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 ASW
Water Supervisor

ASW:WP

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

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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. S. 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	3.89	1.19	1.16	0.41	0.24	2.71	0	0	0.94	12.68
Average	1.89	3.00	3.63	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.

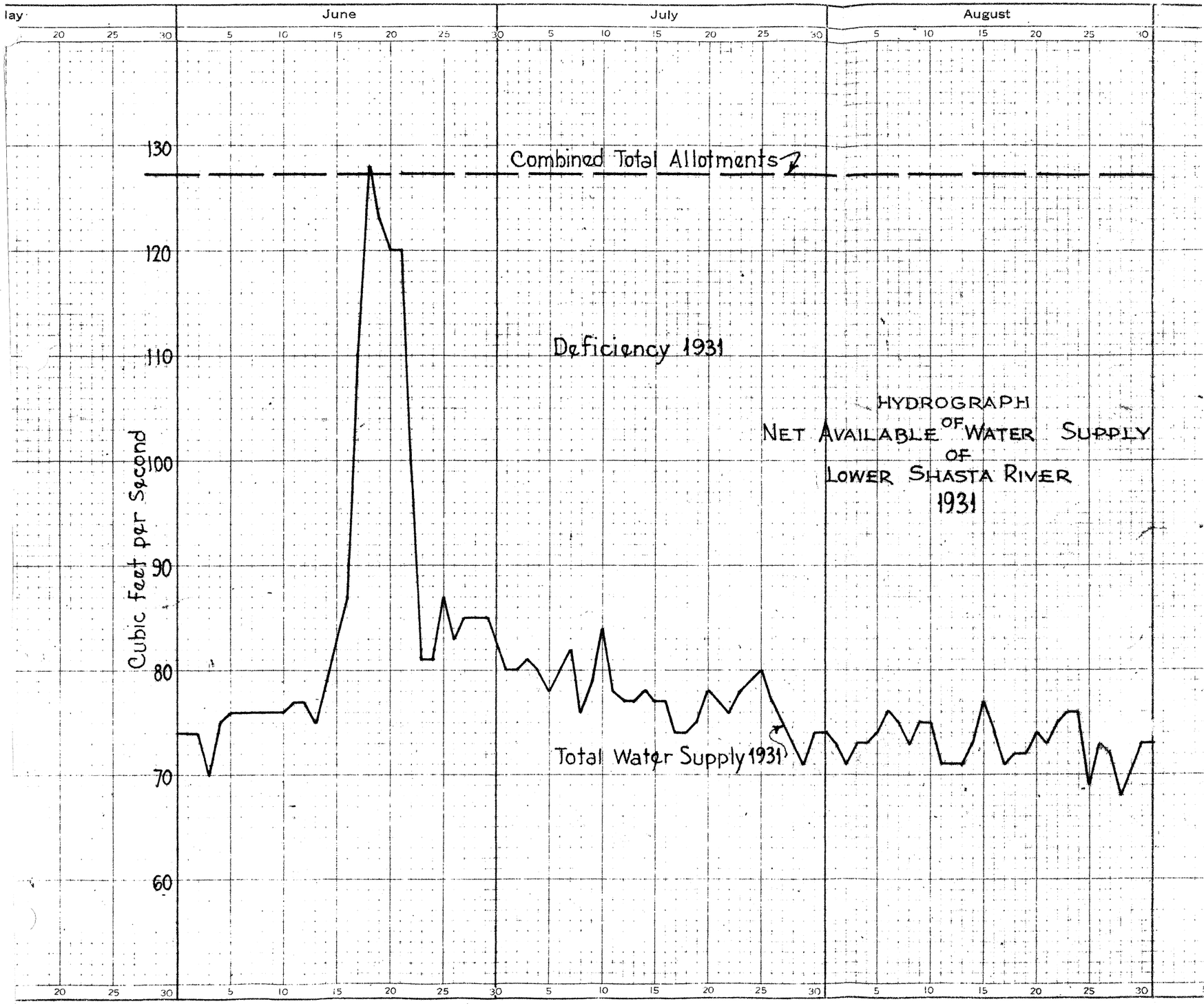
May
June
July
August
Combined Total Allotments
Deficiency 1931
Total Water Supply 1931
Cubic Feet per Second
130
120
110
100
90
80
70
60
HYDROGRAPH
NET AVAILABLE WATER SUPPLY
OF
LOWER SHASTA RIVER
1931

