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

Prepared in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

OPEN-FILE REPORT 94-81

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 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 September 1993. 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 determining 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 wet season when ground-water withdrawals for agricultural use are normally low. The cumulative rainfall for the study area was 4.01 inches below normal for the period from October 1992 to September 1993 (Southwest Florida Water Management District, 1993).

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 September 13-17, 1993. Supplemental data were collected by the Southwest Florida Water Management District, West Coast Reginal Water Supply Authority, C.F. Industries, IMC-Agrico Company and Nu-Gulf Industries.

SUMMARY OF HYDROGBOLOGIC CONDITIONS

Long-term seasonal fluctuations of the potentiometric surface at selected wells are shown by hydrographs in figure 1. The hydrographs generally indicate that water levels in latitudes 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 large year-to-year and seasonal fluctuations. Maximum daily water levels for selected wells from September 1992 through September 1993 are shown in figure 2. The hydrographs show that water levels were recovering during the month of September for the entire study area. Because water-level measurements were made throughout a 5-day period in mid-September, the measurements do not absolutely represent a "snapshot" of conditions at a specific time, nor do they coincide with a seasonal high.

Water levels in most wells measured in September 1993 were higher than those measured in May 1993 (Mularoni, 1993). In 586 wells with paired measurements, the September 1993 level ranged from 20.91 feet below to 26.84 feet above the May 1993 level and averaged 2.03 feet above the May level. The greatest rise in water levels occurred in southern Hillsborough and eastern Manatee Counties as a result of reduced seasonal ground-water withdrawals for irrigation. The greatest rise in water levels occurred in a monitor well in central Manatee County.

Water levels measured in September 1993 were generally lower than those reported for September 1992 (Mularoni, 1992). In 572 wells with paired measurements, the September 1993 level ranged from 9.60 feet below to 4.73 feet above the September 1992 level and averaged 0.41 foot below the September 1992 level. The general decline in water levels during this period was largely the result of below normal rainfall that resulted in above average seasonal ground-water withdrawals from the aquifer.

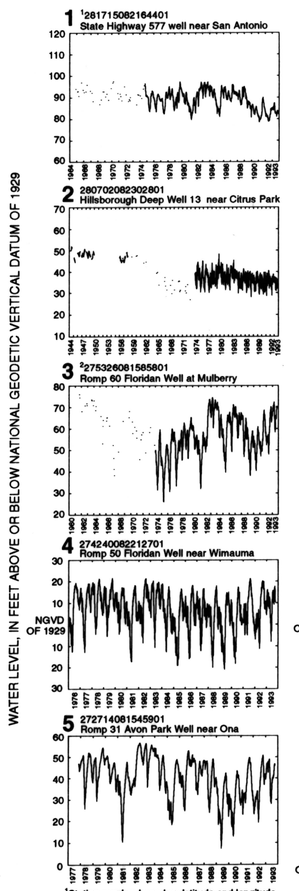
REFERENCES

Duerr, A.D., Hunn, J.D., Lewelling, B.R., and 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.

Mularoni, R.A., 1992, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, May 1992: U.S. Geological Survey Open-File Report 92-472, 1 sheet.

—— 1993, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, September 1992: U.S. Geological Survey Open-File Report 93-49, 1 sheet.

Southwest Florida Water Management District, 1993, Summary of hydrologic conditions, September 1993: 3 p.



[1]Station number based on latitude and longitude of the site
[2]Romp 60 (Regional Observation and Monitor Well Program) a Southwest Florida Water Management District monitor well and identifying number

Figure 1.--Water levels in selected wells tapping the Upper Floridan aquifer system.

Figure 2.-- Maximum daily water levels in selected wells from September 1992 to September 1993.

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. National Geodetic Vertical Datum of 1929. Hachures indicate depressions. Dashed where approximately located.

BOUNDARY OF SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

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

SPRING

NOTE: The potentiometric contours are generalized to portray synoptically the head in a dynamic hydrologic system, taking due account of the variations in hydrogeologic conditions, such as differing depths of wells, non-simultaneous 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

POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER SYSTEM, WEST-CENTRAL FLORIDA, SEPTEMBER 1993

By R. A. Mularoni

1994

Copies of this map can be purchased from:
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