

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

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

REPORT ON
WATER MASTER SERVICE
ON
HAT CREEK
SHASTA COUNTY, CALIFORNIA
FOR SEASON OF 1928

oOo

By Harrison Smitherum, Water Master

oOo

Sacramento, California
June 1930

TABLE OF CONTENTS

	Page
<u>LETTER OF TRANSMITTAL</u>	
<u>INTRODUCTION</u> - - - - -	1
<u>PRECIPITATION</u> - - - - -	3
<u>WATER SUPPLY</u> - - - - -	4
<u>DEMAND ON WATER SUPPLY</u> - - - - -	5
<u>CHANNEL LOSSES</u> - - - - -	7
<u>AVAILABLE WATER SUPPLY COMPARED WITH DEMAND</u> - - - - -	8
<u>DISTRIBUTION OF WATER</u> - - - - -	9
Determination of Percentage of Irrigation Allotments Available - - - - -	9
Method of Distributing Irrigation Allotments - - - - -	9
Method of Distributing Minimum Flow Allotments - - - - -	10
Summary of Distribution and Resultant Water Deliveries - - - - -	12
<u>USE OF WATER</u> - - - - -	14
<u>CROP PRODUCTION</u> - - - - -	17
<u>FINANCIAL STATEMENT</u> - - - - -	18

TABLE OF CONTENTS (Continued)

TABLES:

1. Precipitation Data, Hat Creek, Shasta County, Monthly, Seasonal and Average Amounts of Precipitation in Inches.
2. Precipitation Data, Hat Creek, Shasta County. Precipitation for the Seasonal Year 1927-1928 Compared with Mean for Seasonal Years 1921-1928.
3. Daily Discharge, in Cubic Feet per Second, of Hat Creek above All Diversions for the Irrigation Season of 1928.
4. Demand on Water Supply During Upper Users' Periods 1928 Season.
5. Demand on Water Supply During Lower Users' Periods 1928 Season.
6. Minimum Flow Allotments as Distributed to Upper Users During 1928 Season.
7. Minimum Flow Allotments as Distributed to Lower Users During 1928 Season.
8. Water Deliveries on Hat Creek 1928 Season.
9. Acreages to be Supplied and Decreed Irrigation Allotments 1928 Season.
10. Crop Production on Lands Irrigated from Hat Creek 1928 Season.

PLATES:

1. Diagram Showing Flow of Hat Creek above All Diversions Compared with Demand on Water Supply 1928.

STATE OF CALIFORNIA
Department of Public Works
SACRAMENTO

DIVISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

EDWARD HYATT, STATE ENGINEER
CHIEF OF DIVISION

June 25, 1930

Mr. Edward Hyatt,
State Engineer
Sacramento, California

Dear Sir: Attention; Mr. Gordon Zander, Hydraulic Engineer

There is transmitted herewith a report covering water master service on Hat Creek, Shasta County, California, during the period from May 1st to October 8, 1928.

The report describes the methods and practices followed in the distribution of the waters of Hat Creek in accordance with the provisions of the Doyel, et al., vs. Massie, et al. decree, and presents the results obtained by this distribution.

Respectfully submitted,

HARRISON SMITHERUM
Water Master

REPORT ON WATER MASTER SERVICE
ON
HAT CREEK, SHASTA COUNTY, CALIFORNIA
FOR
SEASON OF 1928.

INTRODUCTION

Water Master service on Hat Creek for the 1928 Season extended over the period from June 6 to October 5 during which time the waters of the stream were distributed in accordance with the provisions of the Doyel et.al. vs. Massie et.al. decree, entered May 14, 1924 in the Superior Court of Shasta County, California. The provisions of this decree are discussed in the "Report on Water Master Service in Hat Creek Valley, Shasta County, California, during Season of 1924" by Paul V. Wheatley, Water Master, October 1924.

A petition signed by four parties to the above mentioned decree requesting the appointment of a water master for Hat Creek for the 1928 Season was received by the Division on April 16, 1928, and immediately thereafter plans were completed for the employment of a water master to serve on Hat and Burney Creeks throughout the entire season. The water master selected, however, left the services of the State just as the season was opening on these streams and it became necessary to fill the position from the permanent force of the Division.

In this emergency, and to provide an experienced water master from the Division's permanent force without disrupting its other important work, it was found necessary to have three men serve as water master on the streams at different times throughout the season. The office of water master was held successively by T. R. Simpson from June 6 to

18, by Harrison Smitherum from June 18 to August 13, and by L. C.

