

DEPARTMENT OF PUBLIC WORKS

STATE OF CALIFORNIA

REPORTS OF THE

DIVISION OF WATER RESOURCES

EDWARD HYATT, State Engineer

REPORT ON

WATER MASTER SERVICE

ON

HAT CREEK

SHASTA COUNTY, CALIFORNIA

1931 SEASON

oOo

By F. RUSSEL SIMPSON, Senior Hydraulic Engineer

oOo

Sacramento, California

February 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

February 15, 1932

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 1st to September 30th, 1931.

The 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,

T. R. Simpson

Senior Hydraulic Engineer

ORGANIZATION

Walter E. Garrison	Director of Public Works
Edward Hyatt	State Engineer
Harold Conkling	Deputy State Engineer

GORDON ZANDER

Supervising Hydraulic Engineer

T. Russel Simpson	Senior Hydraulic Engineer
G. M. Vickroy	Water Master

GENERAL DESCRIPTION OF WORK

Water master service was conducted on Hat Creek during the 1931 season in accordance with the provisions of the decree in the case of Doyel vs. Massie, under the water master district procedure of Sections 37 to 37f, inclusive, of the Water Commission Act of California.

G. M. Vickroy replaced Robert Startt as water master for the Hat Creek Water Master District. Water Master service was commenced in the district on May 1, 1931, and was terminated for the season on October 18, 1931.

Hat Creek was dry at the time of commencement of water master service in 1931, below the Morris Lower Ditch. At that time, only about 50 per cent of allotments were available for the Reigar and Morris Ditches. The flash boards at the heads of Hahn Creek and the Old Channel had been removed at some time prior to May 1st, and it was estimated that the combined loss in these two channels due to excessive flows therein was about 30 cubic feet per second. The flow in each channel was immediately reduced to 8 cubic feet per second.

All of the diversions from Hat Creek were opened during the 1931 season. The Vint Stevenson diversions were not opened until the third rotation period. Harvey Wilcox used the Stevenson allotment during the first period. W. P. Hall and W. W. Brown did not receive any water under permits during the 1931 season.

There was a shortage of water at all times during the period of water master service in 1931. The water supply on May 1st was equal to about 80 per cent of allotments and the supply rapidly decreased thereafter to between 35 and 40 per cent of allotments by

August 1st. The flow increased slightly at the end of the season
due to cooler weather and rains.

DISCUSSION OF RESULTS FOR SEASON

The precipitation at Hat Creek for the seasonal year commencing on October 1, 1930, and terminating on September 30, 1931, has been compared with the precipitation for other years during which investigations and water master service have been conducted on Hat Creek and have been tabulated in TABLE 1 of this report. The precipitation during 1923 and 1927 was considered nearly normal, whereas the other eight years of record were subnormal. The precipitation in 1931 was comparable with that in 1924, being about 40 per cent of normal.

TABLE 2 is a tabulation of the daily discharge of Hat Creek above all diversions during the 1931 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 and channel losses, is also shown on PLATE 1.

TABLE 3 shows the water deliveries on Hat Creek during the 1931 season expressed both in cubic feet per second and in per cent of full allotments. TABLE 3 also shows the average channel loss during each rotation period. The average channel loss for the season during the upper users' period was 18 cubic feet per second and during the lower users' period was 23 cubic feet per second.

TABLE 4 shows crop yields from typical lands irrigated from Hat Creek in 1931. The crop returns for the 1931 season were subnormal largely due to lack of water.

During the 1931 season, a three foot concrete Parshall Measuring Flume was installed in the Bidwell Ditch and a five foot concrete flume in the Wilcox Middle Ditch.

CONTROVERSIES

No serious controversies occurred on Hat Creek during the 1931 season, although there were occurrences worthy of mention for future guidance of the water master.

Ralph Bidwell complained of interference with his minimum flow by the operation of the Harry Lonquist power plant. Mr. Bidwell finally constructed new headworks and ditch immediately opposite to his home. This makes it possible for him to divert his minimum flow right with no interference from the power plant and also the heavy conveyance loss in a long ditch is thereby eliminated. He plans on placing his garden under the new diversion in the future.

Vint Stevenson disputed the right of the water master to regulate the headworks at the head of Old Channel. He desired to run about one-half of the flow of Hat Creek through Old Channel, which would result in natural inundation of most of the Gray Ranch and a considerable area of Harvey Wilcox and Vint Stevenson. A large portion of any flow of more than 10 cubic feet per second in Old Channel spreads out and is lost. It was necessary to attach a regulation sign at the head of Old Channel informing interested parties that this was subject to the exclusive regulation of the water master.

