DEPARTMENT OF PUBLIC WORKS

STATE OF CALIFORNIA

REPORTS OF THE

DIVISION OF WATER RESOURCES

Edward Hyatt, State Engineer

REPORT ON WATER MASTER SERVICE ON OWL CREEK MODOC COUNTY, CALIFORNIA DURING SEASON OF 1929

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By Leslie C. Jonson, Water Master

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Sacramento, California
March 1930

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STATE OF CALIFORNIA

Department of Public Works

SACRAMENTO

DIVISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

EDWARD HYATT, STATE ENGINEER
CHIEF OF DIVISION

March 1, 1930

Mr. Edward Hyatt
State Engineer
Sacramento, California

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

A report covering the water master service on Owl Creek in Modoc County, California, during the season of 1929, is submitted herewith.

This report includes a description of the regulation and distribution of the waters of Owl Creek in accordance with the provisions of the decree entered on April 29, 1929, by the Superior Court of the State of California, in and for the county of Modoc, in the case of C. E. Cummins, et al., vs. Wiley Allen, et al., and a discussion of the results that were accomplished thereby.

Run-off records and other pertinent hydraulic data are included, together with a financial statement showing the cost of water master service, and the sources from which such cost was met.

Respectfully submitted,

Leslie C. Jopson
Water Master

REPORT ON WATER MASTER SERVICE

ON OWL CREEK, MODOC COUNTY, CALIFORNIA

DURING SEASON OF 1929

INTRODUCTION

A history of the case of C. E. Cummins, et al., vs. Wiley Allen, et al., may be found in the "Report on Water Supply and Use of Water from Owl Creek, Modoc County, California", by T. Russel Simpson, Assistant Hydraulic Engineer, dated December 21, 1925, and in the "Report on Water Master Service on Owl Creek" of 1926, 1927 and 1928.

A decree was entered in the above mentioned case on April 29, 1929, by the Superior Court of Modoc County. In this decree the Division of Water Rights, or its successor, was appointed permanent water master to act at such times as it was deemed necessary by the said Division.

Anticipating the entering of the decree Mr. Leslie C. Jopson was appointed Modoc County Water Master for the 1929 irrigation season, under the provision of the stipulation for consent judgment in the case of C. E. Cummins, et al., vs. Wiley Allen. et al., which was signed by all the water users on Owl Creek in 1928, and subsequently took up his duties in the field on April 1st.

Distribution of the waters of Owl Creek was made by the water master in 1929 in accordance with the above mentioned decree which sets forth the respective rights and priorities of all the water users on Owl Creek except that of Mary Wade which is set forth in a stipulation among the water users.

A schedule of allotments, as was later incorporated in the decree, was embodied in the water master report for the 1928 season as Schedule 2 of the appendix. The decree discusses these rights in more detail and sets forth several rights outside of the general irrigation season which are not mentioned in the Schedule.

DISTRIBUTION OF WATER

1. Functions of Water Master

The primary function of the water master on Owl Creek was the supervision of the distribution of the water of the stream in accordance with the decree entered by the Superior Court of Modoc County in the case of C. E. Cummins, et al., vs. Wiley Allen, et al., dated April 29, 1929. The allotments of water under the decree were the same as the allotments under the agreements used in 1927 and 1928, a copy of which is included in the 1928 report. The water master also collected hydrographic and other data pertinent to the water master service.

The duties of water master were assumed in the field on April 1, 1929. Measuring devices were installed on all of the diversion ditches immediately thereafter, for the purpose of assisting in the regulation of the distribution of water. These devices consisted of staff gages rated with an accoustic current meter but were later replaced by Parshall Measuring Flumes as time became available.

In order to obtain information as to the net water supply available for delivery, an automatic water stage recorder was installed in Owl Creek immediately above the uppermost diversion. The flow of Owl Creek often varies more than 50 per cent during a 24 hour period. The mean daily discharge for any current day could be computed from the recorded fluctuation in flow during the preceding 24 hour period.

The computed mean daily discharge for the current day was the criterion for apportioning the flow, rather than the flow at any particular moment of observation. The automatic recorder station was equipped with a staff gage rated with an electric current meter. The measured channel loss was subtracted from the mean daily discharge at the recorder station

leaving the net water supply available for diversion under the schedule of allotments. The various diversions were regulated as often as the weather changed and effected the rate of run-off.

Records were kept of the water supply and of the distribution of the same among the various diversions between April 1 and September 30, 1929. Observations of crop conditions and of the acreage irrigated in 1929 were made at frequent intervals by the water master.

2. Allotments Compared with Water Supply

The water supply of Owl Creek during the 1929 season as compared with the total allotments under the decree is shown in Table 16 at the end of this report. It will be noted that there was no one-half month period in 1929 during which the average water supply reached the total amount of allotments. However, there were two times during the season, once in May and once in June, when there was water in excess of the allotments for a short time.

The average water supply for the 1929 irrigation season, that is, from Apri 1st to July 7th, was 51 per cent of the scheduled allotments for the same period. In 1927, which has been considered a very nearly normal year as to precipitation and run-off, the average water supply for the period from April 1st to July 7th was 89 per cent of the allotments.

The deficiency as described above was felt most keenly by the later rights, as all rights on Owl Creek are on a priority basis. These later rights, composing the last 10.93 cubic feet per second of the allotments, received water for only a portion of their allotments and that only during the latter half of May and a few days after the middle of June.

The late season water supply , that is, during August and September, when occasional regulations were made by the water master dropped below the domestic water allotments early in August and reached

a minimum flow at the register station of 1.8 cubic feet per second. Losses in the stream channel reduced this amount by half at the heads of the Mc Clintoch and Heryford ditches which were the only ditches open during the critical low flow period.

3. Efficiency of Distribution

A fair degree of efficiency of distribution, in accordance with the provisions of the court decree setting forth the respective rights on Owl Creek, was obtained during the 1929 season. The factor of inadequate headgates and measuring devices was largely overcome during the season by the installation in the various ditches of Parshall Measuring Flumes for measuring the amounts of water diverted. These installations will be discussed in more detail in a later chapter. The flashy character of the run-off on Owl Creek during the general irrigation season was a factor effecting the efficiency of distribution for which there appears to be no remedy.

