SUPPLEMENT 1

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SUMMARY OF THE CONDITION OF SOUTH FLORIDA WATER STORAGE AREAS

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Central and Southern Florida Flood Control District

July 1973

SUMMARY OF THE CONDITIONS OF SOUTH FLORIDA WATER STORAGE AREAS

IN THE 1972-73 DRY SEASON

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Introduction

This is the first supplement to the original summary report which compiled and compared various meteorologic and hydrologic data for the 1970-1971, and 1971-1972 dry seasons. This supplement presents similar information for the 1972-1973 dry season and provides commentary and comparison thereon.

Rainfall

Table 1 summarizes monthly rainfall data for the four reservoir areas, and compares the monthly and seasonal values with normal values.

October rainfall was more than 3 inches deficient over the entire region, with the major impact being felt in the Lake Okeechobee area where rainfall was 20% of normal. From November through March rainfall was uniformly above normal. Substantial defiencies showed up again, however, in April and May; particularly in the central and southern Everglades areas. Dry season rainfall averaged about 80% of normal for the entire region.

Figures 1-A and 1-B show the accumulated dry season rainfall for all four areas and compares the 1972-73 values with normal and with those for 1970-71 and 1971-72. Although both 1970-71 and 1972-73 were rainfall deficient seasons the pattern of deficiency was different. In the former period October rainfall in all areas was not substantially below normal and the severely deficient months were November through January with deficiencies again in March and April. In 1972-1973 almost the reverse was the case. October was deficient, whereas in November through March there was an excess above normal.

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In all areas there is an accumulated rainfall deficiency since October 1970 which is about 5 inches in the Lake Okeechobee area and about 7 inches in the southern Everglades area.

Evaporation

Table 2 lists monthly open pan evaporation data for Lake Okeechobee and at Pumping Station 7.

The Lake Okeechobee data tend to support the observation made in the original report that higher seasonal evaporation losses appear to be associated with seasonal rainfall deficiencies. However, the S-7 data do not show this; the 1972-1973 losses being greater than those in 1970-1971. The high values for April and May are noted and these are obviously associated with the strong sustained winds which occurred on several occasions, particularly around April 21-24, during that period.

Table 3 lists the estimated monthly evaporation and total drafts on Lake Okeechobee, and makes comparisons of the 1972-73 percentages with those for 1970-71 and 1971-72. There is no particular pattern to these data other than confirmation of the obvious fact that evaporation represents a smaller share of the total draft during periods of heavier irrigation water withdrawls.

Water Delivery and Use

Table 4 is a summary of the water deliveries to the service areas of all four reservoirs. Lake Okeechobee deliveries were less than in 1970-71, but more than in 1971-73. This is evidence of the relationship between increased need for supplemental irrigation water and deficient precipitation. Monthly values show this as well; the largest deliveries were made in October, April and May, the months of deficient rainfall.

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Tables 5 and 6 show the demands related to points of delivery and to seepage.

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Total system delivery was about 11% greater than in 1971-1972 and about 19% less than in the drought of 1970-71.

Figure 3 shows the mass total system delivery curves for the past 3 dry seasons.

Deliveries to Everglades National Park were deficient in the months of October and November because of low stages in Conservation Area No. 3. A portion of these deficiencies were made up in December through February.

Low stages in the conservation areas are a partial explanation for the reduced deliveries from the conservation areas when compared with 1971-1972, since seepage is considered to be a beneficial use delivery.

Reservoir Inflow

Table 7 lists selected data on inflow (surface runoff) into each of the four reservoir areas. These data are a generalized reflection of precipitation in the areas contributory to the reservoirs. For most of the inflow points (except the Kissimmee River) the values for 1972-73 lie closer to those for 1970-71 than for 1971-72. This indicates the scarcity of runoff producing events in an area such as the Agricultural Area even though total seasonal rainfall was on the order of 80% of normal.

Kissimmee River inflow was significally greater than in either 1970-71 or 1971-72 because of close to normal rainfall in the Kissimmee Valley. This factor contributed substantially to the maintenance of adequate stages in Lake Okeechobee during the critical months of April and May.

Figure 3 is a set of bar graphs, for each reservoir, showing the proportions of total inflow contributed by rainfall and by runoff. Throughout the period rainfall was by far the greater contributor to inflow to all

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these conservation areas. On the other hand, from January on, runoff was the major factor for Lake Okeechobee.

Stage - Storage

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Figures 4A and 4B depict reservoir stages in comparison with the regulation schedules and historical maximum, minimum and mean stages.

Figures 5 through 9 are curves showing the relationships between available reservoir storage and the 1970-1971 demand.

Water Budget, October 1972 - May 1973

Figures 10 through 13 are graphical summaries of the water budget parameters of the 1972-73 dry season for each reservoir.

The data for Conservation Areas 2 A and 3 A indicate a reasonably good balance. The poor balance for Lake Okeechobee is unexplainable at at this time and is being analyzed.

