DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
AND LOCAL AGENCIES

OPEN-FILE REPORT 82-261
SHEET 1 OF 2

WATER TABLE IN THE SURFICIAL AQUIFER

INTRODUCTION

The configuration of the water table in the surficial aquifer and of the potentiometric surface of the Floridan aquifer, in parts of west-central Florida in the vicinity of well fields, are shown on sheets 1 and 2, respectively. The areal maps encompass land areas of about 1,200 mi^2 and include parts of Hernando, Hillsborough, Manatee, Pasco, and Pinellas Counties. The maps are prepared semi-annually by the U.S. Geological Survey in cooperation with the Southwest Florida Water Management District and local agenices. Water levels generally are lowest in May and highest in September; in contrast, pumpage is typically highest in May and lowest in September.

Water levels at the following 14 well-field areas are mapped: Cross Bar Ranch, Cypress Creek, Starkey, Pasco County, Eldridge-Wilde, Clearwater-Dunedin-Belleair, East Lake Road, Cosme, Section 21, Morris Bridge, Brandon, Riverview, Sun City, and Verna. The well fields supply water to urban and suburban areas of Hillsborough, Pasco, Pinellas, and Sarasota Counties.

The surficial aquifer generally consists of unconsolidated, fine-grained sediment as much as 80 feet in thickness. In most areas, the surficial aquifer is underlain by clay that forms a leaky confining layer separating the surficial aquifer from the underlying Floridan aquifer. In southern Hillsborough County and at the Verna well field in Sarasota County, confining beds separate the Floridan aquifer from overlying intermediate aquifers. The Floridan aquifer consists of limestone and dolomite beds that have an average thickness of about 1,000 feet.

SUMMARY OF CONDITIONS

Rainfall during the 1981 water year (October 1980-September 1981) was about 90 percent of the 1941-1970 normal. The area had excessive rainfall in November, February, June, and August and deficient rainfall in the remaining months (table 1). Rainfall during the 1981 wet season (June-September) was near normal whereas rainfall during the 1981 dry season (October-May) was 25 percent below normal. Mandatory restrictions on water use, due to severe drought conditions, had been in effect from May 6, 1981, to September 9, 1981.

On September 21, 1981, total pumpage from the well fields was 140.3 Mgal, 60 Mgal less than on May 18, 1981, and 0.6 Mgal more than on September 15, 1980. the last two times when the well fields were monitored (table 2). Most well fields pumped less water on September 21, 1981, than on September 15, 1980, exceptions being Cross Bar Ranch, Section 21, Morris Bridge, Brandon, and Riverview well fields. Pumpage from these well fields ranged between 0.1 to 7.9 Mgal more on September 21, 1981, than on September 15, 1980.

Seasonal and year-to-year fluctuation of water levels in the surficial and Floridan aquifers for selected well-field wells are shown by hydrographs (sheet 2). The hydrographs show that, generally, the highest water levels occur in September following the wet season, and the lowest levels occur in May at the end of the dry season.

In September 1981, ground-water levels were significantly higher than those of May 1981 and were unchanged or within a few feet of those in September 1980. Seasonal recharge from summer rains and reduced pumpage are factors in the water-level recovery from record and near record low levels of May 1981.

The water table for September 1981 averaged more than 4 feet higher than levels measured in May 1981 and less than 1 foot higher than September 1980 levels. Water levels were 1 to 8 feet higher in September 1981 than in May 1981. The annual change of water levels ranged from a decrease of more than 4 feet at the Section 21 well field to an increase of more than 2 feet at the Eldridge-Wilde well field.

Potentiometric levels for September 1981 were about 1 to 10 feet higher than those in May 1981, exceptions being those levels in the Riverview, Sun City, and Verna well fields. Levels at these well fields were about 28 to 36 feet higher in September 1981 than in May 1981. Potentiometric levels in September 1981 averaged less than 1 foot lower than levels measured the previous September and ranged from a decrease of 7 feet at the Cross Bar Ranch well field to an increase of 4 feet at the Verna well field.

