

INTRODUCTION

The lands of the Papago, San Xavier, and Gila Bend Indian Reservations include about 4,600 sq mi in south-central Arizona (fig. 1) and are characterized by low, rugged mountains, which are directly from the desert floor. The mountains are separated by broad, deep, sediment-filled basins, which generally trend northeast and slightly northward. The climate is arid to semiarid, and the precipitation pattern is characterized by two distinct types of storm-local storms (thunderstorms and isolated winter storms. Average annual precipitation ranges from 5 in. at the southwestern part of the Papago Indian Reservation to 20 in. in the Baboquivan Mountains (Sellers and Hall, 1974, p. 7, fig. 3). Rainfall occurs as intermittent showers along the mountain slopes and as snowfalls in the many washes that cut the desert floor. Surface-water resources, mainly storm runoff and occasional intermittent snowmelt, are not of sufficient quantity to be considered a dependable source of water for irrigation, mining, or public supply use. Some runoff, however, is stored in catchment tanks for use by livestock.

About 11,000 members of the Papago Tribe of Arizona live in the three reservations, which are divided into seven administrative districts (see map). Approximately one-half of the population resides in the Salt Spring district. With the exception of a small community of about 100 persons just south of the reservation, the Gila Bend Indian Reservation is uninhabited and used only for livestock. The economy of the Papago and San Xavier Indian Reservations is based largely on farming, mining, and livestock, all of which depend heavily on ground water. In 1980, about 6,000 acre-ft of ground water was withdrawn from two reservations for all uses; about 7,000 acre-ft of the ground water was used for irrigation at Vista Way and Papago Farms, 600 acre-ft for public supply, of which 300 acre-ft was for the Salt community, about 300 acre-ft for mine use, and an estimated 30 to 80 acre-ft for livestock. Ground water withdrawn from the Gila Bend Indian Reservation was negligible.

The purpose of the investigation was to evaluate the ground-water resources of the Papago, San Xavier, and Gila Bend Indian Reservations in terms of potential water supplies available in quantity and chemical quality for public supply, livestock, and irrigation uses. The study is an update of the study by Hallett and others (1962) and summarizes additional information on the three reservations that was collected by the U.S. Geological Survey in cooperation with the U.S. Bureau of Indian Affairs during 1978-81. Data from 574 wells were analyzed for the study. Although some springs exist in the mountains of the reservations, these water supplies are negligible and are not addressed in the report. Data sources that were used to compile the generalized geology are shown in the list and details that accompany figure 3. The 500-foot contour of estimated thickness of the basin-fill deposits (fig. 3), which is based on geologic data supplemented by geophysical data, is accurate to about 100 ft. The 2,000-foot contour (fig. 3), which is based entirely on geophysical investigations, is accurate to about 20 ft. Water wells (fig. 4) and chemical quality of water (fig. 5) for areas adjacent to reservations boundaries were taken from published reports for the specific areas (Hallett and others, 1962; 1963; 1964; 1965; 1966; 1967; 1968; 1969; 1970; 1971; 1972; 1973; 1974; 1975; 1976; 1977; 1978; 1979; 1980; 1981; 1982; 1983; 1984; 1985; 1986; 1987; 1988; 1989; 1990; 1991; 1992; 1993; 1994; 1995; 1996; 1997; 1998; 1999; 2000; 2001; 2002; 2003; 2004; 2005; 2006; 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019; 2020; 2021; 2022; 2023; 2024; 2025; 2026; 2027; 2028; 2029; 2030; 2031; 2032; 2033; 2034; 2035; 2036; 2037; 2038; 2039; 2040; 2041; 2042; 2043; 2044; 2045; 2046; 2047; 2048; 2049; 2050; 2051; 2052; 2053; 2054; 2055; 2056; 2057; 2058; 2059; 2060; 2061; 2062; 2063; 2064; 2065; 2066; 2067; 2068; 2069; 2070; 2071; 2072; 2073; 2074; 2075; 2076; 2077; 2078; 2079; 2080; 2081; 2082; 2083; 2084; 2085; 2086; 2087; 2088; 2089; 2090; 2091; 2092; 2093; 2094; 2095; 2096; 2097; 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