STATE OF CALIFORNIA

DEPARTMENT OF PUBLIC WORKS

DIVISION OF WATER RIGHTS

Harold Conkling, Chief of Division

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REPORT ON WATER MASTER SERVICE

ON

OWL CREEK

IN

SURPRISE VALLEY, MODOC COUNTY, CALIFORNIA

DURING SEASON OF 1928

oOo

By Leslie Jopson
Water Master

oOo

Sacramento, California

March, 1929

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STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
SACRAMENTO

DIVISION OF WATER RIGHTS
401 PUBLIC WORKS BUILDING

March 2, 1929

Mr. Harold Conkling
Chief of Division of Water Rights
Sacramento, California

Dear Sir: Attention: Mr. Gordon Zander, Hydraulic Engineer

A report of Water Master Service on Owl Creek, Surprise Valley, Modoc County, California, during the season of 1928, is submitted herewith.

This report includes a description of the regulation and distribution of the waters of Owl Creek in accordance with the schedule contained in the stipulation for consent judgment in the case of C. E. Cummins, et al., vs. Wiley Allen, et al., which has been signed by all the water users of Owl Creek and decree is now awaiting the signature of the Judge of the Superior Court.

Run-off records and other pertinent hydraulic data are included, together with a financial statement showing the cost of Water Master Service in Surprise Valley during the season of 1928, and the sources from which such cost was met.

Respectfully submitted,

Leslie Johnson
Water Master

REPORT ON WATER MASTER SERVICE

ON OWL CREEK

SURPRISE VALLEY - MODOC COUNTY

CALIFORNIA

DURING SEASON OF 1928

INTRODUCTION

The History of the case of C. E. Cummins, et al., vs. Wiley Allen, et al., may be found in the following reports by the Division of Water Rights: "Report on Water Supply and Use of Water from Owl Creek, Modoc County, California", dated December 21, 1925, and two "Reports on Water Master Service on Owl Creek in Surprise Valley, Modoc County, California", during the seasons of 1926 and 1927, respectively.

Subsequent to the 1927 report a joint meeting of the water users of Owl and Soldier Creeks was held at Cedarville on March 20, 1928. Mr. Harold Conkling, Chief of the Division of Water Rights, presided at the meeting and discussed with the water users the status of the litigation on the two creeks. The 1927 water master service and report thereon were discussed and recommendations and criticisms made.

At the same meeting an agreement was entered into for the continuance of water master service during the season of 1928. This agreement was in accordance with the schedule contained in the stipulation for consent judgment, mentioned previously in the letter of transmittal of this report. All parties signed the agreement except Mr. John Ennis, who insisted that he did not think a water master would be necessary during the 1928 season.

In accordance with the agreement, the Division of Water Rights on March 21, 1928, appointed Mr. Paul V. Wheatley as water master to take

charge of the distribution of the waters of Owl Creek, as well as of Soldier, Cedar and Emerson Creeks all in Surprise Valley.

Mr. Wheatley assumed his duties on Owl Creek on April 1st and administered the waters of the stream until June 8th on which date the writer took over the Surprise Valley Water Distribution. The writer administered the water until July 31st on which date water master service was terminated in Surprise Valley for 1928.

The agreement under which the distribution of the waters of Owl Creek was made in 1928 is included herewith as an appendix.

DISTRIBUTION OF WATER

1. Functions of Water Master

The function of the water master on Owl Creek was the supervision of the distribution of the waters of the stream in accordance with the agreement providing the schedule of water allotments for the 1928 irrigation season, as described above in the "Introduction" to this report. The agreement also provided the water master with authority to make the necessary supervision.

The duties of water master were assumed in the field on April 1, 1928. No records of diversions and stream flow were made, however, until April 14th, as some of the users had not signed the agreement which provided for the water master service. The intervening time was spent in organizing the seasons work and in rating the measuring devices used on the various streams under his jurisdiction.

2. Allotments Compared with Water Supply

There was surplus water in Owl Creek, over and above the combined allotments of 39.75 cubic feet per second under the schedule in 1928, between the dates of May 8th and May 30th. Prior to May 8th but little irrigation was done so that the supply was about equal to the demand without regard to priorities. After May 30th the flow of Owl Creek fell off quite rapidly until June 13th. From June 13th until the end of the month only about 38 per cent of the total allotments could be filled. For the entire month of June, which practically concludes the general irrigation season in Surprise Valley, the deficiency averaged about 47 per cent. After July 1st very little water was available for purposes other than stock and garden use. A 50 per cent shortage in domestic water was reached by July 31st at the conclusion of the water master's supervision.

3. Efficiency of Distribution

A fair degree of efficiency of distribution, in accordance with the provisions of the agreement for distributing the water during the 1928 season, was obtained. The main factors operating against efficient distribution were lack of proper headgates and sensitive measuring devices on the ditches and the flashy fluctuation of flow in the creek.

The latter difficulty in efficient distribution necessitates either constant supervision or installation of extensive headworks. The other difficulties could and should be surmounted by adequate headgates and measuring devices. Several water users have signified their intention of installing Improved Venturi Flumes which in their cases will remedy the difficulties of measuring the flow in the ditches which have steep grades and gravelly bottoms.

RUN-OFF RECORDS

The standard method of collecting run-off records, as briefly described on page 11 of the "Report on Water Supply and Use of Water from Owl Creek, Modoc County, California", prepared by T. Russel Simpson under date of December 21, 1925, was used in the investigation.

An automatic water stage recorder was installed on Owl Creek at the gaging station near St. John's which has been used for the past three years. A number of current meter measurements were made which when plotted with measurements made in preceding years showed but little yearly variation indicating that the control at the station may be considered permanent. With this fact in mind a discharge curve was made for the station by plotting all stream flow measurements made over the past four years and drawing a smooth curve through the average of the points. A copy of the curve is included herewith as Plate II. The curve should be checked occasionally by the water master as the stream carries considerable quantities of debris during peak flows.

The discharge of Owl Creek at the gaging station for the period from April 14th to July 31st, 1928, has been tabulated in Table 3. The discharge at this station combined with all diversions above for the same period, has been tabulated in Table 4.

The hydrographs on Plate I of this report graphically show the relation between the total net available water supply of Owl Creek in 1928 and in 1927, the total diversions in 1928 and the combined allotments under the schedule.

PRECIPITATION

The precipitation at Cedarville for the seasonal year, commencing on September 1, 1927, and terminating on August 31, 1928, has been compared with the average mean precipitation in Table 1 of this report. It will be noted that the total precipitation during the seasonal year 1927-28 was somewhat less than the average mean, and of this amount more than one-half occurred during the months of November and March, rather than being uniformly distributed.

