TECHNICAL PUBLICATION SJ 84-7

ANNUAL REPORT OF HYDROLOGIC CONDITIONS

1983 WATER YEAR

By

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Palatka, Florida

August 1984

Project Number 2002314

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INTRODUCTION

The Water Resources Department of the St. Johns River Water Management Distirct has prepared an annual report for the water year 1983 (October 1982 through September 1983). This report is directed toward state, regional and local governmental units, planning agencies, agricultural and business concerns, and interested members of the public; and is intended to provide current information on hydrologic conditions in the District and on the activities of the Water Resources Department.

The report is divided into two parts. The first section deals with the status of the resource: 1. Precipitation, 2. Ground Water, 3. Surface Water, and 4. Water Use data for the 1983 water year are presented and compared with historical data. Rainfall statistics for the period 1941 to 1970 are presented in the appendices along with a list of current technical reports and information circulars available through the Department. Future annual reports will be expanded and modified, as data becomes available, to provide more detailed information on water quantity and quality, water use, and other water resources information of interest to the people of the District.

STATUS OF THE RESOURCE

RAINFALL

Precipitation in the St. Johns River Water Management District occurs primarily as rainfall. The isohyetal map of the normal rainfall which is the annual mean for the period 1951-1980 is shown in Figure 1.

The annual rainfall variation in the District for the water year 1983 is shown in Figure 2. Rainfall within the District during the 1983 water year ranged from a low 45.45 inches at Lisbon in Lake County to a high of 63.06 inches at Vero Beach in Indian River County. Average rainfall for the 1983 water year calculated using the isohyetal map (Figure 2) was 55.0 inches as compared to a District mean of 52.0 inches (based on Figure 1) for the period of 1951-1980. The rainfall was above normal for two consecutive years since 1981 drought.

The departure from the normal rainfall for the 1983 water year is illustrated on Figure 3. Rainfall was above normal almost through the entire District except portions of Clay, Putnam, Marion, Lake and Orange counties. In general, the coastal areas received much higher rainfall than the normal.

The District received unusually heavy rainfall during late winter and early spring as shown in Figure 4 for some stations. This resulted in a swelling of streams and lakes in the months of February-April (see Surface Water).

In summary, rainfall for most of the District during the 1983 water year was above the period of record normal rainfall.

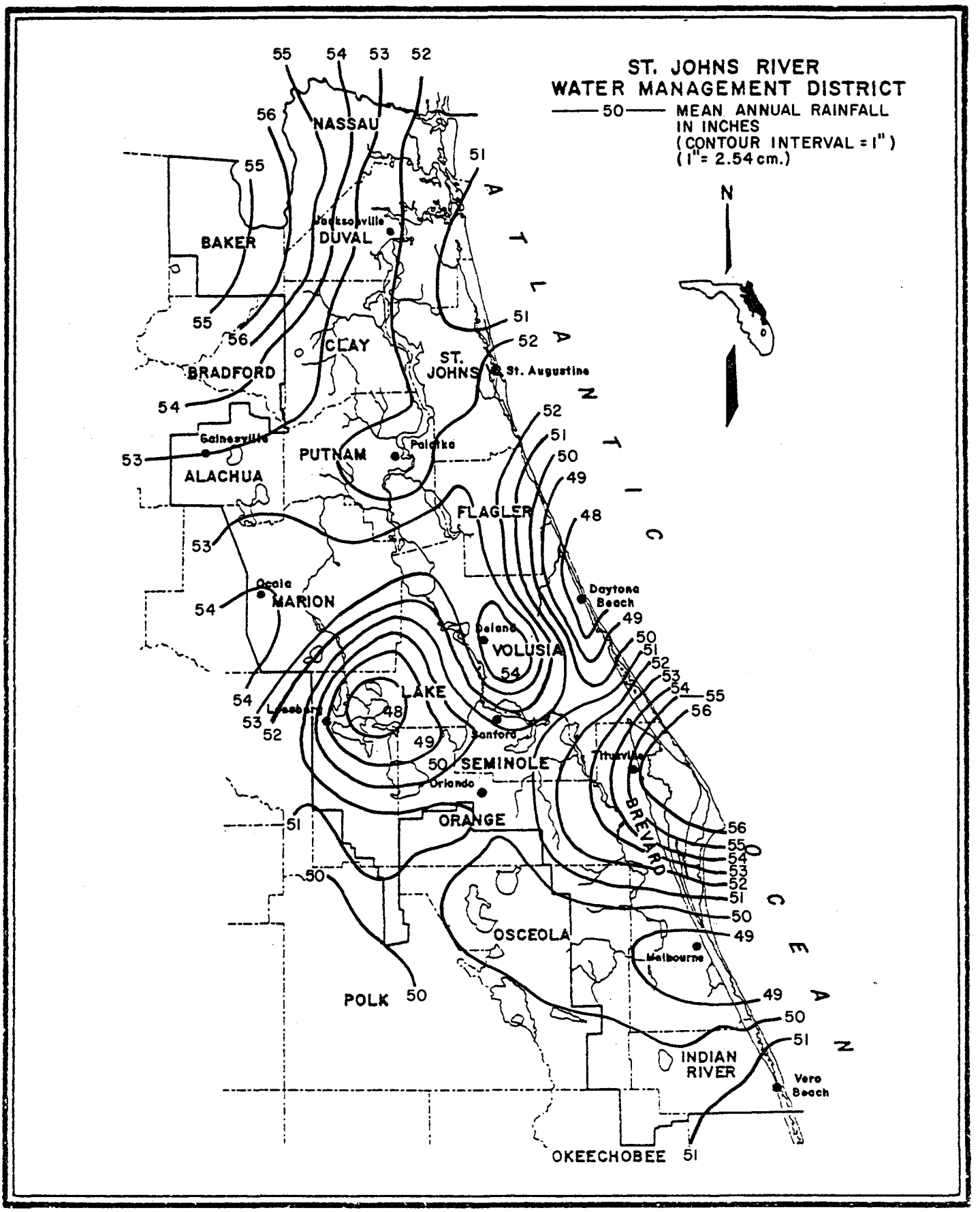


Figure 1. -- Mean Annual Rainfall in the SJRWMD, 1951-1980

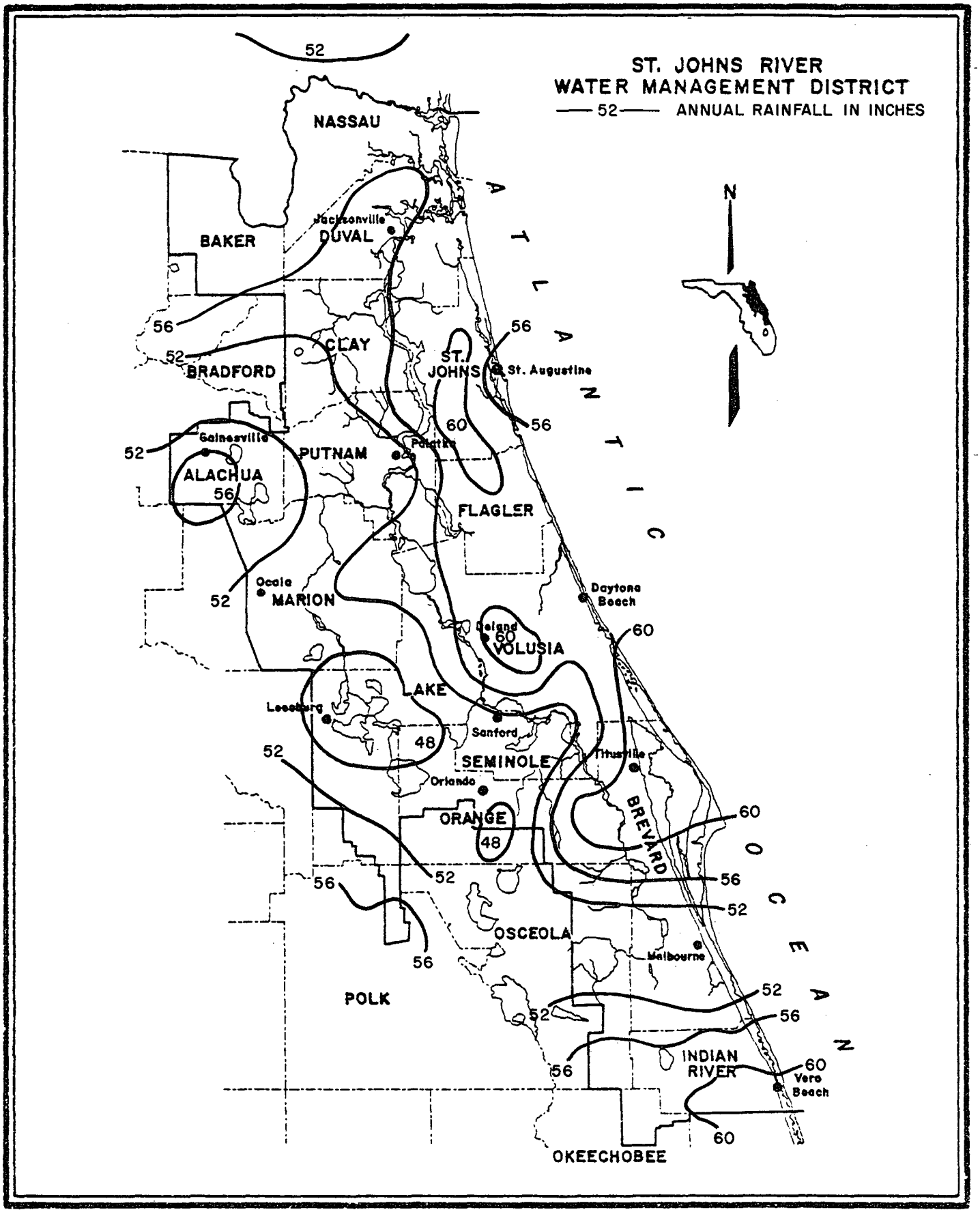


Figure 2. -- 1983 Rainfall in Inches (October 1982 - September 1983)

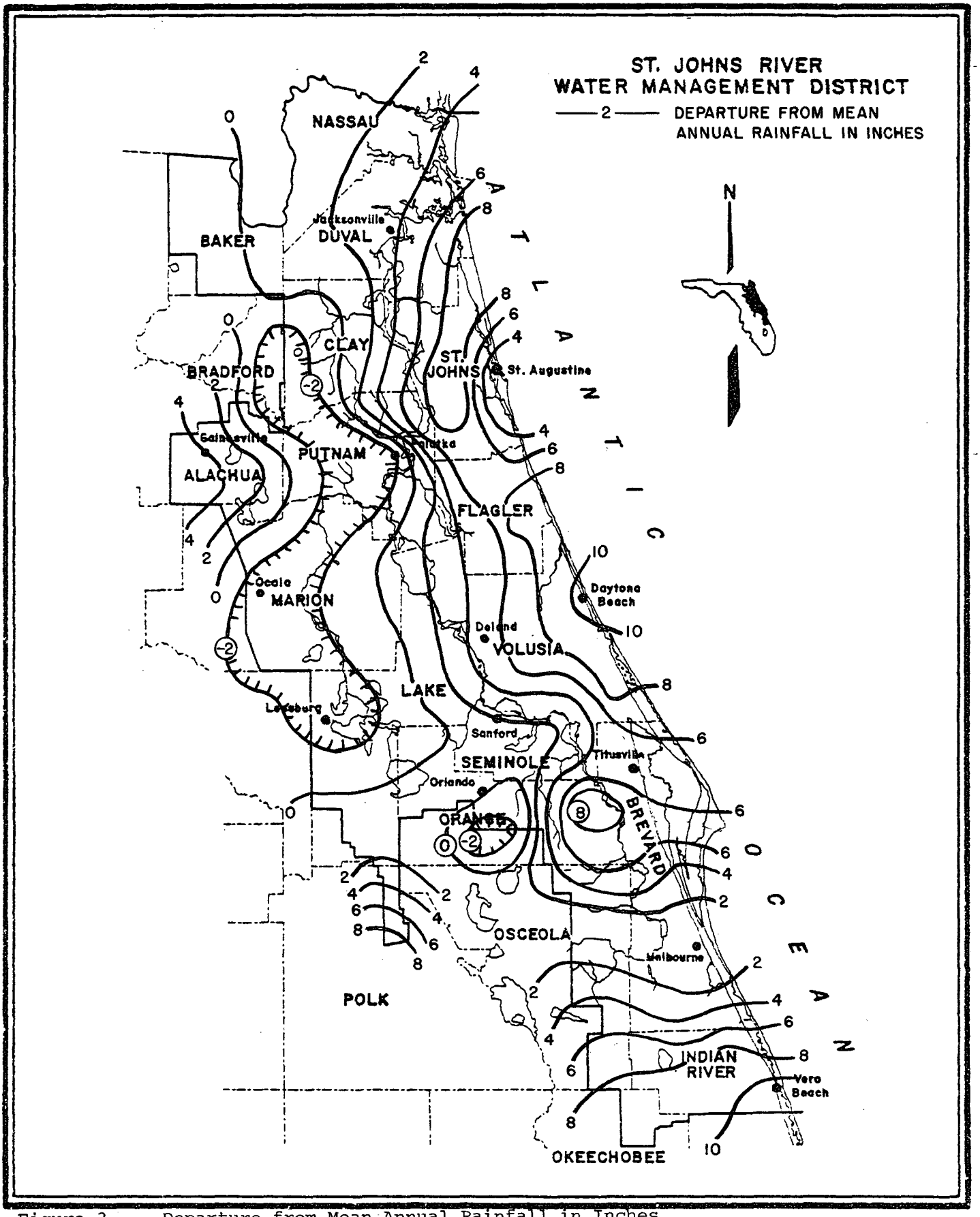


Figure 3. -- Departure from Mean Annual Rainfall in Inches
(October 1982 - September 1983)

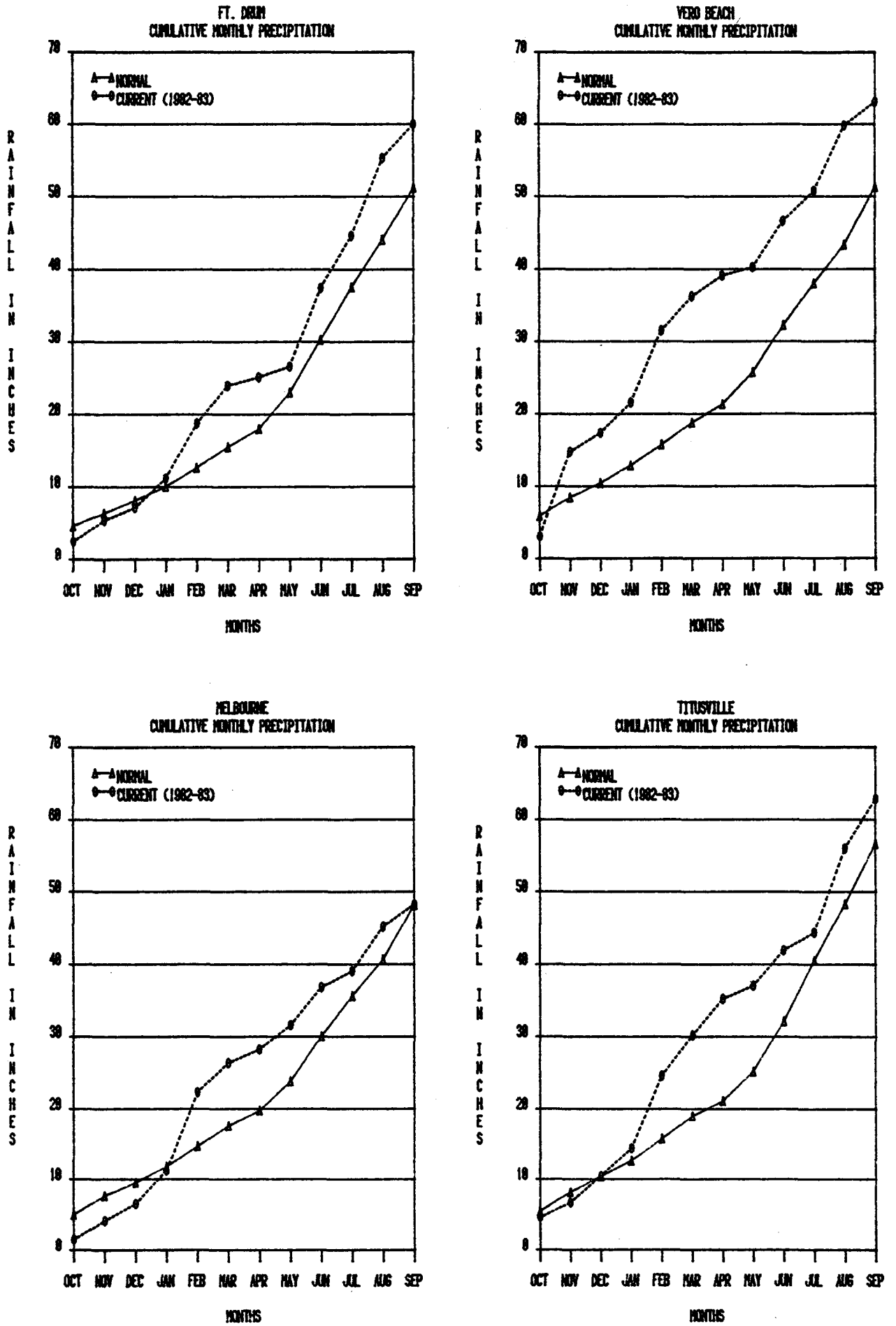


FIGURE 4. -- Cumulative Monthly Rainfall at Selected Stations (October 1982 - September 1983)

FLORIDAN AQUIFER

Figures 5 and 6 display the potentiometric surface of the Floridan aquifer during May and September 1983, respectively. The potentiometric change of water level surfaces between the normal seasonal low in May and the seasonal high in September is shown in Figure 7. While most areas of the District experienced little change in the potentiometric head from May to September of 1983, the potentiometric levels did rise from Water Year 1982 to Water Year 1983. The greatest increases during the period May to September of 1983 were observed in an area north of Ocala and in the Upper St. Johns River Baisn in Brevard, Indian River, Orange and Osceola counties. Potentiometric levels in the Floridan aquifer for Water Year 1983 are near or slightly above the normal of the last several years.