Jopson from August 13 to October 5.

PRECIPITATION

In Table 1, submitted at the end of this report, there is presented a summary of the records of precipitation kept at Hat Creek Power Plant No 1, near Cassel for the seasonal years from October 1921 to September 1928 inclusive.

In Table 2, also submitted at the end of this report the precipitation for the seasonal year 1927-1928 is compared with the mean precipitation for the seasonal years 1921 to 1928.

The total precipitation for the seasonal year 1927-1928 was 106 per cent of the mean seasonal precipitation for the period of record. The precipitation for the period October 1, 1927 to May 1, 1928 was 115 per cent of the mean for the same period, while for the period May 1 to September 30, 1928 the precipitation was 70 per cent of the mean for that period. June, with a mean precipitation of approximately one inch, was practically dry in 1928, only 0.08 inch of rainfall having been recorded.

WATER SUPPLY

A record of the flow of Hat Creek above all diversions for the period May 1st to October 8th, 1928, is presented in Table 3, submitted at the end of this report. Table 3 is a composite record obtained by adding the flow in the Harvey Wilcox, Gray, Stevenson, Hall and Shearin ditches to the flow of Hat Creek at the United States Geological Survey measuring station, which station is located below the intakes of the above named ditches. The record gives the total flow of Hat Creek available to meet the demands therefrom, incident to the distribution of the waters of the stream in accordance with the provisions of the Doyel vs. Massie decree.

In the following table there is presented a comparison of water supply conditions on Hat Creek for the 1928 Season with the other seasons of record.

Season May 1 - October 8	Average Flow of Hat Creek Above All Diversions C.F.S.	Average Delivery in Per Cent of Total Irrigation Allotment
1924	No record	(a) 67
1925	143	85
1926	122	72
1927	(b) 143	(b) 86
1928	136	78

(a) Period May 31st to October 8th

(b) Period May 11th to September 28th

DEMAND ON WATER SUPPLY

The demand on the flow of Hat Creek in distributing the waters of that stream in accordance with the provisions of the Doyel vs. Massie decree comprises the amounts of water set forth in the various paragraphs and schedules of the decree, certain additional allotments not provided for in the decree, and the amount of water lost in the channel of Hat Creek between the uppermost and lowermost diversions. The various items and amounts constituting this demand during the 1928 season have been summarized in Tables 4 and 5, submitted at the end of this report. Table 4 gives the demand for the Upper Users' periods, while Table 5 presents similar data for the Lower Users' periods.

The various items in Tables 4 and 5, where based upon the authority of the Doyel vs. Massie decree, are self-explanatory. The additional allotments not provided for in the decree have been fixed by agreement between the water master and the water user receiving such allotment. The reasons for granting these additional allotments are explained below.

The irrigation and minimum flow allotments to the United States Forest Service are necessary due to the fact that, although not a party to the Doyel vs. Massie suit, the Forest Service is a recognized water user on Hat Creek.

The minimum flow allotment to Sullivan became necessary to provide stock and domestic water for Sullivan's use after he had elected to take his irrigation allotment in a rotation head instead of a continuous flow head.

The minimum flow allotment to Vernon March was allowed to correct an inadvertant ommission in the decree.

Hal A. Shearin claims a right to the use of the waters of Hat Creek as a riparian owner. He has agreed to irrigate during the Upper Users' periods, but no amount of water has been fixed as the measure of his water right. During the 1928 Season, Shearin's diversion averaged approximately 1.00 cubic foot per second.

The item of channel losses in Hat Creek is explained in the following chapter.

CHANNEL LOSSES

To determine the channel losses in Hat Creek simultaneous measurements of the flow of the stream and of all diversions therefrom were made at frequent intervals throughout the season. These measurements gave an average conveyance loss of 14 cubic feet per second during the periods when the Upper Users were receiving their irrigation allotments, while the average conveyance loss during the Lower Users' periods was found to be 21 cubic feet per second.

A summary of the measurements and the resultant channel losses is presented in Table 8, submitted at the end of this report.

AVAILABLE WATER SUPPLY
COMPARED WITH DEMAND

The mean flow of Hat Creek for the period from May 1 to October 8, 1928 was 136 cubic feet per second, or 86 per cent of the average demand of 158 cubic feet per second.