PLATE 1

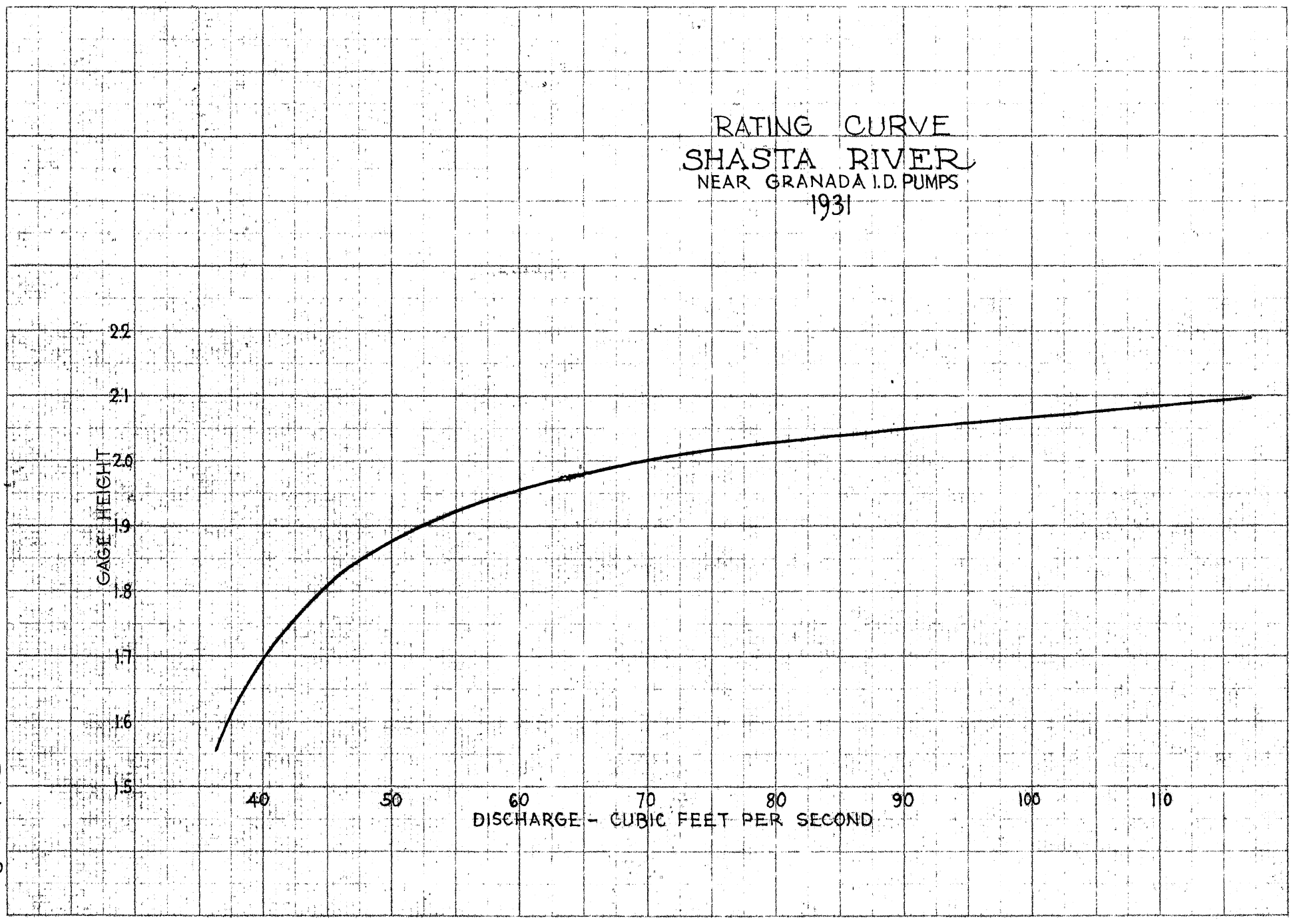
RATING CURVE
SHASTA RIVER
NEAR GRANADA I.D. PUMPS
1931
GAGE HEIGHT
2.2
2.1
2.0
1.9
1.8
1.7
1.6
1.5
40
50
60
70
80
90
100
110
DISCHARGE - CUBIC FEET PER SECOND

PLATE 2