During an average year, approximately 21 per cent of the precipitation occurs during the period from May 1st to September 30th. During the season of 1927-28 only 8 per cent fell during the same period. The precipitation after May 1st is ordinarily of great benefit in sustaining the dry weather flow of Owl Creek.

In Table 2 the character of the precipitation, at Cedarville, during the months of December, January, February and March of the season of 1927-28 is compared with the normal for those months. It will be seen that where the snowfall is ordinarily 77 per cent of the total precipitation it was only 23 per cent in 1927-28.

An interesting conclusion can be drawn by observing the relation of rainfall to run-off over the period of record.

In the following table is presented the available data as taken from this and previous reports on Owl Creek.

Year	Precipitation at Cedarville Expressed in Percent of Seasonal Mean	*Run-off Expressed in percent of that in 1927
1924-25	94	97**
1925-26	80	48
1926-27	96	100
1927-28	85	76

* Period from time flow exceeds 10 cubic feet per second until July 7th used in calculation.

** Run-off estimated during part of April, 1925.

The water supply in 1927 was entirely adequate for irrigation requirements so it was thought it would be a suitable base on which to make comparisons of run-off. It will be noted that in years of deficient precipitation that the deficiency of run-off increases at a greater rate than the deficiency of precipitation. The information given in the table should only be taken as giving an indication of what may be expected, as a hard and fast rule of variation of run-off depending on precipitation cannot be made, since a number of other factors have considerable influence such as the distribution and character of precipitation.

USE OF WATER

Continuous records were kept of the disposition made of the flow of Owl Creek during the period April 14th to July 31st, 1928. A brief description of the manner of collecting the records of use of water is given on page 14 of the "Report on Water Supply and Use of Water from Owl Creek", previously referred to. The estimated daily diversions of the various ditches are shown in Table 5 to 15, inclusive, submitted at the end of this report.

The areas irrigated under the various diversion systems, during the period from April 1st to July 7th, 1928, were estimated by the water master and have been tabulated in Table 17 with the amount of water in acre feet diverted to them during the general irrigation season.

The rate of the gross use of water for each diversion system during the general irrigation season has been calculated in acres irrigated per cubic foot per second and has been tabulated in Table 17 of this report with the data described in the preceding paragraph.

It will be noted from Table 17 that the combined average rate of gross use during the irrigating season, for the acreage irrigated in 1928, was approximately one cubic foot per second to fifty-eight acres.

This duty of water would seem to indicate a surplus of water on Owl Creek but exactly the opposite was true. The low duty given in Table 17 covers an average period of fifty-days that all the ditches were operating. For twenty-three days of the fifty, during the month of May, there was an excess of water available with some wasting into the lake after all ditches were filled to capacity. The flow of Owl Creek fell off in a few days during the first week of June to a point where about one-half the priorities were eliminated. As a result those ditches which were closed had been operating over almost their entire season with considerable water

above their allotments. The result was a very low duty when the actual length of time water was diverted was considered. The normal irrigation season on Owl Creek is ninety-eight days which if applied to the amount of water diverted the same as the fifty-day period would give a duty of one hundred and fourteen acres per cubic foot per second.

A reasonable use of water on Owl Creek has been found to be one cubic foot per second to seventy-one acres as stated under the paragraph "Duty of Water" in the "Report on Water Supply and Use of Water from Owl Creek". This is the duty of water upon which the allotments in the stipulation for consent judgment were based.

CROPS

The crop yields on ranches irrigated from Owl Creek, as estimated by the water master, were fair. The wild hay crop on the lower ranches was nearly normal but suffered on higher lands for which water was not available after the first or second week in June. The first crop of alfalfa was good but no water was available to irrigate to any extent for a second crop or for pasture.

Gardens and orchards showed very good crops except those requiring water late in the season after the creek became too low to supply all domestic allotments.

DISCUSSION AND RESULTS IN 1928

The net available water supply of Owl Creek in 1928, as tabulated in Table 4 of this report, has been compared with that in 1927, as tabulated in Table 3 of the report for that season, in the following table:

Period	Average Flow Available - c.f.s.		Flow in 1928 expressed in per cent of flow in 1927
	1928	1927	
April 14 to 30	13.73	24.32	56
May	57.58	40.78	141
June	23.27	57.56	40
July 1 to 7	10.59	29.01	36
April 14 to July 7	~~105.17~~ 328	~~151.77~~ 425	~~69~~ 77

In making the above comparison it may be assumed that the 1927 run-off and distribution of run-off was nearly normal. The item of greatest importance, that may be noted from the above table is the distribution of the run-off. It will be noted that the run-off season during 1928 was approximately one month earlier than in 1927. Also that the total run-off in 1928 was approximately one third less than in 1927.

In a normal year general irrigation can easily be carried on by all water users until late in June. In 1927 water was not available for all users except for a period of twenty-three days from May 8th to May 30th. During this period an excess of water was used by all diversions. After May 30th no ditch was allowed more than its allotment of irrigation water.

FINANCIAL STATEMENT

The investigation and water master service during the 1928 season on Emerson, Owl, Cedar, and Soldier Creeks were financed partly by subscription from the water users and partly by contribution by the Division of Water Rights.

No segregation was made in the expense of conducting the work in 1928 on these four stream systems in Surprise Valley, because it was handled as a unit.

The total unit cost of the work in 1928 on these four stream systems was $ 0.23 per acre of irrigated land.

A financial statement in which receipts and disbursements are itemized, follows.

FINANCIAL STATEMENT

SURPRISE VALLEY WATER DISTRIBUTION

1928 SEASON

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RECEIPTS

Contributed by water users on Soldier Creek	$300.00	
Contributed by water users on Owl Creek	233.00	
Contributed by water users on Emerson Creek	299.95	
Contributed by water users on Cedar Creek	200.00	
Contributed by Division of Water Rights	800.00	$ 1,832.95

DISBURSEMENTS

Salaries	$1269.35	
Board and Lodging	161.18	
Travel Expense	171.50	
Automobile Expense	200.92	
Printing and Blueprinting	30.00	$ 1,832.95

A P P E N D I X

AGREEMENT

Re Distribution of Waters of Owl Creek

During the 1928 Irrigation Season

WHEREAS there is a suit entitled, "C. E. Cummins, et al, vs. Wiley Allen, et al", pending in the Superior Court of the State of California in and for the County of Modoc, in which the rights to water, from Owl Creek in said county and state, of all the parties hereunto subscribed are involved, and

WHEREAS the parties hereunto subscribed desire a definite basis for distribution of the waters of Owl Creek during the 1928 irrigation season,

NOW THEREFORE IT IS HEREBY STIPULATED AND AGREED by and between each and every party hereunto subscribed and among all of said parties:

1. That the waters of Owl Creek shall be distributed, during the period from April 1st to July 7, 1928 only, in accordance with Schedule 2 hereunto annexed and made a part hereof.