A comparison of the flow of Hat Creek above all diversions with the demand on the water supply for the 1928 Season is shown graphically on Plate 1, submitted at the end of this report. The graph representing the flow of Hat Creek was plotted from the data presented in Table 3, while the demand curve is based upon the data contained in Tables 4 and 5.

A graph representing the combined diversions from Hat Creek during the 1928 Season is also shown on Plate 1. The difference between this graph and the graph of the flow of Hat Creek is the measure of the channel losses in the stream.

DISTRIBUTION OF WATER

Determination of Percentage of Irrigation Allotments Available.

The United States Geological Survey measuring station on Hat Creek below Cave Camp is used as the control in determining the amount of water available for distribution. This station, however, is located below the Harvey Wilcox, Gray, Stevenson, Hall and Shearin ditches, therefore, it is necessary to add the combined flow of these ditches to the flow at the measuring station, the resultant figure being the discharge of the creek above all diversions. The amount of water available for distribution for irrigation during any particular period is the difference between the discharge of the creek above all diversions and the fixed demand on the water supply, such as the minimum flow allotments to the users of the opposite class, channel losses, and all other allotments not subject to proration. The various items and amounts constituting the fixed demands during the Upper and Lower Users' periods are set forth in Tables 4 and 5, respectively. The ratio of the amount of water available for irrigation to the total decreed irrigation allotments gives the percentage of the aforesaid irrigation allotments that can be delivered.

Method of Distributing Irrigation Allotments.

Two days prior to the beginning of each ten day rotation period the flow of Hat Creek above all diversions was determined and the percentage of allotments available for distribution to the class of users entitled to irrigation heads of water was computed. On the day preceding the change date, each of these users was notified in writing as to the percentage of allotments, the amount of his allotment, and the gage reading on his measuring device necessary to deliver such allotment. On the day of the change the water master

inspected and regulated the various ditches to the correct amounts. The stream usually settled down to a steady flow on the day following the change, and the ditches were again inspected and reregulated. Thereafter inspection of the ditches was made at frequent intervals during each period for the purpose of obtaining data relative to channel losses or to reregulate diversions when changes in the flow of the stream indicated that an adjustment of allotments was necessary.

Method of Distributing Minimum Flow Allotments.

In Schedules II and IV of the Doyel vs. Massie decree certain amounts of water have been allotted to the various Hat Creek ditches to provide the owners thereof with water for domestic and stock watering purposes and to prevent damage to the ditches by drying out during the respective non-irrigation periods. It, however, has become the practice of the water users to pool their minimum flow allotments and use the same through one ditch for irrigation purposes. In the case of partnership ditches the amount of water allotted to the ditch has been divided between the several owners by agreement. In accordance with these practices, the minimum flow allotments are distributed to the owners of the ditches rather than to the ditches, as specified in Schedules II and IV.

The pooled minimum flow allotments of the Upper and Lower Users, and the ditches in which their allotments were carried during the 1928 Season are shown in Tables 6 and 7, respectively, submitted at the end of this report.

In addition to the pooling of minimum flow allotments certain other practices in the operation of the Hat Creek ditches have been permitted since water master service was begun on the stream. These practices were continued during the 1928 Season as follows:

The Stevenson Main Ditch was permitted to divert a minimum

flow of approximately 1.00 cubic foot per second instead of the 0.25 cubic foot per second specified in Schedule II. This is necessary to supply suitable water for drinking purposes at the Stevenson cabin located about 1/4 mile below the head of the ditch. The water not consumed by transportation losses and for domestic and stock watering purposes is returned to Hat Creek without undue loss.

The Hall Ditch was permitted to divert in excess of its irrigation and minimum flow allotments at all times, although the Hall sawmill was not in operation during the 1928 Season. Also the 0.50 cubic foot per second of water allotted to this ditch for the transportation of sawdust from the mill was given to Hall throughout the season as part of his irrigation and minimum flow allotments. The excess water in the Hall Ditch is necessary to preserve timber flumes and header boxes appurtenant to the sawmill, and is returned to Hat Creek. The amount of water used by Hall was determined by the difference between the amount of water at the staff gage below the head of the ditch and the amount of water returned to Hat Creek at the Cippoletti weir at the end of the ditch. It is assumed that the 0.50 cubic foot per second of water allotted for sawdust transportation covers the conveyance loss in the ditch, incident to keeping the sawmill flume and header box wet.

In the past the Heryford Upper Ditch has been permitted to carry in excess of the Heryford minimum flow allotment for the purpose of operating a small power wheel at the Heryford ranch house. The power wheel, however, has now fallen into disuse, and this practice should be entirely done away with until such time as there is actual use of the water for power purposes.

