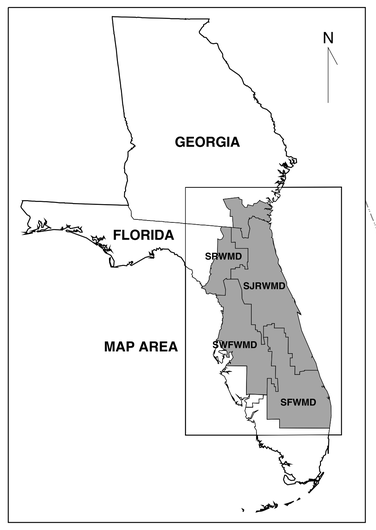
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with
ST. JOHNS RIVER WATER MANAGEMENT DISTRICT
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

OPEN FILE REPORT 01-313

Leel Knowles, Jr., 2001, Potentiometric surface of the Upper Floridan aquifer in the St. Johns River Water Management District and vicinity, Florida, May 2001



EXPLANATION

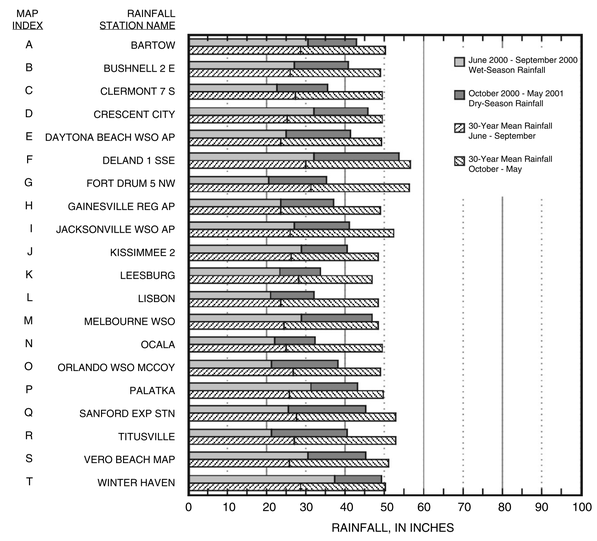
- 50 — POTENTIOMETRIC CONTOUR -- Shows altitude at which water level would have stood in tightly cased wells. Hachures indicate depressions. Contour intervals 5 and 10 feet. Datum is sea level. Dashed where inferred.
- STATE WATER MANAGEMENT DISTRICT BOUNDARY
  - SJRWMD -- St. Johns River Water Management District
  - SRWMD -- Suwannee River Water Management District
  - SFWMD -- South Florida Water Management District
  - SWFWMD -- Southwest Florida Water Management District
- 37 — SURVEYED WELL WITH KNOWN OPEN-HOLE INTERVAL -- Measuring-point datum is referenced to benchmark datum. Number is altitude of water level in feet above or below sea level.
- 31 — SURVEYED WELL WITH UNKNOWN OPEN-HOLE INTERVAL -- Measuring-point datum is referenced to benchmark datum. Number is altitude of water level in feet above or below sea level.
- 46 — UNSURVEYED WELL WITH KNOWN OPEN-HOLE INTERVAL -- Measuring-point datum is estimated from topographic map. Number is altitude of water level in feet above or below sea level.
- 35 — UNSURVEYED WELL WITH UNKNOWN OPEN-HOLE INTERVAL -- Measuring-point datum is estimated from topographic map. Number is altitude of water level in feet above or below sea level.
- SPRING -- Line indicates direction of spring outflow.
- 42 — SINKHOLE -- Surface collapse feature exposing the Upper Floridan aquifer. Where measured, number is altitude of water level in feet above sea level.
- A — RAINFALL STATION -- Letter is index to bar graph.

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929) -- a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

NOTE: The potentiometric contours are generalized on a regional scale to portray water levels in a dynamic hydrologic system taking due account of the variations in hydrogeologic conditions such as well-depth differences, non-simultaneous 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.

