
## INTRODUCTION

The intermediate aquifer system underlies a 5,000-square-mile area within the Southwest Florida Water Management District including De Soto, Sarasota, Hardee, Manatee, and parts of Charlotte, Hillsborough, Highlands, Polk, and Lee Counties. The intermediate aquifer system is overlain by the surficial aquifer system and is underlain by the Floridan aquifer system. The intermediate aquifer system consists of layers of sand, shell, clay, calcareous clay, limestone, and dolomite of the Tamiami Formation and Hawthorn Group of Oligocene to Pleistocene age (Wingard and others, 1995). The intermediate aquifer system contains one or more water-bearing units separated by discontinuous confining units. The intermediate 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 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 vary 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 The volume of water withdrawn from the intermediate aquifer system is considerably less than that withdrawn from the Floridan aquifer system in the study area (Duerr and others, 1988).

In areas where multiple water-bearing units exist in the system, wells open to individual units were selected for water-level measurements whenever possible. The water levels along the northern boundary of the intermediate aquifer system generally are similar to water levels in the underlying Upper Floridan aquifer because the confining unit that separates the two aquifers is either absent or discontinuous in that area, permitting direct hydraulic connection between the two aquifer systems. In the southwestern and lower coastal region of the study area, the intermediate aquifer system is composed of the Tamiami-upper Hawthorn aquifer and the underlying lower Hawthorn-upper Tampa aquifer (Wolansky, 1983). Lateral boundaries for the Tamiami-upper Hawthorn aquifer are undetermined because of limited hydrogeologic data.

The purpose of this report is to show the potentiometric surfaces of the intermediate aquifer system in May 2000 (figs. 1 and 2). 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 measuring the altitude of water levels in a network of wells, and is represented on maps by contours that connect points of equal altitude. Both maps represent water-level conditions near the end of the dry season, when ground-water levels are usually at an annual low and withdrawals for agricultural use are usually high. The cumulative average rainfall for the central and southern regions within the Southwest Florida Water Management District (from June 1999 through May 2000) was 38.86 and 42.56 inches, respectively. These rainfalls were below the regions' historical means of 52.68 and 52.75 inches, respectively (Southwest Florida Water Management District, May 2000).

This report, prepared by the U.S. Geological Survey in cooperation with the Southwest Florida Water Management District, is one of a series of semi-annual intermediate aquifer system potentiometric-surface map reports prepared for west-central Florida since September 1985. Water-level data are collected in May and September to show the typical annual low and high water-level conditions, respectively. Most of the water-level data for the two maps were collected by the U.S. Geological Survey during the period May 15-19, 2000. Because water-level measurements were made during a 5-day period in mid-May, the measurements may not represent a "snapshot" of conditions at a specific time, nor do they necessarily coincide with a seasonal low.

## WATER-LEVEL CHANGES FROM MAY 1999 TO MAY 2000

The composite potentiometric surface of all water-bearing units within the intermediate aquifer system is shown in figure 1. The potentiometric surface of the Tamiami-upper Hawthorn aquifer is shown in figure 2 and is based on water levels from wells open only to this aquifer.

Water levels in about 80 percent of wells measured in May 2000 for the composite potentiometric surface of the intermediate aquifer system were lower than the May 1999 water levels (Duerr and Torres, 2000). In 116 wells with paired measurements, the May 2000 levels ranged from about 16 feet below to about 4 feet above the May 1999 levels. The largest decrease in water levels was in central Hardee County and the largest increase in water levels was in central Sarasota County. In 25 wells with paired measurements in the Tamiami-upper Hawthorn aquifer, the May 2000 levels ranged from about 11 feet below to about 4 feet above the May 1999 levels. Water levels were lower in about 60 percent of the wells in May 2000. The largest decrease in water levels was in southwestern De Soto County and the largest increase in water levels was in southern Charlotte County.

## WATER-LEVEL CHANGES FROM SEPTEMBER 1999 TO MAY 2000

Water levels in about 99 percent of wells measured in May 2000 for the composite potentiometric surface of the intermediate aquifer system were lower than the September 1999 water levels (Duerr and Torres, 2000). In 115 wells with paired measurements, the May 2000 levels ranged from about 43 feet below to less than 1 foot above the September 1999 levels. The largest decrease in water levels was in southeastern Hardee County and the only increase in water levels was in coastal Sarasota County. In 24 wells with paired measurements in the Tamiami-upper Hawthorn aquifer, the May 2000 levels ranged from about 21 feet below to about 2 feet below the September 1999 levels. Water levels were lower in all measured wells in May 2000. The largest decrease in water levels was in northwestern Sarasota County.