Figure 8 shows the locations of four long-term monitor wells in the District. The Alamana well in Volusia County showed little overall change in potentiometric levels during the 1983 water year (Figure 8). The other three wells recorded rises in the potentiometric levels of approximately 2 to 3 feet since the 1982 Water Year.

The Keystone Heights and Alamana wells are located in recharge areas which are sparsely populated. Variations of water levels in these two wells are the result of differences in natural recharge and discharge. The overall increase in potentiometric levels at the Keystone Heights well indicates greater

recharge during the water year than discharge in the hydraulically connected areas down gradient in the Floridan aquifer. The Alamana well potentiometric levels are approximately the same as last Water Year. The Keystone Heights well in Clay County recorded a total rise of approximately 3 feet from Water Year 1982 potentiometric levels.

The Neptune Beach and Platt wells are located in areas of high demands on the Floridan aquifer. The fluctuations in water levels are directly affected by heavy ground water pumpage. The Neptune Beach well, in Duval County, reflects heavy urban withdrawals. The Platt well, in Brevard County, reflects predominately agricultural demands. The Neptune Beach well recorded approximately 2 feet of rise during the 1983 Water Year. The Platt well recorded approximately 3 feet of rise during the same period.

The period of record trends of all 4 wells indicate slowly dropping potentiometric water levels in the Alamana, Keystone Heights and Neptune Beach wells. The Platt well appears to show a stabilizing of the dropping potentiometric levels during the 1974 to 1981-1982 period and a moderate rise in potentiometric levels from 1981-1982 to the present.

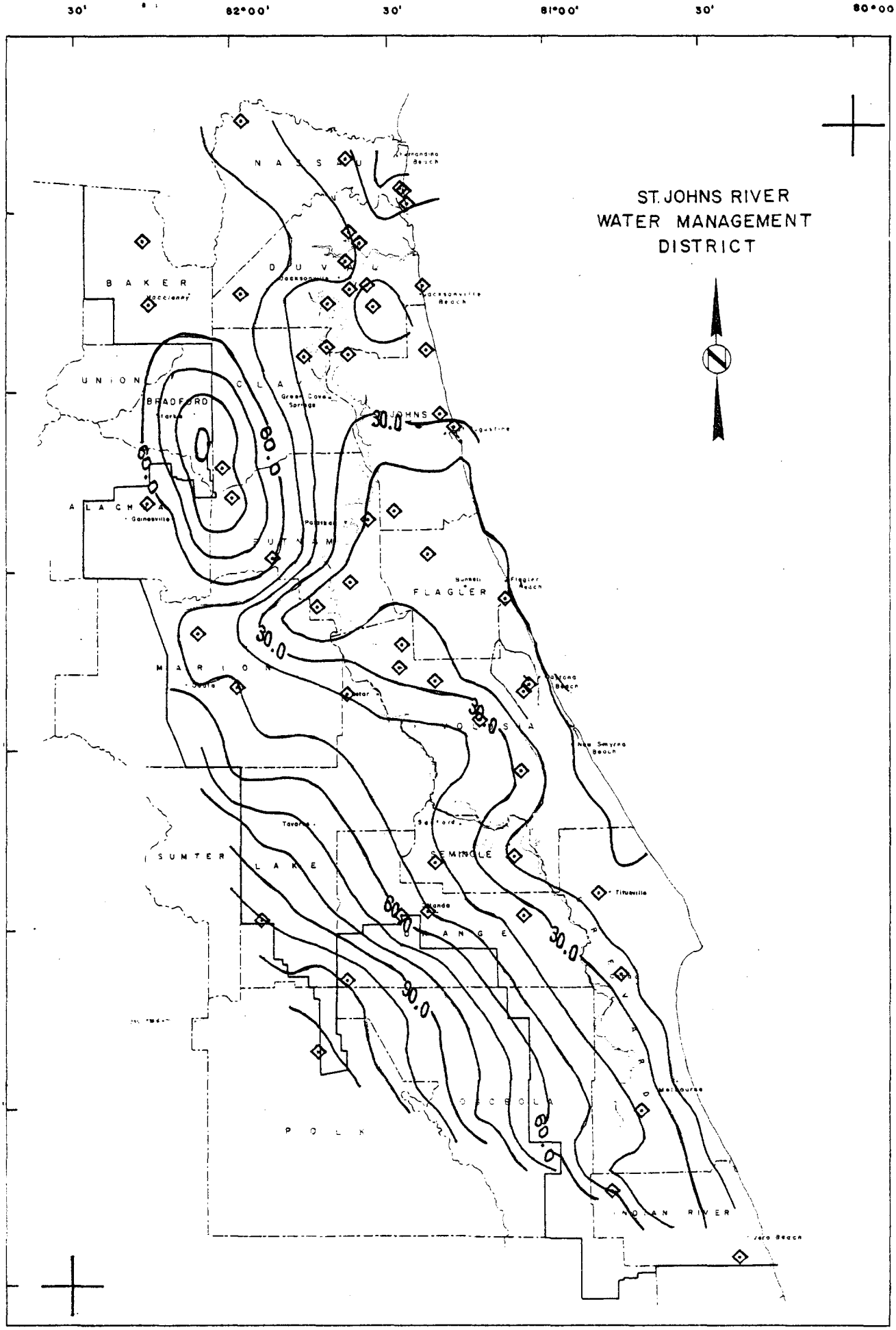


FIGURE 5. -- Potentiometric Level of the Floridan Aquifer, May 1983

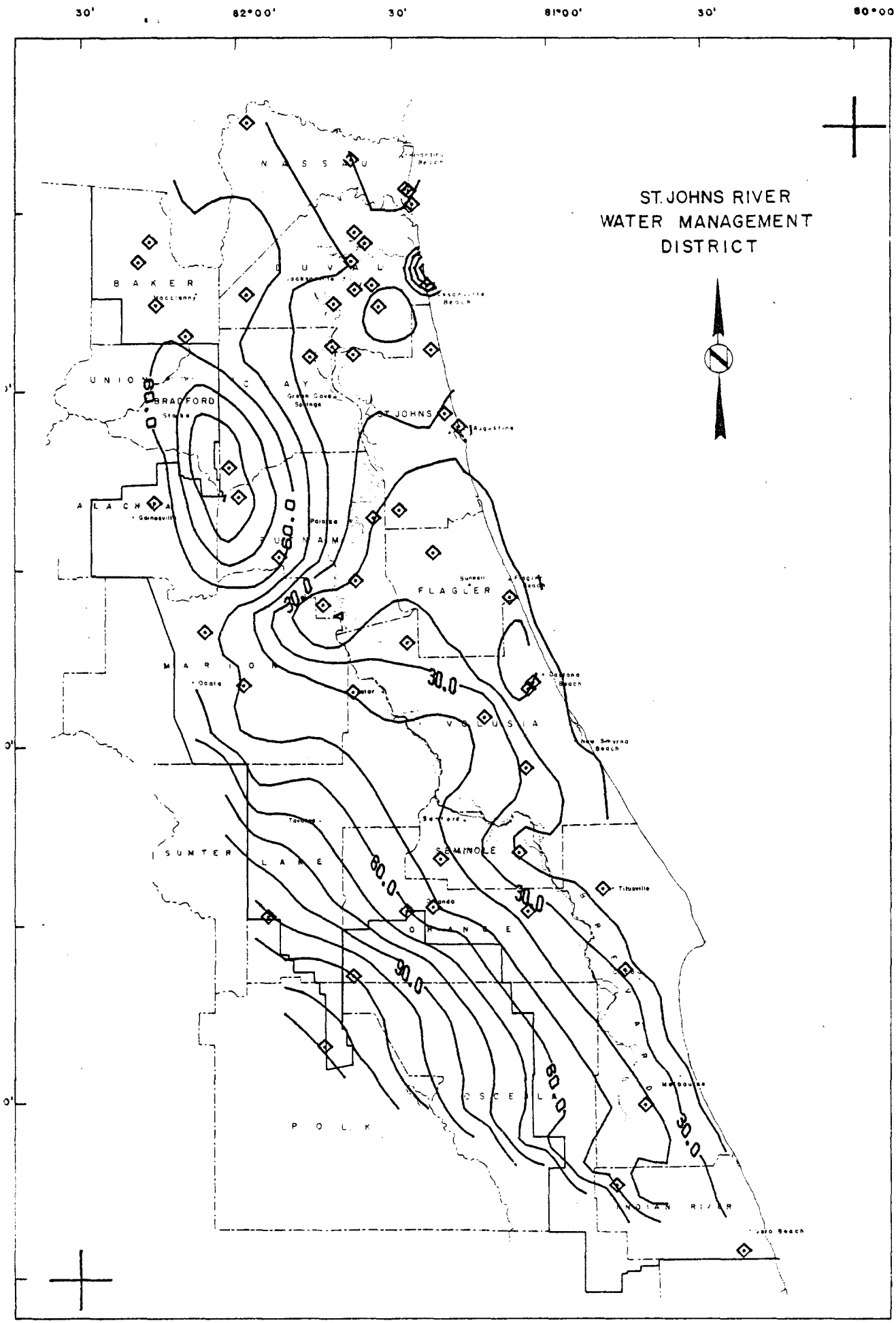


FIGURE 6. -- Potentiometric Level of the Floridan Aquifer, September 1983

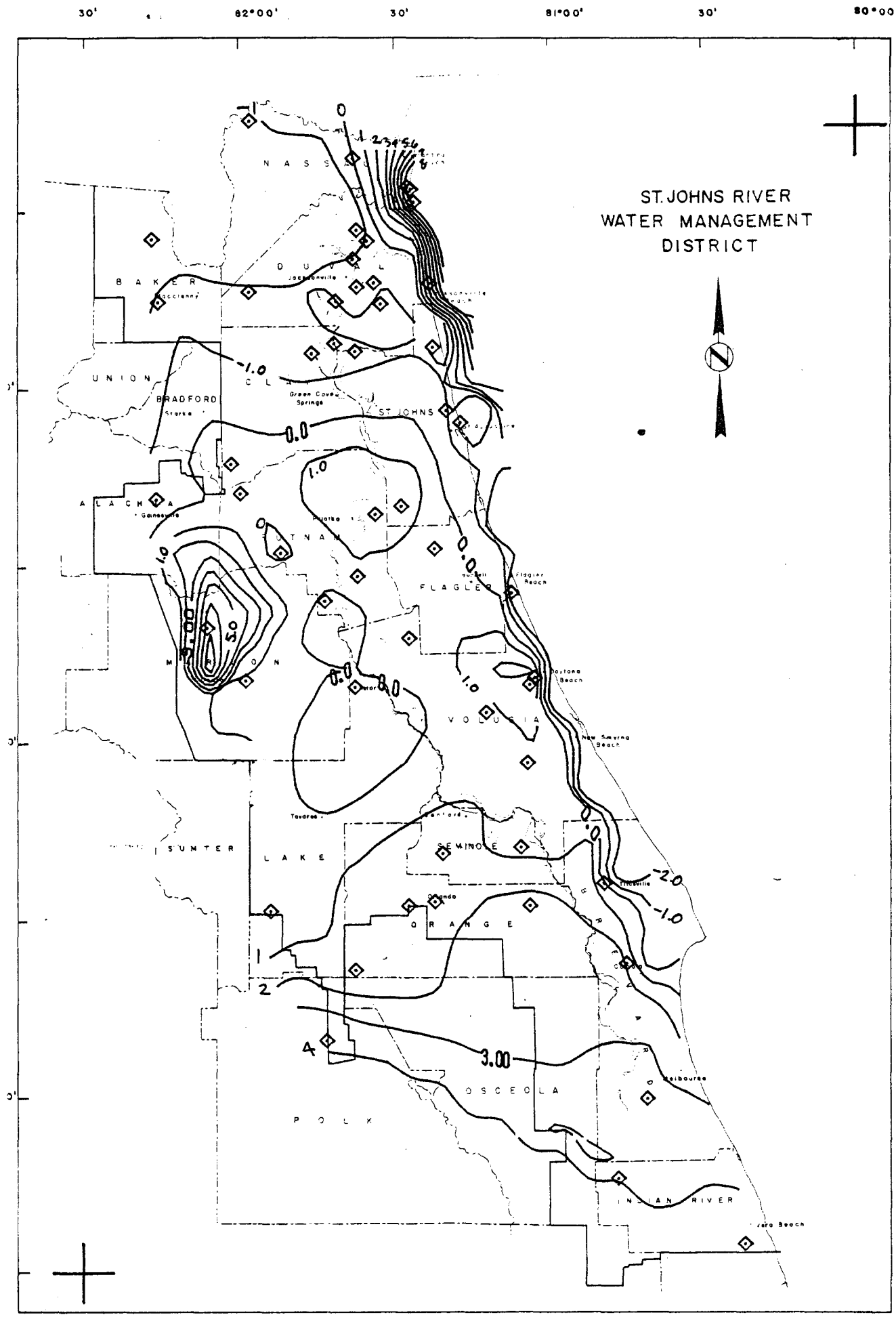


FIGURE 7. -- Change in the Potentiometric Surface of the Floridan Aquifer, May 1983 - September 1983

