DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

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

REPORT ON

WATER MASTER SERVICE

ON

LITTLE SHASTA RIVER

SISKIYOU COUNTY, CALIFORNIA

DURING THE SEASON OF 1931

BY
A. S. WHEELER, WATER MASTER

SACRAMENTO, CALIFORNIA
MARCH 1932

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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 16, 1932

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

Dear Sir: ATTENTION: Mr. Gordon Zander
Supervising Hydraulic Engineer

Herewith is submitted a report covering the water master service on Little Shasta River in Siskiyou County, California, during the season of 1931.

This report includes a description of the regulation and distribution of the waters of Little Shasta River and its tributaries in accordance with the Stipulation and Agreement entered into by the various water users on March 27, 1927, and a subsequent agreement for water master service entered into on June 15, 1928.

Runoff records and other pertinent data are included together with a discussion of the results that were obtained.

Respectfully submitted,

A. S. WHEELER
Water Master

ORGANIZATION

Colonel Walter E. Garrison, Director of Department of Public Works

Edward Hyatt, State Engineer

Harold Conkling, Deputy State Engineer

Gordon Zander, Supervising Hydraulic Engineer

A. S. Wheeler, Water Master

REPORT ON

WATER MASTER SERVICE

ON

LITTLE SHASTA RIVER AND TRIBUTARIES

SISKIYOU COUNTY, CALIFORNIA

DURING SEASON OF 1931

GENERAL DESCRIPTION OF WORK

Water master service was continued on Little Shasta River and its tributaries during the 1931 season under the agreement for such service entered into on June 15, 1928, which agreement provides for such service until the decree in the matter of the Shasta River Adjudication Proceedings has been entered.

The water master service for the 1931 season commenced on April 1st and ceased on September 30th with the writer acting in the capacity of water master.

The shortage in the total water supply during 1931 eliminated any consideration of the sixth and seventh priorities as set forth in the schedule of allotments.

Consideration of a portion of the first priorities was also eliminated due to the fact that they covered springs not contributing to the flow in Little Shasta River.

The second priority covering 12 diversions near the head of Little Shasta River was not regulated due to the fact that two were

not being used, no water was available for six as the sources were either dry or the flow so low that no water reached Little Shasta River and regulation of the remaining four would have little or no appreciable effect upon the supply available to the main irrigated areas of the stream system.

The flow in Dewey Gulch at no time during the period of water master service for 1931 exceeded 0.04 c.f.s. and ceased completely the first week in May and accordingly this source was not considered during 1931.

This report accordingly deals only with the distribution of the available supply from Cleland Springs and Little Shasta River at a point just above the intake to the Harp Ditch.

The water users were represented in the dealings with the Division of Water Resources during 1931 by a committee composed of S. C. Hart, J. C. Martin and Sidney O'Connor.

No attempt to exercise the right to divert water at Diversions 429, 430, 447, 448 and 450, as listed in the Shasta River Adjudication Proceedings, was made and no ditches below the Hart, Haight and Prather Ditch were able to divert during the 1931 period of water master service as no water was available for the sixth and seventh priorities which covered these ditches.

DISCUSSION OF RESULTS FOR SEASON

The precipitation at Mt. Shasta City and Montague for the seasonal year, October 1, 1930, to September 30, 1931, is compared with the precipitation during the preceding forty-one seasonal years in Table 1 of this report which table also shows the average precipitation for the total period of record at these two stations.

It will be noted from Table 1 that the precipitation for the seasonal year 1930-31 was 54% of the average.

Table 2 is a tabulation of the daily discharge of Little Shasta River at the stream flow measuring station established just above the intake to the Harp Ditch.

Table 3 is a tabulation of the daily discharge of Cleland Springs.

Tables 4 to 9 inclusive, are tabulations of the daily total available supply from the sources considered and distribution thereof by priorities for each month of the 1931 water master season. These tables show the percentage of distribution by priorities and also the percent of the total allotments available for distribution. The total available supply as shown in these tables is graphically shown and compared with the like supply during the 1922 season on Plate 1 of this report.

Table 12 is a tabulation of the number of acres irrigated, nature of the crops thereon and the yield thereof as reported by certain of the water users.

To assist in an accurate distribution of the water supply

temporary measuring devices were installed as follows:

Harp Ditch	12 inch wooden Parshall Flume
Hart and Haight Ditch	6 inch wooden Parshall Flume
Dimmick Ditch	6 inch metal "V" notch weir
Little Shasta River	Automatic water stage recorder, staff gage and a 48 inch rectangular weir. The weir was installed during May and prior to that time measurements of the flow were made with a current meter.

All other ditches receiving water during the period of water master service were previously equipped with permanent concrete Parshall Flumes with the exception of the Martin and Davis Ditch in which a concrete rectangular weir was installed.

The fact that permanent diversion works have not been installed at the heads of ditches, and that loose rocks are used to divert the water, operates to some extent against an accurate distribution of the available water supply.

During the 1931 season an accurate distribution was also prevented a considerable portion of the season by interference on the part of the lessee of the Terwilliger Estate lands which interference eventually caused the other water users to file a complaint with the Superior Court of Siskiyou County.

CONTROVERSIES

The only controversy which occurred during the 1931 season was between Mr. D. C. Shelley, lessee of the Terwilliger Estate lands, and the water users below.

It was claimed by Mr. Shelley that the lands he leased were riparian and entitled to such additional water, beyond that allowed by the water master in accordance with existing agreements, as he saw fit to divert.

His more or less continuous taking of additional water caused ditches below at times to become dry or nearly so and deprived the water users on these ditches of sufficient water for domestic and stock watering purposes with the result that the other users were finally forced to request the Superior Court of Siskiyou County for an order restraining him from further interference which order was issued.

RECOMMENDATIONS

In order to simplify distribution and to insure a more accurate distribution permanent diversion works should be constructed for all ditches and headgates installed and concrete Parshall Flumes installed in the Harp ditch, Hart and Haight ditch and in three ditches on the Jerwilliger Estate.

TABLE 1

PRECIPITATION DATA

Average Mt. Shasta City and Montague -1889-1931

Season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Season Total
1889-90	8.30	3.39	8.21	6.74	4.68	3.54	1.77	2.22	1.17	0	0	0.60	40.67
1890-91	1.67	0.80	3.46	2.05	6.61	2.11	1.98	1.74	0.92	0.03	0.18	0.61	21.55
1891-92	0.15	0.18	6.30	1.52	2.00	2.47	2.92	2.74	0.82	0.23	0	0.93	20.26
1892-93	0.62	4.55	5.70	1.60	1.40	1.76	5.50	2.03	0.02	0.17	0	0.34	23.69
1893-94	0.30	2.75	2.54	5.62	2.24	2.16	1.23	1.64	1.12	0	0	0.84	20.44
1894-95	2.05	2.38	6.74	5.92	1.68	2.95	0.66	2.28	0.52	0.28	0	2.32	27.78
1895-96	0.50	0.62	3.03	10.59	1.17	1.33	1.77	1.91	0.07	0.01	0.15	0.22	21.37
1896-97	0.64	3.62	7.64	3.35	2.63	0.96	0.67	0.48	0.08	0	0.24	0	20.31
1897-98	2.28	2.93	2.57	0.61	6.56	0.89	0.58	3.07	1.07	0	0	0	20.56
1898-99	0.25	1.23	1.87	2.93	0.51	1.54	0.11	1.15	0.51	0	0.66	0	10.76
1899-00	2.08	6.51	2.93	4.68	0.63	5.71	1.85	1.32	0.88	0	0.36	0.34	27.29
1900-01	5.83	3.83	3.38	6.03	5.10	0.75	1.55	0.74	0.40	0.13	0.48	1.09	29.31
1901-02	2.04	4.73	1.83	1.11	14.20	2.83	3.14	1.97	0.02	0.28	2.58	0.06	34.79
1902-03	2.95	7.49	3.99	5.18	0.93	5.19	0.11	0.14	0.32	0.14	0.03	0.01	26.48
1903-04	1.22	8.12	1.63	2.20	8.02	10.17	3.94	0.42	0.05	0.23	0.01	3.15	39.16
1904-05	4.18	1.99	3.82	6.02	2.14	4.85	1.19	2.61	0.52	0.07	0	0.15	27.54
1905-06	0.17	1.28	2.21	8.04	2.97	6.84	0.98	1.76	1.50	0.23	0.16	0.41	26.55
1906-07	0.06	2.78	5.69	5.35	2.86	8.71	0.61	0.58	0.90	0.06	1.28	0.37	29.25
1907-08	0.54	0.15	7.82	4.52	6.43	0.50	0.86	1.92	0.21	0	0	0.15	23.10
1908-09	2.61	1.80	1.41	13.18	10.22	2.00	0.06	0.21	0.39	0.62	0.04	0.65	33.19
1909-10	2.00	3.69	3.70	4.14	1.40	1.80	1.25	0.80	0.03	0.20	0	0.62	19.63
1910-11	0.71	7.25	2.08	6.54	2.13	3.78	1.61	1.00	0.32	0.94	0	0.69	27.05
1911-12	0.89	1.23	2.00	3.99	1.21	4.12	2.79	2.32	1.29	0.28	0.45	2.71	23.28
1912-13	1.66	3.75	0.95	4.19	0.65	1.38	1.70	1.55	3.21	2.06	0.40	0.23	21.73
1913-14	0.31	4.72	6.26	10.16	4.02	1.90	1.37	1.23	1.13	0.63	0.03	0.57	32.33
1914-15	2.09	0.29	4.55	4.04	7.60	4.24	1.08	2.61	0.06	0.31	0.01	0.01	26.89
1915-16	0.17	1.84	4.22	9.23	2.73	2.45	0.29	0.53	0.65	0.64	0.51	0.19	23.45
1916-17	0.26	1.02	3.84	1.70	4.03	2.04	1.54	1.25	0.01	0.08	0.20	0.29	16.26
1917-18	0	2.91	2.07	1.54	1.55	3.61	0.76	0.20	0.01	0.10	0.49	2.77	16.01
1918-19	2.12	1.69	1.19	3.44	6.08	2.84	0.76	0.14	0.15	0.04	0.04	1.01	19.50
1919-20	0.13	0.43	2.54	0.40	0.49	2.44	2.61	0.64	0.63	0.71	0.42	0.30	11.74
1920-21	1.86	5.79	4.21	5.43	2.07	2.01	0.36	1.82	0.24	0	0	0.08	23.87
1921-22	1.02	2.57	4.71	0.90	4.92	3.12	0.36	1.26	0.81	0.02	0.35	0.12	20.16
1922-23	3.22	2.43	4.61	2.33	0.85	0.08	2.56	0.75	1.91	0.11	0.20	1.91	20.96
1923-24	1.53	0.41	1.66	1.37	1.44	1.07	0.32	0.12	0.27	0.08	0.21	0.50	8.98
1924-25	3.80	2.52	3.04	1.31	5.95	2.12	3.98	1.50	0.82	0.26	0.46	2.83	28.59
1925-26	0.66	1.99	1.71	1.39	3.61	0.13	3.30	0.78	0	0.23	0.38	0.05	14.23
1926-27	1.71	11.13	2.59	3.51	5.42	1.78	4.05	1.26	0.62	0.01	0.06	0.01	32.15
1927-28	1.88	4.31	1.91	2.01	2.75	4.75	2.17	0.74	0.40	0.24	0.10	0.37	21.63
1928-29	0.87	3.92	3.81	0.83	2.30	1.67	1.51	0.21	0.87	0	0	0	15.99
1929-30	1.10	0	7.33	3.75	2.73	1.93	2.62	0.75	0.49	0.03	0.09	1.17	21.99
Average	1.62	3.35	3.70	4.13	3.58	2.84	1.67	1.28	0.62	0.23	0.26	0.69	23.67

