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DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

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REPORTS OF THE
DIVISION OF WATER RESOURCES
Edward Hyatt, State Engineer

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REPORT ON
WATER MASTER SERVICE
ON
LITTLE SHASTA RIVER

SISKIYOU COUNTY, CALIFORNIA
DURING THE SEASON OF 1933

oOo

BY

HARRISON SMITHERUM
SENIOR HYDRAULIC ENGINEER

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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

February 19, 1934

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

Dear Sir:

ATTENTION: Mr. Gordon Zander,
Supervising Hydraulic Engineer.

Herewith is submitted a report covering water master service on Little Shasta River in Siskiyou County, California, during the 1933 season.

The report presents a general description of the work and a discussion of the results obtained. Records of precipitation, run-off and other pertinent data are included.

Respectfully submitted,

Senior Hydraulic Engineer.

ORGANIZATION

Earl Lee Kelly, Director of Department of Public Works

Edward Hyatt, State Engineer.

Harold Conkling, Deputy State Engineer.

Gordon Zander, Supervising Hydraulic Engineer

Harrison Smitherum, Senior Hydraulic Engineer.

REPORT ON
WATER MASTER SERVICE
ON
LITTLE SHASTA RIVER AND TRIBUTARIES
SISKIYOU COUNTY, CALIFORNIA
DURING SEASON OF 1933

GENERAL DESCRIPTION OF WORK

The rights by appropriation to the use of the waters of Shasta River and its tributaries were established by the Judgment andDecree of the Superior Court of Siskiyou County entered on December 30, 1932, in the Shasta River Adjudication Proceeding. Following entry of the decree, the Shasta River Water District was created by order of the State Engineer , however, the Division was prevented from initiating water master service on the stream system for the 1933 season in accordance with the provisions of Sections 37 to 37f, inclusive, of the Water Commission Act, due to failure on the part of the water users to file the required petition. Supervision over diversions from the stream system during 1933, therefore, was confined to operation under the terms of agreements entered into among the water users and covered only Little Shasta and Lower Shasta Rivers. Requests for service on a number of other tributaries of Shasta River were received, but sufficient financial cooperation could not be obtained from the water users to permit extending the service.

The Little Shasta River Water Users Agreement for 1933 was similar to the agreement in use during the previous five years. It provided for the distribution of the waters of Little Shasta River in accordance with the amounts and priorities allotted the several rights in the Shasta River Judgment and Decree.

The service rendered during the season was confined principally to the distribution of the flow available for the first and fourth and the third and fifth priority rights on Cleland Springs and Little Shasta River below the head of the Harp Ditch, respectively. The remaining first priority rights, which cover individually owned springs not contributing to the flow of Little Shasta River, and the second priority rights, which, divert from the stream above the Harp Ditch, were eliminated from the distribution schedule. The flow available for distribution was insufficient to provide any water for the sixth and seventh priority classes.

Mr. A. S. Wheeler acted in the capacity of water master from June20 to July 1, inclusive. The writer took over the duties on July 2 and served throughout the remainder of the season.

The water users committee for the 1933 season was composed of the same members who served during 1932, namely, J. C. Martin, Raymond Hart, W. T. Martin, Sidney O'Connor and Ray Soule.

DISCUSSION OF RESULTS FOR 1933SEASON

Precipitation

The average of the precipitation at Mount Shasta City and Montague for the seasonal year 1932-1933 was 84% of the mean precipitation for the 44 seasonal years of record, 1889 to 1933, and 108% of the mean precipitation for the six seasonal years 1927 to 1933, during which water master service has been conducted on Little Shasta River. The record of precipitation at the above named stations is shown in Table 1 submitted at the end of this report.

Water Supply

A measuring station equipped with a water stage recorder was maintained on Little Shasta River above the head of the Harp Ditch. The water stage recorder readings were applied to the station rating curve to obtain the record of daily discharge. This record is shown in Table 2.

The record of discharge of Cleland Springs is presneted in Table3. It is the summation of daily measurements taken at the 4 foot contracted weir on the Haight, Deter and Kegg Ditch and the 2 foot Parshall measuring flume on the Terwilliger Cleland Spring Ditch.

The combined flow of Little Shasta River and Cleland Springs represents the total water supply available for distribution and is shown in column 1 of Tables 4 to 7, inclusive.

The total water supply is shown graphically and compared with the record for 1922 on Plate 1 of this report. Plate 1 also indicates the deficiency in the 1933 water supply as compared to the combined allotments to be served.

