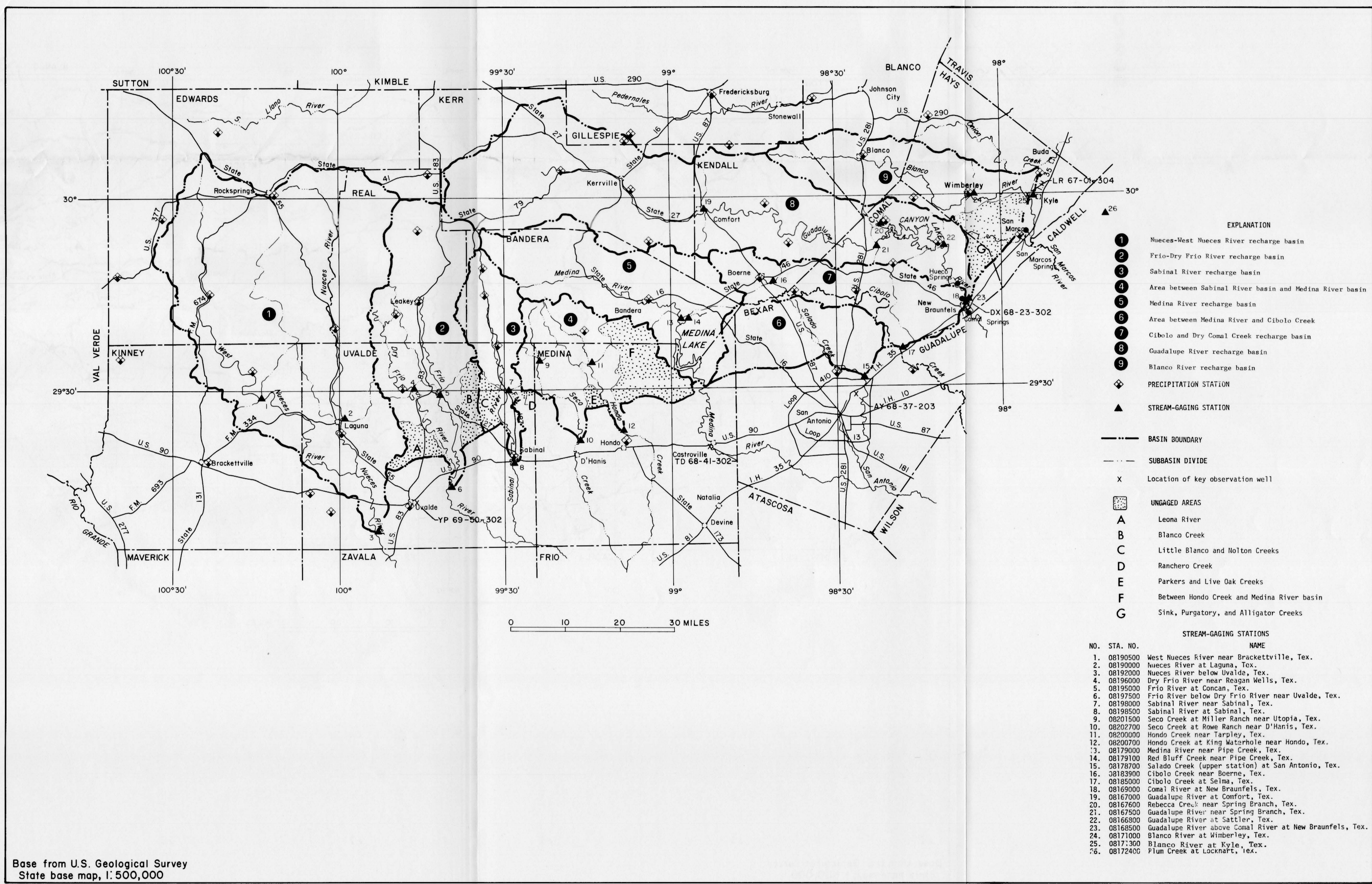


FIGURE 1.-Hydrologic features in the San Antonio area

Note: Large-format versions of the original plates are on the following pages.





