

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RIGHTS

Harold Conkling, Chief of Division.

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REPORT ON WATER MASTER SERVICE
ON
HAT CREEK, SHASTA COUNTY, CALIFORNIA
FOR
SEASON OF 1927.

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By
-H. Searancke-
Water Master

Sacramento, California.

May 1928.

May 1, 1928.

Mr. Harold Conkling,
Chief of Division of Water Rights,
Sacramento, California.

Dear Sir:

There is transmitted herewith a report covering water master service on Hat Creek, Shasta County, California, during the period May 17, 1927 to September 28, 1927.

The report describes and discusses the regulation and supervision of the distribution of water according to the provisions of the Hat Creek decree. It also discusses the installation of measuring devices, and makes certain recommendations.

Records of stream flow and tabulations showing deliveries of water and crop yields are appended.

Respectfully submitted,

(H. Searancke)

HS:JR.

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INTRODUCTION

The Doyel vs. Massie decree entered May 14, 1924, in the Superior Court of the State of California in and for the County of Shasta, settled the relative rights of the users of water from Hat Creek above the junction of that stream with Rising River. The provisions of that decree are discussed in a report on Water Master Service on Hat Creek for Season of 1924, made to the Division of Water Rights by Mr. F. V. Wheatley, Water Master on Hat Creek during the 1924 irrigation season.

The above mentioned decree provides that upon the request of any party of the suit, the Division of Water Rights may appoint a Water Master to distribute the water in accordance with the terms of the decree, if, upon investigation, it appears necessary to do so. On April 25, 1927, the Division of Water Rights received a petition for Water Master Service on Hat Creek from certain of the plaintiffs in the suit of Doyel vs. Massie, and, upon investigation, it appeared to the Division that the petition was justified. It was not thought necessary, however, either by the petitioners or by the Division that the Water Master should take charge of the distribution of the water of Hat Creek before the middle of May. On May 17, 1927 Walter E. Stoddard, having been appointed Water Master, arrived at Burney and immediately

took over the supervision of both Hat and Burney Creeks. Mr. Stoddard continued to discharge the duties of Water Master on both these streams until July 25, 1927, upon which date he was relieved by Harry Searancke who remained at Burney in the capacity of Water Master until October 17, 1927, by which time it had become obvious that there was no further need for Water Master Service.

Gaging Stations:

There are two gaging stations on Hat Creek, known as the upper and lower stations. The Upper Station is located approximately on the north line of Sec. 33, T 33 N, R 5 E. The Lower Station is in the Alec Brown Ranch in the NW $\frac{1}{4}$ Section 8, T 33 N, R 5 E. Each of these stations is provided with a concrete well and shelter for an automatic stage register, and also with a foot bridge to facilitate making current meter measurements. A more detailed description of these gaging stations may be found in "Report of Water Master Service on Hat Creek for Season 1926" by U. B. Gilroy.

The Upper Station has been used by the Water Master as the point for making current meter measurements in connection with the distribution of the water. This station is about 3 miles below the uppermost diversion, and the total available flow can readily be obtained by adding to the quantity flowing by the station, as indicated by the current meter measurement, the quantities being diverted above the station.

The control of the Upper Station is of a shifting character, which fact precludes the possibility of permanent rating. This condition necessitates continual metering of the stream by the Water Master, an operation which consumes much valuable time. It furthermore renders the records of the automatic stage register practically valueless as a chronicle of the quantity of water flowing.

A list of the current meter measurements made at the upper station during the season of 1927 is submitted as Table 1 at the end of this report.

Channel Losses:

During the 1927 season on five occasions practically simultaneous meterings were made at the upper and lower stations. The results of these meterings are as follows:

Date	FLOW IN SECOND FEET	
	Upper Station	Lower Station
1927		
May 18	199.2	201.0
" 30	158.1	150.0
June 10	190.7	192.0
July 1	158.6	157.1
Sept. 6	98.9	96.4

The above results would seem to indicate that at no time was there excessive seepage, while at times there may have been slight accretion.

DISTRIBUTION OF WATER

Method of Distributing Water:

The method employed in making the distribution of water on Hat Creek was essentially as follows:

Two days before the beginning of each ten day rotation period the discharge of the creek was metered at the gaging station. To the quantity thus determined was added the quantities being diverted above the gaging station, the resultant figure being the discharge above all diversions. Deducting from the total flow thus obtained the minimum flows to be allowed for those ditches not included in the irrigation schedule for the coming period, and also deducting a reasonable allowance for

channel losses, there remained the quantity of water which was available for irrigation. The ratio of this quantity to the total of the allotments included in the irrigation schedule showed the percentage of his allotment that would be available for each irrigator during the approaching rotation period. The day preceding the beginning of the new rotation period was then spent in notifying these water users as to the quantities they would be entitled to divert on the following morning. On the day of the change the Water Master would inspect and regulate the various ditches. Usually, however, two or even three days elapsed before the stream settled down to conditions of steady flow and the diversions were finally adjusted.