RUN-OFF RECORDS

The standard method of collecting run-off records, as is briefly described on page 11 of the "Report on Water Supply and Use of Water From Owl Creek" dated December 21, 1925, was used in the water master service during the 1929 season.

An automatic water stage recorder was installed on Owl Creek at the mouth of the canyon, above all diversions except that of the Allen-Arreche Ditch, on March 29, 1929. Continuous records were kept of the water supply at this point from April 1st to September 30th, and have been tabulated in Table 3 of this report in cubic feet per second.

The hydrographs on Plate 1 graphically shows the relation between the water supply of Owl Creek in 1929 and in 1927.

The total of the allotments from Owl Creek under the decree is also shown on Plate 1.

PRECIPITATION

The precipitation at Cedarville, records of which are kept by the United States Weather Bureau, for the seasonal year commencing September 1, 1928, and terminating on August 31, 1929, have been compared with the mean precipitation in Table 1 of this report.

It will be noted from Table 1 that the total precipitation for the seasonal year 1928-29 was but 80 per cent of the mean annual precipitation. It will be further noted that the precipitation did not occur uniformly through the year but was characterized by excessive fluctuation from month to month, whereas, it is the more regular occurrence of storms which causes the best run-off conditions.

Most of the season of snowfall on the Warner Range of Mountains is normally included in the period from December 1st to April 1st. The most desirable snowpack, that is, snow which will usually pack hard and melt late in the spring, occurrs during this period. In average years approximately 50 per cent of the total annual precipitation at Cedarville occurrs during this four month period and 70 per cent of this is in the form of snow. During this four month period in 1928-29, the precipitation was about 65 per cent of the normal for the period and but 54 per cent of this amount occurred in the form of snow. The deficiency in precipitation during these four months, and especially the deficiency in snowfall, largely accounts for the low run-off from Owl Creek during the general irrigation season in 1929.

USE OF WATER

Continuous records were kept of the disposition made of the flow of Owl Creek during the period from April 1 to September 30, 1929. 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", to which previous mention has been made. The estimated mean daily diversions of the various ditches are shown in Tables 5 to 15, inclusive, submitted at the end of this report.

The areas irrigated under the various diversion systems, during the period from April 1 to July 10, 1929, 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, in acres irrigated per cubic foot per second and the total use in acre feet per acre have been calculated from the data in Table 17 and have been tabulated therein.

A comparison of the use of water in 1929 with the use in 1927 follows:

Description	1929	1927	Use in 1929 Expressed in per cent of 1927
Days in irrigation Season	79	98	81
Total acre feet diverted	3492	4718	74
Acreage Irrigated	2120	2824	75
Use in acre feet per acre	1.65	1.67	99
Use in acres irrigated per cubic foot per second	95	116	82

As may be seen the season in 1929 was 19 per cent shorter than in 1927 while the acre feet diverted and the acreage irrigated were both about 25 per cent less. The total use per acre on the acreage irrigated in the two years was comparable but the rate of use was 18 per cent lower in 1929 than

in 1927 due mainly to the difference in length of the irrigation season.

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 late in the season. The alfalfa hay crop was short due to the cold weather and to the limited amount of water available.

Gardens and orchards were fair but suffered from lack of water late in the season.

DISCUSSION OF RESULTS IN 1929

The gross available water supply in 1929, 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 1929 Expressed in per cent of flow in 1927
	1929	1927	
April 1 to April 15	5.35	7.91	68
April 16 to April 30	11.57	24.92	46
May 1 to May 15	19.90	37.28	53
May 16 to May 31	33.94	43.75	78
June 1 to June 15	23.04	57.98	40
June 16 to June 30	29.93	57.37	52
July 1 to July 7	17.41	29.01	60
April 1 to July 7	20.30	37.65	54

The above table indicates that the average flow of Owl Creek in 1929 was about 54 per cent of that in 1927 for the period shown. It will be seen also that the run-off in 1929 was not sustained through the later part of the season as was the case in 1927.

No great difficulty was encountered in distributing the waters of Owl Creek in 1929 even though the water supply was probably not over 50 per cent of normal.

A number of the users had insufficient water to meet their needs but realizing the deficiency in supply they were willing to take what it was possible to give them. The fact that some of the early rights were willing to get along on only a part of their water until they required their entire allotments also helped in allowing some of the later rights water.

The water supply during August and September was entirely inadequate to supply the domestic rights in 1929. A total of 4.23 cubic feet per second is included in these rights and but 1.00 cubic foot per second could be delivered to them after the first week of September. This 1.00 cubic foot per second was diverted by the McClintock and the Heryford

ditches, all other diversions being closed.as the water supply dropped below the point where water was available for their priority. The same condition of water supply continued through October and November.

MEASURING DEVICES

The decree in the case of C. E. Cummins, et al., vs. Wiley Allen, et al., not only set forth the respective rights of the various parties concerned but included a provision requiring the installation of adequate headgates and measuring devices in all of the diversion conduits. Accordingly, the water master, in 1929, made the overseeing of these installations an important part of his duties. The following devices were installed:

Ditch	Owner	Device
Ennis-Arreche	(J.C.Ennis (Jennie Arreche)	2 Foot Parshall Measuring Flume
Dalton	J. C. Ennis	2 Foot " " "
Cook	Lyle Cook, et al.	2 Foot " " "
Wade	Mary Wade	1 Foot " " "
Stiner	Jessie H. Stiner	6 Inch " " "
McClintoch	Leonora Caldwell	2 Foot " " "
Chase	(J. C. Allen (C. A. Larimore)	1 Foot " " "
Price	W. Malitz	6 Inch " " "
Heryford	J. W. Heryford	2 Foot " " "
Cummins	C. E. Cummins	2 Foot " " "

The Parshall Measuring Flumes were constructed according to the plans and specifications prepared by the Division of Water Rights. A record of the cost of the various sizes of Flumes installed was kept by the water master on all of the streams in Surprise Valley and has been tabulated below for flumes having 2 "x6" mudsills, 2"x4" sill caps, 2"x4" posts and, in all cases but one, 1 inch floor and sidewalls. The height of sidewalls were as shown in the table below. It will be noted that the price of lumber was $35.00 per M which is an average price for this vicinity.

