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 1937

BY

P. E. Stephenson
Assistant Hydraulic Engineer

Sacramento, California
March, 1938

TABLE OF CONTENTS

	Page
LETTER OF TRANSMITTAL	
ORGANIZATION	
GENERAL DESCRIPTION OF WORK - - - - - - - - - - -	1
DISCUSSION OF RESULTS FOR SEASON - - - - - - - -	2
CONTROVERSIES - - - - - - - - - - - - - - - - - - -	3
RECOMMENDATIONS - - - - - - - - - - - - - - - - -	4

TABLES:

1. Precipitation Data.
2. Continuous Records of Daily Discharge of Hat Creek in Cubic Feet per Second above all Diversions for the Period April 1 to September 30, 1937.
3. Water Deliveres on Hat Creek - 1937 season.

PLATE

1. Hydrograph of Hat Creek showing water supply above all diversions.

STATE OF CALIFORNIA

Department of Public Works

SACRAMENTO

DIVISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

EDWARD HYATT, STATE ENGINEER
CHIEF OF DIVISION

March 15, 1938

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, 1937.

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

ORGANIZATION

Earl Lee Kelly	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
G. M. Vickroy	Deputy Water Master

Sacramento, California
March 1938

GENERAL DESCRIPTION OF WORK

Water master service was conducted on Hat Creek during the 1937 season in accordance with the provisions of the decree in the case of Doyel vs. Massie.

Water master service was commenced on May 1, 1937 by F. E. Stephenson and G. M. Vickroy. Water distribution work was continued under the direction of both water masters until July 1. From July 1 to October 1 the work was done mainly by F. E. Stephenson as deputy water master, in connection with similar work in the Burney Water Master District, T. Russel Simpson was Supervising Water Master. After October 1 there was surplus water due to early fall rains.

All diversions from Hat Creek were opened during the 1937 season.

The water supply during the 1937 season was such that an average of about 60 per cent total allotments were delivered.

The heavy snows during the winter of 1936-37 caused considerable channel damage by breaking the willow and alder growth into the stream channel. About June 15, 1937, a heavy localized rain occured on Mount Lassen causing Hat Creek to reach a peak of about 400 cubic feet per second causing considerable sand to be moved and where willows and alders had blocked the channel, the sand was deposited so as to completely fill the channel in some places. The most serious damage was on the Alan Brown Ranch caused by willow and alder Dams on the Start Ranch. The channel through the Brown Ranch was thereby restricted to a capacity of about 10 cubic feet per second which resulted in heavy losses due to seepage and water spreading to adjacent pasture over the channel banks. During July, 1937 the lower users cleaned the channel through the Start Ranch and some channel work was done on the Brown Ranch. The capacity of the channel was thereby increased and as a result the channel losses were decreased.

DISCUSSION OF RESULTS FOR SEASON

The precipitation at Hat Creek for the seasonal year October 1, 1936 to September 30, 1937, has been compared with the precipitation for the preceding five seasonal years in Table 1 at the end of this report. Compared with the average for the past sixteen years the 1937 season was 102 per cent of normal.

Table 2 is a tabulation of the daily discharge of Hat Creek above all diversions during the 1937 season. Plate 1 graphically shows the water supply that is tabulated in Table 2. The gross 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 1937 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.

CONTROVERSIES

The controversies during the 1937 season on Hat Creek were few and of minor detail with all disputes being settled by the water master.

RECOMMENDATIONS

Parshall measuring flumes should be constructed during the 1938 season on the following ditches:

1. Geissner Ditch at Otto Geissner Line
2. Reiger Ditch at Head
3. Reiger Ditch at Kenns Line
4. Bidwell Ditch at Head
5. Bidwell Ditch at Bidwell Dam
6. Wilcox Upper Ditch
7. Wilcox Middle Ditch

A permanent control is important at the head of Hahn Channel and should be a combined dam and wasteway.

Extensive channel changes should be made through the Alan Brown and Start Ranches to prevent excessive seepage losses and to speed the delivery of irrigation water to the lowermost users.