As reported by the water users, the run-off of Little Shasta River prior to June 20 was unusually favorable and the ranches received the most adequate and timely irrigation experienced in the past several years. Commencing about June 20, however, the discharge dropped rapidly to the low flow normally experienced during the summer months.

Distribution

Tables 4 to 7 show the available supply in per cent of the total allotments from the two sources and the percentage of allotments distributed to each of the several priority classes which received water subsequent to June 20.

The first and fourth priority rights were distributed, beginning on July 28, in accordance with a rotation schedule worked out between Ida A. Martin and D. C. Shelley, lessee of the Susan E. Terwilliger et al ranch. The apportionment of water between these two parties entitled Mr. Shelley to the water 27 hours every seven days, however, in order that the change might come at the same hour each week, the schedule permitted Mr. Shelley to use the water for 24 hours of each week, the remaining 3 hours being allowed to accumulate for several weeks and then used by runnung a head of water for a proportionate length of time.

The effect of this rotation schedule on the water available for the down stream users was very carefully observed. A water stage recorder installed on Little Shasta River below the Terwilliger ranch gave a continuous record of any shortage or return flow caused by use of the water on the Terwilliger ranch. The irrigator on the Terwilliger ranch with the exercise of proper care and with the aid of a staff gage in Little Shasta River below the Terwilliger Shop Ditch practically maintained the flow required to supply the downstream diversions. It was found that the schedule had no effect on the downstream users as long as the flow below the Terwilliger ranch remained practically uniform; that a

shortage in the downstream supply, even of short duration, had the effect of unbalancing deliveries to the users on partnership ditches and that for any considerable shortage it took several days to restore the balance; that some return flow occurred but was of little or no benefit to anyone due to its intermittent character and short duration of flow; and that the return flow from the Terwilliger ranch could not be depended upon to supply the requirements of the downstream diversions.

Interference with headgate regulation occurred only on the Susan E. Terwilliger et al ditches. On July 18 water was diverted and used through the McMurren Ditch for the irrigation of a small strip of meadow pasture at a time when the entire Terwilliger allotment was being diverted and used through the Harp Ditch. On July 31 an excessive head of water, 0.38 cubic feet per second ove r the decreed allotment of 0.30 cubic feet per second, was observed flowing in the Harp Ditch. These two instances represent the major interferences which occurred during the season.

Crops

Crop production reports were received from only three ranches, however, it was the concensus of opinion among the water users that crops were good throughout the valley. A summary of the reports received is presented in Table 8.

RECOMMENDATIONS

The setting of the staff gages on the measuring devices should be checked with an engineers level or other suitable instrument at the beginning of each irrigation season. First sections of enameled staff gages should be installed on the two Parshall flumes on the Terwilliger ranch and the Parshall flume on the Babcock, Martin and Soule Ditch.

TABLE 1

PRECIPITATION DATA

Average of Precipitation at Mount Shasta City and Montague-1889 to 1933 (1)

Monthly, seasonal and average amounts in inches

Season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Seasonal
1930-31	0.41	1.26	0.77	3.59	1.19	1.16	0.41	0.24	2.71	0.00	0.00	0.94	12.68
1931-32	1.95	.92	6.81	2.32	1.13	1.77	1.39	3.20	.50	.19	.00	.00	20.18
1932-33	.46	3.50	2.35	4.98	.64	5.86	.57	1.28	.34	.12	.00	.20	20.30
Totals	69.25	130.70	161.68	180.33	149.87	125.31	70.84	57.11	28.96	9.76	10.57	29.81	1024.19
Mean 44 yrs.	1.57	2.97	3.67	4.10	3.41	2.85	1.61	1.30	.66	.22	.24	.68	23.28

(1) See 1930 Water Master Report for records 1889-1930.