SELECTED RAINFALL STATIONS

MAP INDEX	RAINFALL STATION NAME
A	BARTOW
B	BUSHNELL 2 E
C	CLERMONT 7 S
D	CRESCENT CITY
E	DAYTONA BEACH WSO AP
F	DELAND 1 SSE
G	FORT DRUM 5 NW
H	GAINESVILLE REG AP
I	JACKSONVILLE WSO AP
J	KISSIMMEE 2
K	LEESBURG
L	LISBON
M	MELBOURNE WSO
N	OCALA
O	ORLANDO WSO MCCOY
P	PALATKA
Q	SANFORD EXP STN
R	TITUSVILLE
S	VERO BEACH MAP
T	WINTER HAVEN



FIRST-MAGNITUDE SPRINGS

First-magnitude spring name	Spring-pool altitude, in feet above sea level	Discharge, in cubic feet per second	Period-of-record mean-daily discharge, in cubic feet per second
Silver Springs	39	398[a]	783
Rainbow Springs	30	514[a]	704
Blue Springs (Volusia County)	1	101[a]	155
Silver Glen Springs	10	115[b]	110
Alexander Springs	10	96[b]	109

These altitudes do not necessarily reflect the potentiometric surface at the spring pool.
[a]Mean-daily discharge for May 2001.
[b]Instantaneous discharge measured on May 22-24, 2001.

INTRODUCTION

This map depicts the potentiometric surface of the Upper Floridan aquifer in the St. Johns River Water Management District and vicinity in May 2001. Potentiometric contours are based on water-level measurements collected at 684 wells during the period May 2 - 30, near the end of the dry season. The shapes of some contours have been inferred from previous potentiometric-surface maps with larger well networks. The potentiometric surface of the carbonate Upper Floridan aquifer responds mainly to rainfall, and more locally, to ground-water withdrawals. Potentiometric-surface highs generally correspond to topographic highs where the aquifer is recharged. Springs and areas of diffuse upward leakage naturally discharge water from the aquifer and are most prevalent along the St. Johns River. Areas of discharge are reflected by depressions in the potentiometric surface. Ground-water withdrawals locally have lowered the potentiometric surface. Ground water in the Upper Floridan aquifer generally flows from potentiometric highs to potentiometric lows in a direction perpendicular to the contours.

SUMMARY OF HYDROLOGIC CONDITIONS

Measured values of the potentiometric surface ranged from 19 feet below sea level near Fernandina Beach, Florida, to 123 feet above sea level in Polk County, Florida. Below-average rainfall during the previous winter-spring months contributed to increased ground-water withdrawals and a further decrease in water levels from September 2000 to May 2001. The average water level of the network in May 2001 was about 4 feet lower than the average in September 2000. Water levels in May 2001 were 10 feet or more lower than water levels in September 2000 at many of the wells in the Southwest Florida Water Management District, in central Alachua County, and in southern St. Johns County. Water levels declined 20 feet or more in Polk and Hardee Counties. Water levels increased 1 to 6 feet at a few wells, mainly in southern Georgia and north-central Florida.

The average water level of the network in May 2001 generally was about 1 to 2 feet lower than the average in May 2000. Water-level declines were observed across the entire network area except in parts of the South Florida Water Management District and the Southwest Florida Water Management District. Water levels declined 5 to 16 feet in northern parts of the Southwest Florida Water Management District, in central Alachua County, and in southern St. Johns County.

During the preceeding 38 months, accumulated rainfall deficits (determined from 30-year rainfall averages) of 30 to 50 inches or more across sections of interior Florida have resulted in widespread water-level declines of 8 feet or more since May 1998. About one-half of this decline has occurred since May 2000. Water-level declines of 10 feet or more have been observed in nearly all counties located west of the St. Johns River during the period May 1998 to May 2001. First-magnitude springflows have declined by as much as 50 percent during this period.

ADDITIONAL REFERENCES

Long-term hydrographs of ground-water levels for continuous and periodic wells are published in: U.S. Geological Survey, 2000, Water Resources Data - Florida Water Year 2000, v. 1B. Northeast Florida Ground Water, Water-Data Report FL-00-1B, p. 3-26; and are available at internet site: http://water.usgs.gov/fl/nwis/gw

Base from U.S. Geological Survey digital data, 1:100,000, 1983
Universal Transverse Mercator projection,
Zone 17

POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER IN THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT AND VICINITY, FLORIDA, MAY 2001

By
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2001

Copies of this map can be purchased from:
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