TABLE 2

Continuous Records of Discharge

LITTLE SHASTA RIVER

For the period April 1 to September 30, 1931

Date	April	May	June	July	Aug.	Sept.	
1	16.	14.6	2.7	2.1	1.5	1.5	
2	13.	10.4	2.7	2.1	1.6	1.5	
3	8.5	8.8	2.6	2.	1.6	1.5	
4	10.2	7.9	2.6	1.8	1.5	1.5	
5	10.4	7.2	2.3	1.8	1.5	1.3	
6	11.	6.8	2.4	1.7	1.5	1.4	
7	12.3	6.2	2.2	1.7	1.6	3.3	
8	8.7	5.8	2.4	1.8	1.5	5.2	
9	9.3	5.5	2.4	1.6	1.5	4.6	
10	10.2	5.1	2.5	1.7	0.7	2.2	
11	10.2	4.9	2.	1.7	1.1	2.1	
12	8.1	4.5	2.2	1.6	1.2	2.	
13	10.4	4.9	2.2	1.6	1.5	2.	
14	7.2	5.7	2.5	1.6	1.5	1.9	
15	6.6	5.4	5.4	1.7	1.5	1.9	
16	7.7	4.9	4.3	1.6	1.2	1.9	
17	7.9	4.6	5.	1.6	1.1	1.8	
18	7.2	4.3	3.7	1.6	1.5	2.1	
19	6.7	4.3	2.8	1.5	1.5	2.7	
20	7.7	4.1	2.7	1.5	1.5	2.3	
21	7.2	4.1	2.6	1.5	1.5	2.1	
22	7.7	3.9	2.4	1.5	1.6	2.	
23	6.3	3.8	2.4	1.4	1.6	2.	
24	7.2	3.8	2.3	1.4	1.5	2.2	
25	7.7	3.9	2.2	1.4	1.5	2.1	
26	7.7	3.7	2.2	1.5	1.5	2.2	
27	6.8	3.4	3.1	1.5	1.6	2.1	
28	6.8	3.3	2.4	1.5	1.5	2.	
29	8.4	3.2	2.3	1.6	1.5	2.3	
30	7.8	2.8	2.2	1.6	1.4	2.2	
31		2.7		1.5	1.4		
Total Sec. Ft. Days	273.9	164.5	81.7	50.7	44.7	65.9	6 month period
Mean Sec. Ft.	9.2	5.3	2.7	1.6	1.4	2.2	3.7
Max. Sec. Ft.	16.	14.6	5.4	2.1	1.6	5.2	16.
Min. Sec. Ft.	6.3	2.7	2.	1.4	0.7	1.3	0.7
Total Acre Ft.	545.	326.	162.	100.	88.	130.	1351.

TABLE 3

Continuous Records of Discharge

CLELAND SPRINGS

For the period April 1 to September 30, 1931

Date	April	May	June	July	Aug.	Sept.	
1	7.6	7.2	7.6	7.6	7.2	7.4	
2	7.6	7.2	7.6	7.6	7.2	7.4	
3	7.6	7.2	7.6	7.6	7.2	7.4	
4	7.6	7.3	7.6	7.6	7.2	7.4	
5	7.6	7.3	7.6	7.5	7.2	7.4	
6	7.5	7.3	7.7	7.5	7.2	7.3	
7	7.5	7.3	7.7	7.5	7.2	7.3	
8	7.5	7.3	7.7	7.4	7.2	7.3	
9	7.4	7.3	7.7	7.4	7.2	7.2	
10	7.4	7.3	7.6	7.4	7.2	7.2	
11	7.4	7.3	7.6	7.4	7.2	7.2	
12	7.4	7.3	7.6	7.4	7.2	7.2	
13	7.4	7.3	7.6	7.4	7.2	7.2	
14	7.4	7.3	7.6	7.4	7.3	7.2	
15	7.4	7.3	7.6	7.4	7.3	7.2	
16	7.4	7.3	7.5	7.4	7.3	7.2	
17	7.4	7.4	7.5	7.3	7.3	7.2	
18	7.4	7.4	7.5	7.3	7.3	7.2	
19	7.4	7.4	7.5	7.3	7.4	7.2	
20	7.4	7.5	7.5	7.2	7.4	7.3	
21	7.3	7.5	7.5	7.2	7.4	7.3	
22	7.2	7.5	7.5	7.2	7.4	7.3	
23	7.2	7.6	7.5	7.2	7.4	7.3	
24	7.2	7.6	7.5	7.2	7.4	7.3	
25	7.2	7.6	7.5	7.2	7.4	7.3	
26	7.2	7.6	7.5	7.2	7.4	7.3	
27	7.2	7.6	7.5	7.2	7.5	7.3	
28	7.2	7.6	7.5	7.2	7.5	7.3	
29	7.2	7.6	7.6	7.2	7.5	7.3	
30	7.2	7.6	7.6	7.2	7.5	7.3	
31		7.6		7.2	7.5		
Total Sec. Ft. Days	221.4	229.6	227.1	227.8	226.8	218.4	6 month period
Mean Sec. Ft.	7.4	7.4	7.6	7.4	7.3	7.3	7.4
Max. Sec. Ft.	7.6	7.6	7.7	7.6	7.5	7.4	7.7
Min. Sec. Ft.	7.2	7.2	7.5	7.2	7.2	7.2	7.2
Total Acre ft.	437.	456.	450.	452.	449.	433.	2877.

TABLE 4

SUPPLY AND DISTRIBUTION

April 1931

DAY	Available Supply: Little Shasta River	Available Supply: Cleland Springs	Available Supply: Total	% of Distribution by Priorities: First	Third	Fourth	Fifth	% of Total Allotments
1	16.	7.6	23.6	100	100	100	48	30
2	13.	7.6	30.6	100	100	100	92	39
3	8.5	7.6	16.1	100	100	100	14	21
4	10.2	7.6	17.8	100	100	100	21	23
5	10.4	7.6	18.	100	100	100	22	23
6	11.	7.5	18.5	100	100	100	25	24
7	12.3	7.5	19.8	100	100	100	30	26
8	8.7	7.5	16.2	100	100	100	14	21
9	9.3	7.4	16.7	100	100	100	17	22
10	10.2	7.4	17.6	100	100	100	21	23
11	10.2	7.4	17.6	100	100	100	21	23
12	8.1	7.4	15.5	100	100	100	11	20
13	10.4	7.4	17.8	100	100	100	22	23
14	7.2	7.4	14.6	100	100	100	7	19
15	6.6	7.4	14.	100	100	100	4	18
16	7.7	7.4	15.1	100	100	100	9	19
17	7.9	7.4	15.3	100	100	100	10	20
18	7.2	7.4	14.6	100	100	100	7	19
19	6.7	7.4	14.1	100	100	100	5	18
20	7.7	7.4	15.1	100	100	100	9	19
21	7.2	7.3	14.5	100	100	100	7	19
22	7.7	7.2	14.9	100	100	100	8	19
23	6.3	7.2	13.5	100	100	100	2	17
24	7.2	7.2	14.4	100	100	100	6	19
25	7.7	7.2	14.9	100	100	100	8	19
26	7.7	7.2	14.9	100	100	100	8	19
27	6.8	7.2	14.	100	100	100	4	18
28	6.8	7.2	14.	100	100	100	4	18
29	8.4	7.2	15.6	100	100	100	12	20
30	7.8	7.2	15	100	100	100	9	19
Total Sec. Ft. Days	273.9	221.4	495.3	100	100	100	16	21
Mean Sec. Ft.	9.2	7.4	16.5					
Max. Sec. Ft.	16.	7.6	30.6					
Min. Sec. Ft.	6.3	7.2	13.5					
Total Acre Feet	545.	437.	982.					

Remarks: No water available for sixth and seventh priorities. Second priority not included. See text under "General Description of Work" for explanation

TABLE 5

SUPPLY AND DISTRIBUTION

May 1931

Day	Available Supply: Little Shasta River	Available Supply: Cleland Springs	Available Supply: Total	% of Distribution by Priorities: First	Third	Fourth	Fifth	% of Total Allotments
1	14.6	7.2	21.8	100	100	100	39	28
2	10.4	7.2	17.6	100	100	100	21	23
3	8.8	7.2	16.	100	100	100	13	21
4	7.9	7.3	15.2	100	100	100	10	20
5	7.2	7.3	14.5	100	100	100	7	19
6	6.8	7.3	14.1	100	100	100	5	18
7	6.2	7.3	13.5	100	100	100	2	17
8	5.8	7.3	13.1	100	100	100	1	17
9	5.5	7.3	12.8	100	100	88	0	17
10	5.1	7.3	12.4	100	100	71	0	16
11	4.9	7.3	12.2	100	100	62	0	16
12	4.5	7.3	11.8	100	100	46	0	15
13	4.9	7.3	12.2	100	100	62	0	16
14	5.7	7.3	13.	100	100	100	0	17
15	5.4	7.3	12.7	100	100	83	0	17
16	4.9	7.3	12.2	100	100	62	0	16
17	4.6	7.4	12.	100	100	54	0	16
18	4.3	7.4	11.7	100	100	42	0	15
19	4.3	7.4	11.7	100	100	42	0	15
20	4.1	7.5	11.6	100	100	38	0	15
21	4.1	7.5	11.6	100	100	38	0	15
22	3.9	7.5	11.4	100	100	29	0	15
23	3.8	7.6	11.4	100	100	29	0	15
24	3.8	7.6	11.4	100	100	29	0	15
25	3.9	7.6	11.5	100	100	33	0	15
26	3.7	7.6	11.3	100	100	25	0	15
27	3.4	7.6	11.	100	100	13	0	14
28	3.3	7.6	10.9	100	100	8	0	14
29	3.2	7.6	10.8	100	100	4	0	14
30	2.8	7.6	10.4	100	95	0	0	13
31	2.7	7.6	10.3	100	93	0	0	13
Total Sec. Ft. Days	164.5	229.6	394.1	100	99	57	3	17
Mean Sec. Ft.	5.3	7.4	12.7					
Max. Sec. Ft.	14.6	7.6	21.8					
Min. Sec. Ft.	2.7	7.2	10.3					
Total Acre Feet	326.	455.	781.					