Summary and Results:

The Water Master arrived on Hat Creek May 17th, during the 2nd rotation period, and immediately assumed supervision over all diversions from the creek. Owing to the ample supply of water which was sufficient to meet all reasonable demands, it was not found necessary to put the rotation schedule into operation until the beginning of the 8th period (July 10th). Rotation was practiced up to the end of the 15th period (Sept. 28th), after which date little interest was taken in irrigation, and water was allowed to run to waste.

Table 3, submitted with this report, lists for each of the 10 day periods during which rotation was actually practiced, the average flow of Hat Creek above all diversions, and the estimated deliveries of water in percentage of full irrigation allotments made to the respective classes of water users. The percentages shown are averages for the period, and represent the quantities of water available for use by the class entitled to irrigate.

Chronicle of Events:

The pertinent facts regarding the distribution of water during the 1927 irrigation season are as follows:

1st Period: May 1st - 11th (Upper Users Period). The Water Master had not yet arrived, consequently there are no records on hand either of the flow in Hat Creek or of the various amounts diverted during this period.

2nd Period: May 11th - 21st (Lower Users Period). The Water Master arrived on Hat Creek on May 17th. As there was about 200 second feet available for irrigation it was not necessary to practice rotation.

3rd Period: May 21st - 31st (Upper Users Period). At the beginning of this period the flow above all diversions was 175 second feet. By the end of the period the flow had diminished to 158 second feet. Rotation was not practiced.

4th Period: May 31st - June 10th (Lower Users Period). During this period the flow above all diversions increased to 190 second feet. It was therefore unnecessary to put the rotation schedule into effect.

5th Period: June 10th - June 20th (Upper Users Period). The average discharge of Hat Creek above all diversions during the period was 185 second feet. Rotation was not practiced.

6th Period: June 20th - June 30th. (Lower Users Period). Some rain occurred during this period. By the end of the period the flow above all diversions was reduced to about 160 second feet. Rotation was not practiced.

7th Period: June 30th - July 10th (Upper Users Period). During this period the amount of water available for irrigation diminished to 145 second feet. Rotation was not practiced.

8th Period: July 10th - July 20th (Lower Users Period). At the beginning of the period there was 145 second feet available for irrigation. The rotation schedule was put into operation with about 90% allotments. Since neither of the Geissner Ranches were able to use their full allotments, the surplus was given to Allan Brown and David Doyel.

As this was the first period during which rotation was practiced, the upper users, who had not finished their irrigation, and whose crops were suffering from lack of moisture, were given an increased minimum flow to enable them to finish their irrigation. Throughout this period all of the lower users had ample water.

At the end of the period the discharge above all diversions was reduced to 134 second feet.

9th Period: July 20th - July 30th (Upper Users Period). The average discharge of Hat Creek above all diversions during this period was about 129 second feet. Rotation was practiced with approximately 85% allotments.

10th Period: July 30th - August 9th (Lower Users Period). During this period the average discharge above all diversions was about 119 second feet. The diversions were regulated for 75% allotments. The Bertha Geissner ranch was not prepared to divert during this period and the allotment belonging to that ranch was distributed among the other lower users.

11th Period: August 9th - August 19th (Upper Users Period). The average flow available during this period was 113 second feet which was estimated as being sufficient to supply 72% allotments.

12th Period: August 19th - August 29th (Lower Users Period). The average flow during this period was 112 second feet which would have supplied about 70% allotments had all the lower users diverted their pro rata of the available water. Otto Geissner, however, was unable to use his full allotment, and the Bertha Beissner ranch used no water. The surplus thus

formed was divided between Allan Brown, Brown Brothers, Henry Lonquist, and Ralph Bidwell.

13th Period: August 29th - Sept. 8th (Upper Users Period). The average flow of Hat Creek above all diversions during this period was approximately 110 second feet. This quantity indicates about 70 per cent allotment.

14th Period: Sept. 8th - Sept. 18th (Lower Users Period). The average flow available for distribution for this period was 115 second feet. Rotation was practiced with about 72% allotments. The supply was amply sufficient to meet all demands. Harry Wilcox, having rented the Bertha Geissner ranch and not desiring to irrigate it, was permitted to use the Geissner allotment on his own ranch.

