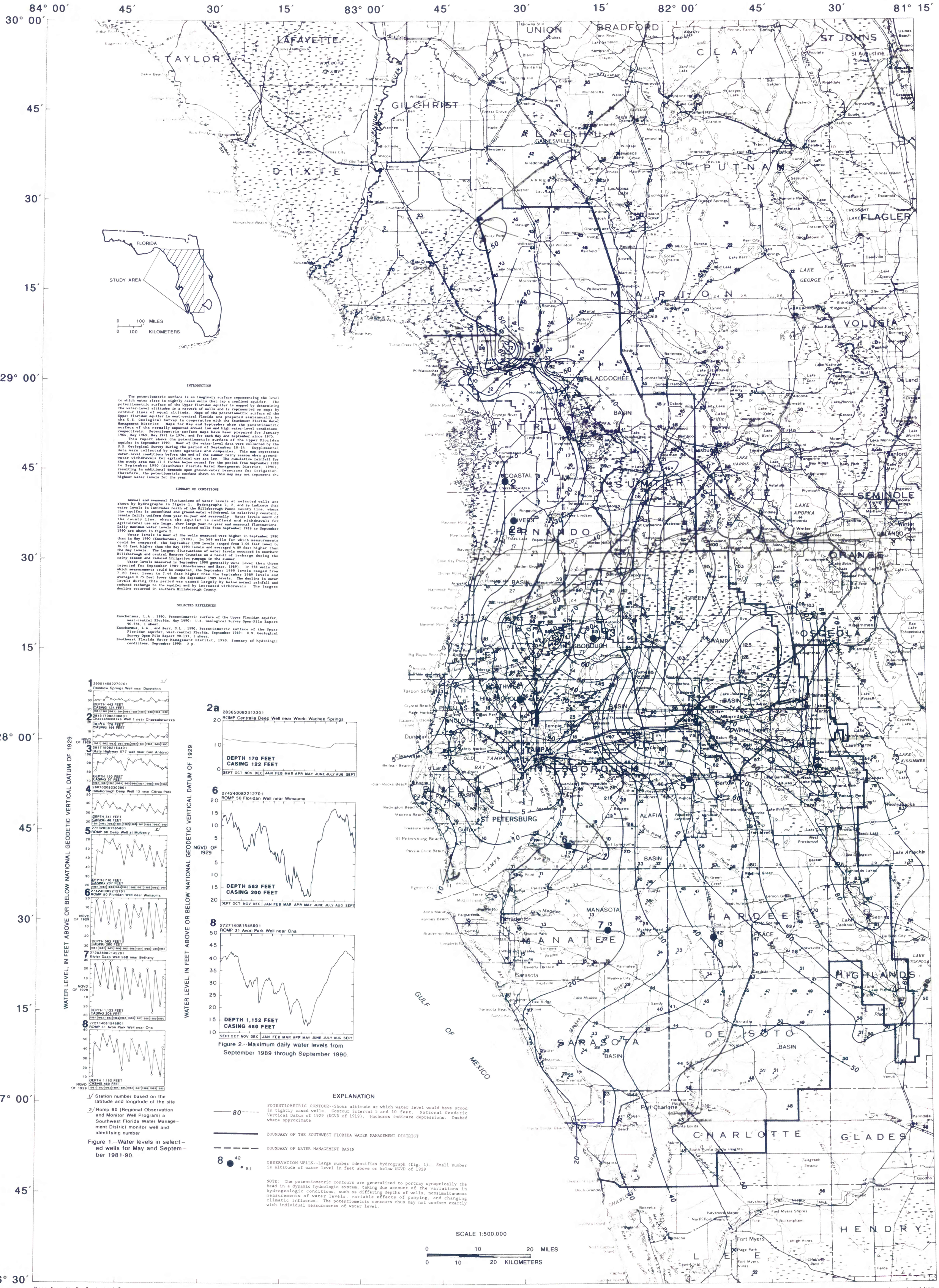
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

OPEN-FILE REPORT 91-90



INTRODUCTION

The potentiometric surface is an imaginary surface representing the level to which water rises in tightly cased wells that tap a confined aquifer. The potentiometric surface of the Upper Floridan aquifer is mapped by determining the water-level altitudes in a network of wells and is represented on maps by contour lines 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 in September 1990. Most of the water-level data were collected by the U.S. Geological Survey during the period of September 10-14. Supplemental data were collected by other agencies and companies. This map represents water-level conditions before the end of the summer rainy season when ground-water withdrawals for agricultural use are low. The cumulative rainfall for the study area was 11.2 inches below normal for the period from September 1989 to September 1990 (Southwest Florida Water Management District, 1990), resulting in additional demands upon ground-water resources for irrigation. Therefore, the potentiometric surface shown on this map may not represent the highest water levels for the year.

SUMMARY OF CONDITIONS

Annual and seasonal fluctuations of water levels at selected wells are shown by hydrographs in figure 1. Hydrographs 1, 2, and 2a indicate that water levels in latitudes north of the Hillsborough-Pasco County line, where the aquifer is unconfined and ground-water withdrawal is relatively constant, remain fairly uniform from year-to-year and seasonally. Water levels south of the county line, where the aquifer is confined and withdrawals for agricultural use are large, show large year-to-year and seasonal fluctuations. Daily maximum water levels for selected wells from September 1989 to September 1990 are shown in figure 2.

Water levels in most of the wells measured were higher in September 1990 than in May 1990 (Knochenmus, 1990). In 569 wells for which measurements could be compared, the September 1990 levels ranged from 1.06 feet lower to 36.05 feet higher than the May 1990 levels and averaged 4.89 feet higher than the May levels. The largest fluctuations of water levels occurred in southern Hillsborough and central Manatee Counties as a result of recharge during the rainy season and reduced irrigation pumpage in the summer.

Water levels measured in September 1990 generally were lower than those reported for September 1989 (Knochenmus and Barr, 1989). In 558 wells for which measurements could be compared, the September 1990 levels ranged from 7.20 feet lower to 7.44 feet higher than the September 1989 levels and averaged 0.75 feet lower than the September 1989 levels. The decline in water levels during this period was caused largely by below normal rainfall and reduced recharge to the aquifer and by increased withdrawals. The largest decline occurred in southern Hillsborough County.

SELECTED REFERENCES

Knochenmus, L.A., 1990, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, May 1990: U.S. Geological Survey Open-File Report 90-556, 1 sheet.

Knochenmus, L.A., and Barr, G.L., 1990, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, September 1989: U.S. Geological Survey Open-File Report 90-133, 1 sheet.

Southwest Florida Water Management District, 1990, Summary of hydrologic conditions, September 1990: 2 p.

1/ Station number based on the 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 for May and September 1981-90.

Figure 2.--Maximum daily water levels from September 1989 through September 1990.

EXPLANATION

80 — 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 1919). Hachures indicate depressions. Dashed where approximate

BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

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8 ● 42 • 51 — OBSERVATION WELLS--Large number identifies hydrograph (fig. 1). Small number is altitude of water level in feet above or below NGVD of 1929

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.

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

POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA, SEPTEMBER 1990

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1991

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