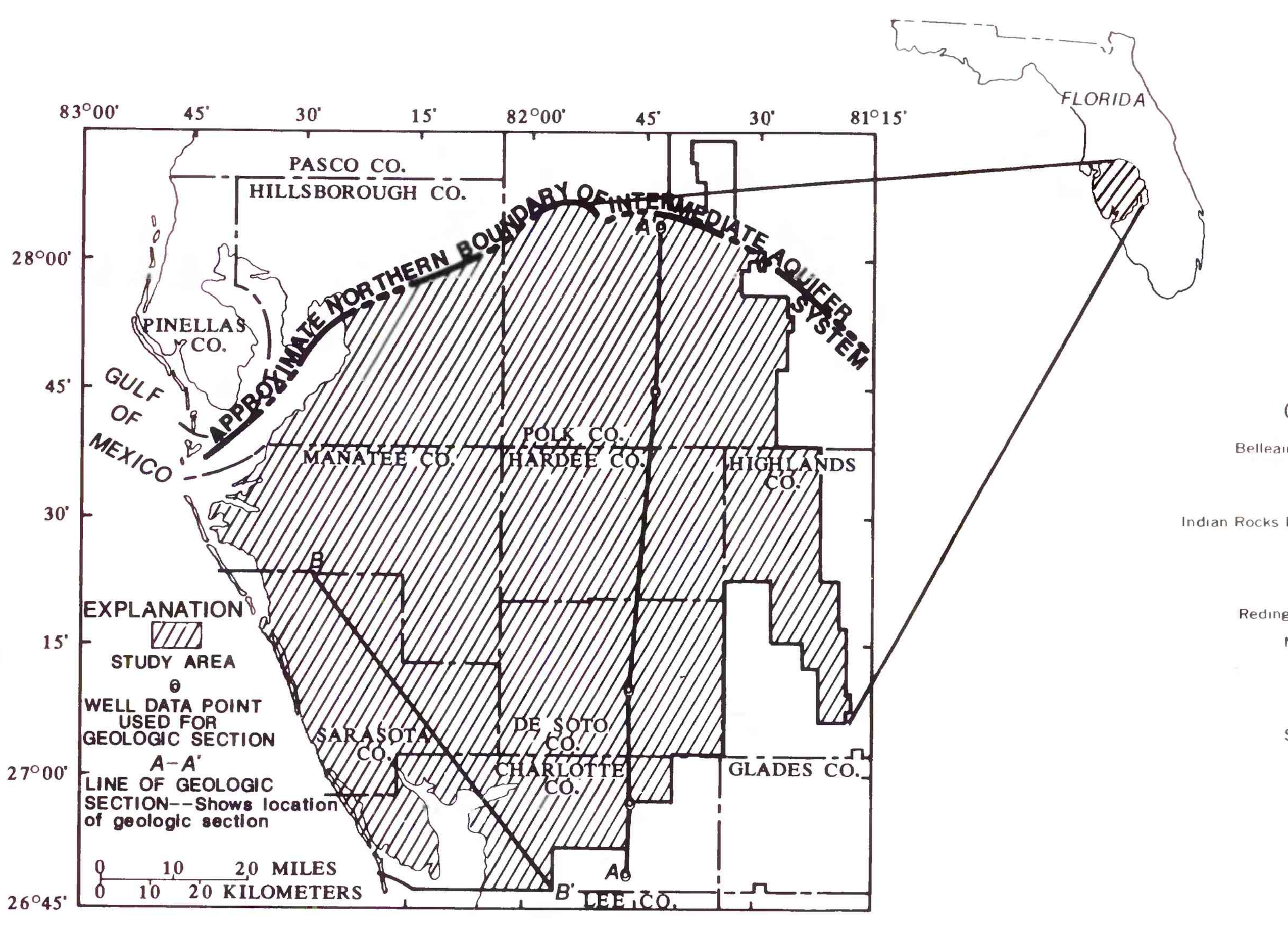


Figure 1.-- Study area and location of hydrogeologic sections A–A' and B–B'.