2. That the Division of Water Rights, of the Department of Public Works, of the State of California may appoint a Water Master to distribute the waters of Owl Creek and its tributaries during the 1928 irrigation season, in accordance with the rights of the several parties here to, as hereinabove provided in paragraph 1, and that said Water Master shall have power and authority to inspect and regulate the diversions of all the parties hereto in accordance with this agreement, and in the exercise of such authority may enter upon the lands of said parties for the purpose of such inspection and regulation, and may establish and maintain such gaging stations and measuring devices and require such diversion works in said stream and diversion ditches as may be necessary or convenient. The several ditch owners

shall furnish the necessary labor and material for the construction and installation of said measuring devices and diversion works.

3. That in order to meet the costs of such distribution by the Water Master during the 1928 irrigation season, the parties hereto agree to pay to the Division of Water Rights on or before April 1, 1928, their respective assessments as set forth in Schedule 1, hereunto annexed and made a part hereof.

IN WITNESS WHEREOF, the parties hereto have affixed their hands and seals this day of March, 1928.

SCHEDULE 1

APPORTIONMENT OF COST OF WATER MASTER SERVICE FOR

1928 IRRIGATION SEASON

OWL CREEK

NAME	Continuous Flow Allotment Cubic Feet per Second	Proportional Cost
J. C. Allen, Jr.	0.99	$ 7.50
W. & S. Allen	2.47	18.65
Jennie Arreche	3.06	23.10
Lyle Cook	4.98	37.60
C. E. Cummins	2.82	21.30
Cummins Estate	6.11	46.15
J. C. Ennis	8.87	67.00
J. W. Heryford	5.48	41.40
C. A. Larimore	1.26	9.50
Walter Malitz	0.53	4.00
J. M. Reeder	0.40	3.00
Jessie H. Stiner	0.94	7.10
Mary Wade	1.81	13.70
Totals	39.72	$ 300.00

SCHEDULE 2

WATER ALLOTMENTS FROM OWL CREEK LISTED IN THE ORDER OF PRIORITIES

Ranch	Ditch	Acreage to be Supplied	Allotment Cubic Feet Per Second	Priority
Fannie D. McClintock	McClintock	Domestic	0.52	First
J. W. Heryford	Heryford	Domestic	0.52	Second
C. E. Cummins	Cummins Upper	Domestic	0.52	Third
J. C. Ennis	Ennis-Arreche	Domestic	0.43	Fourth
Jennie Arreche	Ennis-Arreche	Domestic	0.43	Fourth
Mary Wade	Wade	Domestic	0.52	Bet. 4&5
Jessie H. Stiner	Stiner	Domestic	0.43	Fifth
J. C. Allen Estate	Price (Allen)	Domestic	0.43	Sixth
J. M. Reeder	Reeder	Domestic	0.43	Seventh
Fannie D. McClintock	McClintock, or Old Channel	318.0	3.95	Eight
J. C. Ennis	Dalton	154.5	2.18	Ninth
J. W. Heryford	Heryford	254.9	3.07	Tenth
C. E. Cummins	Cummins (Upper)	160.0	1.74	Eleventh
	(Lower South)			
	(North)			
C. E. Cummins	Williams	40.0	0.56	Twelfth
Cummins Estate	King or Old Channel	273.5	3.85	Twelfth
J. C. Ennis	Ennis-Arreche	82.0	0.73	Thirteenth
Jennie Arreche	Ennis-Arreche	89.0	0.82	Thirteenth
Mary Wade	Wade	128.7	1.29	Fourteenth
J. C. Allen, Jr.	Chase	70.5	0.99	Fourteenth
C. A. Larimore	Chase	89.2	1.25	Fourteenth
J. W. Heryford	Heryford	36.5	0.51	Fifteenth
Cummins Estate	King or Old Channel	277.0	2.26	Fifteenth
J. W. Heryford	Heryford	97.6	1.38	Sixteenth
Mrs. Jesse H. Stiner	Stiner	66.5	0.51	Seventeenth
J. C. Allen Estate	Price (Allen)	37.5	0.10	Eighteenth
W. and S. Allen	Allen-Arreche	175.2	2.47	Nineteenth
Jennie Arreche	Allen-Arreche	128.9	1.81	Nineteenth
H. D. Cook Estate	Cook	464.5	4.98	Nineteenth
J. M. Reeder	Reeder	28.5	0.00	Twentieth
Fannie D. McClintock	McClintock	75.0	1.06	Twenty-First
	TOTAL	3918.8	37.94	

TABLES

TABLE 1

PRECIPITATION AT CEDARVILLE FOR SEASONAL YEAR
1927-28 COMPARED WITH MEAN PRECIPITATION
(Records from 1894-1928)

Month	Mean Precipitation at Cedarville in Inches	Precipitation for Seasonal Year 1927-28: In Inches	In Per Cent of Mean Total
September	0.53	0.32	2.5
October	1.08	0.86	6.7
November	1.71	2.87	22.5
December	1.62	0.86	6.7
January	1.74	0.92	7.2
February	1.56	0.75	5.9
March	1.47	2.93	23.0
April	0.90	0.81	6.4
May	1.07	0.00	0.0
June	0.62	0.55	4.3
July	0.26	0.00	0.0
August	0.19	0.00	0.0
TOTAL	12.75	10.87	85.2

TABLE 2

CHARACTER OF PRECIPITATION AT CEDARVILLE FOR SEASONAL YEAR 1927-28
COMPARED WITH MEAN

Month	Mean Precipitation				Precipitation 1927-28			
	Total Inches	Snow Inches	Rain Inches	Snow Expressed in Per Cent of Total	Total Inches	Snow Inches	Rain Inches	Snow Expressed in Per Cent of Total
December	1.62	1.20	0.42	74%	0.86	0.86	0.00	100%
January	1.74	1.40	0.34	80	0.92	0.40	0.52	44
February	1.56	1.10	0.46	70	0.75	0.00	0.75	0
March	1.47	1.20	0.27	82	2.93	0.00	2.93	0
TOTAL	6.39	4.90	1.49	77%	5.46	1.26	4.20	23%

NOTE: 10 inches of snow assumed equal to 1 inch of rain.