Throat Width in Inches	Height of Side Walls in Inches	Cost of Materials: Lumber at $35.00 per M.	Cost of Materials: Nails, etc.	Cost of Labor: Cutting	Cost of Labor: Installing	Total Cost
6	15	$2.10	$0.30	$2.50	$2.55	$7.45
9	15	2.75	0.35	2.50	2.65	8.25
12	18	3.75	0.40	2.65	4.15	10.95
24	18	4.50	0.45	2.80	4.75	12.50
36	18	5.00	0.50	3.00	5.50	14.00
*24	18	7.75	0.55	3.50	5.50	17.30

* 2 inch material used for floor and walls.

STATUS OF APPLICATION

One application, No. 2842, to appropriate water from Owl Creek was withheld from action by the Division of Water Rights pending the outcome of the litigation on that creek. The application was filed by Wm. P. St. John on May 20, 1922, was protested by eight users whose ditches take out below the proposed point of diversion, and came up for hearing on May 7, 1924. An agreement was reached at this hearing whereby the protests were to be withdrawn and a permit was to be issued with a clause inserted therein, stating that all rights granted were subject to the rights to be decreed in the case of C. E. Cummins, et. al., vs. Wiley Allen, et.al., and that the Division of Water Rights was to regulate the diversion under the permit during periods of water scarcity to the end that such use would not interfere with prior vested rights.

Permit No. 3276 for 0.54 cubic foot per second to irrigate 43 acres of land was accordingly issued on June 11, 1929 to Walter T. Malitz to whom Mr. St. John had assigned his rights.

FINANCIAL STATEMENT

The investigation and water master service during the 1929 season in Modoc County on Davis, Soldier, Cedar, Owl and Emerson Creeks were financed partly by subscription from the water users and partly by contribution by the Division of Water Resources.

No segregation was made in the expense of conducting the work on these five stream systems in 1929. The total unit cost of the work on these five stream systems was twenty-five cents per acre of irrigated land, of which one-half was borne by the State. The unit cost to the water users was thus about twelve and one-half cents per acre of irrigated land.

A financial statement in which receipts and disbursements are itemized follows:

FINANCIAL STATEMENT

MODOC COUNTY WATER DISTRIBUTION

1929 SEASON

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RECEIPTS

Contributed by Owl Creek Water Users	$300.00	
Contributed by Soldier Creek Water Users	300.00	
Contributed by Cedar Creek Water Users	199.95	
Contributed by Davis Creek Water Users	500.05	
Contributed by Emerson Creek Water Users	299.95	
Contributed by Division of Water Resources	1,600.00	
		$ 3,199.95

DISBURSEMENTS

Salaries and Wages	$2,135.99	
Field Expenses	1,020.06	
Printing and Blueprinting	39.20	
Miscellaneous	4.70	
		$ 3,199.95

TABLES

TABLE 1

Precipitation for Seasonal Year 1928-29 Compared with Mean Precipitation at Cedarville - 1894 to 1929

Month	Mean Precipitation at Cedarville	Precipitation for Seasonal Year 1928-29	
		Cedarville	Per cent of Total Mean
September	0.26	0.40	3.1
October	1.03	0.15	1.2
November	1.59	1.43	11.0
December	1.53	0.42	3.2
January	1.81	2.08	16.0
February	1.64	0.59	4.5
March	1.49	1.20	9.3
April	0.89	1.85	14.2
May	1.12	0.29	2.2
June	0.68	1.98	15.2
July	0.28	0.00	0.0
August	0.21	0.00	0.0
TOTAL	12.99	10.39	80.0

Note: Per cent of Total Mean from May 1st to August 31st of average year is 17.6%, whereas in 1929 it was 17.4%

TABLE 2

Character of Precipitation at Cedarville for Seasonal Year 1928-29 compared with Mean

Month	Mean Precipitation				Precipitation 1928-29			
	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	1.53	1.10	0.43	72	0.42	0.20	0.22	48
January	1.81	1.40	0.41	77	2.08	1.50	0.58	72
February	1.64	1.00	0.64	61	0.59	0.40	0.19	68
March	1.49	1.10	0.39	74	1.20	0.20	1.00	17
TOTAL	6.53	4.60	1.93	70	4.29	2.30	1.99	54

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

TABLE 3

CONTINUOUS RECORDS OF DAILY DISCHARGE IN CUBIC FEET PER SECOND OF OWL CREEK AT REGISTER STATION FOR THE PERIOD FROM APRIL 1st TO SEPTEMBER 30th, 1929.

Day	April	May	June	July	August	September	
1	5.6	17.0	20.	20.	5.0	2.5	
2	6.7	17.0	21.	20.	5.0	2.3	
3	6.7	17.0	20.	18.9	4.4	2.3	
4	5.7	17.5	18.9	17.5	4.4	2.3	
5	5.2	16.0	17.9	16.5	4.1	2.3	
6	5.5	15.6	17.0	15.2	4.1	2.3	
7	5.5	15.6	16.5	13.8	4.1	2.3	
8	4.3	17.0	16.5	13.4	3.9	2.3	
9	4.5	18.9	20.	12.2	3.9	2.1	
10	4.5	18.9	18.9	11.8	3.6	2.1	
11	4.3	20.	18.5	9.5	3.3	2.1	
12	4.1	24.	19.4	9.1	3.3	2.1	
13	4.3	28.	21.	9.5	3.0	1.8	
14	5.5	28.	25.	9.3	3.0	1.8	
15	7.9	28.	75.	8.8	3.0	1.8	
16	9.5	31.	51.	8.0	2.8	1.8	
17	9.0	32.	41.	8.0	2.8	1.8	
18	8.7	33.	34.	7.8	2.5	1.8	
19	8.4	34.	30.	7.5	2.5	1.8	
20	11.4	37.	28.	7.5	2.5	1.8	
21	9.5	41.	29.	7.1	2.5	1.8	
22	9.0	43.	31.	6.8	2.5	1.8	
23	10.6	52.	30.	6.5	2.3	1.8	
24	9.8	51.	28.	6.2	2.3	1.8	
25	9.2	41.	28.	6.2	2.8	2.1	
26	11.0	31.	27.	6.2	2.8	2.1	
27	16.5	26.	25.	5.9	2.5	2.1	
28	17.0	24.	24.	5.6	2.5	2.1	
29	17.0	23.	22.	5.6	2.5	2.1	
30	17.0	23.	21.	5.3	2.5	2.1	
31		21.		5.3	2.5		
Total Sec. Ft. Days	253.9	841.5	794.6	311.0	98.9	61.2	183 Day Period
Mean Sec. Ft.	8.46	27.15	26.49	10.03	3.19	2.04	12.90
Maximum Sec. Ft.	17.0	52.	75.	20.	5.0	2.5	75.
Minimum Sec. Ft.	4.1	15.6	16.5	5.3	2.3	1.8	1.8
Total Ac. Ft.	503.5	1668.7	1575.7	616.7	196.1	121.4	4682.1

TABLE 4

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND OF OWL CREEK ABOVE ALL DIVERSIONS FOR THE PERIOD FROM APRIL 1st TO SEPTEMBER 30th, 1929.

