PREPARED IN COOPERATION WITH THE
ARIZONA WATER COMMISSION

INTRODUCTION

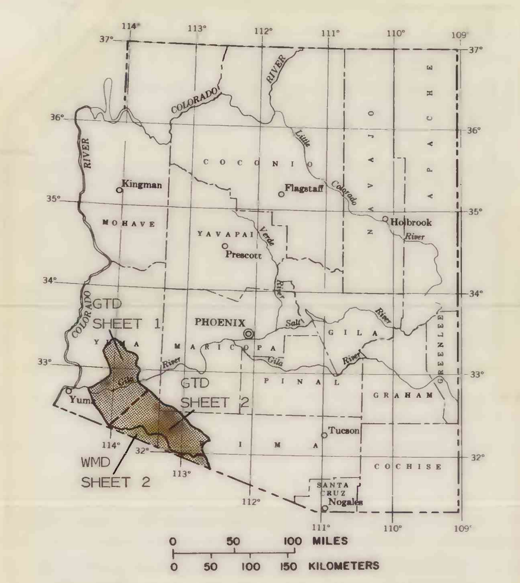
The Gila River drainage from Texas Hill to Dome area and the western Mexican drainage area include about 4,700 mi^2 in southwestern Arizona. The main water-bearing unit comprises the unconsolidated alluvium deposited by the Gila River and its ephemeral tributaries and the unconsolidated to weakly consolidated alluvium in the valleys that separate the mountains. Igneous, metamorphic, and sedimentary rocks that make up the northwest-trending block-faulted mountains may yield a few gallons per minute of water to wells and springs. Most of the ground-water development has taken place in the Wellton-Mohawk area in the northern part of the Gila River drainage from Texas Hill to Dome area (see sheets 1 and 3), where the alluvium consists of an upper sandy unit and a lower gravel unit (U.S. Bureau of Reclamation, 1963, p. 42-43). The upper sandy unit contains sand, silt, clay, and some gravel lenses and ranges from 20 to 80 ft in thickness. The lower gravel unit ranges from 10 to 70 ft in thickness and overlies a clay layer (U.S. Bureau of Reclamation, 1963, p. 42-43).

The hydrologic data on which these maps are based are available, for the most part, in computer-printout form for consultation at the Arizona Water Commission, 222 North Central Avenue, Suite 800, Phoenix, and at U.S. Geological Survey offices in: Federal Building, 301 West Congress Street, Tucson; Valley Center, Suite 1880, Phoenix; and 1940 South Third Avenue, Yuma. Material from which copies can be made at private expense is available at the Tucson, Phoenix, and Yuma offices of the U.S. Geological Survey.

GROUND WATER

In the Wellton-Mohawk area, extensive use of ground water for irrigation began in the 1920's, and by 1950 nearly 50,000 acre-ft of ground water was being pumped. Water levels that were 10 to 20 ft below the land surface in the mid-1920's had declined to more than 30 ft below the land surface by 1952—the first year that Colorado River water was imported for irrigation. The use of imported Colorado River water for irrigation caused the water levels to rise, and in the early 1970's water levels were within 6 ft of the land surface in most of the area. Since 1961, a network of about 70 wells has been pumping about 200,000 acre-ft of ground water annually for drainage of the waterlogged land. During the period 1915-76, about 4,150,000 acre-ft of ground water was withdrawn, of which about 3,253,000 acre-ft was pumped for drainage purposes. In 1976, 64,860 acres of cropland was under irrigation in the Wellton-Mohawk area (U.S. Bureau of Reclamation, 1976a). Ground water in the Wellton-Mohawk area is of unsuitable chemical quality for most uses. Specific-conductance values of more than 12,000 micromhos are common (see sheet 3), and fluoride concentrations generally range from 1 to 10 mg/L (milligrams per liter). (See Kister, 1973.) The chemical quality of most of the ground water was marginal prior to irrigation development, and recycling of the water gradually increased the salinity; by 1946, the ground water was no longer suitable for irrigation (Babcock and others, 1947). At present (1979), most of the water used for irrigation is imported from the Colorado River.