SELECTED REFERENCES

Yobbi, D. K., Mills, L. R., and Woodham, W. M., 1980, Ground-water levels in selected well fields and in west-central Florida, September 1980: U.S. Geological Survey Open-File Report 81-77.

Yobbi, D. K., and Woodham, W. M., 1981, Ground-water levels in selected well fields and in west-central Florida, May 1981: U.S. Geological Survey Open-File Report 81-1106.

Table 1.--Monthly rainfall totals, October 1980-September 1981, and monthly normals, 1941-70 at selected stations in west-central Florida

[Monthly totals in inches]

Rainfall station and well-field identification letter	Operating agency	October 1980	Normal (1941-70)	November 1980	Normal (1941-70)	December 1980	Normal (1941-70)	January 1981	Normal (1941-70)	February 1981	Normal (1941-70)	March 1981	Normal (1941-70)	April 1981	Normal (1941-70)	May 1981	Normal (1941-70)	June 1981	Normal (1941-70)	July 1981	Normal (1941-70)	August 1981	Normal (1941-70)	September 1981	Normal (1941-70)
St. Leo near Cross Bar Ranch (A)	NOAA[1/]	3.2	2.93	4.8	1.87	0.7	2.36	0.7	2.55	3.4	3.14	3.3	4.53	0.1	3.10	1.7	3.79	10.6	8.02	8.4	6.68	11.2	8.55	4.1	7.03
Cypress Creek (B)	USGS[2/]	3.6		3.4		0.5		0.7		3.3		3.4		0.0		1.7		10.8		9.9		10.5		7.4	
Starkey (C)	SWFWMD[3/]	1.7		5.4		0.6		0.8		4.1		3.9		0.1		0.8		7.2		5.4		10.0		2.6	
South Pasco (D)	SWFWMD	0.7		2.4		0.3		0.6		4.5		3.4		0.0		1.2		7.9		7.6		7.9		4.2	
Eldridge-Wilde (E)	SWFWMD	1.6		3.8		0.3		0.7		5.0		3.3		0.0		1.5		9.7		3.8		8.9		4.3	
Dunedin (F)	USDA[4/]	1.2		5.7		0.8		0.5		7.5		1.9		0.0		1.1		4.0		0.6		12.1		5.3	
East Lake Road (G)	Pinellas County	1.7		4.6		1.0		0.9		3.7		3.7		0.0		1.6		10.8		8.0		---		---	
Cosme (H)	St. Petersburg	1.9	3.15	3.6	2.42	0.8	1.91	0.5	2.30	6.1	2.79	2.5	4.17	0.0	2.20	1.0	2.68	6.8	6.66	7.1	9.95	12.2	9.78	5.7	6.54
Section 21 (Lutz) (I)	SWFWMD	1.1		3.5		0.6		0.4		3.0		2.5		0.0		2.1		6.1		6.4		13.8		4.8	
Morris Bridge (J)	SWFWMD	2.0		4.9		0.5		0.7		3.8		2.4		0.0		1.9		---		8.5		12.8		10.4	
Valrico near Brandon (K)	USDA	0.4		4.1		0.6		0.5		5.2		1.3		0.0		0.9		6.7		8.2		12.8		12.8	
Riverview (L)	Hillsborough County	---		---		---		0.5		3.6		1.6		0.0		1.3		4.4		5.6		8.0		4.5	
Ruskin near Sun City (M)	NOAA	0.9	2.54	3.6	1.79	0.8	2.19	0.8	2.33	4.3	2.86	1.2	3.89	0.1	2.10	3.1	1.41	8.9	6.69	6.0	8.43	11.9	8.0	7.0	6.35
Verna (N)	Sarasota	0.3		3.3		0.5		0.3		5.7		1.7		0.0		2.5		7.6		9.0		14.5		5.7	
Monthly average of stations		1.6	2.87	4.1	2.03	0.6	2.15	0.6	2.39	4.8	2.93	2.6	4.20	0.0	2.47	1.6	2.63	7.8	7.06	6.8	9.02	11.3	8.78	6.1	6.64