Day	April	May	June	July	August	September	
1	5.6	17.0	22.	20.	5.0	2.5	
2	6.7	17.0	21.	20.	5.0	2.3	
3	6.7	17.0	20.	18.9	4.4	2.3	
4	5.7	17.5	18.9	17.5	4.4	2.3	
5	5.2	16.0	17.9	16.5	4.1	2.3	
6	5.5	15.6	17.0	15.2	4.1	2.3	
7	5.5	15.6	16.5	13.8	4.1	2.3	
8	4.3	17.0	16.5	13.4	3.9	2.3	
9	4.5	18.9	20.	12.2	3.9	2.1	
10	4.5	18.9	18.9	11.8	3.6	2.1	
11	4.3	21.	18.5	11.5	3.3	2.1	
12	4.1	26.	19.4	10.3	3.3	2.1	
13	4.3	30.	21.	10.7	3.0	1.8	
14	5.5	31.	25.	10.9	3.0	1.8	
15	7.9	31.	75.	10.3	3.0	1.8	
16	9.5	34.	51.	9.4	2.8	1.8	
17	9.0	35.	41.	9.3	2.8	1.8	
18	8.7	36.	34.	9.0	2.5	1.8	
19	8.4	37.	30.	8.6	2.5	1.8	
20	11.4	40.	30.	8.5	2.5	1.8	
21	9.5	44.	31.	8.0	2.5	1.8	
22	9.0	46.	33.5	7.6	2.5	1.8	
23	10.6	55.	32.4	7.1	2.3	1.8	
24	9.8	54.	30.	6.6	2.3	1.8	
25	9.2	44.	30.	6.2	2.8	2.1	
26	11.0	33.4	29.	6.2	2.8	2.1	
27	16.5	28.2	27.	5.9	2.5	2.1	
28	17.0	26.2	26.	5.6	2.5	2.1	
29	17.0	25.	24.	5.6	2.5	2.1	
30	17.0	25.	23.	5.3	2.5	2.1	
31		23.		5.3	2.5		
Total Sec. Ft. Days	253.9	895.3	819.5	327.2	98.9	61.2	183 Day Period
Mean Sec. Ft.	8.46	28.95	27.32	10.55	3.19	2.04	13.42
Maximum Sec. Ft.	17.0	55.	75.	20.	5.0	2.5	75.
Minimum Sec. Ft.	4.1	15.6	16.5	5.3	2.3	1.8	1.8
Total Ac. Ft.	503.5	1775.4	1625.1	648.8	196.1	121.4	4870.3

TABLE 5

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF ALLEN-ARRECHE DITCH ON OWL CREEK AT HEAD -
1929

Day	May	June	July	August	
1	NO DIVERSION	2.0	NO DIVERSION	NO DIVERSION	
2		0.0			
3		0.0			
4		0.0			
5		0.0			
6		0.0			
7		0.0			
8		0.0			
9		0.0			
10		0.0			
11	1.0	0.0	2.0		
12	2.0	0.0	1.2		
13	2.0	0.0	1.2		
14	3.0	0.0	1.6		
15	3.0	0.0	1.5		
16	3.0	0.0	1.4		
17	3.0	0.0	1.3		
18	3.0	0.0	1.2		
19	3.0	0.0	1.1		
20	3.0	2.0	1.0		
21	3.0	2.0	0.9		
22	3.0	2.5	0.8	*	
23	3.0	2.4	0.6		
24	3.0	2.0	0.4		
25	3.0	2.0			
26	2.4	2.0	NO DIVERSION		
27	2.2	2.0			
28	2.2	2.0			
29	2.0	2.0			
30	2.0	2.0			
31	2.0				
Total Sec. Ft. Days	*53.8	24.9	**16.2		51 Day Period
Mean Sec. Ft.	* 2.56	0.83	**		1.86
Maximum Sec. Ft.	* 3.0	2.5	** 2.0		3.0
Minimum Sec. Ft.	* 1.0	0.0	** 0.4		0.0
Total Ac. Ft.	*106.7	49.4	**32.1		156.1

* 21 day period.

** Not included in Totals and Means.

TABLE 6

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND OF ENNIS-ARNECHE DITCH ON OIL CREEK AT HEAD- 1929

Day	April	May	June	July	August	
1	1.2	1.5	2.0	2.4	0.8	
2	1.5	1.5	2.0	2.4	0.8	
3	1.5	1.5	2.2	2.4	0.8	
4	1.2	0.9	2.0	2.0	0.8	
5	1.1	0.9	0.9	1.5	0.7	
6	1.2	0.9	0.9	1.2	0.7	
7	1.2	0.9	0.9	0.8	0.7	
8	1.1	0.9	0.9	1.0	0.6	
9	1.1	2.0	1.0	1.2	0.6	
10	1.1	2.4	1.0	1.2	0.5	
11	1.1	2.4	1.0	1.0	0.5	
12	1.1	2.4	1.5	1.0	0.5	
13	1.1	2.4	2.0	1.1	0.4	
14	1.2	2.6	2.4	1.1	0.4	
15	1.4	3.0	1.0	0.9	0.4	
16	1.4	4.0	1.0	0.9	0.4	
17	1.4	2.5	1.0	0.9	0.4	
18	1.2	2.5	1.0	0.9	0.4	
19	1.2	2.5	1.0	0.8	0.4	
20	1.5	2.5	3.5	0.8		
21	1.4	2.5	3.0	0.8		
22	1.4	3.5	2.5	0.8		
23	1.4	3.5	2.5	0.8		
24	1.4	3.5	2.4	0.9		
25	1.4	3.5	2.4	0.9		
26	1.5	2.3	2.0	0.9		
27	2.0	2.0	2.0	0.9		
28	1.5	2.0	2.5	0.9		
29	1.5	2.0	2.3	0.9		
30	1.5	2.0	2.4	0.8		
31		2.0		0.8		
Total Sec. Ft. Days	39.8	69.0	53.2	34.9	*10.8	141 Day Period
Mean Sec. Ft.	1.33	2.23	1.77	1.13	* 0.57	1.47
Maximum Sec. Ft.	2.0	4.0	3.5	2.4	* 0.8	4.0
Minimum Sec. Ft.	1.1	0.9	0.9	0.8	* 0.4	0.4
Total Ac. Ft.	78.9	136.8	105.5	69.2	21.4	411.8

NO DIVERSION

* 19 day period.