TABLE 3

RECORDS OF DAILY DISCHARGE IN CUBIC FEET PER SECOND OF OWL CREEK AT REGISTER STATION FOR THE PERIOD APRIL 14 TO JULY 31, 1928.

Day	April	May	June	July	August
1		19.6	36.3	14.0	
2		21.0	36.3	12.3	
3		24.5	38.5	11.8	
4		27.7	35.5	9.5	
5		31.4	34.6	7.5	
6		37.2	33.7	6.4	
7	NO RECORD	42.8	30.7	6.0	
8		44.8	26.5	5.7	
9		67.7	26.5	5.5	
10		67.7	25.1	5.3	
11		62.8	23.5	4.8	
12		63.0	21.5	6.4	NO RECORD
13		65.2	19.6	6.0	
14	8.6	66.6	19.2	5.5	
15	9.4	67.7	19.2	5.3	
16	8.9	63.0	18.8	5.0	
17	8.4	54.6	18.4	5.0	
18	7.9	52.2	18.0	4.8	
19	7.7	51.2	17.5	4.5	
20	7.9	53.5	17.5	4.3	
21	8.6	87.4	17.5	4.0	
22	10.1	80.0	17.2	3.7	
23	11.7	77.7	17.2	3.3	
24	10.6	74.0	17.2	3.1	
25	11.5	67.7	16.8	2.9	
26	12.9	64.2	16.5	*2.7	
27	17.5	60.6	16.2	*2.5	
28	21.0	58.0	15.0	*2.3	
29	24.5	55.6	14.8	*2.2	
30	31.4	47.0	16.5	2.1	
31		39.0		*2.0	
Total Sec. Feet Days	*218.6	1695.4	678.3	166.4	109 Day Period
Mean Sec. Feet	12.86	54.69	22.63	5.37	25.31
Maximum Sec. Feet	31.4	87.4	36.3	14.0	87.4
Minimum Sec. Feet	7.7	19.6	14.8	2.0	2.0
Total Acre Feet	433.	3362.	1346.	330	5471.

* Estimated.

** 17 days.

TABLE 4

ESTIMATED DAILY DISCHARGE OF OWL CREEK IN CUBIC FEET PER SECOND ABOVE ALL DIVERSIONS FOR PERIOD APRIL 14 TO JULY 31, 1928

Day	April	May	June	July	August
1		21.6	39.3	14.0	
2		23.1	38.8	12.3	
3		26.8	37.8	11.8	
4		30.2	37.7	10.5	
5		34.1	36.8	9.1	
6	NO RECORD	40.1	35.9	8.4	
7		45.6	32.7	8.0	
8		47.5	28.5	7.7	
9		70.4	27.3	7.5	
10		70.5	25.1	7.3	
11		65.7	23.5	6.8	
12		66.0	21.5	6.4	
13		68.5	19.6	6.0	NO RECORD
14	8.6	69.9	19.2	5.5	
15	9.4	71.1	19.2	5.3	
16	8.9	66.2	18.8	5.0	
17	8.4	57.6	18.4	5.0	
18	7.9	55.2	18.0	4.8	
19	7.7	54.0	17.5	4.5	
20	7.9	56.3	17.5	4.3	
21	8.6	90.8	17.5	4.0	
22	10.1	83.2	17.2	3.7	
23	11.7	80.9	17.2	3.3	
24	12.6	77.0	17.2	3.1	
25	13.5	70.7	16.8	2.9	
26	14.9	67.1	16.5	2.7	
27	19.5	63.4	16.2	2.5	
28	23.1	60.8	15.0	2.3	
29	26.7	58.4	14.8	2.2	
30	33.9	50.2	16.5	2.1	
31		42.2		2.0	
Total Sec. Feet Days	*233.4	1785.1	698.0	181.0	109 day Period
Mean Second Feet	13.73	57.58	23.27	5.84	26.58
Minimum Second Feet	33.9	90.8	39.3	14.0	90.8
Maximum Second Feet	7.7	21.6	14.8	2.0	2.0
Total Acre Feet	463	3540	1384.	359.	5746.

* 17 days.

TABLE 5

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF ALLEN-ARRECHE DITCH ON OWL CREEK AT HEAD - 1928

Day	April	May	June	July	August
1		2.0	3.0	0.0	
2		2.1	2.5	0.0	
3		2.3	2.3	0.0	
4		2.5	2.2	1.0	
5		2.7	2.2	1.6	
6		2.9	2.2	2.0	
7		2.8	2.0	2.0	
8		2.7	2.0	2.0	
9		2.7	0.8	2.0	
10		2.8	0.0	2.0	
11	NO DIVERSION	2.9	0.0	2.0	
12		3.0	0.0		
13		3.3	0.0		
14		3.3	0.0		
15		3.4	0.0		
16		3.2	0.0	NO DIVERSION	
17		3.0	0.0		
18		3.0	0.0		
19		2.8	0.0		
20		2.8	0.0		
21		3.4	0.0		
22		3.2	0.0		
23		3.2	0.0		
24	2.0	3.0	0.0		
25	2.0	3.0	0.0		
26	2.0	2.9	0.0		
27	2.0	2.8	0.0		
28	2.1	2.8	0.0		
29	2.2	2.8	0.0		
30	2.5	3.2	0.0		
31		3.2			
Total Sec. Feet Days	14.8	89.7	19.2	14.6	79 day Period
Mean Sec. Feet	2.11	2.89	0.64	1.33	1.75
Maximum Sec. Feet	2.5	3.4	3.0	2.0	3.4
Minimum Sec. Feet	2.0	2.0	0.0	0.0	0.0
Total Acre Feet	29.	178.	38.	29.	274.