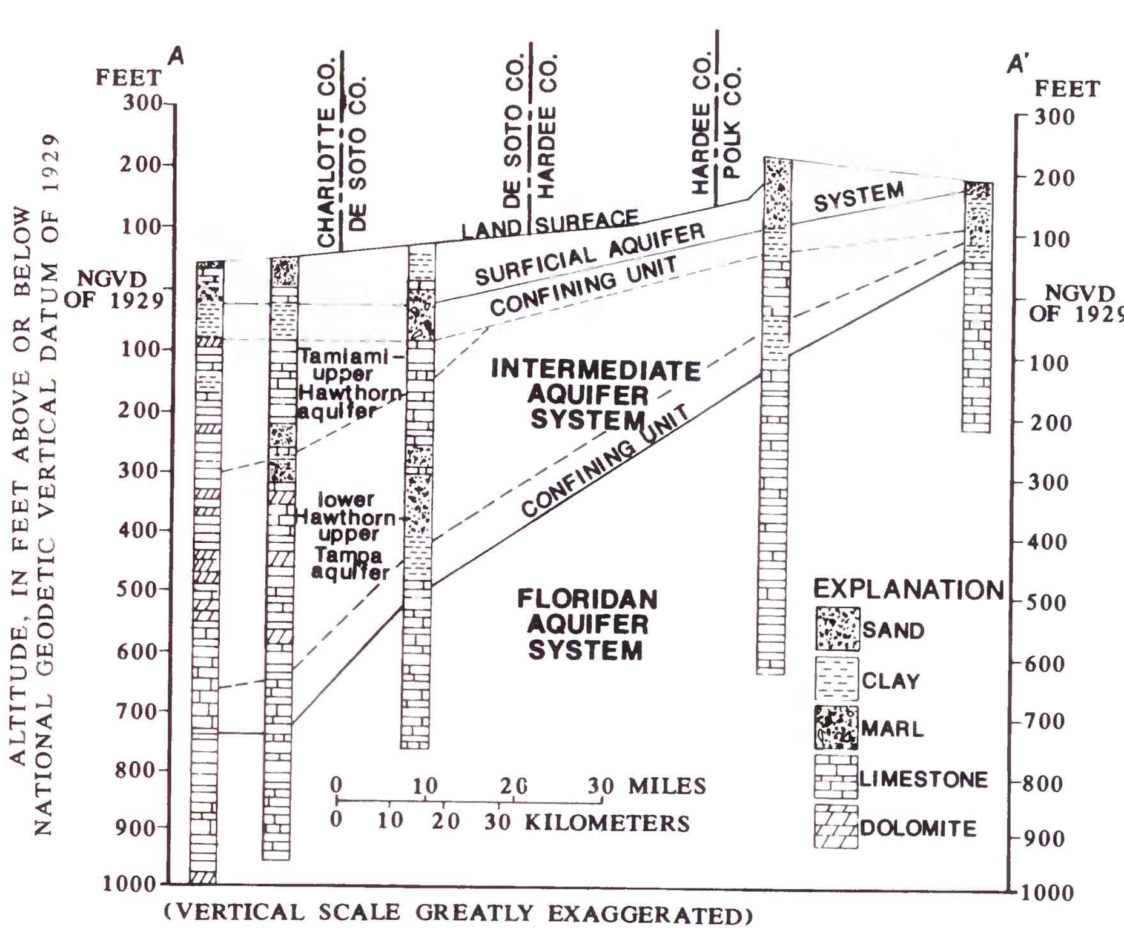


Figure 2.-- Generalized hydrogeologic section A–A'. (Modified from Corral and Wolansky, 1984. For line of section, see figure 1.)