TABLE 7

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF DALTON DITCH ON OWL CREEK AT HEAD - 1929

Day	April	May	June	July	August	
1		1.0	2.0	2.2		
2		1.0	2.2	2.2		
3		1.0	2.2	2.2		
4		2.3	2.0	2.2		
5		2.0	2.2	2.1		
6		2.2	2.2	2.0		
7		2.2	2.2	1.9		
8		2.2	2.2	2.2		
9		2.2	2.2	1.8		
10		2.2	2.2	1.6		
11	NO DIVERSION	2.2	2.2	2.0	NO DIVERSION	
12		2.2	2.2	2.0		
13		2.2	2.2	2.0		
14		2.3	2.5	2.0		
15		2.3	1.0	2.0		
16		2.3	1.0	2.0		
17		2.5	1.0	1.6		
18		2.5	4.0	1.5		
19		2.5	3.0	1.4		
20		2.5	2.2	1.4		
21		2.5	2.2	1.1		
22		2.5	2.2	1.0		
23		3.5	2.2	0.9		
24		3.5	2.2	0.6		
25		3.2	2.2			
26		2.2	2.2	NO DIVERSION		
27		2.2	2.2			
28		2.2	2.2			
29	0.5	2.0	2.1			
30	1.0	2.0	2.1			
31		2.0				
Total Sec. Ft. Days	*1.5	69.6	64.7	**41.9		87 Day Period
Mean Sec. Ft.	*0.75	2.25	2.16	** 1.75		2.04
Maximum Sec. Ft.	*1.0	3.5	4.0	**2.2		4.0
Minimum Sec. Ft.	*0.5	1.0	1.0	**0.6		0.5
Total Ac. Ft.	*3.0	138.0	128.3	**83.1		352.4

* 2 day period.

** 24 day period.

TABLE 8

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF COOK DITCH ON OWL CREEK AT HEAD - 1929

Day	April	May	June	July	August	
1	0.8		0.0		NO DIVERSION	
2	0.8		0.0			
3	0.8		0.0			
4	0.8		0.0			
5			0.0		0.5	
6			0.0		0.5	
7			0.0		0.5	
8			0.0		0.5	
9			0.0		0.5	
10			0.0		0.5	
11			0.0			
12		0.5	0.0			
13	NO DIVERSION	1.0	0.0			
14		2.5	0.0	NO DIVERSION		
15		2.5	0.0			
16		2.5	0.0			
17		3.0	5.0			
18		3.0	4.0		NO DIVERSION	
19		3.1	4.0			
20		4.0	4.0			
21		4.5	4.0			
22	NO DIVERSION	5.0	4.0	NO DIVERSION		
23		5.0	4.0			
24		5.0	4.0			
25		5.0	4.0			
26		2.5	4.0			
27		2.0	2.0		NO DIVERSION	
28		2.0	2.0			
29		1.5	2.0			
30		1.0	0.0			
31		0.0				
Total Sec. Ft. Days	*3.2	**55.6	47.0		*3.0	50 Day Period
Mean Sec. Ft.		** 2.78	1.57			2.05
Maximum Sec. Ft.		** 5.0	5.0			5.0
Minimum Sec. Ft.		** 0.0	0.0			0.0
Total Ac. Ft.	*6.3	**110.3	93.2		*5.9	203.5

* Not included in Totals and Means

** 20 day period.

TABLE 9

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND OF WADE DITCH ON OWL CREEK AT HEAD- 1929

Day	May	June	July	
1	NO DIVERSION	0.6	NO DIVERSION	
2		0.6		
3		0.5		
4		0.4		
5		0.0		
6		0.0		
7		0.0		
8		0.0		
9		0.0		
10		0.0		
11	0.3	0.0		
12	0.4	0.0		
13	0.5	0.0		
14	0.0	0.0		
15	0.0	1.5		
16	0.0	0.8		
17	2.0	1.5		
18	1.8	2.0		
19	1.8	1.8		
20	2.0	1.5		
21	2.0	1.5		
22	2.0	1.5		
23	2.0	1.5		
24	2.0	1.5		
25	2.0	1.5		
26	2.0	1.5		
27	1.8	1.5		
28	1.5	1.5		
29	1.5	1.4		
30	1.5	1.0		
31	1.5			
Total Sec. Ft. Days	*28.6	25.6		51 Day Period
Mean Sec. Ft.	* 1.36	0.85 ~~8.53~~		1.06
Maximum Sec. Ft.	* 2.0	2.0		2.0
Minimum Sec. Ft.	* 0.0	0.0		0.0
Total Ac. Ft.	*56.7	50.8		107.5

* 21 day period.