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TABLE I

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SUMMARY OF RAINFALL DATA (INCHES)

SLADES	5 -3.46	/ +1.95	5 +0.22) +0.06	3 +0.28	7 -0.05	4 -1.88	i -2.37	l -5.25
EVERC 1972	3.65	3.67	1.26	1.70	1.98	1.97	0.84	3.44	18.51
S. NORMAL	7.11	1.72	1.04	1.64	1.70	2.02	2.72	5.81	23.76
ADES 73 DEP.	-3.17	+0.89	+0.42	+0.76	-1.26	+1.69	-1.90	-1.53	-4.10
EVERGL 1972-	2.82	2.65	1.92	2.52	0.60	3.92	0.92	3.49	18.84
C. J NORMAL	5.99	1.76	1.50	1.76	1.86	2.23	2.82	5.02	22.94
ADES 73 DEP.	-3.73	+0.94	+0.23	+0.30	-0.60	+0.58	-1.15	-0.85	-4.28
EVERGL 1972-	1.44	2.40	1.77	1.96	1.20	3.18	0.99	3.67	16.61
N. NORMAL	5.17	1.46	1.54	1.66	1.80	2.60	2.14	4.52	20.89
HOBEE 73 DEP.	-3.35	+1.40	+0.42	+1.17	-0.05	+0.62	-1.75	+0.66	-0.88
0KEEC 1972-	0.81	2.52	1.58	2.26	1.79	2.88	1.00	4.53	17.37
LAKE NORMAL	4.16	1.12	1.16	1.09	1.84	2.26	2.75	3.87	18.25
HINOM	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	TOTAL

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MONTHLY EVAPORATION - LAKE OKEECHOBEE AND S-7 (INCHES)

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HINOW	LAKE NORMAL	0KEECHOB 1972-73	EE DEP.	NORMAL	s-7 1972-73	DEP.
OCTOBER	4.50	5.76	+1.26	3.35	4.30	+0.95
NOVEMBER	3.70	3.10	-0.60	3.16	2.74	-0.42
DECEMBER	3.00	3.19	+0.19	2.67	3.18	+0.51
JANUARY	3.00	2.48	-0.52	2.51	3.15	+0.64
FEBRUARY	3.60	3.32	-0.28	3.06	3.48	+0.42
MARCH	5.00	4.96	-0.04	4.70	5.30	+0.60
APRIL	5.70	6.16	+0.46	5.80	6.54	+0.74
MAY	6.30	7.54	+1.24	5.20	6.63	+1.43
- Transm						
TOTAL	34.80	36.51	+1.71	30.45	35.32	+4.87

LAKE OKEECHOBEE - RELATION OF EVAPORATION TO TOTAL DRAFT

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MONTH	Q (AF)	EVAPOH 1972 Inches	ATTON 2-73 AF	TOTAL DRAFT ^a 1972-73 AF	EVAPOR 1972-73	ATION DRAF 1970-71	т (%) ^b 1971-72
OCTOBER	97,565	5.8	195,750	293,315	66.7	80.7	91.0
NOVEMBER	50,569	3.1	100,647	151,216	66.6	53.3	77.9
DECEMBER	38,111	3.2	102,933	141,044	73.0	49.2	61.9
JANUARY	26,047	2.5	79,916	105,963	75.4	53.7	67.4
FEBRUARY	15,912	3.3	107,140	123,052	87.1	71.0	76.5
MARCH	47,919	5.0	162,750	210,669	77.3	63.9	70.4
APRIL	122,052	6.2	202,650	324,702	62.4	56.6	79.2
МАҮ	145,941	7.5	238,516	384,457	62.0	65.9	91.5
AVERAGE	ł	ł			71.3	61.8	7.77

(a) Total draft (AF) = Outflow (AF) + Evaporation (AF)

(b) Evaporation draft (χ) = Evaporation (AF)/Total draft (AF)

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SUMMARY OF WATER DELIVERY - OCTOBER 1972 THROUGH MAY 1973 ACRE-FEET Ny 1

HLNOW	LAKE OKEECHOBEE	CONSERVATION AREA 1	CONSERVATION AREA 2A	CONSERVATION AREA 3A	EVERGLADES NATIONAL PARK	TOTAL TOTAL
1972 OCTOBER	97.565	15.609	12.912	36_278	55,150	217 516
NOVEMBER	50,569	15,409	12,496	30,347	48.040	156,861
DECEMBER	38,111	14,993	11,068	27,055	35,940	127,167
1973						
JANUARY	26,047	16,600	10,453	25,210	28,380	106,690
FEBRUARY	15,912	14,722	5,554	22,215	12,110	70,513
MARCH	47,919	16,898	4,870	20,291	5,450	95,428
APRIL	122,052	16,330	8,910	13,100	2,440	162,832
МАҮ	145,941	12,224	6,605	15,843	1,650	182,263
TOTAL	544,116	122,785	72,868	190,339	189,160	1,119,268

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LAKE OKEECHOBEE SERVICE AREA DEMAND (ACRE FT.)