TABLE 2

Daily Discharge in Cubic Feet per Second of

LITTLE SHASTA RIVER ABOVE HARP DITCH

June 20 to September 30, 1933

Day	June	July	Aug.	Sept.	
1		11.3	4.72	3.40	
2		11.5	4.65	3.22	
3		11.8	4.65	3.16	
4		11.5	4.65	3.10	
5		10.9	4.65	3.16	
6		10.2	4.65	3.28	
7		9.9	4.56	2.98	
8		10.3	4.09	3.10	
9		9.06	4.02	3.04	
10		8.49	3.46	2.98	
11		8.07	3.83	2.74	
12		7.75	3.83	2.74	
13		7.47	3.70	2.80	
14		7.20	3.58	2.80	
15		7.12	3.52	2.92	
16		6.84	3.52	2.92	
17		6.41	3.52	2.92	
18		6.32	3.46	3.46	
19		6.14	3.46	2.98	
20	29.1	5.99	3.46	3.22	
21	28.0	5.82	3.40	3.34	
22	27.0	5.82	3.34	3.16	
23	25.5	5.64	3.34	3.04	
24	25.0	5.58	3.40	3.76	
25	24.0	5.42	3.40	4.03	
26	24.5	5.26	3.40	3.34	
27	23.0	5.10	3.40	3.22	
28	22.0	4.95	3.40	3.10	
29	20.0	4.80	3.40	2.98	
30	19.0	4.80	3.46	2.98	
31		4.80	3.46		
Total Sec.					
Ft.Days	267.1	232.25	117.38	93.87	103 day period
Mean Sec.					
Feet	24.3	7.49	3.79	3.13	6.90
Acre-Ft.	530	460	233	186	1410

TABLE 5

Daily Discharge in Cubic Feet per Second of

CLELAND SPRINGS

For the Period June 20 to September 30, 1933

Day	June	July	Aug.	Sept.	
1		7.1	7.42	7.39	
2		7.1	7.42	7.39	
3		7.39	7.40	7.39	
4		7.48	7.40	7.48	
5		7.42	7.40	7.41	
6		7.48	7.42	7.41	
7		7.48	7.39	7.34	
8		7.48	7.49	7.39	
9		7.60	7.30	7.39	
10		7.56	7.34	7.36	
11		7.48	7.40	7.34	
12		7.48	7.40	7.34	
13		7.48	7.34	7.36	
14		7.48	7.32	7.34	
15		7.48	7.38	7.39	
16		7.48	7.44	7.39	
17		7.48	7.39	7.36	
18		7.48	7.39	7.34	
19		7.40	7.39	7.34	
20	7.2	7.40	7.39	7.40	
21	7.1	7.40	7.35	7.40	
22	7.1	7.40	7.35	7.39	
23	7.1	7.40	7.35	7.39	
24	7.1	7.40	7.35	7.34	
25	7.1	7.42	7.39	7.34	
26	7.0	7.40	7.39	7.34	
27	7.0	7.41	7.40	7.34	
28	7.0	7.40	7.40	7.34	
29	7.0	7.39	7.41	7.39	
30	7.1	7.31	7.34	7.39	
31		7.24	7.34		
Total Sec. Ft. Days	77.8	229.90	228.89	221.21	103 day period
Mean Sec. Ft.	7.11	7.42	7.38	7.37	7.36
Acre-feet	151	456	454	439	1500

TABLE 4

SUPPLY AND DISTRIBUTION

June 1933

Day	Total available Supply c.f.s.	Total available Supply % of Total allotments	Distribution in per cent of priority allotments First	Third	Fourth	Fifth
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20	36.3	47	100	100	100	100
21	35.1	45	100	100	100	100
22	34.1	44	100	100	100	95
23	32.6	42	100	100	100	88
24	32.1	41	100	100	100	86
25	31.1	40	100	100	100	81
26	31.5	41	100	100	100	83
27	30.0	39	100	100	100	76
28	29.0	37	100	100	100	72
29	27.0	35	100	100	100	63
30	26.1	34	100	100	100	59
Total	344.9					
Mean	31.4	40	100	100	100	82
Maximum	36.3	47	100	100	100	100
Minimum	26.1	34	100	100	100	59
Acre-feet	684					

TABLE 5

SUPPLY AND DISTRIBUTION

July 1933

Day	Total available Supply		Distribution in per cent of priority allotments			
	c.f.s.	% of Total allotments	First	Third	Fourth	Fifth
1	18.4	24	100	100	100	24
2	18.6	24	100	100	100	25
3	19.2	25	100	100	100	28
4	19.0	25	100	100	100	27
5	18.3	24	100	100	100	24
6	17.7	23	100	100	100	21
7	17.4	22	100	100	100	20
8	17.8	23	100	100	100	22
9	16.7	22	100	100	100	17
10	16.0	21	100	100	100	13
11	15.6	20	100	100	100	12
12	15.2	20	100	100	100	10
13	15.0	19	100	100	100	9
14	14.7	19	100	100	100	8
15	14.6	19	100	100	100	7
16	14.3	18	100	100	100	6
17	13.9	18	100	100	100	4
18	13.8	18	100	100	100	4
19	13.5	17	100	100	100	2
20	13.4	17	100	100	100	2
21	13.2	17	100	100	100	1
22	13.2	17	100	100	100	1
23	13.0	17	100	100	98	0
24	13.0	17	100	100	98	0
25	12.8	16	100	100	90	0
26	12.7	16	100	100	86	0
27	12.5	16	100	100	77	0
28	12.4	16	100	100	72	0
29	12.2	16	100	100	63	0
30	12.1	16	100	100	59	0
31	12.0	15	100	100	55	0
Total	462.2					
Mean	14.9	19	100	100	97	9
Maximum	19.2	25	100	100	100	28
Minimum	12.0	15	100	100	55	0
Acre-feet	916.					