TABLE 10

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF STINER DITCH ON OWL CREEK AT HEAD - 1929

Day	April	May	June	July	August	
1	0.5	0.45	0.45	0.5	0.8	
2	0.6	0.45	0.45	0.5	0.8	
3	0.6	0.45	0.45	0.5	0.7	
4	0.5	0.45	0.45	0.5	0.4	
5	0.6	0.45	0.45	0.5	0.4	
6	0.6	0.45	0.45	0.5	0.4	
7	0.6	0.45	0.45	0.5	0.4	
8	0.5	0.45	0.45	0.5	0.4	
9	0.5	0.45	0.45	0.5	0.4	
10	0.5	0.45	0.45	0.5	0.3	
11	0.5	0.45	0.45	0.5	0.3	
12	0.3	0.8	0.45	0.6	0.3	
13	0.3	0.8	0.45	0.6	0.3	
14	0.4	0.8	0.45	0.6	0.3	
15	0.3	0.8	0.0	0.6		
16	0.3	0.8	0.0	0.5		
17	0.3	0.8	0.0	0.5		
18	0.3	0.8	0.5	0.5		
19	0.3	0.8	0.4	0.5		
20	0.4	0.8	0.2	0.5		
21	0.4	0.9	1.0	0.5	DIVERSION	
22	0.4	1.0	0.5	0.5		
23	0.4	1.0	0.5	0.5		
24	0.4	1.0	0.45	0.45		
25	0.4	1.0	0.45	1.5		
26	0.5	0.9	0.45	1.5		
27	0.6	0.5	0.5	1.4	NO	
28	0.5	0.2	0.6	1.0		
29	0.5	0.45	0.6	1.0		
30	0.5	0.45	0.5	1.0		
31		0.45		1.0		
Total Sec. Ft. Days	13.5	20.0	12.95	20.75	*6.2	136 Day Period
Mean Sec. Ft.	0.45	0.65	0.43 ~~4.32~~	0.67	*0.44	0.54
Maximum Sec. Ft.	0.6	1.0	1.0	1.5	*0.8	1.5
Minimum Sec. Ft.	0.3	0.2	0.0	0.45	*0.3	0.0
Total Ac. Ft.	26.8	39.7	25.7	41.1	*12.3	145.6

* 14 day period.

TABLE 11

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF MCCLINTOCK DITCH ON OWL CREEK AT HEAD - 1929

Day	April	May	June	July	August	September	
1	1.0	5.0	4.2	5.0	0.8	0.6	
2	1.2	5.0	4.5	5.0	0.8	0.5	
3	1.2	6.0	4.5	4.5	0.6	0.5	
4	1.0	6.0	4.5	4.5	0.4	0.5	
5	1.2	5.0	4.5	4.4	0.4	0.5	
6	1.3	5.0	4.5	4.3	0.4	0.5	
7	1.3	5.0	4.5	3.0	0.4	0.5	
8	1.0	4.5	4.5	3.5	0.4	0.5	
9	1.0	4.5	4.5	3.0	0.4	0.5	
10	1.0	4.5	4.5	2.6	0.5	0.5	
11	1.3	4.5	4.5	2.4	0.5	0.5	
12	0.8	4.5	4.5	2.3	0.5	0.5	
13	0.8	4.5	4.5	2.4	0.5	0.45	
14	1.4	5.0	5.0	2.4	0.5	0.45	
15	3.0	5.5	2.0	2.4	0.6	0.45	
16	3.5	5.5	6.0	2.2	0.6	0.45	
17	3.2	5.5	6.0	2.2	0.6	0.45	
18	3.1	5.6	6.5	2.1	0.5	0.45	
19	3.0	5.6	4.0	2.0	0.5	0.45	
20	3.5	5.6	2.0	2.0	0.6	0.45	
21	3.0	5.7	5.0	1.8	0.6	0.45	
22	3.0	6.0	4.5	1.7	0.6	0.45	
23	3.0	6.0	4.5	1.6	0.5	0.45	
24	3.0	5.0	4.5	1.5	0.5	0.45	
25	2.8	5.0	4.5	0.6	0.7	0.5	
26	3.1	4.0	4.5	0.6	0.7	0.5	
27	4.0	4.0	4.5	0.6	0.6	0.5	
28	4.2	4.0	4.5	0.4	0.6	0.6	
29	4.2	4.0	4.5	0.7	0.6	0.6	
30	4.2	4.0	4.3	0.6	0.6	0.6	
31		4.5		0.6	0.6		
Total Sec. Ft. Days	69.3	154.5	135.0	72.9	17.1	14.8	183 Day Period
Mean Sec. Ft.	2.31	4.98	4.50	2.35	0.55	0.49	2.53
Maximum Sec. Ft.	4.2	6.0	6.0	5.0	0.8	0.6	6.0
Minimum Sec. Ft.	0.8	4.0	2.0	0.4	0.4	0.45	0.4
Total Ac. Ft.	137.4	306.4	267.7	144.6	33.9	29.3	919.3

TABLE 12

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND OF CHASE DITCH ON OWL CREEK AT HEAD - 1929

Day	May	June	
1	NO DIVERSION	1.0	
2		1.0	
3		0.7	
4		0.6	
5		0.0	
6		0.0	
7		0.0	
8	1.5	0.0	
9	2.0	0.0	
10	2.0	0.0	
11	1.0	0.0	
12	2.0	0.0	
13	1.0	0.0	
14	2.0	0.0	
15	2.5	0.0	
16	2.5	0.0	
17	2.0	0.0	
18	2.0	2.0	
19	2.0	1.5	
20	2.0	1.3	
21	2.3	0.9	
22	2.5	2.0	
23	2.5	2.0	
24	2.5	2.0	
25	2.2	2.0	
26	2.1	2.5	
27	2.0	2.2	
28	1.5	2.0	
29	1.5	2.0	
30	1.5	1.1	
31	2.0		
Total Sec. Ft. Days	*47.1	26.8	54 Day Period
Mean Sec. Ft.	* 1.96	0.89	1.37
Maximum Sec. Ft.	* 2.5	2.5	2.5
Minimum Sec. Ft.	* 1.0	0.0	0.0
Total Ac. Ft.	*93.4	53.1	146.5

* 24 day period.

TABLE 13

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF PRICE DITCH ON OWL CREEK AT HEAD - 1929

