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Everglades Drainage District: Biennial Report 1927-1928 to the Board of Commissioners of Everglades Drainage District

F C. Elliot

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EVERGLADES DRAINAGE DISTRICT

BIENNIAL REPORT

1927-1928

TO THE

BOARD OF COMMISSIONERS

OF

EVERGLADES
DRAINAGE
DISTRICT



F. C. ELLIOT
CHIEF DRAINAGE ENGINEER

EVERGLADES DRAINAGE
DISTRICT

BIENNIAL REPORT

1927-1928

TO THE

BOARD OF COMMISSIONERS

OF

EVERGLADES
DRAINAGE
DISTRICT



F. C. ELLIOT

CHIEF DRAINAGE ENGINEER

Biennial Report to the Board of Commissioners of Everglades Drainage District

Tallahassee, Fla., Jan. 1, 1929.

Board of Commissioners of
Everglades Drainage District,

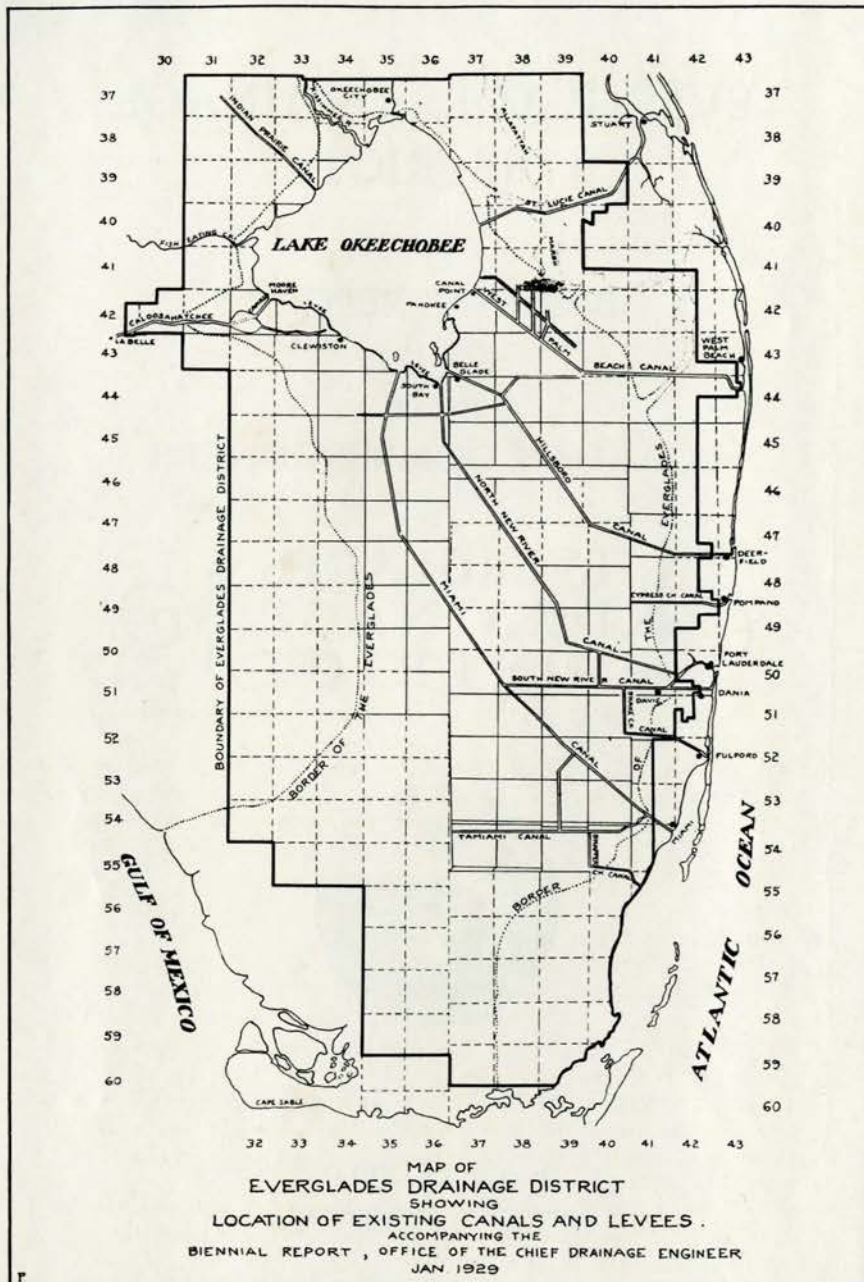
Honorable Doyle E. Carlton, Governor and Chairman.
Honorable Ernest Amos, Comptroller.
Honorable W. V. Knott, State Treasurer.
Honorable Fred H. Davis, Attorney General.
Honorable Nathan Mayo, Commissioner of Agriculture.

Gentlemen :

It has been the practice of this office to transmit to the Board of Commissioners of Everglades Drainage District every two years a report covering the work accomplished in the Everglades during the two preceding years, to submit estimates for continuing the work, to make recommendations for new work, and suggest such other subjects as should come to the attention of the Board in reference to the District not only relating to the work going on but also from the standpoint of taxation, provision of money for future work, and matters in general relating to the District connected with drainage.

Previous reports have dealt with the subject principally from the standpoints of engineering, of construction, of estimates, costs and budgets for the years which they cover. In June, 1927, the Board of Commissioners of Everglades Drainage District instructed the Chief Drainage Engineer to submit a report on Everglades Drainage District covering additional subjects not theretofore brought down or compiled, which Resolution was in the following language :

“WHEREAS, the said Board deems it advisable to have of record official statement in which shall be incorporated a brief historical record of the District ;



the operation of the District under Everglades Drainage District Laws; the work performed by said District; the general conditions of the District from time to time; reference to taxes imposed and collected and the general financing of the works; also reference to the advancement of the District from time to time resulting from drainage operations and statements relating to such other subjects as may bear upon the District, its condition and status and the future development of the same, now therefore,

BE IT RESOLVED:

That the Chief Drainage Engineer be and he is hereby directed to prepare in as brief form as practicable, a report to Board of Commissioners of Everglades Drainage District on subject as above and to submit said report at an early date."

Pursuant to the above Resolution, a report covering these subjects was submitted.

It is proposed in this Biennial Report to set forth subjects not only from an engineering, construction, operating and maintenance standpoint, but also subjects referred to in the above Resolution of the Board.

Respectfully,

F. C. ELLIOT,
Chief Drainage Engineer.

The Biennial Report for 1927 and 1928 is divided into Part I and Part II. The first relates in a general way to the work accomplished to date from an engineering and construction standpoint. The second relates to subjects other than those of an engineering nature.

PART I.

Part I deals in a general way with the work accomplished to date and in detail with such work for the past two years. Estimates are submitted and recommendations made for continuing the work and for undertaking new work. Subjects are mentioned which should come to the attention of the Board in reference to the District, relating to construction, colonization, the progressive advancement of drainage through the selection of restricted areas, the rate at which such progressive drainage may be undertaken, and a discussion of engineering and other questions involved.

Much of the subject matter described above as Part I has been discussed in previous Biennial Reports and it does not appear necessary to bring these discussions into a new report.

REORGANIZATION

In 1928 the Board of Commissioners of Everglades Drainage District undertook a reorganization of the work carried out by that Board as evidenced by the following from a Resolution of July 7th, 1928:

"Be IT RESOLVED, That for reasons stated above, the Chief Drainage Engineer, F. C. Elliot, be retained at the same compensation, and in addition to his other duties be designated as Secretary to both the Board of Commissioners of Everglades Drainage District and Trustees of the Internal Improvement Fund, whose duty it shall be to act as Chief Drainage Engineer and also Secretary of the Board of Commissioners of Everglades Drainage District and of the Trustees of the Internal Improvement Fund, effective August 1, 1928, of all matters of the Trustees, including that of taxes and lands, it being deemed highly essential that those several duties relating to these Boards

be co-ordinated under one head, for economy and efficiency."

Pursuant to the Resolution as above and to instructions from Board of Commissioners of Everglades Drainage District, the Chief Drainage Engineer and Secretary divided the work of Everglades Drainage District into the following departments:

Engineering Department.—All work of an engineering nature relating to Everglades Drainage District, construction works therefor, maintenance of work already provided, operation of those works, engineering investigations and surveys, and the keeping of engineering records of the foregoing and the distributions of costs and expenses relating thereto.

Tax Department.—The keeping of complete records of Everglades Drainage District taxes, the lands subject thereto, those delinquent thereunder, the sale of such lands, the accounting for all moneys derived from taxes, the distribution of the same to the proper fund and their application to the purposes required.

Bond Department.—The keeping of complete records of all bond transactions, the payment of bond interest, payment of principal at maturity, the provision of money from the tax fund and from the sinking fund therefor, and the accounting of moneys received and disbursed from the proceeds of bonds.

Accounting Department.—Keeping of books and the auditing of all accounts of the Board of Commissioners of Everglades Drainage District.

Secretary Department.—The taking and recording of all Minutes, Resolutions and transactions of Board of Commissioners of Everglades Drainage District and generally the work of the said Board of a secretarial nature.

The above arrangement became effective as of August 1st, 1928. Simultaneously therewith a similar program was worked out for the Trustees of the Internal Improvement Fund. The work of the Trustees of the Internal Improvement Fund in some respects is related to and affects Everglades Drainage District, but since they are separate entities and their business is separately attended

to, no reference is here made to the work of the Trustees of the Internal Improvement Fund. Complete information in reference to the Trustees may be found in the "*Minutes of the Trustees of the Internal Improvement Fund of the State of Florida*," printed volumes of which are available to the public.

AUDIT OF BOARD OF COMMISSIONERS OF EVERGLADES DRAINAGE DISTRICT

The following audit of the business of the Board of Commissioners of Everglades Drainage District covering the period July 1st, 1926, to June 30th, 1928, was made by the State Auditor. The audit is reproduced in this report exactly as submitted by the auditor.

STATE OF FLORIDA—AUDITING DEPARTMENT

W. S. MURROW, *State Auditor*

Tallahassee, Jan. 7th, 1929.

Hon. Fred C. Elliot,
Secretary Everglades Drainage District,
Capitol.

Dear Mr. Elliot:

I am handing you herewith copy of report on examination of the records and accounts of the Board of Commissioners of the Everglades Drainage District, by A. J. Henry, as of June 30th, 1928, for your files.

Yours very truly,

W. S. MURROW,
State Auditor.

WSM/j

Hon. W. S. Murrow,
Acting State Auditor,
Tallahassee, Fla.

Dear Sir:

I beg to submit herewith report of an audit made by me, pursuant to your instructions, of the accounts of the Board of Commissioners of the Everglades Drainage District, covering the period from July 1, 1926, to June 30, 1928.

The Board of Commissioners of Everglades Drainage District consists of the following:

Hon. John W. Martin, Governor, Chairman.
 Hon. Ernest Amos, Comptroller.
 Hon. J. C. Luning, Treasurer.
 Hon. Fred H. Davis, Attorney General.
 Hon. Nathan Mayo, Commissioner of Agriculture,
 members.
 Hon. J. Stuart Lewis, Secretary.

The minutes of the Board appear to be incomplete. They do not show all of the expenditures, and they do not show all of the loans made from the Trustees of the Internal Improvement Fund. The warrant register is incomplete and contains numerous errors. However, this condition appears to have been corrected since the period covered by this audit, but before this audit actually was made, and the accounts of the Board are now being handled accurately and in a satisfactory manner.

The expenditures of the Board are shown with the distribution used by the former secretary. This distribution is unsatisfactory, but is adopted for this report on account of the great amount of time that would be necessary to go over the bills and re-distribute them correctly. The expenditures since the close of the period of this audit are being distributed so as to reflect clearly the activities of the Drainage Board.

SUMMARY OF EXPENDITURES

	July 1, 1926 to June 30, 1927	July 1, 1927 to June 30, 1928	Total 2 years
Excavation ...	\$ 824,329.37	\$ 217,088.18	\$1,041,417.55
Salaries	197,968.74	109,249.38	307,218.12
Office Expense	2,415.49	2,724.95	5,140.44
Gen. Expense .	181,611.24	75,780.29	257,391.53
Subsistence ...	62,379.98	16,738.36	79,118.34
Miscellaneous .	68,003.73	41,444.64	109,448.37
Total	\$1,336,708.55	\$ 463,025.80	\$1,799,734.35
Paid By:			
Board Fund ..\$	927,936.68	\$ 41,392.58	\$ 969,329.26
Drain. Tax Fd.	342,347.40	399,385.86	741,733.26
One Mill T. Fd.	66,424.47	22,247.36	88,671.83
	<u>\$1,336,708.55</u>	<u>\$ 463,025.80</u>	<u>\$1,799,734.35</u>

In addition to above expenditures, the Board has incurred indebtedness for excavation during the period covered by this audit as follows:

Arundel Corporation, notes for work	\$1,713,608.44
For work not yet paid for by notes	391,227.96
Brown Co., notes for work this period	28,413.65
Total incurred for work during period	\$2,133,250.05
Paid through accounts by check	\$1,041,417.55
Paid by notes and accounts ..	2,133,250.05
Total for excavation	\$3,174,667.60
Total Expenditures	\$1,799,734.35
Total Indebtedness	2,133,250.05
Total work done	\$3,932,984.40

The expenditures shown above do not include repayments of loans to the Internal Improvement Fund, or expenses in connection with bonds issued, which are shown later in this report.

INDEBTEDNESS OF AND TO THE BOARD OF DRAINAGE COMMISSIONERS, EXCEPT BONDS

In addition to current bills and payrolls which were due July 1, 1928, and which are not taken into account, the Board has the following notes and account outstanding:

TO ARUNDEL CORPORATION

No.	Date of Note	Due	Int.	Amount	Renewal Note
1-A	6/15/27	6/15/28	6%	\$ 70,771.49	"
2-A	7/15/27	7/15/28	6%	70,350.21	"
3-A	8/15/27	8/15/28	6%	67,480.56	"
4-A	9/15/27	9/15/28	6%	75,008.31	"
5-A	10/15/27	10/15/28	6%	67,874.84	"
6-A	11/15/27	11/15/28	6%	71,169.17	"

No.	Date of Note	Due	Int.	Amount	Renewal Note
7-A	12/15/27	12/15/28	6%	75,207.65	"
8-A	1/15/28	1/15/29	6%	60,371.55	"
9-A	2/15/28	2/15/29	6%	54,229.62	"
10-A	3/15/28	3/15/29	6%	53,555.73	"
11-A	3/15/28	3/15/29	6%	53,555.74	"
12-A	4/15/28	4/15/29	6%	120,817.22	"
13-A	5/15/28	5/15/29	6%	117,694.17	"
14-A	6/15/28	6/15/29	6%	111,620.29	"

Total of Renewal Notes \$1,069,706.55

20	7/15/27	7/15/28	6%	\$ 98,639.57
21	8/15/27	8/15/28	6%	95,709.25
22	9/15/27	9/15/28	6%	88,694.39
23	10/15/27	10/15/28	6%	92,628.51
24	11/15/27	11/15/28	6%	54,773.91
25	12/15/27	12/15/28	6%	41,224.39
26	1/15/28	1/15/29	6%	58,275.45
27	2/15/28	2/15/29	6%	76,630.20
28	3/15/28	3/15/29	6%	86,919.67
29	4/15/28	4/15/29	6%	91,531.25

Total Current Notes \$ 785,026.59

Total Notes to Arundel Corp. \$1,854,733.14
 Indebtedness of Board Account of
 estimates not yet paid by notes . . . 391,227.96

Total Indebtedness to Arundel Corp. \$2,245,961.10

TO BROWN COMPANY

No.	Date of Note	Due	Int.	Amount
1	2/ 1/28	2/ 1/29	6%	\$ 5,343.65
2	2/21/28	2/21/29	6%	8,580.00
3	3/15/28	3/15/29	6%	7,762.50
4	4/27/28	4/27/29	6%	6,727.50

Total \$28,413.65 \$28,413.65

TO TRUSTEES OF THE INTERNAL IMPROVEMENT FUND

					Bal. Due Int.
6	5/31/26	90 days	3%	\$ 53,567.18	Pd. to 11/30/27
9	2/ 2/27	90 days	3%	20,000.00	
10	2/22/27	90 days	3%	115,049.96	
11	3/16/27	90 days	3%	16,000.00	
13	4/ 5/27	90 days	3%	17,500.00	
14	5/31/27	90 days	3%	5,000.00	
15	6/ 7/27	90 days	3%	50,000.00	

Total \$ 277,117.14 \$277,117.14
 Total Notes of Board . . \$2,160,263.93
 Indebtedness to Arun-
 del Corp. not yet
 paid by note 391,227.96

Total Indebtedness . . . \$2,551,491.89 \$2,551,491.89

The following debts are owed to the Board:

Newhall Drainage District, note dated Feb. 1, 1926, for \$9,642.92 6%, due Aug. 1, 1926. Renewal note. Interest paid on notes renewed.

Note date Jan. 1, 1927, for \$21,285.27, 6% due July 1, 1927. Renewal note. Interest on notes renewed was \$1,769.62, and \$1,700.00 was paid. Interest due \$69.62 plus interest from January, 1927.

Disston Island Drainage District owes \$6,289.72, since 1924, for construction and engineering.

South Shore Drainage District owes \$2,467.36, for engineering and inspection from June, 1926, to March, 1927.

Hendry County owes \$2,000.00 since 1925, for excavation.

DRAINAGE BONDS

BONDS OUTSTANDING

Issue	Outstanding July 1, 1926		Retired 7/1/26 to 6/30/28	Outstanding June 30, 1928
5/1/1917	\$ 117,600.00	6%	\$117,600.00	None
7/1/1920	1,500,000.00	6%	273,000.00	\$1,227,000.00
1/1/1921	1,000,000.00	6%	232,000.00	768,000.00
7/1/1921	500,000.00	6%	None	500,000.00
1/1/1922	1,250,000.00	6%	None	1,250,000.00
7/1/1923	1,500,000.00	5½%	137,000.00	1,363,000.00
1/1/1924	700,000.00	5½%	700,000.00	None
1/1/1925	1,300,000.00	5½%	None	1,300,000.00
Sub total	\$7,867,600.00		\$1,459,600.00	\$6,408,000.00

REFUNDING BONDS ISSUED JULY 1, 1925

Series A	\$2,500,000.00	5%	None	\$2,500,000.00
Series B	None	5%	\$505,000.00	505,000.00
Series C	None	5%	837,000.00	837,000.00
Sub total	\$2,500,000.00		\$1,342,000.00	\$3,842,000.00
Grand total	\$10,367,600.00			\$10,250,000.00

BONDS IN HANDS OF STATE TREASURER

Not Yet Delivered

REFUNDING BONDS

Series B—No. 506 to No. 2500.....	\$1,995,000.00
Series C—No. 838 to No. 3950.....	3,113,000.00
Total unissued	\$5,108,000.00

The refunding bonds were exchanged for bonds previously issued, or sold and a like amount of older bonds redeemed so as to keep the outstanding bonded indebtedness at \$10,250,000.00. The refunding process was begun in the period covered by the last audit, dated June 30, 1926, and was brought into balance during the period of this audit. Bonds not due but called or offered for exchange were redeemed at 102%, refunding bonds sold or

exchanged at 92.45%, and difference in accrued interest at date of exchange paid.

The Treasurer holds for the Board receiver's certificate of proof of claim against the Bank of Okeechobee, assigned by the tax collector on account of taxes collected, as follows:

No. 693, Acct. One Mill Maintenance Tax ..\$	388.29
No. 694, Acct. Acreage Tax	1,560.58

Dividends of \$15.53 and \$62.45, respectively, were received and deposited in the proper tax funds.

The Board has certificates of proof of claim that could not be located against the Bank of Moore Haven, assigned by the tax collector on account of taxes collected. On March 31, 1928, the bond fund received \$17.13 account 4½% dividend paid March, 1928, and the tax fund received \$47.59 account 12½% dividend paid May, 1925.

The board has certificates that could not be located assigned by the tax collector of Palm Beach County under Chapter 12240 (1927) amounting to \$30,600.52.

It is respectfully recommended that these certificates of proof of claim be located and properly filed, and accounts kept on them.