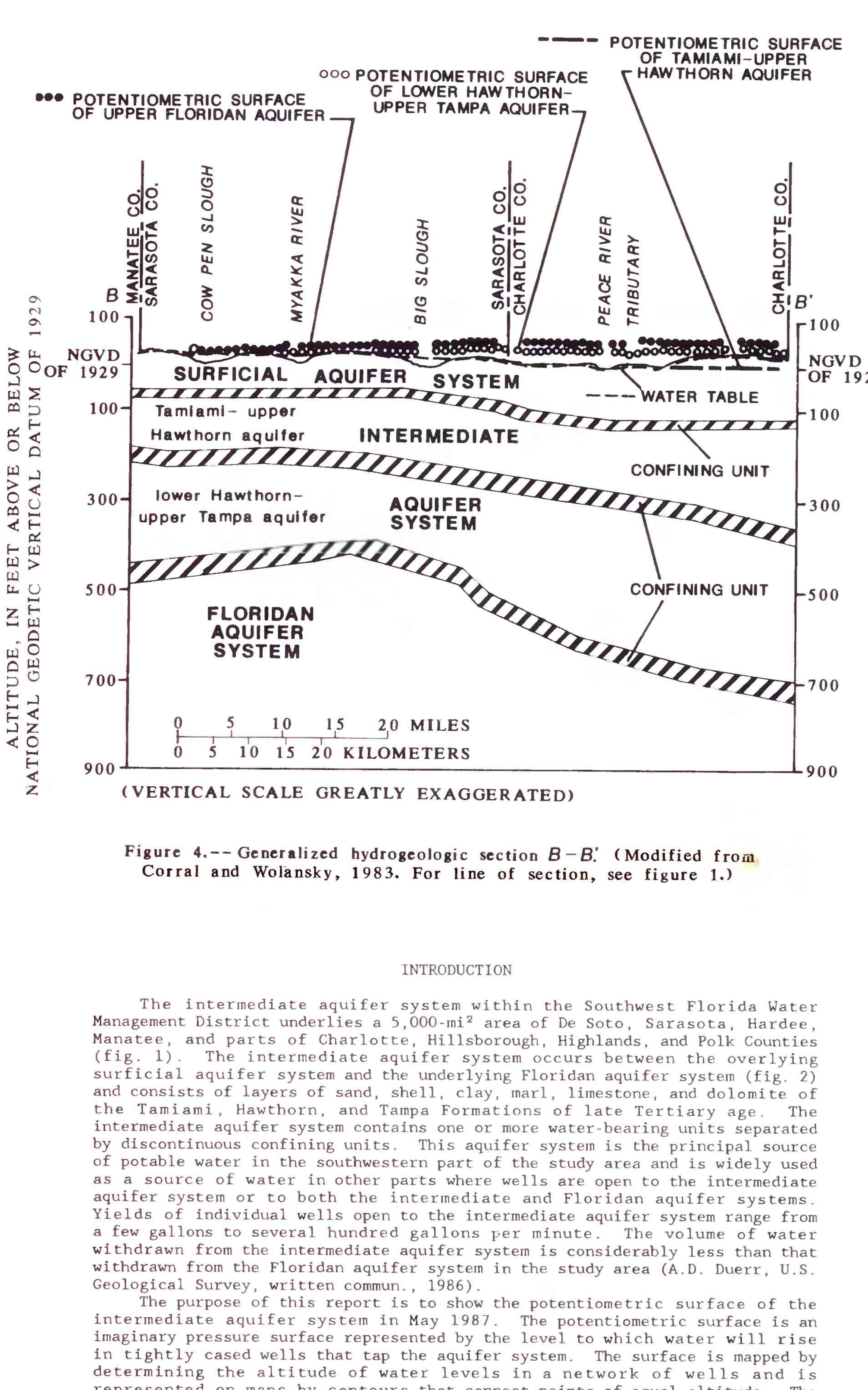


Figure 4.-- Generalized hydrogeologic section B–B'. (Modified from Corral and Wolansky, 1983. For line of section, see figure 1.)

INTRODUCTION

The intermediate aquifer system within the Southwest Florida Water Management District underlies a 5,000-mi² area of De Soto, Sarasota, Hardee, Manatee, and parts of Charlotte, Hillsborough, Highlands, and Polk Counties (fig. 1). The intermediate aquifer system occurs between the overlying surficial aquifer system and the underlying Floridan aquifer system (fig. 2) and consists of layers of sand, shell, clay, marl, limestone, and dolomite of the Tamiami, Hawthorn, and Tampa Formations of late Tertiary age. The intermediate aquifer system contains one or more water-bearing units separated by discontinuous confining units. This aquifer system is the principal source of potable water in the southwestern part of the study area and is widely used as a source of water in other parts where wells are open to the intermediate aquifer system or to both the intermediate and Floridan aquifer systems. Yields of individual wells open to the intermediate aquifer system range from a few gallons to several hundred gallons per minute. The volume of water withdrawn from the intermediate aquifer system is considerably less than that withdrawn from the Floridan aquifer system in the study area (A.D. Duerr, U.S. Geological Survey, written commun., 1986).