Day	April	May	June	July	August	
1	0.3	0.45	0.5	0.45	0.4	
2	0.4	0.45	0.5	0.45	0.4	
3	0.4	0.45	0.5	0.45	0.3	
4	0.3	0.45	0.45	0.45	0.3	
5	0.3	0.45	0.45	0.45	0.3	
6	0.3	0.45	0.45	0.45	0.3	
7	0.3	0.45	0.45	0.45	0.3	
8	0.3	0.45	0.45	0.45	0.25	
9	0.3	0.45	0.45	0.45	0.2	
10	0.3	0.45	0.45	0.45	0.5	
11	0.3	0.45	0.45	0.4		
12	0.3	0.55	0.45	0.4		
13	0.3	0.55	0.45	0.4		
14	0.4	0.6	0.45	0.4		
15	0.4	0.6	0.0	0.4		
16	0.4	0.6	0.6	0.45	Remains	
17	0.4	0.6	0.6	0.45		
18	0.4	0.6	0.6	0.45		
19	0.4	0.6	0.6	0.45		
20	0.4	0.6	0.8	0.45		
21	0.4	0.7	0.8	0.45		
22	0.4	1.0	0.45	0.45		
23	0.4	1.0	0.45	0.45		
24	0.4	1.0	0.45	0.4		
25	0.4	1.0	0.45	0.5		
26	0.4	0.7	0.45	0.5		
27	0.45	0.5	0.45	0.45		
28	0.45	0.5	0.45	0.45		
29	0.45	0.5	0.45	0.45		
30	0.45	0.5	0.45	0.45		
31		0.5		0.45		
Total Sec. Ft. Days	11.1	18.15	14.5	13.75	*3.25	132 Day Period
Mean Sec.Ft.	0.37	0.59	0.48	0.44	*0.33	0.46
Maximum Sec.Ft.	0.45	1.0	0.8	0.5	*0.5	1.0
Minimum Sec.Ft.	0.3	0.45	0.0	0.4	*0.2	0.0
Total Ac.Ft.	22.0	36.0	28.8	27.3	*6.4	120.5

* 10 day period.

TABLE 14

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF HERYFORD DITCH ON OWL CREEK AT HEAD - 1929

Day	April	May	June	July	August	September	
1	0.8	3.8	3.6	4.0	0.6	0.6	
2	0.9	3.8	3.6	4.0	0.6	0.6	
3	0.9	3.5	3.6	3.5	0.5	0.6	
4	0.8	3.5	3.6	3.5	0.45	0.6	
5	0.8	3.5	3.6	3.3	0.4	0.6	
6	0.8	3.5	3.6	3.2	0.4	0.6	
7	0.8	3.5	3.6	4.0	0.4	0.6	
8	0.6	3.5	3.6	3.5	0.4	0.6	
9	0.7	3.8	3.6	3.0	0.4	0.5	
10	0.7	4.0	3.6	3.0	0.6	0.5	
11	0.8	4.0	3.6	1.4	0.5	0.5	
12	0.6	4.1	3.7	1.2	0.5	0.5	
13	0.7	4.5	3.8	1.3	0.5	0.45	
14	0.8	5.5	4.0	1.3	0.5	0.45	
15	1.1	5.5	5.0	1.1	0.5	0.45	
16	2.0	5.5	1.0	0.6	0.5	0.45	
17	1.8	5.5	4.0	0.6	0.5	0.45	
18	1.8	5.5	5.0	0.6	0.4	0.45	
19	1.6	5.5	5.0	0.55	0.4	0.45	
20	2.5	5.5	5.0	0.5	0.5	0.45	
21	2.0	5.5	4.0	0.45	0.5	0.45	
22	2.0	5.5	4.0	0.4	0.5	0.45	
23	2.5	6.0	4.0	0.35	0.5	0.45	
24	2.0	6.0	4.0	0.3	0.5	0.45	
25	1.8	5.6	4.0	0.3	0.7	0.6	
26	2.5	5.0	4.0	0.25	0.7	0.6	
27	4.0	4.5	4.5	0.25	0.6	0.6	
28	4.5	4.0	4.0	0.6	0.6	0.6	
29	4.4	4.0	3.0	0.5	0.6	0.6	
30	4.4	4.5	4.0	0.6	0.6	0.6	
31		3.6		0.6	0.6		
Total Sec. Ft. Days	51.6	141.7	115.6	48.75	15.95	15.8	183 Day Period
Mean Sec. Ft.	1.72	4.57	3.85	1.57	0.51	0.53	2.13
Maximum Sec. Ft.	4.5	6.0	5.0	4.0	0.7	0.6	6.0
Minimum Sec. Ft.	0.6	3.5	1.0	0.25	0.4	0.45	0.25
Total Ac. Ft.	102.3	281.0	229.2	96.7	31.6	31.3	772.1

TABLE 15

ESTIMATED DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF CUMMINS COMBINED DIVERSIONS FROM OWL CREEK - 1929

Day	April	May	June	July	August	September	
1	0.6	3.0	3.5	3.5	0.6	0.4	
2	0.7	3.0	3.5	3.5	0.6	0.3	
3	0.7	2.3	2.5	2.8	0.5	0.3	
4	0.6	2.0	2.5	2.6	0.3	0.3	
5	0.7	1.5	3.5	2.4	0.3	0.3	
6	0.7	1.0	3.0	2.3	0.3	0.3	
7	0.7	1.0	2.5	1.5	0.3	0.3	
8	0.4	2.0	2.5	1.3	0.3	0.3	
9	0.4	2.0	5.0	1.0	0.3	0.2	
10	0.4	1.5	4.0	0.9	0.0	0.2	
11	0.0	3.0	4.0	0.6	0.5	0.2	
12	0.6	4.6	4.5	0.6	0.5	0.2	
13	0.6	6.0	5.0	0.6	0.5		
14	0.8	4.5	8.0	0.6	0.4		
15	0.8	4.0	10.0	0.6	0.6		
16	1.0	5.0	10.0	0.6	0.4		
17	1.0	5.0	8.0	0.6	0.4		
18	0.9	6.0	5.0	0.6	0.3		
19	0.9	6.1	5.0	0.55	0.3		
20	2.0	6.2	4.5	0.5	0.5		
21	1.5	8.0	4.0	0.45	0.5		
22	1.0	8.0	5.5	0.45	0.5		
23	2.0	12.0	5.0	0.45	0.4		
24	1.6	12.0	4.0	0.4	0.4		
25	1.4	8.0	4.0	0.8	0.5		
26	2.0	6.0	3.0	0.6	0.5		
27	4.0	4.0	3.0	0.5	0.4		
28	4.0	3.5	2.0	0.6	0.4		
29	3.6	3.0	2.0	0.5	0.4		
30	3.1	3.0	3.0	0.5	0.4		
31		2.5		0.45	0.4		
Total Sec. Ft. Days	38.7	138.7	132.0	33.35	12.7	*3.3	164 Day Period
Mean Sec. Ft.	1.29	4.47	4.40	1.08	0.41	*0.28	2.19
Maximum Sec. Ft.	4.0	12.0	10.0	3.5	0.6	*0.4	12.0
Minimum Sec. Ft.	0.0	1.0	2.0	0.4	0.3	*0.2	0.0
Total Ac. Ft.	76.7	275.0	261.8	66.1	25.2	*6.5	711.3

NO DIVERSION

* 12 day period.

