STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

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

REPORT ON

WATER MASTER SERVICE

ON

HAT CREEK

SHASTA COUNTY, CALIFORNIA

FOR THE SEASON OF 1938

BY

P. E. Stephenson
Assistant Hydraulic Engineer

Sacramento, California
March, 1939

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CULBERT L. OLSON
GOVERNOR OF CALIFORNIA

EDWARD HYATT, STATE ENGINEER
CHIEF OF DIVISION

FRANK W. CLARK
DIRECTOR

STATE OF CALIFORNIA
Department of Public Works
SACRAMENTO

DIVISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

March 15, 1939

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

Attention: Mr. Gordon Zander
Supervising Hydraulic Engineer

Dear Sir:

There is submitted herewith a report covering water master service on Hat Creek, Shasta County, California, during the period from May 1 to September 30, 1938.

This report describes the methods and practices followed in the distribution of the waters of Hat Creek in accordance with the Doyel vs. Massie decree, and presents the results obtained under the distribution.

Respectfully submitted,

P E Stephenson
Assistant Hydraulic Engineer

Come to GOLDEN GATE INTERNATIONAL EXPOSITION
. . . . . February 18th to December 2nd 1939

ORGANIZATION

Frank W. Clark	Director of Public Works
Edward Hyatt	State Engineer
Harold Conkling	Deputy State Engineer

GORDON ZANDER

Supervising Hydraulic Engineer

T. Russel Simpson	Senior Hydraulic Engineer
P. E. Stephenson	Assistant Hydraulic Engineer
Wm. A. Alexander	Deputy Water Master

Sacramento, California
March, 1939

GENERAL DESCRIPTION OF WORK

Water master service was conducted on Hat Creek during the 1938 season in accordance with the provisions of the decree in the case of Doyel vs. Massie.

Water Master Service was commenced on May 1, 1938, by P.E. Stephenson. This service was continued throughout the season under the direction of P. E. Stephenson as Deputy Water Master with the part time assistance of W. A. Alexander, Assistant Water Master, in connection with similar work in the Burney Water Master District. T. Russel Simpson was Supervising Water Master.

All diversions from Hat Creek were opened during the 1938 season. Considerable damage was caused to some of the diversions along Hat Creek by the winter floods and early spring high water, these diversions were all repaired during the early summer months.

The water supply during the 1938 season was such that an average of more than 90 per cent total allotments were delivered.

The storms during early December 1937, produced a flood which reached a peak of 2500 cubic feet per second on December 11, 1937, causing considerable damage to diversion dams, headgates, laterals and the main creek channel. The high water caused considerable erosion of the gravel and sand deposits along the stream channel above Old Station which caused considerable channel filling throughout the entire length of the stream. This condition caused the stream to leave its natural channel and spread out over adjacent lava beds and ranch properties even after the flood had subsided. Some ranch properties were isolated due to this channel condition for a considerable period of time. This condition was brought to the attention of the Division of Water Resources and an appropriation of $4000.00 was made available to restore Hat Creek to its original channel being an allocation from monies appropriated to the Emergency Fund for Flood Relief by Assembly Bill No. 25, 1938 session. The expenditure of this money was made under the direction and general supervision of G. M. Vickroy and T. R. Simpson.

DISCUSSION OF RESULTS FOR SEASON

The precipitation at Hat Creek for the seasonal year October 1, 1937 to September 30, 1937, has been compared with the precipitation for the preceding six seasonal years in Table 1 at the end of this report. Compared with the average for the past seventeen years the 1937-38 season was 140% of normal.

Results from the snow measurement made at Mount Shasta snow survey course on March 31, 1938, indicated a snow pack equal to 151 per cent of the deduced normal for this course.

Table 2 is a tabulation of the daily discharge of Hat Creek above all diversions during the 1938 season. Plate 1 graphically shows the water supply that is tabulated in Table 2. The grass demand on the water supply, including irrigation allotments, minimum flow requirements and channel losses, are also shown on Plate 1.

Table 3 shows the water deliveries on Hat Creek during the 1938 season expressed in cubic feet per second and in per cent of full allotments. The table also shows the average channel losses during each rotation period. The abnormal losses shown for the period July 20 to Aug. 15, were caused by part of the flow leaving the channel in the Wilcox Ranch and flowing across the lava beds to return to the channel near the Oscar Grant Ranch.