TABLE 6

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF ENNIS-ARRECHE DITCH ON OWL CREEK AT HEAD - 1928

Day	April	May	June	July	August
1		2.0	2.4	.86	
2		2.0	2.4	.86	
3		2.0	2.4	.86	
4		2.1	2.4	.86	
5		2.1	2.4	1.5	
6	NO RECORD	2.2	2.4	2.0	
7		2.2	2.4	2.0	
8		2.2	2.4	2.0	
9		3.0	2.4	2.0	
10		3.5	2.4	2.0	
11		3.5	2.4	1.6	NO RECORD
12		3.5	2.4	1.7	
13		3.5	.86	1.3	
14	.86	3.5	.86	.86	
15	.86	3.5	.86	.86	
16	.86	3.5	.86	.86	
17	.86	3.4	.86	.86	
18	.86	3.4	.86	.86	
19	.86	3.4	.86	.86	
20	.86	3.4	.86	.8	
21	2.0	3.6	.86	.8	
22	2.0	3.5	.86	.8	
23	2.0	3.5	.86	.8	
24	2.4	3.5	.86	.7	
25	2.4	3.5	.86	.7	
26	2.4	3.2	.86	.6	
27	2.4	3.0	.86	.6	
28	2.6	3.0	.86	.6	
29	2.6	2.5	.86	.6	
30	2.8	2.4	.86	.5	
31		2.3		.5	
Total Sec. Feet Days	29.62	91.9	44.28	32.7	109 day Period
Mean Sec. Feet	1.74	2.96	1.48	1.05	1.82
Maximum Sec. Feet	2.8	3.6	2.4	2.0	3.6
Minimum Sec. Feet	0.86	2.0	0.86	0.5	0.5
Total Acre Feet	59.	182.	88.	65.	394.

TABLE 7

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF DALTON DITCH ON OWL CREEK AT HEAD
1928

Day	April	May	June	July	
1		2.2	2.3		
2		2.2	2.3		
3		2.2	2.3		
4		2.2	2.2		
5		2.4	2.2		
6		2.5	2.2		
7		2.6	2.2		
8		2.8	2.2		
9		4.2	2.2		
10		4.2	2.2		
11	NO DIVERSION	4.0	2.2	NO DIVERSION	
12		4.0	2.2		
13		4.1	2.0		
14		4.2	2.0		
15		4.2	2.0		
16		4.1	2.0		
17		3.8	1.8		
18		3.8	1.5		
19		3.8	1.5		
20		3.8			
21		4.4	NO DIVERSION		
22		4.4			
23		4.3			
24		4.3			
25		4.2			
26	2.0	4.2			
27	2.2	3.8			
28	2.2	3.6			
29	2.4	3.3			
30	2.7	2.8			
31		2.4			
Total Sec. Feet Days	11.5	109.0	39.5		55 day Period
Mean Sec. Feet	2.30	3.52	2.08		2.73
Maximum Sec. Feet	2.7	4.4	2.3		4.4
Minimum Sec. Feet	2.0	2.2	1.5		1.5
Total Acre Feet	23.	216.	78.		317.

TABLE 8

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF SADE DITCH ON OWL CREEK AT HEAD - 1928

Day	April	May	June	July
1		1.7	1.8	
2		1.7	1.8	
3		1.8	1.8	
4		1.8	1.8	
5		1.8	1.8	
6		1.8	1.8	
7		2.0	1.8	
8		2.0	1.8	
9		2.6	1.6	
10		2.6	1.6	
11	NO DIVERSION	2.6	1.6	
12		2.6	1.2	
13		2.6		
14		2.6		
15		2.6		
16		2.6	NO DIVERSION	NO DIVERSION
17		2.6		
18		2.6		
19		2.6		
20		2.6		
21		2.6		
22		2.6		
23		2.6		
24		2.6		
25		2.6		
26		2.6		
27		2.5		
28		2.4		
29	1.8	2.2		
30	1.8	2.0		
31		1.8		
Total Sec. Feet Days	3.6	72.3	20.4	45 day Period
Mean Sec. Feet	1.8	2.33	1.7	2.14
Maximum Sec. Feet	1.8	2.6	1.8	2.6
Minimum Sec. Feet	1.8	1.7	1.2	1.2
Total Acre Feet	7.	143.	40.	190.

TABLE 9

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF COOK DITCH ON COL CREEK AT HEAD - 1926

Day	April	May	June	July	
1		NO DIVERSION	3.5	0.0	
2			3.0	0.0	
3			3.0	2.5	
4			3.0	2.0	
5			3.0	1.2	
6			3.0	1.2	
7		5.0	2.5	0.9	
8		5.0	2.5	0.7	
9		7.0	1.0	0.5	
10		7.0	0.0	0.3	
11		6.6	0.0	0.3	
12	NO DIVERSION	6.6	0.0	1.6	
13		7.0	0.0	1.6	
14		7.0	0.0	1.6	
15		7.0	0.0	1.4	
16		6.6	0.0	1.2	
17		6.0	0.0		
18		6.0	0.0		
19		6.0	0.0		
20		6.0	0.0		
21		7.2	0.0	NO DIVERSION	
22		7.0	0.0		
23		7.0	0.0		
24		6.5	0.0		
25		6.5	0.0		
26		6.5	0.0		
27		6.5	0.0		
28		6.5	0.0		
29		6.5	0.0		
30		5.5	0.0		
31		4.5			
Total Sec. Feet Days		159.0	24.5	17.0	71 day Period
Mean Sec. Feet		6.36	8.17	1.06	2.82
Maximum Sec. Feet		7.2	3.5	2.5	7.2
Minimum Sec. Feet		4.5	0.0	0.0	0.0
Total Acre Feet		315.	49.	34.	398.

TABLE 10

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF STINER DITCH ON OWL CREEK AT HEAD - 1928

Day	April	May	June	July	August
1		0.9	0.9	0.43	
2		0.9	0.9	0.43	
3		0.9	0.9	0.43	
4		0.9	0.9	0.43	
5		0.9	0.8	0.43	
6	NO RECORD	1.0	0.8	0.43	
7		1.0	0.43	0.43	
8		1.0	0.43	0.43	
9		1.6	0.43	0.43	
10		1.6	0.43	0.43	
11		1.6	0.43	0.43	
12		1.6	0.43	0.43	
13		1.6	0.43	0.43	NO RECORD
14	0.4	1.6	0.43	0.43	
15	0.4	1.6	0.43	0.43	
16	0.4	1.6	0.43	0.43	
17	0.4	1.4	0.43	0.43	
18	0.4	1.4	0.43	0.43	
19	0.4	1.4	0.43	0.43	
20	0.4	1.4	0.43	0.4	
21	0.4	1.8	0.43	0.3	
22	0.4	1.8	0.43	0.3	
23	0.4	1.6	0.43	0.3	
24	0.4	1.6	0.43	0.3	
25	0.4	1.6	0.43	0.3	
26	0.4	1.4	0.43	0.2	
27	0.4	1.3	0.43	0.2	
28	0.5	1.3	0.43	0.2	
29	0.6	1.2	0.43	0.2	
30	0.9	1.0	0.43	0.2	
31		0.9		0.2	
Total Sec. Feet Days	7.6	41.4	15.52	11.27	109 day Period
Mean Sec. Feet	0.45	1.34	5.17	0.36	0.70
Maximum Sec. Feet	0.9	1.8	0.9	0.43	1.8
Minimum Sec. Feet	0.4	0.9	0.43	0.2	0.2
Total Acre Feet	15.	82.	31.	22.	150.

