

Figure 5. Fluoride content in water of the Woodbine aquifer

Stiff diagrams, plotted in Figure 6 for a representative number of wells in the study area, illustrate that sodium bicarbonate water is the dominant hydrochemical facies in the Woodbine aquifer. Dissolved solids are generally higher in the south, as indicated by the greater widths of the diagrams, and lower in the outcrop. Higher sulfate concentrations, as indicated by the longer axes at the base of the figures, are also apparent in the southeast part of the aquifer. Some wells in the downdip portions of the aquifer contain chloride as the dominant anion, as exemplified by three wells on the map, one each in Collin, Dallas, and Ellis counties.

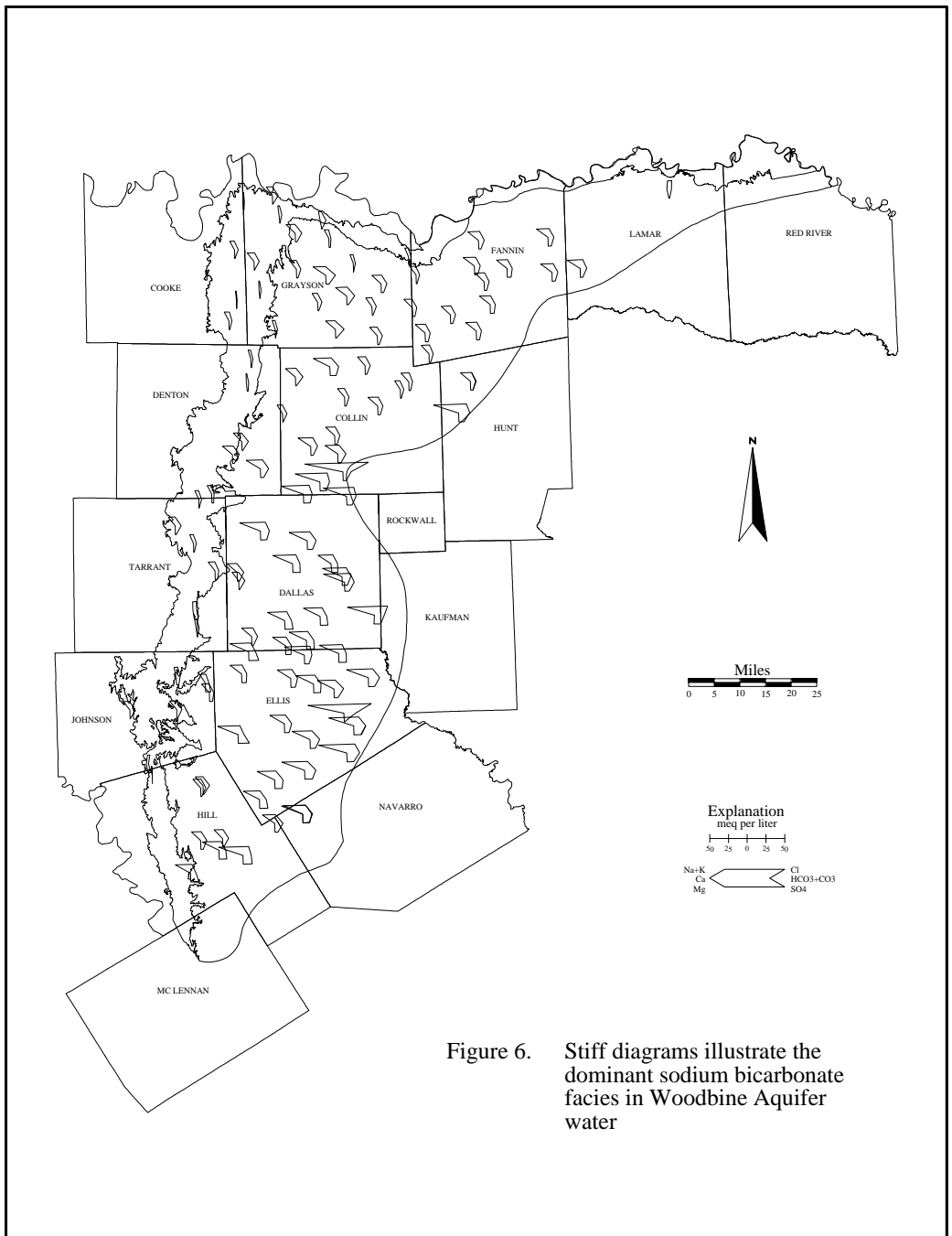


Figure 6. Stiff diagrams illustrate the dominant sodium bicarbonate facies in Woodbine Aquifer water

Table 4 lists ranges and average concentrations (of only those analyses above detection limits) of dissolved trace element constituents in the Woodbine, for the most part detected in insignificant amounts. None were found above the primary MCL, and only iron and manganese were detected in amounts greater than their secondary MCLs. These occur naturally as iron-rich carbonates are dissolved and are generally indicative of localized reducing conditions in the aquifer. The map in Figure 7 illustrates specific well locations where iron and manganese exceeded the secondary constituent levels of 0.3 mg/l (300µg/l) and 0.05 mg/l (50 µg/l), in a total of 15 percent and 22 percent of the recent samples, respectively. In apparent contrast to the other maps, the higher levels of iron and manganese are found mainly in that portion of the aquifer that crops out to the west, where exposures of siderite, limonite, and hematite concretions are common (Stephenson, 1952). The map is misleading, however, as the iron-rich upper zone in deeper wells to the east is not sampled because the zone is typically sealed off with casing.

Constituent	% Above Detection	Range	Average	# > MCL
Arsenic	10	<10 - 8	4	
Barium	90	<10 - 327	18	
Boron	100	80 - 5,500	1,451	
Cadmium	1	1 sample at 6		
Chromium	14	<20 - 16	5	
Copper	35	<20 - 53	8	
Iron	85	<20 - 13,000	786	13* (15%)
Lead	0			
Manganese	83	<20 - 1,100	118	17* (22%)
Molybdenum	1	1 sample at 5		
Silver	0			
Vanadium	0			
Zinc	59	<20 - 1,100	107	
Aluminum	45	<50 - 1,000	119	
Selenium	0			
Mercury	1	1 sample at 0.3		

* Secondary MCL

Table 4. Dissolved trace elements in Woodbine ground water in micrograms/liter.