[1/] National Oceanic and Atmospheric Administration
[2/] U.S. Geological Survey
[3/] Southwest Florida Water Management District
[4/] U.S. Department of Agriculture, Forest Service

Table 2.--Pumpage and water-level data at fourteen well fields in west-central Florida

Well field and well-field identification letter	Operating agency	Number of supply wells	Number of supply wells pumping at time of monitoring 9-21-81	Pumpage (Mgal) 9-15-80	5-18-81	9-21-81	Water table in the surficial aquifer above NGVD of 1929 (ft): Well no.	Year record began	Extremes for period of record prior to 1981: High (mo-yr)	Low (mo-yr)	9-15-80	5-18-81	9-21-81	Potentiometric surface of the Floridan aquifer above or below (-) NGVD of 1929 (ft): Well no.	Year record began	Extremes for period of record prior to 1981: High (mo-yr)	Low (mo-yr)	9-15-80	5-18-81	9-21-81
Cross Bar Ranch (A)	West Coast Regional Water Supply Authority	17	4	11.7	18.2	15.0	9-1a	1976	53.1 (11-79)	44.6 (10-80)	44.9	dry	dry	9-1d	1976	56.5 (11-79)	46.9 (11-80)	47.4	38.0	40.4
Cypress Creek (B)	West Coast Regional Water Supply Authority	13	10	29.7	30.3	29.2	E-107s	1973	70.5 (7-74)	64.6 (5-80)	65.7	62.1	66.5	E-107d	1973	73.5 (9-74)	51.3 (5-80)	52.5	44.8	47.9
Starkey (C)	Pasco County	5	4	3.5	4.8	3.0	70Ma	1974	32.4 (9-74)	24.9 (7-75)	28.6	dry	25.9	10	1974	32.1 (10-75)	24.9 (7-77)	28.6	25.1	26.1
Pasco County (D)	St. Petersburg	8	3	12.0	17.3	9.5	E-105a	1973	59.2 (9-79)	52.2 (5-75)	55.6	52.7	56.6	E-105d	1973	52.1 (2-75)	32.8 (5-75)	43.2	35.2	44.9
Eldridge-Wilde (E)	Pinellas County	58	16	20.7	42.1	17.8	11a	1973	21.1 (9-74)	11.0 (5-75)	17.1	16.5	19.5	11d	1973	19.0 (8-79)	7.1 (6-75)	18.1	6.1	16.1
Clearwater-Dunedin-Belleair (F)	Clearwater-Dunedin-Belleair	52	27	12.1	15.6	10.5	34a	1975	62.9 (9-75)	51.8 (5-76)	--	--	--	66S	1954	14.6 (9-59)	7.1 (5-76)	9.4	7.1	9.8
East Lake Road (G)	Pinellas County	8	0	2.0	2.1	0.0	9a	1976	17.1 (9-79)	11.8 (5-77)	15.6	12.2	16.3	9d	1976	16.4 (9-79)	12.0 (5-76)	14.6	11.2	15.7
Cosme (H)	St. Petersburg	23	3	7.9	10.4	7.2	10a	1972	68.4 (7-74)	61.8 (6-75)	66.2	63.1	67.1	11	1972	39.8 (9-79)	19.0 (5-73)	36.4	24.6	34.9
Section 21 (I)	St. Petersburg	7	2	7.1	7.2	7.6	21-13a	1972	51.1 (5-79)	34.1 (6-73)	49.1	43.7	44.8	21-13d	1930	50.9 (9-63)	21.0 (5-75)	41.2	32.4	40.5
Morris Bridge (J)	Tampa	30	14	16.7	28.0	24.6	34a	1972	39.0 (5-80)	30.8 (5-75)	36.4	27.1	34.8	34d	1972	35.9 (10-75)	22.7 (12-78)	26.9	20.3	27.6
Brandon (K)	Hillsborough County	25	10	6.8	12.1	5.8	901s	1976	30.4 (9-78)	21.4 (5-76)	25.0	20.2	26.9	T-1	1963	22.1 (9-63)	12.3 (5-77)	16.7	10.9	18.2
Riverview (L)	Hillsborough County	7	4	1.3	3.6	1.4	3a	1976	58.9 (9-77)	53.8 (5-76)	57.0	53.9	59.0	3d	1969	31.8 (3-68)	-8.1 (5-77)	12.9	-13.5	12.0
Sun City (M)	Hillsborough County	8	0	1.8	2.2	0.5	7a	1976	68.0 (9-77)	63.0 (5-76)	67.9	64.7	67.5	3d	1972	20.1 (9-79)	-16.6 (4-75)	16.9	-18.8	18.0
Verna (N)	Sarasota	39	18	8.4	8.8	8.2	11-04A	1965	62.3 (9-73)	56.6 (5-75)	62.3	58.3	62.1	10-08	1964	43.3 (6-64)	-16.4 (5-76)	13.2	-11.8	17.5
Total				135.7	200.7	140.3														