TABLE 11

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF CHASE DITCH ON OWL CREEK AT HEAD - 1928

Day	April	May	June	July
1		1.8	2.3	
2		2.0	2.3	
3		2.25	2.3	
4		2.25	2.3	
5		2.25	2.3	
6		2.3	2.3	
7		2.3	2.3	
8		2.3	2.3	
9		2.5	2.2	
10		2.5	2.2	
11		2.5	1.5	
12		2.5		
13		2.5		
14		2.5		
15		2.5		
16		2.5		
17	NO DIVERSION	2.5	NO DIVERSION	NO DIVERSION
18		2.5		
19		2.5		
20		2.5		
21		2.5		
22		2.5		
23		2.5		
24		2.5		
25		2.5		
26		2.5		
27		2.5		
28	1.5	2.5		
29	1.5	2.5		
30	1.5	2.2		
31		2.2		
Total Sec. Feet Days	4.5	74.35	24.3	45 day Period
Mean Sec. Feet	1.5	2.40	2.21	2.27
Maximum Sec. Feet	1.5	2.5	2.3	2.5
Minimum Sec. Feet	1.5	1.8	1.5	1.5
Total Acre Feet	9.	147.	48.	204.

TABLE 12

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF McCLINTOCK DITCH ON OWL CREEK AT HEAD - 1928

Day	April	May	June	July	August
1		4.5	4.7	6.0	
2		4.5	4.7	1.0	
3		4.6	4.7	0.52	
4		4.6	4.7	0.52	
5		4.7	4.7	0.52	
6		4.8	4.5	0.52	
7	NO RECORD	5.5	4.7	0.52	
8		6.5	4.6	0.52	
9		6.5	4.5	0.52	
10		6.5	4.4	0.52	
11		6.5	4.5	0.52	
12		6.5	4.5	0.52	
13		6.5	4.7	0.52	
14	0.5	6.5	4.6	0.52	NO RECORD
15	0.5	6.5	4.6	0.52	
16	0.5	6.5	4.5	0.52	
17	0.5	6.5	4.5	1.7	
18	0.5	6.0	5.0	1.6	
19	0.5	6.0	5.0	1.4	
20	0.5	6.0	6.0	1.3	
21	0.5	7.0	6.0	1.1	
22	0.5	7.0	6.0	0.9	
23	0.5	6.5	6.0	0.5	
24	0.5	6.5	6.0	0.5	
25	0.5	6.5	6.0	0.4	
26	0.5	6.0	6.0	0.4	
27	4.0	6.0	6.0	0.4	
28	4.5	6.0	6.0	0.4	
29	5.0	6.0	6.0	0.4	
30	5.0	5.8	6.0	0.4	
31		5.6		0.3	
Total Sec. Feet Days	25.0	185.1	154.1	25.98	109 day Period
Mean Sec. Feet	1.47	5.97	5.14	0.84	3.58
Maximum Sec. Feet	5.0	7.0	6.0	6.0	7.0
Minimum Sec. Feet	0.5	4.5	4.4	0.3	0.3
Total Acre Feet	50.	367.	306.	52.	775.

TABLE 13

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND OF
PRICE DITCH ON OWL CREEK AT HEAD - 1928

Day	April	May	June	July	August
1		0.4	0.5	0.43	
2		0.4	0.5	0.43	
3		0.4	0.5	0.43	
4		0.4	0.5	0.43	
5		0.4	0.5	0.43	
6		0.5	0.5	0.43	
7	NO RECORD	0.6	0.43	0.43	
8		0.6	0.43	0.43	
9		1.0	0.43	0.43	
10		1.0	0.43	0.43	
11		1.0	0.43	0.43	NO DIVERSION
12		1.0	0.43	0.43	
13		1.0	0.43	0.43	
14	0.3	1.0	0.43	0.43	
15	0.3	1.0	0.43	0.43	
16	0.3	1.0	0.43	0.43	
17	0.3	0.8	0.43	0.43	
18	0.3	0.8	0.43	0.4	
19	0.3	0.8	0.43	0.4	
20	0.3	0.8	0.43	0.4	
21	0.3	1.0	0.43	0.4	
22	0.3	1.0	0.43	0.4	
23	0.3	1.0	0.43	0.4	
24	0.3	1.0	0.43	0.4	
25	0.3	0.8	0.43	0.3	
26	0.3	0.8	0.43	0.4	
27	0.3	0.7	0.43	0.4	
28	0.4	0.6	0.43	0.3	
29	0.4	0.5	0.43	0.3	
30	0.4	0.5	0.43	0.3	
31		0.5		No Diversion	
Total Sec. Feet Days	5.4	25.3	13.32	12.11	108 day Period
Mean Sec. Feet	0.32	0.75	0.44	0.40	0.50
Maximum Sec. Feet	0.4	1.0	0.5	0.43	1.0
Minimum Sec. Feet	0.3	0.4	0.43	0.3	0.3
Total Acre Feet	11.	46.	26.	24.	107.

TABLE 19

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND OF CUMMINS
COMBINED DIVERSIONS ON OWL CREEK AT HEADS - 1928

Day	April	May	June	July	August
1		2.0	8.8	4.4	
2		2.5	9.3	6.0	
3		3.0	8.5	5.4	
4		6.0	8.7	3.8	
5		7.0	8.2	2.1	
6	NO RECORD	8.0	7.8	0.52	
7		9.0	6.7	0.52	
8		9.0	3.6	0.52	
9		12.5	5.6	0.52	
10		12.5	5.6	0.52	
11		12.5	4.5	0.52	
12		12.5	4.7	0.52	
13		13.0	5.7	0.52	NO RECORD
14	1.5	13.0	5.5	0.52	
15	1.5	13.5	5.5	0.52	
16	1.5	13.0	5.3	0.5	
17	1.5	13.0	5.3	0.5	
18	1.5	12.0	4.6	0.5	
19	1.5	12.0	4.2	0.4	
20	1.5	12.0	4.5	0.4	
21	1.5	13.0	4.5	0.4	
22	2.0	14.0	4.3	0.4	
23	2.0	13.0	4.3	0.4	
24	2.0	12.0	5.8	0.4	
25	2.0	11.5	6.9	0.4	
26	2.0	11.5	6.6	0.4	
27	2.5	11.0	6.4	0.2	
28	2.5	10.5	5.2	0.2	
29	2.5	10.0	5.1	0.2	
30	3.0	9.5	6.4	0.2	
31		9.0		0.4	
Total Sec. Feet Days	32.5	325.0	178.1	32.8	109 day Period
Mean Sec. Feet	1.91	10.48	5.94	1.06	5.21
Maximum Sec. Feet	3.0	13.0	9.3	6.0	15.0
Minimum Sec. Feet	1.5	2.0	3.6	0.2	0.2
Total Acre Feet	64.	644.	353.	65.	1126.