The following are statements of balances, receipt and disbursements of the funds of the Everglades Drainage District:

DRAINAGE BOND FUND JULY 1, 1926, TO JUNE 30, 1927

Balance July 1, 1926.....	\$373,772.55
Less warrants outstanding	262,465.79
Net balance July 1, 1926.....	\$ 111,306.76
Loans from I. I. Fund.....	228,427.15
Certificates of Deposit taken up by Spitzer Rorick & Co.....	500,000.00
Interest on C/D.....	14,188.89
Int. on New Hall D. D. notes.....	1,700.00
Int. on funds in banks.....	1,706.84
Sale maps, old machinery, etc.....	1,518.63
Sale canal rock and supplies.....	3,795.18
Canal tolls	1,566.94
Transfer from Drainage Tax fund.....	142,822.12
From Spitzer Rorick & Co., in exchange of \$67,000.—6% bonds for \$90,000.— 5% bonds	16,205.00
Lease canal R/W	62.50
Various refunds	366.99

Refunded I. I. Fund.....	\$	8,902.08	
Paid Treasurer "Items of Reconciliation" in audit of June 30, 1926.....		50,822.12	
Redeemed \$13,000—bonds at par.....		13,000.00	
\$5,000—bonds called at 102 and commission.....		5,106.37	
Redeemed \$8,000—bonds at par and commission.....		8,010.00	
Redeemed \$1,000—bond at par.....		1,000.00	
Paid Sinking Fund Account exchange of bonds.....		467.00	
Bills paid, see distribution.....		927,936.68	
Error in paying warrant.....		.40	
Net balance June 30, 1926.....		8,422.35	
		<hr/>	
	\$1,023,667.00	\$1,023,667.00	

DRAINAGE BOND FUND JULY 1, 1927, TO JUNE 30, 1928

Net balance July 1, 1927.....	\$	8,422.35		
Loans from I. I. Fund.....		28,796.15		
Canal tolls.....		448.09		
Sale canal rock and supplies.....		4,620.93		
Miscellaneous receipts and refunds.....		1,135.97		
Interest on funds in banks.....		152.83		
Rent of boat.....		96.34		
Sale of reports.....		130.50		
Inspection fees.....		150.00		
Dividend from Receiver of Bank of Okchobee.....		17.13		
Bills paid, see distribution.....	\$	41,392.58		
Net balance June 30, 1928.....		2,577.71		
		<hr/>		
	\$	43,970.29	\$	43,970.29
		<hr/>		
Net balance, June 30, 1928.....	\$	2,577.71		
Warrants outstanding.....		264.45		
		<hr/>		
Treasurer's balance, June 30, 1928.....	\$	2,842.16		

DRAINAGE TAX FUND JULY 1, 1926, TO JUNE 30, 1927

Balance July 1, 1926.....	\$476,355.58	
Less warrants outstanding.....	695.39	
	<hr/>	
Net balance July 1, 1926.....	\$	475,660.19
Taxes received.....		1,170,339.67
From Comptroller account tax redemptions.....		3.50
Loan from I. I. Fund.....		15,000.00
Refund from Sinking Fund.....		150.00
Paid Interest Coupons.....		
		<hr/>
	\$	560,065.65

Paid Commission.....			653.91
Bonds called \$96,200.00, at 102.....	98,124.00		
Commission.....	94.00		98,218.00
	<hr/>		
Bonds matured \$2,300, at par.....	\$	2,300.00	
Commission.....		0.33	2,300.33
	<hr/>		
Bonds exchanged \$100,000— at par, given \$100,000, Series B 5%, at 92.45% paid discount.....			7,550.00
Bonds exchanged \$700,000 given \$700,000 Series C 5%.....			43,442.00
And bonds exchanged \$137,000 given \$137,000, Series C 5%.....			10,362.68
And bonds called \$10,100— at 102%.....	\$	10,302.00	
Commission.....		12.88	10,314.88
	<hr/>		
Repaid I. I. Fund.....			15,000.00
Transferred to Sinking Fund.....			21,986.28
Transferred to Bond Fund.....			142,822.12
Paid bills, see distribution.....			342,347.40
Net balance June 30, 1927.....			406,090.11
		<hr/>	
	\$1,661,153.36	\$1,661,153.36	

DRAINAGE TAX FUND JULY 1, 1927, TO JUNE 30, 1928

Net balance July 1, 1927.....	\$	406,090.11		
Received taxes.....		1,273,191.42		
Paid Interest Coupon.....			\$	557,902.50
Paid commissions.....			657.61	
Exchanged \$100,000 matured bonds for \$100,000 5% bonds 92.45% paid discount.....			7,550.00	
Exchanged \$165,000 called bonds at 102%. Paid premium.....	\$	3,300.00		
\$165,000 5% bonds, at 92.45% paid discount.....		12,457.50		
Difference accrued interest to Dec. 9, 1927.....		724.17	16,481.67	
	<hr/>			
Exc. \$50,000 called bonds at 102% for \$50,000 5% bonds at 92.45% paid premium.....	\$	1,000.00		

Paid disc. on 5% bonds.....	3,375.00		
Difference in accrued interest to March 9, 1928.....	94.43		4,869.43
Transferred to Sinking Fund			26,813.30
Red. \$5,000 bonds in Sinking Fund			5,000.00
Repaid I. I. Fund.....			258,520.32
Paid bills, see distribution			399,385.86
Net balance June 30, 1928....			402,100.84
		\$1,679,281.53	\$1,679,281.53
Net balance	\$402,100.84		
Outstanding warrants	17,014.13		
Treas. bal. June 30, 1928.....	\$419,114.97		

ONE MILL DRAINAGE TAX FUND JULY 1, 1926,
TO JUNE 30, 1927

Balance July 1, 1926.....	\$ 59,173.74		
Less warrants outstanding	None		
Net balance July 1, 1926....	\$ 59,173.74		
Receipts, taxes	22,279.60		
Paid bills, see distribution..		\$ 66,424.47	
Balance June 30, 1927.....		15,028.87	
	\$ 81,453.34	\$ 81,453.34	

JULY 1, 1927, TO JUNE 30, 1928

Balance July 1, 1927.....	\$ 15,028.87		
Receipts, taxes	26,442.99		
Paid bills, see distribution.....		\$ 22,247.36	
Balance June 30, 1928.....		19,224.50	
	\$ 41,471.86	\$ 41,471.86	

No warrants outstanding.

EVERGLADES DRAINAGE DISTRICT BOND SINKING FUND

JULY 1, 1926, TO JUNE 30, 1927

Balance July 1, 1926.....	\$ 73,459.19		
Transfer 2% taxes collected.....	21,986.28		
Interest, funds in banks.....	2,685.84		
Interest on bonds in Fund.....	291.65		
Discount paid on 5% refunding bonds exchanged for 6% bonds owned by Fund	467.00		
Refund interest paid in error.....		\$ 150.00	
Balance June 30, 1927.....		98,739.96	
	\$ 98,889.96	\$ 98,889.96	

JULY 1, 1927, TO JUNE 30, 1928

Balance July 1, 1927.....	\$ 98,739.96		
Transfer 2% taxes collected.....	26,813.30		
Interest on funds in banks.....	3,694.91		
Interest on bonds in fund.....	125.00		
Redemption of bonds in fund.....	5,000.00		
Disbursements			None
Balance June 30, 1928.....		\$ 134,373.17	
	\$ 134,373.17	\$ 134,373.17	

No warrants outstanding.

Respectfully submitted,

A. J. HENRY, Auditor.

REPORT EVERGLADES ENGINEERING BOARD OF
REVIEW

In March 1927, the Board of Commissioners of Everglades Drainage District engaged the services of Messrs. Anson Marston, S. H. McCrory, and George B. Hills, to submit a report on the drainage of the Everglades. The above, comprising the *Everglades Engineering Board of Review* submitted their report in May following. This report deals with the engineering features involved in connection with the drainage of the Everglades, reviewed the work previously done, rendered its opinion as to the efficiency, correctness and effectiveness of the work already performed, and the cost of the same, and submitted recommendations for the Board to follow in carrying out the new work of the District. This report was published by the Board of Commissioners of Everglades Drainage District and is available upon request.

The above was the second time that the Board of Commissioners of Everglades Drainage District had employed eminent engineers to make an examination and report regarding the Everglades, the prior report being that of the Everglades Engineering Commission made up of Isham Randolph, Marshall O. Leighton and Edmund T. Perkins.

STATUS OF WORK

The status of work of Everglades Drainage District is shown by the following tables:

TABLE "A"

EVERGLADES DRAINAGE DISTRICT—STATUS OF PRESENT WORK TO JAN. 1, 1929

Name of Canal	Length in Miles	Total Excav. in Cubic Yards	Cost
Caloosahatchee	28.00	3,199,457	298,419.35
Cypress Creek	12.20	768,288	106,504.34
Dania	5.95	1,169,019	169,559.49
Harneys Pond	3.65	226,952	44,455.70
Nine Mile	9.73	148,610	16,812.70
Snake Creek	14.30	292,346	42,169.66
Tamiami	5.52	419,577	92,968.78
South New River	25.00	3,700,977	1,031,559.31
Snapper Creek	12.56	572,090	149,442.87
Snapper Creek Ext.	8.47	328,847	
Indian Prairie	20.83	1,668,705	278,553.74
Hillsboro	50.00	8,522,440	1,129,322.75
North New River	59.20	8,708,416	1,935,230.74
Miami	78.70	8,211,169	1,994,502.42
St. Lucie	25.00	25,205,487	5,791,449.45
West Palm Beach	40.90	10,738,937	1,686,307.51
Lateral Canals	39.96	1,181,235	103,926.75
Totals	439.97	75,062,552	\$14,871,185.56

TABLE "B"

EVERGLADES DRAINAGE DISTRICT—STATUS OF PRESENT WORK TO JAN. 1, 1929

Lake Okeechobee Levee.	Length.	Excavation.	Cost.
Bacom Point—Hillsboro Div....	11.00	\$74,871	\$ 163,949.05
Hillsboro—N. New River Div...	3.10	343,274	66,977.30
North New River—Miami Div...	7.50	817,378	146,644.15
Miami—Sand Point Div.....	6.30	421,534	82,653.99
Moore Haven—Sand Point Div.	15.60	1,071,738	192,126.37
Moore Haven—Northwest Div...	3.40	212,628	39,083.62
Totals	46.90	3,741,423	\$ 691,434.48
Miscellaneous excavation for slips, dams, docks, etc.....		151,959	
TOTAL EXCAVATION (canals and levees)		3,893,382	\$15,562,620.04

TABLE "B"—(Continued)

Locks and Dams.	Lock Dimensions		Cost.
	Width (feet)	Length (feet)	
North New River No. 1.....	25	130	\$ 59,795.50
North New River No. 2 (obsolete)...	20	90	7,169.81
North New River No. 3 (obsolete)...	20	90	6,513.10
North New River No. 4.....	22	110	109,506.94
South New River No. 1.....	22	90	68,621.31
Miami No. 1.....	25	130	133,138.21
Miami No. 4.....	22	90	53,488.98
Hillsboro No. 1.....	25	130	61,432.50
Hillsboro No. 2.....	25	130	215,337.94
West Palm Beach No. 1.....	25	130	109,894.07
West Palm Beach No. 2.....	25	135	304,937.43
Caloosahatchee No. 1.....	30	150	114,103.60
Caloosahatchee No. 2.....	30	150	88,836.64
Caloosahatchee No. 3.....	30	150	129,015.35
St. Lucie No. 1.....	30	150	125,677.25
St. Lucie No. 2.....	30	150	417,689.01
Total cost of locks to date, \$2,005,157.64.			

TABLE "C"

EVERGLADES DRAINAGE DISTRICT—STATUS OF PRESENT WORK TO JAN. 1, 1929

Other Work.	Costs.
Operations Department	\$ 61,839.01
Drainage Surveys	11,872.06
Equipment } New Equipment	109,513.83
Equipment } Equipment Maintenance....	30,725.61
Storm Emergency	20,569.28
Fire Control	57,973.78
Miscellaneous Costs	65,831.95
Total	\$358,325.52

RECAPITULATION.

Total Costs to January 1, 1929

Canal Excavation	\$14,871,185.56
Control Works (locks and dams).....	2,005,157.64
Levee Construction	691,434.48
Other Work	358,325.52

Total Expenditures\$17,926,103.20

Distribution of the above costs may be made as follows:

Drainage	\$9,775,390.02
Flood Control	6,066,748.85
Navigation	2,083,964.33

TABLE "D"
EVERGLADES DRAINAGE DISTRICT—WORK ACCOMPLISHED AND EXPENDITURES DURING 1927

CANAL	Excavation Cubic Yards	Const.	COST		TOTAL
			Operation and Maint.	Eng.	
Caloosahatchee	70,793	\$ 14,706.70	\$ 7,868.25	\$ 4,284.28	\$ 26,859.23
Cypress Creek	.....	.....	81.05	.....	81.05
Dania	.....	.....	726.35	.....	726.35
Snake Creek	.....	.....	72.01	.....	72.01
South New River	.....	.....	2,274.47	689.78	2,964.25
Shupper Creek	.....	.....	257.27	.....	257.27
Indian Prairie	.....	.....	1,038.67	1,038.68	2,077.35
Hillsboro	275,350	51,134.88	9,032.17	7,133.42	67,300.47
North New River	657,925	295,661.25	13,564.60	7,703.25	316,929.10
Miami	.....	.....	2,196.69	5,000.00	7,196.69
St. Lucie	1,924,706	866,973.04	40,873.29	10,000.00	917,846.33
West Palm Beach	298,952	38,915.97	10,703.68	3,292.54	52,902.19
Taylor Creek	35,362	12,707.50	.....	2,135.54	14,843.04
Levees—	.....	.....	.....	.....	.....
Lake Okechobee	561,161	.....	91,959.46	27,085.92	119,045.38
North Palm Beach	204,563	17,336.30	.....	1,059.93	18,396.23
Pennsylvania Levee	.....	.....	.....	162.85	162.85
Miscellaneous Yarding	29,722	.....	1,736.44	.....	55,799.35
Equipment	.....	.....	5,245.28	.....	5,245.28
Miscellaneous Expenses	.....	.....	.....	.....	.....
TOTALS—Excavation	4,057,634	.....	.....	.....	.....
Construction	.....	\$1,351,498.55	.....	.....	.....
Maintenance and Operation	.....	.....	\$ 187,629.68	.....	.....
Engineering	.....	.....	.....	\$ 69,576.19	.....
TOTAL EXPENDITURES	.....	.....	.....	.....	\$1,608,704.42

TABLE "E"
EVERGLADES DRAINAGE DISTRICT—WORK ACCOMPLISHED AND EXPENDITURES DURING 1928

CANAL	Excavation Cubic-Yards	Const.	COST		TOTALS
			Operation and Maint.	Eng.	
Caloosahatchee	.....	.....	\$ 5,008.29	\$ 1,493.52	\$ 6,501.81
Cypress Creek	.....	.....	137.01	.....	137.01
Dania	.....	.....	312.51	.....	312.51
Harney's Pond	.....	.....	23,883	15.96	39.79
South New River	.....	.....	1,028.47	1,314.80	2,343.27
Indian Prairie	.....	.....	106.40	107.41	213.81
Hillsboro	99,697	29,809.71	6,607.25	5,390.47	41,807.43
North New River	232,080	145,376.37	3,768.71	9,160.24	158,305.32
Miami	.....	.....	6,347.38	2,181.74	8,529.12
St. Lucie	1,072,823	343,671.80	71,569.21	13,767.64	429,008.65
West Palm Beach	.....	.....	4,950.76	3,413.49	8,364.25
Lake Okechobee Levee	.....	.....	.....	.....	.....
Bacon Point—Hillsboro	38,804	.....	12,360.99	1,890.24	14,251.23
Hillsboro—N. N. R.	45,959	.....	12,643.18	1,008.28	13,651.46
N. N. R.—Miami	46,019	.....	6,279.75	2,231.21	8,510.96
Miami—Sand Point	15,953	.....	7,559.04	2,494.72	10,053.76
Sand Point—Moorehaven	.....	.....	143.98	1,808.23	1,952.21
Moore Haven—Northwest	.....	.....	5.63	529.19	534.82
Miscellaneous Excavations	6,155	.....	.....	.....	.....
Equipment	.....	.....	6,829.43	361.50	20,149.66
Operating Department	.....	.....	7,431.90	.....	7,431.90
Miscellaneous Expenses	.....	.....	2,059.75	.....	2,059.75
TOTALS—Excavation	1,497,490	.....	.....	.....	.....
Construction	.....	\$ 531,816.61	.....	.....	.....
Maintenance and Operating	.....	.....	\$ 155,173.47	.....	.....
Engineering	.....	.....	.....	\$ 47,168.64	.....
TOTAL EXPENDITURES	.....	.....	.....	.....	\$ 734,158.72

FLOOD PROTECTION AROUND LAKE
OKEECHOBEE

This subject was discussed at length in the Biennial Report, 1925-1926. By reason of the importance of this subject, and for emphasizing certain recommendations made in the former Biennial Report, attention is again called to flood protection around Lake Okeechobee, the necessity therefor, and the character of works designed for that purpose.

Experience during the hurricane of 1928, again emphasizes the absolute necessity for protection against Lake Okeechobee during such times. The statement in the 1925-1926, report regarding reduction of hurricane dangers is even more applicable now by reason of an early occurrence of another hurricane. What was stated then should be emphasized now, and for laying emphasis upon the same, the statement in the 1925-1926 report is in part set down here as follows:

There is absolute necessity of undertaking on a broad, comprehensive scale, not only the protection of lands around the lake against storm damage in so far as practicable, but also reducing the danger to human life. That there will be other storms is certain. The occurrence of hurricanes such as that experienced in September, 1926, according to available records, is at extremely infrequent intervals, but *records are often broken* and there is no way of forecasting how soon another may be experienced, hence the early preparation for and speedy completion of works for combating hurricane dangers is most desirable. The protection of life and property against hurricanes is a feature not strictly a part of land drainage, but the experience of September, 1926, makes clear the necessity of combatting this danger, as well as providing against heavy rainfall. The construction of drainage canals adequate for carrying away heavy rainfall, or of the regulation of Lake Okeechobee to a degree satisfactory for agricultural purposes, and as protecting the land against overflow, is strictly a part of the drainage enterprise. The reduction of danger from hurricanes is another matter. Correlation of these two forces, water and wind, and the aggravation of danger by reason of the simultaneous culmination of them in combination, especially in the lake region, is pro-

ductive of conditions similar to those along the shore of the sea itself, and against which it is absolutely imperative to undertake work which will bring the dangers resulting from their combination within reasonable limits by breaking up the combination of these two destructive agencies. Since but one of these is susceptible of treatment, efforts must be confined to works to resist the storm-driven waters. In other words, levees must be built along the shore of Lake Okeechobee.

In planning for flood relief and for lessening hurricane danger, it may seem that the expenditures necessary for its accomplishment are large. The degree of protection necessary should be carefully considered. If such protection is for agricultural purposes only, perhaps works affording less degree of protection and at reduced cost, might be justified on the theory that almost any expenditure would improve conditions, hence warranted. There are situations, therefore, where partial protection may be wise and where property losses at infrequent periods could be borne. On the other hand, there are other situations, such as the protection of towns and homes, involving the consideration of human life, where anything less than complete protection not only would be unwise, but a menace to the lives and property intended to be protected, and where the provision of insufficient works might lead the inhabitants to a feeling of false security which would result in aggravating the danger, rather than ameliorating it.

The construction of an adequate levee around the southwestern, southern and south-eastern shores of Lake Okeechobee of sufficient height to prevent hurricane driven waters going over them, and of sufficient mass and resistance to withstand wave action under hurricane conditions, will require works of far greater height, strength and mass, and at much greater cost, than any required merely for retaining the waters of Lake Okeechobee under non-hurricane conditions, but structures capable of resisting the effects of such storms as that which occurred last September can be built, and though at large cost, the exigencies of the case must be its justification.

The above is from Biennial Report dated Jan. 1st, 1927.

One year and nine months after the above was written, and two years from the occurrence of the former hurri-

cane, another had spread devastation and death in that area. As a result of the 1928 hurricane, the damage within Everglades Drainage District area as estimated by reports from various sources within the several counties affected, amounted to \$3,800,000, and the loss of approximately 2,000 lives.

In connection with construction of levees around Lake Okeechobee, it might be well to state the purpose of these levees and to correct an erroneous impression which is quite general regarding them. There has been an idea abroad that the construction of levees such as are proposed is for the purpose of holding the lake water at high levels. The levees are for no such purpose. Their construction around the low shores of the lake is not for holding high water levels in Lake Okeechobee, but to prevent hurricane-driven waters being blown out of the lake, endangering life and flooding the land. It is here emphasized that the levees proposed are for flood protection under hurricane conditions, and not for holding water in the lake at high levels under non-hurricane conditions.

When levee construction began in 1921 their purpose was for restoring the rim of the lake at or somewhat above its original elevation from which it had subsided three to four feet due to settling of the spongy muck soil from drainage. Protection against hurricanes was not contemplated. It may be interesting to know that all of the developments in the upper Everglades around Lake Okeechobee, the growing of crops, the marketing of them and the bringing into that section of millions of dollars in return, was made possible by the works thus far provided. What is now needed is enlargement, extension and addition to present works in order that they may be adequate to protect lives and property against hurricane-driven waters from Lake Okeechobee.

REGULATION OF LAKE LEVELS

In connection with levees, the regulation of lake levels must be considered as an inseparable part of the flood control problem. The existing War Department permit defines elevation 15.0 feet as the level about which the lake is to be regulated and determines that elevation as the minimum desirable level for the said lake. With the minimum level at elevation 15.0 feet, the high level be-

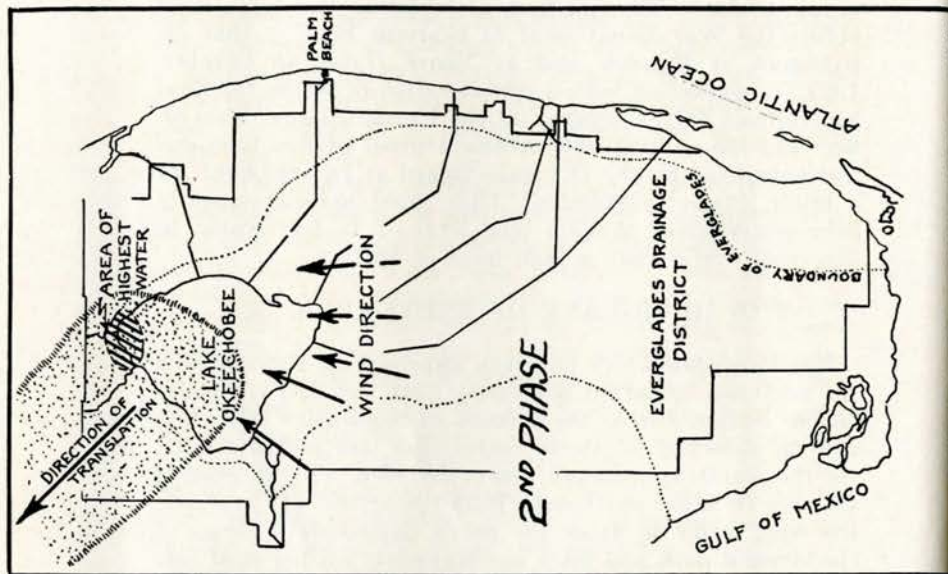
comes 18 feet. The question of lowering this level came before the War Department at hearings held by that department at Pahokee and at Moore Haven in October, 1927, in connection with a consideration of works for flood control and for navigation by the United States. This office is of the opinion that sufficient proof existed then and was submitted by the Drainage Board as an argument for a lower level of regulation. That proof has subsequently been emphasized. A high lake level of 16 feet would be inherently safer than a high level of 18 feet.