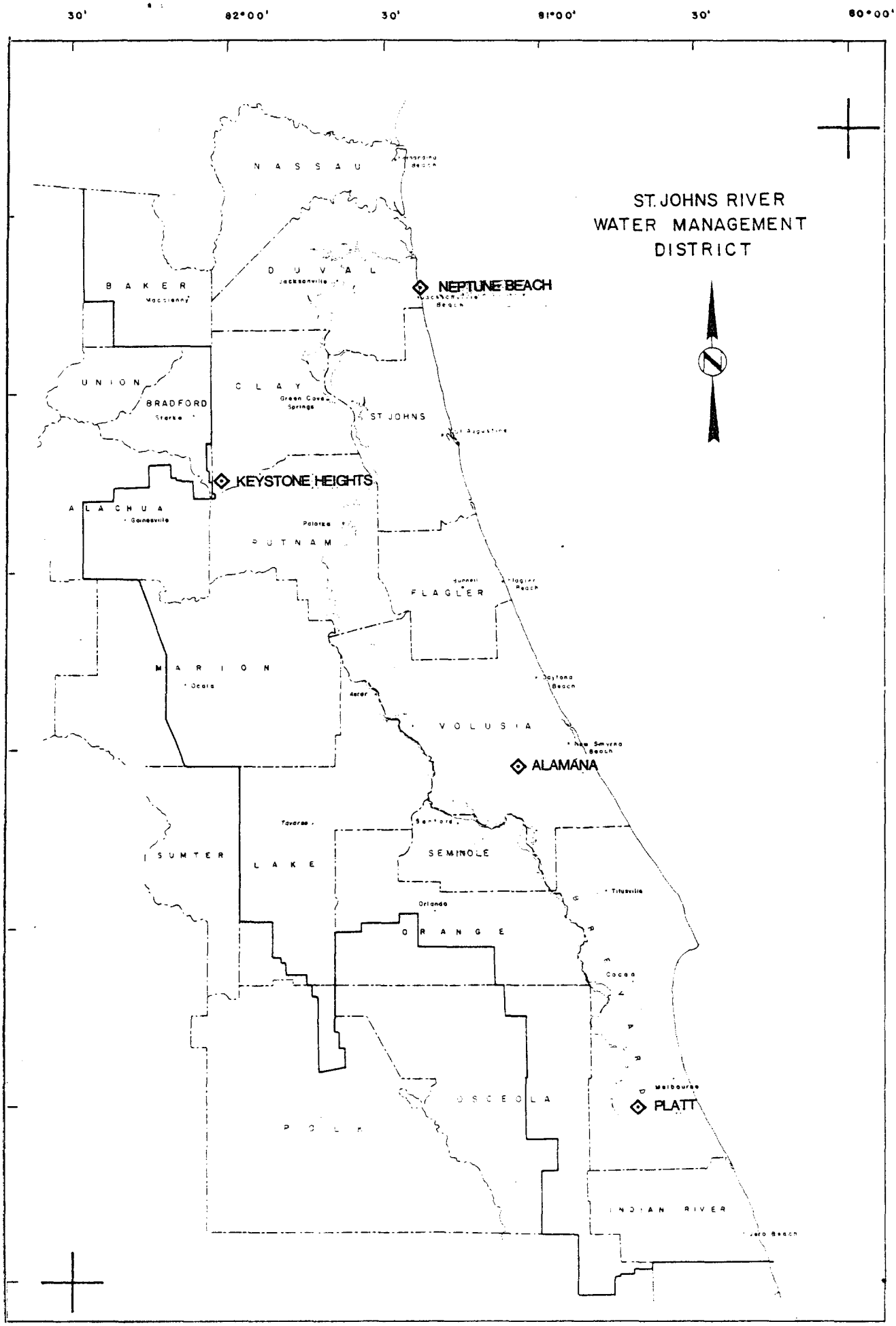


FIGURE 8. -- Long Term Monitor Well Location

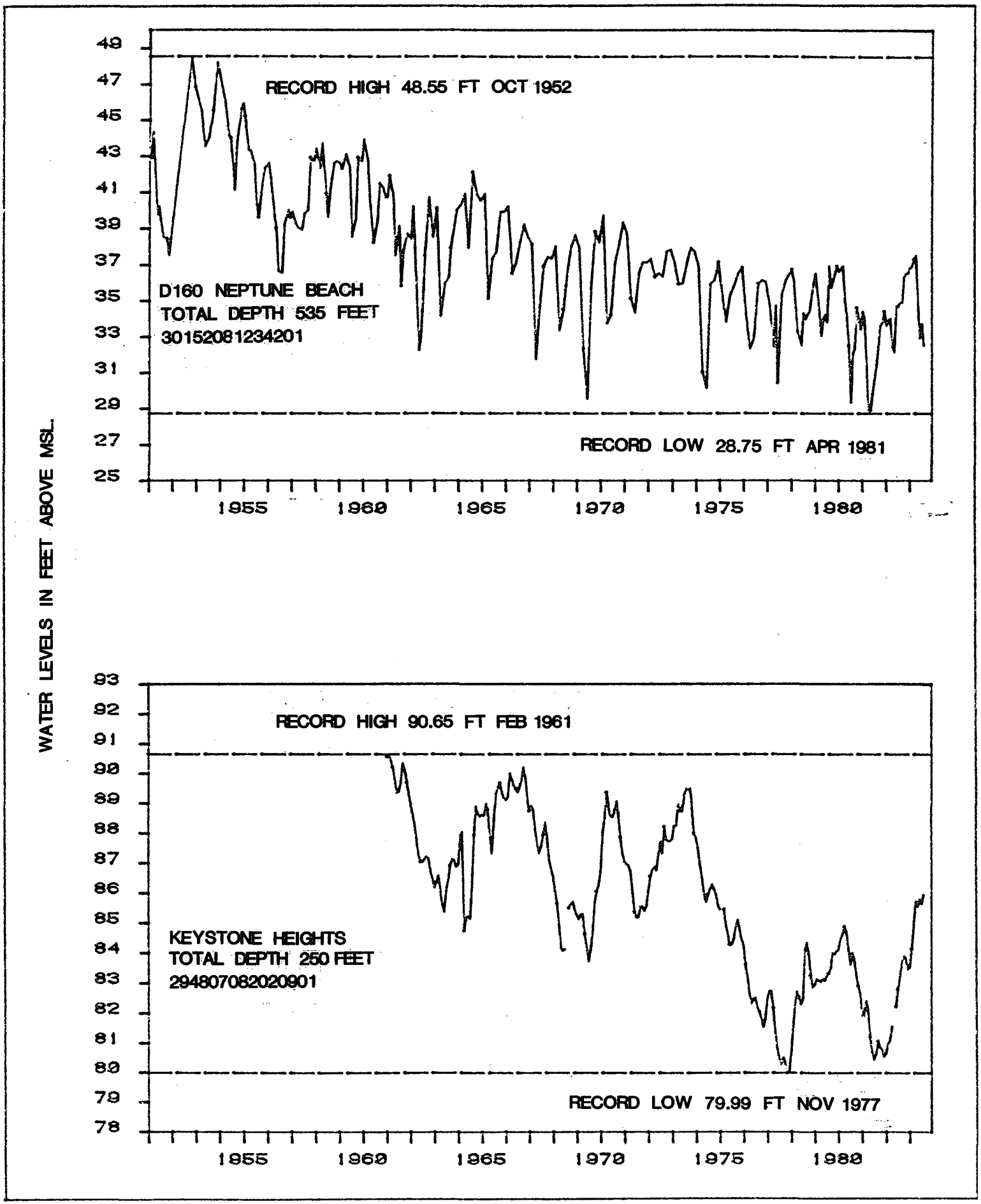


FIGURE 9. -- Hydrographs of Selected Wells in SJRWMD

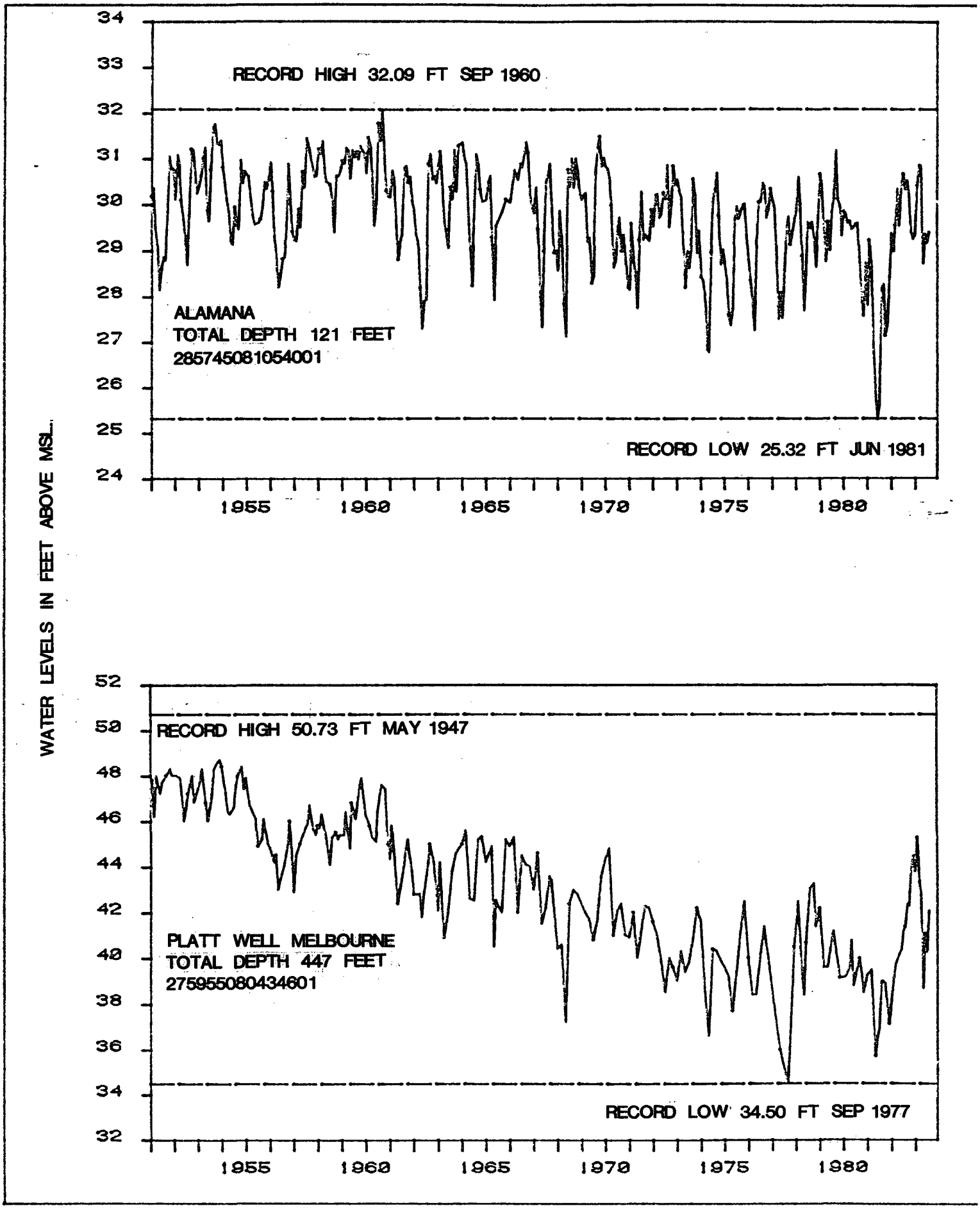


FIGURE 9. -- Hydrographs of Selected Wells in the SJRWMD (cont'd)

SURFACE WATER

The streams and rivers of the St. Johns River Water Management District derive their flows from runoff of precipitation and from ground water discharge. Overall rainfall was about 6% above normal for the District during the 1983 water year. However, unusual heavy rainfall in late winter and early spring caused the lakes and streams to swell in the months of February-April. Locations of stream or lake gaging stations used in the preparation of this report are shown in Figure 9.

Figures 10 through 16 present monthly streamflow data for water years 1981-1983 for selected gaging stations in the District. Figures 17 through 22 show monthly elevations for some principal lakes in the District. The median shown on these figures indicates the flow (or stage) value equaled or exceeded for 50 percent of time during the period of record. In general, streamflow and lake elevations are above median for most of the months.

Table 1 presents the annual mean flow data for different tributaries in the lower St. Johns River Basin.

TABLE 1. Annual Mean Flows for Selected Gaging Stations in the Lower St. Johns River Basin

Gaging Station	Mean Flow in cfs Water Year 1981	1982	1983
Etonia Creek at Bardin	72.0	108	104
Rice Creek near Springdale	17.3	52.0	57.8
Simms Creek near Bardin	24.4	41.3	66.1
South Fork Black Creek near Penney Farms	68.8	171	161
North Fork Black Creek near Middleburg	79.4	174	238
Ortega River at Jacksonville	9.85	33.1	44.7
Pablo Creek at Jacksonville	8.73	30.5	39.0

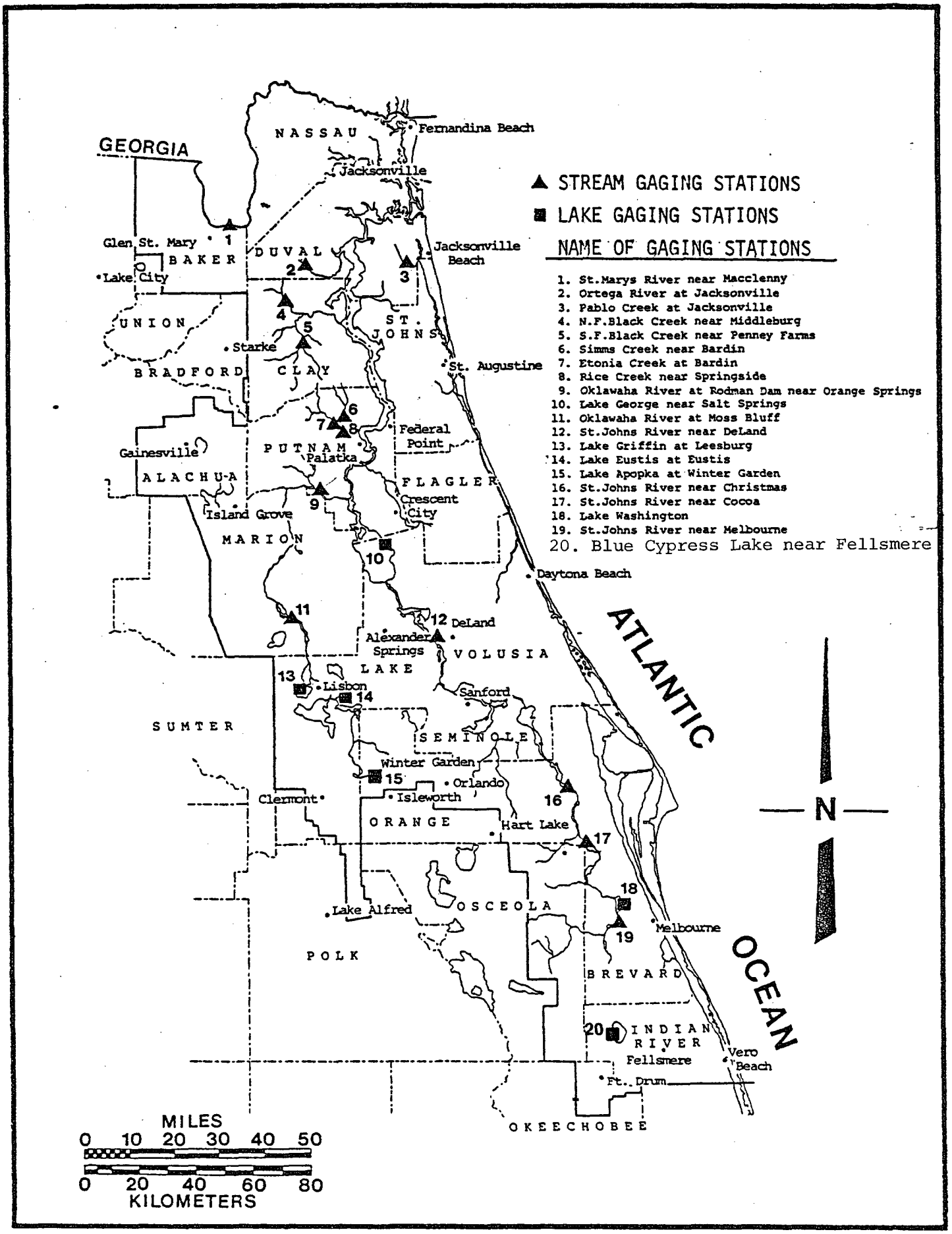


FIGURE 10. -- Location of Stream and Lake Gaging Stations Used in this Report.