Remarks: No water available for sixth and seventh priorities. Second priority not included. See text under "General Description of Work" for explanation.

TABLE 6

SUPPLY AND DISTRIBUTION

June 1931

Day	Available Supply: Little Shasta River	Available Supply: Cleland Springs	Available Supply: Total	% of Distribution by Priorities: First	Third	Fourth	Fifth	% of Total Allotments
1	2.7	7.6	10.3	100	93	0	NO WATER AVAILABLE	13
2	2.7	7.6	10.3	100	93	0		13
3	2.6	7.6	10.2	100	91	0		13
4	2.6	7.6	10.2	100	91	0		13
5	2.3	7.6	9.9	100	87	0		13
6	2.4	7.7	10.1	100	90	0		13
7	2.2	7.7	9.9	100	87	0		13
8	2.4	7.7	10.1	100	90	0		13
9	2.4	7.7	10.1	100	90	0		13
10	2.5	7.6	10.1	100	90	0		13
11	2.0	7.6	9.6	100	81	0		12
12	2.2	7.6	9.8	100	85	0		13
13	2.2	7.6	9.8	100	85	0		13
14	2.5	7.6	10.1	100	90	0		13
15	5.4	7.6	13.	100	100	100		17
16	4.3	7.5	11.8	100	100	46		15
17	5.0	7.5	12.5	100	100	75		16
18	3.7	7.5	11.2	100	100	21		14
19	2.8	7.5	10.3	100	93	0		13
20	2.7	7.5	10.2	100	91	0		13
21	2.6	7.5	10.1	100	90	0		13
22	2.4	7.5	9.9	100	87	0		13
23	2.4	7.5	9.9	100	87	0		13
24	2.3	7.5	9.8	100	85	0		13
25	2.2	7.5	9.7	100	84	0		12
26	2.2	7.5	9.7	100	84	0		12
27	3.1	7.5	10.6	100	98	0		14
28	2.4	7.5	9.9	100	87	0		13
29	2.3	7.6	9.9	100	87	0		13
30	2.2	7.6	9.8	100	85	0		13
Total Sec. Ft. Days	81.7	227.1	308.8	100	90	8	0	13
Mean Sec. Ft.	2.7	7.6	10.3					
Max. Sec. Ft.	5.4	7.7	13.1					
Min. Sec. Ft.	2.1	7.5	9.6					
Total Acre Feet	162.	450.	612.					

Remarks:

No water available for sixth and seventh priorities. Second priority not included. See text under "General Description of Work" for explanation.

TABLE 7

SUPPLY AND DISTRIBUTION

July 1931

Day	Available Supply: Little Shasta River	Available Supply: Cleland Springs	Available Supply: Total	% of Distribution by Priorities: First	Third	Fourth	Fifth	% of Total Allotments
1	2.1	7.6	9.7	100	83			12
2	2.1	7.6	9.7	100	83			12
3	2.0	7.6	9.6	100	81			12
4	1.8	7.6	9.4	100	78			12
5	1.8	7.5	9.3	100	76			12
6	1.7	7.5	9.2	100	75			12
7	1.7	7.5	9.2	100	75			12
8	1.8	7.4	9.2	100	75			12
9	1.6	7.4	9.	100	71			12
10	1.7	7.4	9.1	100	73			12
11	1.7	7.4	9.1	100	73			12
12	1.6	7.4	9.	100	71			12
13	1.6	7.4	9.	100	71			12
14	1.6	7.4	9.	100	71			12
15	1.7	7.4	9.1	100	73			12
16	1.6	7.4	9.	100	71			12
17	1.6	7.3	8.9	100	70			12
18	1.6	7.3	8.9	100	70			12
19	1.5	7.3	8.8	100	68			11
20	1.5	7.2	8.7	100	66			11
21	1.5	7.2	8.7	100	66	No Water Available	No Water Available	11
22	1.5	7.2	8.7	100	66			11
23	1.4	7.2	8.6	100	64			11
24	1.4	7.2	8.6	100	64			11
25	1.4	7.2	8.6	100	64			11
26	1.5	7.2	8.7	100	66			11
27	1.5	7.2	8.7	100	66			11
28	1.5	7.2	8.7	100	66			11
29	1.6	7.2	8.8	100	68			11
30	1.6	7.2	8.8	100	68			11
31	1.5	7.2	8.7	100	66			11
Total Sec. Ft. Days	50.7	227.8	278.5	100	71	0	0	12
Mean Sec. Ft.	1.6	7.4	9.0					
Max. Sec. Ft.	2.1	7.6	9.7					
Min. Sec. Ft.	1.4	7.2	8.7					
Total Acre feet	100.	452.	552.					

Remarks: No water available for sixth and seventh priorities. Second priority not included. See text under "General Description of Work" for explanation.

TABLE 8

SUPPLY AND DISTRIBUTION

August 1931

Day	Available Supply: Little Shasta River	Available Supply: Cleland Springs	Available Supply: Total	% of Distribution by Priorities: First	Third	Fourth	Fifth	% of Total Allotments
1	1.5	7.2	8.7	100	66			11
2	1.6	7.2	8.8	100	68			11
3	1.6	7.2	8.8	100	68			11
4	1.5	7.2	8.7	100	66			11
5	1.5	7.2	8.7	100	66			11
6	1.5	7.2	8.7	100	66			11
7	1.6	7.2	8.8	100	68			11
8	1.5	7.2	8.7	100	66			11
9	1.5	7.2	8.7	100	66			11
10	0.7	7.2	7.9	100	53			10
11	1.1	7.2	8.3	100	59			11
12	1.2	7.2	8.4	100	61			11
13	1.5	7.2	8.7	100	66			11
14	1.5	7.3	8.8	100	68			11
15	1.5	7.3	8.8	100	68			11
16	1.2	7.3	8.5	100	63			11
17	1.1	7.3	8.4	100	61			11
18	1.5	7.3	8.8	100	68			11
19	1.5	7.4	8.9	100	70			11
20	1.5	7.4	8.9	100	70			11
21	1.5	7.4	8.9	100	70	NO WATER AVAILABLE	NO WATER AVAILABLE	11
22	1.6	7.4	9.	100	71			12
23	1.6	7.4	9.	100	71			12
24	1.5	7.4	8.9	100	70			11
25	1.5	7.4	8.9	100	70			11
26	1.5	7.4	8.9	100	70			11
27	1.6	7.5	9.1	100	73			12
28	1.5	7.5	9.	100	71			12
29	1.5	7.5	9.	100	71			12
30	1.4	7.5	8.9	100	70			11
31	1.4	7.5	8.9	100	70			11
Total Sec. Ft. Days	44.7	226.8	271.5	100	67	0	0	11
Mean Sec. Ft.	1.4	7.3	8.8					
Max. Sec. Ft.	1.6	7.5	9.1					
Min. Sec. Ft.	0.7	7.2	7.9					
Total Acre Ft.	88.	449.	537.					

Remarks: No water available for sixth and seventh priorities. Second priority not included. See text under "General Description of Work" for explanation.

TABLE 9

SUPPLY AND DISTRIBUTION

September 1931

Day	Available Supply: Little Shasta River	Available Supply: Cleland Springs	Available Supply: Total	% of Distribution by Priorities: First	Third	Fourth	Fifth	% of Total Allotments
1	1.5	7.4	8.9	100	70	0		11
2	1.5	7.4	8.9	100	70	0		11
3	1.5	7.4	8.9	100	70	0		11
4	1.5	7.4	8.9	100	70	0		11
5	1.3	7.4	8.7	100	66	0		11
6	1.4	7.3	8.7	100	66	0		11
7	3.3	7.3	10.6	100	98	0		14
8	5.2	7.3	12.5	100	100	75		16
9	4.6	7.2	11.8	100	100	46		15
10	2.2	7.2	9.4	100	78	0		12
11	2.1	7.2	9.3	100	76	0		12
12	2.	7.2	9.2	100	75	0		12
13	2.	7.2	9.2	100	75	0		12
14	1.9	7.2	9.1	100	73	0		12
15	1.9	7.2	9.1	100	73	0		12
16	1.9	7.2	9.1	100	73	0	NO WATER AVAILABLE	12
17	1.8	7.2	9.	100	71	0		12
18	2.1	7.2	9.3	100	76	0		12
19	2.7	7.2	9.9	100	86	0		13
20	2.3	7.3	9.6	100	81	0		12
21	2.1	7.3	9.4	100	78	0		12
22	2.	7.3	9.3	100	76	0		12
23	2.	7.3	9.3	100	76	0		12
24	2.2	7.3	9.5	100	80	0		12
25	2.1	7.3	9.4	100	78	0		12
26	2.2	7.3	9.5	100	80	0		12
27	2.1	7.3	9.4	100	78	0		12
28	2.	7.3	9.3	100	76	0		12
29	2.3	7.3	9.6	100	81	0		12
30	2.2	7.3	9.5	100	80	0		12
Total Sec. Ft. Days	65.9	218.4	284.3	100	78	4	0	12
Mean Sec. Ft.	2.2	7.3	9.5					
Max. Sec. Ft.	5.2	7.4	12.5					
Min. Sec. Ft.	1.3	7.2	8.7					
Total Acre feet	130.	433.	563.					

Remarks: No water available for sixth and seventh priorities. Second priority not included. See text under "General Description of Work" for explanation.

