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

Prepared in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

OPEN FILE REPORT 97-643
Metz, P.A. and others, 1997, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, May 1997

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 waterbearing-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 measured in May 1997. 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 levels are usually at an annual low and withdrawals for agricultural use are usually high. The cumulative rainfall for the study area was 11.98 inches below average for the period from June 1996 through May 1997 (Southwest Florida Water Management District, 1997).

This report, prepared by the U.S. Geological Survey in cooperation with the Southwest Florida Water Management District, is part of a semi-annual 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 12 -16, 1997. Supplemental data were collected by other agencies and companies. A potentiometric-surface map also was prepared for areas east and north of the Southwest Florida Water Management District boundary by the U.S. Geological Survey office in Altamonte Springs, Florida.

SUMMARY OF HYDROGEOLOGIC CONDITIONS

Annual and seasonal fluctuations of water levels for selected wells are shown by hydrographs in figure 1. Water levels are relatively stable from year-to-year and season-to-season in areas where the aquifer is generally unconfined and pumpage is relatively small (hydrograph 1). Water levels also are relatively stable in areas where the confining layer is variable (hydrograph 2). In the southern part of the study area where the confining layer is present and pumpage is relatively large, hydrographs 3, 4, and 5, show much larger year-to-year fluctuations. Maximum daily water levels for selected wells from May 1996 through May 1997 are shown in figure 2. Hydrographs 3, 4, and 5 show that water levels were at their lowest level during the month of March and increased during April and May. An example of how much water levels fluctuate is shown in the hydrograph for the ROMP 50 well where water levels decreased approximately 15 feet from February to March, but increased approximately 12 feet from April to May. 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 high.

Water levels in most wells measured in May 1997 were lower than the May 1996 water levels (Mattie and others, 1996). In 402 wells with paired measurements, the May 1997 levels ranged from 12 feet below to 10 feet above the May 1996 levels and averaged 1 foot below the May 1996 levels. The greatest decrease in water levels occurred in southern Hillsborough, central Manatee, and Hardee Counties due to ground-water withdrawals for irrigation. Water levels measured in May 1997 were generally lower than the September 1996 water levels (Metz and others, 1997). In 529 wells with paired measurements, the May 1997 levels ranged from 8 feet above to 32 feet below the September 1996 levels and averaged 3 feet below the September 1996 levels.

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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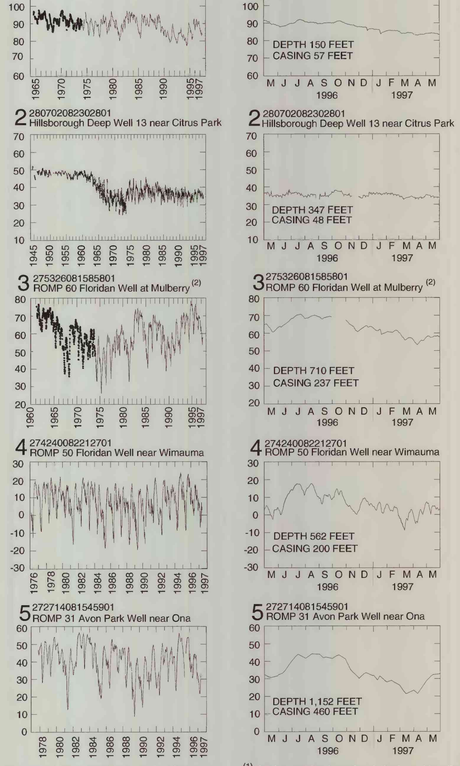

(1) Station number based on latitude and longitude of the site.

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

Figure 1. Annual and seasonal fluctuations of water levels for selected wells. (Gaps indicate missing data)

Figure 2. Maximum daily water levels for selected wells from May 1996 to May 1997. (Gaps indicate missing data)

EXPLANATION

VERNA — MUNICIPAL WELL FIELD

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

BOUNDARY OF SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

5 (32) (19) OBSERVATION WELLS - - Large number identifies hydrograph (figs. 1 and 2). Small number is altitude of water level in feet above or below National Geodetic Vertical Datum of 1929.

SPRING - - Number is the measured spring-pool altitude, in feet. The altitudes do not necessarily reflect the potentiometric surface at the spring pool.

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 the individual measurements of water level.

SCALE 1:500,000
5 0 5 10 15 20 MILES
5 0 5 10 15 20 KILOMETERS

Base from Southwest Florida Water Management District digital data, 1992
Universal Transverse Mercator projection, Zone 17

POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA, MAY 1997

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

1997

Copies of this map can be purchased from:
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