15th Period: Sept. 18th - Sept. 28th. (Upper Users Period). average discharge above all diversions during this period was 116 second feet. This quantity permitted the diversion of approximately 75% allotments by the upper users.

After the 15th period the demand for water was so light that there was apparently no further need for observing the 10 day rotation periods. Although each water user was permitted to divert at will there was at all times water running to waste below the Otto Geissner ranch.

Tables 4 and 5, submitted with this report, show the estimated deliveries of irrigation water, in acre feet, made to each water user during the period May 1st - September 28, 1927.

Table 6 shows the crop production in Hat Creek Valley for the season of 1927.

Measuring Devices:

In the Water Master's report for season 1926 by U. B. Gilroy there is contained a list of the measuring devices that had been installed in ditches diverting from Hat Creek by the end of the 1926 season.

During the 1927 season the following installations were made:

Harvey Wilcox Upper Ditch - Standard rectangular Weir.

Ratlodge - Lonquist Ditch - Standard rectangular Weir.

Bidwell Ditch - Improved Venturi Flume.

There still remain a few ditches that either have no measuring devices at all or have devices which are not satisfactory. The majority of the Indian ditches are without any form of measuring device. This is also true of the Bertha Geissner Ditch. The Heryford Upper Ditch is furnished with an orifice, but the upper end of this ditch has cut a new channel, and the water no longer runs through the orifice.

Absence of fall at the upper end of the Harry Wilcox Middle Ditch makes it unsuitable for any form of measuring device. So flat is the grade that the operation of checks some distance down the ditch affects the water surface in the creek itself. Besides the allotment for the Harry Wilcox ranch, Rube Wilcox diverts part of his allotment through the Harry Wilcox Middle Ditch. There is no way of measuring this water at the diversion box except by the cut and try method with the current meter, which is exceedingly tedious and wasteful of time. The elevation of the water surface at this point is continually changing owing to the operation of checks, so there is no constant relation between gage height and quantity. Usually the amount diverted through the Harry Middle Ditch for use on the Rube Wilcox Wilcox/ranch is not constant throughout the period and it is necessary for the Water Master to regulate the diversion by means of the current meter more than once each period.

*(1929 3'-Parshall measuring flume
Monis Upper Ditch
& Longcutley well
East Water
Concrete
3' timber
in Hall
Ditch.
R. A. Wilcox
at head of
R. A. Wilcox
ranch.*

Recommendations:

The following recommendations are made in the belief that if they are carried out they will tend to improve the conditions under which the water of Hat Creek is administered.

(1) That a new location be chosen for the upper gaging station at some point where there is a well defined permanent control formed of solid rock. One or more of such controls may be found in the vicinity of the Shearin ranch.

(2) That the Indian Agent at Redding be asked to cooperate with the Division of Water Rights in the matter of installing measuring devices in the Indian ditches.

(3) That standard measuring devices be installed in all ditches that are not at present properly equipped in that respect.

(4) That Rube Wilcox be urged to build a ditch for himself which will obviate the necessity for his use of the Harry Wilcox Middle Ditch.

(5) That Harry Wilcox be encouraged to divert all his water through his upper ditch, build a connecting link between his upper and middle ditches, and abandon the use of the upper part of the middle ditch. Under this plan the middle ditch would cease to be a diversion and would become merely a branch of the upper ditch. This proposed change would eliminate the following disadvantages under which the Harry Wilcox system operates at present:

(1) The difficulty of building up the existing dam in Hat Creek so as to force the full allotment into the middle ditch.

(2) The flat grade at the upper end of the middle ditch which is so affected by the operation of checks as to make satisfactory regulation of the allotment an impossibility.

(5) The necessity for a re-apportioning of the Harry Wilcox allotment between the upper and middle ditches during the ten days rotation period. Under the present system this re-apportioning is almost invariably required.

It would probably be necessary to enlarge the section of the upper ditch from its head to its junction with the proposed connecting link with the middle ditch.