Pumping from the wellfield that supplies Fort Myers has resulted in a cone of depression in the potentiometric surface of the Tamiami-upper Hawthorn aquifer in northern Lee County.

## ACKNOWLEDGMENTS

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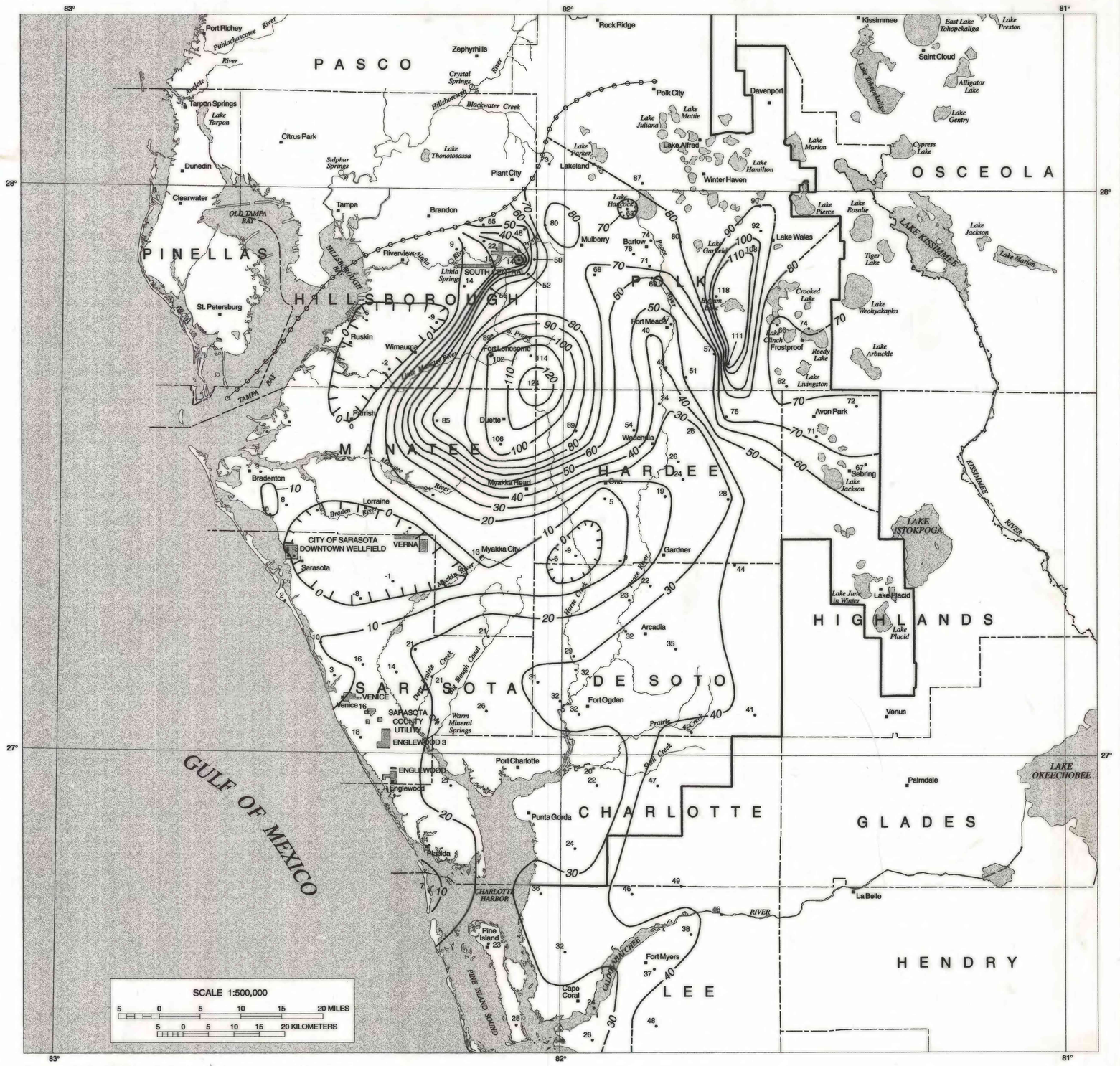


Figure 1. Composite potentiometric surface of the intermediate aquifer system.