TABLE 6

SUPPLY AND DISTRIBUTION

August 1933

Day	Total available Supply		Distribution in per cent of priority allotments				
	c.f.s.	% of Total allotments	First	Third	Fourth	Fifth	
1	12.1	16	100	100	59	0	
2	12.1	16	100	100	59	0	
3	12.0	15	100	100	55	0	
4	12.0	15	100	100	55	0	
5	12.0	15	100	100	55	0	
6	12.1	16	100	100	59	0	
7	12.0	15	100	100	55	0	
8	11.6	15	100	100	38	0	
9	11.3	15	100	100	25	0	
10	10.8	14	100	100	4	0	
11	11.2	14	100	100	21	0	
12	11.2	14	100	100	21	0	
13	11.0	14	100	100	13	0	
14	10.9	14	100	100	8	0	
15	10.9	14	100	100	8	0	
16	11.0	14	100	100	13	0	
17	10.9	14	100	100	8	0	
18	10.8	14	100	100	4	0	
19	10.8	14	100	100	4	0	
20	10.8	14	100	100	4	0	
21	10.8	14	100	100	4	0	
22	10.7	14	100	100	0	0	
23	10.7	14	100	100	0	0	
24	10.8	14	100	100	0	0	
25	10.8	14	100	100	0	0	
26	10.8	14	100	100	0	0	
27	10.8	14	100	100	0	0	
28	10.8	14	100	100	0	0	
29	10.8	14	100	100	0	0	
30	10.8	14	100	100	0	0	
31	10.8	14	100	100	0	0	
Total	346.1						
Mean	11.2	14	100	100	18	0	
Maximum	12.1	16	100	100	59	0	
Minimum	10.7	14	100	100	0	0	
Acre-feet	686						

TABLE 7

SUPPLY AND DISTRIBUTION

September 1933

Day	Total available Supply		Distribution in per cent of priority allotments				
	c.f.s.	% of Total allotments	First	Third	Fourth	Fifth	
1	10.8	14	100	100	0	0	
2	10.6	14	100	100	0	0	
3	10.6	14	100	100	0	0	
4	10.6	14	100	100	0	0	
5	10.6	14	100	100	0	0	
6	10.7	14	100	100	0	0	
7	10.3	13	100	100	0	0	
8	10.5	14	100	100	0	0	
9	10.4	13	100	100	0	0	
10	10.3	13	100	100	0	0	
11	10.1	13	100	100	0	0	
12	10.1	13	100	100	0	0	
13	10.2	13	100	100	0	0	
14	10.1	13	100	100	0	0	
15	10.3	13	100	100	0	0	
16	10.3	13	100	100	0	0	
17	10.3	13	100	100	0	0	
18	10.8	14	100	100	0	0	
19	10.3	13	100	100	0	0	
20	10.6	14	100	100	0	0	
21	10.7	14	100	100	0	0	
22	10.6	14	100	100	0	0	
23	10.4	13	100	100	0	0	
24	11.1	14	100	100	0	0	
25	11.4	15	100	100	0	0	
26	10.7	14	100	100	0	0	
27	10.6	14	100	100	0	0	
28	10.4	13	100	100	0	0	
29	10.4	13	100	100	0	0	
30	10.4	13	100	100	0	0	
Total	315.2						
Mean	10.5	14	100	100	0	0	
Maximum	11.4	15	100	100	0	0	
Minimum	10.1	13	100	100	0	0	
Acre-feet	625						