THE HURRICANE OF SEPTEMBER, 1928

The hurricane which had been approaching Florida from the southeast, reported September 10th, reached the Okeechobee section during the evening of September 16th. The general direction of storm translation was northwesterly. As the storm approached, the wind blew with increasing violence from the northeast. With the arrival of the storm, the wind came in from the north immediately ahead of the storm's path and from northwesterly on the west side of its path. In its first stage, with the wind coming from northerly directions as above, the duration of heavy storm winds was from 4 to 6 hours, reaching maximum velocity during the hour preceding the lull. As the storm struck Lake Okeechobee, the general wind direction was from the northward toward the south end of the lake.

In the southeast section of the lake there is a large pocket known as South Bay. The water throughout South Bay is shallow, varying from a few inches along its edge to 5 to 7 feet at distances of 5 or 6 miles off shore, where the water reached its greatest height during the first phase of the storm. Marks of various kinds on and along the levee indicate that wave crests reached 29 feet. Still water in buildings along and near the levee registered water marks as high as 25.7 feet. During the week ending the day prior to the storm, the elevation of the lake ranged from 16.3 to 16.4 feet. The day following the storm the lake stood at 17.3 feet. Land elevations along this section vary generally from 17.0 to 19.0 feet. Storm waters in the South Bay section of the lake were driven to heights of 12 feet above the then lake level.

Near midnight a lull came, indicating the center or vortex of the storm. This lull lasted 40 to 50 minutes

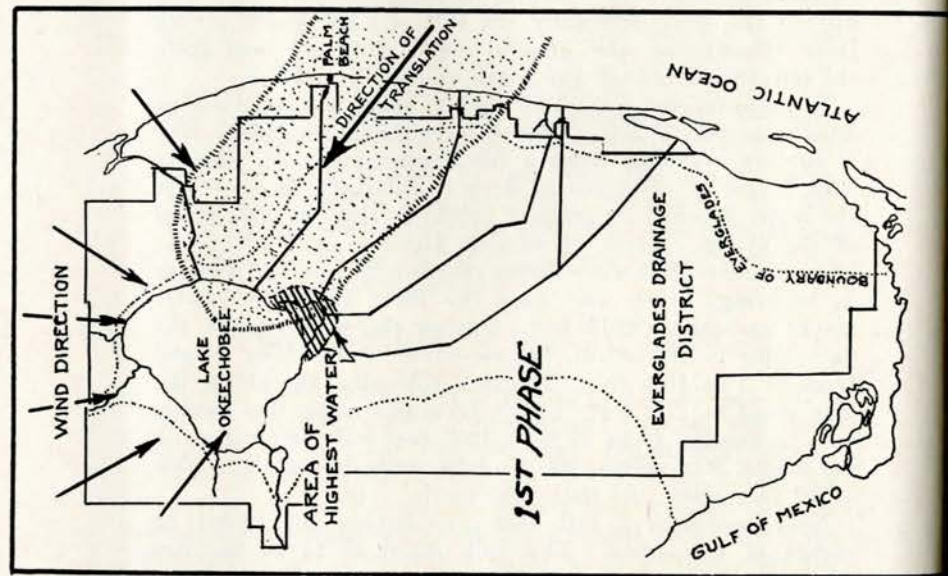


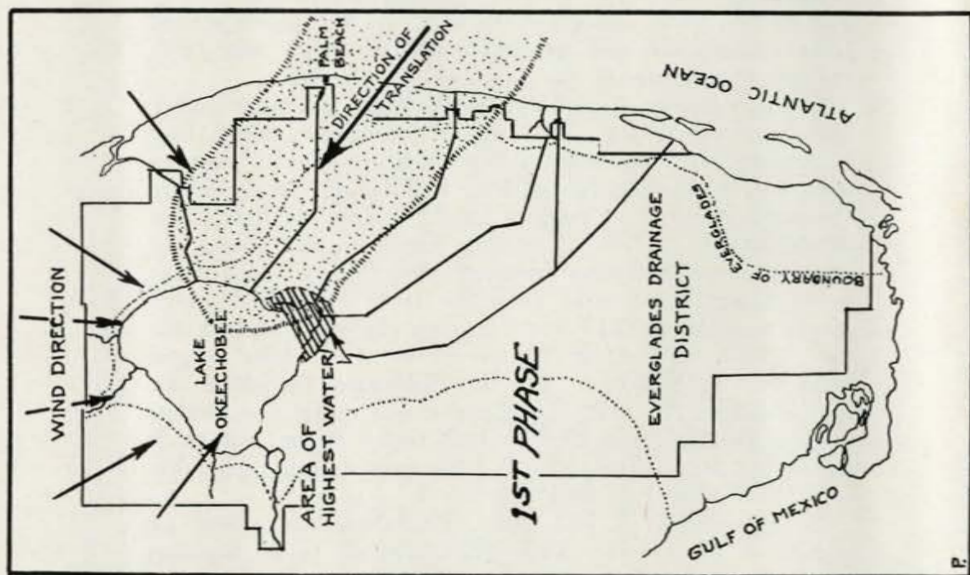
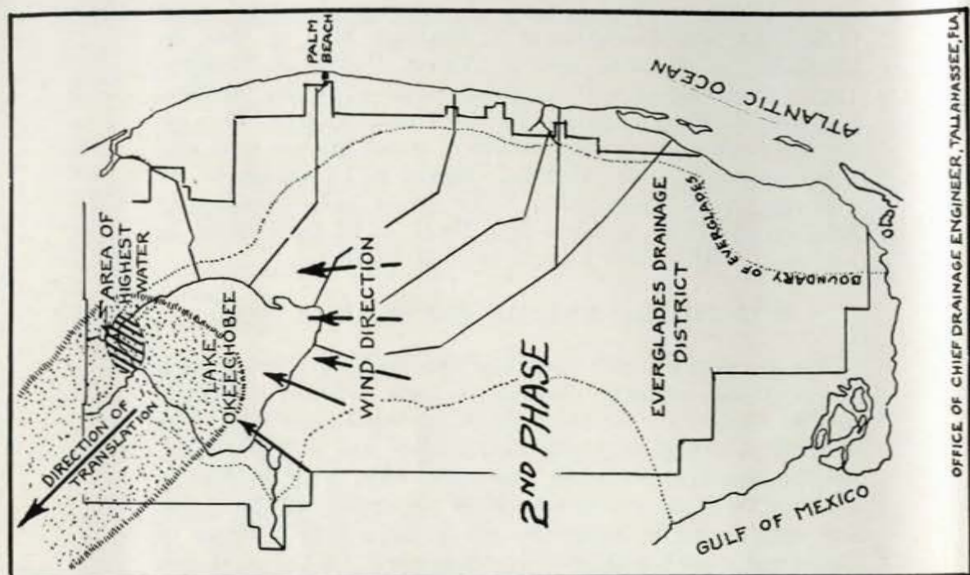
in the east lake section, according to best information. Following this lull, the wind came in with sudden and violent force from the south and slightly southwest. This was the second phase of the storm. The wind from the south promptly shifted the lake crest from the south end to the north end. Indications are that wave crests reached elevation 29 feet at the north end. A water mark inside of a building near the point showing wave crest at elevation 29 feet, registered 26.9 feet. The wind from the south reached its maximum intensity in about 30 minutes to one hour, after which it rapidly subsided. Along the east shore of the lake the water rose from 2 to 4 feet as measured at Canal Point, head of Saint Lucie Canal and vicinity. The accompanying map shows water levels reached during the storm at various points along and near the lake shore and a water stage curve for the two storm phases.

The comparatively slight rise along the East Beach probably results from:

- 1.—The direction of the wind in both phases of the storm was nearly parallel with the east shore line.
- 2.—The long shore line of even configuration.
- 3.—The slope of the shore is much more pronounced over this section of the lake, water to a depth of 8 to 12 feet extending to within 800 to 1000 feet of the shore, permitting undertow to set in, thus assisting in returning the storm-driven surface waters to the body of the lake along the bottom.

Along the entire south shore of the lake there are temporary levees extending generally to elevation 22 to 28 feet. The lower sections of the levees were topped. A few high sections around elevation 29 feet show evidence that the water did not go over these high places. The temporary levee was constructed for the most part of muck, marl and sand, or a mixture of the above and of rock in a few places where rock had been encountered in excavating. Though without riprap protection, considerable reaches of the levee suffered but minor damage. In a few places the levee was breached; in many places the top was washed away to a depth of two to three feet. The section of levee where damage occurred extended from Pelican Point to Miami Canal, a distance of 21.6 miles. The aggregate length of levee damaged to the extent of





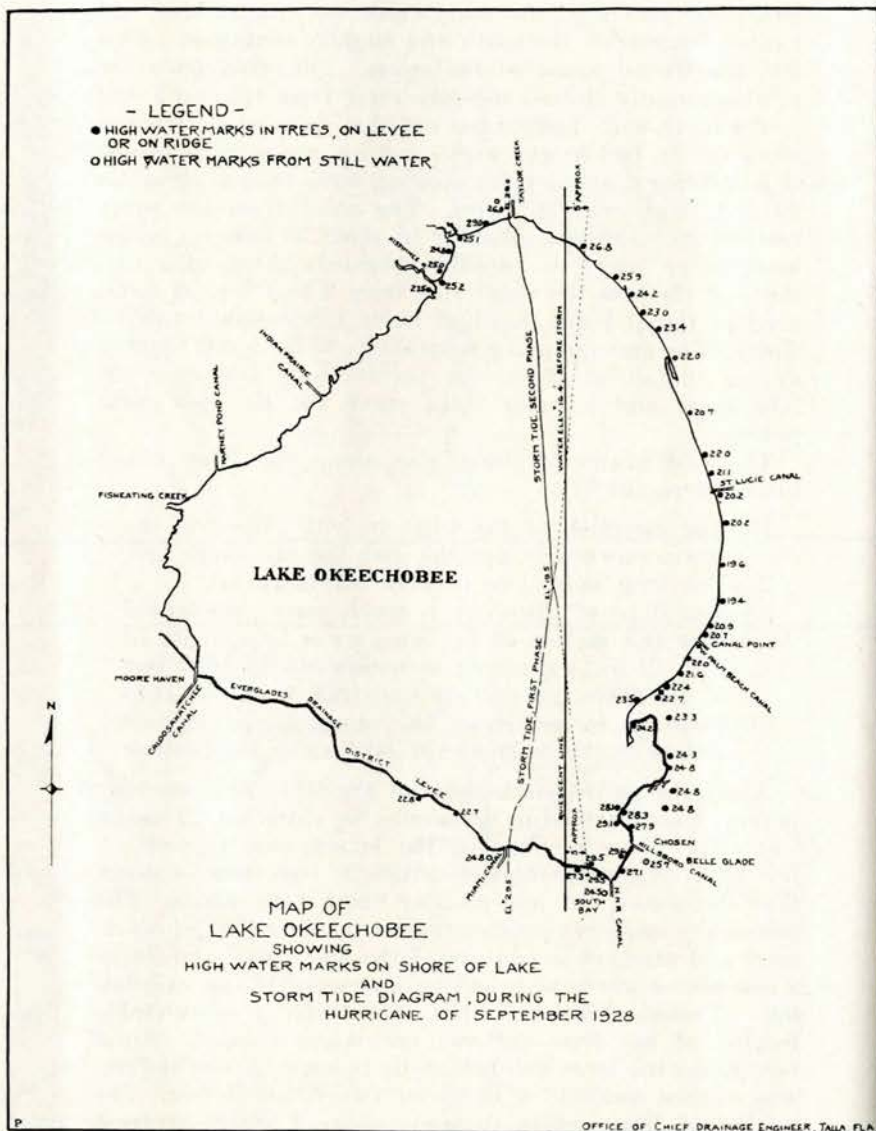
having its crest lowered to elevation 20 feet or below, was 1.7 miles.

With the exception of the levee as above, drainage works of the District, including canals, locks, spillways, and other structures, suffered no serious damage.

The accompanying is a record of the Everglades Drainage District barometer at West Palm Beach during the storm period:

Sept. 15th—	7:00 A. M.—	29.86	
	12:00 Noon—	29.78	
	6:00 P. M.—	29.69	
Sept. 16th—	1:00 A. M.—	29.68	
	4:30 A. M.—	29.64	
	8:40 A. M.—	29.46	
	11:40 A. M.—	29.33	
	2:30 P. M.—	29.04	
Sept. 16th—	5:20 P. M.—	28.20	
	6:00 P. M.—	27.92	
	6:15 P. M.—	27.74	Beginning of Lull.
	6:50 P. M.—	27.70	
	7:00 P. M.—	27.62	
	7:10 P. M.—	27.60	(2 minutes)
	7:30 P. M.—	27.78	End of lull
	8:15 P. M.—	28.08	
	9:00 P. M.—	28.52	
	10:00 P. M.—	28.90	
	11:00 P. M.—	29.07	
Sept. 17th—	12:15 A. M.—	29.22	
	9:00 A. M.—	29.54	
	11:00 A. M.—	29.55	
	5:00 P. M.—	29.60	

The velocity of storm translation was approximately 15 miles per hour, so that equivalent storm periods as between West Palm Beach and the eastern shore of Lake Okeechobee are separated by 3 to 4 hours. The anemometer at Everglades Drainage District station three miles south-east of Lake Okeechobee near Belle Glade failed at an indicated wind velocity of 96 miles per hour. Another instrument located at Canal Point on the east shore is unofficially reported to have blown away when registering 150 miles per hour. General indications in the affected territory would lead to the assumption that the storm of



September, 1928, is comparable in wind velocity to that of September, 1926, where velocities of 132 miles per hour were reported from the Miami section.

Rain catchment during the hurricane period was as follows:

Moore Haven—5.33 inches.

Canal Point—5.82 inches.

Head of St. Lucie Canal—8.96 inches.

The above is purposely referred to as "catchment," for there is little doubt but that our rain gauges did not catch all of the precipitation. The best guide as to rainfall is the two days rise of Lake Okeechobee of 0.9 feet. This rise occurred before water in sufficient quantities began discharging into the lake from its sheds to produce more than 0.2 feet rise. Rainfall on the lake must have amounted to an average of 9 inches, with greater amounts on the east and northeast than on other sections. This was the second extremely heavy rainfall in a single period during the 1928 rainy season, there having occurred in August 13.17 inches of rain from the 8th to 13th. Though not relevant as to the September storm, it may be stated as having effect upon the lake and its watershed that the total rainfall caught at Saint Lucie station (near the center of both storms) for August and September was 35.87 inches, and for nine months of 1928 to September 30th, 65.44 inches, the normal for 12 months being approximately 48 to 50 inches in the lake section. The total for the year was 68.10 inches.

The above description is related in order that conditions prevailing during that storm may be borne in mind in connection with a consideration of:

1. Requirements for levees to resist hurricane-driven waters.
2. Requirements for lake level control.

LAKE LEVEES

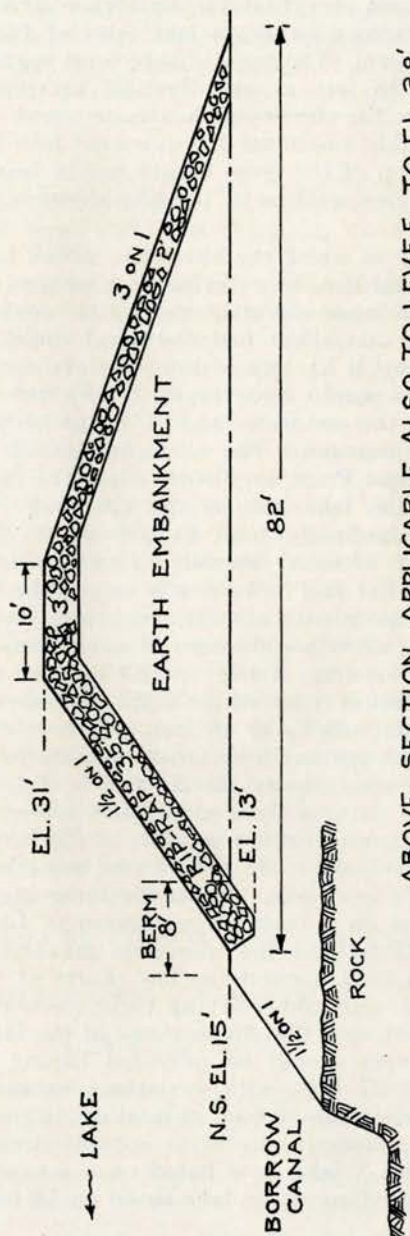
From the above it is shown that both storm crests, that is, the crest during the first phase of the storm on the south side of the lake and that during the second phase on the north side, reached practically the same elevation. Wave crests reached elevation 29 feet in both instances.

The above elevation for hurricane driven waters was attained from a quiescent lake level of 16.4 feet, just before the storm. The basis of lake level regulation was with elevation 18 feet as an allowable maximum. Based on 12 feet as the developed hurricane crest and 18 feet as the allowable maximum for quiescent lake level, it is clear that the top of the levee should not be below elevation 30 feet for those sections of the lake showing necessity therefor. 30

The way in which the hurricane struck Lake Okeechobee and its wind direction during both phases was not such as to disclose what elevation the water would have reached along the east shore had the wind come from the west, hence, there is no way of knowing exactly what elevation the waters would have reached with the wind direction normal to the east shore and of an intensity equal to those of that hurricane. The configuration of the lake shore from Pelican Point to Chaney Bay, the more pronounced slope of the lake bottom and the long even shore line would undoubtedly tend to prevent as high lake level from winds of equal intensities as were attained elsewhere, but just what this difference is or may be there is no way of determining with absolute accuracy. It would scarcely be safe to allow a difference of more than 3 feet. Hence on such allowance, if a levee with its crest at elevation not below 30 feet is required for south shore sections under lake level regulations up to 18 feet, the shore or a levee along East Beach section and other sections of the lake with similar characteristics should not be below elevation 27 feet. The natural shore along such sections is below that elevation, hence if other sections of the lake are to be safe at lake levels up to 18 feet, levees must be built entirely around the said lake. From the foregoing it is therefore stated that on a basis of regulation of Lake Okeechobee, having 18 feet as the allowable maximum level, levees should be built around the low shores of the lake on the north and south sides having their crests not below elevation 30 feet, and that for sections of the lake such as East Beach, levees should be provided having their elevation not below 27 feet, with variations between elevation 27 feet and elevation 30 feet, as local conditions warrant.

As an alternative to levees entirely around Lake Okeechobee with a lake level based on a maximum of 18 feet, is the regulation of the lake based on 16 feet as the allow-

PROPOSED PLAN
FOR
LAKE OKEECHOBEE LEVEE
JAN. 1929



ABOVE SECTION APPLICABLE ALSO TO LEVEE TO EL. 28.

BIENNIAL REPORT, OFFICE OF CHIEF DRAINAGE ENGINEER, TALLAHASSEE FLA

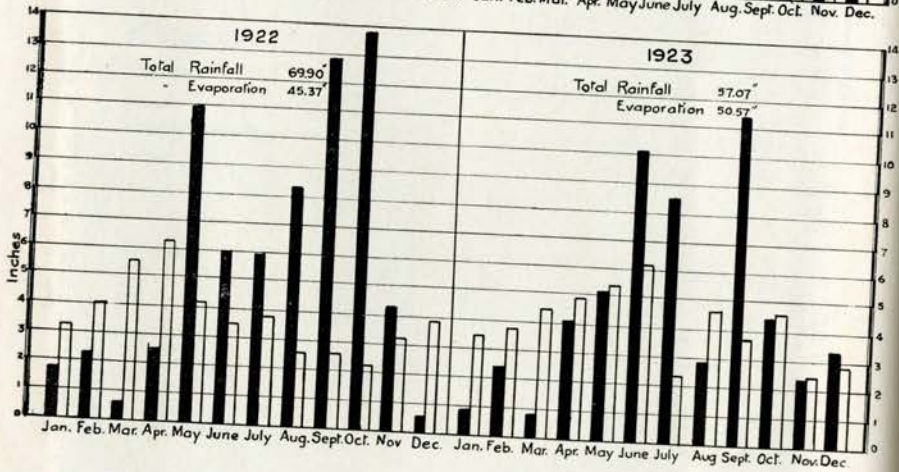
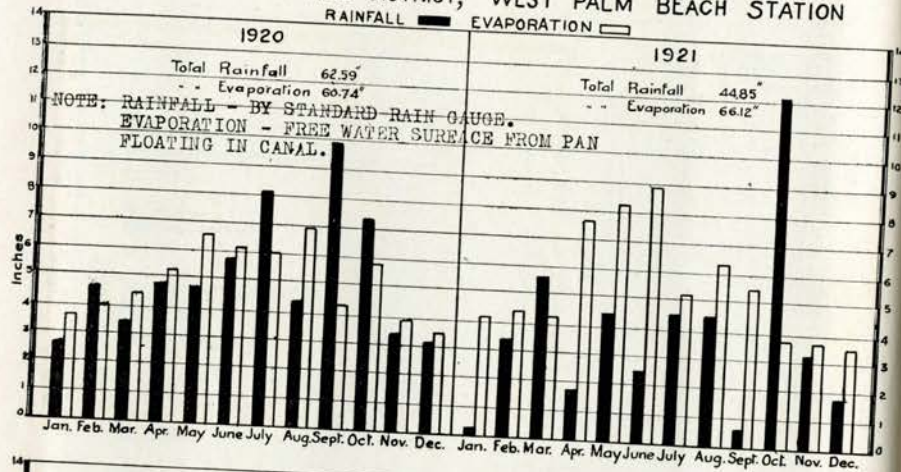
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able maximum, with levees having their crest at 28 feet for the sections along the south shore and part of the north shore, and omitting entirely levees along East Beach where the natural shore line is above elevation 25 feet.