TABLES

TABLE 1

Precipitation Data
Hat Creek, Shasta County - Elevation 3010 Feet
Monthly, Seasonal and Average Amounts of Precipitation in Inches

Season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Seasonal
10 year Mean 1921-1931	0.91	1.94	1.98	1.86	2.76	1.51	1.46	1.23	0.90	0.04	0.17	0.61	15.37
1931-32	2.56	1.94	5.76	1.69	0.62	1.08	1.51	0.97	0.08	0.19	0.00	0.00	16.40
1932-33	0.65	0.90	2.27	3.01	0.32	2.81	1.25	0.71	0.19	0.06	0.10	0.19	13.46
1933-34	1.42	T	3.37	1.07	2.58	1.28	0.19	2.48	1.43	0.13	0.08	0.18	14.21
1934-35	1.03	3.07	2.21	3.89	2.44	3.00	5.39	1.46	0.05	0.07	0.09	0.02	22.72
1935-36	1.89	0.60	2.74	4.76	4.55	0.78	1.15	0.51	0.66	0.12	0.01	0.61	18.38
1936-37	0.09	0.00	2.19	2.04	5.53	3.22	1.08	0.27	1.21	0.67	0.00	0.01	16.31
1937-38	2.41	5.01	3.61	2.27	2.81	3.92	1.32	0.44	0.28	0.45	0.00	0.39	22.91
17 year mean 1921-1938	1.14	1.83	2.48	2.20	2.73	1.84	1.55	1.18	0.76	0.12	0.11	0.45	16.39

TABLE 2

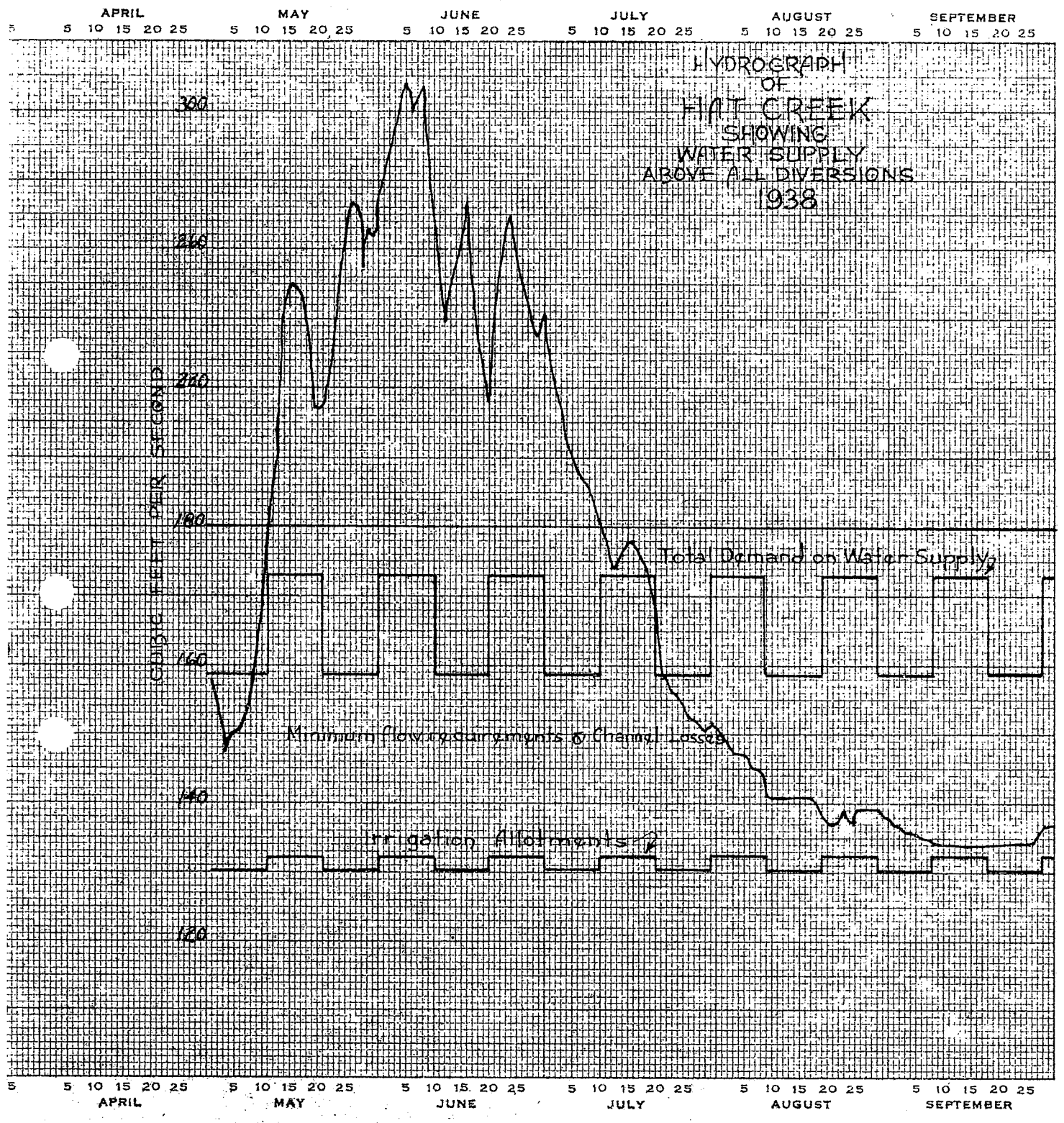
CONTINUOUS RECORDS OF DAILY DISCHARGE IN CUBIC FEET
PER SECOND OF HAT CREEK ABOVE ALL DIVERSIONS
FOR THE PERIOD APRIL 1 TO SEPTEMBER 30, 1938