TABLE 10

CROP PRODUCTION

1931 Season

Owner	Crop	Acres	Total Yield		Yield per Acre	
			Sacks	Tons	Sacks	Tons
Haight, A. C.	Alfalfa	10		25		2.5
	Meadow Hay	10		30		3.0
	Pasture	90				
	Cattle 12, Horses 2, Sheep 2 - April 1 to October 31					
Haight, Ira F.	Alfalfa	6		4		0.7
	Meadow Hay	3		6		2.0
	Pasture	18				
	Cattle 10 - April 15 to October 15					
Martin, Wm. T.	Alfalfa	20		30		1.5
	Meadow Hay	120		180		1.5
	Barley	175	150		0.9	
	Orchard	0.5				
	Garden	0.25				
	Pasture	112				
	Cattle 110, Sheep 120, Hogs 10 - May 1 to October 1					
O'Connor, Sidney	Alfalfa	100		250		2.5
	Meadow Hay	80		80		1.0
	Orchard	4				
	Garden	0.25				
	Pasture	10				
	Cattle 10, Horses 10, Sheep 50 - All year					
Rohrer, J. B.	Alfalfa	120		180		1.5
	Meadow Hay	10		12		1.2
	Barley	120	500		4.2	
	Pasture	74				
	Cattle 40, Horses 4, Sheep 150, Hogs 30 - March 1 to January 1					
Soule, Clarence W.	Alfalfa	20		20		1.0
	Meadow Hay	5		6		1.2
	Barley	12	132		11.0	
	Wheat	10	120		12.0	
	Alfalfa Seed	15		0.5		0.03
	Orchard	0.5				
	Garden	0.25				
	Pasture	10				
	Cattle 4, Horses 2, Sheep 105, Hogs 4 - April 1 to October 31					

DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

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

REPORT ON

WATER SUPERVISOR SERVICE

ON

LOWER SHASTA RIVER

SISKIYOU COUNTY, CALIFORNIA

DURING THE SEASON OF 1931

BY
A. S. WHEELER, WATER SUPERVISOR

SACRAMENTO, CALIFORNIA
MARCH 1932

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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 24, 1932

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

Dear Sir: ATTENTION: Mr. Gordon Zander
Supervising Hydraulic Engineer

Herewith is submitted a report on the water supervisor service on Lower Shasta River in Siskiyou County, California during the season of 1931.

This report includes a description of the regulation and distribution of the waters of the lower portion of Shasta River in accordance with an agreement entered into by the various water users on May 30, 1931, and a discussion of the results that were obtained.

Runoff records and other pertinent data are included.

Respectfully submitted,

A. S. WHEELER
Water Supervisor

ASW:MF

ASW

ORGANIZATION

Colonel Walter E. Garrison, Director of Department of Public Works

Edward Hyatt, State Engineer

—

Harold Conkling, Deputy State Engineer

—

Gordon Zander, Supervising Hydraulic Engineer

—

A. S. Wheeler, Water Supervisor

REPORT ON

WATER SUPERVISOR SERVICE

ON

LOWER SHASTA RIVER

SISKIYOU COUNTY, CALIFORNIA

DURING SEASON OF 1931

GENERAL DESCRIPTION OF WORK

Water supervisor service was continued on the lower portion of Shasta River during 1931 under an agreement for such service entered into by the water users on May 30, 1931.

Under the agreement the service for 1931 commenced on June 1 and was to cease on September 30 but owing to the fact that the Granada Irrigation District pumps shut down for the season on August 31 the service was discontinued at that time. The shut down of these pumps insured the other water users a surplus supply and consequently further regulation and distribution was not necessary.

All of the water users exercised their rights to divert during the period of water supervisor service.

During the 1931 season none of the water users diverted the full amount to which they were entitled except for short periods which was due to failure to operate pumps a sufficient number of hours and to the fact that the growth of moss and water grasses in gravity diversions was much greater than is normally experienced and consequently the capacity of the ditches was greatly reduced.

The 1931 season was marked by very satisfactory cooperation on the part of the water users but owing to a very erratic flow in Shasta River distribution was not as satisfactory as during the 1930 season.

The water users were divided into two priority classes with the first priority including all users except the Granada Irrigation District and Roland Ekstrom.

DISCUSSION OF RESULTS FOR 1931 SEASON

The precipitation at Mt. Shasta City and Montague for the seasonal year, October 1, 1930, to September 30, 1931, is compared with the precipitation during the preceding forty-one seasonal years in Table 1 of this report which table shows the average precipitation for the total period of record at these two stations.

It will be noted from Table 1 that the precipitation for the seasonal year 1930-31 was 54% of the average.

Table 2 is a tabulation of the daily discharge of Shasta River at a stream flow measuring station which was established near the Granada Irrigation District pumps. The station is located at the outlet of a pool about 1,000 feet downstream from the pumps and the channel is straight for about 100 feet above and 200 feet below the station. The control is a gravel bar. The available supply at this point is graphically shown on Plate 1 of this report and Plate 2 is a rating curve for the station.

Table 3 is a tabulation of the daily discharge of Shasta River at a stream flow measuring station established and maintained by the U. St Geological Survey at the Montague-Grenada Highway bridge. The table shows the quantity available for distribution to the extreme lower users from the river.

Tables 4 and 5 are tabulations of the daily total supply and the distribution thereof by priorities for each month of the 1931 water supervisor season. These tables show the percentage of distribution by priorities. Table 4 shows the quantity distributed to the upper users and Table 5 that to the lower users. The division between the

two groups being the Montague-Grenada Highway bridge.

From Table 5 it will be noted that the average return flow experienced from irrigation operations of the upper users was 9 cubic feet per second and this quantity constituted 58% of the amount necessary to meet the requirements of the lower users.

The results obtained during the 1931 water supervisor season were satisfactory in view of the obstacles encountered in the form of sudden fluctuations in the flow of Shasta River. The irregularity of return flow, considerable diurnal fluctuation over most of the season and irrigation operations in the Big Springs Area, above the portion of the river being administered, combined to cause a very erratic and undependable flow in the river.

The main cause of the fluctuating flow in Shasta River was the pumping operations of the Big Springs Irrigation District since they were continually changing the quantity being pumped. The average supply available to them was approximately 20% below normal and in order to secure additional water whenever possible the use under prior rights in the area was closely watched and the pumps regulated accordingly with the result that sudden changes of as high as 7 cubic feet per second would be caused in the flow in Shasta River. The changes would occur as often as three times in 24 hours.

No controversies over diversions occurred during the period of water supervisor service.

CROPS

Due to the failure on the part of the water users to file the crop production reports requested from them no tabulation of the number of acres irrigated and the crops thereon has been made.

It may be stated, however, that the greater portion of the approximately 6500 acres irrigated was planted to alfalfa and clover with the yield being about 75% of normal or about 2.25 tons per acre.

TABLE 1

PRECIPITATION DATA

Average Mt. Shasta City and Montague -1889-1931

Season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Season Total
1889-90	8.30	3.39	8.21	6.74	4.68	3.54	1.77	2.22	1.17	0	0	0.60	40.67
1890-91	1.67	0.80	3.46	2.05	6.61	2.11	1.98	1.74	0.92	0.03	0.18	0.61	21.55
1891-92	0.15	0.18	6.30	1.52	2.00	2.47	2.92	2.74	0.82	0.23	0	0.93	20.26
1892-93	0.62	4.55	5.70	1.60	1.40	1.76	5.50	2.03	0.02	0.17	0	0.34	23.69
1893-94	0.30	2.75	2.54	5.62	2.24	2.16	1.23	1.64	1.12	0	0	0.84	20.44
1894-95	2.05	2.38	6.74	5.92	1.68	2.95	0.66	2.28	0.52	0.28	0	2.32	27.78
1895-96	0.50	0.62	3.03	10.59	1.17	1.33	1.77	1.91	0.07	0.01	0.15	0.22	21.37
1896-97	0.64	3.62	7.64	3.35	2.63	0.96	0.67	0.48	0.08	0	0.24	0	20.31
1897-98	2.28	2.93	2.57	0.61	6.56	0.89	0.58	3.07	1.07	0	0	0	20.56
1898-99	0.25	1.23	1.87	2.93	0.51	1.54	0.11	1.15	0.51	0	0.66	0	10.76
1899-00	2.08	6.51	2.93	4.68	0.63	5.71	1.85	1.32	0.88	0	0.36	0.34	27.29
1900-01	5.83	3.83	3.38	6.03	5.10	0.75	1.55	0.74	0.40	0.13	0.48	1.09	29.31
1901-02	2.04	4.73	1.83	1.11	14.20	2.83	3.14	1.97	0.02	0.28	2.58	0.06	34.79
1902-03	2.95	7.49	3.99	5.18	0.93	5.19	0.11	0.14	0.32	0.14	0.03	0.01	26.48
1903-04	1.22	8.12	1.63	2.20	8.02	10.17	3.94	0.42	0.05	0.23	0.01	3.15	39.16
1904-05	4.18	1.99	3.82	6.02	2.14	4.85	1.19	2.61	0.52	0.07	0	0.15	27.54
1905-06	0.17	1.28	2.21	8.04	2.97	6.84	0.98	1.76	1.50	0.23	0.16	0.41	26.55
1906-07	0.06	2.78	5.69	5.35	2.86	8.71	0.61	0.58	0.90	0.06	1.28	0.37	29.25
1907-08	0.54	0.15	7.82	4.52	6.43	0.50	0.86	1.92	0.21	0	0	0.15	23.10
1908-09	2.61	1.80	1.41	13.18	10.22	2.00	0.06	0.21	0.39	0.62	0.04	0.65	33.19
1909-10	2.00	3.69	3.70	4.14	1.40	1.80	1.25	0.80	0.03	0.20	0	0.62	19.63
1910-11	0.71	7.25	2.08	6.54	2.13	3.78	1.61	1.00	0.32	0.94	0	0.69	27.05
1911-12	0.89	1.23	2.00	3.99	1.21	4.12	2.79	2.32	1.29	0.28	0.45	2.71	23.28
1912-13	1.66	3.75	0.95	4.19	0.65	1.38	1.70	1.55	3.21	2.06	0.40	0.23	21.73
1913-14	0.31	4.72	6.26	10.16	4.02	1.90	1.37	1.23	1.13	0.63	0.03	0.57	32.33
1914-15	2.09	0.29	4.55	4.04	7.60	4.24	1.08	2.61	0.06	0.31	0.01	0.01	26.89
1915-16	0.17	1.84	4.22	9.23	2.73	2.45	0.29	0.53	0.65	0.64	0.51	0.19	23.45
1916-17	0.26	1.02	3.84	1.70	4.03	2.04	1.54	1.25	0.01	0.08	0.20	0.29	16.26
1917-18	0	2.91	2.07	1.54	1.55	3.61	0.76	0.20	0.01	0.10	0.49	2.77	16.01
1918-19	2.12	1.69	1.19	3.44	6.08	2.84	0.76	0.14	0.15	0.04	0.04	1.01	19.50
1919-20	0.13	0.43	2.54	0.40	0.49	2.44	2.61	0.64	0.63	0.71	0.42	0.30	11.74
1920-21	1.86	5.79	4.21	5.43	2.07	2.01	0.36	1.82	0.24	0	0	0.08	23.87
1921-22	1.02	2.57	4.71	0.90	4.92	3.12	0.36	1.26	0.81	0.02	0.35	0.12	20.16
1922-23	3.22	2.43	4.61	2.33	0.85	0.08	2.56	0.75	1.91	0.11	0.20	1.91	20.96
1923-24	1.53	0.41	1.66	1.37	1.44	1.07	0.32	0.12	0.27	0.08	0.21	0.50	8.98
1924-25	3.80	2.52	3.04	1.31	5.95	2.12	3.98	1.50	0.82	0.26	0.46	2.83	28.59
1925-26	0.66	1.99	1.71	1.39	3.61	0.13	3.30	0.78	0	0.23	0.38	0.05	14.23
1926-27	1.71	11.13	2.59	3.51	5.42	1.78	4.05	1.26	0.62	0.01	0.06	0.01	32.15
1927-28	1.88	4.31	1.91	2.01	2.75	4.75	2.17	0.74	0.40	0.24	0.10	0.37	21.63
1928-29	0.87	3.92	3.81	0.83	2.30	1.67	1.51	0.21	0.87	0	0	0	15.99
1929-30	1.10	0	7.33	3.75	2.73	1.93	2.62	0.75	0.49	0.03	0.09	1.17	21.99
1930-31	0.41	1.26	0.77	3.59	1.19	1.16	0.41	0.24	2.71	0	0	0.94	12.68
Average	1.59	3.00	3.65	4.12	3.52	2.84	1.69	1.25	0.67	0.22	0.25	0.70	23.41