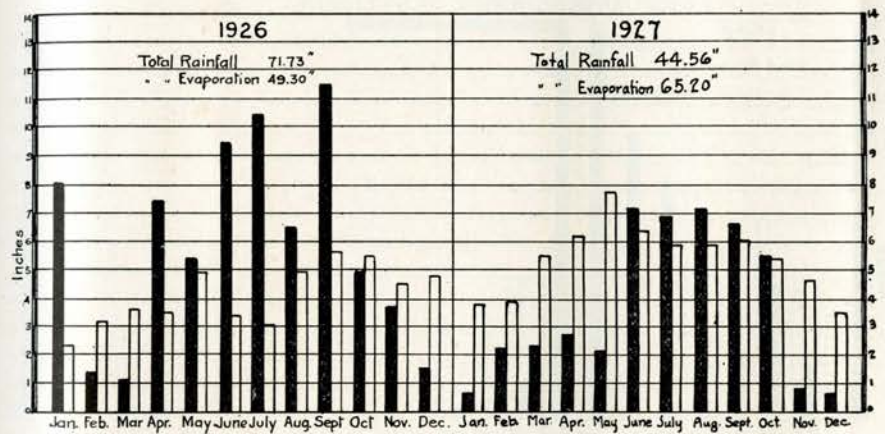
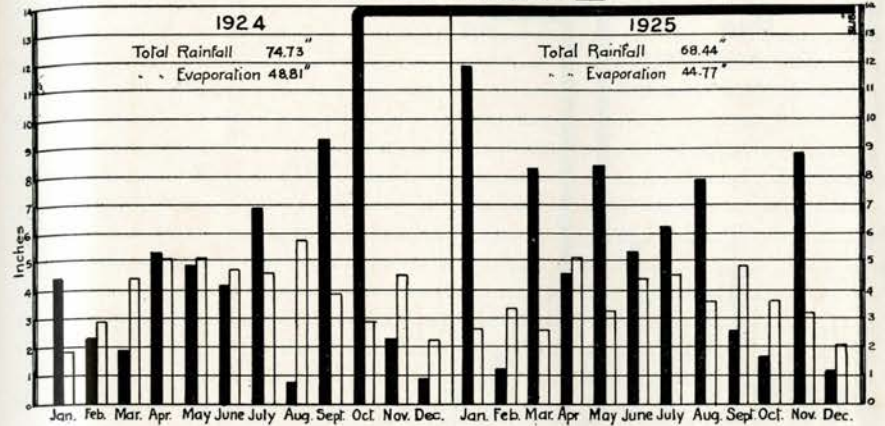
ESTIMATES OF COSTS

1. For levee entirely around the lake on the basis of maximum lake level at 18 feet and levee crest at 30 to 31 feet, \$6,311,000.00.
2. For levees around those sections of the lake where necessary, based upon lake level control at an allowable maximum of 16 feet, and levee crest at 28 feet, \$2,593,000.00

EVERGLADES DRAINAGE DISTRICT, WEST PALM BEACH STATION

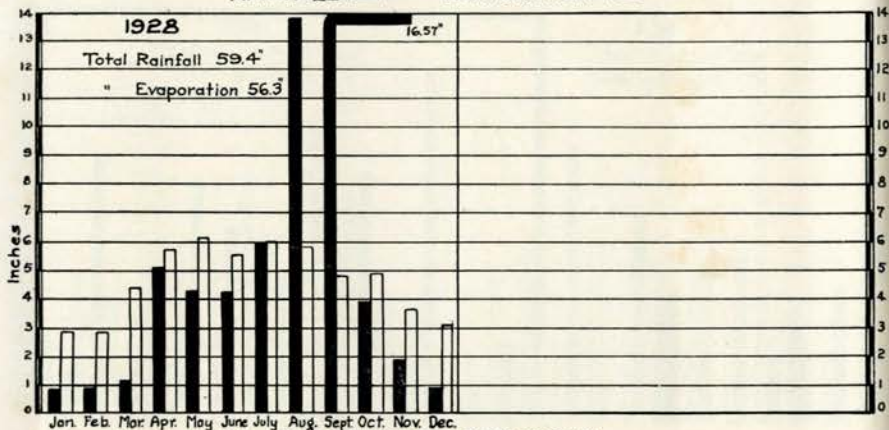


EVERGLADES DRAINAGE DISTRICT WEST PALM BEACH STATION

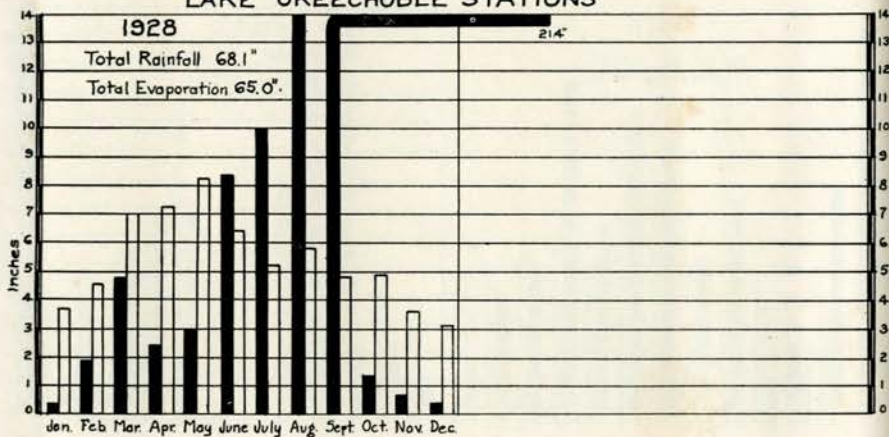


EVERGLADES DRAINAGE DIST. WEST PALM BEACH STATION

RAINFALL ■ EVAPORATION □



LAKE OKEECHOBEE STATIONS



Elevations shown thus (co.) U.S. Engrs. Datum - HW Charlotte Harbor 1882
 118 M.L.W. Gulf of Mexico 1910
 737 From Railway Companies
 41 1/2 Everglades Drainage District Surveys



WATERSHED, NORMAL CONDITIONS	AREA IN SQUARE MILES
1 Fishing Creek and Indian Prairie	880
2 Lake Istokpog	654
3 Taylor Creek	217
4 Kissimmee	2,425
Total Area of Watershed	4,176
Area of Lake Okechobee	730
TOTAL AREA OF DRAINAGE BASIN	4,906

— WATERSHED UNDER FLOOD CONDITIONS —
 Areas 1, 2, 3 & 4 4,176 Sq. Miles
 South Shore Watershed 300
 Lake Okechobee 730
 Total 5,206

OFFICE OF THE CHIEF DRAINAGE ENGINEER
 TALLAHASSEE, FLORIDA 1927

LAKE OUTLETS

Lake Okeechobee is the second largest body of fresh water wholly within the United States. It is nearly circular in form, having an average diameter of about 31 miles and a superficial area of approximately 730 square miles. Its maximum depth with the lake at 18 feet above sea level is 18 feet. The bottom of the lake at its greatest depth therefore is at sea level. Its average depth might be taken at about 8 to 12 feet. The normal elevation of the lake before drainage operations began was 20.5 feet above the sea and usually fluctuated through a vertical range of 2 to 3 feet between high water in the rainy season and low water in the dry season. It occupies a large shallow depression in an extremely flat surrounding country.

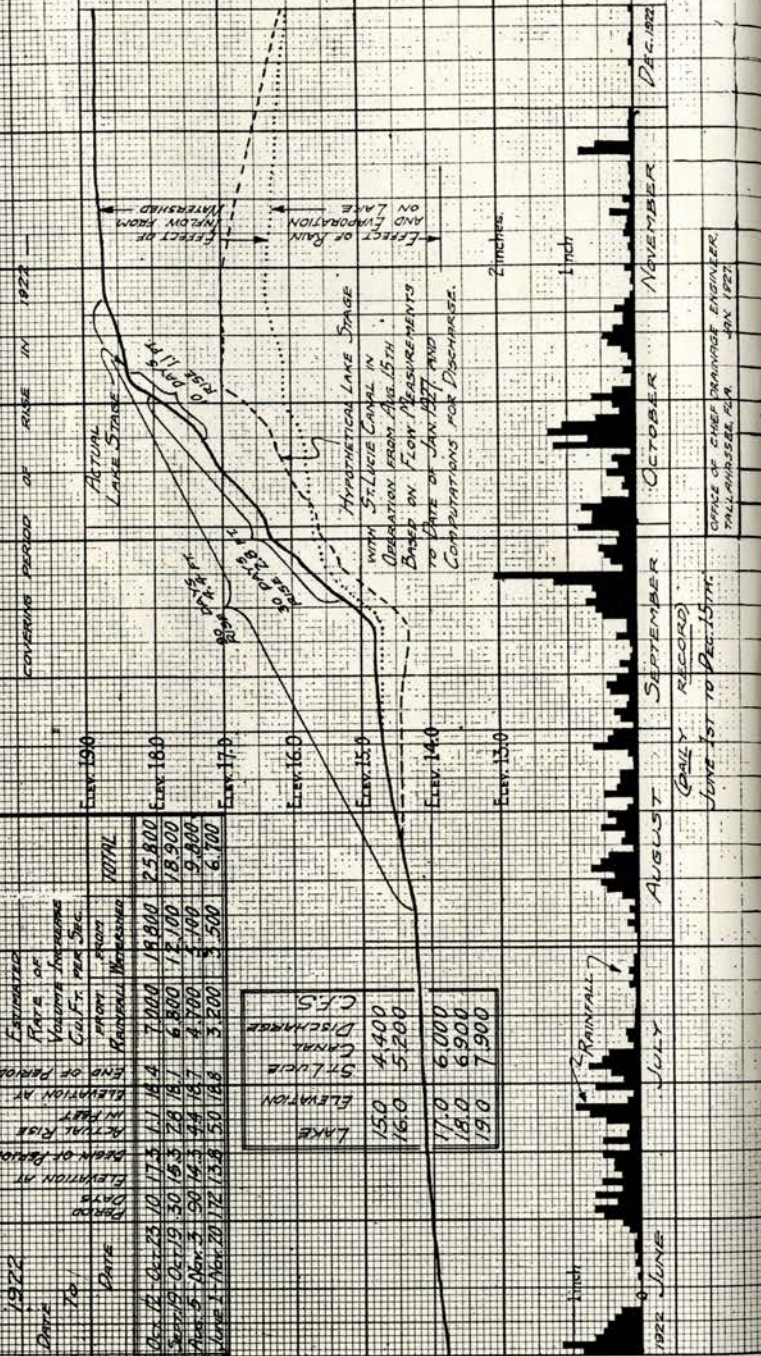
The lake is the catch basin receiving the runoff from its watershed to the northward which has an area of 4,176 square miles. To the above should be added a secondary watershed around the south shore of the lake having an area of 300 square miles, and the lake itself of 730 square miles. The total area as above under flood conditions amounts to 5,206 square miles. The water from the northern watershed finds its way to the lake principally through the Kissimmee River and valley, and also through Taylor Creek, Fisheating Creek and by direct surface drainage not confined within definite channels.

Since storm periods are those of primary importance in connection with flood control, it is necessary to give particular consideration to heavy rainfall as producing high lake levels, which in combination with hurricanes are productive of disastrous floods. Rainfall periods for the years 1922, 1924, 1926, and 1928, are shown in detail on diagrams for those years. The diagrams disclose similar characteristics for each rainfall period, the difference being chiefly of degree, depending on their relative intensity, duration and distribution.

These diagrams largely relate their own stories. Among other things they reflect the value of Lake Okeechobee as a great reservoir within which storm waters may be temporarily stored. Each of these diagrams discloses that during limited periods much larger volumes of water pour into Lake Okeechobee than can be removed within it by discharge outlets capable of being provided within

Lake
Okeechobee

LAKE OKEECHOBEE
RAINFALL AND LAKE STAGE
-1927-

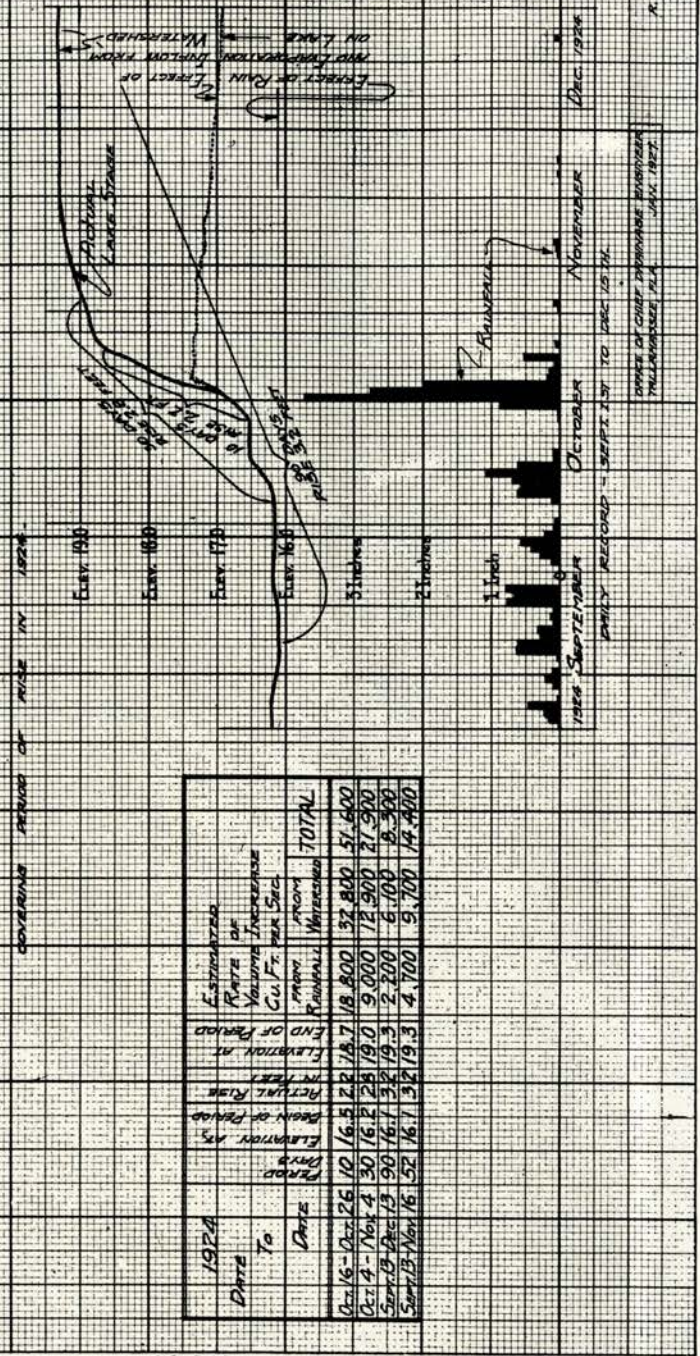


DATE	BEAN OF PERIOD	ELEVATION AT	ACTUAL RISE IN FEET	ELEVATION AT END OF PERIOD	ESTIMATED RATE OF VOLUME INCREASE C.U.F. PER SEC.	CANAL DISCHARGE	RAINFALL FROM WATERSHED	TOTAL
Oct. 12	Oct. 23	17.3	1.1	18.4	7,000	19,800	25,800	
Sept. 19	Oct. 19	16.3	2.8	19.1	6,800	12,100	18,900	
Aug. 5	Nov. 3	14.3	4.8	19.1	4,700	3,700	8,400	
June 1	Nov. 20	13.8	5.0	18.8	3,200	3,500	6,700	

LAKE	ELEVATION	ST. LUCIE CANAL DISCHARGE	C.F.S.
150	4,400		
160	5,200		
170	6,000		
180	6,800		
190	7,900		

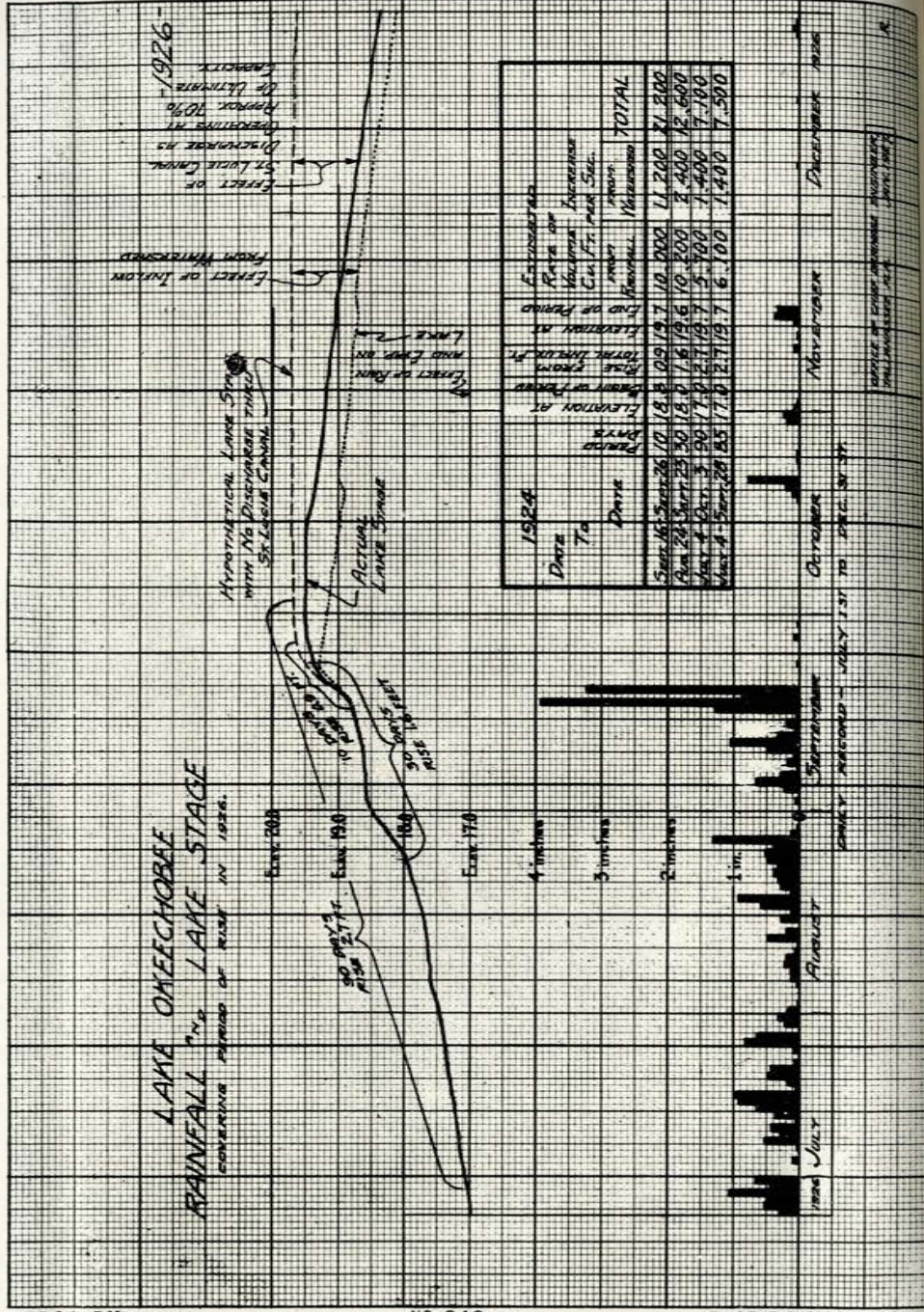
OFFICE OF CHIEF DRAINAGE ENGINEER
PALM-BAY, FLA. JAN 1927

LAKE OKEECHOBEE
RAINFALL AND LAKE STAGE
-1924-



DATE	BEAN OF PERIOD	ELEVATION AT	ACTUAL RISE IN FEET	ELEVATION AT END OF PERIOD	ESTIMATED RATE OF VOLUME INCREASE C.U.F. PER SEC.	CANAL DISCHARGE	RAINFALL FROM WATERSHED	TOTAL
Oct. 16	Oct. 26	16.5	2.8	19.3	18,800	32,800	51,600	
Oct. 4	Nov. 4	16.2	2.8	19.0	9,000	12,900	21,900	
Sept. 13	Dec. 13	16.1	3.2	19.3	2,200	6,100	8,300	
Sept. 13	Nov. 16	15.2	4.1	19.3	4,700	5,700	10,400	

