

D AQUIFER

The D aquifer is present in the southwestern and northeastern parts of the area and consists of the Dakota Sandstone, Morrison Formation, Cow Springs Sandstone, Bluff Sandstone, Summerville Formation, and Entrada Sandstone. The aquifer is composed of a series of sandstone, mudstone, and siltstone beds and includes carbonaceous material in the upper part. The aquifer is about 900 ft thick at Lohali Point and 1,000 ft thick near Teec Nos Pos; the aquifer has been eroded extensively and probably does not reach a maximum thickness of more than 1,000 ft.

Ground water in the D aquifer is under unconfined conditions. Although the formations that make up the aquifer probably are hydraulically connected, most of the water is derived from a few sandstone beds. Well yields range from less than 5 to 25 gal/min and depend on the saturated thickness of the aquifer.

In the southwestern part of the area the water is of marginal to unsuitable chemical quality for domestic use; the sulfate and dissolved-solids concentrations generally exceed the recommended limits of 250 and 500 mg/L, respectively, in drinking water (U.S. Public Health Service, 1962). Water samples from five wells have fluoride concentrations that range from 0.3 to 1.0 mg/L. In the northeastern part of the area the water probably is of acceptable chemical quality for domestic use; water samples from wells 9K-216 and 9T-527 have less than 500 mg/L of dissolved solids and 0.4 and 0.9 mg/L fluoride, respectively. The water from well 12T-502, however, contains 1,220 mg/L of dissolved solids and 8.4 mg/L of fluoride. The recommended average optimum fluoride concentration for a water supply differs according to the annual average maximum daily air temperatures (U.S. Public Health Service, 1962). In the northern part of the Chinle area the annual average maximum daily air temperature is about 65°F, and the optimum concentration of fluoride in drinking water is 0.9 mg/L. The presence of concentrations greater than 1.8 mg/L is grounds for rejection of the water for public supply.

ALLUVIUM

The alluvium along the channels and flood plains of the larger washes may yield small amounts of water to wells. The alluvium is from a few feet thick along the smaller washes to as much as 225 ft thick along Chinle Wash near Chinle. Where the saturated alluvium is several tens of feet thick, it may be considered a relatively permanent source of water; however, where the alluvium is less thick, the wells that penetrate the unit may go dry during periods of drought.

The water in the alluvium along most of the smaller washes is of unsuitable chemical quality for domestic use. The sulfate and dissolved-solids concentrations exceed the recommended limits of 250 and 500 mg/L, respectively, in drinking water (U.S. Public Health Service, 1962). The fluoride concentrations in the water from wells 10R-51 and 10R-58 are 1.5 and 1.6, respectively. At Chinle, the water in the alluvium is of suitable chemical quality for domestic use. The water from the NTUA North well contains 310 mg/L of dissolved solids and 0.4 mg/L of fluoride. Near Many Farms, the water is of marginal to unsuitable chemical quality for most uses.

EXPLANATION

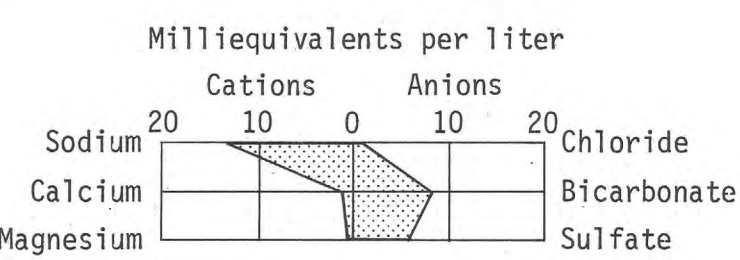
● **10K-237**
2492
2228
6000
1.0

WELL THAT PENETRATES THE D AQUIFER—First entry, 10K-237, is well number or name. Second entry, 2492, is depth to water in feet below land surface (R, depth to water reported; M, depth to water measured; F, flowing well). Third entry, 5725, is altitude of the water level in feet above mean sea level. Fourth entry, 6000, is specific conductance in micromhos per centimeter at 25°C (specific conductance is an indication of the dissolved-solids concentration in water). Fifth entry, 1.0, is fluoride concentration in milligrams per liter.

○ **10R-166**
1385
1365
1330
1.7

WELL THAT PENETRATES THE ALLUVIUM—First entry, 10R-166, is well number or name. Second entry, 1385, is depth to water in feet below land surface (R, depth to water reported; M, depth to water measured). Third entry, 1365, is altitude of the water level in feet above mean sea level. Fourth entry, 1330, is specific conductance in micromhos per centimeter at 25°C (specific conductance is an indication of the dissolved-solids concentration in water). Fifth entry, 1.7, is fluoride concentration in milligrams per liter.

CHEMICAL-QUALITY PATTERN DIAGRAM—Shows major chemical constituents in milliequivalents per liter. The pattern is in a variety of shapes and sizes, which provides a means of comparing, correlating, and characterizing similar or dissimilar types of water. The pattern tends to maintain its characteristic shape as the sample becomes dilute or concentrated, and the pattern size varies in proportion to the variation in dissolved solids.