The purpose of this report is to show the potentiometric surface of the intermediate aquifer system in May 1987. The potentiometric surface is an imaginary pressure surface represented by the level to which water will rise in tightly cased wells that tap the 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. The composite potentiometric surface of all water-bearing units within the intermediate aquifer system is shown in figure 3. In areas where multiple aquifers exist, wells open to all aquifers were selected for water-level measurements whenever possible. In the southwestern and lower coastal region of the study area, Wolansky (1983) describes two aquifers and confining units in the intermediate aquifer system: the Tamiami-upper Hawthorn aquifer and the underlying lower Hawthorn-upper Tampa aquifer (fig. 4). The potentiometric surface of the Tamiami-upper Hawthorn aquifer is shown in figure 5. Water levels are from wells drilled and open exclusively to that aquifer. The exact boundary for the Tamiami-upper Hawthorn aquifer is undetermined because of limited hydrogeologic data available from wells.

This map is the third in a series of aquifer system potentiometric surface maps based on synoptic measurements made in the study area. Potentiometric surface maps are prepared by the U.S. Geological Survey in cooperation with the Southwest Florida Water Management District. Water-level data are collected twice annually, in May and September, which indicate, respectively, the normally expected annual low and high water-level conditions. Most of the water-level data for this map were collected during the period of May 18-22. Supplemental data were collected by other agencies and companies. The map represents water-level conditions near the end of the spring dry season when ground-water withdrawals are large and the potentiometric surface is near its lowest level for the year.

SUMMARY OF HYDROGEOLOGIC CONDITIONS

The hydrographs for selected wells shown in figure 6 generally indicate that the annual and seasonal fluctuations of the water levels are large in interior regions, where water demand for irrigation is large, and smaller in coastal areas, where water use, predominantly for public supply, is less. Daily maximum water levels for selected wells from May 1986 to May 1987 are shown in figure 7.

Water levels measured in May 1987 averaged about 5 feet lower than those measured in September 1986. Water levels declined about 7 feet or less along coastal and extreme southern regions and 1 to 16 feet in other areas. The largest declines were in Hardee County where seasonal water use is normally heavy.

May 1987 water levels averaged about 2 feet higher than May 1986. The rise was as much as 9 feet in some interior regions and about 4 feet or less in the coastal and extreme southern regions.

Water levels in Tamiami-upper Hawthorn aquifer wells are 5 to 15 feet lower than wells open to the entire system. At hydrograph site 7 (figs. 3, 5, 6, and 7), separate monitor wells are open to the Tamiami-upper Hawthorn aquifer and to the lower Hawthorn-upper Tampa aquifer. Water levels in the Tamiami-upper Hawthorn aquifer were 15 feet lower in September 1986 and 10 feet lower in May 1987 than in the lower Hawthorn-upper Tampa aquifer.

SELECTED REFERENCES

Corral, M.A., and Wolansky, R.M., 1984, Generalized thickness and configuration of the top of the intermediate aquifer, west-central Florida, 1984: U.S. Geological Survey Water-Resources Investigations Report 84-4018, 1 sheet.

Lewelling, B.R., 1986, Potentiometric surface of the intermediate aquifer system, west-central Florida, September 1986: U.S. Geological Survey Open-File Report 87-35, 1 sheet.

Wolansky, R.M., 1983, Hydrogeology of the Sarasota-Port Charlotte area, Florida: U.S. Geological Survey Water-Resources Investigations Report 82-4089.