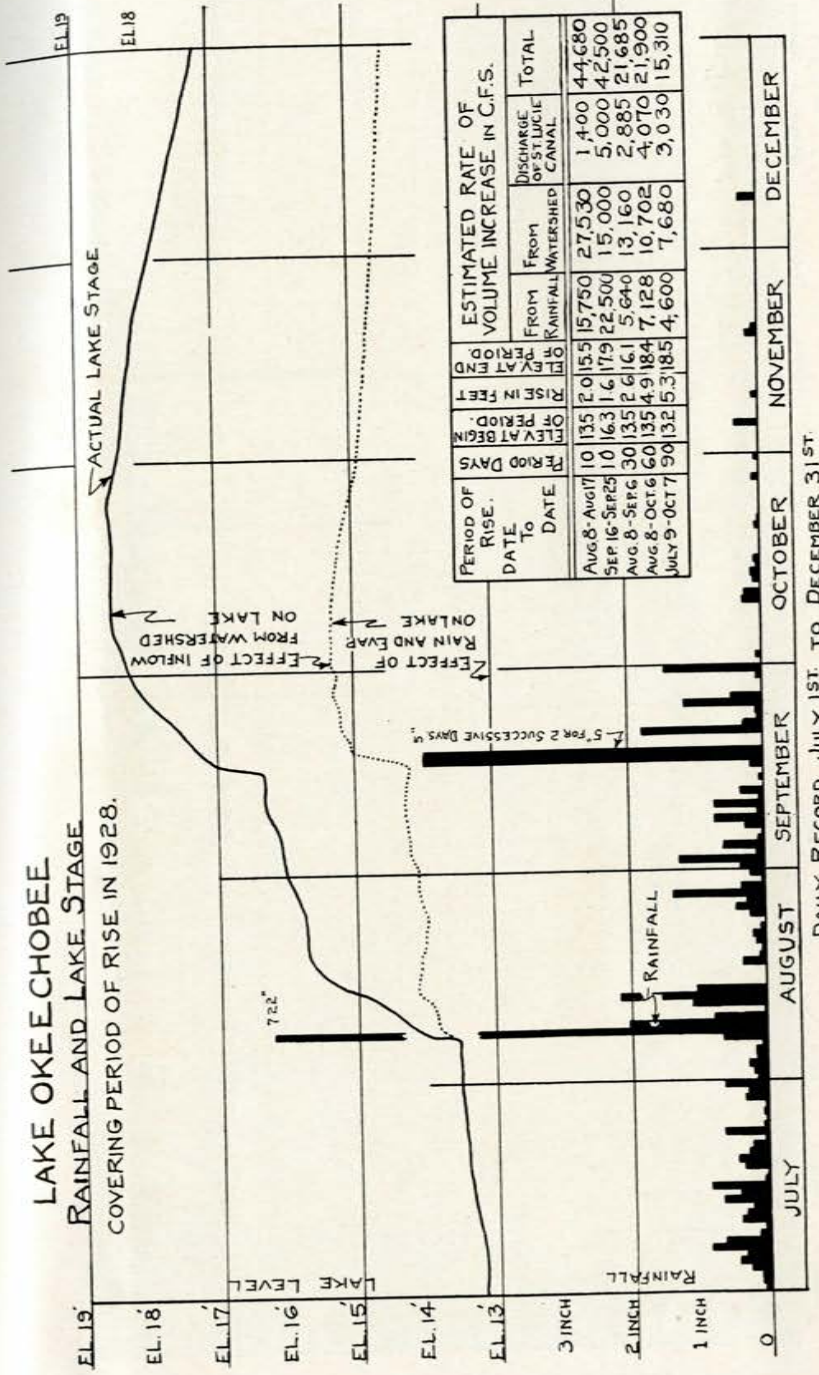
OFFICE OF CHIEF DRAINAGE ENGINEER
PALM-BAY, FLA. JAN 1927



EDCO Efficiency 20 X 20

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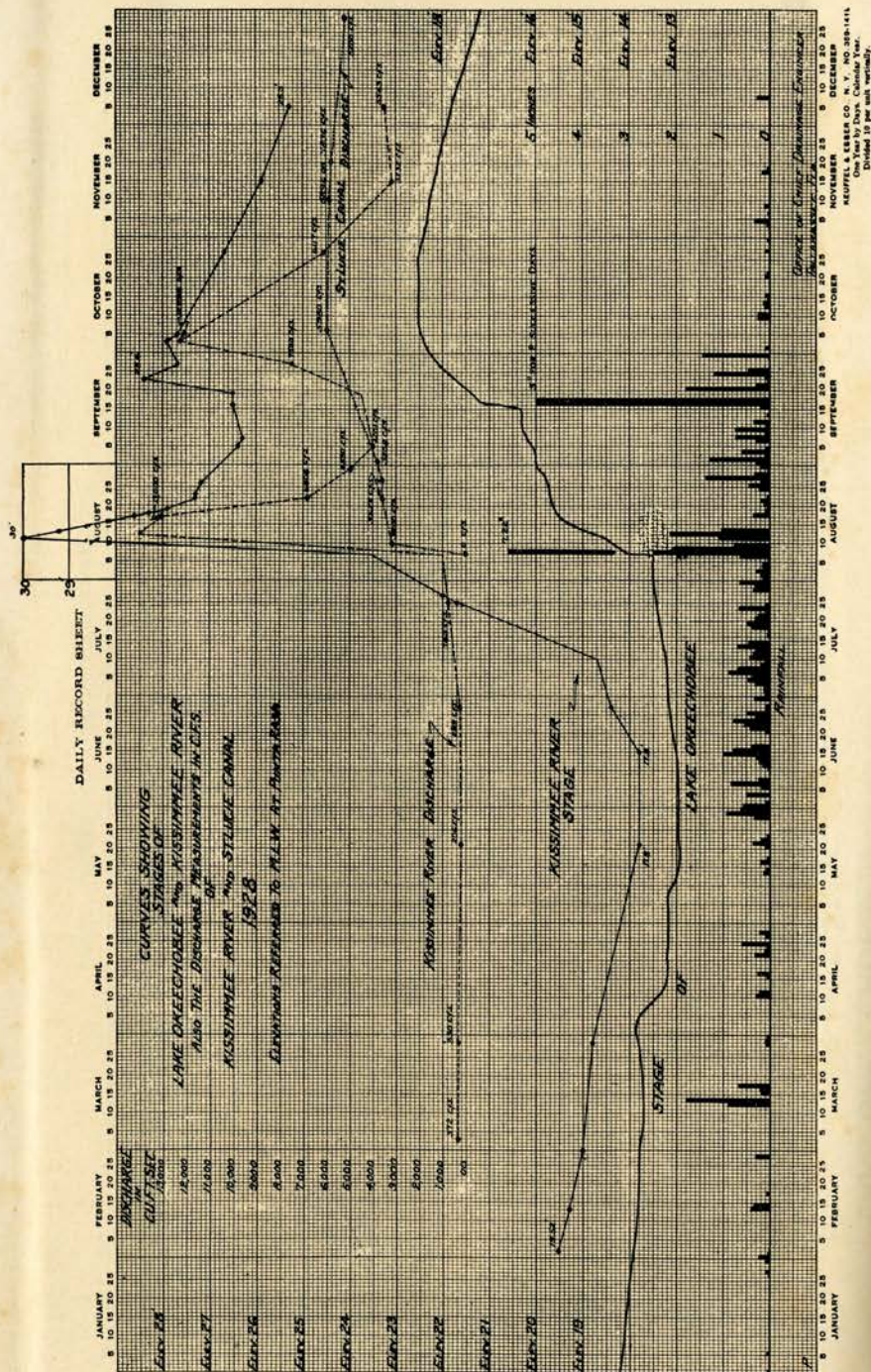
EUGENE DIETZGEN CO Chicago and New York

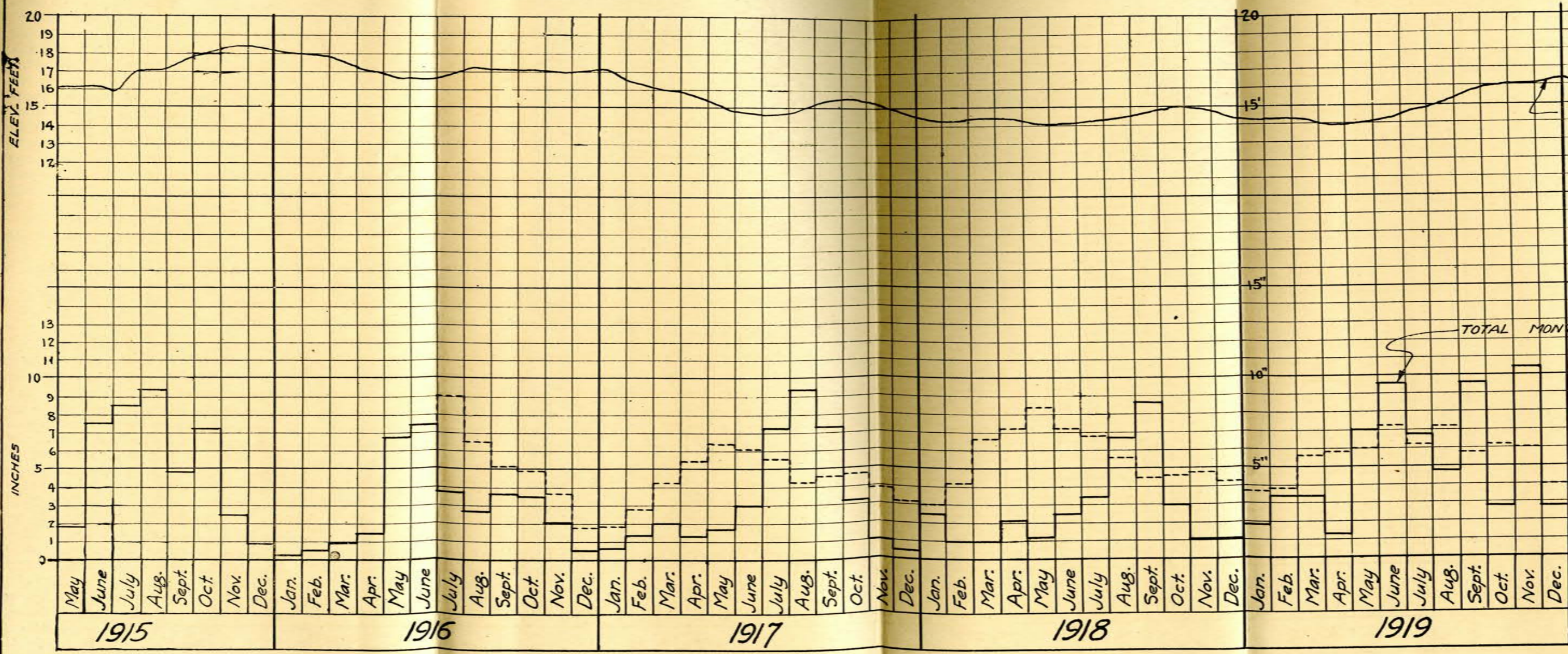


PERIOD OF RISE DATE	PERIOD DAYS	ELEV AT BEGIN OF PERIOD	RISE IN FEET	ELEV AT END OF PERIOD	ESTIMATED RATE OF VOLUME INCREASE IN C.F.S.		TOTAL
					FROM RAINFALL	FROM WATERSHED	
AUG-8-AUG-17	10	135	20.155	15,750	27,530	1,400	44,680
SEP-16-SEP-25	10	163	16.179	22,500	15,000	5,000	42,500
AUG-8-SEP-6	30	135	26.161	5,640	13,160	2,885	21,685
AUG-8-OCT-6	60	135	49.184	7,128	10,702	4,070	21,900
JULY-9-OCT-7	90	132	53.185	4,600	7,680	3,030	15,310

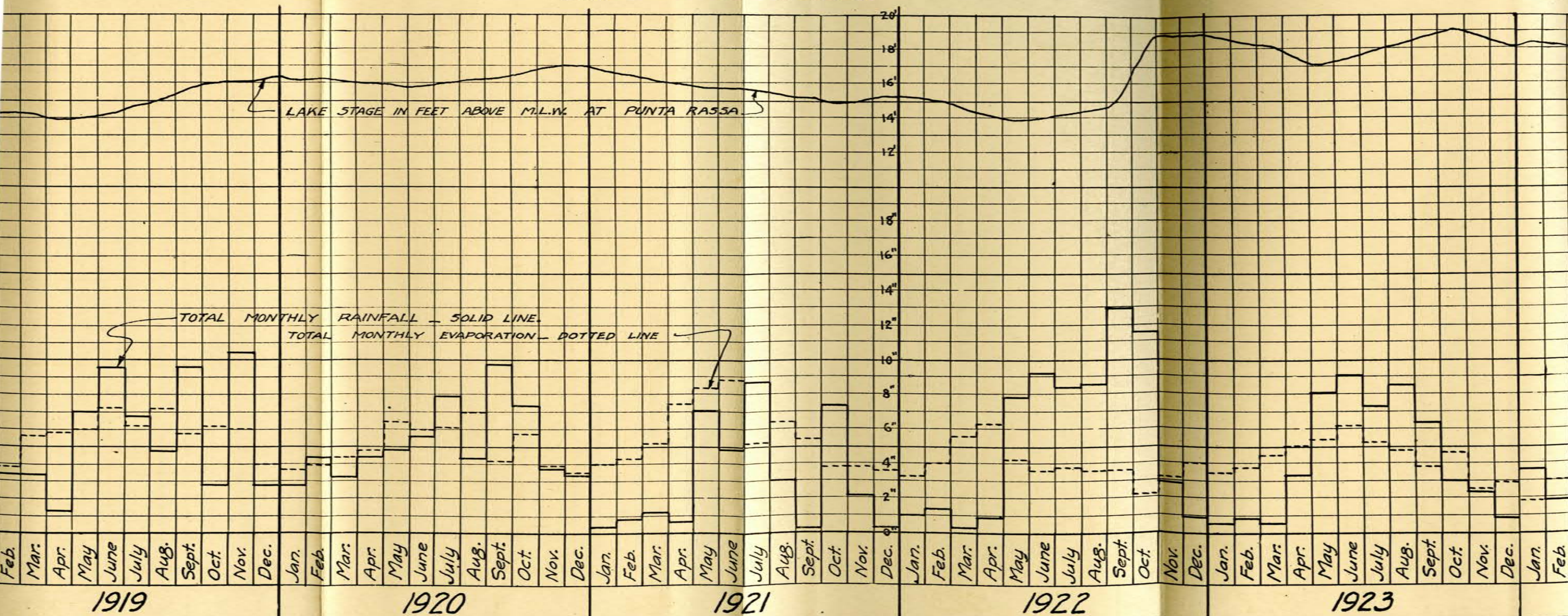
DAILY RECORD JULY 1ST. TO DECEMBER 31ST.

OFFICE OF CHIEF DRAINAGE ENGINEER TALLAHASSEE FLA. JAN. 1928

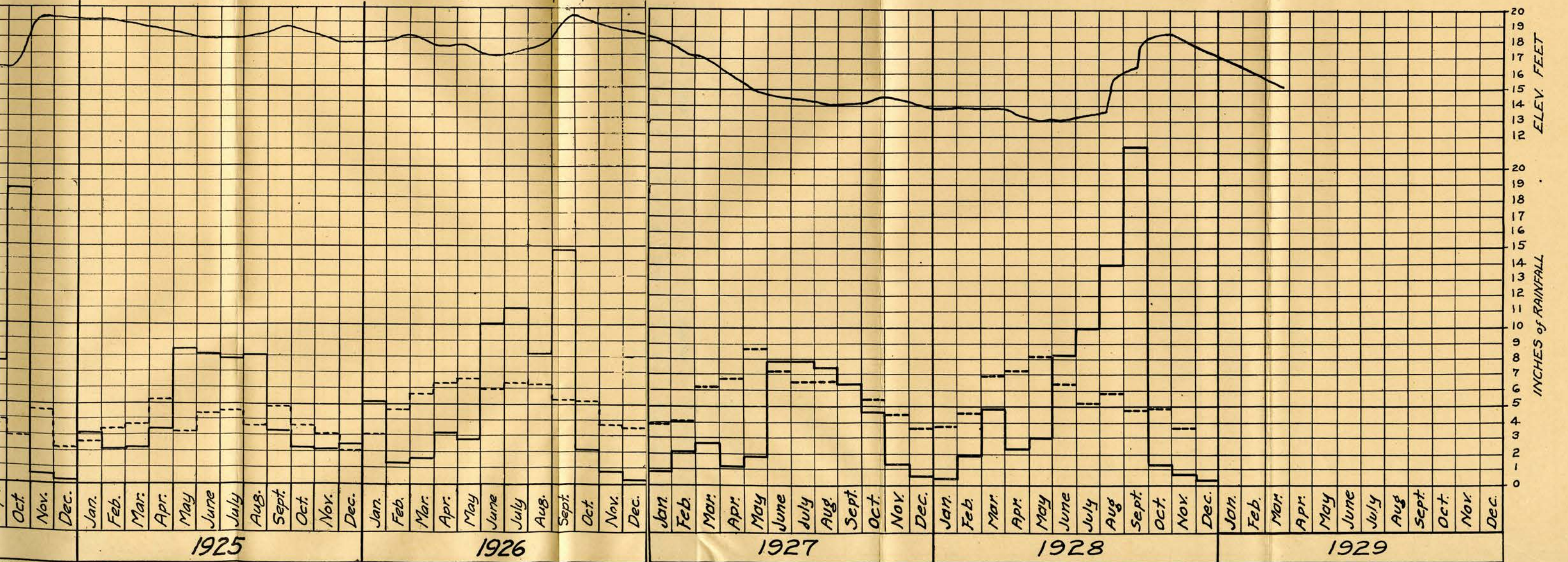




RAINFALL EVAPORATION AND LAKE STAGE LAKE OKEECHOBEE



NOTE:- SAINT LUCIE CANAL Discharge Increased from Approximately 35% in SEPTEMBER to Approximately 65 or 75% in OCTOBER. Note Immediate Downward Trend and Compare with Previous Years.



any reasonable limit of cost. In the year 1922, the average of the 10 day maximum coming into the lake was 25,800 cubic feet per second; in 1924, the quantity was 51,600; in 1926 it amounted to 21,200; and in 1928, a year unlike any preceding in that there were two separate intense rainstorms, there was a maximum 10 day inflow of 44,680 cubic feet per second for the first storm and 42,500 for the second. The Saint Lucie Canal as completed has a discharge capacity of 5,000 cubic feet per second, with lake elevation 17 feet. This discharge capacity to accommodate 51,000 cubic feet per second necessary for holding the lake at an unchanged level at the end of a 10 day period under such conditions, would require 10 canals such as the Saint Lucie at a cost of around \$60,000,000.00. By reason of lake storage it is unnecessary to discharge waters from it at anything like the rate at which it is supplied.

For periods of 90 days water was supplied to the lake at the following average rates:

- 1922— 9,800 cubic feet per second.
- 1924— 8,300 cubic feet per second.
- 1926— 7,100 cubic feet per second
- 1928—15,310 cubic feet per second.

In the above, evaporation losses are accounted for. The total addition to Lake Okeechobee during the 90-day period for 1928 was greater than for any other year of record. The elevation of the lake at the beginning of the 1928 flood period was 13.7. The addition of the above volume to the lake with no lake discharge would have raised its level 6.2 feet, or to elevation 19.9. To have controlled the level of the lake within three feet in 90 days under those conditions would have required discharging from the lake during that time an average of 8,400 cubic feet per second. 5,000 cubic feet per second of that amount has already been provided for through Saint Lucie Canal. The remaining discharge which would have been necessary for holding the lake to a 3-foot rise under the conditions imposed during 1928, would be 3,400 cubic feet per second.

A total discharge from the lake of 7,500 cubic feet per second would have controlled the lake during the storm period of 1928, within a range of 3.4 feet. On August 7th, the beginning of the first storm, the lake was at elevation 13.7 feet. With a total available discharge as above the

lake would have reached elevation 17.1 feet. The elevation actually attained, with Saint Lucie Canal as is, was 18.5 feet.

The Saint Lucie Canal as at present constructed has a discharge capacity from Lake Okeechobee with the lake at elevation 17.0 feet of five thousand cubic feet per second. For providing total discharge capacity of 7,500 cubic feet per second either:

1. Enlarge Saint Lucie Canal to a total of 7,500 cubic feet per second at an estimated cost of \$1,224,000.00 for lake level regulation to 18 feet, or, \$1,474,000.00 for 16 foot level.

Or,

2. Leave Saint Lucie Canal as is and enlarge Caloosahatchee Canal so that its discharge capacity will be 2,500 cubic feet per second at an estimated cost of \$937,600.00 for lake level regulation to 18 feet, or \$1,185,000.00 for 16-foot level for work within the boundaries of Everglades Drainage District.

The second plan requires improvement of Caloosahatchee River west of the boundary of Everglades Drainage District to such extent as will enable the said river to take care of the added water from Lake Okeechobee. This plan is therefore contingent upon some other agency undertaking that portion of the work outside of the Everglades Drainage District. The estimated cost of the same is approximately \$1,500,000.00. Caloosahatchee River is a navigable waterway of the United States and has been the subject of improvement by the Federal government from time to time.

Of the above alternative plans, the preference is for improving the Caloosahatchee Canal and River for the following reasons:

1. The cost of improvement within Everglades Drainage District is less and may be undertaken more economically by the District, provided some other agency undertakes the necessary improvement to Caloosahatchee River outside of Everglades Drainage District.

2. Additional territory will be opened up and benefited by the improvement to Caloosahatchee Canal and River, while the improvement to Saint Lucie Canal will not affect adjacent territory.
3. The improvement to Caloosahatchee Canal and River resulting in a minimum navigable depth of six feet through this channel would afford the remaining connection for a valuable navigable waterway across Florida.
4. Experience during the hurricane of 1926, and 1928, and records of other hurricanes indicate that the paths of maximum disturbance are commonly 35 to 45 miles in width. That the direction of translation of such storms is, in a large majority of cases, from the southeast toward the northwest: that since the Saint Lucie and Caloosahatchee Canal and River have opposite directions more or less at right angles to the usual path of hurricanes and are separated by more than 30 miles between their nearest ends, and greater distances through their further reaches, it is unlikely that any one hurricane will seriously damage both waterways, but that if Saint Lucie Canal is in the path of the storm, the Caloosahatchee outlet will escape, and vice versa. Hence, if one of these waterways received damage which reduces its discharge capacity from the lake, the other will escape and will be intact for serving to its full capacity. Control outlets from opposite sides of the lake are advisable.

Cost of Lake Okeechobee control works to be provided in Everglades Drainage District, based upon lake level up to 18 feet.