In the rest of the Gila River drainage from Texas Hill to Dome area and in the western Mexican drainage area, ground-water development has been small (see sheets 1 and 2). Well yields range from about 5 to 50 gal/min, and the water is used for domestic, livestock, wildlife, and mining supplies. The specific-conductance values indicate that dissolved-solids concentrations range from about 270 to 3,100 mg/L. The dissolved-solids values may be estimated by multiplying the specific conductance by 0.6, which is the average ratio of dissolved solids to specific conductance in these areas. The maximum contaminant level for dissolved solids in public water supplies is 500 mg/L, as proposed in the secondary drinking-water regulations of the U.S. Environmental Protection Agency (1977b, p. 17146). The U.S. Environmental Protection Agency (1977a, b) has established national regulations and guidelines for the quality of water provided by public water systems. The regulations are either primary or secondary. Primary drinking-water regulations govern those contaminants in drinking water that have been shown to affect human health. Secondary drinking-water regulations apply to those contaminants that affect esthetic quality. The primary regulations are enforceable either by the Environmental Protection Agency or by the States; in contrast, the secondary regulations are not Federally enforceable. The secondary regulations are intended as guidelines for the States. The regulations express limits as "maximum contaminant levels," where contaminant means any physical, chemical, biological, or radiological substance or matter in water. Except in the Wellton-Mohawk area, fluoride concentrations in water samples from wells and springs range from 0.0 to 10 mg/L. The maximum contaminant level for fluoride in public water supplies differs according to the annual average maximum daily air temperature (Bureau of Water Quality Control, 1978, p. 6). In the Gila River drainage from Texas Hill to Dome area and in the western Mexican drainage area the annual average maximum daily air temperature is about 86°F, and the maximum contaminant level for fluoride is 1.4 mg/L.



INDEX MAP SHOWING AREA OF REPORT (SHADED)

EXPLANATION

ARBITRARY BOUNDARY OF GROUND-WATER AREA—GILA RIVER FROM TEXAS HILL TO DOME, GTD; WESTERN MEXICAN DRAINAGE, WMD

CONVERSION FACTORS

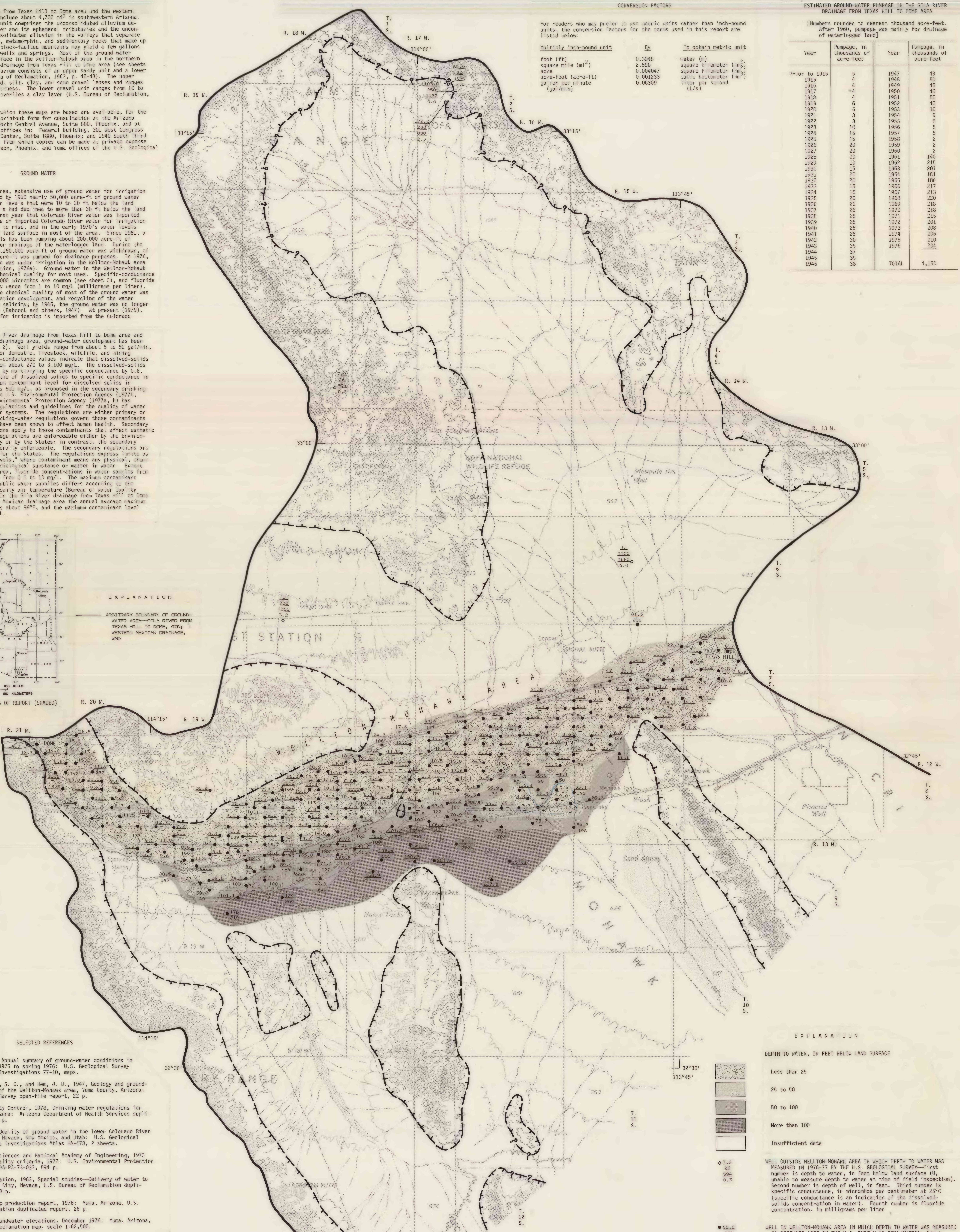
For readers who may prefer to use metric units rather than inch-pound units, the conversion factors for the terms used in this report are listed below:

Multiply inch-pound unit	By	To obtain metric unit
foot (ft)	0.3048	meter (m)
square mile (mi^2)	2.590	square kilometer (km^2)
acre	0.004047	square kilometer (km^2)
acre-foot (acre-ft)	0.001233	cubic hectometer (hm^3)
gallon per minute (gal/min)	0.06309	liter per second (L/s)

ESTIMATED GROUND-WATER PUMPAGE IN THE GILA RIVER DRAINAGE FROM TEXAS HILL TO DOME AREA

[Numbers rounded to nearest thousand acre-feet. After 1960, pumpage was mainly for drainage of waterlogged land]

Year	Pumpage, in thousands of acre-feet	Year	Pumpage, in thousands of acre-feet
Prior to 1915	5	1947	43
1915	4	1948	50
1916	4	1949	45
1917	4	1950	46
1918	4	1951	50
1919	6	1952	40
1920	6	1953	16
1921	3	1954	9
1922	3	1955	8
1923	10	1956	5
1924	15	1957	5
1925	15	1958	2
1926	20	1959	2
1927	20	1960	2
1928	20	1961	140
1929	10	1962	215
1930	15	1963	201
1931	20	1964	181
1932	20	1965	186
1933	15	1966	217
1934	15	1967	213
1935	20	1968	220
1936	20	1969	218
1937	25	1970	218
1938	25	1971	215
1939	25	1972	201
1940	25	1973	208
1941	25	1974	206
1942	30	1975	210
1943	35	1976	204
1944	37		
1945	35		
1946	38	TOTAL	4,150



EXPLANATION

DEPTH TO WATER, IN FEET BELOW LAND SURFACE

- Less than 25
- 25 to 50
- 50 to 100
- More than 100
- Insufficient data

○ 7.9 / 26 / 594 / 0.3 — WELL OUTSIDE WELLTON-MOHAWK AREA IN WHICH DEPTH TO WATER WAS MEASURED IN 1976-77 BY THE U.S. GEOLOGICAL SURVEY—First number is depth to water, in feet below land surface (U, unable to measure depth to water at time of field inspection). Second number is depth of well, in feet. Third number is specific conductance, in micromhos per centimeter at 25°C (specific conductance is an indication of the dissolved-solids concentration in water). Fourth number is fluoride concentration, in milligrams per liter

● 62.2 / 158 — WELL IN WELLTON-MOHAWK AREA IN WHICH DEPTH TO WATER WAS MEASURED IN DECEMBER 1976 BY THE U.S. BUREAU OF RECLAMATION—First number is depth to water, in feet below land surface. Second number is depth of well, in feet. See sheet 3 for specific-conductance data

APPROXIMATE BOUNDARY OF THE MAIN WATER-BEARING UNIT—The main water-bearing unit consists of unconsolidated to weakly consolidated alluvium. The igneous, metamorphic, and sedimentary rocks that make up the mountains may yield a few gallons per minute to wells and springs. Queried where uncertain

ARBITRARY BOUNDARY OF GROUND-WATER AREA

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EL CENTRO 1:250,000, 1958,
PHOENIX 1:250,000, 1954, AND
SALTON SEA 1:250,000, 1959

DEPTH TO WATER, WELL DEPTH, SPECIFIC CONDUCTANCE, AND FLUORIDE CONCENTRATION—NORTHERN PART OF GILA RIVER DRAINAGE FROM TEXAS HILL TO DOME AREA

MAPS SHOWING GROUND-WATER CONDITIONS IN THE GILA RIVER DRAINAGE FROM TEXAS HILL TO DOME AREA AND IN THE WESTERN MEXICAN DRAINAGE AREA, MARICOPA, PIMA, AND YUMA COUNTIES, ARIZONA–1977

BY
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