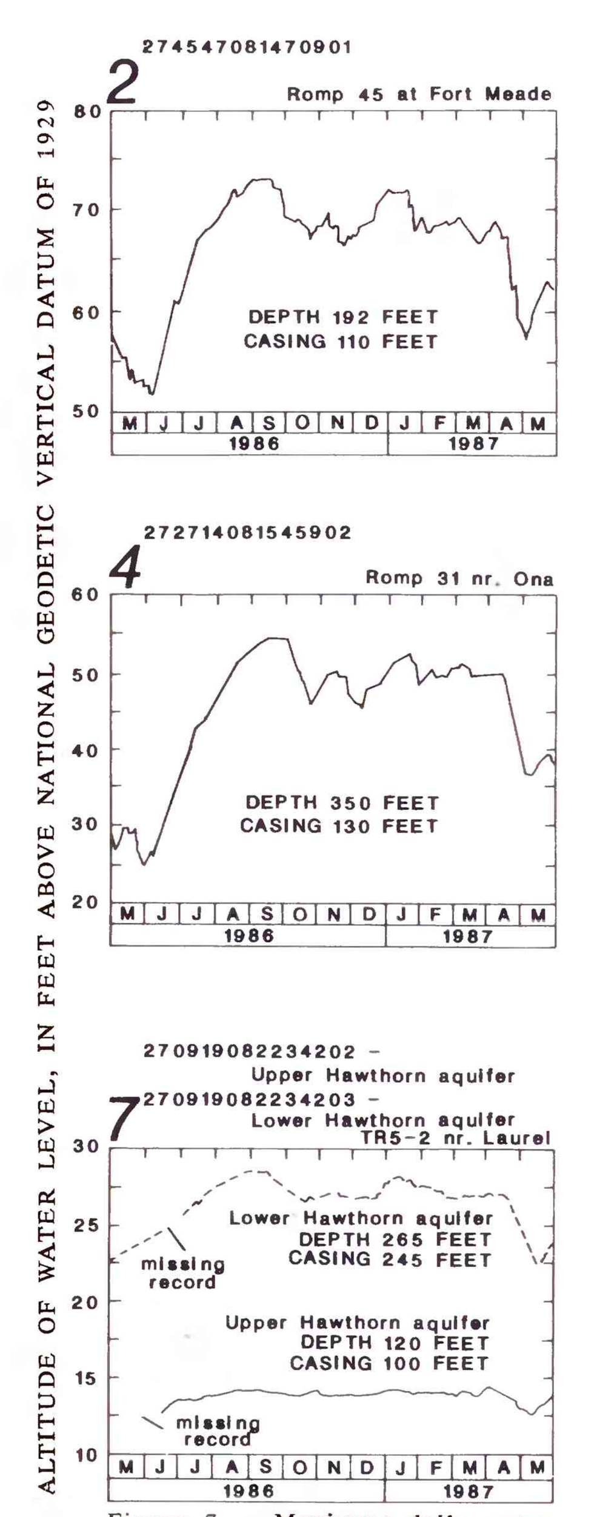
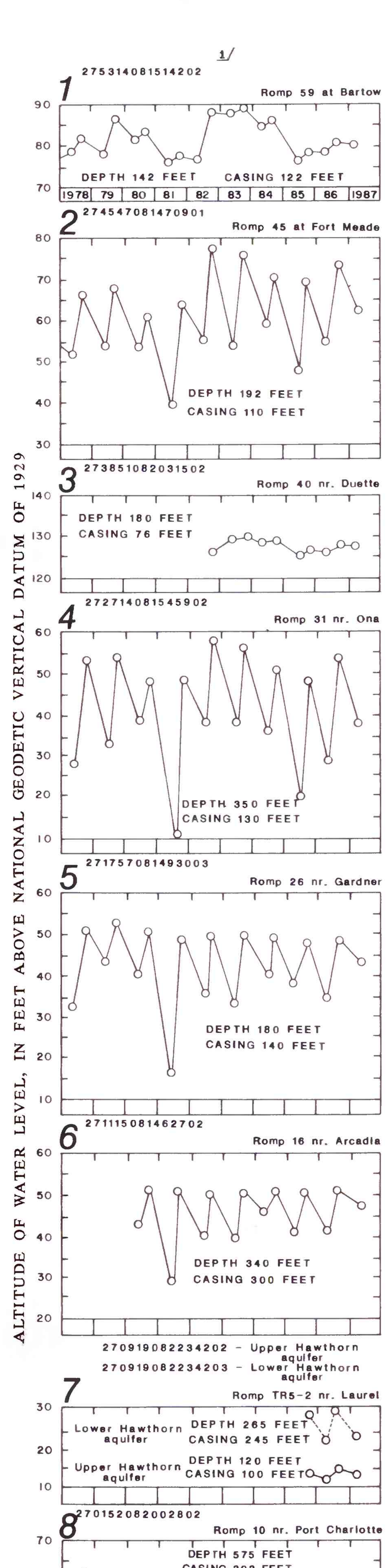


Figure 7.-- Maximum daily water levels from May 1986 to May 1987.



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

Figure 6.-- May and September water levels in selected wells, 1978 - 1987.