The Ratledge-Opdyke-Forest Service Ditch was allowed a minimum flow allotment of 2.50 cubic feet per second. Of this amount Ratledge and Opdyke were permitted to use 0.375 cubic foot per second of water each, the remaining 1.75 cubic feet per second being required to supply suitable water for household use at the Hat Creek Ranger Station located at the end of the ditch.

The Ratledge-Lonquist Ditch was permitted to carry in excess of its minimum flow allotment of 0.75 cubic foot per second in order to supply suitable drinking water at the Ratledge house and to operate a small power wheel, the excess water being returned to Hat Creek below the house.

The Harry Lonquist House Ditch was permitted at all times to carry a head of water sufficient to operate the Harry Lonquist power plant. This water was returned to the stream through the power plant or through the Lonquist-Reynolds - Bidwell Ditch.

The Lonquist - Reynolds - Bidwell Ditch was permitted to carry in excess of Bidwell's minimum flow allotment, the excess water being spilled back to Hat Creek at the Bidwell house. This was necessary due to fluctuations in the flow of the ditch caused by the operation of the Harry Lonquist power plant, and unsatisfactory means of control at the head of the ditch.

Summary of Distribution and Resultant Water Deliveries.

During the first four irrigation periods of the 1928 Season, May 1 to June 10, the average flow of Hat Creek above all diversions was in excess of the demand on the stream. For the remaining 12 irrigation periods the water supply was deficient, reaching its maximum deficiency during the 10th and 11th periods, July 30 to August 19, when the average flow of the stream had decreased to 112 cubic feet per second.

A summary of the water deliveries on Hat Creek for each of the sixteen irrigation periods from May 1 to October 8, 1928 is presented in Table 8, submitted at the end of this report. The water master did not assume his duties in the field until June 6, four days prior to the close of the fourth period, hence, the deliveries shown in the summary for the first three periods were estimated. In making these estimates it was assumed that the class entitled to irrigate received 100 per cent allotments.

The Upper Users in eight irrigation periods were delivered an average of 102 cubic feet per second, or 83 per cent of their total irrigation allotment of 123 cubic feet per second. The maximum irrigation allotment distributed to this class of users for a ten day period was 100 per cent, while the minimum irrigation allotment distributed was 71 per cent.

The Lower Users received an average delivery of 95 cubic feet per second, or 73 per cent of their total irrigation allotment of 130 cubic feet per second, for the eight periods during which they were entitled to irrigate. The maximum ten day average delivery to these users was 100 per cent, and the minimum delivery 57 per cent.

USE OF WATER

Table 9, submitted at the end of this report, gives the irrigated area to be supplied and the full irrigation allotment of each water user on Hat Creek for the 1928 Season. The acreages and allotments are further segregated into the Upper and Lower classes. The total irrigated area of the Upper Users is 1214.4 acres, while that for the Lower Users amounts to 1313.9 acres. The amounts of water delivered to supply these areas are set forth in Table 8, submitted at the end of this report.

There was delivered to the Upper Users an average of 102 cubic feet per second in eight periods (80 days). This amounts to a total delivery of 16,181 acre feet for 1214.4 acres, or a use of 13.3 acre feet per acre. In terms of continuous flow for the 160 day period from May 1st to October 8th this is equivalent to a use of 1 cubic foot per second to each 23.8 acres of irrigated land, or 1.68 Miners Inches (6 inch pressure) per acre.

The Lower Users received an average of 95 cubic feet per second of water in eight periods (80 days) to irrigate 1313.9 acres. This amounts to a total delivery of 15,071 acre feet, or a use of 11.5 acre feet per acre, and is equivalent to a continuous flow for the 160 day period from May 1st to October 8th of 1 cubic foot per second to each 27.7 acres of irrigated land, or 1.45 Miners Inches (6 inch pressure) per acre.

The average delivery to both classes of users for the 160 day period was 98.5 cubic feet per second, or 31,252 acre feet, for 2528 acres of irrigated land. This amounts to a use of 12.4 acre

feet per acre, and is equivalent to a continuous flow of 1 cubic foot per second to each 25.7 acres of irrigated land, or 1.56 Miners Inches (6 inch pressure) per acre.

The foregoing results are summarized in the following table.

