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

Prepared in cooperation with the
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

OPEN-FILE REPORT 92-170

INTRODUCTION

The Floridan aquifer system consists of the Upper and Lower Floridan aquifers separated by a "tight" middle confining unit. The middle confining unit and the Lower Floridan aquifer generally contain saltwater. 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 by far the most 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 report presents the potentiometric surface of the Upper Floridan aquifer in September 1991. 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 low. The cumulative rainfall for the study area is 0.98 in. above normal for the period from September 1990 to September 1991 (Southwest Florida Water Management District, 1991).

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 for the study area based on synoptic measurements. Potentiometric surface maps have been prepared for January 1964, May 1969, May 1971, May 1972, May 1973, May 1974, and for each May and September since 1975. Water-level data are collected in May and September to show near annual low and high water-level conditions. Most of the water-level data for this map were collected by U.S. Geological Survey personnel during the period of September 9-13, 1991. 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 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 season to season, whereas water levels south of the county line (southern area) where withdrawal is substantially greater show large year-to-year and seasonal fluctuations. Maximum daily water levels for selected wells from September 1990 through September 1991 are shown in figure 2.

Water levels in most wells measured in September 1991 were higher than those measured in May 1991 (Mularoni, 1992). In 581 wells with paired measurements, the September 1991 level ranged from 2.54 ft below to 27.19 ft above the May 1991 level and averaged 5.57 ft above the May level. The greatest rise in water levels occurred in southern Hillsborough and central Manatee counties as a result of reduced pumpage for irrigation.

Water levels measured in September 1991 were generally higher than those reported for September 1990 (Mularoni and Knochenmus, 1991). In 557 wells with paired measurements, the September 1991 level ranged from 7.62 ft below to 17.20 ft above the September 1990 level and averaged 2.99 ft above the September 1990 level. The general rise in water levels during this period was caused largely by above normal rainfall, which recharged the aquifer and reduced the pumpage demand.

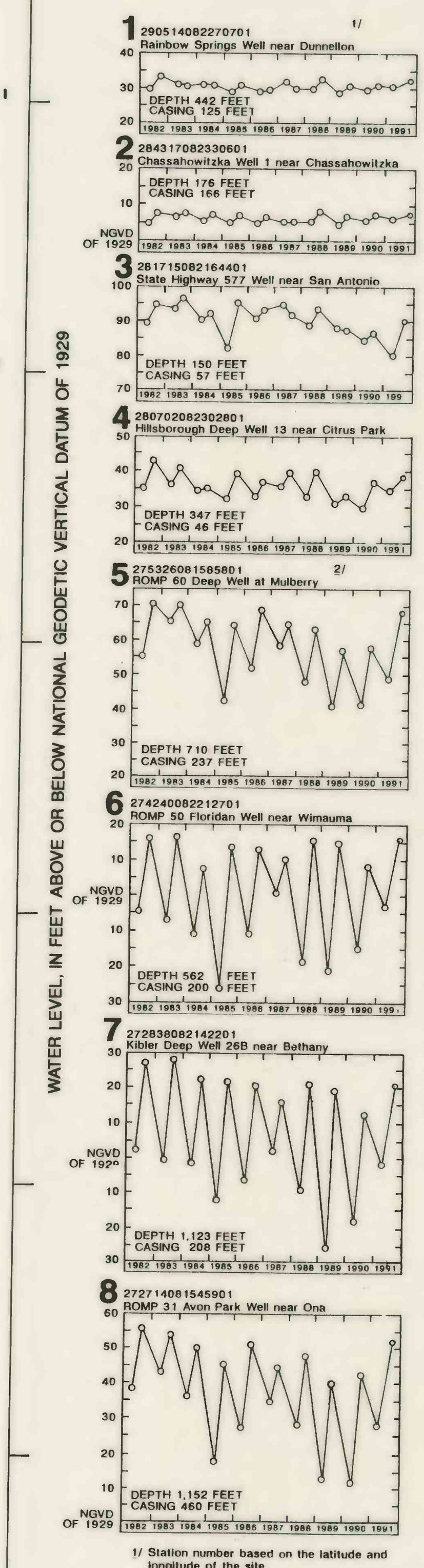
SELECTED REFERENCES

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, 44 p.