LAKE OKEECHOBEE LEVEE (Elevation 31 feet.)
18 foot Basis

	Earth	Rock
South Shore, cubic yards	4,922,000	1,970,000
West Shore, cubic yards	5,632,000	2,505,000
North Shore, cubic yards	1,932,000	630,000
East Shore, cubic yards	1,964,000	1,059,000
Total cubic yards	14,450.00	6,164,000

Cost

14,450,000 c.y. of earth @ 13c	\$1,878,500.00
6,164,000 c.y. of rock @ 60c	3,698,400.00
Total	<u>\$5,576,900.00</u>
Storm Gates at Moore Haven \$ 30,000	
Storm Gates at Taylor Creek ... 30,000	
Improvements to locks 100,000	
Total	<u>\$ 160,000.00</u>
	\$5,736,900.00
Plus 10% for incidentals	573,690.00
Cost	<u>\$6,310,590.00</u>

OUTLETS

(a) Enlargement Saint Lucie Canal 2,448,000 cu. yds. @ 50c	\$1,224,000.00
Protection to Saint Lucie Canal	175,000.00
Plus 10%	139,000.00
Total St. Lucie Plan	<u>\$7,849,490.00</u>
(b) Enlargement Caloosahatchee Canal in District, 3,356,800 cu. yds. @ 26c \$	872,560.00
Improvement to locks and spillways ...	65,000.00
Protection to Saint Lucie Canal	175,000.00
Plus 10%	111,256.00
Total Caloosahatchee Plan	<u>\$7,534,406.00</u>
(c) Including (b) and adding cost of Caloosa- hatchee River outside of District	<u>\$9,034,400.00</u>

Since the District is not authorized by law to undertake works primarily for navigation, the above includes no new channels for developing continuous navigable depths with those works. Additional work for that purpose consisting of Caloosahatchee channel in Lake Okeechobee and channel in Saint Lucie River would cost approximately \$345,000.00.

Based upon lake level up to 16 feet.

LAKE OKEECHOBEE LEVEE—(Elevation 28 Feet)
16 foot Basis

(A) South Shore—Bacom Point to 3 miles N. W. of Moore Haven: Cubic Yards	
Earth	2,883,400
Rock	1,489,900
(B) Bacom Point to Florida East East Coast Railway 1½ miles south of Canal Point:	
Earth	522,000
Rock	215,800
(C) North of Moore Haven and west to Atlantic Coast Line Grade:	
Earth	347,000
Rock	193,000
(D) North Shore:	
Earth	1,647,000
Rock	673,000
Totals—	
Earth	5,399,400
Rock	2,571,700

Cost

5,399,400 cu. yds. of Earth @ 13c	\$ 701,922.00
2,571,700 cu. yds. of Rock @ 60c	1,543,020.00
Total	<u>\$2,244,942.00</u>
Storm Gates all canals (lump sum):	
1 @ 32,000	\$32,000
5 @ 16,000	80,000
	\$ 112,000.00
Total Cost	<u>\$2,356,942.00</u>
Plus 10% for incidentals	235,694.20
Cost	<u>\$2,592,636.20</u>

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OUTLETS

(a) Enlargement Saint Lucie Canal 2,948,000 cu. yds. @ 50c	\$1,474,000.00
Protection to Saint Lucie Canal	175,000.00
Plus 10%	164,900.00
Total Cost St. Lucie Plan	\$4,406,536.20
(b) Enlargement Caloosahatchee Canal in District, 4,308,000 cu. yds. @ 26c	\$1,120,000.00
Improvement Caloosahatchee, 3 locks and spillway	65,000.00
Protection to Saint Lucie Canal	175,000.00
Plus 10%	136,000.00
Total Cost Caloosahatchee Plan	\$4,088,632.20
(c) Including (b) and adding cost of Caloosahatchee River outside of District at \$1,500,000.00	\$5,588,632.20

Since the District is not authorized by law to undertake works primarily for navigation, the above includes no new channels for developing continuous navigable depths with those works. Additional works consisting of Caloosahatchee Channel in Lake Okeechobee and channel in Saint Lucie River for that purpose would cost about \$345,000.00.

The following is a comparison of the two flood control plans outlined above:

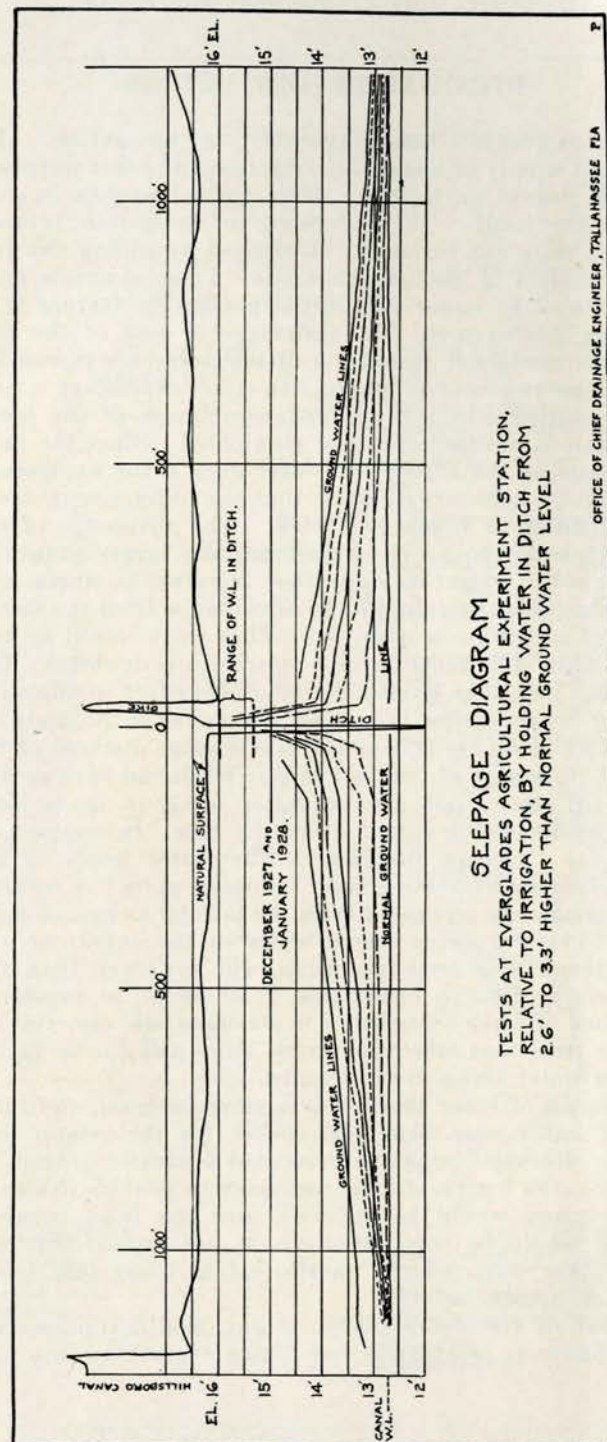
LAKE LEVEL BASIS 18 FEET, LEVEE ELEVATION 31 FEET

ADVANTAGES.—Favorable to navigation. Larger water supply for irrigation and other purposes.

DISADVANTAGES.—Cost \$3,400,000 more than the lower lake level plan. Less favorable to drainage of lands adjacent to the lake. Inherent added danger from high lake levels.

LAKE LEVEL BASIS 16 FEET, LEVEE ELEVATION 28 FEET

ADVANTAGES.—Cost \$3,400,000 less than high lake level plan. Favorable to drainage of lands near Lake Okeechobee. Greater safety due to lower lake levels.

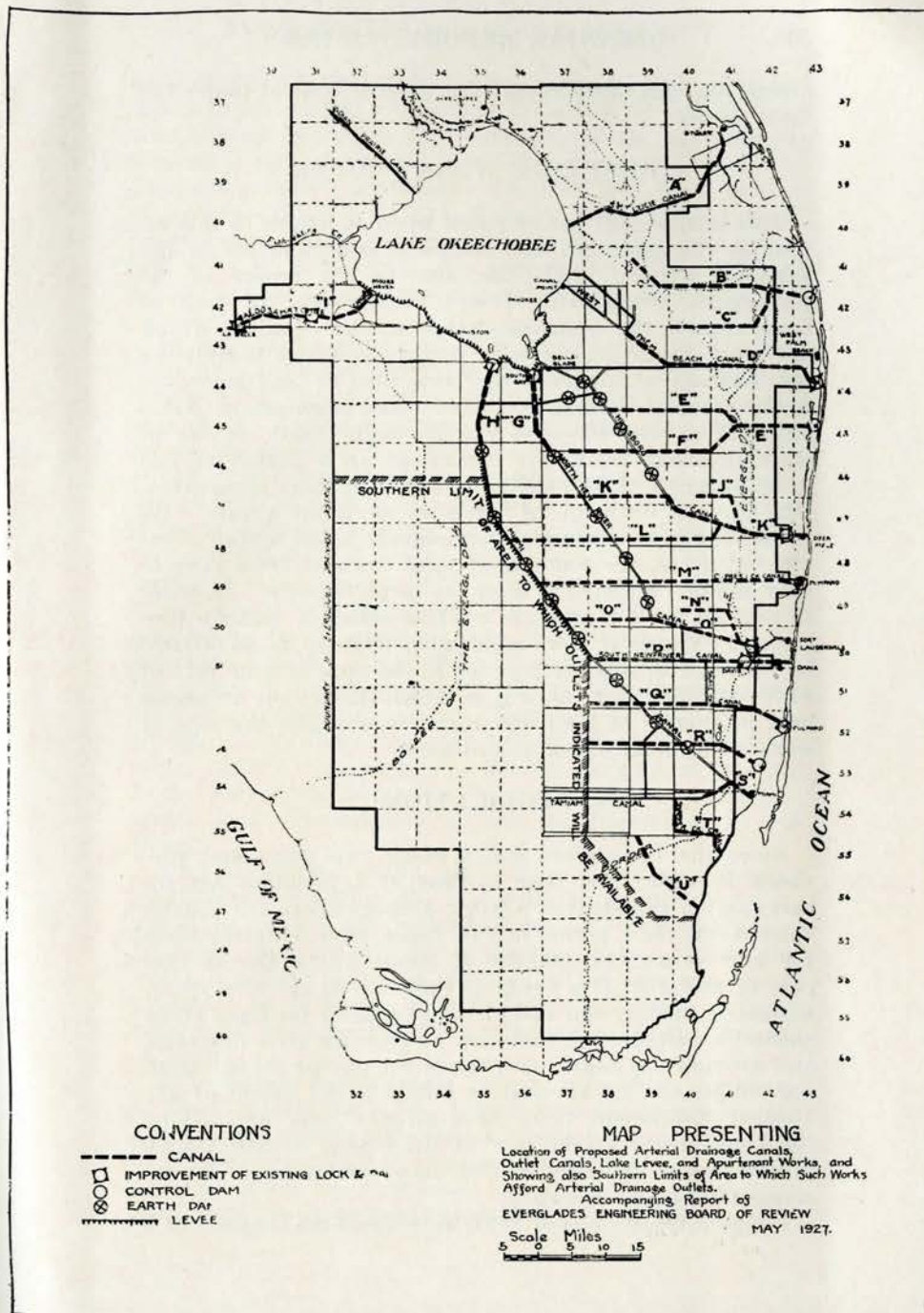


DISADVANTAGES.—Less favorable to navigation. Diminished supply of water for irrigation and other purposes.

With respect to the above items, the comparison in costs speaks for itself. The difference to navigation between the two plans can be largely eliminated by adding two feet to the depths of the lake channels. These channels must be provided in either case if the navigation feature is to be fully harmonized. The difference in cost of the lake channels would not exceed 8% of the difference in cost between the two control plans. In other words, at a cost not exceeding \$350,000 the unfavorableness of the lower lake plan to navigation can be eliminated. Since the chief advantage of the higher lake level plan is for navigation, it would be necessary to show that the difference in favor of navigation is worth \$3,000,000. The advantage of the higher lake level plan in making available larger quantities of water for irrigation and other purposes is worth considering. That there would be advantages from the standpoint of irrigation is conceded. That there would be any worth while difference for other purposes is doubtful. The idea that high lake levels have favorable effect in affording greater fire protection is erroneous except as to the lands immediately along the lake rim within seepage distance of the lake. A difference of two feet in lake levels can have no material influence upon ground water levels in lands more than one-fourth of a mile from the lake. In support of above see "seepage diagram." The water levels in the various canals have far greater influence upon fire control. These canals are separated from the lake by locks and spillways. The prevailing water levels in the canals on the downstream side from the locks will be lower than the level of the lake in either case. It would be expecting too much of Lake Okeechobee to attribute any material influence from that lake upon lands miles away in so far as ground water levels are concerned.

The plan of lower lake levels is more favorable to drainage of lands near Lake Okeechobee for the reason that gravity drainage would be permitted a greater portion of the time, the length of time necessary to provide drainage by pumping would be reduced, and the head pumped against would be less. While it is not argued that the higher lake level plan is unsafe, yet in lower lake levels lies even greater safety.

Either of the above plans, or any modification within those limits, is practicable, but taking everything into con-



sideration, this office favors the plan of control under the lower levels.

DRAINAGE WORK PROPER

This subject will not be dwelt upon at length in this report as the same has had sufficient consideration in the Biennial Report, 1925-1926; also in the report of the Everglades Engineering Board of Review. In both of those reports the recommendation is made that the drainage work be proceeded with progressively by completing the drainage of limited areas from time to time according to the needs of lands for settlement and colonization. Areas aggregating 490,000 acres can be made ready, so far as main drainage works are concerned, in a period of two years at a cost of \$4,000,000. At present there is no necessity for the drainage of lands at so rapid a rate. By proceeding with drainage progressively under a plan of restricted areas, the amount of land drained from year to year can be regulated to meet the needs therefor. In order to provide for a four years working schedule under a progressive system, it is recommended that up to \$4,000,000 be provided to that purpose, or at the approximate rate of \$1,000,000 per year, until it is shown that either an excess or a deficiency of land will result, whereupon the rate of work could be adjusted accordingly.

LEGISLATION

Since the Legislature meets every two years and provision is made from time to time by Legislative Act for carrying on the District's work, arrangements are usually worked out for a period of two years, with tentative plans for four years. \$10,000,000 of bonds will suffice to take care of the District's needs as those needs are now determinable. Such would include flood control for Lake Okeechobee, a suitable schedule for progressive land drainage, and provide the Board with funds for paying its outstanding obligations not covered by bonds to the extent of \$2,100,000. Sufficient taxes have already been imposed by the Legislature to take care of bond issue of \$10,000,000 in addition to the bonded debt now outstanding. No increase in taxes is necessary.

Chapter 12016, Acts of 1927, authorized the issuance of a

total of \$20,000,000 of additional bonds. Under this Act bonds to the extent of \$10,000,000 might be issued from time to time as needed for taking care of the above schedule; or, if more satisfactory, the Act might be amended to limit the proposed bond issue to \$10,000,000; or, if neither of the above plans is deemed advisable, the above Act might be repealed if circumstances justify so doing, and a new law enacted authorizing the issuance of \$10,000,000 of bonds, or such other amount as the board may deem advisable.

In considering works of flood control for the District, there appears probability that the United States will join therein. To what extent is not now known. In anticipation of the United States participating in such work, it would be advisable to secure State legislation specifically authorizing Board of Commissioners of Everglades Drainage District to join and co-operate with the United States in works of flood control for Lake Okeechobee to such extent and in such manner as the said Board may deem advantageous and advisable and to enter into such arrangements or agreement with the United States as in their judgment may be necessary, subject to the limitations of Everglades Drainage District laws, and also carrying authority for the Board of Commissioners of Everglades Drainage District to hypothecate, sell or otherwise dispose of to the United States bonds of Everglades Drainage District, either interest bearing or non-interest bearing, as the said Board may deem advantageous and in such amounts and under such arrangements as may be determined by the Board.

Such legislation would place upon the Board nothing mandatory but would vest in the Board such authority as would be needed for making it possible for Everglades Drainage District to take advantage of the opportunity which favorable action on the part of the Congress would present. In addition to legislation last above outlined must come an Act, also above referred to, for the issuance of bonds.

Anticipating participation by the United States in works of flood control for Lake Okeechobee and assuming the proportion of local contribution which has been suggested by certain Senators and Representatives of Congress based upon precedent in other cases, the set-up for the needs of the District as at present determinable is as follows:

Estimated remaining cost of flood control for Lake Okeechobee, including levees, outlets, and connecting channels	\$10,000,000
Expenditures already made by Everglades Drainage District for flood control and navigation	8,000,000
Total estimated cost	\$18,000,000
Basis Local and State 2/3	\$12,000,000
Less credit already expended	8,000,000
Balance to be provided local and state	4,000,000
Balance to be provided Federal	6,000,000
Therefore, for Everglades Drainage District as previously referred to in this report:	
Flood control for Lake Okeechobee	4,000,000
New drainage work proper (Tentative schedule, 4 yrs.)	4,000,000
Liquidating District's notes	2,000,000
Total	\$10,000,000

If more favorable arrangements with the Federal government than those above outlined can be secured, then so much the better for the district, but at this time it appears advisable for the District to be prepared to the above extent so that when the time comes it will be in position to take advantage of the best arrangement which can be secured from the Congress. By all means the District should be prepared to seize this opportunity for Federal aid when it is presented.

Two questions have been asked by many in the Congress of the United States:

“What part has the State itself taken directly in this enterprise?”

and

“What part can the State (not Everglades Drainage District) take in a possible joint arrangement as between the United States, the Everglades Drainage District and the State?”

The first question is answered later in Part II of this report. The answer to the second will depend on what

action the State Legislature may take, if any, in reference to direct participation on the part of the State in the drainage of the Everglades. That the Legislature will look favorably toward appropriating money from the general revenue, based upon a State millage for that purpose and donating such sum directly to defraying a part of the cost of that work is perhaps unlikely. It may be that the Legislature would view with approval a measure by which the proceeds from a State millage of possibly 1/4 or 1/5 of a mill would be turned over to the Trustees of the Internal Improvement Fund for paying so much as it would of the drainage taxes upon lands of the State. While such would not be in the nature of a contribution to any drainage work, it would greatly assist the Trustees in paying drainage taxes which the law requires the Trustees to pay. Such it is believed might be justified from the standpoint of good business in preserving the lands to the State by permitting such lands to be held till they increase in value by reason of the drainage works for which they are taxed, rather than getting tax money by selling the land piecemeal at low prices prior to their becoming drained. Postponement of sale of such lands until after drainage would result in better prices for them and a better money return to the State. Such provision for tax money would be accepted by the United States as direct State aid.

There is another way by which the State may participate, and without any draft upon the general revenue or resort to a State tax. That is by making available a proper part of the proceeds from lands other than swamp lands toward paying drainage taxes on State owned lands in the Everglades. Information is that the United States would accept such as a State contribution. If so, and the payment is extended over a period of years through the process of annual drainage taxes supporting bonds of the District as is proposed, there would be forthcoming funds from such source therefor. Drainage taxes on State lands are now paid out of proceeds of the sale of swamp lands. The United States will not credit as a State contribution proceeds of the swamp and overflow lands because these lands were granted to the State by the Federal government for that purpose and with the specific condition in the grant that the proceeds thereof be applied to that purpose. The other lands referred to include those which the State owns

in its sovereign capacity, such as lake bottom lands, tidal and submerged lands to such extent as the proceeds therefrom have not been otherwise appropriated by statute. The application of proceeds from other lands to the payment of drainage district taxes on the Trustees' swamp lands in the Everglades, as above stated, will be accepted by the United States as actual State participation. Legislative authority to the Trustees to apply such funds to the payment of drainage taxes on their swamp lands and partly to a district sinking fund would provide a way by which the State could participate directly without a State tax or without draft upon the general revenue of the State.

Such methods of State participation is by way of suggestion to the Trustees and to the Drainage Board for their consideration. Participation by the State in the Everglades would strengthen the whole situation and assist in influencing the Federal government to participate also. It would remove the question coming from Washington as to the why of the propriety of Federal aid for the Everglades while Florida withholds State aid from that undertaking.

PART II

Part II deals in a brief historical way with the Everglades as they came to the State from the Federal government, as Everglades Drainage District was created by State law out of a part of the Internal Improvement Fund Lands and other lands, as the District has operated as a governmental unit, and as the reclamation of the area has developed along economic lines, showing by periods of years its progress and changes as collateral to and as resulting from drainage.

The advancement of the District is shown by its increase in population, enhancement in property values, progress in agriculture, in the construction of roads, railroads, telephone and telegraph lines, and its development along divers lines. Reference is made to the progressive increase in the security of the District as related to its bonded debt; to district drainage taxes supporting the District's bonds; and to other subjects having bearing upon the District as it evolved from its former condition of practically watery waste through its transformation in part to a land of homes, farms, municipalities or communities, having the various advantages and conveniences of modern civilization, and with its accompanying problems.

The subject is touched upon in its principal or important features only. High lights are brought out. Details, even though significant and taken as a whole of great importance, are purposely omitted.

Statements of facts are in most cases accompanied by reference to the authority upon which such statements are based. Frequent quotations have been made from the official records of the Trustees and of the Drainage Board as being the best evidence of their official acts. Conclusions and opinions, where given, are supported by documentary or other reliable evidence for which references have been freely given to admit of full verification, and with all, the subject is treated as briefly as seems practicable.

GENERAL

HOW FLORIDA CAME INTO POSSESSION OF ITS SWAMP AND OVERFLOWED LANDS

By Act of Congress approved September 28th, 1850, known as the "*Swamp and Overflowed Land Grant Act*,"

there came to several States of the Union by grant from the Federal government under the said Act, certain lands designated as Swamp and Overflowed Lands. Among the states authorized to receive lands under the above grant was Florida, and under the said Act there have come to this State from time to time by patents an aggregate of 20,424,972.87 acres of swamp and overflowed land, among which are the Everglades. (See Biennial Report, Commissioner of Agriculture, July 1, 1928.) The Act of Congress above referred to attached a condition to the grant in the following language:

(9 U. S. Statute L 519-520.) "that the proceeds of said lands, whether from sale or by direct appropriation in kind, shall be applied exclusively as far as necessary, to the purpose of reclaiming the said lands by means of levees and drains aforesaid."