Class of Users	Irrigable Acreage	Amount of Water Delivered.				
		Total Acre Feet	per Acre	Acres per C.F.S.	*Miners Inches per Acre	
Upper	1214.4	16,181	13.3	23.8	1.68	
Lower	1313.9	15,071	11.5	27.7	1.45	
All	2528.3	31,252	12.4	25.7	1.56	

* Measured under a 6 inch pressure.

The above results represent a duty of water which would have obtained had the water delivered during the sixteen irrigation periods been applied to the total acreage; and as such are comparable with the results obtained in previous years.

Crop reports for the 1928 Season were submitted by fifteen water users, These reports cover approximately 60 per cent of the total acreage entitled to receive water from Hat Creek, and indicate that approximately 96 per cent of the decreed acreages of those reporting were irrigated during the 1928 season. Applying this 96 per cent to the total decreed acreage on Hat Creek of 2528 acres it is estimated that approximately 2400 acres of land received water in the 1928 Season.

From the foregoing table there was delivered to the Hat Creek water users 31,252 acre feet of water during the sixteen irrigation periods

(160 days) from May 1 to October 8, 1928. Applied to the 2400 acres of land irrigated in 1928, the duty of water is found to be 13 acre feet per acre, and is equivalent to a continuous flow of 1 cubic foot per second to each 24.4 acres of irrigated land, or 1.64 Miners Inches (6 inch pressure) per acre.

CROP PRODUCTION

A summary of the crop reports for the 1928 Season, submitted by the water users on Hat Creek is presented in Table 10, at the end of this report.

FINANCIAL STATEMENT

Water master service in East Shasta County during the 1928 Season covered Hat and Burney Creeks. The work on the two streams was carried on as a unit, and was financed partly by subscription from the water users and partly by contribution by the Division of Water Rights.

No segregation was made in the expense of conducting the work on each stream. The total unit cost on both stream systems was \$0.44 per acre of irrigated land. The cost to the water users was \$0.22 per acre, the remaining one-half of the cost having been borne by the Division of Water Rights.

An itemized statement of the receipts and expenditures follows.

FINANCIAL STATEMENT
EAST SHASTA COUNTY WATER DISTRIBUTION
1928 SEASON

ooo

RECEIPTS

Contributed by Hat Creek Water Users	700.00	
Contributed by Burney Creek Water Users	300.00	
Contributed by Division of Water Rights.	<u>1,000.00</u>	2,000.00

DISBURSEMENTS

Salaries and Wages	1,408.26	
Board and Lodging	352.33	
Automobile Expense	<u>239.41</u>	2,000.00

TABLES

TABLE 1

PRECIPITATION DATA
 HAT CREEK, SHASTA COUNTY, - ELEVATION 3010 FEET
 MONTHLY, SEASONAL, AND AVERAGE AMOUNT OF PRECIPITATION IN INCHES.

Season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Seasonal
1921 - 22	0.30	0.47	3.82	0.85	6.41	2.13	0.38	1.91	1.40	0	0.60	0	18.27
1922 - 23	1.58	2.26	4.85	2.36	0.32	0.03	2.04	1.18	3.29	0.17	0.30	1.70	20.08
1923 - 24	1.16	0.37	1.46	1.30	1.31	1.04	0.73	T	T	0	0.34	0.10	7.81
1924 - 25	2.28	1.40	1.99	1.01	4.12	1.12	1.37	1.98	1.49	0.09	0.18	1.86	18.89
1925 - 26	0.58	2.26	0.48	2.57	2.45	0.75	2.38	1.06	0.00	0.04	0.10	0.01	12.69
1926 - 27	1.18	4.41	0.88	1.63	4.70	1.77	2.89	2.01	0.63	T	T	0.29	20.39
1927 - 28	0.87	4.84	0.36	1.83	1.36	4.87	1.05	1.76	0.08	0.14	0.14	0.16	17.46
Mean	1.13	2.29	1.98	1.65	2.95	1.67	1.56	1.41	0.98	0.06	0.24	0.59	16.51

TABLE 2

PRECIPITATION DATA
HAT CREEK, SEASATA COUNTY.