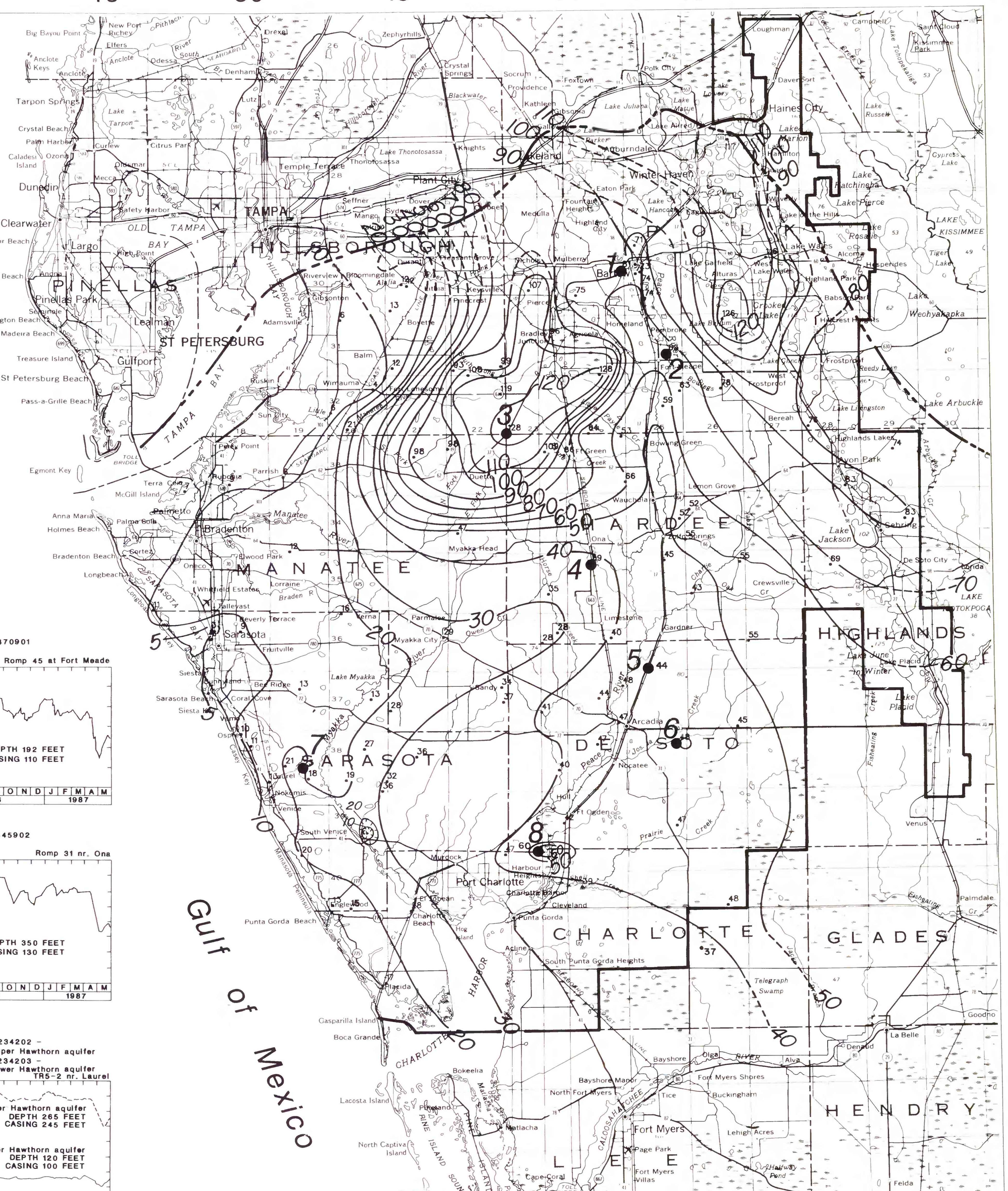


Figure 3.--Potentiometric surface of the intermediate aquifer system, May 1987.

SCALE 1:500,000

0 10 20 30 MILES

0 10 20 30 KILOMETERS

EXPLANATION (FIGURES 3 AND 5)

—40— 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). Dashed where approximate. Hachures indicate depressions

6 ●48 ·47 OBSERVATION WELLS FOR FIGURE 3--Large number and large closed circle identifies hydrograph. Small number with either large or small closed circle shows altitude of water level in feet above NGVD of 1929

7 ○13 ○12 OBSERVATION WELLS FOR FIGURE 5--The open circle represents wells that are drilled and open exclusively to the Tamiami-upper Hawthorn aquifer. Large number with the open circle identifies hydrograph, and small number shows altitude of water level in feet above NGVD of 1929

BOUNDARY OF THE SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

APPROXIMATE NORTHERN BOUNDARY OF THE INTERMEDIATE AQUIFER SYSTEM (A.D. Duerr, written commun., 1986)

