

**EXPLANATION**

- EDWARDS AQUIFER
- STUDY AREA

**INDEX MAP SHOWING EXTENT OF THE EDWARDS AQUIFER**

SYSTEM	FORMATION	HYDROGEOLOGIC UNIT
CRETACEOUS	BUDA LIMESTONE	UPPER CONFINING BED
	DEL RIO CLAY	CONFINING BED
	GEORGETOWN LIMESTONE	EDWARDS AQUIFER
	EDWARDS LIMESTONE	EDWARDS AQUIFER
	WALNUT FORMATION	LOWER CONFINING BED
	GLEN ROSE LIMESTONE	AQUIFER

GENERALIZED HYDROGEOLOGIC COLUMN SHOWING THE EDWARDS AQUIFER AND ITS CONFINING BEDS AND THE CORRELATIVE FORMATIONS

**EDWARDS AQUIFER**

The Edwards aquifer is in an area locally known as the Balcones fault zone which separates the Edwards Plateau from the Gulf Coastal Plain (index map). This fault zone is a series of normal, east-trending, down-to-the-east faults which trend from the east and northeast. In the study area, the faulting has juxtaposed the Edwards aquifer against younger, relatively impermeable clays, limestones, and marls to the east, and against older, less permeable limestones to the west. Vertical displacement along the faults is as much as 200 feet; however, there is no evidence that the aquifer is completely offset by the fault zone (generalized hydrogeologic section). The lithologic descriptions used in this report are adapted from Rodda and others (1970), Garner and Young (1971), and Brune and Duffin (1983).