Applications and Permits Pending Before the Division of Water Rights:

<u>Application No.</u>	<u>Status</u>	<u>Applicant</u>	<u>Amount cu. ft. per second.</u>
2878	Permit 2026	W. W. Brown	0.85
4436	Pending	Red River Lumber Co.	190 - applied for
4449	Permit 2626	Inigo Jones	0.10
4659	Permit 2607	Hal A. Shearin	1
4700	Permit 2608	Carrie K. Hall	1.25

FINANCIAL STATEMENT

HAT AND BURNEY CREEKS WATER DISTRIBUTION

1927 SEASON

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Receipts

Balance on hand from contributions by Burney Creek water users, 1926 season.....	.02
Contributed by Burney Creek water users 1927 season.....	300.00
Contributed by Hat Creek water users 1927 season.....	700.00
Contributed by Red River Lumber Co.....	100.00
Contributed by Division of Water Rights.....	<u>1,000.00</u>
	2,100.02

Disbursements

Salaries.....	1,520.61
Travel Expense.....	117.36
Board and Lodging.....	175.43
Automobile Expense.....	209.19
Blue Printing.....	1.44
	<u>2,024.03</u>
	\$75.99

TABLE 1.

DISCHARGE MEASUREMENTS OF HAT CREEK - UPPER STATION

SEASON 1927.

No	Date	Gage	Quantity in Second Feet	Made By
1	May 18	1.18	199.2	W. E. Stoddard
2	" 21	1.12	174.8	" "
3	" 27	1.17	185.0	R. C. Briggs
4	" 30	1.07	158.1	W. E. Stoddard
5	June 10	1.21	190.1	" "
6	" 17	1.23	201.1	" "
7	" 24	1.21	188.5	" "
8	July 1	1.16	158.6	" "
9	" 8	1.10	147.6	" "
10	" 15	1.11	142.2	" "
11	" 19	1.06	129.0	" "
12	" 28	0.95	115.3	H. Searancke
13	Aug. 8	0.94	111.7	" "
14	" 17	0.87	99.6	" "
15	" 28	0.89	109.5	" "
16	Sept. 6	0.84	98.9	" "
17	" 17	0.89	117.4	" "
18	" 27	0.87	101.9	" "

TABLE 2

HAT CREEK WATER DISTRIBUTION
SCHEDULE OF ROTATION PERIODS

<u>PERIOD</u>	<u>COMMENCES</u> <u>6 A. M.</u>	<u>ENDS</u> <u>6 A. M.</u>	<u>IRRIGATION USE</u> <u>BY USERS.</u>
First	May 1	May 11	Upper
Second	May 11	May 21	Lower
Third	May 21	May 31	Upper
Fourth	May 31	June 10	Lower
Fifth	June 10	June 20	Upper
Sixth	June 20	June 30	Lower
Seventh	June 30	July 10	Upper
Eighth	July 10	July 20	Lower
Ninth	July 20	July 30	Upper
Tenth	July 30	August 9	Lower
Eleventh	August 9	August 19	Upper
Twelfth	August 19	August 29	Lower
Thirteenth	August 29	Sept. 8	Upper
Fourteenth	Sept. 8	Sept. 18	Lower
Fifteenth	Sept. 18	Sept. 28	Upper
Sixteenth	Sept. 28	Oct. 8	Lower
Seventeenth	October 8	October 18	Upper
Eighteenth	October 18	October 28	Lower

TABLE 5.

ESTIMATED WATER DELIVERIES ON HAT CREEK

SEASON 1927.

Irrigation Period	Dates	Aver. Flow of Hat Creek in Sec. Ft.	Estimated Delivery in percent of Full Allotments	
			Upper Users	Lower Users
1	May 1 - May 11	not known	100	
2	May 11 - May 21	200		100
3	May 21 - May 31	166	100	
4	May 31 - June 10	178		100
5	June 10 - June 20	185	100	
6	June 20 - June 30	173		100
7	June 30 - July 10	152	100	
8	July 10 - July 20	140		90
9	July 20 - July 30	129	85	
10	July 30 - Aug. 9	119		75
11	Aug. 9 - Aug. 19	113	72	
12	Aug. 19 - Aug. 29	112		70
13	Aug. 29 - Sept. 8	110	70	
14	Sept. 8 - Sept. 18	114		72
15	Sept. 18 - Sept. 28	116	75	

AVERAGE FOR 4 PERIODS
(July 10 to Sept. 28)

87.8

86.7

NOTE: The rotation schedule was not put into operation until the 8th period. Since all reasonable irrigation demands were apparently satisfied during the periods from May 1st to July 10th, it is assumed that throughout that time all water users were receiving 100% allotments.

TABLE 4.

ESTIMATED DELIVERIES OF IRRIGATION
WATER TO UPPER USERS.

May 1st to September 28, 1927.