TABLE 16

ESTIMATED COMBINED DAILY DISCHARGES
IN CUBIC FEET PER SECOND OF ALL DIVERSIONS ON OWL CREEK - 1928

Day	April	May	June	July	August
1		21.0	35.7	12.64	
2		21.8	35.2	9.24	
3		22.95	34.2	10.66	
4		26.35	34.1	9.56	
5		27.85	33.3	8.3	
6	NO RECORD	29.6	32.5	7.62	
7		38.5	29.56	7.32	
8		40.1	25.86	7.12	
9		49.6	24.66	6.92	
10		50.2	22.66	6.72	
11		49.7	21.16	6.32	NO RECORD
12		49.8	19.36	5.72	
13		51.1	17.62	5.32	
14	4.06	51.2	17.32	4.88	
15	4.06	51.8	17.32	4.68	
16	4.06	50.6	16.92	4.46	
17	4.06	49.0	16.62	4.44	
18	4.06	47.0	16.12	4.31	
19	4.06	46.8	15.72	4.01	
20	4.06	46.8	15.72	3.8	
21	5.2	55.0	15.72	3.5	
22	5.7	53.0	15.52	3.3	
23	5.7	51.2	15.52	2.9	
24	8.1	49.5	15.52	2.8	
25	8.1	48.7	15.14	2.6	
26	10.1	47.6	14.84	2.4	
27	14.3	45.6	14.64	2.2	
28	19.7	44.7	13.44	2.0	
29	22.5	43.0	13.34	2.0	
30	24.2	39.4	14.64	1.9	
31		36.4		1.8	
Total Sec. Feet Days	152.02	1335.85	629.94	161.44	109 day Period
Mean Sec. Feet	8.94	43.09	21.00	5.21	20.91
Maximum Sec. Feet	24.2	55.0	35.7	12.64	55.00
Minimum Sec. Feet	4.06	21.0	13.34	1.8	1.8
Total Acre Feet	301.	2649.	1249.	320.	4519.

TABLE 17

GROSS USE OF WATER FOR IRRIGATION FROM OWL CREEK IN 1928

Ditch	Property Owner	Period of General Irrigation	Acre Feet Diverted	Acreage Irrigated	Gross Use of Water During Period of General Irrigation: Acre Feet per Acre	Gross Use of Water During Period of General Irrigation: Acres per c.f.s.
Allen-Arreche	W.&S. Allen Jennie Arreche	4/24-6/9	274	240.0	1.14	82
Ennis-Arreche	J. C. Ennis Jennie Arreche	4/21-6/12	286	171.0	1.67	63
Dalton	J. C. Ennis	4/26-6/19	317	149.0	2.23	51
Wade	Mary Wade	4/29-6/12	190	104.5	1.82	49
Cook	H. D. Cook Estate	5/7-6/9	398	32.0	1.24	54
Stiner	Jessie H. Stiner	4/28-6/6	96	12.5	7.68	10
Chase	J. C. Allen, Jr. C. A. Larimore	4/28-6/11	204	110.0	1.85	48
McClintock	Fannie D. McClintock	4/27-7/2	724	300.0	2.41	55
Price	W. Malitz	5/6-6/6	48	30.0	1.60	38
Heryford	J.W.Heryford	4/28-6/24	534	300.0	1.78	63
Cummins (Combined)	C. E. Cummins Cummins Estate	4/22-7/5	1083	671.0	1.62	92
TOTAL AND MEAN		4/28-6/16	4154	2408.0	1.72	58