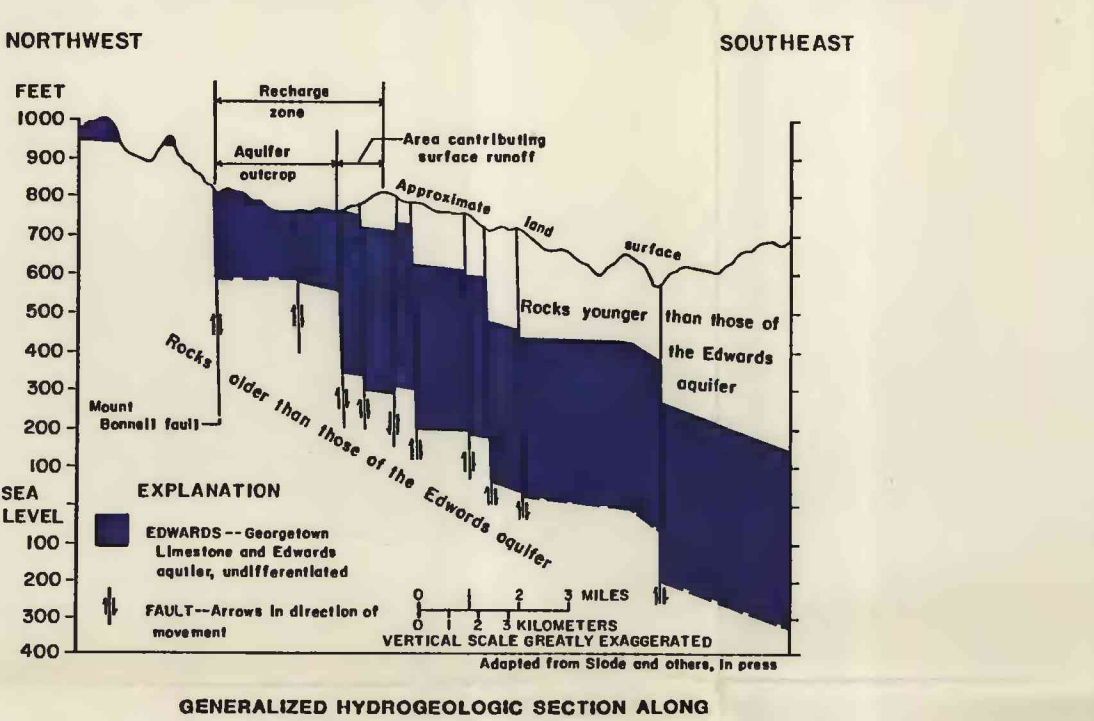
**HYDROGEOLOGIC SETTING**

The Edwards aquifer hydrologically associated with Barton Springs extends from the Colorado River on the north to the City of Kyle on the south, and underlies parts of Travis and Hays Counties. The northern boundary of the aquifer is a hydrologic boundary formed by the Colorado River; the southern boundary is a ground-water divide within the Edwards aquifer; the eastern boundary is the downward limit of freshwater concentration of dissolved solids less than 1,000 milligrams per liter, locally known as the "red-water" line (Andrews and others, 1981); and the western boundary is the westmost occurrence of contiguous Edwards Limestone, and commonly coincides with the Mount Bonnell and associated faults. Isolated outcrops of the Edwards Limestone exist west of the Mount Bonnell and associated faults, but are not considered to be part of the Edwards aquifer.

Irregular dissolution of the Georgetown and Edwards Limestone has created porosity that greatly affects the recharge to, and the hydraulic properties of, the Edwards aquifer. Faulting of the limestones created near-vertical planes, joints, and fractures that allow large volumes of water to enter the aquifer. Much of the porosity along bedding planes is a result of either solution-collapse structures or dissolution of the limestone by acidic water during a period of subaerial exposure at the close of the deposition of the Edwards Limestone (Roberts, 1971). The dissolution-collapse porosity has created permeability throughout much of the aquifer. Much of the recharge to the Edwards aquifer is a north-northeast along the strike of the aquifer toward Barton Springs, which is the major discharge point of the Edwards aquifer in the Austin area.

**RECHARGE ZONE**

As shown on the geohydrologic map, the recharge zone includes the outcrop of the Edwards aquifer in the study area and those parts of the drainage areas of the six major creeks that are underlain by the upper confining bed, but which contribute surface runoff to the outcrop area of the aquifer.



GENERALIZED HYDROGEOLOGIC SECTION ALONG DIP OF THE EDWARDS AQUIFER

**INTRODUCTION**

The Edwards aquifer extends in a narrow belt from Bell County in the northeast to Kinney County in the southwest (index map) and provides water for at least nine counties in south-central Texas. Hydrologic boundaries divide the Edwards aquifer into several parts. This study focuses on the Edwards aquifer in the Austin area for which Barton Springs is the major discharge point (Slade, Dorney, and Stewart, in press). This part of the Edwards aquifer provides the municipal, industrial, domestic, and agricultural water supplies for about 30,000 people in the Austin area (southern Travis and northern Hays Counties). Discharge from Barton Springs sustains streamflow at the confluence of Barton Creek and flows into Tom Lake. Much of the land use within the outcrop area of the Edwards aquifer near Austin is rapidly changing from natural woodland and grassland to commercial and residential developments. Recreational development can result in a substantial degradation of the quality of water that recharges the aquifer; the extent of the recharge zone of the Edwards aquifer was delineated to provide information to the City of Austin for their use in formulating a plan for protecting and managing ground-water quality.

The purpose of this report is to define and delineate the areal extent of the recharge zone of the Edwards aquifer in southern Travis and northern Hays Counties. The areal boundary of the recharge zone was determined by: (1) geologic mapping of the aquifer area; (2) interpretation of aerial photographs; (3) field verification of existing geologic maps (Barne, 1974; DeCook, 1960; Garner and Young, 1971; Rodda and others, 1970; and Smith, 1978); and (4) streamflow-loss studies (Slade, Dorney, and Stewart, in press).