PRECIPITATION FOR THE SEASONAL YEAR 1927 - 1928
COMPARED WITH MEAN FOR SEASONAL YEARS 1921 - 1926

Month	Precipitation in Inches		Per Cent of Total Mean	
	Mean 1921 - 1926	Seasonal Year 1927 - 1928	Mean 1921 - 1926	Seasonal Year 1927 - 1928
October	1.15	0.87	6.8	5.4
November	2.29	4.84	13.9	29.3
December	1.98	0.36	12.0	2.2
January	1.65	1.83	10.0	11.1
February	2.95	1.36	17.9	8.2
March	1.67	4.87	10.1	29.5
April	1.56	1.03	9.5	6.4
May	1.41	1.76	8.5	10.7
June	0.98	0.08	5.9	0.5
July	0.06	0.14	0.4	0.8
August	0.34	0.14	1.4	0.8
September	0.59	0.16	3.6	1.0
Totals	16.51	17.46	100.0	105.9

TABLE 3

DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF HAT CREEK ABOVE ALL DIVERSIONS FOR THE
IRRIGATION SEASON OF 1928

Day	May	June	July	August	September	October	
1	174	180	131	112	114	115	
2	158	182	133	112	114	115	
3	153	180	135	112	115	115	
4	155	176	133	112	116	115	
5	165	176	134	112	118	115	
6	174	175	135	112	115	115	
7	175	175	136	112	117	115	
8	190	167	135	112	112		
9	202	153	135	112	112		
10	209	148	127	112	112		
11	212	147	127	111	111		
12	202	144	128	112	113		
13	196	143	127	112	113		
14	192	143	127	112	114		
15	185	141	127	112	114		
16	183	143	126	112	114		
17	183	144	124	114	115		
18	187	143	123	114	113		
19	190	143	121	114	115		
20	179	135	120	114	115		
21	181	134	124	114	115		
22	198	134	120	114	115		
23	190	134	120	114	115		
24	190	134	118	114	115		
25	200	134	116	114	115		RECORDS
26	212	134	113	114	115		
27	205	134	112	114	115		
28	192	134	111	114	115		NO
29	183	132	112	114	115		
30	173	132	112	112	115		
31	170		112	113			
Total Sec.:							160 Day
Ft. Days	5758.	4474.	3854.	3498.	3432.0	805.	Period
Mean							
Sec. Ft.	186	149.	124.	113.	114.	115.	136.
Maximum							
Sec. Ft.	212.	182.	136.	114.	118.	115.	212.
Minimum							
Sec. Ft.	157.	132.	111.	111.	111.	115.	111.
Total							
Ac. Ft.	11,418	8872.	7642	6936	6805	1596	43,269

TABLE 4

DEMAND ON WATER SUPPLY DURING
UPPER USERS PERIODS
1928 SEASON

ITEM	AUTHORITY	AMOUNT-CFS
Irrigation allotments to Upper Users	: Decree - Schedule 1	: 103.500
Irrigation allotments to Upper Users for reclaimed mud flow lands	: Decree - Par. 21 and : 1927 survey	: 12.530
Irrigation allotment to Sullivan	: Decree - Par. 30	: 4.600
Irrigation allotment to United States Forest Service	: By agreement with Hat Creek : Ranger	: 2.500
Irrigation allotment to Hal A. Shearin	: Claim of riparian right	: 1.000
Allotment to Hall for sawmill use	: Decree - Par. 11	: 0.500
Minimum flow allotments to Lower Users	: Decree - Schedule IV	: 9.125
Minimum flow allotment to Vernon March	: allowed by Water Master	: 1.000
Allowance for conveyance loss in Reiger Ditch	: Decree - Par. 13 & Measurements	: 1.500
Channel loss in Hat Creek	: Measurements of 1928	: 14.000
	: total	: 150.255

NOTE: The first four items, totaling approximately 123 cubic feet per second, constitute the allotments subject to proration. The remaining items constitute a fixed demand of approximately 27 cubic feet per second, which amount is to be deducted from the available water supply in order to determine the amount of water available for the allotments subject to proration.

TABLE 5

DEMAND ON WATER SUPPLY DURING
LOWER USERS PERIODS
1928 SEASON

ITEM	AUTHORITY	AMOUNT C.F.S.
Irrigation allotments to Lower Users	Decree - Schedule III	129.000
Irrigation allotments to Lower Users for reclaimed mud flow lands	Decree - Paragraph 22 and 1927 Survey	1.200
Allotment to Hall for sawmill use	Decree - Paragraph 11	0.500
Minimum flow allotments to Upper Users	Decree - Schedule II	10.125
Minimum flow allotment to Sullivan	Allowed by Water Master	0.500
Minimum flow allotment to United States Forest Service	By agreement with Hat Creek Ranger	1.750
Allowance for conveyance loss in Reiger Ditch	Decree - Paragraph 13 and measurements	1.500
Channel loss in Hat Creek	Measurements of 1928	21.000
	TOTAL	165.575

NOTE: The first two items, totaling approximately 130 cubic feet per second, constitute the allotments subject to proration. The remaining items constitute a fixed demand of approximately 36 cubic feet per second, which amount is to be deducted from the available water supply in order to determine the amount of water available for the allotments subject to proration.