TABLE 2

Continuous Records of Discharge

SHASTA RIVER

Near Granada Irrigation District Pumps
For the Period June 1 to August 31, 1931

Day	June	July	Aug.	
1	74	80	73	
2	74	80	71	
3	70	81	73	
4	75	80	73	
5	76	78	74	
6	76	80	76	
7	76	82	75	
8	76	76	73	
9	76	79	75	
10	76	84	75	
11	77	78	71	
12	77	77	71	
13	75	77	71	
14	79	78	73	
15	83	77	77	
16	87	77	74	
17	110	74	71	
18	128	74	72	
19	123*	75	72	
20	120	78	74	
21	120	77	73	
22	100	76	75	
23	81	78	76	
24	81	79	76	
25	87	80	69	
26	83	77	73	
27	85	75	72	
28	85	73	68	
29	85	71	71	
30	83	74	73	
31		74	73	
Total Sec. Ft. Days	2598	2399	2263	3 month period
Mean Sec. Ft.	87	77	73	79
Max. Sec. Ft.	128	84	77	128
Min. Sec. Ft.	70	71	68	68
Total Acre Feet	5144	4750	4481	14,375

TABLE 3

Continuous Records of Discharge

SHASTA RIVER

Near Montague
For the Period June 1 to August 31, 1931

Day	June	July	Aug.	
1	23	13	13	
2	20	13	14	
3	19	14	11	
4	13	14	12	
5	20	13	14	
6	34	9	15	
7	33	11	16	
8	23	5	19	
9	18	7	14	
10	37	11	20	
11	8	6	19	
12	7	14	16	
13	10	26	16	
14	10	14	16	
15	33	14	14	
16	44	15	14	
17	130	13	12	
18	120	14	14	
19	118	14	14	
20	110	19	15	
21	96	14	19	
22	75	11	19	
23	27	33	17	
24	22	10	19	
25	21	12	17	
26	18	17	17	
27	19	16	17	
28	19	11	18	
29	20	10	10	
30	19	10	11	
31		33	11	
Total Sec. Ft. Days	1166	437	473	3 month period
Mean Sec. Ft.	39	14	15	23
Max. Sec. Ft.	130	33	20	130
Min. Sec. Ft.	7	5	10	5
Total Acre Feet	2309	865	936	4110

TABLE 4

SUPPLY and DISTRIBUTION

Upper Users
1931

DAY	JUNE Available Supply c.f.s.	JUNE Per cent of Distribution by Priorities First	JUNE Per cent of Distribution by Priorities Second	JULY Available Supply c.f.s.	JULY Per cent of Distribution by Priorities First	JULY Per cent of Distribution by Priorities Second	AUGUST Available Supply c.f.s.	AUGUST Per cent of Distribution by Priorities First	AUGUST Per cent of Distribution by Priorities Second
1	74	82	35	80	88	46	73	85	27
2	74	82	46	80	87	46	71	85	27
3	70	82	46	81	87	46	73	82	27
4	75	82	22	80	87	46	73	76	22
5	76	82	0	78	87	46	74	82	30
6	76	82	0	80	87	46	76	82	30
7	76	82	35	82	87	35	75	87	32
8	76	82	46	76	87	17	73	87	32
9	76	72	46	79	87	35	75	87	25
10	76	82	80	84	87	35	75	87	25
11	77	87	35	78	87	17	71	86	25
12	77	91	35	77	85	0	71	85	25
13	75	91	35	77	85	35	71	85	25
14	79	87	35	78	82	35	73	81	25
15	83	87	35	77	82	35	77	83	32
16	87	33	35	77	82	35	74	76	32
17	110	34	0	74	83	35	71	85	22
18	128	34	46	74	83	35	72	85	22
19	123	34	80	75	83	25	72	85	22
20	120	34	80	78	87	35	74	85	30
21	120	34	80	77	87	35	73	85	35
22	100	81	80	76	87	35	75	83	35
23	81	84	46	78	72	35	76	83	35
24	81	83	46	79	87	35	76	82	35
25	87	84	46	80	87	27	69	78	32
26	83	88	46	77	87	27	73	82	32
27	85	88	46	75	87	32	72	81	35
28	85	88	46	73	87	25	68	85	35
29	85	88	46	71	87	22	71	85	30
30	83	88	46	74	87	22	73	86	30
31				74	75	22	73	89	15
Average	87	73	44	77	85	33	73	84	29

NOTE: Diversions not exercising their right, or only a portion thereof, are the cause of fluctuation in the First Priority.

First priority class covers all users except the Granada Irrigation District and Roland Ekstrom.