TABLE 16

WATER ALLOTMENTS COMPARED WITH AVAILABLE WATER SUPPLY DURING 1929 SEASON.

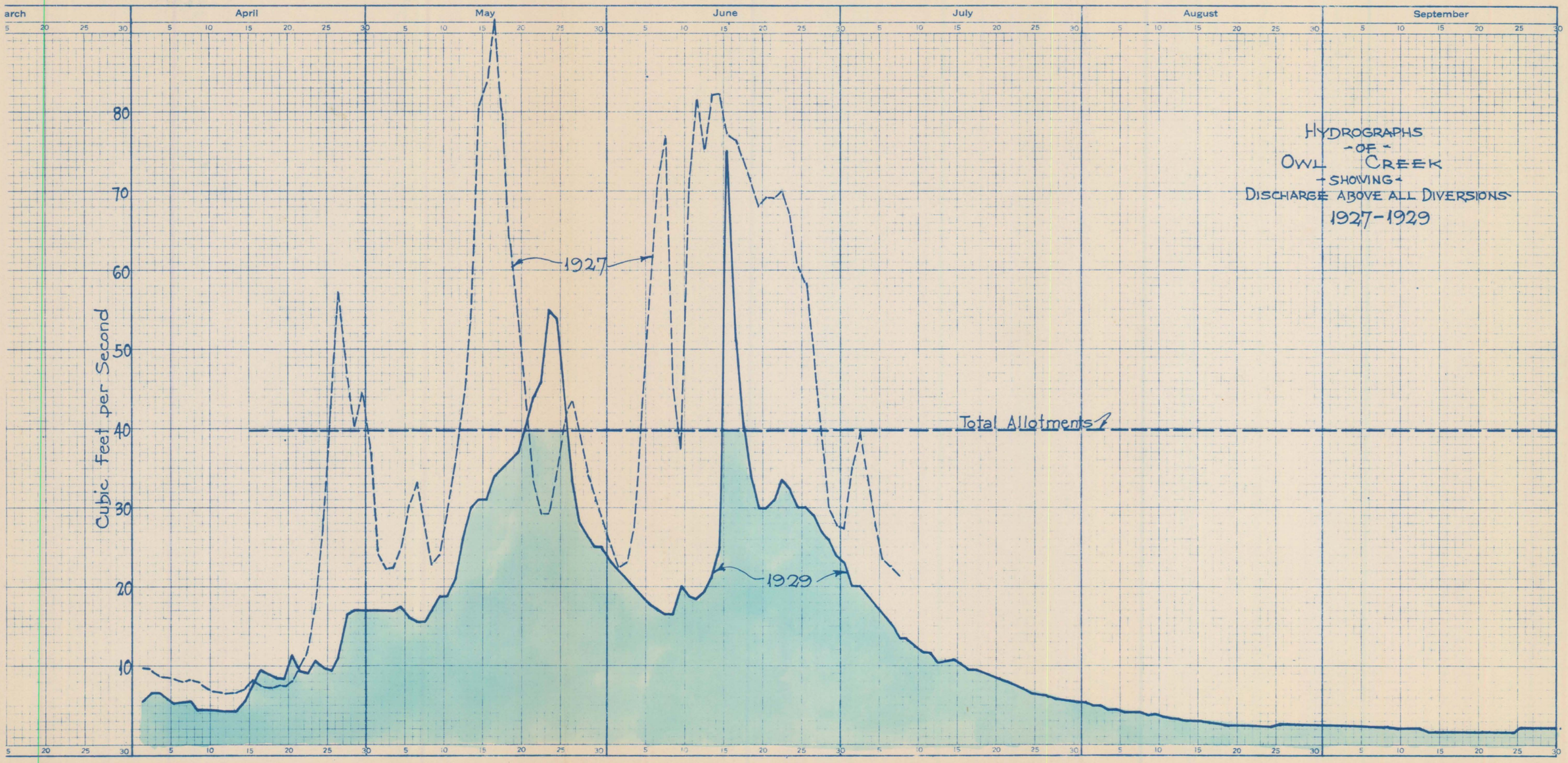
Period	Cubic Feet per Second		Per Cent of Allotment
	Allotments	Water Supply	
4/1 to 4/15	39.75	5.35	13
4/16 to 4/30	39.75	11.57	29
5/1 to 5/15	39.75	19.90	50
5/16 to 5/31	39.75	33.94	85
6/1 to 6/15	39.75	23.04	58
6/16 to 6/30	39.75	29.93	75
7/1 to 7/7	39.75	17.41	44
4/1 to 7/7	39.75	20.30	51

TABLE 17

GROSS USE OF WATER FOR IRRIGATION FROM
OWL CREEK IN 1929.

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	5/11 to6/30	188.2	205.7	0.91	110
Ennis-Arreche	J. C. Ennis Jennie Arreche	4/1to 7/6	345.6	138.7	2.49	77
Dalton	J. C. Ennis	4/29to 7/4	286.5	158.0	1.81	74
Cook	H.D.Cook Est.	5/12to6/29	203.5	338.4	0.60	161
Wade	Mary Wade	5/11to6/30	107.5	110.0	0.98	103
Stiner	Jessie H. Stiner	4/1to 6/30	92.2	25.0	3.69	49
Mc Clintock	Leonora Caldwell	4/15to7/9	754.6	264.0	2.86	60
Chase	J. C. Allen Jr. C. A. Larimore	5/8to6/30	146.5	133.0	1.10	97
Price	W. Malitz	4/14to6/30	78.7	37.5	2.10	74
Heryford	J. W. Heryford	4/15to7/10	660.7	280.0	2.36	73
Cummins (Combined)	C. E. Cummins Cummins Est.	4/16to7/6	628.5	430.0	1.46	111
Total & Mean		4/15to7/3	3492.5	2120.3	1.65	95

PLATES


HYDROGRAPHS
-OF-
OWL CREEK
-SHOWING-
DISCHARGE ABOVE ALL DIVERSIONS
1927-1929
Cubic Feet per Second
80
70
60
50
40
30
20
10
1927
1929
Total Allotments
arch
April
May
June
July
August
September