Mularoni, R.A., 1992, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, May 1991: U.S. Geological Survey Open-File Report 91-524, 1 sheet.

Mularoni, R.A. and Knochenmus, L.A., 1991, Potentiometric surface of the Upper Floridan aquifer, west-central Florida, September 1990: U.S. Geological Survey Open-File Report 91-90, 1 sheet.

Southwest Florida Water Management District, 1991, Summary of hydrologic conditions, September 1991: 3 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 1982-91.

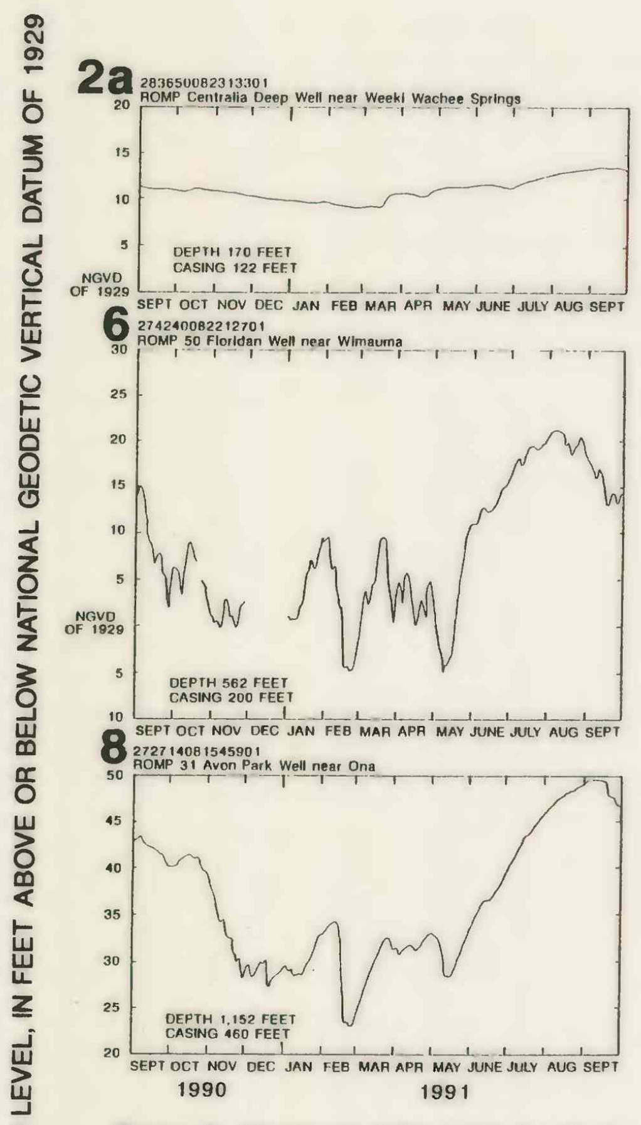
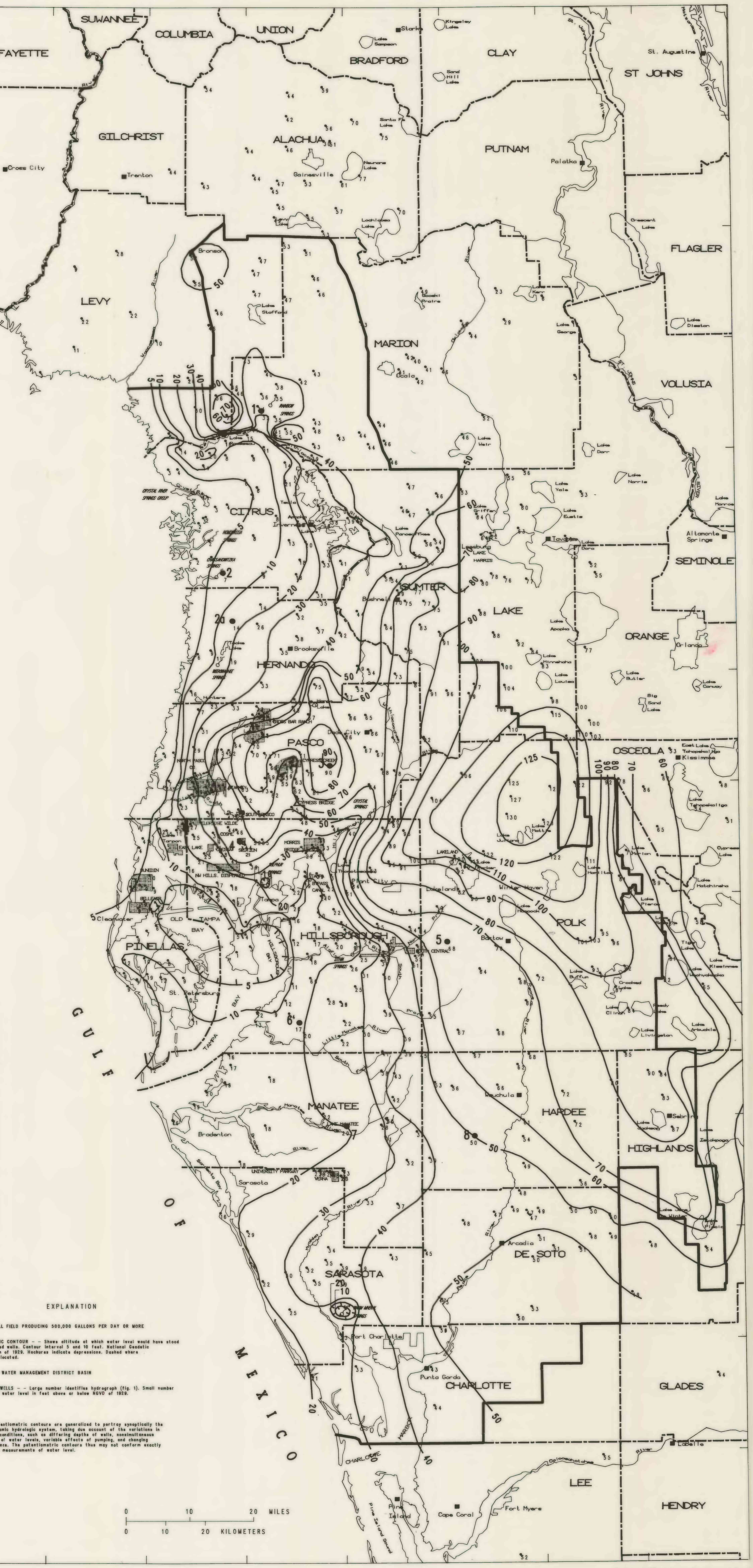


Figure 2.--Maximum daily water levels in selected wells from September 1990 to September 1991.



EXPLANATION

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

— 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. Hachures indicate depressions. Dashed where approximately located.

━━ BOUNDARY OF WATER MANAGEMENT DISTRICT BASIN

5 ● 68 •42 OBSERVATION WELLS - - Large number identifies hydrograph (fig. 1). Small number is altitude of water level in feet above or below NGVD of 1929.

o~ 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, 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 digital data (Lambert projection)
derived from U.S. Geological Survey State
base map of Florida 1:500,000, 1967
Digital data provided by Southwest Florida
Water Management District

POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA, SEPTEMBER 1991

By

R.A. Mularoni

1992

Copies of this map can be purchased from:
U.S. Geological Survey
Book and Open-File Reports Section
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Denver, Colorado 80225