Figure 11. -- STREAMFLOW - ST. MARYS RIVER NEAR MACCLENNY
WATER YEARS 1981-1983

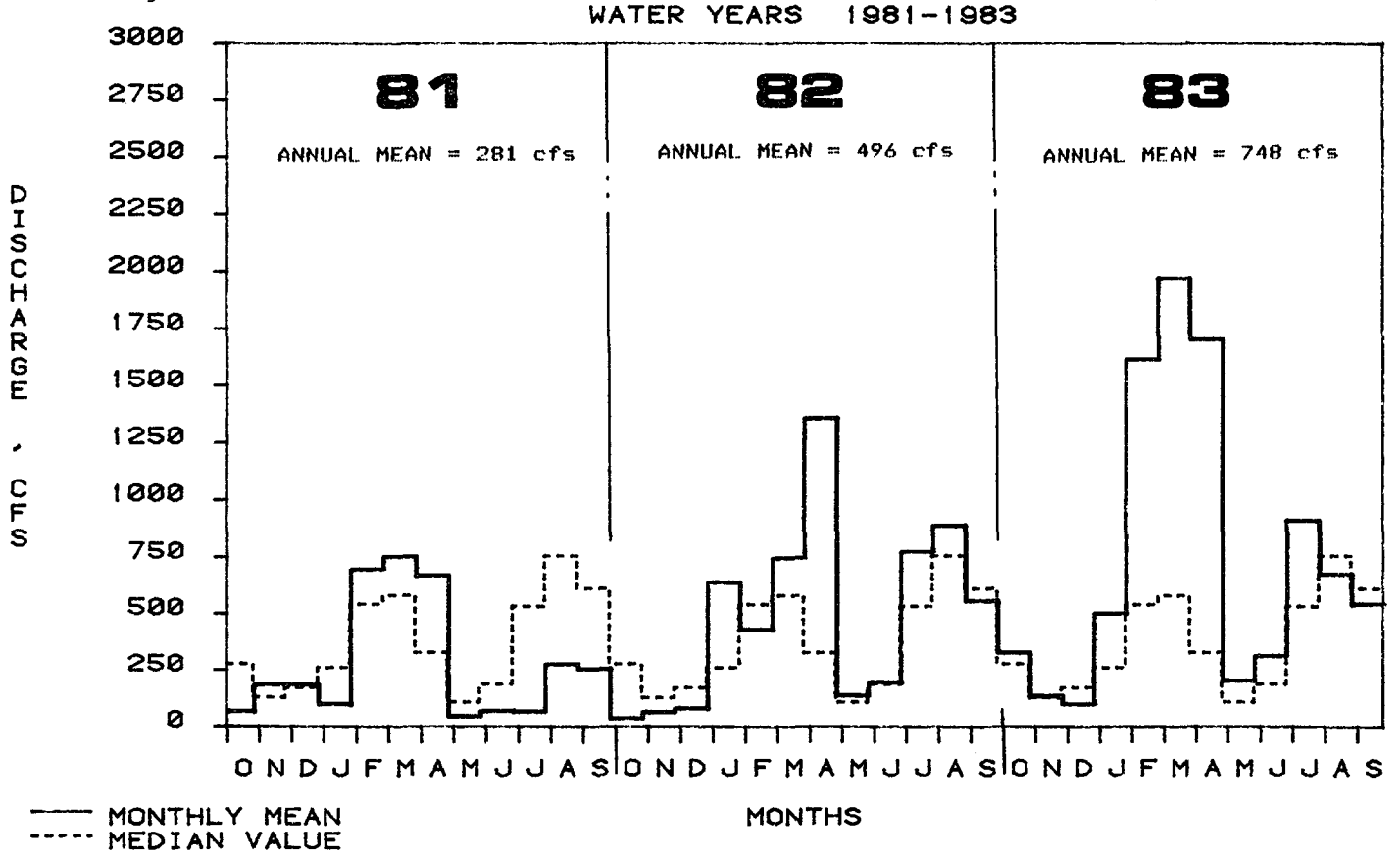


Figure 12. -- STREAMFLOW - ST. JOHNS RIVER NEAR MELBOURNE
WATER YEARS 1981-1983

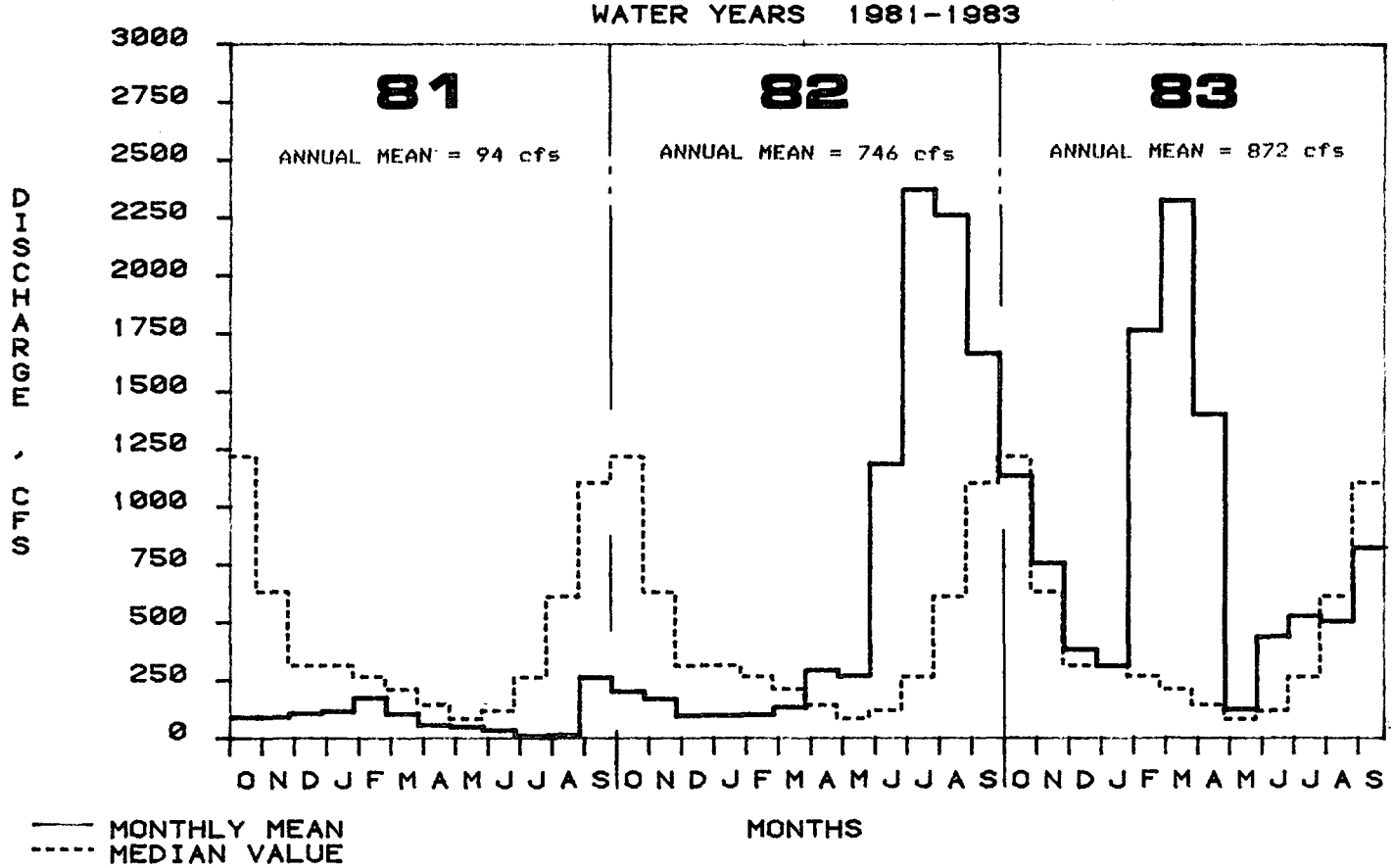


Figure 13. -- STREAMFLOW - ST. JOHNS RIVER NEAR COCOA
WATER YEARS 1981-1983

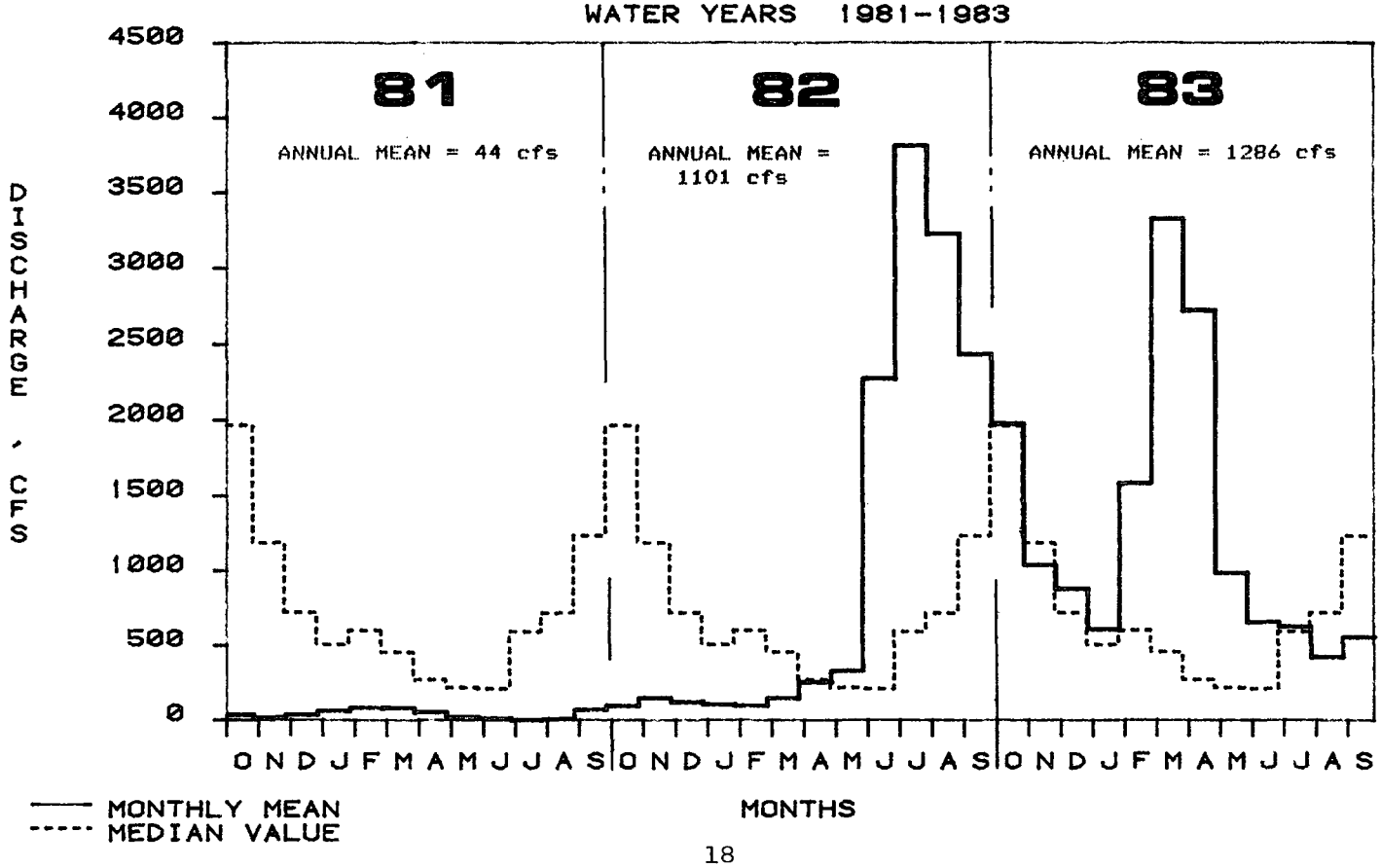


Figure 14. -- STREAMFLOW - ST. JOHNS RIVER NEAR CHRISTMAS
WATER YEARS 1981-1983

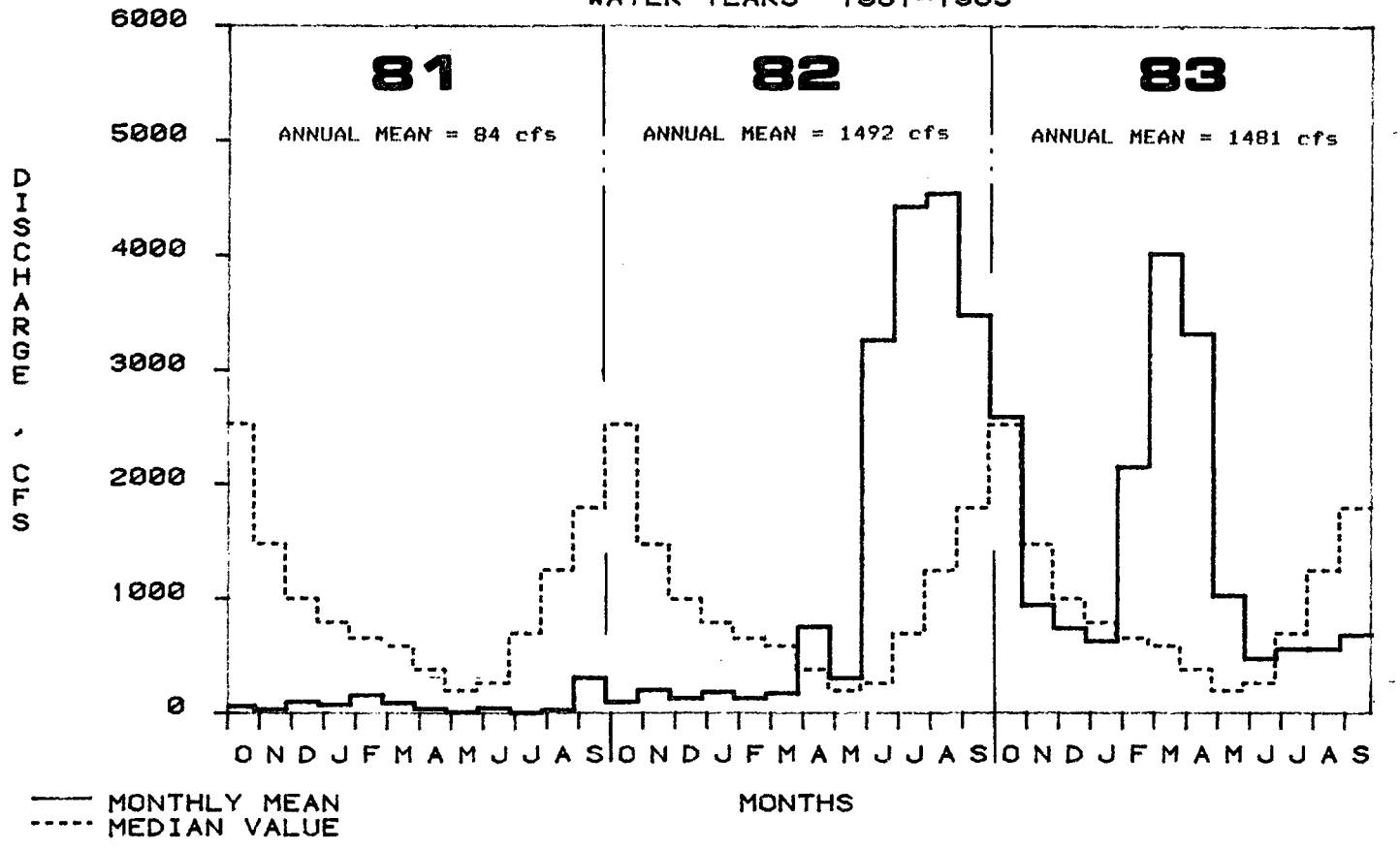


Figure 15. -- STREAMFLOW - ST. JOHNS RIVER NEAR DELAND
WATER YEARS 1981-1983