TABLE 6

MINIMUM FLOW ALLOTMENTS AS
DISTRIBUTED TO UPPER USERS
DURING 1928 SEASON

Name of User	Ditch	Pooled Allotment: C.F.S.	Ditch Total C.F.S.
Harvey Wilcox	Harvey Wilcox Upper	0.50	0.50
Vint Stevenson	Stevenson Main	0.25	0.25
Sidney Gray	Gray	0.125	0.125
W.P. Hall	Hall	(a)1.00	1.00
Alec Brown	Alec Brown	0.125	0.125
Harry Wilcox	Wilcox Middle	1.25	2.50
R.A. Wilcox Estate	Wilcox Middle	1.00	
Holiday Brown	Wilcox Middle	0.25	
McGarry Snook	Wilcox-Davis	0.25	0.25
William Valentine	Valentine Lower	0.50	0.50
C. B. Heryford	Heryford Upper	0.75	0.75
Edith Snook	Edith Snook	0.125	0.125
J. S. Ratledge	Ratledge-Lonquist	0.375	0.75
Henry Lonquist	Ratledge-Lonquist	0.375	
J. S. Ratledge	Ratledge-Opdyke-Forest Service	0.375	2.50
Perry Opdyke	Ratledge-Opdyke-Forest Service	0.375	
Forest Service	Ratledge-Opdyke-Forest Service	1.75	
Perry Opdyke	Opdyke	1.00	1.00
Asa Doty	Morris Lower	1.50	1.50
C. & F. Brown	Reiger	0.50	2.50
L. H. Sullivan	Reiger	0.50	
Transportation Loss	Reiger	1.50	
TOTAL			14.375

(a) Domestic and stock water 0.50 cubic feet per second
Water for sawdust conveyance 0.50

TABLE 7

MINIMUM FLOW ALLOTMENTS AS
DISTRIBUTED TO LOWER USERS
DURING 1928 SEASON

Name of Water User	Ditch	Pooled Allotment and Ditch Total C.F.S.
Henry Lonquist	: Henry Lonquist Lower	: 1.50
Vernon March	: Morris Upper	: 1.00
Harry Lonquist	: Harry Lonquist House	: 0.50
Harry Lonquist and A. N. Reynolds	: Lonquist-Reynolds : East Side	: 2.00
Ralph Bidwell	: Lonquist-Reynolds-Bidwell	: 0.50
Jeff Bone	: Jeff Bone Lower	: 0.25
Lee Bone	: Lee Bone	: 0.25
Julia Wilson	: Julia Wilson	: 0.25
Sam Williams	: Sam Williams	: 0.25
Joe Wilson	: Joe Wilson	: 0.25
Allan Brown and W. W. Brown	: Brown Middle	: 1.50
Charley Snooks	:	:(a) 0.125
David Doyel et al	: Doyel	: 1.00
Bertha Geissner	: Bertha Geissner	: 0.25
Otto Geissner	: Otto Geissner	: 0.50
TOTAL	:	: 10.125

(a) Charley Snooks' allotment assumed to be absorbed by
other Indian ditches.

TABLE 8

WATER DELIVERIES ON HAT CREEK
1928 SEASON

Irrigation: Period	Dates	Average Flow:	Average	Channel Loss:	Average Irrigation Delivery				
		of Hat Creek:	Combined	:	Per Cent of Full		Allotment		
		above all	Diversions:	C. F. S.	C. F. S.:				
		Diversions	C.F.S.	Upper:	Lower:	Upper:	Lower:	Upper	Lower
		C.F.S.	C.F.S.	Users:	Users:	Users:	Users:	Users	Users
1	May 1 - May 11	176	* 152	* 141	* 123	* 100			
2	May 11- May 21	191	* 170	* 21	* 130	* 100			
3	May 21-May 31	191	* 177	* 14	* 123	* 100			
4	May 31-June 10	174	157	17	130		100		
5	June 10-June 20	144	130	14	117	95			
6	June 20-June 30	134	109	25	95		73		
7	June 30-July 10	134	117	17	104	85			
8	July 10-July 20	126	98	28	84		65		
9	July 20-July 30	116	102	14	89	72			
10	July 30-Aug. 9	112	88	24	74		57		
11	Aug. 9-Aug. 19	112	101	11	88	71			
12	Aug. 19-Aug. 29	114	92	22	76		58		
13	Aug. 29-Sept. 8	115	101	14	88	71			
14	Sept. 8-Sept. 18	113	96	17	82		63		
15	Sept. 18-Sept. 28	115	100	15	87	71			
16	Sept. 28-Oct. 8	115	100	12	89		68		
Mean		136	119	14	21	102	95	83	73