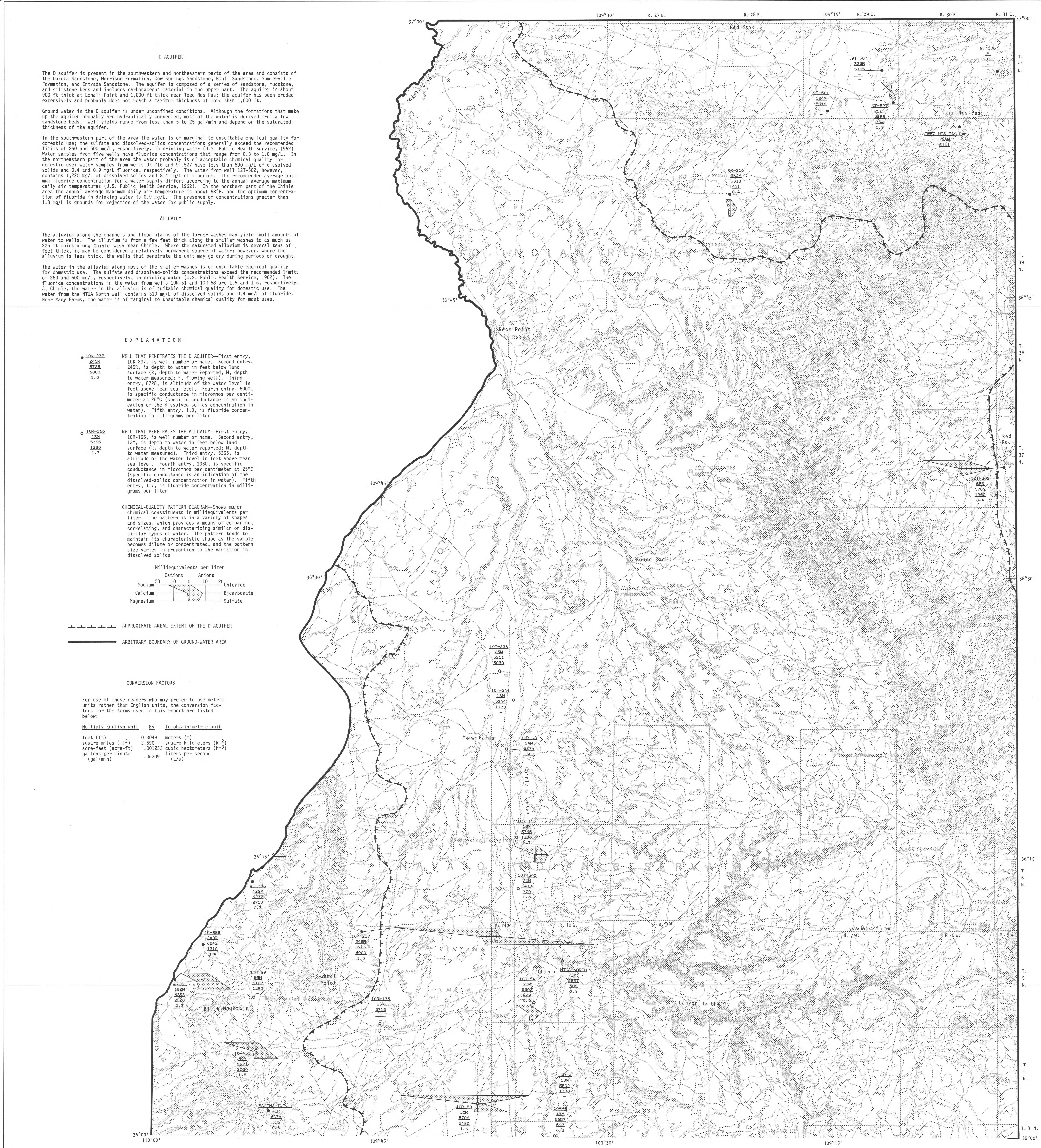
— APPROXIMATE AREAL EXTENT OF THE D AQUIFER

— ARBITRARY BOUNDARY OF GROUND-WATER AREA

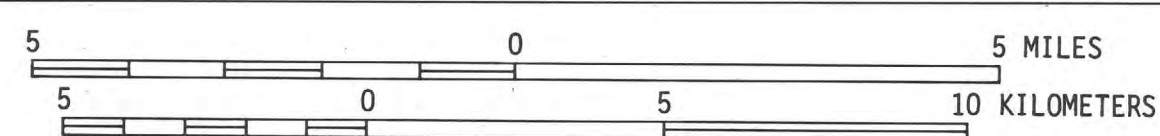
CONVERSION FACTORS

For use of those readers who may prefer to use metric units rather than English units, the conversion factors for the terms used in this report are listed below:

Multiply English unit	By	To obtain metric unit
feet (ft)	0.3048	meters (m)
square miles (mi ²)	2.590	square kilometers (km ²)
acre-feet (acre-ft)	0.01233	cubic hectometers (hm ³)
gallons per minute (gal/min)	0.06309	liters per second (L/s)



BASE FROM U.S. GEOLOGICAL SURVEY SHIPROCK 1:250,000, 1969



CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100-FOOT INTERVALS
DATUM IS MEAN SEA LEVEL

GROUND-WATER CONDITIONS IN THE D AQUIFER AND ALLUVIUM

MAPS SHOWING GROUND-WATER CONDITIONS IN THE NORTHERN PART OF THE CHINLE AREA, APACHE COUNTY, ARIZONA—1976

By

Gary W. Levings and C. D. Farrar