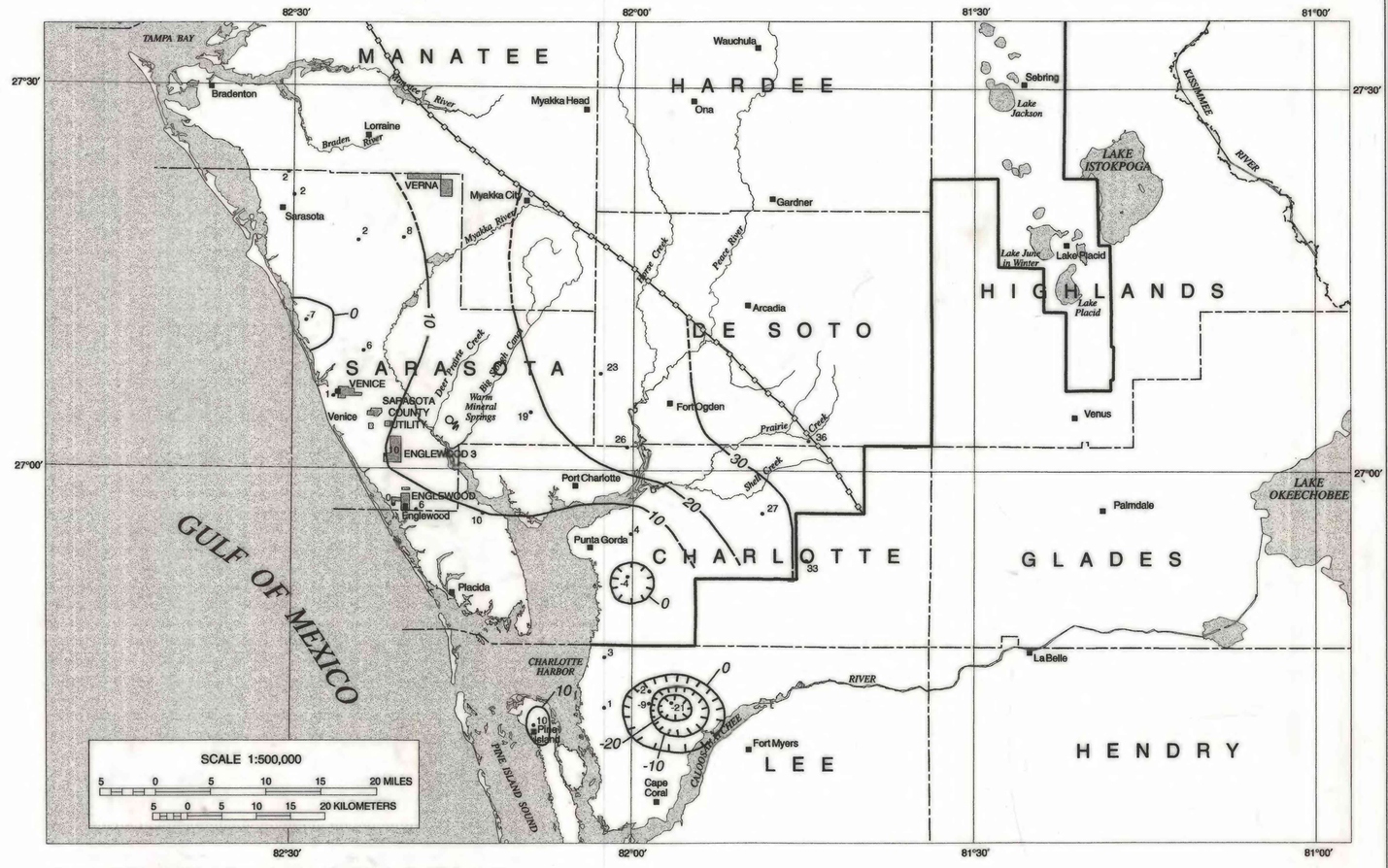


Figure 2. Potentiometric surface of the Tamiami-upper Hawthorn aquifer.

## EXPLANATION

- VERNA — MUNICIPAL WELL FIELD
- —20— — POTENTIOMETRIC CONTOUR - - Shows altitude at which water would have stood in tightly cased wells. Contour interval is 10 feet. National Geodetic Vertical Datum of 1929. Hachures indicate depressions. Dashed where approximately located.
- BOUNDARY OF SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
- APPROXIMATE NORTHERN BOUNDARY OF THE INTERMEDIATE AQUIFER SYSTEM
- APPROXIMATE EASTERN BOUNDARY OF THE TAMIAMI-UPPER HAWTHORN AQUIFER
- 12 — OBSERVATION WELL - - Number is altitude of water level in feet above or below National Geodetic Vertical Datum of 1929.
- SPRING
- CITY OR TOWN

NOTE: The potentiometric contours are generalized to synoptically portray 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 may not conform exactly with the individual measurements of water level.

Base from Southwest Florida Water Management District digital data, 1992
Universal Transverse Mercator projection, Zone 17

# POTENTIOMETRIC SURFACES OF THE INTERMEDIATE AQUIFER SYSTEM, WEST-CENTRAL FLORIDA, MAY 2000

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Copies of this map can be purchased from:
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