

SAN DIEGO RIVER WATER STUDY

Tables Compiled by T. H. King, Engineer for La Mesa, Lemon Grove
and Spring Valley Irrigation District, 1926

Any attempt to divide the waters of the San Diego River as between two interests by permitting these interests to operate a reservoir or reservoirs in common is difficult of attainment and affords an opportunity for possible litigation.

Suggestion: Divide or apportion the waters of the San Diego River upon a geographical basis rather than a quantitative basis. It so happens that the portion of the San Diego River which has been either wholly or in part developed by the La Mesa, Lemon Grove and Spring Valley Irrigation District, or its predecessors in interest, is so situated that a geographical division is not only possible but appears to be readily attainable. The portion of the river upon which the La Mesa District development is located yields a fair amount of water quantitatively.

The following figures on the drainage area tributary to the various points of diversion both in use and proposed, on the San Diego River together with the mean annual runoff of these respective drainage areas is submitted. Tabulation I shows the name of the point of diversion, the area in square miles, the mean annual runoff in acre feet and in millions of gallons. The areas and runoff figures are those prepared by the United States Reclamation Service in the Report of John S. Longwell, on the San Diego River.

TABLE I

The following runoff figures were taken from the John S. Longwell, U. S. Reclamation Service Report on San Diego River.

(1920)

Runoff of the Several Drainage Areas Tributary to San Diego River						
Reservoir	Sq. Miles:	Mean (a)		(a)		% of Total
	Drainage Area	Ac. Feet:	Annual Runoff:	Total Mean Runoff:	Acres Ft.:	
			Mil. Gal.	Mil. Gal.		
Cuyamaca	12	4,226	1,377			
Diverting Dam	90	17,040	5,552			
South Fork	45	4,856	1,582			
El Capitan	40	5,017	1,635			
Lakeside Basin	17	1,668	544			
Total Upper River Tributary to development of District				32,807	10,690	68%
San Vicente	75	8,100	2,639			
Los Coches	14	1,070	349			
Old Mission Dam	83	3,930	1,281			
Mission Valley	59	2,390	779			
Total Lower River				15,490	5,048	32%
Total Mean (a) Annual Runoff, San Diego River				48,298	15,738	100%

(a) 27 year period (Oct. 1892 to Sept. 1919)

(City Engineers should check)

It will be noted from this tabulation that 68% of the runoff of the river is tributary to the development of the District as such development is now located or proposed to be located, leaving 32% of the mean annual runoff of the river tributary to development below by other interests. This apparent inequality, however, is offset by the fact that the suggested development of the District, however optimistically considered the same may be, would in no case stop all of the flow of the river, as there would be a very considerable surplus from the upper river which would be available for use on the lower river.

Table 2 shows, column 1, the year; column 2 the overflow or surplus occurring at Fletcher built to the capacity of 17,000 acre feet, the withdrawals being the maximum withdrawals which could have been made uniformly from 1904 to 1923 inclusive. Column 3 shows the surplus occurring at South Fork if built to capacity of 3,000 acre feet after the maximum uniform withdrawal during the same period has been made. The most optimistic diversion possible by these reservoirs would be in the event that the reservoir would, when the water was available, deliver its entire remaining capacity after the uniform withdrawals above mentioned have been made. In the case of the Fletcher Reservoir this diversion would amount, in round figures, to 10,000 acre feet, when available, and in South Fork this diversion would amount to 2,000 acre feet, when available. In order that such diversions as these may be made, however, a material increase in flume capacity would be required above the present capacity. In order to be sure that such diversion could

