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EXPLANATION OF SYMBOLS	
N: PUMPAGE OF 500 ACRE-FEET OR LESS.	E: YUM AREA INCLUDES SOUTH GILA VALLEY, YUMA WESA, AND YUMA VALLEY. BEGINNING IN 1947 IN YUMA VALLEY, IN 1961 IN SOUTH GILA VALLEY, AND IN 1970 IN YUMA WESA. PUMPAGE WAS FOR DRAINAGE OF WATER-SOFTED AREAS.
A: WITHDRAWAL MOSTLY FOR DRAINAGE PURPOSES.	P: PREVIOUSLY PUBLISHED FIGURE REVISED.
Y: PUMPAGE FOR THESE AREAS WAS NOT ESTIMATED PRIOR TO 1974. THUS, TOTAL IS FOR 1974-77 ONLY. ESTIMATED PUMPAGE BEFORE 1974 IS INCLUDED IN OTHERS.	G: OTHERS* INCLUDES: AGUA FRIA BASIN, ALTAR VALLEY, ARAPAJO VALLEY, BIG SANDY VALLEY, BELL WILLIAMS, BLACK RIVER BASIN, BROWN RIVER BASIN, COLUMBIA RIVER BASIN, CUMMINGS BASIN, DUCK CREEK VALLEY, NEW RIVER-GOLD CREEK, OLD RIVER, PUEBLO VALLEY, RIVER VALLEY, SAN BERNARDINO VALLEY, SAN FRANCISCO RIVER BASIN, SAN SIMON WASH, TINTO BASIN, TUPAC RIVER BASIN, WESTERN MEXICAN DRAINAGE, AND WYATT RIVER. *IN 1974 THE RIVER VALLEY AND TINTO BASIN WERE MOSTLY FOR DOMESTIC AND STOCK WATERS AND THE AMOUNT IS UNKNOWN. TOTAL ANNUAL PUMPAGE FOR THESE AREAS IS ESTIMATED.
C: PUMPAGE FOR LMA AREA WAS INCLUDED IN SAN AGUA RIVER TO 1973. THUS, TOTAL IS FOR 1973-77 ONLY.	
D: PUMPAGE FOR UPA AND LSP AREAS WAS NOT ESTIMATED PRIOR TO 1966. THUS, TOTAL IS FOR 1966-77 ONLY. ESTIMATED PUMPAGE BEFORE 1966 AND IN 1974-77 IS INCLUDED IN OTHERS.	

deposits in the central parts of the basins, but small supplies of water can be obtained locally from the crystalline and consolidated sedimentary rocks in the mountains that bound the basins. In 1977 about 5.4 million acre-ft of water was withdrawn in the province, of which nearly 4.6 million acre-ft was used for the irrigation of crops. Through 1977, slightly more than 167 million acre-ft of ground water had been withdrawn; as a result, water levels are declining in much of the province.

In the Basin and Range lowlands precipitation for 1973-77 was about 16 percent below the long-term average. (See U.S. Environmental Data Service, 1973 (v. 77), 1974 (v. 78), 1975 (v. 79), 1976 (v. 80), 1977 (v. 81), Climatological data—annual summary—Arizona: National Oceanic and Atmospheric Administration, v. 77, no. 13, 18 p.; v. 78, no. 13, 18 p.; v. 79, no. 13, 18 p.; v. 80, no. 13, 19 p.; v. 81, no. 13, 19 p.) This trend was common in most of the Western United States, and severe drought conditions occurred in many areas. The effect of the below-normal precipitation on the groundwater reservoir is not known, but probably was minimal or small, mainly because the effect of large-scale runnings outweighs the effect of deficient precipitations.

In the southeastern part of the province the pattern of deficient precipitation was broken during the large floods in early October 1977; floods in the San Pedro and Santa Cruz Rivers caused widespread damage. At the weather stations in the southeastern part of the province, the average precipitation was 81 mm, which is 10 mm more than the long-term average for the period 1958-1976. (See U.S. Environmental Service, 1977, Climatological data—annual summary—Arizona; National Oceanic and Atmospheric Administration, p. 81, no. 13, 19-77.) Above-average precipitation continued into March 1978. (See U.S. Environmental Service, 1978, Climatological data—January, February, March—Arizona; National Oceanic and Atmospheric Administration, p. 82, no. 1 (January, 22 p.), 2 (February, 22 p.), and 3 (March, 21 p.).)

In the upper San Pedro and upper Santa Cruz areas water levels measured in spring 1978 were slightly higher than those measured in spring 1977. In the upper San Pedro area the average water-level change in 21 wells was +1.5 ft. A rise in water levels in the upper San Pedro area is not unusual because the ground-water reservoir responds readily to intermittent flow in the San Pedro River. In the upper Santa Cruz area the average change in 36 wells was +0.4 ft for 1977-78. Water levels have been declining in the upper Santa Cruz area at least since 1972. The water levels probably were being lowered by the above-normal ground-water recharge and reduced pumping for preirrigation owing to the above-average precipitation in the fall and winter of 1977-78.

Central highland province. --The Central highlands province is the smallest of the three water provinces. In this province ground water is obtained from thick sedimentary deposits in a few areas, from thin sedimentary deposits along stream channels, and locally from fractured crystalline and consolidated sedimentary rocks that are the dominant rock types in the province. Only a few thousand acres of land is under cultivation, and the amount of ground water withdrawn is small--about 38,000 acre-ft in 1977. The small amount of ground-water withdrawal has not resulted in any notable water-level declines except in parts of Chino Valley, where a decline of a few feet per year has been measured in the artesian aquifer.

Plateau uplands province. --In the Plateau uplands province ground-water development is small compared with that in the Basin and Range lowlands province, but it is somewhat greater than that in the Central Highlands province. Most of the ground water is pumped from layered sandstones that stores ground water under both confined and unconfined conditions and from thin deposits of sediment along the major streams. The use of ground water is limited largely to scattered farms and homesites, industrial and utility sites, and a few small communities. The Colorado River, the Rio Grande, and the Gila Mountains provide recreational areas. In 1977 about 78,000 acre-ft of ground water was withdrawn in the province. For the most part, no pattern of rise or decline in water levels is discernible.

Recent Publications Prepared by Personnel of the U. S. Geological Survey in Arizona

The following reports on the water resources and geology of Arizona were published or released to the open file from July 1, 1977, through June 30, 1978.

Aldridge, B. N., 1978, Unusual hydraulic phenomena of flash floods in Arizona, in Proceedings of the Conference on flash floods—hydrometeorological aspects: American Meteorological Society Preprints, p. 117-120.

Babcock, H. M., 1977, Annual summary of ground-water conditions in Arizona, spring 1976 to spring 1977: U.S. Geological Survey Water-Resources Investigations 77-106, maps.

Brown, D. E., Carmony, N. B., and Turner, R. M., 1978, Drainage map of Arizona showing perennial streams and some important wetlands: Arizona Game and Fish Department map, scale 1:1,000,000.

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