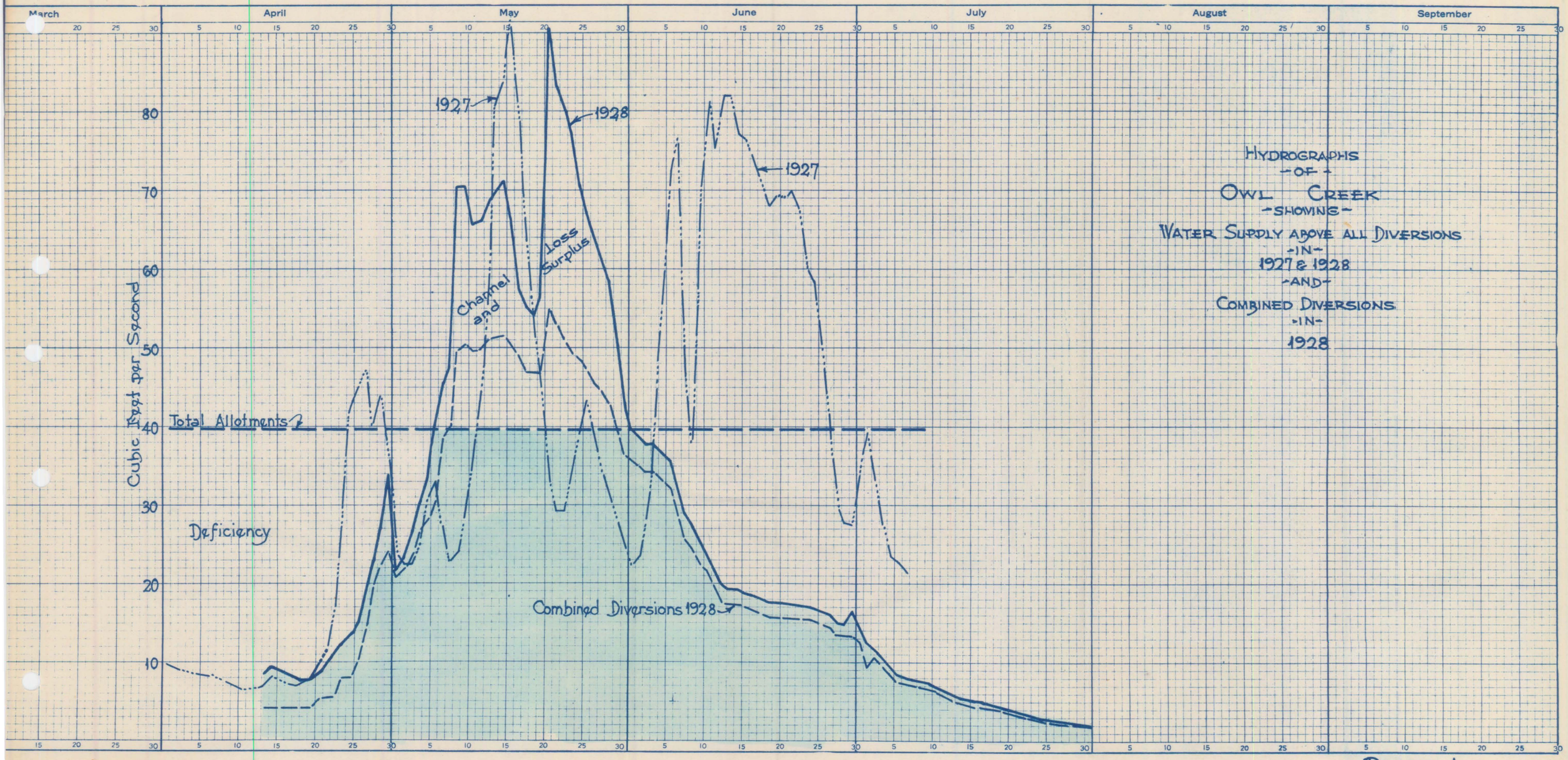
March
April
May
June
July
August
September
Cubic Feet per Second
80
70
60
50
40
30
20
10
1927
1928
1927
Loss
Surplus
Channel
and
Total Allotments
Deficiency
Combined Diversions 1928
HYDROGRAPHS
-OF-
OWL CREEK
-SHOWING-
WATER SUPPLY ABOVE ALL DIVERSIONS
-IN-
1927 & 1928
-AND-
COMBINED DIVERSIONS
-IN-
1928

PLATE 1

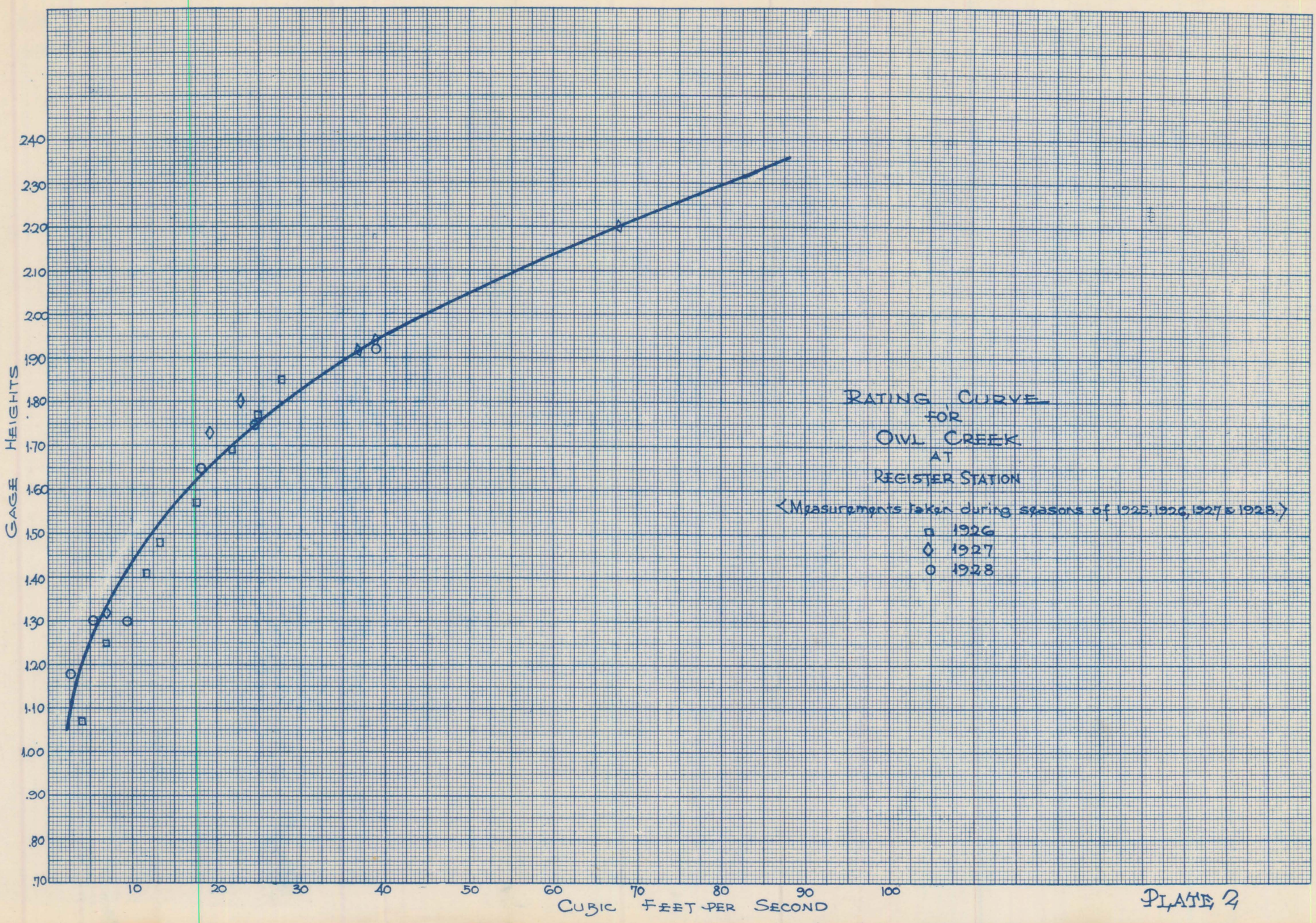
RATING CURVE
FOR
OWL CREEK
AT
REGISTER STATION
(Measurements taken during seasons of 1925, 1926, 1927 & 1928.)
1926
1927
1928
GAGE HEIGHTS
2.40
2.30
2.20
2.10
2.00
1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
.90
.80
.70
10
20
30
40
50
60
70
80
90
100
CUBIC FEET PER SECOND

PLATE 2