EXPLANATION

—20— WATER-TABLE CONTOUR--Shows altitude of water table, September 21-25. Contour interval 2, 5, 10, and 20 feet. Hachures indicate depressions. Datum is National Geodetic Vertical Datum of 1929 (NGVD). Some contours are highly generalized and are based on surface-drainage features in areas where water-table observations are not available.

33 Echo — MUNICIPAL SUPPLY WELLS--Shows location and number or name of well. Open symbol indicates well was idle. Solid symbol indicates well was pumped during monitoring.

9d — OBSERVATION WELL--Shows location of well and water level in feet above or below NGVD. Well number, where shown, indicates hydrograph shown in this report.

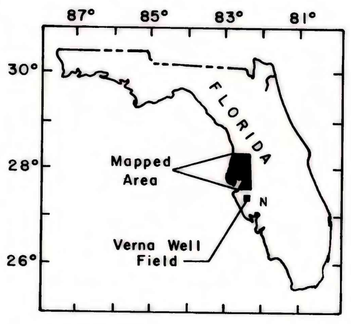
▲ SURFACE-WATER GAGE--Shows location of surface-water gage and water level in feet above or below NGVD.

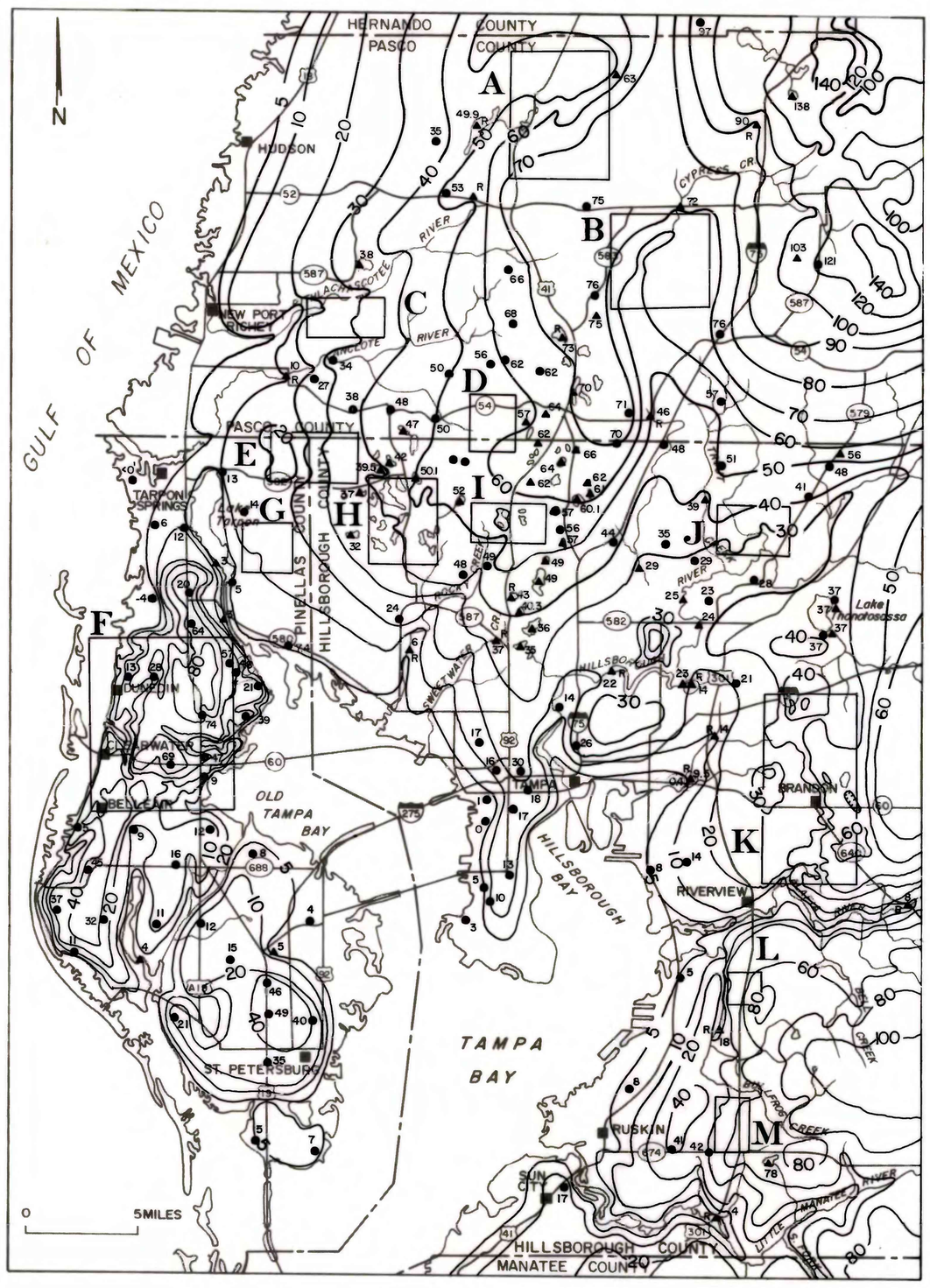
R WATER-LEVEL RECORDER--Shows location of water-level recorder.