TABLE 5

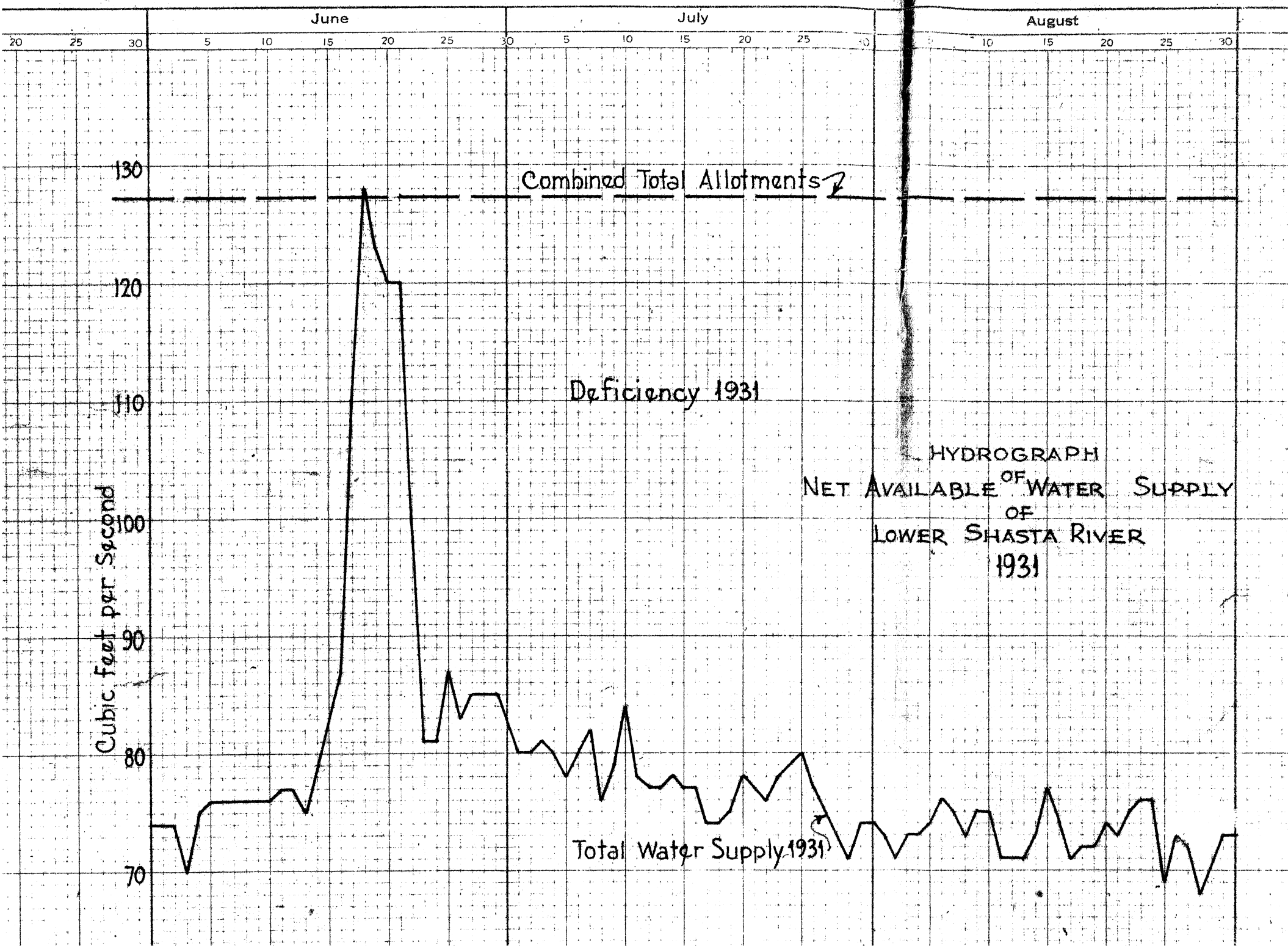
SUPPLY and DISTRIBUTION

Lower Users
1931

DAY	JUNE Available Supply c.f.s. A*	JUNE B*	JUNE Total	JUNE % of Distribution	JULY Available Supply c.f.s. A*	JULY B*	JULY Total	JULY % of Distribution	AUGUST Available Supply c.f.s. A*	AUGUST B*	AUGUST Total	AUGUST % of Distribution
1	10	13	23	90	7	6	13	52	6	7	13	60
2	7	13	20	79	6	7	13	52	4	10	14	70
3	5	14	19	70	3	11	14	67	6	5	11	59
4	0	13	13	55	3	11	14	67	6	6	12	65
5	10	10	20	75	4	9	13	57	6	8	14	66
6	20	14	34	85	3	6	9	47	7	8	15	74
7	20	13	33	85	5	6	11	54	9	7	16	78
8	7	16	23	89	0	5	5	37	9	10	19	87
9	3	15	18	80	0	7	7	44	8	6	14	83
10	25	12	37	84	5	6	11	55	11	9	20	91
11	1	7	8	43	0	6	6	41	11	8	19	90
12	4	3	7	38	9	5	14	70	7	9	16	78
13	1	9	10	52	19	7	26	75	7	9	16	78
14	1	9	10	52	7	7	14	60	9	7	16	78
15	22	11	33	82	7	7	14	59	9	5	14	67
16	32	12	44	81	7	8	15	65	9	5	14	59
17	72	58	130	78	7	6	13	49	6	6	12	55
18	78	42	120	78	9	5	14	68	6	8	14	61
19	87	31	118	78	9	5	14	68	10	4	14	58
20	82	28	110	78	13	6	19	82	10	5	15	64
21	66	30	96	78	7	7	14	71	14	5	19	77
22	66	9	75	82	6	5	11	47	14	5	19	86
23	19	8	27	81	28	5	33	87	11	6	17	84
24	14	8	22	78	6	4	10	43	11	8	19	94
25	13	8	21	87	6	6	12	60	10	7	17	87
26	11	7	18	77	8	9	17	80	10	7	17	83
27	7	12	19	80	10	6	16	77	10	7	17	83
28	6	13	19	80	7	4	11	54	10	8	18	86
29	6	14	20	86	5	5	10	43	8	2	10	44
30	6	13	19	82	3	7	10	43	6	5	11	56
31					27	6	33	86	6	5	11	55
Average	24	15	39	75	8	6	14	60	8	7	15	73

* Column A shows amount not diverted by upper users and
Column B shows return flow from upper users.

NOTE: No second priorities on this section of the river.
Diversions not exercising full right, or only a portion thereof, are the cause of less than 100% distribution.


June
July
August
20
25
30
5
10
15
20
25
30
5
10
15
20
25
10
15
20
25
30
130
120
110
100
90
80
70
Cubic Feet per Second
Combined Total Allotments
Deficiency 1931
Total Water Supply 1931
HYDROGRAPH
NET AVAILABLE OF WATER SUPPLY
OF
LOWER SHASTA RIVER
1931

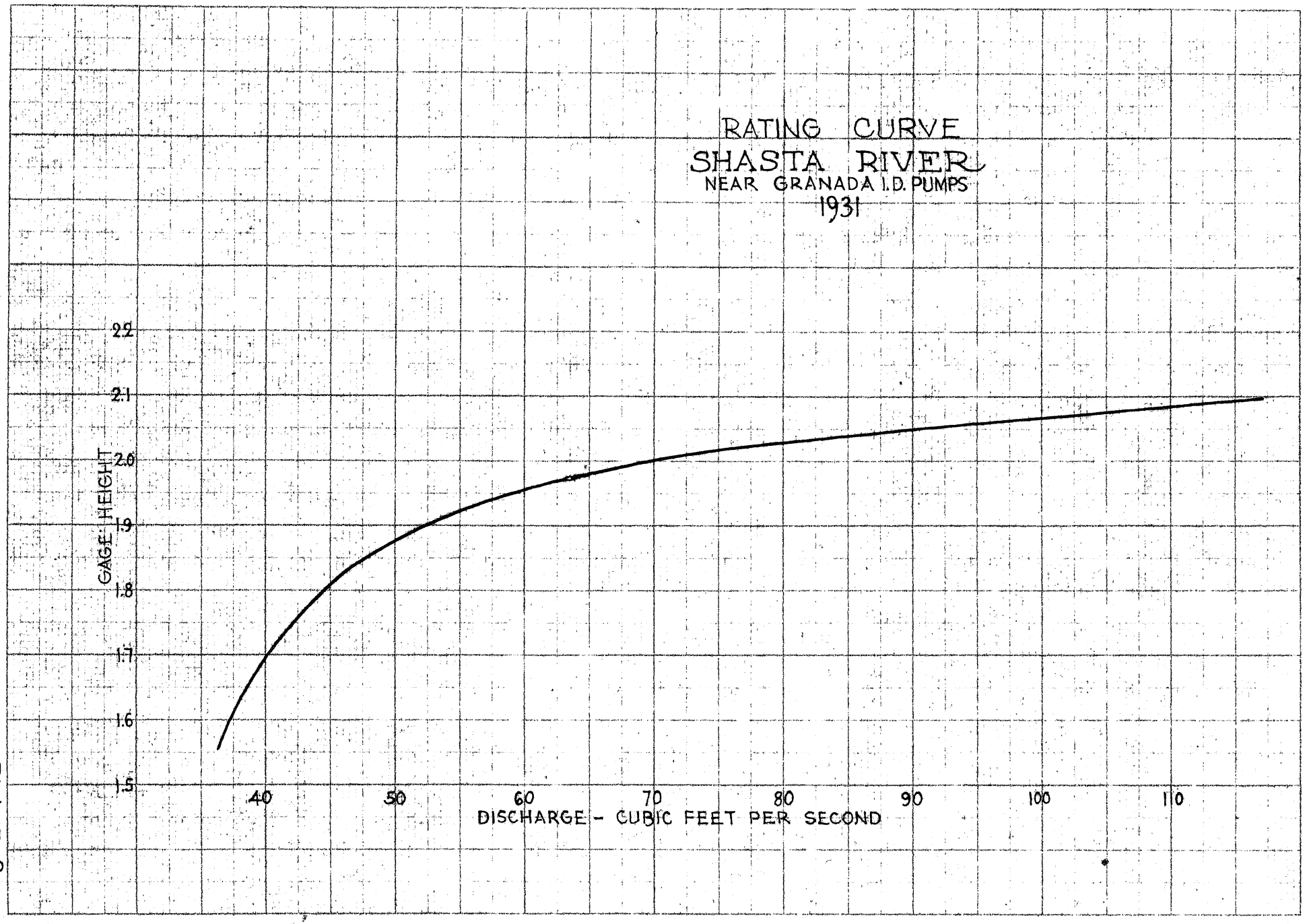

RATING CURVE
SHASTA RIVER
NEAR GRANADA I.D. PUMPS
1931
GAGE HEIGHT
2.2
2.1
2.0
1.9
1.8
1.7
1.6
1.5
40
50
60
70
80
90
100
110
DISCHARGE - CUBIC FEET PER SECOND

PLATE 2

DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

oOo

REPORTS OF THE
DIVISION OF WATER RESOURCES
EDWARD HYATT, STATE ENGINEER

oOo

REPORT ON

WATER SUPERVISOR SERVICE

ON

LOWER SHASTA RIVER

SISKIYOU COUNTY, CALIFORNIA

DURING THE SEASON OF 1930

oOo

By

A. S. Wheeler, Water Supervisor

Sacramento, California

March 1931

oOo

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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, 1931

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

ATTENTION: Mr. Gordon Zander, Hydraulic Engineer

Dear Sir:

Herewith is submitted a report on the water supervisor service on Lower Shasta River in Siskiyou County, California, during the season of 1930.

This report includes a description of the regulation and distribution of the waters of the lower portion of Shasta River in accordance with an agreement entered into by the various water users on June 28, 1930, and a discussion of the results that were obtained.

Runoff records and other permanent data are included together with a financial statement.

Respectfully submitted,

A. S. Wheeler

Water Supervisor

ORGANIZATION

Colonel Walter E. Garrison - - - - - Director, Department of Public Works

Edward Hyatt - - - - - - - - - - - - - State Engineer

oOo

Harold Conding - - - - - - - - - - - Deputy State Engineer

oOo

Gordon Zander, Hydraulic Engineer
In Supervising Charge

oOo

A. S. Wheeler - - - - - - - - - - - - Water Supervisor

oOo

REPORT ON

WATER SUPERVISOR SERVICE

ON

LOWER SHASTA RIVER

SISKIYOU COUNTY, CALIFORNIA

DURING SEASON OF 1930

oOo

GENERAL DESCRIPTION OF WORK

Water supervisor service was continued on the lower portion of Shasta River during 1930 under an agreement for such service entered into by the water users on June 28, 1930.

Under the agreement the service for 1930 commenced on July 1st and ceased on September 30th with the writer acting in the capacity of water supervisor.

All of the water users exercised their rights to divert with the exception of the Kuney and Ekstrom Pumps which were not operated during the period of water supervisor service.

With two exceptions none of the water users diverted the full quantity to which they were entitled. This was due to failure to operate pumps a sufficient number of hours and to the fact that gravity diversions were not kept sufficiently cleared of moss and water grasses to divert the full amount.

The following tabulation shows the average amount diverted by each diversion in percentage of the total quantity to which such diversion was entitled.

DIVERSION	PER CENT OF ALLOTMENT DIVERTED
Granada Irrigation District Pumps	31
Granada Ranch Ditch	82
Ekstrom Pump	0
Hudson and Edmonds Ditch	38
Brown (Knoe) Pump	67
Hudson and Edmonds Pump	84
Shasta River Water Association Pumps	78
King Diversions	52
Massey (Lucas) Pump	0
Webb Bros. Pump	2
Lewis Ditch	55
Lemos Pumps	36
Block Upper Ditch	100
Antonio Ditch	92
Block Lower Ditch	100
Shelley Pump	79

The 1930 season was marked by a particularly high degree of cooperation on the part of the water users and consequently a more accurate and satisfactory distribution was possible than during the 1929 season.

The water users were divided into two priority classes and the first priority covered all users with the exception of the Granada Irrigation District.

DISCUSSION OF RESULTS FOR 1930 SEASON

The precipitation at Mt. Shasta City and Montague for the seasonal year, October 1, 1929, to September 30, 1930, is compared with the precipitation during the preceding forty seasonal years in Table 1 of this report which table shows the average precipitation for the total period of record at these two stations.

It will be noted from Table 1 that the precipitation for the seasonal year 1929-30 was 93% of the average and that slightly over 50% of this occurred during December 1929 and January 1930.