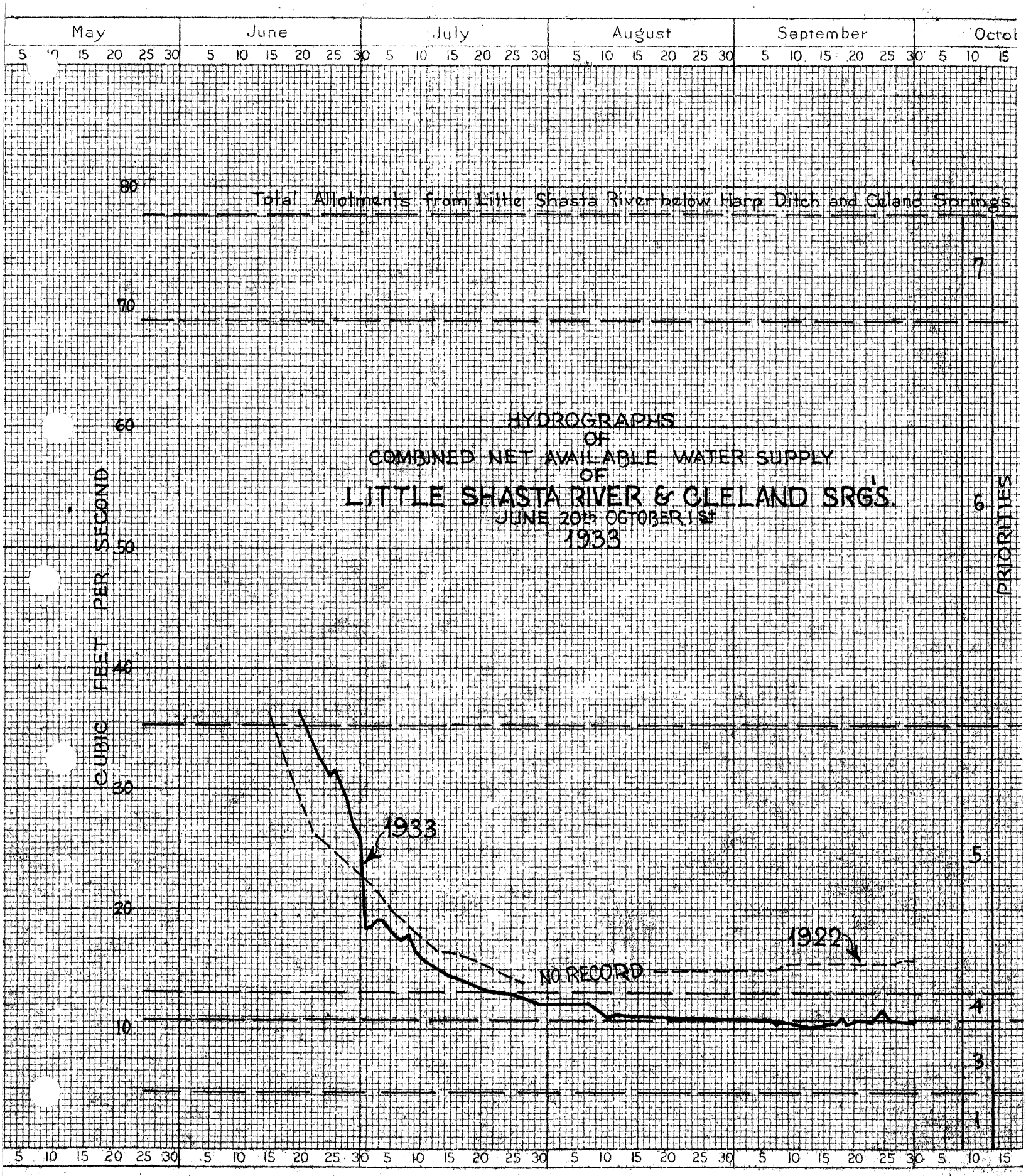
TABLE 8

CROP PRODUCTION

1933 Season

Owner	Crop	Acres	Total Yield		Yield per Acre	
			Tons	Sacks	Tons	Sacks
Dreyer, E. F.	Alfalfa	20	30		1.5	
O'Connor, S.	Alfalfa	100	320		3.2	
	Meadow Hay	80	100		1.2	
	Barley	8		75		9.4
	Orchard	1				
	Garden	0.1				
Soule, Ray	Alfalfa	30	7		0.2	
	Meadow Hay	40	125		3.1	
	Barley	15		360		24
	Wheat	30		280		9.3
	Orchard	10				
	Garden	0.2				

Alfalfa received an average of two irrigations, meadow hay six irrigations and grain crops one irrigation.


May
June
July
August
September
Octo
Total Allotments from Little Shasta River below Harp Ditch and Cleland Springs.
HYDROGRAPHS
OF
COMBINED NET AVAILABLE WATER SUPPLY
OF
LITTLE SHASTA RIVER & CLELAND SRG'S.
JUNE 20th OCTOBER 1st
1933
CUBIC FEET PER SECOND
80
70
60
50
40
30
20
10
1933
1922
NO RECORD
PRIORITIES
7
6
5
4
3
1