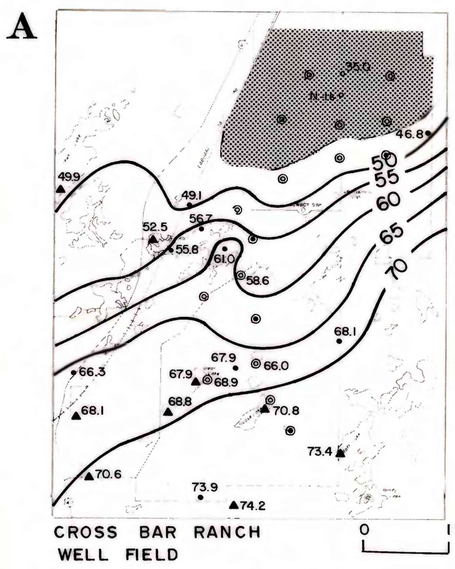
□ WELL-FIELD BOUNDARY--Shows generalized boundary of well-field area.

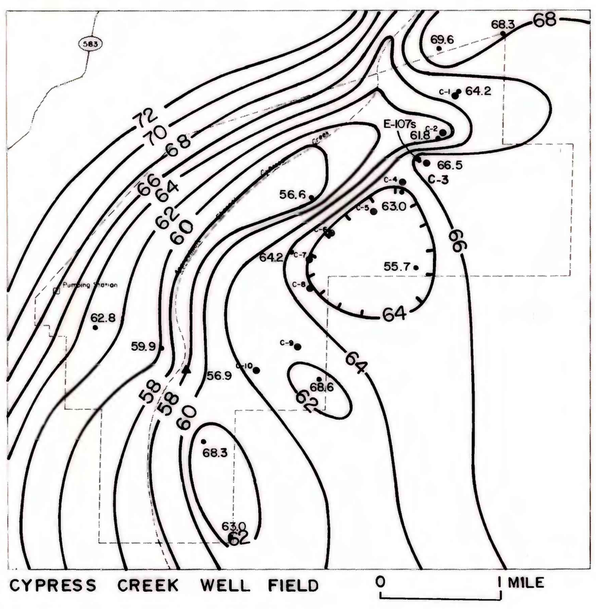
PROPERTY BOUNDARY--Shows boundary of property owned by operating agency.