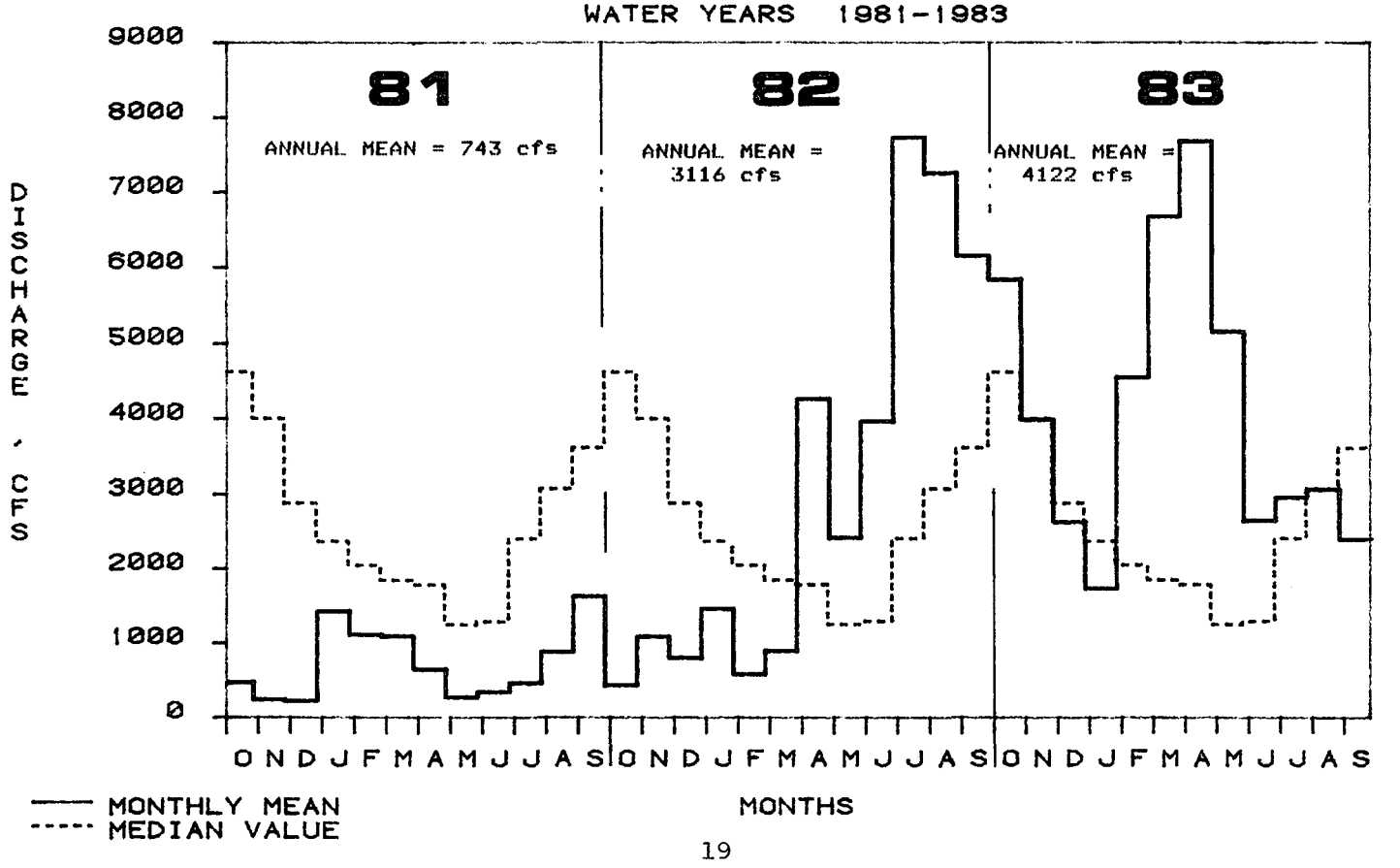


Figure 16. -- STREAMFLOW - OKLAWAHA RIVER AT MOSS BLUFF
WATER YEARS 1981-1983

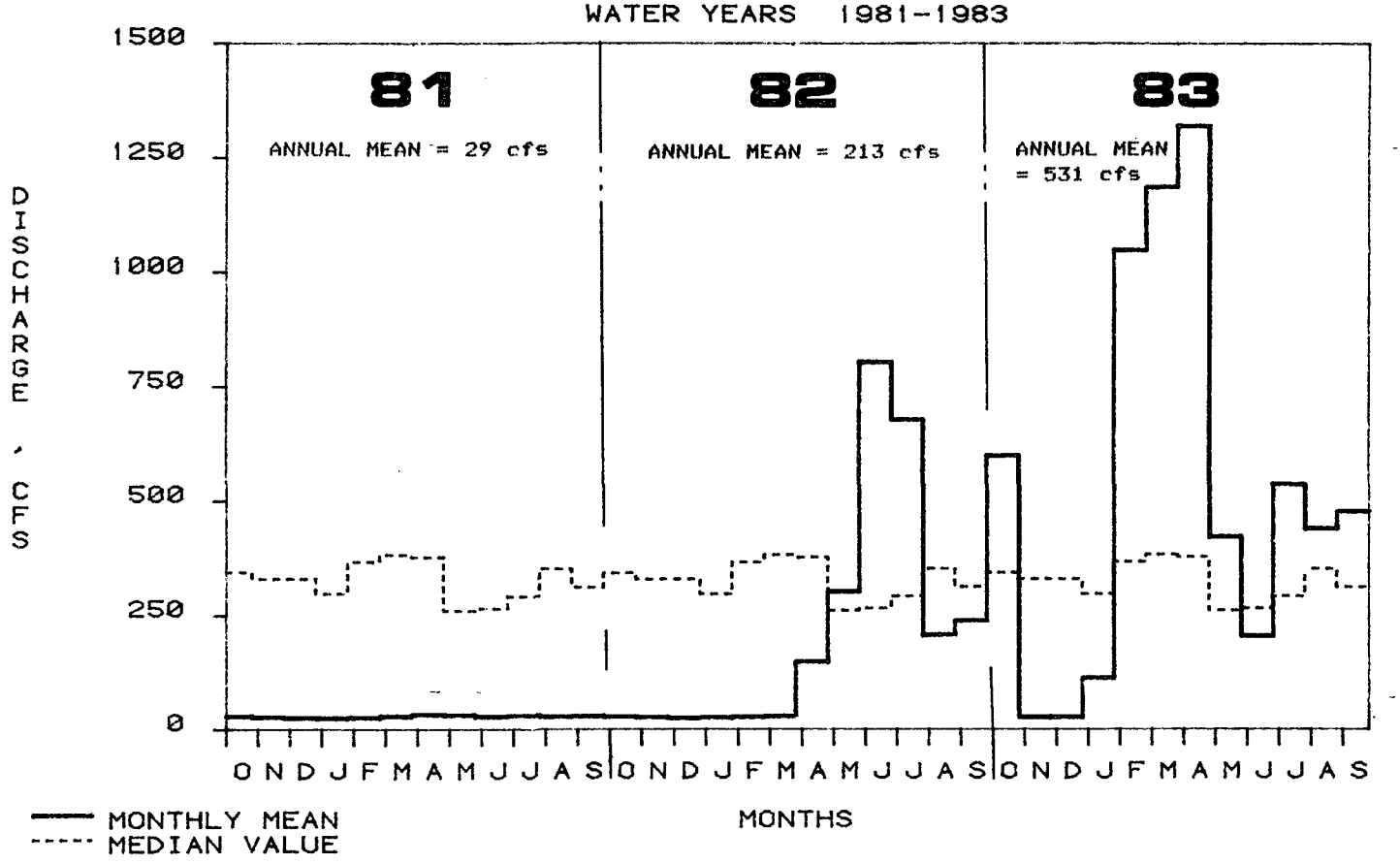


Figure 17. -- STREAMFLOW - OKLAWAHA RIVER AT RODMAN DAM
WATER YEARS 1981-1983

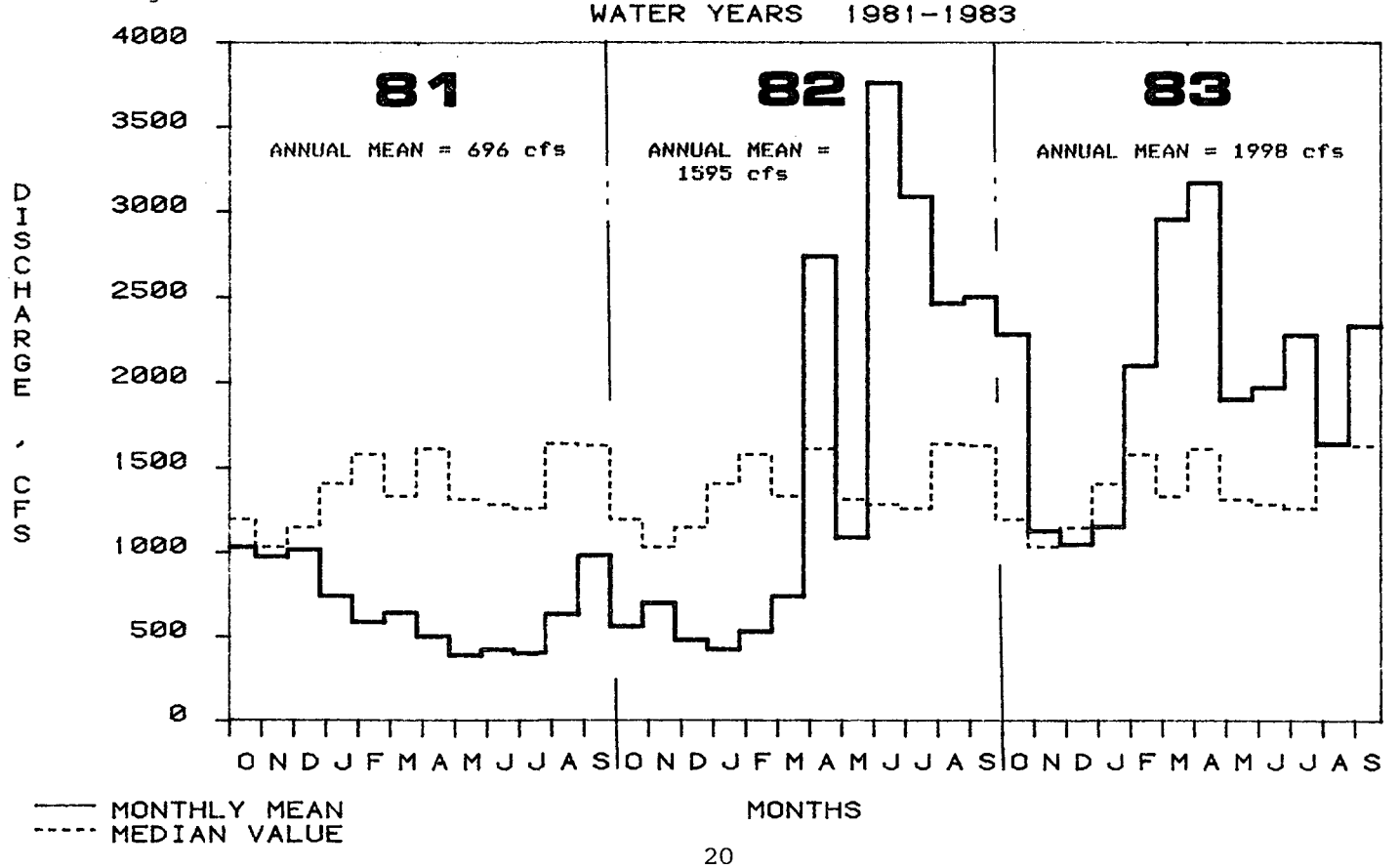


Figure 18. -- ELEVATION - BLUE CYPRESS LAKE NEAR FELLSMERE
WATER YEARS 1981-1983

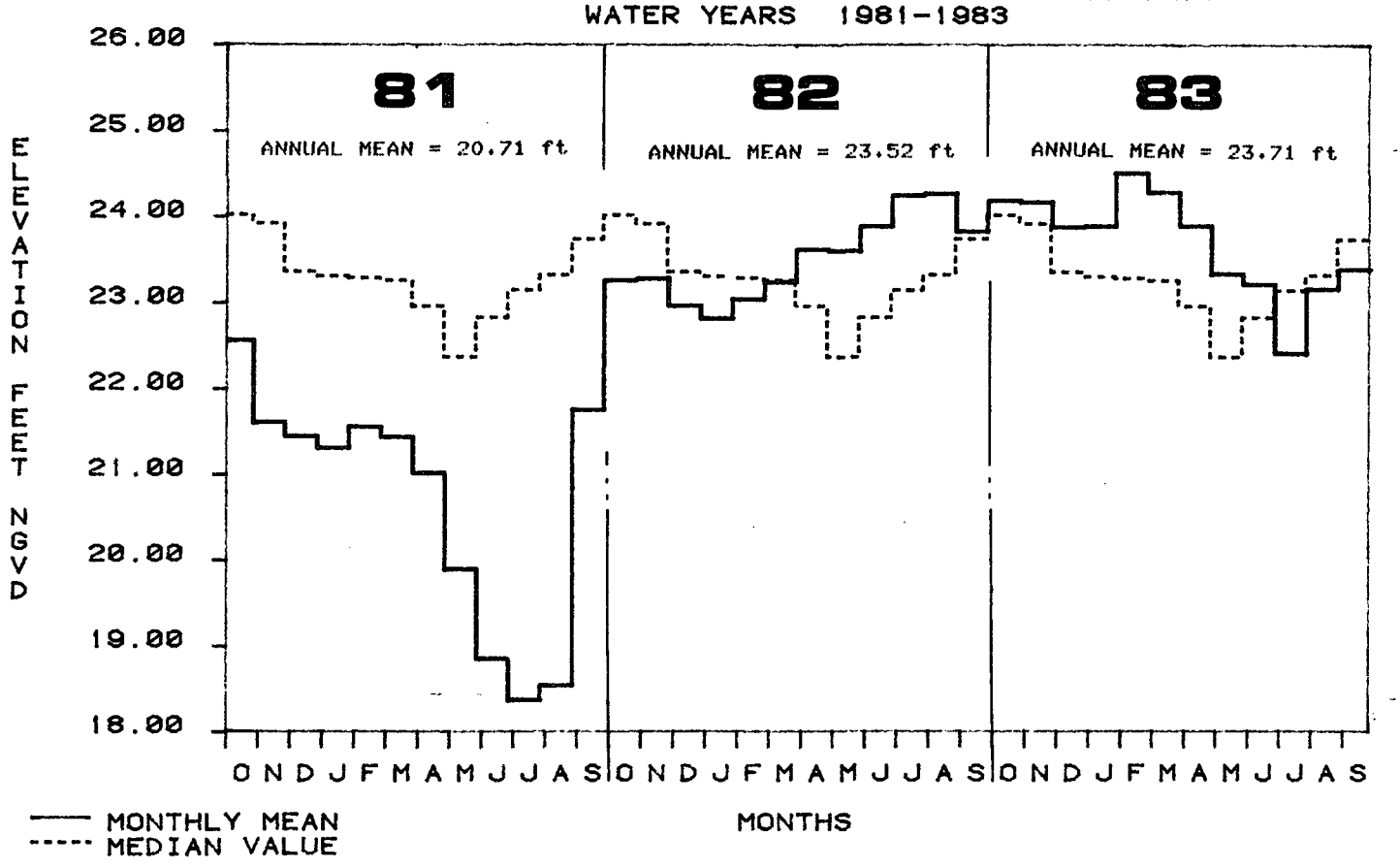


Figure 19. -- ELEVATION - LAKE WASHINGTON NEAR EAU GALLIE
WATER YEARS 1981-1983

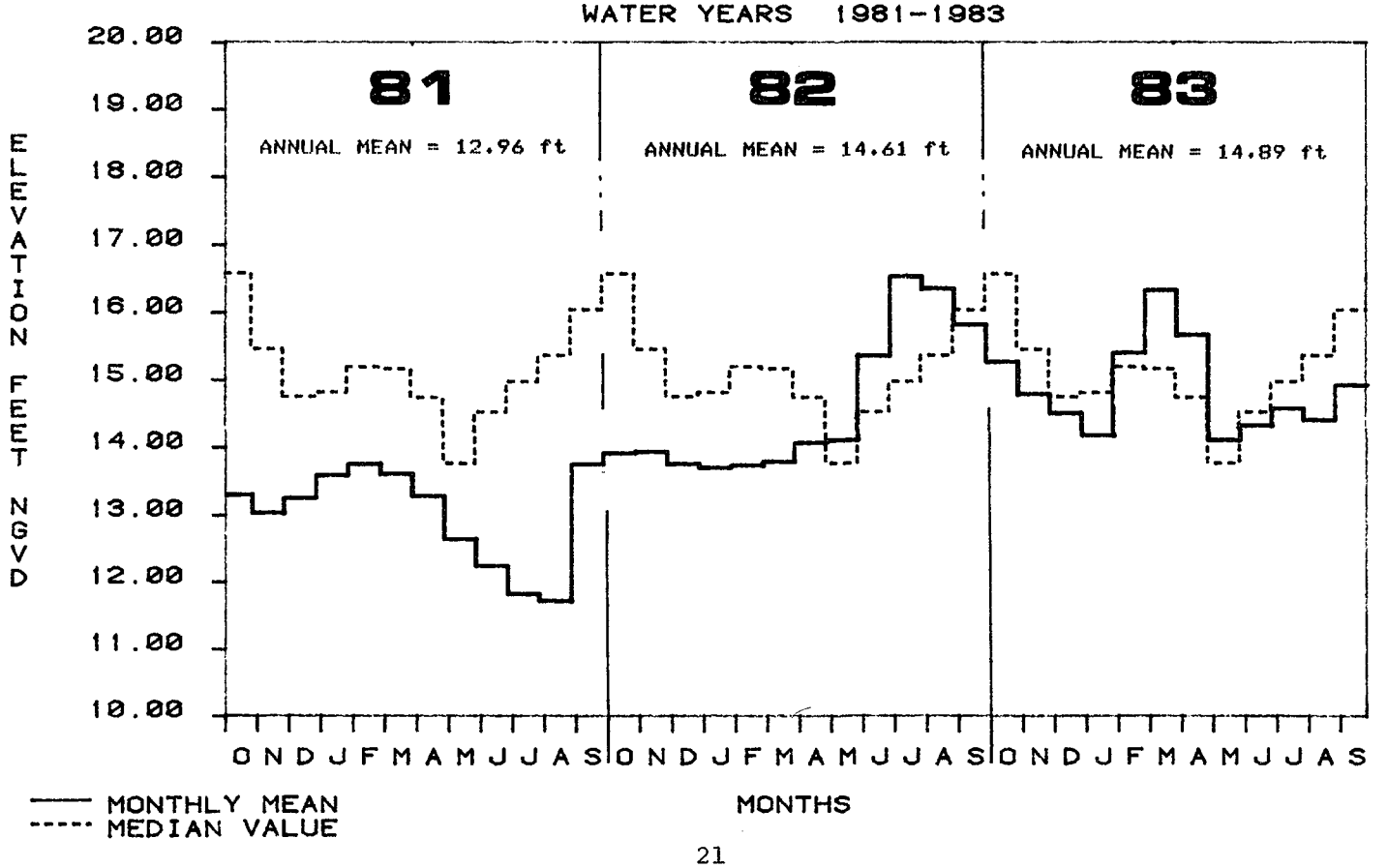
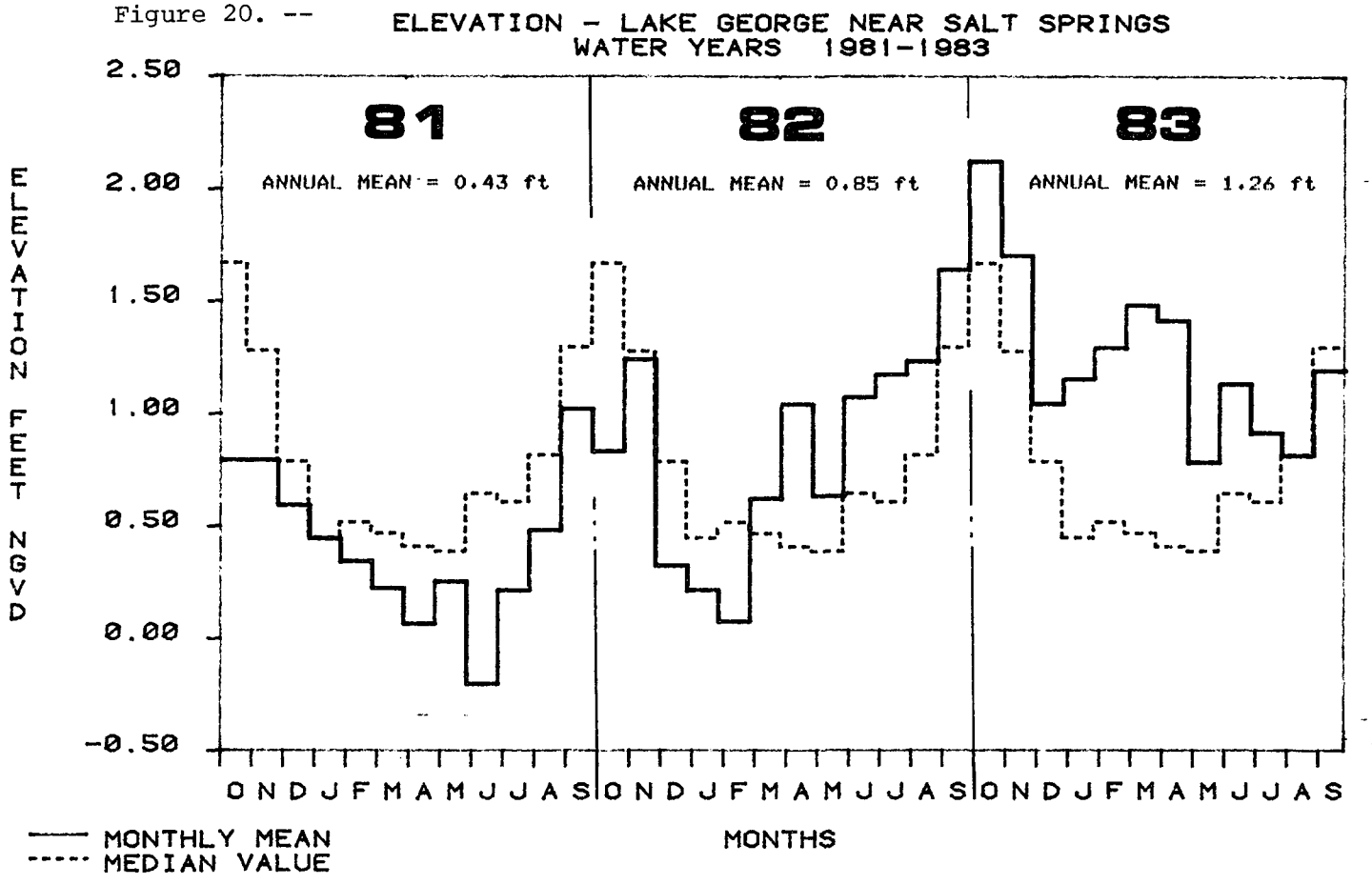