RECOMMENDATIONS

The measuring devices on the Updyke, Forest Service, and Henry Lonquist Ditches should be replaced next season with Parshall Measuring flumes.

FINANCIAL STATEMENT

Under the provisions of Section 37f of the Water Commission Act, all funds collected in a water master district are kept separate and placed in a fund to the credit of that district.

There is submitted on the following page a statement of the funds collected and expenditures during the period from January 1, 1931, to March 1, 1932 for the Hat Creek Water Master District.

FINANCIAL STATEMENT
HAT CREEK WATER DISTRICT FUND
MARCH 1, 1932

RECEIPTS

Balance on December 31, 1930	\$344.01	
Contributed by State in 1931	600.00	
Contributed by Taxpayers (Jan. 1/31 to Mar. 1/32)	590.25	
	\$1,534.26	

DISBURSEMENTS
(Jan. 1/31 to Mar. 1/32)

Water Master Compensation	860.27	
Water Master Travel Expense	242.68	
Cost of Publication of Financial Statement	35.00	
	1,137.95	
<u>BALANCE</u>		396.31

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
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	1.93	1.49	0.09	0.18	1.86	18.89
1925-26	0.58	2.26	0.48	2.57	2.45	0.75	2.39	1.03	0	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	1.33	1.36	4.87	1.05	1.73	0.08	0.14	0.14	0.16	16.96
1928-29	0.50	2.69	2.64	0.92	1.65	1.17	1.85	0.05	1.52	0	0	0.10	13.09
1929-30	0.40	0	3.02	4.36	3.64	1.12	1.61	1.40	0.13	0	0	1.78	17.46
1930-31	0.26	0.73	0.31	2.24	1.59	1.13	0.26	0.93	0.44	0	0	0.09	8.03
Mean	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

Total 9.11 10.43 12.81 18.57 27.55 15.13 12.57 12.24 8.98 0.44 1.66 6.09 153.67
 33 138.06 208.13

51
 30
 51
 9.1

TABLE 2

DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF HAT CREEK ABOVE ALL DIVERSIONS - 1931

Day	May	June	July	Aug.	Sept.
1	118	104	86	86	90
2	121	103	86	88	89
3	123	103	85	88	88
4	125	103	85	88	88
5	125	100	84	88	89
6	126	96	85	88	90
7	125	95	85	89	89
8	119	95	86	89	85
9	118	95	92	91	90
10	119	97	88	90	89
11	112	92	88	90	89
12	117	92	88	89	89
13	119	91	89	89	89
14	122	91	89	89	89
15	119	93	89	90	89
16	115	96	89	90	89
17	114	92	88	88	89
18	110	91	88	85	92
19	107	92	88	86	89
20	107	89	90	90	84
21	112	91	85	89	88
22	105	91	84	89	89
23	105	91	83	89	90
24	106	91	81	89	91
25	122	89	83	89	90
26	117	88	83	89	90
27	110	86	83	90	90
28	106	86	83	90	86
29	105	86	84	90	88
30	105	91	83	88	88
31	100	---	86	89	---

Records obtained by
combining flow at
U. S. G. S. station
with all diversions
above the station.

TABLE 3
WATER DELIVERIES ON HAT CREEK - 1931 SEASON

Irrigation: Period	Dates	Average Flow		Channel		Average Irrigation Delivery				
		of Hat Creek	Average	Loss	Average	Cu. Ft. Per Sec.		Per cent of full allotments		
		above all di-	Combined	C.F.S.	Upper	Lower	Upper	Lower	Upper	Lower
		versions	Diversions	Users	Users	Users	Users	Users	Users	Users
		C.F.S.	C.F.S.	Users	Users	Users	Users	Users	Users	Users
1	May 1 - May 11	128	111	17		99			80	
2	May 11 - May 21	120	98		22			85		65
3	May 21 - May 31	110	92	18		80			65	
4	May 31 - June 10	104	80		24			65		50
5	June 10 - June 20	92	73	19		62			50	
6	June 20 - June 30	92	70		22			55		42
7	June 30 - July 10	88	71	17		60			49	
8	July 10 - July 20	87	65		22			49		37
9	July 20 - July 30	83	65	18		54			44	
10	July 30 - Aug. 9	84	61		23			46		35
11	Aug. 9 - Aug. 19	85	66	19		50			40	
12	Aug. 19 - Aug. 29	85	63		22			49		37
13	Aug. 29 - Sept. 8	84	65	19		52			42	
14	Sept. 8 - Sept. 18	84	63		21			49		37
15	Sept. 18 - Sept. 28	84	65	19		52			42	
16	Sept. 28 - Oct. 8	87	65		22			52		40
Mean		93	73	18	23	64		56	51	43