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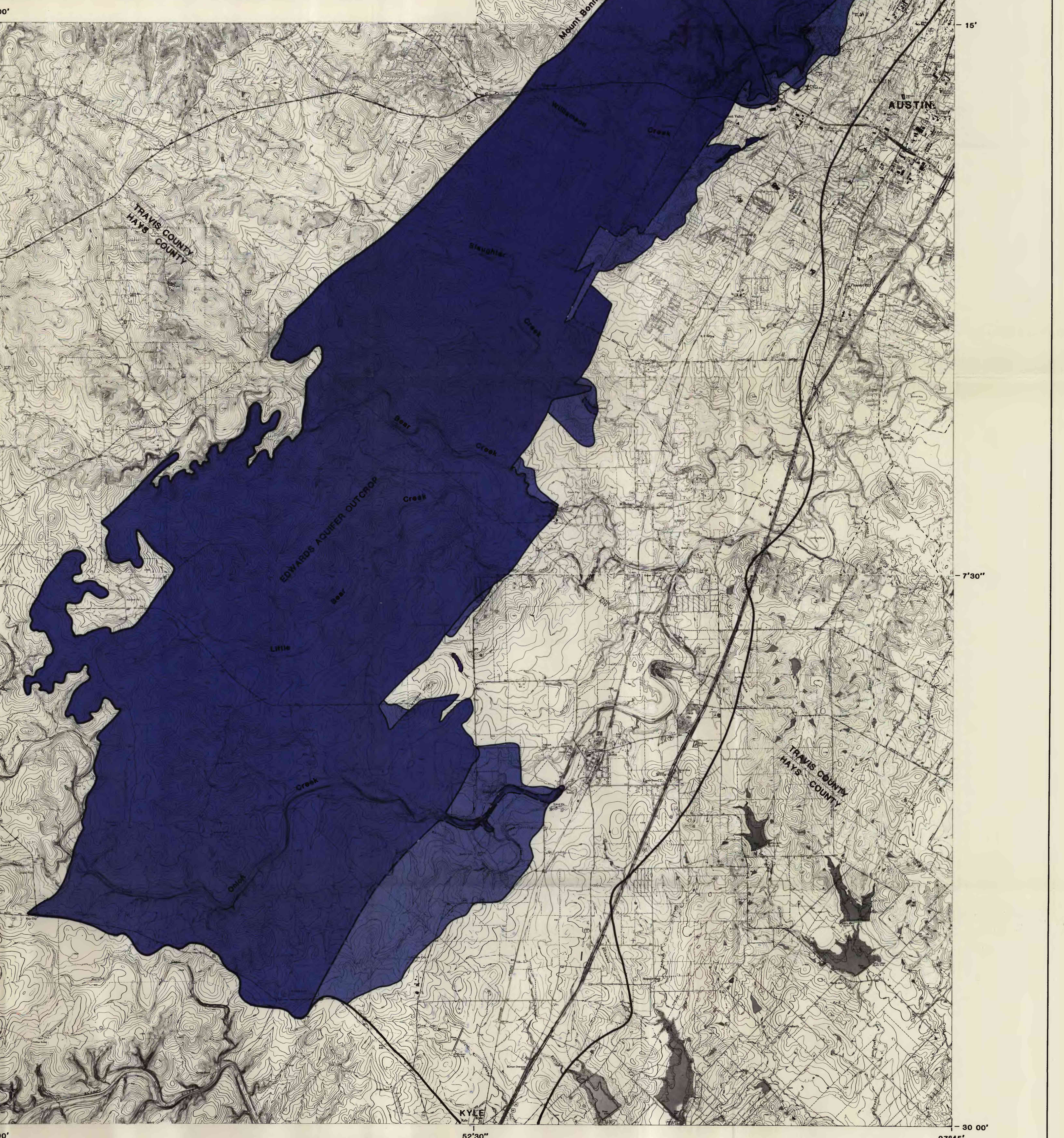
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**CONVERSION FACTORS**

For use of readers who prefer to use metric units, conversion factors for terms used in this report are listed below.

Multiply	By	To obtain
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)

Base from U.S. Geological Survey, 1:24,000 quadrangle maps: Austin West, 1952 (Photorevised 1973), Driftwood, 1958, Signal Hill, 1967 (Photorevised 1973), Mountain City, 1967 (Photorevised 1973), Oak Hill, 1954 (Photorevised 1973), and Buda, 1967 (Photorevised 1973)



**GEOHYDROLOGIC MAP**

SCALE 1:48,000

0 1 2 MILES

0 1 2 KILOMETERS

CONTOUR INTERVALS 10 AND 20 FEET

DATUM IS SEA LEVEL

**EXPLANATION**

- BOUNDARY OF THE EDWARDS AQUIFER
- HYDROLOGICALLY ASSOCIATED WITH BARTON SPRINGS—From Andrews and others (1984)
- RECHARGE ZONE
- Outcrop of the Georgetown and Edwards Limestones, which constitute the Edwards aquifer. Boundary dashed where inferred
- Part of drainage area of major creek that is underlain by the upper confining bed, but which contributes surface runoff either to outcrop of Edwards aquifer or to losing reach of creek