Figure 20. --



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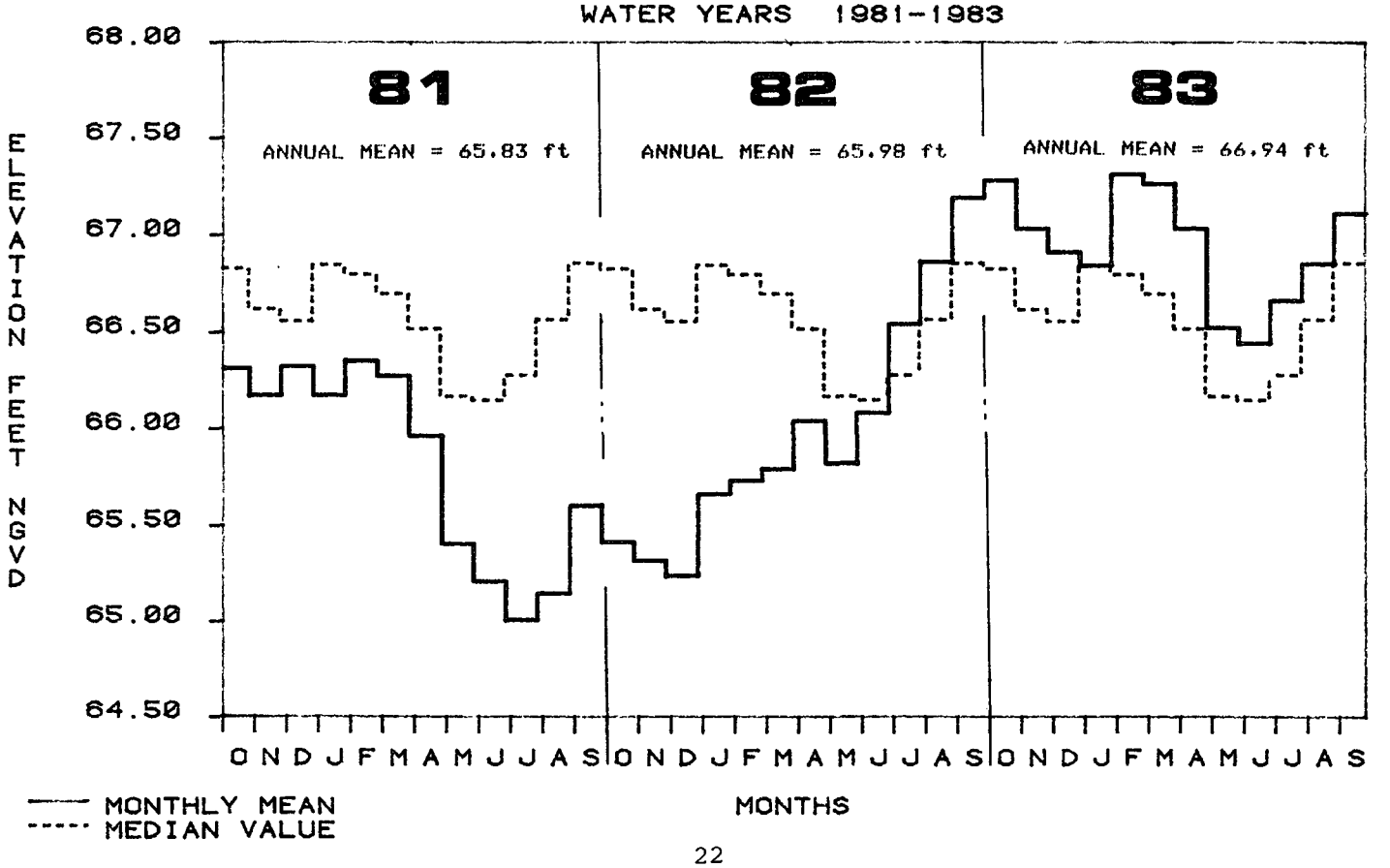


Figure 22. --

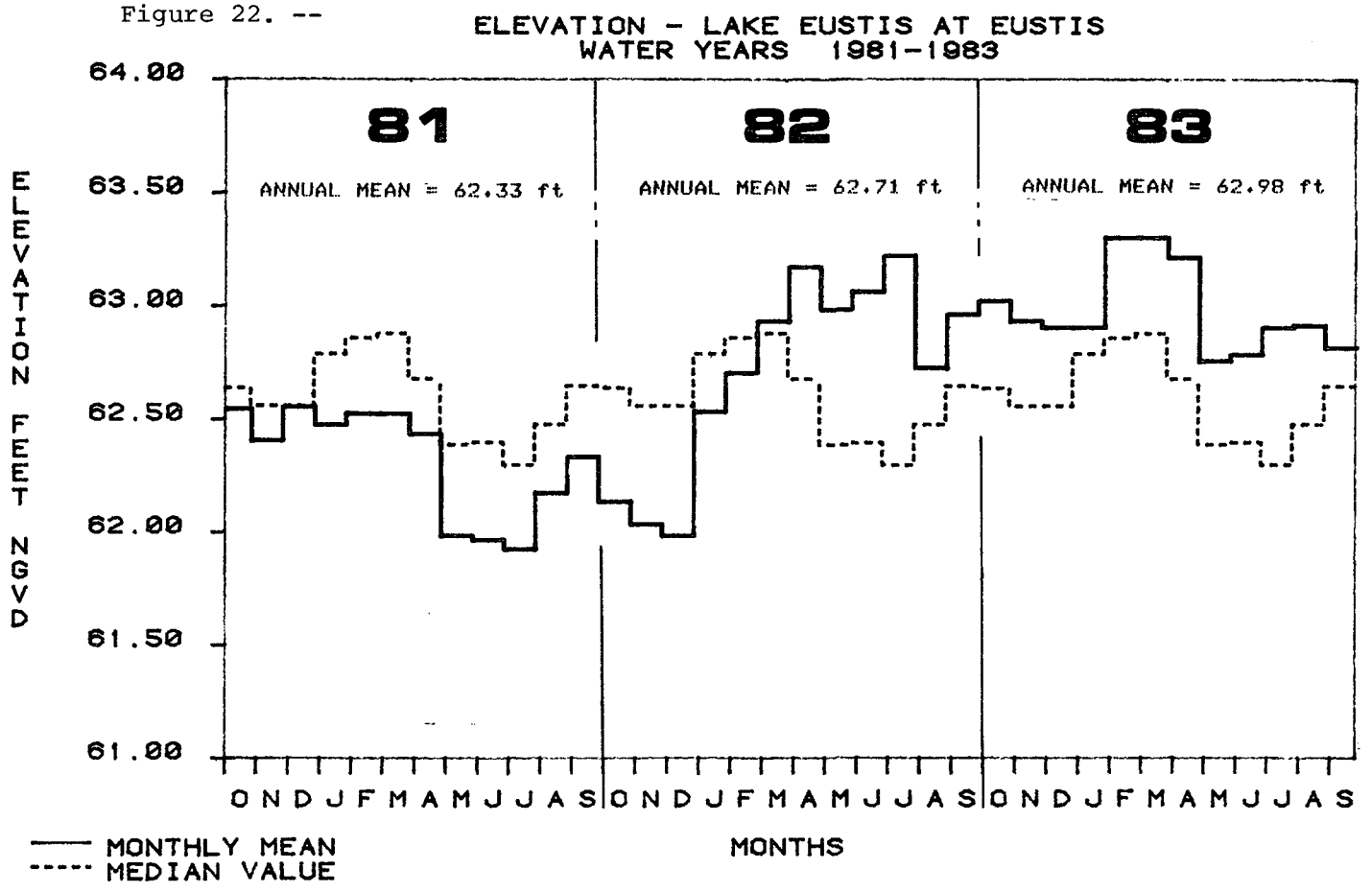
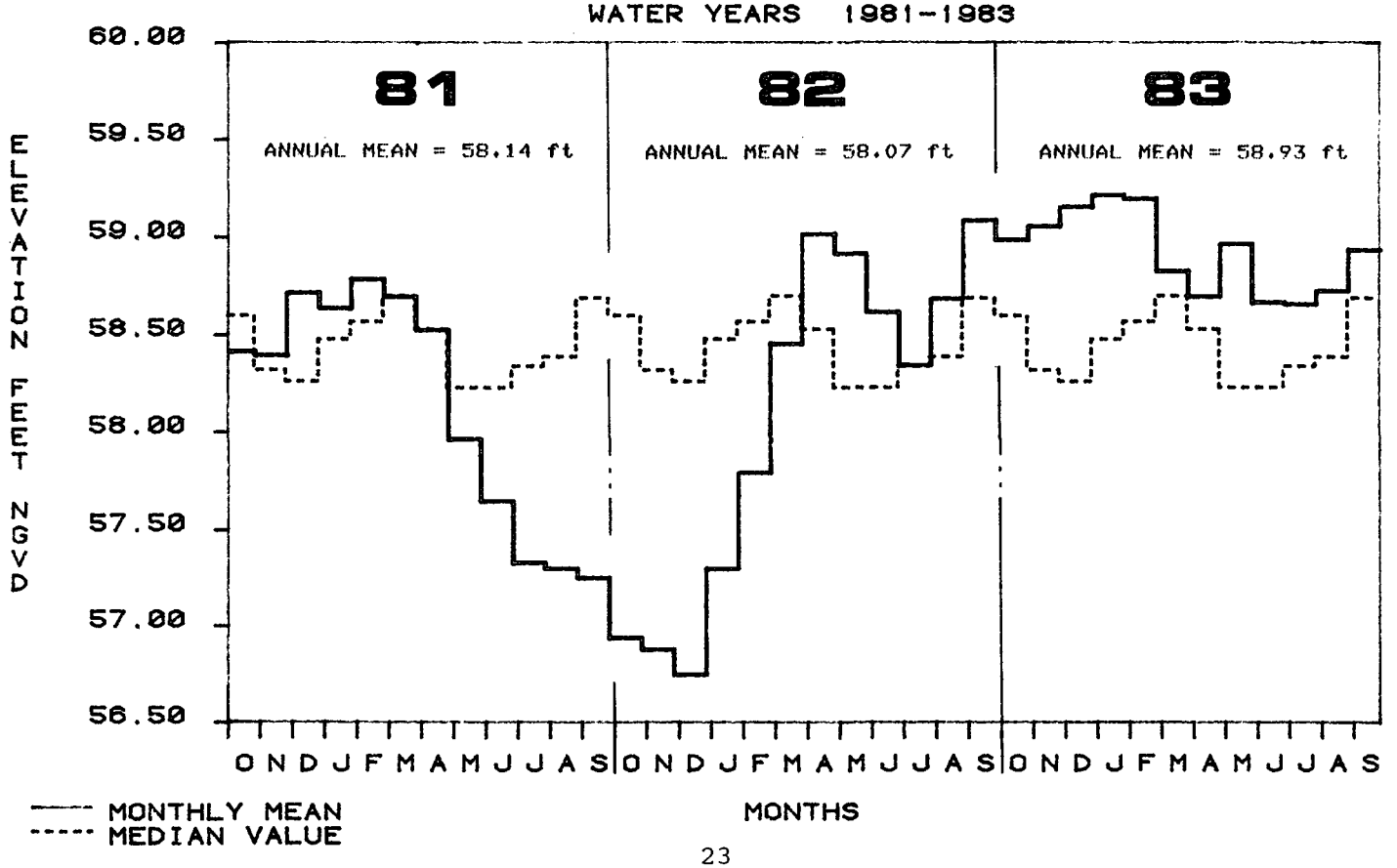


Figure 23. --



WATER USE

Water Use by Category

Agricultural Irrigation (which includes Livestock water use) was the largest fresh water use category for 1983. This category accounted for 44% of the ground water and 82% of the total fresh surface water used within the District (Figure 24). The second largest category was Public supply using 25% of the total fresh ground water and 4% of the total fresh surface water. Other categories where substantial amounts of ground water were used are Heat Pump/Air Conditioning with 13%, Industrial self-supplied (which includes Institutional self-supplied water use) 11% and Domestic self-supplied 7%. Thermoelectric Power Generation accounted for less than 1% (Ø.4%) of the total ground water used in 1983. The two major fresh surface water use categories were Agricultural Irrigation (82%) and Industrial (14%) accounting for 96% of the total used in 1983. Public supply and Thermoelectric Power Generation accounted for the remaining 4% of total fresh surface water use.

Water Use by County

Indian River and Brevard Counties were the largest fresh water use counties for 1983 (Table 2) accounting for 282.3Ø MGD (2Ø%) and 258.19 MGD (18%), respectively. Orange (172.28 MGD), Lake (14Ø.28 MGD) and Duval (136.18 MGD) are the next three largest fresh water use counties for 1983.

Brevard County, the largest fresh ground water use county in 1983, accounted for 23Ø.64 MGD (2Ø%). Other counties which

withdrew over 100 MGD of fresh ground water are Orange (142.12 MGD), Duval (133.89 MGD), Lake (119.13 MGD), and Indian River (106.52 MGD).

Indian River County was the largest fresh surface water use county in 1983 accounting for 174.78 MGD (56%). Other counties using substantial amounts of surface water were Putnam (42.64 MGD), Orange (30.16 MGD), Brevard (27.55) and Lake (21.15 MGD).