Day	Apr.	May	June	July	Aug.	Sept.	
1	113	158	280	230	150	137	
2	113	154	287	221	149	137	
3	114	147	292	214	147	136	
4	120	149	302	205	147	136	
5	116	150	308	201	147	135	
6	114	150	300	197	145	135	
7	116	152	302	195	145	135	
8	120	156	308	193	145	134	
9	125	162	295	186	141	134	
10	125	168	278	182	141	134	
11	127	178	256	178	141	134	
12	127	184	238	174	141	134	
13	127	208	247	174	141	134	
14	127	236	254	176	141	134	
15	128	250	261	178	141	134	
16	130	250	275	178	141	134	
17	136	245	263	176	141	134	
18	143	232	238	174	140	134	
19	147	214	227	172	138	134	
20	147	214	216	166	137	134	
21	152	214	241	158	137	134	
22	152	219	254	158	137	134	
23	150	234	266	156	139	134	
24	150	250	270	156	137	134	
25	145	259	261	154	139	134	
26	143	273	252	152	139	134	
27	145	273	243	152	139	135	
28	145	254	238	152	139	137	
29	145	266	236	150	139	137	
30	149	263	241	152	138	137	
31		270		150	138		
Total Sec. Ft. Days	3991	6532	7929	5460	4380	4037	183 day Period
Mean Sec. Ft.	133	210.7	264.3	176.1	141.2	134.6	176.7
Maximum Sec. Ft.	152	273	308	230	150	137	308
Minimum Sec. Ft.	113	147	216	150	137	134	113
Total Acre-Ft.	7920	12900	15700	10800	8670	7990	64000

TABLE 3

WATER DELIVERIES ON HAT CREEK - 1938 SEASON

Irrigation period	Dates	Average flow of Hat Cr. above all diversions	Average combined Diversions cu.ft. per Sec.	Channel Loss Cu. Ft. per Sec.		Average Irrigation Delivery: Cubic Feet per second		Average Irrigation Delivery: Per cent of Full Allotment	
				Upper Users	Lower Users	Upper Users	Lower Users	Upper Users	Lower Users
1	5/1/ - 5/11	160				Surplus:		100	
2	5/11 - 5/21	225				Surplus:			100
3	5/21 - 5/31	256				Surplus:		100	
4	5/31 - 6/10	295				Surplus:			100
5	6/10 - 6/20	248				Surplus:		100	
6	6/20 - 6/30	250				Surplus:			100
7	6/30 - 7/10	202				Surplus:		100	100
8	7/10 - 7/20	175				Surplus:			100
9	7/20 - 7/30	154	116	38		104		80	
10	7/30 - 8/9	147	107		40		93		70
11	8/9 - 8/19	140	103	37		91		70	
			123	17		110		85	
12	8/19 - 8/29	138	122		16	107			80
13	8/29 - 9/8	136	123	13		110		85	
14	9/8 - 9/18	134	122		12		107		80
15	9/18 - 9/28	135	123	12		110		85	
16	9/28 -10/8								


HYDROGRAPH
OF
HAT CREEK
SHOWING
WATER SUPPLY
ABOVE ALL DIVERSIONS
1938
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
5 10 15 20 25
300
260
220
180
160
140
120
CUBIC FEET PER SECOND
Total Demand on Water Supply
Minimum flow requirements & Channel Losses
Irrigation Allotments