TABLE 2

TABLE SHOWING SURPLUS OCCURRING AT FLETCHER AND SO. FORK

Year	: Overflow When Normal Yield only is Withdrawn		: Overflow When Total Capacity of reservoir after deducting normal yield is withdrawn	
	: Overflow for Fletcher	: Overflow or Surplus for South Fork	: Overflow or Surplus for Fletcher	: Surplus for South Fork
(1)	(2)	(3)	(4)	(5)
1893	0	0	0	0
1894	0	0	0	0
1895	26,484	14,000	16,484	12,000
1896	0	0	0	0
1897	5,125	1,600	0	0
1898	0	0	0	0
1899	0	0	0	0
1900	0	0	0	0
1901	0	0	0	0
1902	0	0	0	0
1903	0	0	0	0
1904	0	0	0	0
1905	0	800	0	0
1906	10,203	10,400	203	8,400
1907	17,026	6,400	7,026	4,400
1908	0	0	0	0
1909	7,002	8,400	0	8,400
1910	1,392	400	0	0
1911	0	0	0	0
1912	0	0	0	0
1913	0	0	0	0
1914	0	0	0	0
1915	10,743	2,800	743	800
1916	100,051	32,800	90,051	30,800
1917	5,246	0	0	0
1918	0	0	0	0
1919	0	0	0	0
1920	0	0	0	0
1921	0	0	0	0
1922	48,381	19,200	38,381	17,200
1923	0	1,200	0	0
Total:	231,653	98,000	152,888	82,000
Mean :				
31 Yrs.	7,473	3,161	4,932	2,645

(City Engineers should check)

be properly carried the flume should be built to the capacity which was originally intended, and for which the frame work of the flume was designed and constructed, namely not less than 80 cu. ft. per second. ^x (Note)

In addition to the surplus from Fletcher and South Fork as shown in Table 2, there would be a surplus of water originating below South Fork and Fletcher in excess of the diversions made by the pumps in the Lakeside Basin as follows:

EXPLANATION OF METHOD OF ARRIVING AT THE AMOUNT OF WATER FROM THE TRIBUTARY DRAINAGE AREA OF THE LAKESIDE BASIN PASSING OVER AND BEYOND THESE SANDS.

The area of these water bearing sands has been determined by Mr. John S. Longwell to be 2367 acres. Assuming 25% voids there would be absorbed, if the sand was dry, $\frac{2367}{4} = 592$ acre feet per foot of depth. The fluctuation of the water plane without regard to pumping is taken as 2.5 feet. The amount of water, on the average, which would be required to recharge the sands, assuming no pumping withdrawals, would be $592 \times 2.5 = 1480$ acre feet. To this amount add the mean pumping withdrawals of 1500 acre feet. $1480 \text{ ac. ft.} + 1500 \text{ ac. ft.} = 2980$ acre feet required, on the average, to recharge the sands.

The mean annual runoff from the drainage area tributary to the Lakeside Basin as shown on Table 1 is 6685 acre feet exclusive of San Vicente and Los Cochis supplies.

Mean annual runoff tributary to Lakeside Basin
exclusive of San Vicente and Los Cochis 6685 ac. ft.

Mean requirement to recharge 2980 " "

3705 ac. ft. mean

quantity of water passing over and beyond the Lakeside Basin

exclusive of San Vicente and Los Coches runoff.

Note: * According to the testimony of Van Dyke, the flume was originally designed to carry 100 cu. ft. per second. This is evidenced by the construction of the sills and yokes as constructed and which are still in place, the idea having been to gradually increase the number of side boards on the flume until the maximum capacity had been attained. The first development under the old San Diego Flume Company consisted of one side board. Later an additional side board was progressively placed and had the plans of the San Diego Flume Company matured as they planned, a dam at the so-called Helena Site, which is identical with the Fletcher Reservoir site, would have been constructed and the remaining side boards would have been placed bringing the capacity up to 100 cu. ft. per second. This capacity of 100 cu. ft. per second would not have been maintained however due to the roughing and warping of the boards, but allowing 20% discount 80 cu. ft. per second would have been available, which capacity would have been more than sufficient to carry out the above outlined plan of diversion.

It has been shown in Table I that there is originating below the drainage area upon which the District is depending a mean annual runoff of 15,490 ac. ft. to which should be added the overflow or surplus from the District's works as follows:

From Table I

Runoff originating below District development 15,490 ac.ft.

From Table 2

Surplus from Fletcher Reservoir 4,932 " "

" " South Fork Reservoir 2,645 " "

From Page 5

Amount passing over Lakeside sands 3,705 " "

Total available for lower river use 26,772 " "

RESULT

	Ac. Ft.	Mil. Gal.	% of Total Runoff
Total mean annual runoff of San Diego River	48,297	15,738	
Total mean annual runoff reaching lower river	26,772	8,724	55
Total mean annual runoff from upper river available for District development	26,525	7,014	45

Ed Fletcher Papers

1870-1955

MSS.81

Box: 39 Folder: 4

**Business Records - Reports - King,
T.H - "San Diego River Water Study"**



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