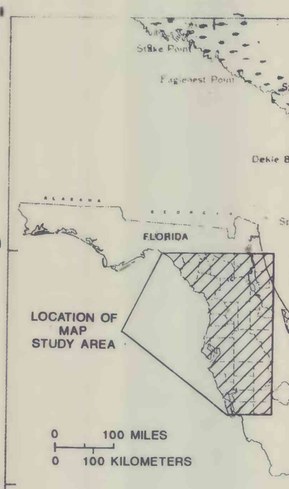
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

OPEN-FILE REPORT 89-393



INTRODUCTION

The potentiometric surface is an imaginary pressure surface represented by the level to which water will rise in tightly cased wells that tap a confined aquifer. The potentiometric surface of the Upper Floridan aquifer 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. Maps of the potentiometric surface of the Upper Floridan aquifer in west-central Florida are prepared semiannually by the U.S. Geological Survey in cooperation with the Southwest Florida Water Management District. Maps for May and September show the potentiometric surface of the normally expected annual low and high water-level conditions, respectively. Potentiometric-surface maps have been prepared for January 1964, May 1969, May 1971 to 1974, and for each May and September since 1975.

This report shows the potentiometric surface of the Upper Floridan aquifer for May 1989. Most of the water-level data were collected by the U.S. Geological Survey during the period of May 15-19. Supplemental data were collected by other agencies and companies. This map represents water-level conditions before the beginning of the summer rainy season when ground-water withdrawals for agricultural use are high. Hence, the potentiometric surface was near its lowest level for the year.

SUMMARY OF 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 latitudes north of the Hillsborough-Pasco County line (northern area), where ground-water withdrawal usually is moderate, remain fairly uniform from year-to-year and seasonally, whereas water levels south of the county line (southern area), where withdrawal is significantly greater, show large year-to-year and seasonal fluctuations. Daily maximum water levels for selected wells from May 1988 to May 1989 are shown in figure 2.

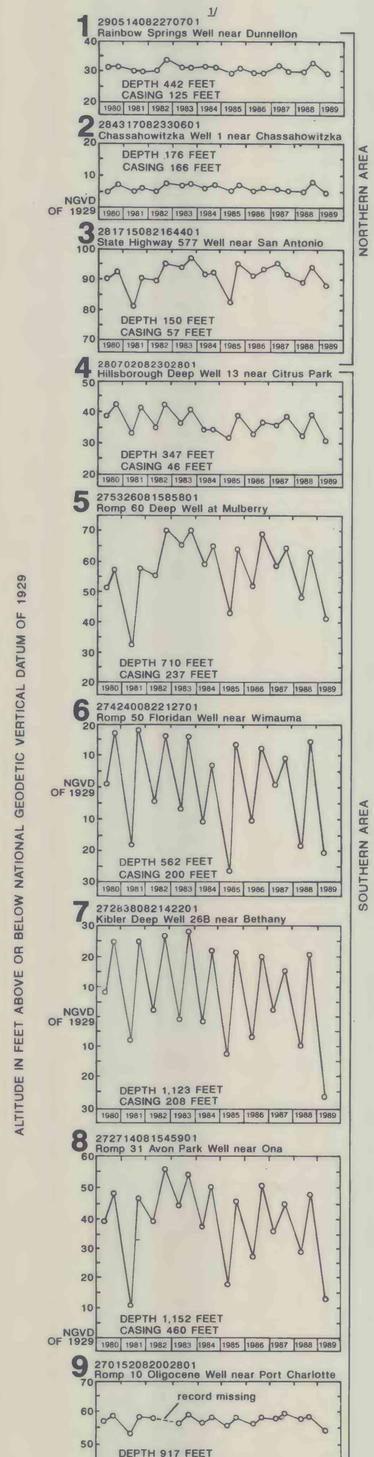
Water levels in most wells measured in May 1989 were lower than those measured in September 1988 (Barr, 1988). May water levels averaged about 4 feet lower than September levels in the northern area and about 12 feet lower in the southern area. In the northern area, declines in water levels from September to May were about 2 feet or less along coastal regions and were about 14 feet or less in inland areas. In the southern area, declines in water levels were about 21 feet or less along coastal regions and in extreme southern regions and about 2 to 49 feet in other areas. The largest fluctuation of water levels occurred in southern Hillsborough, southern Polk, Manatee, Hardee, and northern De Soto Counties as a result of low rainfall and heavy seasonal ground-water withdrawals for irrigation.

The average water-level decline between May 1988 (Lewelling, 1988) and May 1989 was about 1 foot in the northern area and about 3 feet in the southern area. Water levels in individual wells declined as much as 4 feet in the northern area and as much as 23 feet in interior regions of the southern area. Declines during this period generally were 6 feet or less in coastal and extreme southern regions. The decline in water levels between May 1988 and May 1989 was caused largely by below average rainfall from September 1988 through May 1989. In January 1989, a water shortage advisory was issued by water management officials for Pinellas, Hillsborough, and Polk Counties and areas south of these counties; in February 1989, mandatory water restrictions were instituted for this area because of declining ground-water levels and impending drought conditions. Despite the drought, water levels generally remain above the record lows set in 1981 and 1985; some record, or near record, low water levels were observed in parts of Hillsborough, Manatee, and Hardee Counties, as shown in figure 1.

REFERENCES

Barr, G.L., 1988, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, September 1988: U.S. Geological Survey Open-File Report 88-730, 1 sheet.

Lewelling, B.R., 1988, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, September 1988: U.S. Geological Survey Open-File Report 88-461, 1 sheet.



1/ Station number based on the latitude and longitude of the site

Figure 1.--Water levels in selected wells for May and September 1980 to 1989

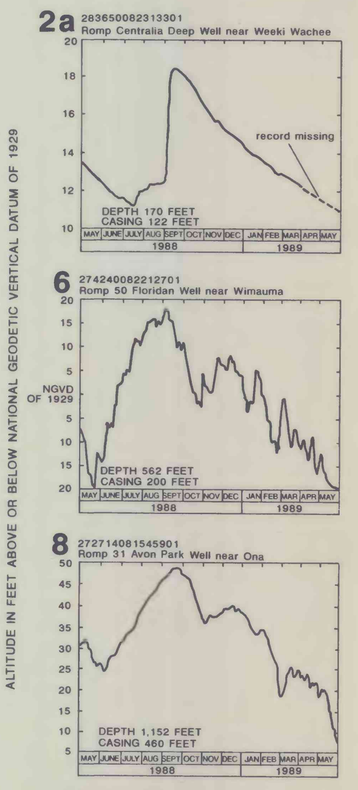


Figure 2.-- Maximum daily water levels in selected wells from May 1988 to May 1989

EXPLANATION

20 — POTENTIOMETRIC CONTOUR--Shows altitude at which water level would have stood in tightly cased wells. Contour interval 5 and 10 feet. National Geodetic Vertical Datum of 1929 (NGVD of 1929). Hachures indicate depressions. Dashed where approximate

1 31 / .32 — OBSERVATION WELLS--Large number and dot identifies hydrograph (fig. 1). Small number is altitude of water level in feet above or below NGVD of 1929

BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

BOUNDARY OF WATER MANAGEMENT BASIN

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, nonsimultaneous measurements of water levels, variable effects of pumping, and changing climatic influence. The potentiometric contours thus may not conform exactly with individual measurements of water level

SCALE 1:500,000

0 10 20 30 MILES
0 10 20 30 KILOMETERS

Base from U. S. Geological Survey
State of Florida map 1967 1:500 000

POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA, MAY 1989

By
G.L. BARR

1989

Copies of this map can be purchased from:
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