Table 2. 1983 COUNTY WATER USE (MGD) BY CATEGORY

	PUBLIC	DOMESTIC	INDUSTRIAL	AGRICULTURE IRRIGATION	THERMO ELECTRIC	HEAT PUMP	TOTAL
ALACHUA	15.73	1.28	1.53	12.04	1.27	-	31.85
Ground	15.73	1.28	1.44	10.67	1.27	-	30.39
Surface	-	-	0.09	1.37	-	-	1.46
BAKER	0.50	1.49	0.21	3.34	-	-	5.54
Ground	0.50	1.49	0.21	2.75	-	-	4.95
Surface	-	-	-	0.59	-	-	0.59
BRADFORD	-	0.24	-	0.10	-	-	0.34
Ground	-	0.24	-	0.10	-	-	0.34
Surface	-	-	-	-	-	-	-
BREVARD	19.13	4.45	0.16	92.63	0.31	141.51	258.19
Ground	7 22	4.45	0.16	76.99	0.31	141.51	230.64
Surface	11.91	-	-	15.64	-	-	27.55
CLAY	6.39	2.34	5.58	3.39	-	-	17.70
Ground	6.39	2.34	5.58	2.12	-	-	16.43
Surface	-	-	-	1.27	-	-	1.27
DUVAL	70.45	18.05	38.69	7.01	1.98	-	136.18
Ground	70.45	18.05	38.69	4.72	1.98	-	133.89
Surface	-	-	-	2.29	-	-	2.29
FLAGLER	1.55	0.27	-	6.62	-	-	8.44
Ground	1.55	0.27	-	6.45	-	-	8.27
Surface	-	-	-	0.17	-	-	0.17
INDIAN R.	7.87	8.19	0.23	264.77	0.24	-	282 30
Ground	7.87	8.19	0.23	88.99	0.24	-	106.52(1)
Surface	-	-	-	175.78	-	-	175.78
LAKE	11.94	8.56	19.05	100.73	-	-	140.28
Ground	11.94	8.56	15.65	82.98	-	-	119.13
Surface	-	-	3.40	17.75	-	-	21.15
MARION	7.95	7.82	0.18	17.61	-	-	33.56
Ground	7.95	7.82	0.18	15.11	-	-	31.06
Surface	-	-	-	2.50	-	-	2.50
NASSAU	2.76	3.81	32.01	2.36	-	-	40.94
Ground	2.76	3.81	32.01	1.47	-	-	40.05
Surface	-	-	-	0.89	-	-	0.89
OKEECHOBEE	-	0.06	-	15.99	-	-	16.05
Ground	-	0.06	-	14.49	-	-	14.55
Surface	-	-	-	1.50	-	-	1.50
ORANGE	83.78	4.96	5.76	77.77	0.01	-	172.28
Ground	83.78	4.96	5.76	47.62	-	-	142.12
Surface	-	-	-	30.15	0.01	-	30.16
OSCEOLA	-	0.06	-	8.43	-	-	8.49
Ground	-	0.06	-	7.57	-	-	7.63
Surface	-	-	-	0.86	-	-	0.86
POLK	-	0.76	-	15.17	-	-	15.93
Ground	-	0.76	-	15.10	-	-	15.86
Surface	-	-	-	0.07	-	-	0.07
PUTNAM	3.06	6.64	55.42	22.68	2.06	2.29	92.15
Ground	3.06	6.64	16.15	21.01	0.36	2.29	49.51
Surface	-	-	39.27	1.67	1.70	-	42 64
SEMINOLE	28.19	3.30	4.39	33 20	-	-	69.08
Ground	28.19	3.30	4.39	32.80	-	-	68.68
Surface	-	-	-	0.40	-	-	0.40
ST. JOHNS	6.12	1.80	0.04	36.82	-	-	44.78
Ground	6.12	1.80	0.04	36.10	-	-	44.06
Surface	-	-	-	0.72	-	-	0.72
VOLUSIA	32.98	6.91	0.42	27.79	0.97	6.16	75.23
Ground	32.98	6.91	0.42	26.43	0.38	6.16	73.28(2)
Surface	-	-	-	1.36	0.59	-	1.95
TOTALS	299.40	80.99	163.67	748.45(3)	6.84	149.96	1449.31
Ground	287.49	80.99	120.91	493.47	4.54	149.96	1137.36
Surface	11.91	-	42.76	254.98	2.30	-	311.95

(1) Includes 0.53 MGD ground saline water for Reverse Osmosis.
(2) Includes 0.02 MGD ground saline water for Reverse Osmosis.
(3) Does not include 3.21 MGD of reused water for irrigation.

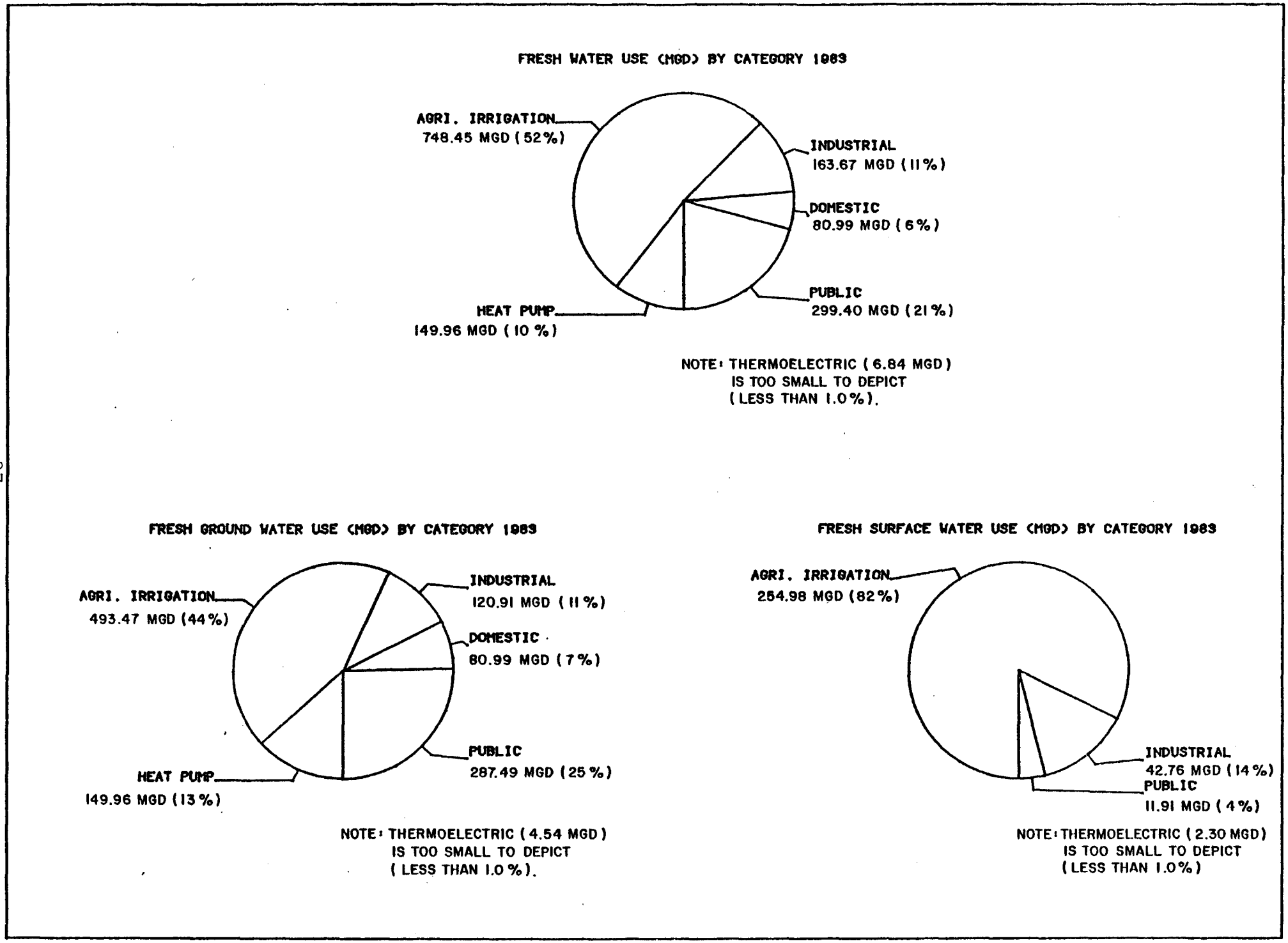


FIGURE 24. -- Total Fresh Water Use by Category - 1983

Water Use by Surface Water Basin

The Upper St. Johns River Basin is the largest fresh water use basin (376.53 MGD) for 1983 (Table 3). This basin was the largest fresh surface water use basin accounting for 167.30 MGD (53%) of the total fresh surface water used in 1983. The Oklawaha River Basin (51.76 MGD), Lower St. Johns River Basin (44.16 MGD), and the Lower Coastal Basin (39.16 MGD) are the only other significant users of fresh surface water for 1983.

The Lower St. Johns River Basin (227.94 MGD), Oklawaha River Basin (255.58 MGD) and the Upper St. Johns River Basin (209.23 MGD) are the largest fresh ground water use basins in 1983. These three basins account for 59% of the ground water withdrawals for 1983.

TABLE 3. Total Fresh Water Use (MGD) by Surface Water Basin: 1983

SURFACE WATER BASIN	GROUND	%	SURFACE	%	TOTAL	%
Nassau R.	3.53	*	0.84	*	4.37	*
St. Marys R.	42.88	4	0.87	*	43.75	3
Lower St. Johns R.	227.94	20	44.16	14	272.10	19
Middle St. Johns R.	174.46	15	6.59	2	181.05	12
Upper St. Johns R.	209.23	19	167.30	54	376.53	26
Oklawaha R.	225.58	20	51.76	17	277.34	19
Upper Coastal	52.55	5	0.77	*	53.32	4
Middle Coastal	94.61(1)	8	0.50	*	95.11	7
Lower Coastal	106.58(2)	9	39.16	13	145.74	10
TOTAL	1,137.36		311.95		1,449.31	

* less than 1.0%

(1) Includes 0.02 MGD ground saline

(2) Includes 0.53 MGD ground saline

APPENDIX A

ANNUAL RAINFALL STATISTICS

The mean rainfall for 1951-1980 (the past three decades ending in 1980) is considered as normal for a given gaging station. However, other rainfall statistics, such as the median (value equaled or exceeded for 50% of time), middle or normal range (the range covered by the middle 50% of the annual rainfall values), maximum and minimum during the record period, the lowest mean annual rainfall (drought rainfall) for a specified period, etc., will be of interest for comparison with 1982 water year rainfall data.

For 25 long term NOAA (National Oceanic and Atmospheric Administration) stations located within and close to the District, the foregoing rainfall statistics including drought rainfall for 3-, 5-, and 10-year continuous periods are presented in Table A-1 for 1951-1980. In addition, Table A-2 considers all rainfall data available from 1931 through calendar year 1982 and presents similar statistics.

TABLE A-1. -- RAINFALL STATISTICS FOR 1951-1980 (PERIOD USED FOR CALCULATING NORMAL RAINFALL)

(ALL RAINFALL VALUES ARE ANNUAL VALUES IN INCHES)

STATION	NORMAL	MEDIAN	NORMAL RANGE	MAXIMUM	MINIMUM	LOWEST MEAN ANNUAL RAINFALL (DROUGHT RAINFALL) FOR		
						3 YEARS	5 YEARS	10 YEARS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
BUSHNELL	51.28	49.76	43.90-58.21	77.11(1960)	35.60(1956)	38.00(1954-56)	45.16(1975-79)	47.80(1970-79)
CLERMONT	51.21	50.41	45.39-55.96	68.09(1959)	32.28(1961)	40.88(1961-63)	45.12(1961-65)	49.65(1954-63)
CRESCENT CITY	53.57	53.10	46.84-59.96	74.47(1964)	37.97(1954)	42.80(1954-56)	48.08(1954-58)	50.93(1954-63)
DAYTONA BEACH	46.81	46.35	37.36-53.94	69.02(1975)	31.36(1952)	36.90(1977-79)	39.83(1976-80)	46.03(1971-80)
DELAND	54.57	54.32	46.04-62.58	74.79(1953)	41.53(1974)	44.88(1954-56)	49.35(1961-65)	52.54(1962-71)
FEDERAL POINT	52.74	53.16	45.06-58.74	73.75(1964)	34.89(1954)	40.01(1954-56)	46.03(1952-56)	50.75(1954-63)
FELLSMERE	50.88	51.14	42.30-56.01	70.93(1959)	27.94(1967)	40.96(1974-76)	42.09(1974-78)	46.24(1969-78)
FERNANDINA BEACH	51.30	49.65	43.45-54.83	82.45(1969)	36.54(1980)	42.58(1954-56)	43.54(1954-58)	47.43(1954-63)
FT. PIERCE	52.56	52.09	46.04-58.50	70.19(1959)	38.30(1961)	43.37(1975-77)	46.77(1973-77)	48.97(1971-80)
GAINESVILLE	52.86	51.10	47.98-60.53	76.95(1964)	33.56(1977)	41.98(1954-56)	46.60(1974-78)	50.01(1954-63)
GLEN ST. MARY	56.56	57.07	47.48-63.06	84.95(1964)	34.35(1954)	41.61(1954-56)	45.90(1951-55)	53.75(1951-60)
ISLEWORTH	51.05	48.85	42.87-56.54	78.78(1953)	35.33(1954)	42.08(1954-56)	44.90(1976-80)	48.09(1971-80)
JACKSONVILLE	52.05	52.13	43.90-56.55	70.57(1973)	36.83(1954)	43.75(1954-56)	46.43(1974-78)	48.62(1954-63)
JACKSONVILLE BEACH	50.01	51.76	42.02-54.80	71.35(1979)	30.01(1954)	39.78(1954-56)	43.71(1954-58)	46.54(1954-63)
KISSIMMEE	48.96	48.63	41.09-54.11	80.38(1960)	28.07(1961)	40.46(1970-72)	42.44(1970-74)	43.58(1971-80)
LAKE ALFRED	50.79	49.07	43.68-57.99	76.57(1959)	35.62(1961)	39.44(1954-56)	44.64(1961-65)	47.17(1969-78)
MELBOURNE	48.16	46.84	41.58-54.84	68.90(1960)	32.52(1965)	40.70(1970-72)	41.31(1970-74)	44.56(1971-80)
OCALA	53.92	51.88	46.06-60.31	71.15(1953)	39.30(1971)	44.04(1971-73)	46.41(1971-75)	50.38(1966-75)
ORLANDO	49.54	49.10	43.91-54.39	68.74(1960)	38.12(1977)	44.08(1975-77)	45.45(1976-80)	46.56(1971-80)
PALATKA	51.52	50.62	45.86-56.82	72.80(1964)	29.22(1954)	38.99(1954-56)	44.26(1952-56)	49.48(1952-61)
SANFORD	51.16	51.00	45.68-54.91	74.06(1953)	35.04(1962)	41.39(1961-63)	46.17(1961-65)	47.36(1961-70)
ST.AUGUSTINE	52.61	50.95	44.21-60.05	79.91(1953)	32.68(1956)	38.12(1954-56)	43.10(1974-78)	49.70(1971-80)
TITUSVILLE	56.67	54.28	48.14-65.63	81.74(1953)	40.15(1980)	45.62(1975-77)	47.50(1974-78)	49.56(1971-80)
VERO BEACH	51.33	50.69	43.97-61.53	68.31(1973)	32.70(1961)	42.68(1961-63)	44.44(1961-65)	48.57(1955-64)
WINTER HAVEN	48.85	48.94	42.60-52.73	73.28(1959)	32.51(1954)	34.45(1954-56)	41.90(1952-56)	46.35(1961-70)

EXPLANATION:-
NORMAL - MEAN FOR 1951-1980
MEDIAN - ANNUAL RAINFALL EQUALED OR EXCEEDED THIS VALUE FOR 50% OF YEARS
NORMAL RANGE - THE RANGE COVERED BY THE MIDDLE 50% OF THE 1951-1980 RAINFALL VALUES
MAXIMUM - HIGHEST RAINFALL DURING 1951-1980
MINIMUM - LOWEST RAINFALL DURING 1951-1980
COLUMN (7) - MEAN RAINFALL FOR 3-YEAR CONTINUOUS PERIOD HAVING THE LOWEST RAINFALL
COLUMN (8) - MEAN RAINFALL FOR 5-YEAR CONTINUOUS PERIOD HAVING THE LOWEST RAINFALL
COLUMN (9) - MEAN RAINFALL FOR 10-YEAR CONTINUOUS PERIOD HAVING THE LOWEST RAINFALL

TABLE A-2. -- RAINFALL STATISTICS FOR THE AVAILABLE PERIOD OF RECORD SINCE 1931

(ALL RAINFALL VALUES ARE ANNUAL VALUES IN INCHES)