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	1.71	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
16 year Mean 1921-1937	1.05	1.62	2.40	2.19	2.73	1.70	1.57	1.23	0.79	0.10	0.12	0.45	15.95

TABLE 2

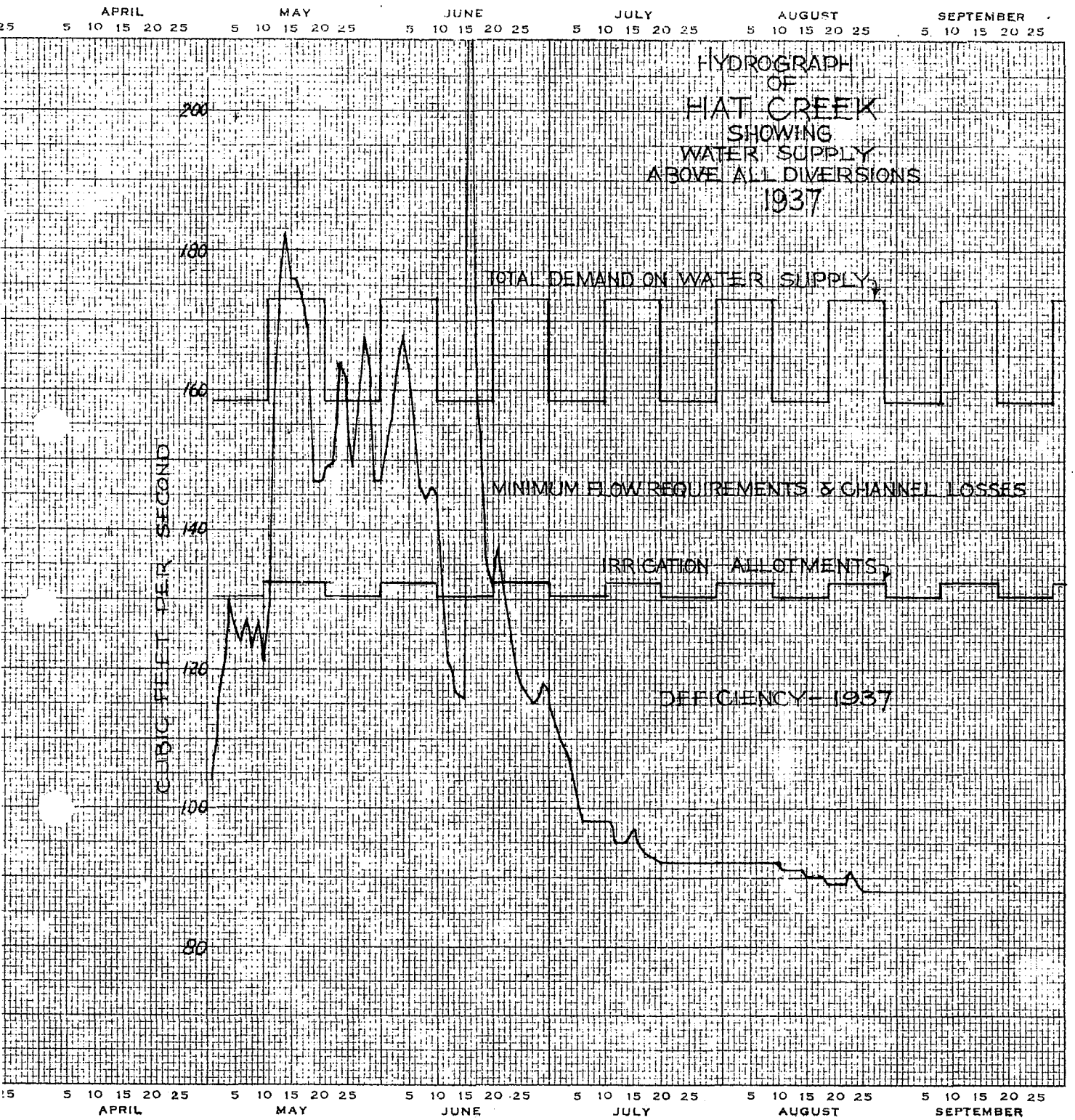
CONTINUOUS RECORDS OF DAILY DISCHARGE IN CUBIC FEET
PER SECOND OF HAT CREEK ABOVE ALL DIVERSIONS
FOR THE PERIOD APRIL 1 TO SEPTEMBER 30, 1937