For the purpose above defined were the lands granted to the said States.

The Act of the Legislature of Florida in reference to the lands thus granted to the State under the Act of Congress as above, may be found under Chapter 610, Laws of Florida, approved June 6th, 1855. The introduction of the Act is in the following language:

"WHEREAS, the Constitution of this State declares that a liberal system of internal improvements being essential to the development of the resources of the country shall be encouraged by the government of this State, and it shall be the duty of the General Assembly as soon as practicable to ascertain by Law proper objects of improvements in relation to roads, canals and navigable streams and to provide for a suitable application of such funds as may be appropriated for such improvements."

Section 16 of the above Act contains the following:

"That the Trustees of the Internal Improvement Fund shall hereafter fix the price of the public lands included in the trust * * * and shall make such arrangements for the drainage of the swamp and overflowed lands as, in their judgment, may be most ad-

vantageous to the Internal Improvement Fund and the settlement and cultivation of the land * * *"

The above was the official expression of the State through the Legislature of the acceptance of the grant from the United States to the State. Thus Florida in accepting the grant and the lands inuring thereunder, accepted the conditions attached thereto, and as between two sovereign powers, was bound by the same. Pursuant to the Act of Congress as above and the Act of the Legislature just referred to, in March 1903, preliminary steps were taken by Honorable W. S. Jennings, Governor of Florida, toward securing for the State the swamp and overflowed lands known as the Everglades. (Message of Governor W. S. Jennings to the Legislature of Florida relative to reclamation of Everglades, April 7, 1903.) Formal application for patent was submitted to the United States on April 6th, 1903, (See Patent No. 137) and pursuant to above application there was issued by the Federal government to the State of Florida said Patent No. 137 dated April 29, 1903, conveying title in fee simple to the lands comprising the Everglades, embracing an estimated aggregate area of 2,862,080 acres.

The description of the lands covered by the patent was by metes and bounds. Within these metes and bounds all sections numbered 16 not otherwise conveyed had previously inured to the State School Fund by Act of Congress, March 3rd, 1845.

THE STATUS OF SWAMP AND OVERFLOWED LANDS AND THEIR ADMINISTRATION BY THE STATE

By Chapter 610, Laws of Florida, Acts of the Legislature approved January 6th, 1855, entitled "An Act to Provide for and Encourage a Liberal System of Internal Improvements in This State," the lands which had theretofore come and thereafter to inure to the said State from the United States by Act of Congress of September 28, 1850, were "set apart and declared a distinct and separate fund to be called the Internal Improvement Fund of the State of Florida," and "said lands and all the funds arising from the sale thereof . . . are hereby irrevocably vested in five trustees, to-wit: The Governor of this State, the Controller of Public accounts, the State Treasurer, the Attorney General, and Registrar of State Lands (Commissioner of Agriculture), and their successors in office."

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The administration of the Internal Improvement Fund was provided for under the above Act and the said Act makes reference to "proper objects of improvement in relation to roads, canals, and navigable streams, and to provide for a suitable application of such funds as may be appropriated from such improvements."

In accordance with the foregoing law known as "*The Internal Improvement Fund Act*," the Trustees have administered the fund to the present date.

In 1901 the Trustees began a more definite policy of administering the lands of the fund with respect to drainage. As a result of the same, suits were instituted in 1902 by land claimants under statutory grants to require the Trustees to make specific conveyance under these legislative land grants and to restrain the Trustees from applying the lands or the funds therefrom to their drainage and reclamation. (See Everglades of Florida, Senate Document 89, 62nd Congress, Pages 12 and 13.)

Question having arisen as to the status of these lands with respect to drainage and the duties and powers of the Trustees in reference thereto, the said Trustees adopted on November 21st, 1904, a Resolution setting forth their policy in reference to the swamp and overflowed lands of the State and their interpretation of their powers and duties regarding the trust fund irrevocably vested in them under the Internal Improvement Fund Act. A part of this Resolution is as follows:

"(1) That the Trustees adhere strictly to the provisions of the Act of January 6, 1855, Chapter 610, Laws of Florida, as to their powers and duties and the purposes for which said trust was created, and that they will assert their rights and defend the title to the lands granted and irrevocably vested in them for the purpose therein set forth, of reclaiming said lands by means of levees and drains."
(See Minutes of Trustees, Volume 7, Page 267.)

The outcome of the suits referred to briefly was, "that said Trustees shall have the right to sell or otherwise dispose of said lands . . . for the purpose of using the proceeds for purposes of drainage and reclamation . . ." The above is covered in an order of the United States Court, May 2nd, 1907. Thus the contention of the Trustees of the Internal Improvement Fund "has been expressly sustained by the

courts and does not appear to be longer a question of controversy." (See Minutes of Trustees, Internal Improvement Fund, Volume 7, Page 536, and 59 Florida 648.)

The foregoing deals generally with the swamp and overflowed lands granted to Florida by the Act of 1850 and their administration as a whole throughout the State.

EVERGLADES DRAINAGE DISTRICT 1905 to 1913

CREATING THE DISTRICT INTO A GOVERNMENTAL UNIT.

The Everglades, as differentiated from other lands of the fund, may now be taken up.

The first drainage law was passed by the Legislature of 1905, approved by the Governor May 27th. This law created a "*Board of Drainage Commissioners*" with authority "to establish drainage districts and to fix the boundaries thereof in the State of Florida" and "levy thereon an acreage tax not exceeding 10 cents per acre per annum," and authorized and empowered the said commissioners "to establish a system of canals, levees, drains, dykes and reservoirs . . . to drain and reclaim the swamp and overflowed lands within the State of Florida." (Chapter 5377, Acts of 1905.)

The United States Court ruled against the constitutionality of the above law. (See Senate Document 89, 62D Congress, 1st Session, page 15.) In 1907 the Legislature passed an amendment, approved May 28th (Chapter 5709, Acts of 1907), curing the defects of the 1905 Act. This Act as amended was sustained by the decision of the United States Circuit Court and the United States Circuit Court of Appeals, and the litigation arising under the former Act was settled. By the Act as amended, the Legislature itself specifically created "*Everglades Drainage District*," defined its boundaries, levied an annual tax of 5 cents per acre upon the lands of the District, and authorized the use of the proceeds of the said tax for draining and reclaiming the lands within said District. Under this Act the "*Board of Drainage Commissioners* instituted the work of draining and reclaiming the Everglades."

Thus it will be seen that in respect to the Everglades the condition attaching to the grant under the Act of Congress of 1850 "that the proceeds of said lands, whether

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1907

from sale or by direct appropriation in kind, shall be applied exclusively so far as necessary, to the purpose of reclaiming the said lands by means of levees and drains aforesaid," have been and are being complied with. Florida has kept the faith and the Everglades "come with clean hands" to their development.

DRAINAGE OPERATIONS IN THE EVERGLADES

Actual operations in the Everglades may be considered as having begun when there was "caused to be constructed the dredge Everglades which was launched at Fort Lauderdale, on the 4th day of July, 1906. Also the Dredge Okeechobee which was launched during the month of October, 1906." (Senate Document 89, page 16.) Also, in reference to Dredges Caloosahatchee and Miami, launched in 1908 and 1909. (See Minutes of the Trustees of the Internal Improvement Fund, Volume 7, page 293.)

The above dredges, operated by the Trustees and Drainage Commissioners, carried on the work of drainage in the Everglades till July 1st, 1910, when dredging operations directly by the District were discontinued and superseded by award of contract for all excavation, including the sale of the dredges, to a dredging contractor. The work performed from the beginning in 1906 till July 1st, 1910, by the District is represented by the following:

Name of Canal	Miles Excavated
North New River Canal	11.19
South New River Canal	13.64
Miami Canal	4.25

(See report Chief Drainage Engineer to May 1st, 1911, Senate Document 89, page 200.)

The work above is represented by a total excavation of 3,848,000 cubic yards of material. (See Minutes of Trustees of the Internal Improvement Fund, Volume 8, page 637.)

Note.—The foregoing omits mention of Caloosahatchee Canal, re-dredging old Disston Cut, 15 miles, but the excavation for the same is included in the statement. The above estimate of excavation appears to be approximately 168,636 cubic yards in excess. The quantity ascertained by the engineer's office is

3,679,364 cubic yards, which quantity is shown by the canal statement as the total excavation from July, 1906, till July, 1910.

During this period sale of Everglades land was greatly stimulated and land values enhanced by the drainage work. In 1908, the Trustees sold Everglades land at \$1.25 per acre. (Minutes of Trustees, Volume 8, page 163.) "A conservative estimate of the increase in the value of Everglades land may be obtained by comparing the price of \$2.00 per acre realized by the State for the sales prior to 1909 with the price of \$15.00 per acre obtained by the State for lands sold in 1910." (Senate Document 89, page 17.)

In 1910 the Trustees of the Internal Improvement Fund and Board of Drainage Commissioners entered into contract, said contract becoming effective July 1st, 1910, for the excavation of four canals requiring the removal of an estimated aggregate amount of 19,000,000 cubic yards of earth and rock for their completion. Work under this contract began in July, 1910.

From 1906 until 1913 funds for prosecuting the drainage work were derived from two sources as shown by the records as follows:

"First, the Everglades lands proper owned and controlled by the Trustees of the Internal Improvement Fund, who are authorized and fully empowered under the Act of January 6th, 1855, to sell such lands and apply the proceeds thereof to the purpose of drainage and reclamation."

and

"Second, the new and additional source of revenue provided by the enactment of the Drainage Law (1905 amended in 1907) which assesses a tax on the area included in the District of 5 cents per acre per annum, furnishing an annual net revenue of approximately \$200,000.00."

During this period, as has been shown, funds for carrying on the drainage work were provided partly from the sale of State land and partly from Everglades Drainage

District taxes levied on the lands of the District. The Everglades tax was at the rate of 5 cents per acre per annum. The assessment amounted to an average of \$215,-656.00 per annum for the six years, 1907, to 1912, inclusive.

From 1906, to July 1st, 1913, work in the Everglades comprised in principal part the opening of 225.4 miles of main drainage canals, representing the excavation of 18,-871,364 cubic yards of earth and rock, the construction of two concrete locks and dams, and the carrying on of drainage surveys and investigations. The total cost of the work to July 1st, 1913, was, in round figures, \$1,836,000.00. At the beginning of drainage operations in 1907 to 1909, it was shown that State lands in the Everglades sold for \$1.25 to \$2.00 per acre on an average. The population of the District taken from the United States census, 1910, was 1,492, the greater part of which was along the coast from Coconut Grove south. In 1913 the Trustees sold 10,634.22 acres of State land at an average price of \$15.45 per acre. (Report of Commissioner of Agriculture, land sales 1913.) The area of the District in 1913, to which the drainage tax applied was 4,313,120 acres. On the basis of land values represented by State land sales at \$2.00 per acre in 1908 and 1909, the District had a land value of \$8,-626,240.00. In 1913 based upon land values as indicated by State land sales for that year, the District had a land value of \$66,647,704.00. It is certain that the drainage work was the chief influence in this increase. Thus it will be observed that concurrently with the expenditures of \$1,836,000.00 for drainage, land values in the district increased on the basis above described about \$58,000,000.00.

Neither the records of the Trustees of the Internal Improvement Fund nor of the Board of Commissioners of Everglades Drainage District show what the assessed value of lands in Everglades Drainage District was prior to 1915. A statement by Board of Commissioners of Everglades Drainage District dated June 1st, 1916, contains the following:

"The assessed valuation of the lands within the District for state and county purposes for the year 1915 was \$9,690,800 approximately. These figures are taken from the assessors' books of the various counties within the District."

Prior to 1913, it may be stated for all practical purposes, that the agricultural output in the nature of farm products of the District was on so small a scale as to be of little or no commercial value. In some instances, through precarious farming operations, various truck crops were grown, principally by way of demonstration. The principal value of these demonstrations was to support the original conclusion of the Trustees and the Drainage Board that the lands of the Everglades when reclaimed would be agriculturally valuable. Drainage of the Everglades was based upon the assumption that the lands when reclaimed would become agriculturally valuable. Upon no other basis could there be justification for their reclamation, involving a great expenditure of time, money and energy. That this assumption was well founded will be borne out further as shown later in this report by the statement of farming operations and the importance from a commercial and market standpoint which the agricultural products of the country assumed as drainage progressed.

The work under the Drainage Commissioners related entirely to drainage. An important work having bearing upon drainage and the description of land for taxation was carried out by the Trustees of the Internal Improvement Fund at the expense of the fund. This consisted in the survey of Everglades lands, included in the Everglades Patent No. 137. These lands came to the State as unsurveyed. The land sales made by the Trustees of the Internal Improvement Fund necessitated the making of surveys in this heretofore unsurveyed territory by which to locate, describe and convey title to purchasers, and also for description in the imposition of taxes. This work was initiated in 1911 under "Instructions for Surveying the Lands Embraced in U. S. Patent No. 137, Known as the Everglades," adopted by the Trustees of the Internal Improvement Fund December 29th, 1910, and under "Amended Instructions," adopted December 23rd, 1912. These surveys were based upon the rectangular system adopted by the United States. To date approximately 1,000,000 acres of Everglades lands have been surveyed into townships and ranges, with the greater portion subdivided into sections. These surveys have been adopted as official by the Trustees, have been confirmed and validated by Act of the Legislature (Chapter 7892, Laws of Florida, Acts of 1919) and have been sustained by the Supreme Court of this State, the opinion of which was

affirmed on appeal to the Supreme Court of the United States. (See case Hardee v. Horton, 90 Florida, Page 452.)

Drainage operations in the Everglades as dealt with above, proceeded under the Act of 1905 as amended in 1907, till 1913 when Chapter 6456, Acts of 1913, Laws of Florida, approved June 6th, became effective. The following table affords information in reference to assessment and collection of Everglades Drainage District taxes from 1907 to 1912 inclusive.

EVERGLADES TAXES

ACREAGE TAX ACT OF 1905 AS AMENDED IN 1907.

Year	Total Levy	Collected
1907	\$ 215,456.32	\$ 197,529.66
1908	215,332.05	204,971.67
1909	214,620.99	179,779.19
1910	221,901.40	228,565.72
1911	216,144.93	226,903.88
1912	210,481.63	179,392.64
Total	\$1,293,937.32	\$1,217,142.76

Ratio of Collections to Total Levy 94%

EVERGLADES DRAINAGE DISTRICT AS AT PRESENT EXISTING

Operation Under the 1913 Act.

Since 1913 funds for prosecuting the drainage work have been obtained, with the exception of small amounts borrowed temporarily on notes, subsequently repaid, by proceeds of drainage district taxes used either as direct tax money or as derived from the sale of bonds based upon such taxes.

Under the Act of 1913 and amendments thereto, drainage work in the Everglades has continued to this date. The Act of 1913 was much broader in its scope than the former 1905 Act as amended in 1907, and conferred additional powers upon the governing board of the district, among which was the authorization to "borrow money on permanent loans and incur obligations from time to time," and the said board was "authorized and empowered to issue in the corporate name of the said board negotiable coupon bonds of Everglades Drainage District."

The 1913 Act also imposed Everglades Drainage District Acreage Taxes on a differential scale or rate, according to the proportion of benefits received by various areas, as based in a general way upon location of such areas in reference to the drainage works constructed or proposed to be constructed by the District. This plan of tax assessment has been followed from 1913 until the present date. The following table affords information in reference to the assessment and collection of Everglades Drainage District Taxes from 1913 to 1928 inclusive:

ACTS OF 1913 AND AMENDMENTS

Year	Total Levy	Delinquencies		Total
		Collected	Paid by Trustees	
1913	\$ 352,221.90	\$ 267,839.39	\$ 55,241.57	\$ 323,089.96
1914	342,968.82	296,144.21	42,352.32	338,496.53
1915	307,703.34	332,419.69	17,535.55	349,955.24
1916	306,971.63	228,111.47	13,642.29	241,753.76
1917	306,695.52	287,710.79	6,057.86	293,768.65
1918	295,022.00	275,267.17	9,792.35	285,059.52
1919	344,591.00	444,288.11	5,086.12	449,374.23
1920	490,260.74	312,627.10	89,226.62	401,853.72
1921	470,883.12	426,374.81	72,387.37	498,762.18
1922	660,348.18	667,362.76	36,320.11	703,682.87
1923	783,569.76	775,987.96	27,213.83	803,201.79
1924	1,152,768.50	1,126,940.89	1,638.07	1,128,578.96
1925	1,468,001.31	1,369,287.68	118,255.77	1,487,543.45
1926	1,548,740.19	1,177,840.71	271,864.27	1,449,704.98
1927	1,741,000.73	1,247,396.84	229,667.42	1,477,064.26
*1928	1,714,298.45	370,413.00	to Feb. 28, 1929.	

*Collectable November 1, 1928, to April 1, 1929.

1 MILL TAX

Year	Total Levy	Collections
1921	\$ 9,424.10	\$ 4,634.46
1922	9,424.10	16,631.96
1923	11,982.30	10,627.67
1924	15,071.98	7,374.70
1925	27,635.79	19,904.95
1926	31,099.99	24,066.92
1927	41,824.00	25,072.00
*1928	31,955.00	1,314.29 to Feb. 28, 1929.

*Collectable Nov. 1, 1928, to April 1, 1929.

With the sale of the first issue of Everglades bonds, drainage work in the Everglades took on an added impetus. The expansion of the drainage work by the district influenced and encouraged developments along other lines. Even to the end of 1916 the Everglades were inaccessible except by means of the drainage canals. Roads reaching the Everglades consisted of a short section of about five miles reaching the settlement of Davie in the edge of the Everglades in Broward County; a section extended along Miami Canal northwest of Miami for four or five miles; the new town of Moore Haven which had just come into existence on the west shore of Lake Okeechobee was connected with the outside world by scarcely more than a trail, passable to vehicles at favorable seasons by main strength and awkwardness. Developments other than along drainage lines had scarcely begun. Farming operations were just beginning to assume importance from a commercial and market standpoint. Accommodations for the traveler were scant and inconvenient. Human habitations consisted for the most part of scarcely more than shacks of an extremely temporary nature. The population of the district to 1915 had reached a total of 6,816 persons, as disclosed by the State census for that year. The greater part of this population was along the east coast from Coconut Grove south, and while in the district, could scarcely be considered as Everglades residents.

Of the work and the development of the district as a whole it can be said that it was at a stage representing a beginning only. For all practical purposes the time of real development in the Everglades might be taken as beginning in 1916 or 1917.

EVERGLADES DRAINAGE DISTRICT BONDS

Authorized by Act of 1915—\$3,500,000.00

See Resolution of Commissioners of Everglades Drainage District, January 3, 1917.

Date	Amount	Int. Rate on Bonds	Maturity	Sales Rate Basis
Nov. 1, 1915	\$1,500,000	6%	Average	6 5/8%
May 1, 1916	\$1,500,000		12 1/2 years	Average Price
May 1, 1917	\$ 500,000			94.8c
Callable at 102. Amount outstanding Dec. 31, 1928—\$ None.				

EVERGLADES DRAINAGE DISTRICT 71

Authorized by Act of 1919—\$2,500,000.00 ✓

See Resolution of Commissioners of Everglades Drainage District, July 22, 1920.

Date	Amount	Int. Rate on Bonds	Maturity	Sales Rate Basis
✓ July 1, 1920	\$1,500,000	6%	Average	6.53%
✓ Jan. 1, 1921	1,000,000		13-2/3 years	Average Price
95.0c				
Callable at 102. Amount outstanding Dec. 31, 1928, \$1,886,000.00				

Authorized by Act of 1921—\$1,750,000.00 ✓

See Resolution Board of Commissioners of Everglades Drainage District, November 26, 1921

Date	Amount	Int. Rate on Bonds	Maturity	Sales Rate Basis
✓ July 1, 1921	\$ 500,000	6%	Average	6 1/2%
✓ Jan. 1, 1922	1,250,000		16 years	Average Price
95.0c				
Without prior option. Amount outstanding Dec. 31, 1928—\$1,750,000.00.				

Authorized by Act of 1923—\$3,500,000.00 ✓

See Resolution Board of Commissioners of Everglades Drainage District, July 24, 1923

Date	Amount	Int. Rate on Bonds	Maturity	Sales Rate Basis
✓ July 1, 1923	\$1,500,000	5 1/2%	Average	5.95%
✓ Jan. 1, 1924	700,000		18 1/2 years	Average Price
95.0c				
5 5/8%				
✓ Jan. 1, 1925	\$1,300,000	5%	17-3/4 years	Average Price
93.04c				
Without prior option. Amount outstanding Dec. 31, 1928—\$2,663,000.00.				

ACT OF 1925—REFUNDING

Amount not limited. Use limited to refunding only.

Date	Amount	Int. Rate on Bonds	Maturity	Sales Rate Basis
1925 "A"	\$2,500,000	5%	19 1/2 years	Average Price
1925 "B"	2,500,000	5%	20 1/2 years	
1925 "C"	3,950,000	5%	20 1/2 years	
according to maturities as taken				

Refunding Bonds outstanding Dec. 31, 1928—\$3,842,000.00.

21550
350
7750

The total amount of Everglades Drainage District Bonds outstanding as of December 31st, 1928, is as follows:

6% Bonds	\$3,636,000.00
5½% Bonds	1,363,000.00
5% Bonds	5,142,000.00
Total	\$10,141,000.00

The Acts of the Legislature authorizing the above bonds and levying taxes therefor have been affirmatively passed on by the Supreme Court of the State as to the Acts of 1913, 1915, 1917 and 1921. Validation suits as to the Acts of 1923 and 1925 were waived inasmuch as there were no subjects presented in these Acts not already passed on by the courts.