- EXPLANATION**
- 1 Nueces-West Nueces River recharge basin
  - 2 Frio-Dry Frio River recharge basin
  - 3 Sabinal River recharge basin
  - 4 Area between Sabinal River basin and Medina River basin
  - 5 Medina River recharge basin
  - 6 Area between Medina River and Cibolo Creek
  - 7 Cibolo and Dry Comal Creek recharge basin
  - 8 Guadalupe River recharge basin
  - 9 Blanco River recharge basin
  - ◆ PRECIPITATION STATION
  - ▲ STREAM-GAGING STATION
  - BASIN BOUNDARY
  - - - SUBBASIN DIVIDE
  - X Location of key observation well
  - ▨ UNGAGED AREAS
  - A Leona River
  - B Blanco Creek
  - C Little Blanco and Nolton Creeks
  - D Ranchero Creek
  - E Parkers and Live Oak Creeks
  - F Between Hondo Creek and Medina River basin
  - G Sink, Purgatory, and Alligator Creeks
- STREAM-GAGING STATIONS**
- | NO. | STA. NO. | NAME   |
|-----|----------|--|
| 1.  | 08190500 | West Nueces River near Brackettville, Tex.               |
| 2.  | 08190000 | Nueces River at Laguna, Tex.                             |
| 3.  | 08192000 | Nueces River below Uvalde, Tex.                          |
| 4.  | 08196000 | Dry Frio River near Reagan Wells, Tex.                   |
| 5.  | 08195000 | Frio River at Concan, Tex.                               |
| 6.  | 08197500 | Frio River below Dry Frio River near Uvalde, Tex.        |
| 7.  | 08198000 | Sabinal River near Sabinal, Tex.                         |
| 8.  | 08198500 | Sabinal River at Sabinal, Tex.                           |
| 9.  | 08201500 | Seco Creek at Miller Ranch near Utopia, Tex.             |
| 10. | 08202700 | Seco Creek at Rowe Ranch near D'Hanis, Tex.              |
| 11. | 08200000 | Hondo Creek near Tarpley, Tex.                           |
| 12. | 08200700 | Hondo Creek at King Waterhole near Hondo, Tex.           |
| 13. | 08179000 | Medina River near Pipe Creek, Tex.                       |
| 14. | 08179100 | Red Bluff Creek near Pipe Creek, Tex.                    |
| 15. | 08178700 | Salado Creek (upper station) at San Antonio, Tex.        |
| 16. | 08183900 | Cibolo Creek near Boerne, Tex.                           |
| 17. | 08185000 | Cibolo Creek at Selma, Tex.                              |
| 18. | 08169000 | Comal River at New Braunfels, Tex.                       |
| 19. | 08167000 | Guadalupe River at Comfort, Tex.                         |
| 20. | 08167600 | Rebecca Creek near Spring Branch, Tex.                   |
| 21. | 08167500 | Guadalupe River near Spring Branch, Tex.                 |
| 22. | 08166800 | Guadalupe River at Sattler, Tex.                         |
| 23. | 08168500 | Guadalupe River above Comal River at New Braunfels, Tex. |
| 24. | 08171000 | Blanco River at Wimberley, Tex.                          |
| 25. | 08173600 | Blanco River at Kyle, Tex.                               |
| 26. | 08172400 | Plum Creek at Lockhart, Tex.                             |

FIGURE 2.-Drainage basins and data-collection sites in the San Antonio area



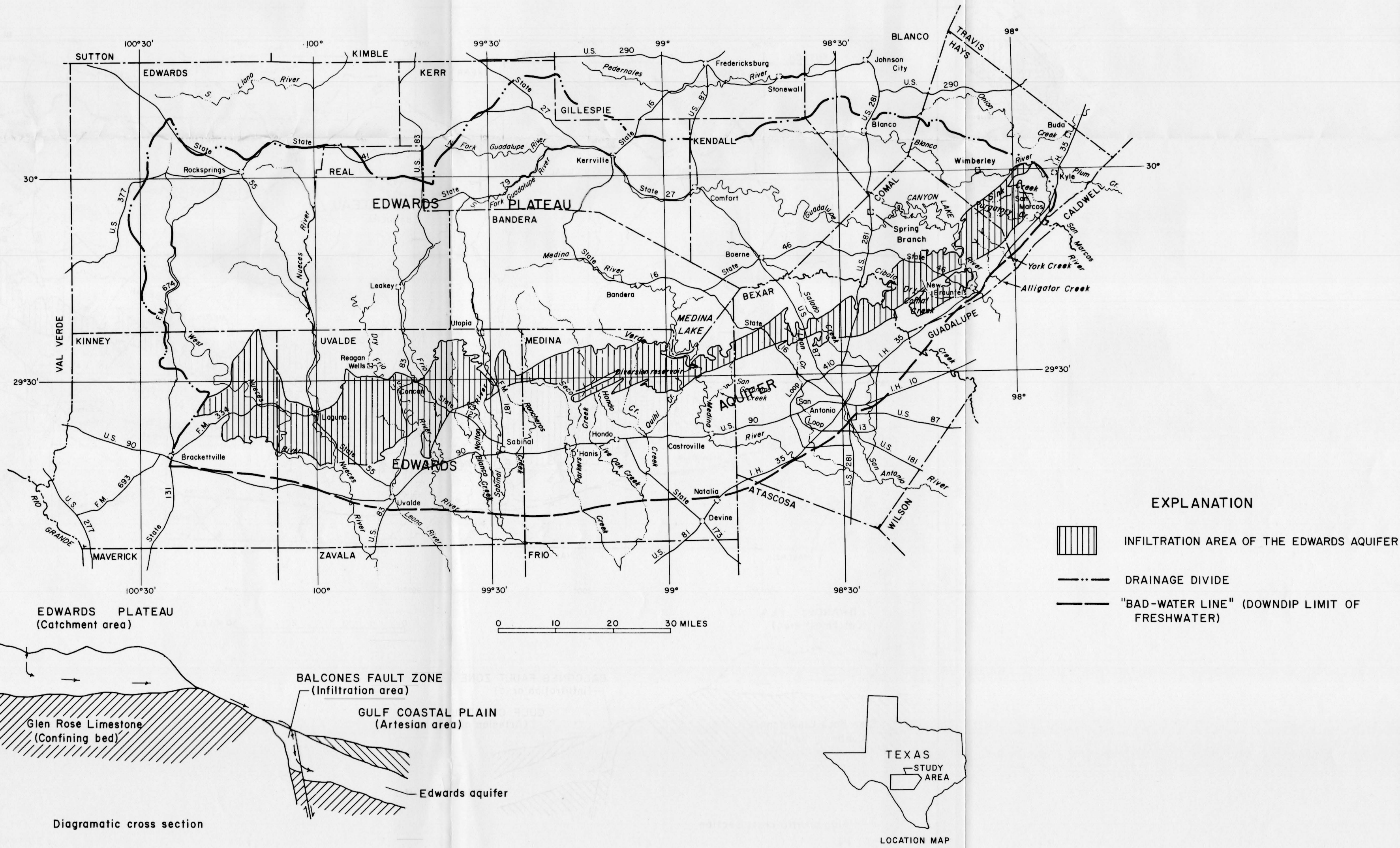


FIGURE 1.-Hydrologic features in the San Antonio area