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

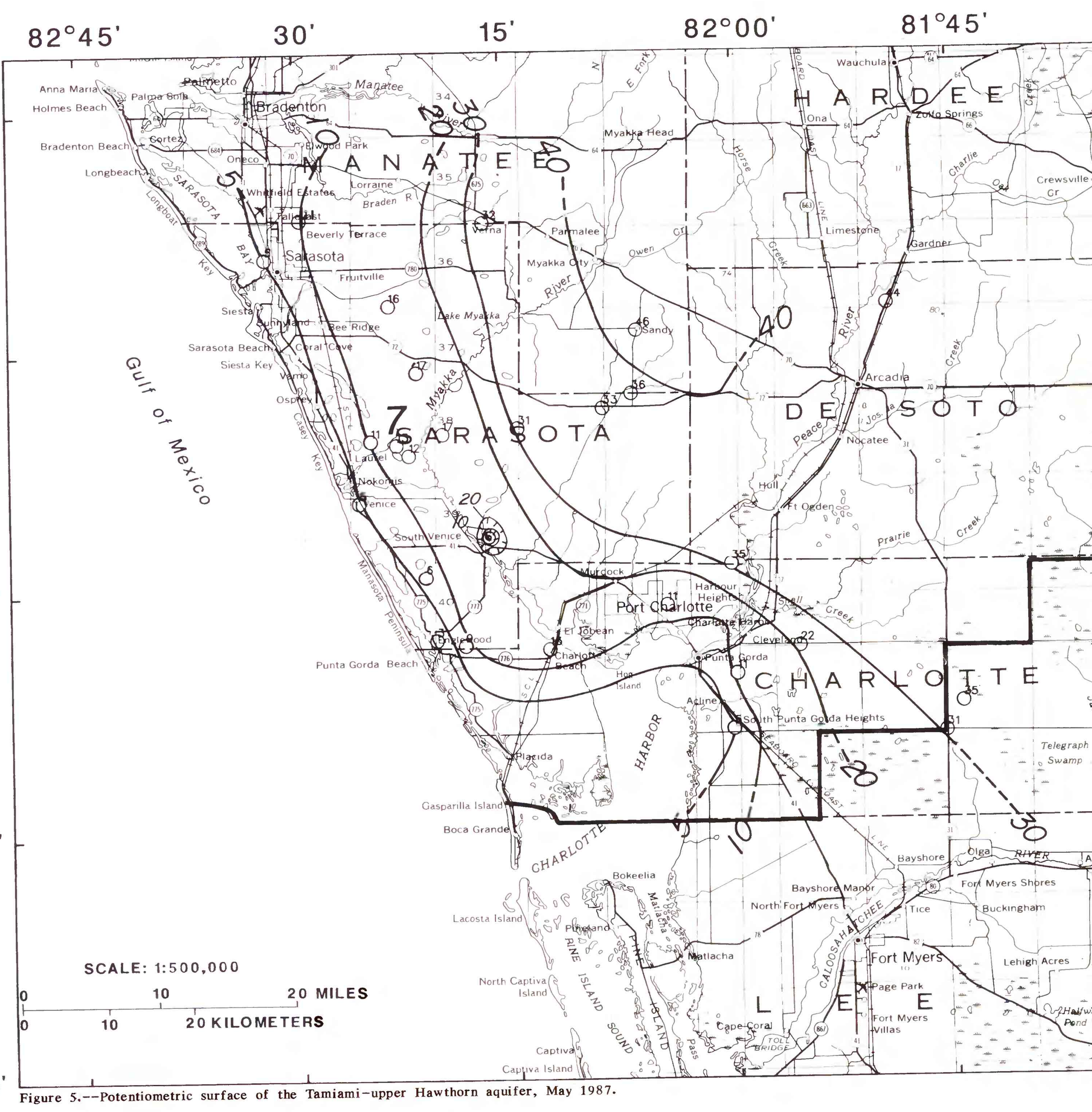


Figure 5.--Potentiometric surface of the Tamiami-upper Hawthorn aquifer, May 1987.

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

POTENTIOMETRIC SURFACE OF THE INTERMEDIATE AQUIFER SYSTEM, WEST-CENTRAL FLORIDA, MAY 1987

By
B.R. Lewelling

1988

Copies of this map can be purchased from:
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Federal Center, Bldg. 810
Box 25425
Denver, Colorado 80225