WHAT IS BEHIND EVERGLADES DRAINAGE DISTRICT BONDS?

Everglades Drainage District Bonds issued prior to 1927 are supported by the following:

Section 1165, Revised General Statutes: "The proceeds arising from the acreage tax levied by this Article shall be used by the said board in the construction and maintenance of such canals . . . and to repay any loans and interest thereon, and to the creation of a sinking fund for the retirement of the principal of the bonds that the board may issue."

Section 1168, Revised General Statutes: "The tax or assessment levied by this Article shall constitute a lien upon the lands so assessed as of the first day of January of each year in which the entries aforesaid are made in said tax rolls, which lien shall be superior in dignity to all other liens upon said lands and equal in dignity to the lien for State and County taxes upon said land."

also,

In command to tax collectors, same section: ". . . and in case such drainage tax is not paid on or before the first day of April, next, you are to collect the same by levy and sale of the lands so assessed, . . ."

Section 1183, Revised General Statutes: ". . . which moneys (proceeds from taxes levied) so far as necessary are hereby set apart and appropriated for

the purpose to apply said moneys, and to pay the interest upon the said bonds as the same shall fall due, and at the maturity of said bonds out of the moneys to pay the principal thereof, and there shall be and there is hereby created a sinking fund for the payment of the principal of the said bonds and the said board shall set apart and pay into such sinking fund annually out of the taxes levied and imposed by this Article and the other revenue and funds of the said district, at least two (2) percent of the amounts of bonds outstanding. The said sinking fund . . . shall not be appropriated to any other purpose than that herein specified."

As guarantee against default in tax payment to the district, Section 1171 in reference to lands sold for taxes states:

" . . . and in case there are no bidders, the whole tract shall be bid off by the tax collector for the Trustees of the Internal Improvement Fund and shall be held by said trustees during the period herein allowed for the redemption of said lands."

And Section 1172: "The tax collector shall require immediate payment by any person to whom any parcel of such land may be struck off . . ."

The two sections last above cited require in case of tax sales of parcels of land where there are no bidders, that such parcels be struck off to the Trustees of the Internal Improvement Fund, and the said trustees are required by law to pay the delinquent taxes thereon. The above provision acts automatically as a guarantee to Everglades Drainage District against deficits in tax collection. Note in the tax tables the amount of delinquencies paid by the Trustees. It means substantially that acreage tax collections finally coming to Everglades Drainage District must be practically 100% of the assessment. Also, since the lands are behind the taxes and the taxes support the bonds, it follows that through the medium of drainage taxes the lands of the said district stand behind the bonds.

By the above, the full faith and credit of the district, including the State lands in the Everglades, is pledged to the payment of the interest and of the principal at maturity on bonds issued by Everglades Drainage District.

The Legislature of 1927 passed an Act, approved April 28th, " . . . to Authorize the Issuance of Additional Bonds of the Everglades Drainage District of Florida and to provide for the Payment of Such Bonds."

The Board of Commissioners of Everglades Drainage District entered into contract dated May 11th, 1927, for the sale of \$10,000,000 of bonds out of the total of \$20,000,000 authorized by the 1927 Act. The contract price was on a 5-5/8 basis. The proposed bonds were to bear interest at the rate of 5%, have maturities varying from 20 to 40 years, and upon such schedule of interest and maturities the sales basis as above resulted in a price ranging from 90.1 cents to 92.55 cents for the bonds, the average being 90.99 cents on the dollar. The above bonds have not been issued. Litigation over the 1927 Act passed from the Circuit Court of the State to the State Supreme Court, which Court by affirmative decision thereon, except in the matter of three minor points which were rejected, held the Act valid. Appeal from the opinion of the State Supreme Court was taken in the United States Supreme Court, and in October of 1928 the Supreme Court of the United States declined to take jurisdiction on the ground that the case as submitted was not properly appealable. This action of the Supreme Court of the United States left the 1927 Act in the status as passed upon by the Supreme Court of Florida.

ESTIMATE OF ACREAGE TAXES AS IMPOSED BY
CHAPTER 12017, ACTS OF 1927, AND AMOUNTS
ESTIMATED FOR BOND REQUIREMENTS.

Year	Total Tax Levy	85% of Levy	Int. Plus 2% on bonds out	Balance for other purposes
1929	\$1,942,946	\$1,651,504	\$748,465	\$ 903,039
1930	1,942,946	1,651,504	738,865	912,639
1931	2,147,151	1,825,078	728,465	1,096,613
1932	2,147,151	1,825,078	709,765	1,115,313
1933	2,148,913	1,826,576	688,015	1,138,561
After 1934	2,148,913	1,826,576	663,715	1,162,861
to 1955	do	do	to 14,000 000	1,812,576
1966				1,826,576

Since no bonds were issued under the 1927 Act, the levy of an ad valorem tax was not made by Board of Commissioners of Everglades Drainage District for the reason

that this tax was "for the sole purpose of paying or redeeming bonds authorized by this Act." Hence, till their issuance such tax is not applicable. The Board of Commissioners of Everglades Drainage District determined the value of property within Everglades Drainage District under Chapter 12016 to be \$106,000,000 for the year 1927. Reference to the foregoing tax tables discloses that the taxes heretofore levied by the Legislature, exclusive of the ad valorem tax authorized by the 1927 Act and now in effect in Everglades Drainage District, is sufficient to take care of all outstanding indebtedness of the district and for new bonds to the extent of about \$10,000,000, provided that all funds derived from taxes, or practically so, be applied to new bonds and not expended directly in defraying costs of the drainage work.

The principal purpose in levying an ad valorem tax for Everglades Drainage District was to provide for a valuation of property subject to the District's drainage taxes, which valuation would indicate the relation between the bonded debt of the District and the value of property therein. The revenue to be derived from such ad valorem tax was secondary. In fact, under the Board's decision to fix this tax for the present at 1/5 mill on the dollar of property, there would be produced a revenue of approximately \$21,000.00 to \$22,000.00, which is only about 1-1/10% of the revenue resulting from the acreage drainage tax. As above stated, the purpose here was to show the value of property behind the bonds rather than the raising of revenue.

The reason for the valuation by the Board of Commissioners of Everglades Drainage District was that the valuation of property by county tax assessors is different for each county in or partly within Everglades Drainage District. While the assessors' valuations are properly applicable with reference to the respective counties so assessed for county purposes, yet by reason of the variation between counties it would not be satisfactory for District purposes nor represent evenly the relative value of property in the said District.

The foregoing deals with the provisions of the law and the requirements thereunder in reference to Everglades Drainage District taxes, the bonds of the said District and the security behind the said bonds. Everglades Drainage District has never postponed an interest payment or a

payment of principal at maturity. In addition to the foregoing legal considerations, there are others not of a statutory nature, but nevertheless having important bearing upon the security of the District as related to its bonded debt and as to the safety of the bonds of the District as investments. These are economic considerations. The question of whether or not Everglades Drainage District is economically sound is disclosed through the advancement of the District as shown by its increase in population, the enhancement in property values, its progress in agriculture, and in the construction of roads, railroads, telephone and telegraph lines, and other diverse developments as the District has evolved from its former condition of practically watery waste through its transformation in part, to a land of homes, farms, municipalities and communities, and as it has changed from a status of purely potential possibilities to that in part of present actualities with still greater prospects for larger potential development.

The advancement of the District in an economic way may be indicated in part by the following tabulation:

LAND VALUES, POPULATION, ETC.

Column 1—Average State land sales, price per acre.

Column 2—Estimated population.

Column 3—Assessed value as for State and County purposes.

Column 4—Estimated acres under cultivation.

Column 5—Miles improved roads.

Column 6—Miles railroad.

Column 7—Approximate value on State land sales basis.

Column 8—Bonded debt.

Year	1	2	3	4	5	6	7	8
				Acres	Mi.	Mi.		
1905	\$ 1.25				45		\$ 5,391,000	
1910	2.00	1,492			42	45	8,626,000	
	(1913)						(1913)	
1915	15.45	6,816	9,690,800	20,000	50	49	66,600,000	
			(1921)					
1920	24.73	23,500	9,424,100	34,000	72	81	106,300,000	5,000,000
1925	108.66	40,200	27,635,790	50,000	340	180	467,000,000	10,250,000
	(1926)						(1926)	
1927	81.51	46,007	41,824,090	92,000	507	192	350,500,000	10,255,000
1928	92.68	48,000	31,955,200	96,000	586	210	**	10,141,000

*106,000,000

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SOURCES OF INFORMATION

1. Official records of Trustees of the Internal Improvement Fund and reports of Commissioner of Agriculture, land division.
2. State and United States census and estimated for 1928.
3. County tax assessor's books. Prior to 1927 acres exempt from acreage tax not included. 1927 includes all. *Board of Commissioners of Everglades Drainage District, under Chapter 12016 Acts of 1927.
4. Includes marsh lands south of Coconut Grove but no citrus lands.
5. From Everglades Drainage District maps. Does not include many short non-connecting roads in 1925 and 1927.
6. From Everglades Drainage District maps.
7. Estimated from column 1. **Acreage of land sold not large enough or so distributed as to represent average value.
8. From official records of drainage board. Columns partly blank fragmentary records only.

NOTE—The 1925 "Boom" is reflected in abnormal land values.

It has been shown that the advancement of the district and its increase in value to date progressed at a far more rapid rate than have expenditures from which such advancement has resulted. It has been shown that in 1905 at the beginning of drainage, based upon the average price for which state lands sold, the district had a land value of approximately \$5,391,000. In 1928 the district had a land and property value, based upon land sales prices and property estimates, of about \$300,000,000, or an increase of nearly \$295,000,000 from 1905 till 1928. The cost of the drainage work to December 31st, 1928, was in round figures, \$18,000,000, or for each million dollars expended in drainage by the district, the value of the district has increased about sixteen and one-half times—an expense ratio of 1 and increase value rate of 16½.

THE WORK MUST GO ON

The work completed to the present date represents a large part of the total, but it is by no means all that is necessary. But few areas of Everglades Drainage District,

Increase in value good

as the drainage works now are, are reasonably protected from flood dangers or in readiness for settlement and cultivation under that degree of protection to which the lands are entitled and which they must have in order that such settlement and cultivation may proceed with security against overflow. The continuance of tax payments is warranted only upon final placing of the lands taxed in condition to be productive, and from their earnings in shape to support the tax imposed. The soundness of the district in its present condition depends in great measure upon the completion of drainage. It would not continue sound if the work should be discontinued or abandoned. There are outstanding as of December 31st, 1928, \$10,141,000 of Everglades Drainage District Bonds. The first bonds were issued by authority of the 1915 Legislature. For nearly fourteen years the district has met interest and maturity payments promptly. There has never been a postponement in interest or principal. The district's record is excellent in that regard. Everglades bonds have earned a high experience rating. The credit basis of the district has improved from the date of the first issue until the present. That high standing should be protected. The ability of the district to pay its debt already incurred is dependent in large degree upon the completion of the work and the placing of the lands under settlement and cultivation. This means supplying the remaining drainage works necessary therefor. It is essential, therefore, that provision be made for carrying on the work.

The improvements, enterprises and developments thus far undertaken or begun in the district predicate their successful accomplishment upon the completion of the drainage works necessary thereto. Every undertaking of every character whatsoever in the drainage district is dependent upon the drainage enterprise. Inseparably bound up with it are many millions of dollars of private investment dependent upon drainage. The most humble citizen in Everglades Drainage District, as well as those of greater means, is affected. Drainage is the entire foundation upon which the whole fabric of development and life of the district exists. There is but one difference between the Everglades as they originally were and the Everglades as they now are, or as they may be in the future. That one difference is drainage. Subtracting drainage, the Everglades would promptly return to their original condition of watery waste, uninhabitable by human beings and unfit

in the general scheme of things for uses of man. With drainage, it has been abundantly proven by experience in certain areas where drainage has sufficiently advanced to afford an example of what can be accomplished by cultivation of the land. When considered in reference to its great area, it is too obvious to require discussion that the ultimate result of the carrying out of this great enterprise is of almost incalculable moment to the State.

EXTENT TO WHICH DRAINAGE OF THE EVERGLADES IS A STATE UNDERTAKING

The drainage of the Everglades is frequently referred to as a State undertaking. The statement is often made that "The State is draining the Everglades." This is not true in a strictly technical, legal sense, for aside from the application of funds from swamp land and certain other lands to Everglades taxes on State lands, no money has ever been appropriated by the State for drainage, no general State tax is imposed for such purpose, the bonds issued for carrying on the work are not an obligation of the State, and no law authorizes the State itself to take part in or have a hand in this drainage enterprise, but notwithstanding the above as a strict legal interpretation of the situation, the State has a great deal to do with the Everglades in being the largest land owner in the district and as having its highest public officials direct the work and affairs of the said district. Furthermore, in its broad economic sense, the State views the drainage of the Everglades as the means of developing a tremendous potential asset within its domain. But, though no actual money from the general revenue has been furnished by the State, yet all the lands owned by it in that section originally amounting to nearly three million acres, or more than two-thirds of the total, were, for all practical purposes pledged to the undertaking, and in accordance with the terms of the grant, "the proceeds of said lands, whether from sale or by direct appropriation in kind" have been "applied exclusively as far as necessary to the purpose of reclaiming the said lands by means of drains and levees aforesaid." Furthermore, the Board of Commissioners of Everglades Drainage District and the Trustees of the Internal Improvement Fund are continuing in the performance of their duties imposed by various laws, all in accordance with the Act of Congress hereinbefore referred to, and in accordance with the

original Act of the Legislature, Chapter 610, Laws of Florida, approved January 2, 1855, requiring the trustees to make "arrangements for the drainage of the swamp and overflowed lands." The above may be taken as the foundation upon which the policy of drainage rests, and it is shown that from the beginning to this date, State authorities charged with the administration of these lands, have been, are now and propose to continue the carrying out of the duties and trust thus imposed upon them.

Lands designated as "Swamp and Overflowed Lands" in the Everglades held by the Trustees of the Internal Improvement Fund on December 31st, 1928, amounted to 871,600.84 acres unincumbered, and approximately 128,494 acres additional covered by sales contracts on which partial payments have been made and additional payments amounting to \$2,075,472 will become due from time to time.

The State School Fund owns approximately 95,400 acres of land in the Everglades Drainage District. The lands owned by the school fund are not subject to any sort of drainage or other tax. The school lands therefore, are increasing in value without cost to the school fund. In addition to the school lands proper, the school fund receives 25% of the proceeds from the sale of all State swamp lands in the Everglades. These lands constitute a valuable asset of the State and of the school fund which is participated in not only by every county within which Everglades lands are situate, but within the entire State.

Such is the material interest which the State has in the Everglades. There is another phase of the subject and another kind of interest which the State has in this enterprise of no small import either to the Everglades or to the State. Florida has assumed to a degree the moral responsibility for this undertaking, has encouraged it politically and has fathered it as a great economic development on the theory that it will enhance in value and will reflect to advantage upon the whole State: that it will place upon the tax books property for general taxation which will swell the general revenue of the State, and that it will assist in adding to the State that most valuable of all possessions—citizens. Furthermore, it may be anticipated as drainage progresses, as colonization, settlement and cultivation of the land advances, as new and important developments expand along divers lines as collateral to the drainage enterprise, that the State will naturally, logically and inevitably become more directly and closely connected with this the

greatest work of reclamation and development ever embarked upon by any State in the Union. It is quite clear, therefore, that though the drainage of the Everglades may not be a State undertaking in its technical sense, yet in its broader interpretation it is at least a quasi-State project in which the State has a very material and direct interest and a degree of moral responsibility.

Such are the interests which the State of Florida has in the drainage of the Everglades.

FEDERAL INTEREST

By virtue of the character, scope and extent of the undertaking and the various considerations involved therein, the general proposition of the reclamation of the Everglades joins with the subject interests even outside of the State. In recent years attention has been focused upon certain aspects of the drainage of the Everglades or in certain features affecting the Everglades and especially the territory around Lake Okeechobee as affected by the said lake. Therefrom result certain Federal interests.

There are now before the Congress of the United States certain measures looking to participation on the part of the Federal government in works of flood control for Lake Okeechobee. Participation in flood control on the part of the United States must be based upon the assumption that the Federal government has an interest or interests in Lake Okeechobee. The establishing of the principles on which such interests are founded is essential in order that the United States may be justified in undertaking such work.

The general proposition of protecting its citizens against danger, violence, or disaster, whether within a State, within the United States, or in a foreign land, is a principle already established by the United States in having assumed that as an obligation and as a duty thereunder. The application of this general principle is not inconsistent here. In this case there are still other interests.

Lake Okeechobee is a navigable waterway of the United States, under its jurisdiction and control and subject to the laws of Congress. The preservation of its navigability, the holding of its waters at levels favorable thereto, and the regulation of commerce thereon, result in levels which are unfavorable to drainage and to protection of life and property against hurricane floods unless certain works are pro-

vided to compensate for high lake levels maintained in the interest of navigation. It would be feasible to lower Lake Okeechobee to an extent which would remove danger of flood to surrounding lands, even under hurricane conditions, but such lowering would result in the impairment, and possibly even in the complete destruction, of its navigable feature. Hence if its navigability is to be preserved unimpaired, and by reason of that navigability the said lake takes the status of a waterway of the United States, and it does, it appears incumbent upon the United States to preserve its interest in navigation simultaneously with the State in preserving its interests in drainage and reclamation, and other subjects growing out of that purpose. There appears justification, therefore, for the United States to provide works of flood control which will make the territory around Lake Okeechobee safe against disastrous flood in maintaining high water levels in the lake in the interest of navigation. The interest of the United States in navigation is so clear and so well established that discussion along that line is not necessary.

There is another interest of the United States in Lake Okeechobee as direct and as important as that of navigation. That interest is directly in flood control and comes about through the provisions of the Act of Congress of September 28th, 1850, known as the "*Swamp and Overflowed Land Grant Act*." Under that Act the Everglades were patented to Florida by the United States for a specific purpose expressed in the language of the Act as follows:

(9 U. S. Statute L 519-520) "that the proceeds of said lands, whether from sale or by direct appropriation in kind, shall be applied exclusively so far as necessary to the purpose of reclaiming the said lands by means of levees and drains aforesaid."

The Legislature of Florida by Chapter 610, approved January 6th, 1855, accepted the grant, the purpose for which made, and the condition imposed by the said Act of Congress. Pursuant thereto Florida has been and is engaged in accomplishing that purpose and in carrying out that condition. The Act of Congress as above, together with the Act of the State Legislature, formed a compact between the United States and the State as sovereign powers, and they are bound by the same. Florida in carrying out the purpose and condition expressed in the Act of Congress

finds itself confronted with the task of taking care of something not ceded to it, over which it has no control or jurisdiction, but of serious import in carrying out that condition. It has become necessary to undertake works for the protection of life and property against Lake Okeechobee, a navigable waterway under the control and jurisdiction of the United States, and subject to its laws. Lake Okeechobee has operated to defeat the purpose laid down in the grant and to prevent Florida from complying with the condition imposed upon it by the United States. The Act of Congress inevitably connects the United States with the State of Florida in flood control for Lake Okeechobee. If Florida is to carry out the condition imposed upon it by Congress for the purposes of reclamation, then that condition must be possible of accomplishment. Since the condition has been imposed by the United States, and since Lake Okeechobee is a waterway of the Federal government, it follows that that agency should not permit something of its own to thwart the State in carrying out that condition. This means that the United States should undertake such works for flood control in and about Lake Okeechobee as will permit the State to carry out in good faith on its part the condition imposed by the Federal government. Interest on the part of the United States in flood control is thereby established and it is submitted that the Federal government should undertake such work, or should participate therein to such extent as will make it possible for the State to carry out without undue burden on its part the condition imposed by the Congress.

The interests of the United States in Lake Okeechobee as above are therefore three-fold.

First: Upon the principle of protection of its citizens.

Second: Upon the principle of Federal interest in navigation.

Third: Upon the principle of its interest through the Act of Congress of September 28th, 1850, imposing a condition upon the State and the obligation to permit the State to carry out that condition.

ALL INTERESTS

The aspects of the reclamation of the Everglades in so far as the several interests are concerned may be stated as follows:

Local Interests: By virtue of which through local drainage the lands of the District are made fit for settlement and cultivation.

The enhancement of value of property of the locality and the local benefits derived from the works therefor.

State Interests: The carrying out of an obligation imposed by the United States and accepted by the State in the grant of land for the specific purpose of reclamation.

The enhancement of values of state lands.

The development within its domain of a great area and the placing upon the tax books property for general taxation which will swell the general revenue of the State.

In adding to the State that most valuable of all possessions—citizens, and the making of the said territory safe for their habitation.

Federal Interests: Jointly with the State, the safety and protection of its citizens.

Jointly with the State, through the Act of Congress of 1850 imposing a condition upon the State, and the obligation on the part of the United States to permit the said State to carry out that condition.

Upon the Federal interest in navigation.

Thus far the work has gone forward upon the basis of local interest. That is to say, the money for carrying on works of flood control, drainage and reclamation, and incidentally for navigation, has been provided through drainage taxes upon the lands and property within Everglades Drainage District. The total thus far raised by the Dis-

trict is \$18,000,000. All of the money applied by the State to the payment of drainage taxes (Everglades and sub-drainage district) on its lands has come from the sale of swamp and overflowed lands granted to it by the Federal government except approximately \$800,000 which has come from the sale of lands other than swamp lands. No appropriation has been made by the State from its general revenue and no State tax has ever been imposed on account of the Everglades. No appropriations for the purposes of the District have thus far been made by the United States. Certain surveys and examinations have been authorized by Congress for Federal purposes in and about that section of Florida, but no money has been expended by Congress upon drainage or flood control work.

The part which these several interests, Local, State, and Federal, may take in time to come will have great bearing upon the future of that territory.

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