				,			
HTNOM	Lake Shore AREA	HGS-3	HGS-4	HGS-5	ST. LUCIE & CALOOSAHATCHEE CANALS	MARTIN CO. IRRIGATION	MONTHLY DEMAND
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1712 OCTOBER	3,283	13,795	37,787	21,695	10,822	10,183	97,565
NOVEMBER	2,801	5,681	16,443	8,535	9,331	7,778	50,569
DECEMBER	0	4,272	13,575	9,092	3,116	8,056	38,111
1973 JANUARY	2,152	2,501	5,794	4,268	4,220	7,112	26,047
FEBRUARY	833	887	3,394	2,047	1,430	7,321	15,912
MARCH	1,229	3,631	15,106	12,444	6,139	9,370	47,919
APRIL	2,706	17,534	50,517	30,567	9,907	10,821	122,052
МАҮ	2,905	41.030	51,287	26,366	13,214	11,139	145,941
TOTAL	15,909	89,331	193,903	115,014	58,179	71,780	544,116

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DEMAND OF CONSERVATION AREAS (ACRE-FT)

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HINOM	CONE	SERVATION	AREA 1	CONS	FRVATION A	RFA 2A		UNSERVATIO	ON ADEA 3	~	MONTELT V
	S-39 & LWDD	SEZPAGE	SUB- TOTAL	S-34 S-38	SEEPAGE	SUB- TOTAL	S-151	SEEPAGE	EVERG. NAT'L PARK	SUB- TOTAL	TOTAL
19/2 OCTOBER	1,651	13,958	15,609	0	12,912	12,912	0	36,278	55,150	91,428	119,949
NOVEMBER	2,259	13,150	15,409	0	12,496	12,496	0	30,347	48,040	78,387	106,292
DECEMBER	1,589	13,404	14,993	0	11,068	11,068	0	27.055	35,940	62,995	89,056
1973 JANUARY	3,380	13,220	16,600	0	10.453	10.453	C	25.210	28.380	53, 590	80.643
FERNARY	2.670	12.052	14 722	C	5 55/5	2 2 2 7		27 215	011 01	365.36	50 6 01
MARCH	5.400	11.498	16.898	2.410	2.460	4.870		20 991	077,31 0450 7	177 26	100, 74
APRIL	7,940	8,390	16,330	7,720	1,190	8,910		13,100	2,440	15,540	40,780
МАҮ	7,305	4,919	12,224	5,990	615	6,605	4,160	11,683	1,650	17,493	36,322
TOTAL	32,194	90,591	122,785	16,120	56,748	72,868	4,160	186,179	189,160	379,499	575,152

SELECTED INFLOW DATA - OCTOBER THROUGH MAY

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STATION	AVERAGE DISCHARGE OCT - MAY (ACRE-FT)	DISCHARGE TOTAL (ACRE-FT)	OCT. 72 THRU M DEP. FROM ACRE-FT	AY 73 NORMAL %
LAKE OKEECHOBEE				
Kissimmee River	771,570	624,550	-147,020	-19.05
Taylor Creek	(1956-70) (1956-70)	9,850	- 23,305	-70.29
Fisheating Creek	86,922 (1956–70)	28,076	- 58,846	-67.70
CONSERVATION AREA 1				
S-5A	130,460	31,880	- 98,580	-75.56
S-6	(1958-70) 81,744 (1960-70)	14,230	- 67,514	-82.59
CONSERVATION AREA 2A				
S-7	84,069 (1961-70)	19,550	- 64,519	-76.75
CONSERVATION AREA 3A				
S-8	105,676	27,300	- 78,376	-74.17
S-9	(1962-70) 50,101 (1958-70)	52,380	+ 2,279	+ 4.55

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ACCUMULATED RAINFALL FROM OCTOBER TO MAY



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OCTOBER TO MAY

EUGENE DIETZGEN CO. MADE IN U. S. A.

NO. 340-10 DIETZGEN GRADH PAP 10 X 10 PER INCH

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FIGURE 2



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FIGURE 3

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MONTH-END STAGE OF THE RESERVOIRS

MONTH-END STAGE OF THE RESERVOIRS





UGENE DIETZGEN CO. MARE IN D. P. A.

DIETZGEN GRAPH PAPER MILLIMETER 340-M

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FIGURE 5





I UGENE DIETZGEN CO. VADE 'N U. S. A.

340-M DIETZGEN GRAPH PAPER Millimeter

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EUGENE DIETZGEN CO. Made in U. S. A.

340-M DIETZGEN GRAPH PALLEV MILLIMETER

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FIGURE 7



EUGENE DIETZGEN CO.

340-M DIETZGEN GRAPH PAPER MILLIMETER

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MADE IN U.

MILLIMETER

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EUGENE DIETZGEN CO. MADE IN U. S. A

NO. 340-10 DIETZGEN GRAHH HAHER 10 X 10 PER (NCH

FIGURE II



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LUGENE DIETZGEN CO. MADE IN U. S. A.

NO. 340-10 DIETZGEN GRAPH PAPEH 10 X 10 PER INCH

FIGURE 12

EUGENE DIETZGEN CO. MADE IN U. 9. A.

NG. 340-10 DIETZGEN GRAPH PAPE 10 X 10 PER INCH