Table 2 is a tabulation of the daily discharge of Shasta River at a stream flow measuring station which was established near the Grenada Irrigation District Pumps and the available supply at this point is graphically shown on Plate 1 of this report.

Table 3 is a tabulation of the daily discharge of Shasta River at the U. S. Geological Survey stream flow measuring station established at the Montague-Grenada Highway Bridge. This table shows the quantity available for distribution to the extreme lower users on Shasta River.

Tables 4 and 5 are tabulations of the daily total supply and distribution thereof by priorities for each month of the 1930 water supervisor season. These tables show the percentage of distribution by priorities. Table 4 shows the quantity distributed to the upper users and Table 5 that to the lower users. The division between the two groups being the Montague-Grenada Highway Bridge.

It will be noted from Tables 3 and 5 that sufficient flow was maintained at the lower stream flow measuring station to meet the requirements of the lower users at all times with the exception of August 14th on which date there was a shortage for about 14 hours.

A considerably greater quantity of water was wasted into the Klamath River during the 1930 season than in former seasons of water supervisor service. This may be attributed to the fact that during the last two months of the season the Granada Irrigation District did not attempt to divert the full quantity of water allotted to them at various river stages by the water supervisor and was prompted by a desire on their part to curtail their pumping operations for financial reasons.

From Table 5 it will be noted that the average return flow experienced from the irrigation of the upper users' lands was 8 cubic feet per second and this quantity constituted 61% of that necessary to meet the requirements of the lower users.

No controversies over diversions occurred during the period of water supervisor service.

CROPS

Due to the failure on the part of most of the water users to file crop production reports requested of them no tabulation of the number of acres irrigated and the crops thereon has been made.

A survey of the area served by diversions included in this report indicated a yield slightly below normal and a total of approximately 6700 acres irrigated during the period of water supervisor service.

The greater portion of the land irrigated was planted to alfalfa and clover and from the information which was obtained the average yield on this land was about 3 tons per acre.

FINANCIAL STATEMENT

The finances for conducting investigations and water master service on all streams in Northern California, except in water districts operating under the procedure of Sections 37 to 37f of the Water Commission Act, during the 1930 season were combined into one fund. This was done because a portion of the work on the various streams was related and because of convenience in bookkeeping. The streams included under the fund were Emerson, Davis and Mill Creeks in Modoc County, Clover, North Cow, and Oak Run Creeks in Shasta County, Little Shasta and Lower Shasta Rivers in Siskiyou County, and Pit River in Big Valley.

The work was 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 the nine stream systems during the 1930 season. The total unit cost of the work was about twenty-four cents per acre of irrigated land, of which about half was borne by the state.

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

FINANCIAL STATEMENT

NORTHERN CALIFORNIA WATER DISTRIBUTION

1930 SEASON

Receipts

Contributed by Emerson Creek Water Users - - - - -	$290.10
Contributed by Davis Creek Water Users - - - - - -	389.20
Contributed by Mill Creek Water Users - - - - - - -	500.00
Contributed by Clover Creek Water Users - - - - -	372.00
Contributed by North Cow Creek Water Users - - - -	442.87
Contributed by Oak Run Creek Water Users - - - - -	94.48
Contributed by Little Shasta River Water Users - -	926.02
Contributed by Lower Shasta River Water Users - - -	200.00
Contributed by Pit River - - - - - - - - - - - - - -	450.00
Contributed by Division of Water Resources - - - -	3950.00
	$ 7614.67

Disbursements

Salaries and Wages - - - - - - - - - - - - - - - - -	$4987.18
Travel and Field Expenses - - - - - - - - - - - -	2550.92
Printing and Blueprinting - - - - - - - - - - - -	43.42
Miscellaneous - - - - - - - - - - - - - - - - - - -	33.15
	$ 7614.67

T A B L E S

TABLE 1

PRECIPITATION DATA

Average Mt. Shasta City and Montague -1889-1930

Season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Season Total
1889-90	8.30	3.39	8.21	6.74	4.68	3.54	1.77	2.22	1.17	0	0	0.60	40.67
1890-91	1.67	0.80	3.46	2.05	6.61	2.11	1.98	1.74	0.92	0.03	0.18	0.61	21.55
1891-92	0.15	0.18	6.30	1.52	2.00	2.47	2.92	2.74	0.82	0.23	0	0.93	20.26
1892-93	0.62	4.55	5.70	1.60	1.40	1.76	5.50	2.03	0.02	0.17	0	0.34	23.69
1893-94	0.30	2.75	2.54	5.62	2.24	2.16	1.23	1.64	1.12	0	0	0.84	20.44
1894-95	2.05	2.38	6.74	5.92	1.68	2.95	0.66	2.28	0.52	0.28	0	2.32	27.78
1895-96	0.50	0.62	3.03	10.59	1.17	1.33	1.77	1.91	0.07	0.01	0.15	0.22	21.37
1896-97	0.64	3.62	7.64	3.35	2.63	0.96	0.67	0.48	0.08	0	0.24	0	20.31
1897-98	2.28	2.93	2.57	0.61	6.56	0.89	0.58	3.07	1.07	0	0	0	20.56
1898-99	0.25	1.23	1.87	2.93	0.51	1.54	0.11	1.15	0.51	0	0.66	0	10.76
1899-00	2.08	6.51	2.93	4.68	0.63	5.71	1.85	1.32	0.88	0	0.36	0.34	27.29
1900-01	5.83	3.83	3.38	6.03	5.10	0.75	1.55	0.74	0.40	0.13	0.48	1.09	29.31
1901-02	2.04	4.73	1.83	1.11	14.20	2.83	3.14	1.97	0.02	0.28	2.58	0.06	34.79
1902-03	2.95	7.49	3.99	5.18	0.93	5.19	0.11	0.14	0.32	0.14	0.03	0.01	26.48
1903-04	1.22	8.12	1.63	2.20	8.02	10.17	3.94	0.42	0.05	0.23	0.01	3.15	39.16
1904-05	4.18	1.99	3.82	6.02	2.14	4.85	1.19	2.61	0.52	0.07	0	0.15	27.54
1905-06	0.17	1.28	2.21	8.04	2.97	6.84	0.98	1.76	1.50	0.23	0.16	0.41	26.55
1906-07	0.06	2.78	5.69	5.35	2.86	8.71	0.61	0.58	0.90	0.06	1.28	0.37	29.25
1907-08	0.54	0.15	7.82	4.52	6.43	0.50	0.86	1.92	0.21	0	0	0.15	23.10
1908-09	2.61	1.80	1.41	13.18	10.22	2.00	0.06	0.21	0.39	0.62	0.04	0.65	33.19
1909-10	2.00	3.69	3.70	4.14	1.40	1.80	1.25	0.80	0.03	0.20	0	0.62	19.63
1910-11	0.71	7.25	2.08	6.54	2.13	3.78	1.61	1.00	0.32	0.94	0	0.69	27.05
1911-12	0.89	1.23	2.00	3.99	1.21	4.12	2.79	2.32	1.29	0.28	0.45	2.71	23.28
1912-13	1.66	3.75	0.95	4.19	0.65	1.38	1.70	1.55	3.21	2.06	0.40	0.23	21.73
1913-14	0.31	4.72	6.26	10.16	4.02	1.90	1.37	1.23	1.13	0.63	0.03	0.57	32.33
1914-15	2.09	0.29	4.55	4.04	7.60	4.24	1.08	2.61	0.06	0.31	0.01	0.01	26.89
1915-16	0.17	1.84	4.22	9.23	2.73	2.45	0.29	0.53	0.65	0.64	0.51	0.19	23.45
1916-17	0.26	1.02	3.84	1.70	4.03	2.04	1.54	1.25	0.01	0.08	0.20	0.29	16.26
1917-18	0	2.91	2.07	1.54	1.55	3.61	0.76	0.20	0.01	0.10	0.49	2.77	16.01
1918-19	2.12	1.69	1.19	3.44	6.08	2.84	0.76	0.14	0.15	0.04	0.04	1.01	19.50
1919-20	0.13	0.43	2.54	0.40	0.49	2.44	2.61	0.64	0.63	0.71	0.42	0.30	11.74
1920-21	1.86	5.79	4.21	5.43	2.07	2.01	0.36	1.82	0.24	0	0	0.08	23.87
1921-22	1.02	2.57	4.71	0.90	4.92	3.12	0.36	1.26	0.81	0.02	0.35	0.12	20.16
1922-23	3.22	2.43	4.61	2.33	0.85	0.08	2.56	0.75	1.91	0.11	0.20	1.91	20.96
1923-24	1.53	0.41	1.66	1.37	1.44	1.07	0.32	0.12	0.27	0.08	0.21	0.50	8.98
1924-25	3.80	2.52	3.04	1.31	5.95	2.12	3.98	1.50	0.82	0.26	0.46	2.83	28.59
1925-26	0.66	1.99	1.71	1.39	3.61	0.13	3.30	0.78	0	0.23	0.38	0.05	14.23
1926-27	1.71	11.13	2.59	3.51	5.42	1.78	4.05	1.26	0.62	0.01	0.06	0.01	32.15
1927-28	1.88	4.31	1.91	2.01	2.75	4.75	2.17	0.74	0.40	0.24	0.10	0.37	21.63
1928-29	0.87	3.92	3.81	0.83	2.30	1.67	1.51	0.21	0.87	0	0	0	15.99
1929-30	1.10	0	7.33	3.75	2.73	1.93	2.62	0.75	0.49	0.03	0.09	1.17	21.99
Average	1.62	3.05	3.70	4.13	3.58	2.84	1.67	1.28	0.62	0.23	0.26	0.69	23.67

TABLE 2

Continuous Records of Discharge

SEMINA RIVER

For the Period July 1 to September 30, 1930
At Granada Irrigation District Pumps

Day	July	August	September	
1	76	82	82	
2	75	82	81	
3	75	82	82	
4	75	81	80	
5	75	81	82	
6	76	81	78	
7	76	81	76	
8	77	79	79	
9	81	79	82	
10	81	79	86	
11	81	78	90	
12	78	76	90	
13	78	74	103	
14	78	74	105	
15	76	83	105	
16	76	83	108	
17	76	83	110	
18	76	83	110	
19	76	78	110	
20	76	80	110	
21	76	80	110	
22	78	78	126	
23	80	78	126*	
24	80	77	130*	
25	80	77	130*	
26	78	77	133*	
27	79	82	133*	
28	79	83	130*	
29	80	79	136	
30	80	79	136	
31	81	78	—	
Total Sec. Ft. Days	2410	2407	3009	3 month period
Mean Sec. Ft.	78	79	100	86
Max. Sec. Ft.	81	83	136	136
Min. Sec. Ft.	75	74	76	74
Total Ac. Ft.	4772	4885	5958	15615

* No record - Flow estimated.

