U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

OPEN-FILE REPORT 96-594
Mattie, J.A. and others, 1996, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, May 1996

INTRODUCTION

The Floridan aquifer system consists of the Upper and Lower Floridan aquifers separated by a middle confining unit. The middle confining unit and the Lower Floridan aquifer generally contain highly mineralized water in west-central Florida. In most reports on the hydrology of southwest Florida, the term "Floridan aquifer " has been applied to the water-bearing rocks herein referred to as the Upper Floridan aquifer. The Upper Floridan aquifer is a productive aquifer and supplies more than 10 times the amount of water pumped from either the surficial aquifer system or the intermediate aquifer system in most of the study area (Duerr and others, 1988).

This map report depicts the potentiometric surface of the Upper Floridan aquifer in May 1996. The potentiometric surface represents the level to which water will rise in tightly cased wells that tap a confined aquifer system. The surface is mapped by measuring the altitude of water levels in a network of wells and is represented on maps by contours that connect points of equal altitude. This map represents water-level conditions near the end of the dry season, when ground-water withdrawals for agricultural use are usually high. The cumulative rainfall for the study area was 12.35 inches above average for the period from June 1995 through May 1996 (Southwest Florida Water Management District, 1996).

This report, prepared by the U.S. Geological Survey in cooperation with the Southwest Florida Water Management District, is one of a series of Upper Floridan aquifer potentiometric-surface map reports made of the study area. Potentiometric-surface maps have been prepared for January 1964, May 1969, May 1971, May 1973, May 1974, and for each May and September since 1975. Water-level data are collected in May and September to show the near annual low and high water-level conditions, respectively. Most of the water-level data for this map were collected by the U.S. Geological Survey during the period of May 20-24, 1996. Supplemental data were collected by other agencies and companies.

SUMMARY OF HYDROGEOLOGIC CONDITIONS

Annual and seasonal fluctuations of the potentiometric surface at selected wells are shown by hydrographs in figure 1. The hydrographs generally indicate that water levels in areas north of the Hillsborough-Pasco County line (northern area), where the aquifer generally is unconfined and ground-water withdrawals are relatively small, remained fairly uniform from year-to-year and season-to-season, whereas water-levels south of the county line (southern area), where the aquifer is confined and withdrawals are relatively large, show much larger year-to-year and seasonal fluctuations. Maximum daily water levels for selected wells from May 1995 through May 1996 are shown in figure 2. The hydrographs show that water levels declined much more during May 1996 in the southern part of the study area than in the northern part. An example of this dynamic system is shown in the hydrograph for the ROMP 50 well where the water level declined about 8 feet. Because water-level measurements were made over a 5-day period in mid-May, the measurements do not absolutely represent a "snapshot" of conditions at a specific time, nor do they necessarily coincide with a seasonal low.

Water levels in most wells measured in May 1996 were lower than those measured in September 1995 (Metz and others, 1996). In 588 wells with paired measurements, the May 1996 level ranged from 36 feet below to 10 feet above the September 1995 level and averaged 3 feet below the September 1995 level. The greatest decline in water levels occurred in southern Hillsborough, central Manatee, and northern Sarasota Counties as a result of heavy seasonal ground-water withdrawals for irrigation.

Water levels measured in May 1996 were generally higher than those reported for May 1995 (Metz and Stelman, 1995). In 505 wells with paired measurements, the May 1996 level ranged from 9 feet below to 18 feet above the May 1995 level and averaged 1.5 feet above the May 1995 level.

REFERENCES

Duerr, A.D., Hunn, J.D., Lewelling, B.R., Trommer, J.T., 1988, Geohydrology and 1985 water withdrawals of the aquifer systems in southwest Florida, with emphasis on the intermediate aquifer system: U.S. Geological Survey Water-Resources Investigations Report 87-4259, 115 p.

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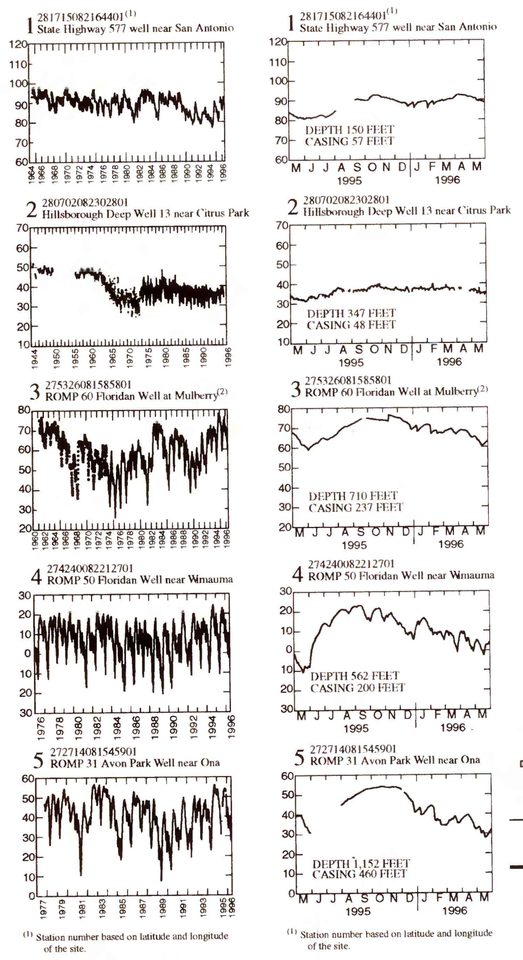

(1) Station number based on latitude and longitude of the site.

(2) ROMP 60 (Regional Observation and Monitor Well Program) is a Southwest Florida Water Management District monitor well and identification number.

Figure 1. Maximum daily water levels in selected wells tapping the Upper Floridan aquifer system.

Figure 2. Maximum daily water levels in selected wells from May 1995 to May 1996.

EXPLANATION

MUNICIPAL WELL FIELD PRODUCING 500,000 GALLONS PER DAY OR MORE

POTENTIOMETRIC CONTOUR - - Shows altitude at which water would have stood in tightly cased wells. Contour intervals are 5 and 10 feet. Datum is National Geodetic Vertical Datum (NGVD) of 1929. Hachures indicate depressions. Dashed where approximately located.

BOUNDARY OF SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

OBSERVATION WELLS - - Large number identifies hydrograph (figs. 1, 2). Small number is altitude of water level in feet above or below NGVD of 1929.

SPRING

CITY OR TOWN

NOTE: The potentiometric contours are generalized to synoptically portray the head in a dynamic hydrologic system, taking due account of the variations in hydrogeologic conditions, such as differing depths of wells, nonsimultaneous measurements of water levels, variable effects of pumping, and changing climatic influence. The potentiometric contours may not conform exactly with individual measurements of water level.

0 5 10 15 20 MILES
0 5 10 15 20 KILOMETERS

Base from Southwest Florida Water Management District digital data, 1992.
Universal Transverse Mercator projection, Zone 17
Scale 1:500,000

POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA, MAY 1996

By J.A. Mattie, P.A. Metz, and A.E. Torres

1996

Copies of this map can be purchased from:
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