STATION	MEAN	MEDIAN	MIDDLE RANGE	MAX	MIN	LOWEST MEAN ANNUAL RAINFALL (DROUGHT RAINFALL) FOR		
						3 YEARS	5 YEARS	10 YEARS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
BITHLO,1959-1982	52.55	51.46	47.52-57.15	73.04	36.43	44.91(1979-81)	46.13(1977-81)	48.64(1972-81)
BUSHNELL,1948-1981	51.71	51.16	44.02-58.21	77.11	35.60	38.00(1954-56)	45.16(1975-79)	47.63(1972-81)
CLERMONT,1931-1982	50.86	51.04	46.59-54.84	68.09	32.28	40.88(1961-63)	45.12(1961-65)	48.42(1948-57)
CRESCENT CITY,1931-1982	53.22	52.94	46.72-59.31	75.03	37.97	42.80(1954-56)	47.47(1935-39)	48.90(1948-57)
DAYTONA BEACH,1937-1982	48.84	48.10	39.87-55.18	79.29	31.36	34.71(1950-52)	37.55(1977-81)	45.08(1950-59)
DELAND,1931-1982	54.87	54.53	47.01-62.27	75.89	41.53	44.88(1954-56)	49.35(1961-65)	52.03(1948-57)
FELLSMERE,1931-1982	54.24	54.64	49.35-60.79	78.83	27.94	40.96(1974-76)	42.09(1974-78)	45.76(1972-81)
FEDERAL POINT,1931-1982	53.24	53.11	45.12-60.14	73.75	34.89	40.01(1954-56)	46.03(1952-56)	50.03(1931-40)
FERNANDINA BEACH,1931-1982	50.71	49.65	41.77-55.14	82.45	22.79	41.44(1938-40)	43.54(1954-58)	44.94(1931-40)
FT. DRUM,1956-1982	50.66	53.94	45.08-57.20	63.89	32.74	43.35(1965-67)	45.07(1964-68)	46.54(1961-70)
FT. PIERCE,1931-1982	52.93	51.46	45.97-58.93	77.51	38.22	43.37(1975-77)	46.77(1973-77)	48.33(1972-81)
GAINESVILLE,1931-1982	52.32	50.55	47.53-59.96	76.95	33.56	41.98(1954-56)	44.04(1977-81)	48.21(1973-82)
GLEN ST. MARY,1931-1982	55.76	55.14	47.58-62.23	84.95	34.35	41.61(1954-56)	45.90(1951-55)	49.88(1934-43)
INDIAN LAKES EST,1961-1980	51.87	50.26	46.64-59.74	68.33	30.25	42.63(1970-72)	48.32(1967-71)	50.08(1961-70)
ISLEWORTH,1931-1982	52.02	50.68	45.31-57.57	78.78	35.33	42.08(1954-56)	44.90(1976-80)	47.83(1972-81)
JACKSONVILLE,1941-1982	53.24	52.86	48.51-61.76	77.37	35.77	42.27(1980-82)	43.93(1977-81)	46.62(1954-63)
JACKSONVILLE BEACH,1945-1982	50.94	52.37	42.60-57.01	71.35	30.01	39.78(1954-56)	43.71(1954-58)	46.54(1954-63)
KISSIMMEE,1931-1982	49.38	48.83	41.74-54.82	80.38	28.07	40.46(1970-72)	42.44(1970-74)	43.58(1971-80)
LAKE ALFRED,1931-1982	50.93	50.02	43.52-57.84	76.57	35.62	39.44(1954-56)	44.64(1961-65)	47.17(1969-78)
LISBON,1959-1982	47.48	46.39	41.57-51.85	67.58	33.11	38.95(1961-63)	43.39(1961-65)	44.93(1961-70)
MELBOURNE,1941-1982	48.72	46.84	41.59-55.20	73.28	31.97	37.70(1980-82)	41.31(1970-74)	43.94(1973-82)
OCALA,1931-1982	53.96	53.31	46.49-59.39	74.71	37.51	44.04(1971-73)	46.41(1971-75)	49.27(1931-40)
ORLANDO,1941-1982	50.02	50.18	43.96-55.18	68.74	38.12	43.25(1942-44)	45.45(1976-80)	46.56(1971-80)
PALATKA,1931-1982	52.46	51.60	46.64-57.65	74.61	29.22	38.99(1954-56)	44.26(1952-56)	46.87(1973-82)
SANFORD,1931-1982	51.53	51.17	45.78-55.45	74.06	35.04	41.39(1961-63)	46.17(1961-65)	47.36(1961-70)
ST.AUGUSTINE,1931-1982	52.43	50.95	44.24-59.23	79.91	32.68	38.12(1954-56)	43.10(1974-78)	46.99(1973-82)
STARKE,1961-1982	53.33	54.30	49.91-57.30	63.28	40.10	46.24(1975-77)	48.66(1973-77)	51.43(1973-82)
TITUSVILLE,1931-1982	55.44	53.90	47.89-64.71	81.74	35.18	44.30(1937-39)	47.12(1977-81)	48.85(1972-81)
VERO BEACH,1949-1982	51.48	49.74	43.97-61.53	81.74	32.70	42.68(1961-63)	44.44(1961-65)	48.27(1949-58)
WINTER HAVEN,1948-1982	49.90	49.48	43.48-55.65	73.28	32.51	34.45(1954-56)	41.90(1952-56)	46.35(1961-70)

EXPLANATION:-

MEAN - STATION MEAN FOR PERIOD SHOWN IN COLUMN (1)
MEDIAN - ANNUAL RAINFALL EQUALED OR EXCEEDED THIS VALUE FOR 50% OF YEARS
MIDDLE RANGE - RANGE COVERED BY THE MIDDLE 50% OF THE RAINFALL VALUES
MAX - HIGHEST RAINFALL DURING PERIOD SHOWN IN COLUMN (1)
MIN - LOWEST RAINFALL DURING PERIOD SHOWN IN COLUMN (1)
COLUMN (7) - MEAN RAINFALL FOR 3-YEAR CONTINUOUS PERIOD HAVING THE LOWEST RAINFALL
COLUMN (8) - MEAN RAINFALL FOR 5-YEAR CONTINUOUS PERIOD HAVING THE LOWEST RAINFALL
COLUMN (9) - MEAN RAINFALL FOR 10-YEAR CONTINUOUS PERIOD HAVING THE LOWEST RAINFALL

APPENDIX B

EXHIBIT B

TECHNICAL PUBLICATIONS

1978

Month Approved	Publication Number	Title	Author(s)
March	SJ 78-1	(Formerly Information Circular #1) Annual Report of Hydrologic Conditions and Water Resource Activities - 1977 Water year (Water Resources Department) (Short Title: 1977 Annual Hydrologic Report)	Alfred Canepa, Donthamsetti V. Rao & Dann K. Yobbi
August	SJ 78-2	(Formerly Information Circular #2) Improvement of Water Quality Through a Cooperative Well Plugging Program (Resources Evaluation Division) (Short Title: Cooperative Well Plugging Program)	Douglas A. Munch

TECHNICAL PUBLICATIONS

1979

Month Approved	Publication Number	Title	Author(s)
March	SJ 79-1	(Formerly Information Circular #3) Annual Report of Hydrologic Conditions and Water Resource Activities - 1978 Water Year (Water Resources Department) (Short Title: 1978 Annual Hydrologic Report)	Alfred Canepa, Frank Fenzel, & Donthamsetti V. Rao
March	SJ 79-2	(Formerly Technical Report #1) Geology of the Oklawaha Basin (Resources Evaluation Division)	Richard Johnson
May	SJ 79-3	(Formerly Technical Memorandum #1) Test Drilling Report of Northeast Volusia County (Resources Evaluation Division)	Douglas A. Munch
July	SJ 79-4	Part 1 (Formerly Technical Report #2) - Text - Saline Contamination of a Limestone Aquifer by Connate Intrusion in Agricultural Areas of St. Johns, Putnam and Flagler Counties, Northeast Florida (Resources Evaluation Division) (Short Title: Connate Intrusion in Northeast Florida) Part 2 (Formerly Technical Memorandum #2) - Supplemental Data	Douglas A. Munch Bruce Ripy, & Richard Johnson
November	SJ 79-5	(Formerly Technical Report #4) Summary of the Hydrology of the Upper Etonia Creek Basin (Resources Evaluation Division) (Short Title: Upper Etonia Creek Study)	Douglas A. Munch Dann Yobi, & George Chappell
November	SJ 79-6	(Formerly Technical Report #6) Upper Oklawaha River Basin Water Management Study, Part 1: Lake Griffin Region Study (Engineering Division) (Short Title: Lake Griffin Region Study)	C. Charles Tai & Donthamsetti V. Rao

TECHNICAL PUBLICATIONS

1980

Month Approved	Publication Number	Title	Author(s)
January	SJ 80-1	(Formerly Information Circular #4) Salt Water Intrusion in Coastal Aquifers: A Bibliography (Resources Evaluation Division) (Short Title: SWIS Bibliography)	George P. Szell
February	SJ 80-2	(Formerly Information Circular #5) Annual Report of Hydrologic Conditions and Water Resource Activities - 1979 Water Year (Water Resources Department) (Short Title: 1979 Annual Hydrologic Report)	Douglas A. Munch, Frank Fenzel, & Donthamsetti V. Rao
March	SJ 80-3	(Formerly Technical Report #5) Hydrologic Investigation of the Potentiometric High Centered About the Crescent City Ridge, Putnam County, Florida (Resources Evaluation Division) (Short Title: Crescent City High Study)	Fred Ross & Douglas A. Munch
April	SJ 80-4	(Formerly Technical Report #3) Investigation of Ground Water Resources and Salt Water Intrusion in the Coastal Areas of Northeast Florida (Resources Evaluation Division) (Short Title: SWIS I)	James M. Frazee & Donnie McClaugherty
June	SJ 80-5	(Formerly Technical Report #6A) Annual Water Use Survey-1978 (Planning Department)	Elaine Scott
July	SJ 80-6	(Formerly Technical Report #7) Development of Environmental Constraints for the Proposed Jane Green Detention Areas (Environmental Sciences Division) (Short Title: Jane Green Environmental Constraints)	Carol Biagotti-Griggs & David Girardin

Month Approved	Publication Number	Title	Author(s)
July	SJ 80-7	(Formerly Technical Memorandum #4) Results of Test Drilling and Materials Investigation of Borrow Areas (Resources Evaluation Division)	Fred Ross
August	SJ 80-8	(Formerly Technical Memorandum #3) Log Pearson Type 3 Distribution: Tables of Quantiles (Engineering Division)	Donthamsetti V. Rao
November	SJ 80-9	(Formerly Technical Report #8) Effects on the Floridan Aquifer of Ground Water Withdrawals for Fernery Freeze Protection, Southeast Putnam County, Florida (Resources Evaluation Division) (Short Title: Effects of Fernery Freeze Protection)	Fred Ross

TECHNICAL PUBLICATIONS

1981

Month Approved	Publication Number	Title	Author(s)
July	SJ 81-1	(Formerly Technical Report #9) Structural Geologic Features and their Relationship to Salt Water Intrusion in West Volusia, North Seminole and Northeast Lake Counties (Resources Evaluation Division) (Short Title: Salt Water Intrusion from Geologic Features)	Richard Johnson
August	SJ 81-2	(Formerly Technical Report #11) Analysis of Residential Demand of Water in the St. Johns River Water Management District (Resources Evaluation Division) (Short Title: Residential Water Demands)	Kathryn Lewis, Richard Marella, & Roy Carriker
November	SJ 81-3	(Formerly Technical Report #10) Annual Water Use Survey - 1979 (Resources Evaluation Division)	Richard Marella
November	SJ 81-4	(Formerly Information Circular #6) Annual Report of Hydrologic Conditions - 1980 Water Year (Water Resources Department) (Short Title: 1980 Annual Hydrologic Report)	Douglas A. Munch, Donthamsetti V. Rao, Alan Aikens, & Richard Marella

TECHNICAL PUBLICATIONS

1982

Month Approved	Publication Number	Title	Author(s)
January	SJ 82-1	(Formerly Technical Report #12) Frequencies of High and Low Stages for Principal Lakes in the St. Johns River Water Management District (Engineering Division) (Short Title: High & Low Lake Stages)	Donthamsetti V. Rao
February	SJ 82-2	(Formerly Technical Report #13) Vegetation Community Structure of the Proposed Jane Green Detention Area (Environmental Sciences Division) (Short Title: Jane Green Vegetative Structure)	Carol Birgotti-Griggs
February	SJ 82-3	(Formerly Technical Memorandum #5) Investigation of Fern Water Use in Southeast Putnam County, Florida (Resources Evaluation Division) (Short Title: Fern Water Use)	Phil Leary
March	SJ 82-4	(Formerly Technical Report #15) Upper St. Johns River Hydroglic Model (USJM) Users Manual (Engineering Division) (Short Title: USJM Users Manual)	C. Charles Tai & Thirasak Suphunvorranop
April	SJ 82-5	(Formerly Technical Report #14) Annual Water Use Survey - 1980 (Resources Evaluation Division)	Richard Marella
October	SJ 82-6	(Formerly Information Circular #7) Annual Report of Hydrologic Conditions - 1981 Water year (Water Resources Department) (Short Title: 1981 Annual Hydrologic Report)	Douglas A. Munch, Donthamsetti V. Rao, Alan Aikens, & Richard Marella

TECHNICAL PUBLICATIONS

1983

Month Approved	Publication Number	Title	Author(s)
January	SJ 83-1	(Formerly Technical Report #17) Water Quality Monitoring Annual Report (Environmental Sciences Division)	Carol J. Fall
March	SJ 83-2	(Formerly Information Circular #8) St. Johns River Water Management District Current Population and Projections - 1980 (Resources Evaluation Division)	Richard Marella & Bruce Ford
May	SJ 83-3	(Formerly Technical Report #16) A Study of Crown Flood Irrigation Methods (Engineering Division)	David Clapp & Harold A. Wilkening, III
May	SJ 83-4	(Formerly Technical Report #18) The Role of Fire on Land-Use Management (Environmental Sciences Division)	Greenville B. Hall
June	SJ 83-5	(Formerly Technical Report #22) Econlockhatchee River System: Level I Report (Environmental Sciences Division)	Larry Gerry
July	SJ 83-6	Part 1 (Formerly Technical Report #20) Hydrologic and Engineering Study for Extreme Drawdown of Lake Griffin (Engineering Division) (Short Title: Lake Griffin Drawdown Study) Part 2 - Executive Summary	Wayne Ingram
July	SJ 83-7	(Formerly Map Series 83-1) Map Series - Ground Water Withdrawals From the Floridan Aquifer in Duval County-1980 (Resources Evaluation Division) (Short Title: Map of Duval Ground Water Withdrawals)	Richard Marella

Month Approved	Publication Number	Title	Author(s)
November	SJ 83-8	(Formerly Technical Report #26) Distribution and Structure of Floodplain Plant Communities in the Upper Basin of the St. Johns River, Florida (Environmental Sciences Division) (Short Title: Upper Basin Plant Communities)	Edgar F. Lowe
December	SJ 83-9	(Formerly Technical Report #25) - Annual Water Use Summary - 1981 (Resources Evaluation Division)	Richard Marella

TECHNICAL PUBLICATIONS

1984

Month Approved	Publication Number	Title	Author(s)
January	SJ 84-1	(Formerly Information Circular #9) Annual Report of Hydrologic Conditions - 1982 Water Year (Water Resources Department) (Short Title: 1982 Annual Hydrologic Report)	Douglas A. Munch, Donthamsetti V. Rao, & Richard Marella
January	SJ 84-2	Part -1 (Formerly Technical Report #27)-Annual Water Use Survey - 1982 (Resources Evaluation Division)	Richard Marella
December		Part 2 - Map Series (Formerly Map Series 83-2)	Richard Marella
January	SJ 84-3	(Formerly Information Circular #10) Report on Uncontrolled Free Flowing Artesian Wells-Free Flowing Well Plugging Program (Resources Evaluation Division) (Short Title: Free Flowing Well Plugging Program)	Scott Edwards
April	SJ 84-4	(Formerly Map Series 84-3) Map Series - Ground Water Withdrawals from the Floridan Aquifer in Nassau County Area - 1982	Richard Marella
August	SJ 84-5	Annual Water Use Survey, 1983 (Resource Evaluation Division)	Richard Marella
August	SJ 84-6	Hydrologic Reconnaissance of Marion County (Resource Evaluation Division)	Kevin Rohrer
August	SJ 84-7	Annual Report of Hydrologic Conditions, 1983 Water Year (Resource Evaluation and Engineering Divisions) (Short Title - 1983 Annual Hydrologic Report)	William Osburn Richard Marella Donthamsetti Rao
August	SJ 84-8	Water Quality of the Southern Reach of the Middle St. Johns River. A Focus on the Drought of 1980 through 1981 (Environmental Science Division) (Short title - Water Quality of Middle St. Johns)	Joel Steward

TECHNICAL PUBLICATIONS

(UNDER WAY)

Title	Author(s)
Howell Branch Basin Surface Water Management Study (Engineering Division) (Short Title: Howell Branch Study)	Thirasak Suphunvorranop
Stratigraphic Analysis of Geophysical Logs in Water Wells in Peninsular Florida (Resources Evaluation Division) (Short Title: Geophysical Logs in Water Wells)	Richard Johnson
Burrell Dam Safety Evaluation (Engineering Division)	Wayne Ingram
Upper St. Johns River Streamflow Modeling - Part 1 Simulation of Existing Basin (Engineering Division) (Short Title: Upper St. Johns Basin Simulation)	Donthamsetti V. Rao & C. Charles Tai
A Review and Extension of our Understanding of the Ecology of the Upper St. Johns River, Florida and the Effects of the Development of its Floodplain (Environmental Sciences Division) (Short Title: Ecology of the Upper St. Johns and Effects of Development)	Edgar F. Lowe, Carol J. Fall, Larry Gerry, Greenville B. Hall & Jerry E. Brooks
Effect of Sand Mining Operations on Johns Lake Upper Palatlakaha River Basin (Resources Evaluation Division) (Short Title: Sand Mining on Johns Lake)	George Szell
Procedure for Determining 24-hour and 96-hour Synthetic Storms (Engineering Division) (Short Title: Synthetic Storms Study)	Donthamsetti V. Rao
Palatlakaha Hydrologic Model (Engineering Division)	Wayne Ingram
Burrell Spillway Discharge Evaluation (Engineering Division)	Wayne Ingram