Water User	Irrigated area to be supplied	Decreed Full Irrigation allotment	Acre Feet in 8 irrigation periods (80 days)	Estimated Total Delivery in 8 periods in ac. ft. (87.8% of full allotment)
Harvey Wilcox	61.4*	6.125	972	852
Wint Stevenson	70.0** 77.3	7.00 7.70	1110	975
Chas. S. Gray	10.0	1.00	158	139
W. P. Hall	32.4***	3.25	516	453
Alec. Brown	4.7	0.50	79	69
Harry Wilcox	181.1	18.0	2855	2508
R. A. Wilcox	211.0****	21.1	3347	2959
Holiday Brown	11.2	1.125	178	156
McGarry Snook	21.7	2.125	337	296
Wm. Valentine	13.9	1.625	258	227
Chas. Heryford	35.0	3.50	555	487
Edith Snook	2.4	0.50	80	70
J. Ratledge	44.3	4.375	694	603
Henry Lonquist	18.8	1.875	297	261
Opdyke Brothers	177.3	11.75	2816	2472
U.S. Forest Service	11.1	2.50	397	349
Asa Doty	222.7	22.25	3530	3099
L. E. Sullivan	46.0	4.60	730	640
Brown Bros.	32.1	3.25	516	452
Totals	1207.1	122.45	19,426	17,053

* Includes 40 acres of mud flow land
 ** " 46 " " " " "
 *** " 5 " " " " "
 **** " 27 " " " " "

TABLE 5.

ESTIMATED DELIVERIES OF IRRIGATION WATER

TO LOWER USERS

May 1st to September 28th, 1927.

Water User	Irrigated Area to be Supplied	Decreed Full Irrig. Sec. Ft.	Full Irrig. Allotment Acre feet in 7 (70 days) Irrg. Periods	Estimates Total Delivery in 7 pds. in acre feet (86.7% of full allotment)
Vernon March	134.8	13.50	1,874	1,525
Harry Lonquist	98.7	9.75	1,355	1,173
A. N. Reynolds	114.7	11.50	1,596	1,384
Henry Lonquist	92.5	9.25	1,284	1,113
R. E. Bidwell	99.9*	10.00	1,388	1,203
L. & H. Boone	13.1	1.50	208	180
Sam Williams	11.4	1.25	174	151
Julia Wilson	20.4	2.00	278	241
Joe Wilson	28.2	2.75	382	331
Harry Bob	34.0	3.50	485	421
Alan Brown	124.1	12.25	1,700	1,474
W. W. Brown	79.1	8.00	1,110	962
David Doyel	242.5	24.25	3,566	2,918
Bertha Geissner	121.0	12.25	1,700	1,474
Otto Geissner	79.7	8.00	1,110	962
<i>Charles ...</i>		0.50		
Totals	1,293.9	129.75	18,009	15,612

5 acres Includes 12 acres mud flow land.

TABLE 6.

CROP PRODUCTION IN HAT CREEK - SEASON 1927.

	HAY			GRAIN			POTATOES	GARDEN AND ORCHARD	
	MEADOW	ALFALFA	WHEAT	BARLEY					
	Acres:	Tons:	Tons:	Acres:	Tons:	Tons:	Acres:	Sacks:	Sacks per:
	:	per	:	per	per	per	:	acre	:
	:	Acres:	:	Acres:	:	Acres:	:	:	:
Harvey Wilcox	12	10	0.83	33	40	1.21			
Charles S. Gray				15	20	1.33			
Harry Wilcox	140	140	1.00	200	300	1.50			
Rube Wilcox	160	250	1.56				1.3	100	77
W. P. Hall				22	27	1.23			
Allan G. Valentine				14	12	0.86			
Chas. Heryford				35	40	1.14			
J. Ratledge				38	100	2.63	3	300	100
U.S. Forest Service				8	11	1.38			
Opdyke Bros.				150	400	2.67	3	50	16.6
Henry Lonquist				93	125	1.34	13	not known	
Harry Lonquist	10	20	2.00	65	195	3.00	8	" "	1.0
Asa Doty	75	160	2.13	60	240	4.00	10	" "	Hogs
Vernon March				90	240	2.67	15	200	13.3
Ralph S. Bidwell	10	12	1.20	60	175	2.92	22	3000	136
Brown Brothers				31	67	2.16			
Alan Brown	8	15	1.87	100	170	1.70	1.5	not known	2.0
W. W. Brown				82	--	--	5	250	50
David Doyel	60	70	1.16	50	100	2.00	10	52	5.2
Otto Geissner	30	60	2.00	10	20	2.00	16	125	7.8