TABLE 4

CROP PRODUCTION ON TYPICAL LANDS
IRRIGATED FROM HAT CREEK - 1931 SEASON

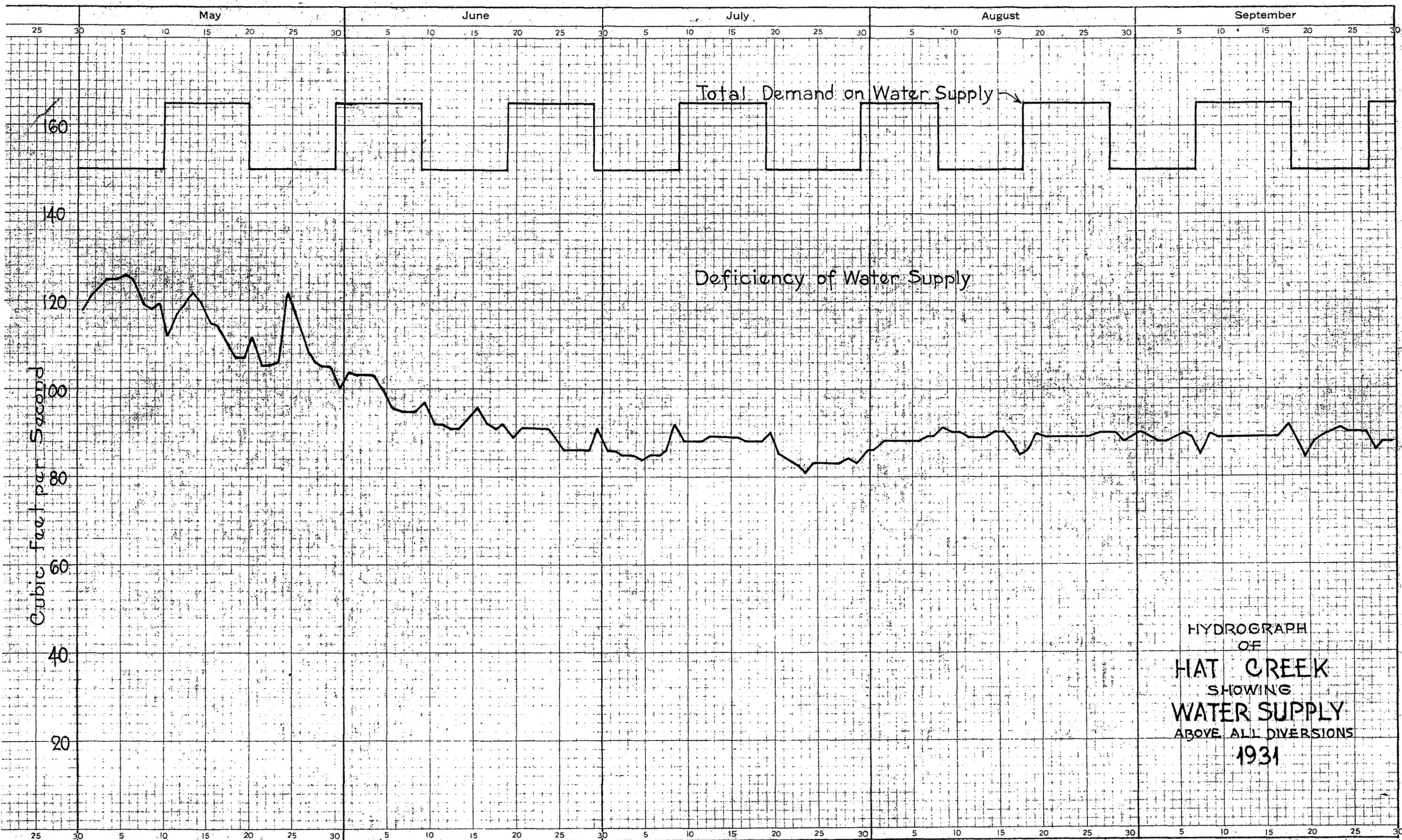
Owner	Crop	Acres	Total Yield		Yield Per Acre	
			Sacks	Tons	Sacks	Tons
Ralph Bidwell	: Alfalfa	: 60	:	: 85	:	: 1.4
	: Mdw. Hay	: 10	:	: 15	:	: 1.5
	: Pasture	: --	:	: (94 cattle & horses - 4 months)		:
Alan Brown	: Alfalfa	: 50	:	: 50	:	: 1.0
	: Grain Hay	: 15	:	: 15	:	: 1.0
	: Mdw. Hay	: 20	:	: 25	:	: 1.2
	: Potatoes	: 0.2	: 10	:	: 50	:
	: Pasture	: 25	:	: (24 cattle & horses - 6 months)		:
			:	: (700 sheep - 1½ months)		:
David Doyel	: Grain Hay	: 31	:	: 40	:	: 1.3
	: Mdw. Hay	: 40	:	: 80	:	: 2.0
	: Wheat	: 8	: 45	:	: 6	:
	: Orchard	: 0.5	:	: 1.5	:	: 3.0
	: Potatoes	: 6	: 600	:	: 100	:
	: Pasture	: 100	:	: (93 cattle & horses - 12 months)		:
			:	: (165 sheep and hogs - 12 months)		:
Otto Geissner	: Alfalfa	: 12	:	: 25	:	: 2.1
	: Grain Hay	: 15	:	: 10	:	: 0.7
	: Mdw. Hay	: 60	:	: 70	:	: 1.2
	: Barley	: 4	: 26	:	: 6	:
	: Wheat	: 18	: 90	:	: 5	:
	: Potatoes	: 0.7	: 70	:	: 100	:
	: Pasture	: 10	:	: (23 cattle & horses - 6 months)		:
			:	: (46 sheep & hogs - 6 months)		:
Chas. Heryford	: Potatoes	: 8	: 250	:	: 31	:
	: Pasture	: 15	:	: (12 cattle - 12 months)		:
Harry A. Lonquist	: Alfalfa	: 60	:	: 150	:	: 2.5
	: Grain Hay	: 5	:	: 10	:	: 2.0
	: Mdw. Hay	: 2	:	: 2.5	:	: 1.2
	: Wheat	: 10	: 56	:	: 5.6	:
	: Orchard	: 1	:	: 2.5	:	: 2.5
	: Potatoes	: 0.5	: 100	:	: 200	:
	: Pasture	: ----	:	: (180 cattle - 1 month)		:
J. S. Ratledge	: Alfalfa	: 35	:	: 35	:	: 1.0
	: Grain Hay	: 8	:	: 17	:	: 2.1
	: Corn	: 1	: 60	:	: 60	:
	: Pasture	: ----	:	: (52 cattle & horses - 4 months)		:

TABLE 4 (cont'd)

Owner	Crop	Acres	Total Yield		Yield Per Acre	
			Sacks	Tons	Sacks	Tons
McGary Snook	: Alfalfa	: 16	:	: 13	:	: 0.8
Wm. Valentine	: Grain Hay	: 4	:	: 3	:	: 0.8
	: Potatoes	: 0.2	: 25	:	: 125	:
	: Pasture	: 8	:	: (7 cattle & horses - 6 months)		:
Estate of	: Alfalfa	: 250	:	: 175	:	: 0.7
Harry Wilcox	: Potatoes	: 2.2	: 350	:	: 160	:
	: Pasture	: ---	:	: (250 cattle & horses - 3 months)		:
W. P. Hall	: Alfalfa	: 30	:	: 45	:	: 1.5
	: Pasture	: 40	:	: (50 sheep for 6 months)		:
Henry Lonquist	: Alfalfa	: 84	:	: 160	:	: 1.9
	: Mdw. Hay	: 10	:	: 15	:	: 1.5
	: Oats	: 8	:	: 15	:	: 1.9
	: Potatoes	: $\frac{1}{4}$: 20	:	: 80	:
	: Pasture	: --	:	: (180 cattle for 2 months)		:

TABLE 4 (cont'd)

Owner	Crop	Acres	Total Yield		Yield Per Acre	
			Sacks	Tons	Sacks	Tons
McGary Snook	:Alfalfa	: 16	:	: 13	:	: 0.8
Wm. Valentine	:Grain Hay	: 4	:	: 3	:	: 0.8
	:Potatoes	: 0.2	: 25	:	: 125	:
	:Pasture	: 8	:	:(7 cattle & horses - 6 months)		:
Estate of	:Alfalfa	: 250	:	: 175	:	: 0.7
Harry Wilcox	:Potatoes	: 2.2	: 350	:	: 160	:
	:Pasture	: ---	:	:(250 cattle & horses - 3 months)		:
W. P. Hall	:Alfalfa	: 30	:	: 45	:	: 1.5
	:Pasture	: 40	:	:(50 sheep for 6 months)		:
Henry Lonquist	:Alfalfa	: 84	:	: 160	:	: 1.9
	:Mdw. Hay	: 10	:	: 15	:	: 1.5
	:Oats	: 8	:	: 15	:	: 1.9
	:Potatoes	: $\frac{1}{4}$: 20	:	: 80	:
	:Pasture	: --	:	:(180 cattle for 2 months)		:



HYDROGRAPH
 OF
HAT CREEK
 SHOWING
WATER SUPPLY
 ABOVE ALL DIVERSIONS
 1931