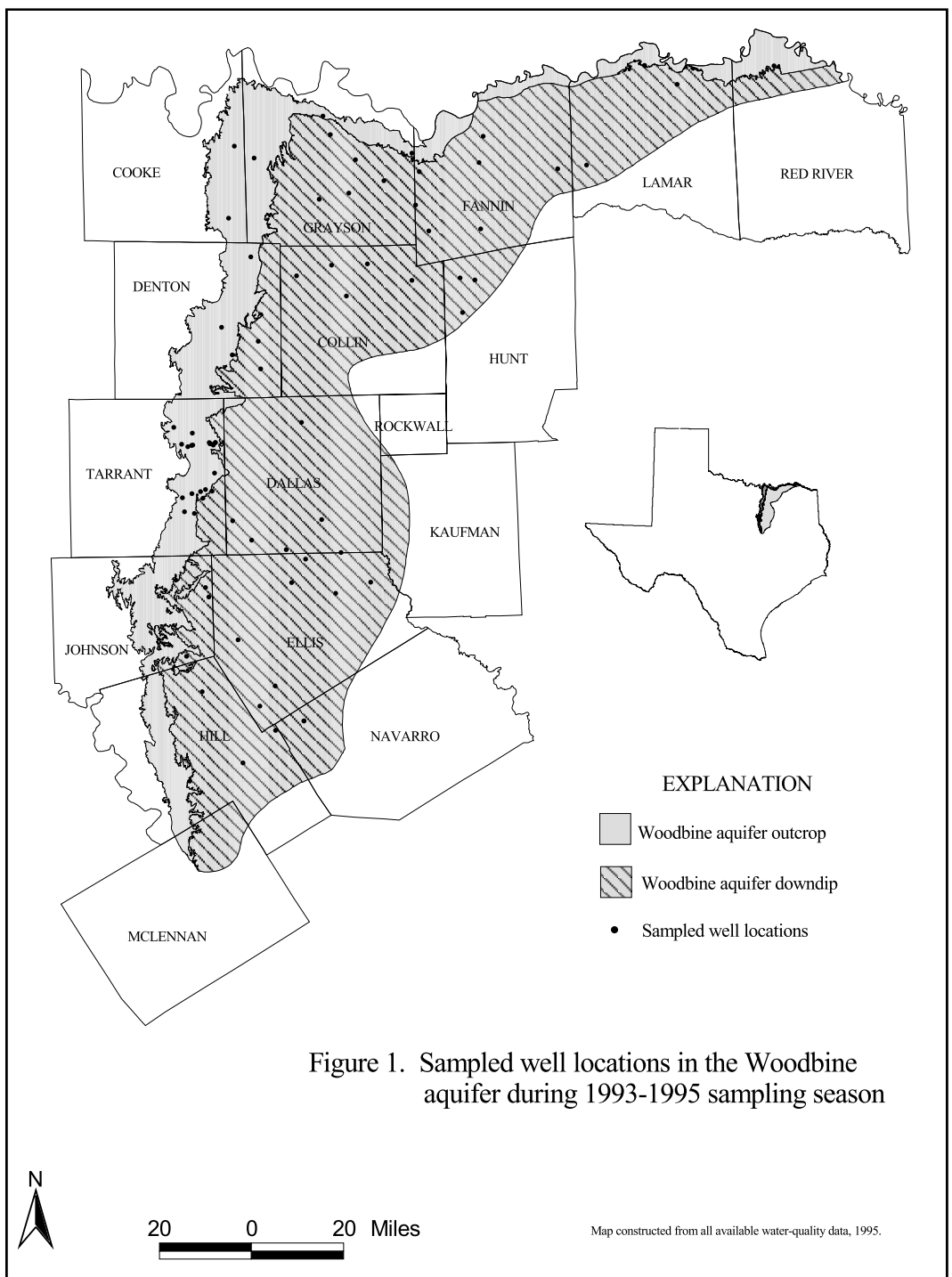


Water Quality in the Woodbine Aquifer

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INTRODUCTION

The Woodbine aquifer covers parts of 17 counties in north-central Texas, extending from McLennan County in the south to Grayson, Fannin, Lamar, and Red River counties in the north. It crops out in a northeast-southwest trend from McLennan to Cooke and Grayson counties, then parallels the Red River in a west-east strike, cropping out in Fannin, Lamar, and Red River counties. Seventy-eight wells completed in the aquifer were sampled from 1993 through 1995 by the Texas Water Development Board (TWDB) as part of its program to monitor the ambient water quality in major and minor aquifers throughout the state and any changes that may have occurred over time. The map in Figure 1 illustrates the extent of the aquifer's outcrop and subsurface downdip portion and location of sampled wells. The author thanks the landowners who permitted their wells to be sampled; the TWDB environmental quality specialists who collected the samples: John Asensio, Merrick Biri, Dennis Jones, Ron Mohr, Robbie Ozment, Lennie Winkelman, and Eddie Zapata; and geologist Phil Nordstrom who edited the atlas. TWDB graphics specialists Alison Omo and Erika Boghici created the illustrations using ArcView.



The Woodbine Formation in this location is composed of fine-grained, cross-stratified fluvial sandstones interbedded with overbank shale and clay deposited during the Cretaceous. The aquifer dips eastward into the subsurface where it reaches a maximum depth of 2,500 feet below land surface. Regionally, it thickens downdip and toward the northeast, ranging in thickness from 230 feet near the southern extent of the outcrop to approximately 700 feet near the downdip limit in Fannin County. The regional dip to the southeast near the outcrop averages 35 feet per mile, but increases to 75 feet per mile near the downdip limit of fresh to slightly saline water.

In its northern extent, the aquifer is divided into three water-bearing zones readily distinguished on electric logs of wells between Dallas and Sherman, but less easily determined downdip or over long distances along strike. The three zones differ considerably in productivity and quality; only the lower two zones of the aquifer are developed to supply water for domestic and municipal use as the upper zone yields limited amounts of water containing large amounts of iron. Farther to the east, the Woodbine produces oil and gas in the East Texas Basin.