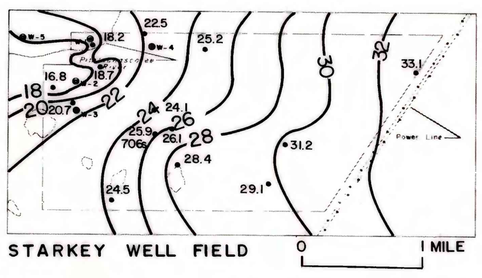
E Well-field identification letter.

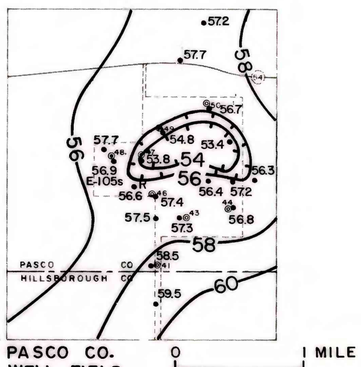


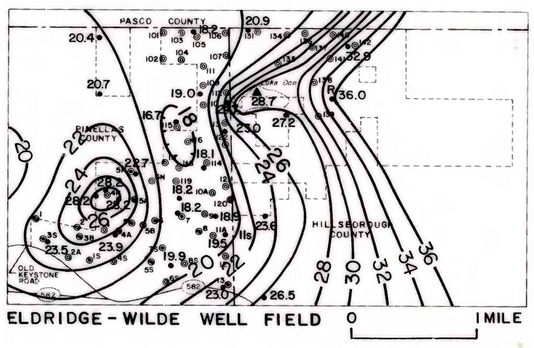


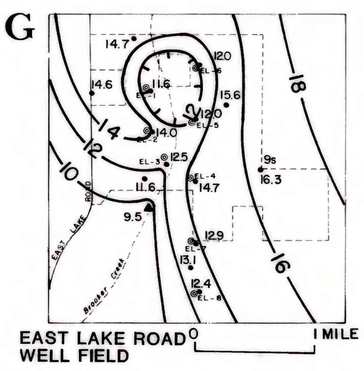


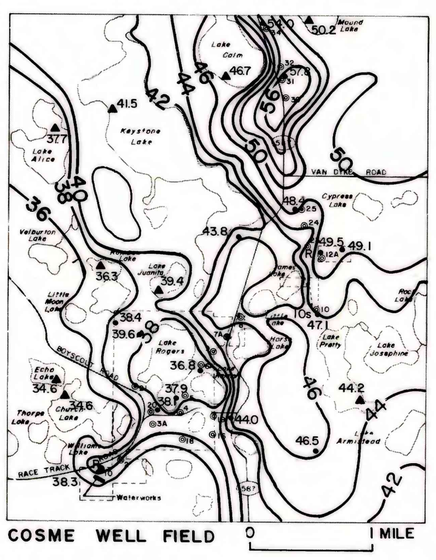


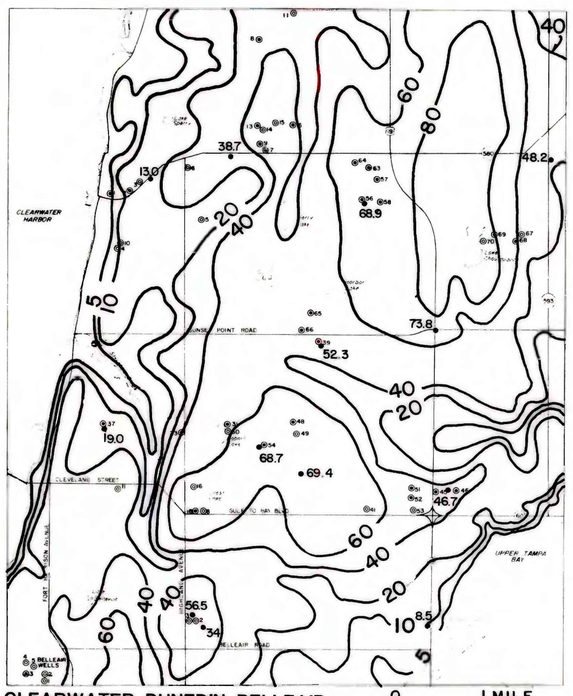


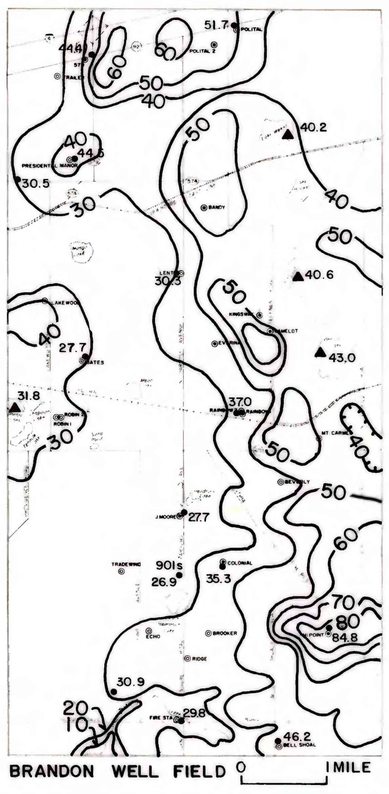