* Estimated

TABLE 9

ACREAGES TO BE SUPPLIED
AND
DECREED IRRIGATION ALLOTMENTS
1928 SEASON

Water User	Irrigated Area to be supplied		Decreed Full Irrigation allotment	
	Upper Users	Lower Users	Upper Users Sec. Feet	Lower Users Sec. Feet
R. E. Bidwell		(a) 99.9		10.00
Harry Bob		34.0		3.50
J. & L. Bone		13.1		1.50
Alec Brown	4.7		0.50	
Allan Brown		124.1		12.25
Fay & Clare Brown	32.1		3.25	
Holiday Brown	11.2		1.125	
W. W. Brown		79.1		8.00
Asa Doty	222.7		22.25	
David Doyel		242.3		24.25
Bertha Geissner		121.0		12.25
Otto Geissner		79.7		8.00
Chas. S. Gray	10.0		1.00	
W. P. Hall	(b) 32.4		3.25	
Chas. Heryford	35.0		3.50	
Harry A. Lonquist		98.7		9.75
Henry Lonquist	18.8	92.5	1.875	9.25
Sofia Lonquist		114.7		11.50
Vernon March		134.8		13.50
Opdyke Bros.	177.3		17.75	
J. Ratledge	44.3		4.375	
A. N. Reynolds	(See Sofia Lonquist)			
Edith Snook	2.4		0.50	
McGarry Snook	21.7		2.125	
Charley Snook		20.0		0.50
Vint Stevenson	(c) 77.3		7.705	
L. H. Sullivan	46.0		4.60	
U. S. Forest Service	11.1		2.50	
Wm. Valentine	13.9		1.625	
Harry Wilcox	181.1		18.00	
Harvey Wilcox	(d) 61.4		6.125	
R. A. Wilcox Estate	(e) 211.0		21.075	
Sam Williams		11.4		1.25
Joe Wilson		28.2		2.75
Julia Wilson		20.4		2.00
TOTALS	1214.40	1313.90	123.155	130.25

- (a) Includes 12.0 acres of reclaimed mud flow land.
- (b) " 5.0 " " " " " "
- (c) " 53.3 " " " " " "
- (d) " 40.0 " " " " " "
- (e) " 27.0 " " " " " "

TABLE 10

CROP PRODUCTION ON LANDS IRRIGATED FROM HAT CREEK
1928 SEASON

Owner	Crop	Acres	Total Yield		Yield per Acre	
			Sacks	Tons	Sacks	Tons
R. E. Bidwell	Young Alfalfa	15				
	Alfalfa	60		150		2.5
	Garden	1				
	Orchard	0.5				
	Pasture	25				
Allan Brown	Meadow Hay	35		52		1.5
	Alfalfa	50		125		2.5
	Barley	5		5		1.0
	Garden	0.5				
	Orchard	0.5				
	Pasture	33				
W. W. Brown	Alfalfa	60		140		2.3
	Wheat Hay	13		26		2.0
Asa Doty	Pasture	223				
David Doyel	Meadow Hay	40		40		1.0
	Alfalfa	35		85		1.3
	Wheat	36	222	14.4	6.2	0.4
	Orchard	0.5				
	Pasture	100				
Bertha Geissner	Meadow Hay	80		35		0.4
Otto Geissner	Meadow Hay	70		100		1.4
	Alfalfa	10		30		3.0
Chas. Heryford	Pasture	35				
Harry A. Lonquist	Alfalfa	90		240		2.7
	Wheat	8	80	5.2	10	0.7
	Garden	0.7				
	Orchard	0.8				

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER
5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25

DIAGRAM SHOWING
FLOW OF HAT CREEK
ABOVE ALL DIVERSIONS
COMPARED WITH
DEMAND ON WATER SUPPLY
1928