Day	Apr.	May	June	July	Aug.	Sept.	
1	89.0	104.	152.	113.	92.0	88.0	
2	89.0	115.	156.	110.	92.0	88.0	
3	84.0	120.	164.	109.	92.0	88.0	
4	83.0	130.	168.	107.	92.0	88.0	
5	84.0	126.	163.	102.	92.0	88.0	
6	83.0	124.	156.	98.0	92.0	88.0	
7	82.0	127.	146.	98.0	92.0	88.0	
8	84.0	123.	144.	98.0	92.0	88.0	
9	84.0	127.	146.	98.0	92.0	88.0	
10	84.0	121.	145.	98.0	92.0	88.0	
11	83.0	129.	130.	98.0	91.0	88.0	
12	85.0	158.	121.	95.0	91.0	88.0	
13	105.	174.	120.	95.0	91.0	88.0	
14	112.	182.	116.	95.0	91.0	88.0	
15	111.	176.	116.	97.0	90.0	88.0	
16	100.	176.	263.	95.0	90.0	88.0	
17	100.	172.	168.	94.0	90.0	88.0	
18	100.	169.	149.	93.0	90.0	88.0	
19	100.	147.	134.	93.0	89.0	88.0	
20	100.	147.	151.	92.0	89.0	88.0	
21	100.	149.	138.	92.0	89.0	88.0	
22	100.	149.	133.	92.0	89.0	88.0	
23	100.	156.	126.	92.0	91.0	88.0	
24	100.	164.	123.	92.0	89.0	88.0	
25	104.	161.	118.	92.0	89.0	88.0	
26	104.	149.	117.	92.0	89.0	88.0	
27	100.	158.	115.	92.0	88.0	88.0	
28	100.	168.	115.	92.0	88.0	88.0	
29	100.	161.	118.	92.0	88.0	88.0	
30	100.	147.	117.	92.0	88.0	88.0	
31		147.		92.0	88.0		
Total Sec. Ft. Days	2850.	4556.	4208.	2990.	2798.	2640.	183 Day Period
Mean Sec. Ft.	95.0	147.	140.5	96.4	90.2	88.0	109.5
Maximum Sec. Ft.	105.	182.	263.	113.	92.0	88.0	263.
Minimum Sec. Ft.	82.0	104.	115.	92.0	88.0	88.0	82.0
Total Acre-Ft.	5650.	9030.	8340.	5930.	5550.	5240.	39,700.

TABLE 3

WATER DELIVERIES ON HAT CREEK - 1937 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	120	97	23		84		65	
2	5/11 - 5/21	144	122		22		107		80
3	5/21 - 5/31	158	143	15		130		100	
4	5/31 - 6/10	157	134		23		119		90
5	6/10 - 6/20	148	130	18		117		90	
6	6/20 - 6/30	129	107		22		93		70
7	6/30 - 7/10	109	97	12		85		65	
8	7/10 - 7/20	98	68		30		53		40
9	7/20 - 7/30	92	77	15		65		50	
10	7/30 - 8/9	92	68		24		53		40
11	8/9 - 8/19	91	77	14		65		50	
12	8/19 - 8/29	89	68		21		53		40
13	8/29 - 9/8	88	71	17		59		45	
14	9/8 - 9/18	88	68		20		53		40
15	9/18 - 9/28	88	71	17		59		45	
16	9/28 - 10/8	88	68		20		53		40
Average for Period from May 1 to October 8, 1937		111	92	16	23	83	73	64	55


HYDROGRAPH
OF
HAT CREEK
SHOWING
WATER SUPPLY
ABOVE ALL DIVERSIONS
1937
TOTAL DEMAND ON WATER SUPPLY
MINIMUM FLOW REQUIREMENTS & CHANNEL LOSSES
IRRIGATION ALLOTMENTS
DEFICIENCY - 1937
CUBIC FEET PER SECOND
200
180
160
140
120
100
80
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
5 10 15 20 25