TABLE 3

Continuous Records of Discharge

[illegible] RIVER

For the Period July 1 to September 30, 1930
At Montague-Grenada Highway Bridge

Day	July	August	September	
1	13	19	22	
2	12	19	21	
3	12	16	22	
4	13	16	20	
5	13	18	22	
6	13	30	19	
7	14	25	15	
8	12	27	18	
9	13	27	20	
10	17	19	23	
11	20	15	26	
12	19	14	28	
13	15	13	41	
14	14	7	43	
15	16	16	72	
16	16	15	72	
17	15	20	89	
18	14	20	89	
19	14	20	89	
20	15	22	94	
21	15	22	96	
22	18	20	96	
23	15	20	96*	
24	16	20	113*	
25	41	20	115*	
26	13	20	110*	
27	13	20	110*	
28	15	20	130*	
29	16	18	128	
30	16	16	128	
31	18	14	—	
Total Sec. Ft. Days	493	675	1956	3 month period
Mean Sec. Ft.	16	22	65	35
Max. Sec. Ft.	41	30	128	128
Min. Sec. Ft.	12	7	15	7
Total Ac. Ft.	976	1336	3872	6185

* No record - flow estimated.

TABLE 4

WATER AND DISTRIBUTION

Upper Users

1930

Day	July Available Supply c.f.s.	July Per cent of Distribution by priorities First	July Per cent of Distribution by priorities Second	August Available Supply c.f.s.	August Per cent of Distribution by priorities First	August Per cent of Distribution by priorities Second	September Available Supply c.f.s.	September Per cent of Distribution by priorities First	September Per cent of Distribution by priorities Second
1	76	80	60	82	79	43	82	78	43
2	75	79	43	82	79	43	81	78	43
3	75	82	43	82	79	57	82	77	43
4	75	82	52	81	79	57	80	77	43
5	75	82	52	81	78	57	82	77	55
6	76	82	52	81	77	0	78	75	66
7	76	80	43	81	77	0	76	75	66
8	77	83	33	79	76	0	79	74	66
9	81	80	33	79	74	45	82	74	66
10	81	80	33	79	74	50	86	72	43
11	81	80	33	78	74	50	90	72	43
12	78	81	50	76	73	50	90	72	43
13	78	80	50	74	83	43	103	70	43
14	78	80	50	74	83	33	105	70	30
15	76	80	50	83	83	33	105	27	0
16	76	81	50	83	82	33	108	27	0
17	76	81	50	83	82	0	110	27	0
18	76	81	50	83	82	0	110	25	0
19	76	81	50	78	82	0	110	25	0
20	76	81	50	80	82	0	110	25	0
21	76	81	50	80	82	0	110	23	0
22	78	81	57	78	82	0	126	23	0
23	80	81	66	78	82	0	126	23	0
24	80	81	66	77	82	0	130	23	0
25	80	87	66	77	82	0	130	23	0
26	79	70	50	77	78	0	133	22	0
27	79	80	43	82	78	55	133	22	0
28	79	80	43	83	80	43	136	22	0
29	80	80	43	79	80	43	136	22	0
30	80	79	43	79	79	43	136	22	0
31	81	79	43	78	80	43	—	—	—
Average	78	79	49	79	79	27	100	47	33

NOTE: Diversions not exercising their full right, or only a portion thereof, are the cause of fluctuation in the First Priorities.

First Priority Class covers all users except the Granada Irrigation District.

TABLE 9

[illegible]

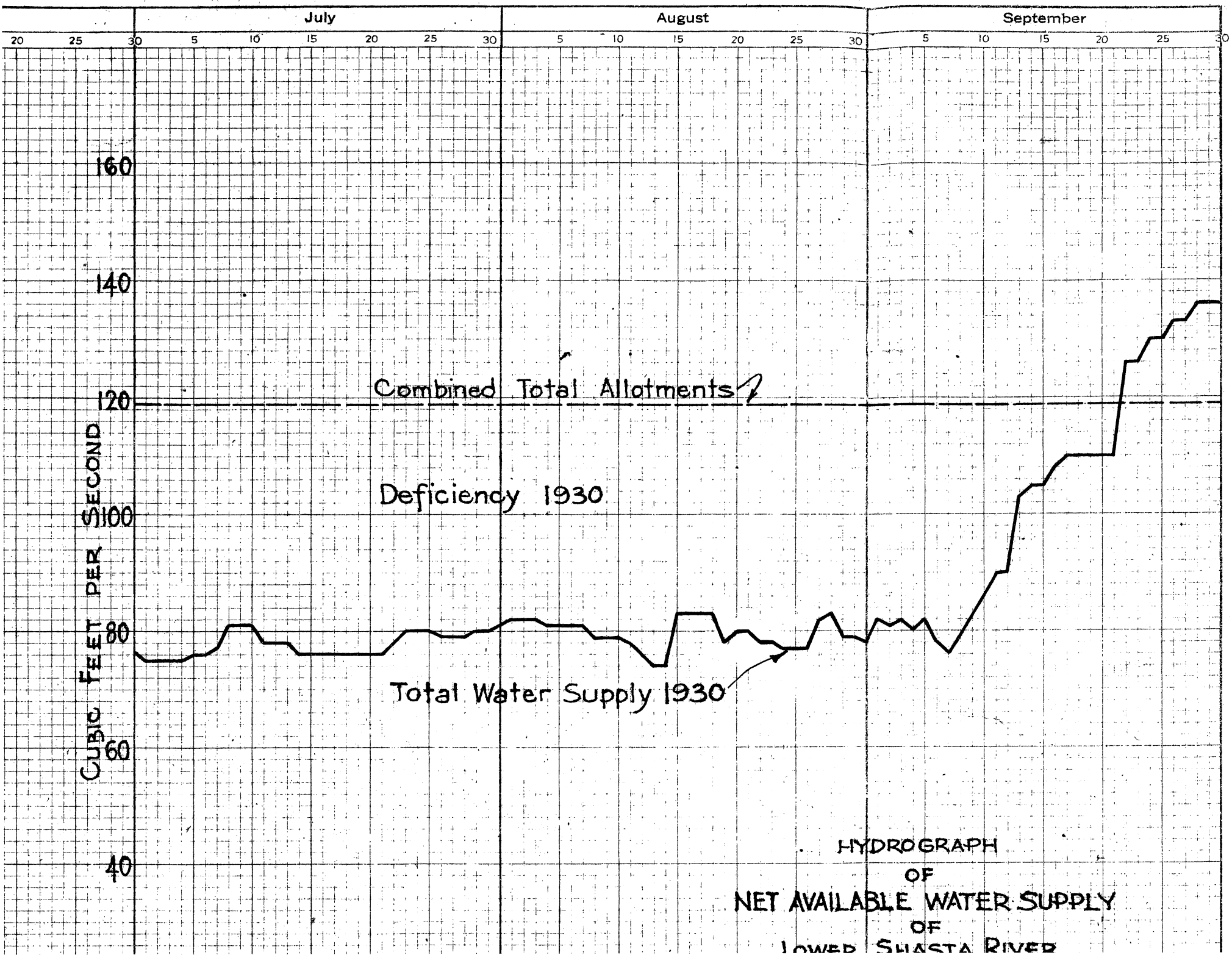
Lower Users

1930

DAY	July Available Supply c.f.s. A*	July Available Supply c.f.s. B*	July Total	July Per cent of distribution	August Available Supply c.f.s. A*	August Available Supply c.f.s. B*	August Total	August Per cent of distribution	September Available Supply c.f.s. A*	September Available Supply c.f.s. B*	September Total	September Per cent of distribution
1	1	12	13	68	9	9	18	68	8	14	22	68
2	1	11	12	68	9	10	19	68	7	14	21	68
3	2	10	12	68	6	10	16	68	12	10	22	68
4	3	10	13	68	5	11	16	68	11	9	20	68
5	1	12	13	68	5	13	18	68	12	10	22	68
6	0	12	12	68	6	14	20	68	9	9	18	68
7	2	12	14	68	14	11	25	68	6	9	15	68
8	2	10	12	68	17	10	27	68	4	14	18	68
9	4	9	13	68	17	10	27	68	7	13	20	68
10	7	10	17	68	9	9	18	68	11	12	23	68
11	11	9	20	68	9	6	15	68	13	13	26	67
12	13	6	19	68	7	7	14	68	16	12	28	67
13	13	2	15	68	7	6	13	68	31	11	41	67
14	3	11	14	68	0	7	7	67	34	9	43	67
15	4	12	16	68	10	6	16	68	68	4	72	67
16	4	12	16	68	10	5	15	68	70	2	72	67
17	2	13	15	68	18	12	30	68	87	2	89	67
18	1	13	14	68	14	12	26	68	87	2	89	67
19	1	13	14	68	17	13	30	68	87	2	89	67
20	1	14	15	68	27	5	32	68	92	3	94	67
21	1	14	15	68	27	5	32	68	93	3	96	67
22	2	16	18	68	22	8	30	68	93	3	96	67
23	2	13	15	68	25	5	30	68	93	3	96	67
24	2	16	18	68	25	4	29	68	*110	3	113	67
25	33	8	41	68	22	7	29	68	*110	3	113	67
26	9	10	19	68	22	7	29	68	*114	2	116	67
27	0	13	13	68	21	9	30	68	*114	2	116	67
28	4	11	15	68	24	6	30	68	*118	3	120	67
29	7	9	16	68	12	6	18	68	*121	2	123	67
30	8	8	16	68	11	5	16	68	*121	2	123	67
31	9	9	18	68	7	7	14	68	—	—	—	—
Average	5	11	16	68	14	8	22	67	59	6	65	68

* Column A shows amount not diverted by upper users, and
Column B shows return flow from upper users.

NOTE: Diversions not exercising their full right, or only a portion thereof, are the cause of less than 100% distribution. Balance of available supply wasted into Klamath River.
No second priorities on this portion of the river.


July
August
September
20
25
30
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10
15
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25
30
5
10
15
20
25
30
160
140
120
100
80
60
40
CUBIC FEET PER SECOND
Combined Total Allotments
Deficiency 1930
Total Water Supply 1930
HYDROGRAPH
OF
NET AVAILABLE WATER SUPPLY
OF
LOWER SHASTA RIVER