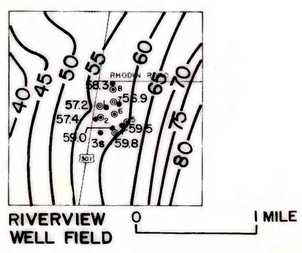


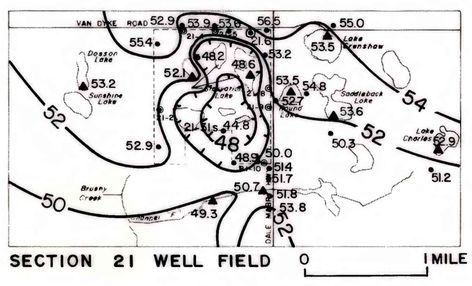


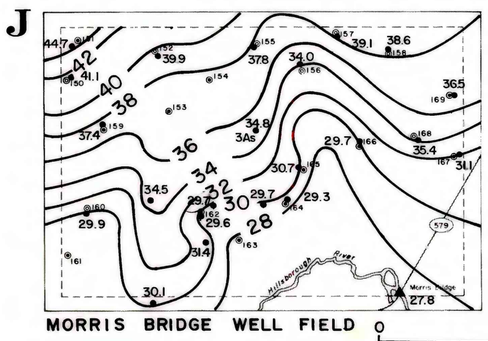


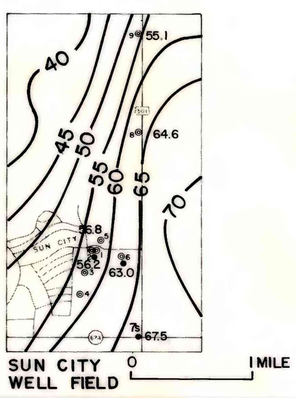


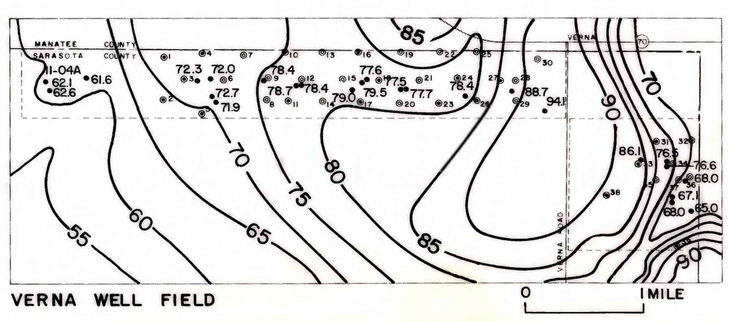












GROUND-WATER LEVELS IN SELECTED WELL FIELDS AND IN WEST-CENTRAL FLORIDA, SEPTEMBER 1981

By

D. K. YOBBI and G. L. BARR

1982