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 FOR SEASON OF 1930

By T. Russel Simpson, Senior Hydraulic Engineer

Sacramento, California
January 1932

STATE OF CALIFORNIA

Department of Public Works

SACRAMENTO

DIVISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

EDWARD HYATT, STATE ENGINEER
CHIEF OF DIVISION

January 16, 1932

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

Attention Mr. Gordon Zander, Sup. Hyd. Engineer

Dear Sir:

There is transmitted herewith a report covering water master service on Hat Creek, Shasta County, California, during the period from May 1 to October 10, 1930.

The report covers the methods and practices followed in the distribution of the waters of Hat Creek in accordance with the provisions of the Doyel vs. Massie decree and presents the results obtained under this distribution.

Respectfully submitted,

T. Russel Simpson

Senior Hydraulic Engineer

ORGANIZATION

Walter E. Carrison	Director of Public Works
Edward Hyatt	State Engineer

Harold Conkling	Deputy State Engineer

GORDON ZANDER
Supervising Hydraulic Engineer

T. Russel Simpson	Senior Hydraulic Engineer
Robert Startt	Water Master

GENERAL DESCRIPTION OF WORK

Water master service was conducted on Hat Creek during the 1930 season in accordance with the provisions of the decree in the case of David Doyel, et al., vs. Harvey Massie, et al.

The Water Commission Act of California in Section 37 provides that whenever the rights to water on a stream system have been determined a water master district may be created by the State to facilitate the handling of water master service on the stream. This procedure was followed and an order was entered by the State Engineer on September 11, 1929 creating the Hat Creek Water District (now Hat Creek Water Master District).

After the creation of the Hat Creek Water Master District a petition signed by the owners of more than fifteen per cent of the conduits within the district was received by the Division of Water Recources requesting appointment of a water master to distribute the water in the district. Acting upon the petition the Division appointed T. R. Simpson and Robert Startt as water masters for the district.

Water master service was commenced in the Hat Creek Water Master District on May 1, 1930, and was terminated for the season on October 10, 1930.

All of the diversions from Hat Creek were opened during the 1930 season. The Vint Stevenson rights were utilized by Harvey W. Wilcox during the first three rotation periods of the upper users.

The Hall sawmill was not operated during the period of water master service. Vernon March and Henry Lonquist finished irrigating during the first rotation period of the lower users three days prior to the end of the period. With these exceptions the full adjudicated rights of all the parties were exercised. Messrs. Hall and W. W. Brown received some water under permits from May 1 to June 20.

There was a slight surplus of water during the latter part of May and again during the second week in June. Except on these occasions, there was some shortage of water throughout the remainder of the period of water master service. The shortage however did not become acute until July 1. Thereafter the water supply failed rapidly from 80 per cent of allotments on July 1 to 45 per cent of allotments on August 1. The flow held fairly constant after August 1 for the remainder, except for a few days after a rain on September 8.

The minimum flow stage of Hat Creek during 1930 was slightly less than that during 1929.

DISCUSSION OF RESULTS FOR SEASON

The precipitation at Hat Creek for the seasonal year, commencing on October 1, 1929, and terminating on September 30, 1930, 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 seven years of record, including 1930, were subnormal.

Table 2 is a tabulation of the daily discharge of Hat Creek above all diversions during the 1930 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 allotments and channel losses, is also shown on Plate 1.

Table 3 shows the water deliveries on Hat Creek during the 1930 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 17 cubic feet per second and during the lower users period was 25 cubic feet per second.

Table 4 shows crop yields from typical lands irrigated from Hat Creek in 1930. The crop returns for the 1930 season were, for the most part, subnormal. This was due partly to deficient water supply and partly to late spring frosts and frosts in August. Both the first and second cuttings of alfalfa were frosted prior to maturation. The potatoes and gardens were also injured by the frost on August 23, 1930.

A 3 foot concrete Parshall Measuring Flume was installed in the Doyel Ditch in 1930.

A channel control was constructed at the head of Hahn Creek in order to regulate the division of the flow between Hat Creek and Hahn Creek.

New headworks were installed at the head of the Bertha Giessner Ditch.

Three lava sink holes in the channel of Hat Creek on the Henry Lonquist Ranch were filled and sealed in June 1930. This resulted in salvaging about 4 cubic feet per second.

CONTROVERSIES

No serious controversies occurred on Hat Creek during the 1930 season, although there were a few occurrences worthy of mention for future guidance of the water master.

Messrs. Valentine and Ratledge felled a tree in Hat Creek immediately below the head of the Hahn Branch. After the collection of drift in the tree, the flow in Hahn Creek was increased to about 40 cubic feet per second. The channel of Hahn Creek is flat and has a capacity of about 10 cubic feet per second. The surplus water spread over portions of the Valentine and Heryford Ranches and sank in the lava rocks. There is nothing in the decree specifying the amount of water to be diverted into Hahn Creek, but any water over and above 10 cubic feet per second flowing therein is largely lost. Consequently a channel control was installed at the head of Hahn Creek and the flow was restricted to slightly less than 10 cubic feet per second. It was necessary to attach a regulation sign at this point informing the interested parties that this was subject to the exclusive regulation of the water master, because of interference from Messrs. Valentine and Ratledge.

Mr. Sullivan complained several times of interference with the water in his ditch. An automatic recorder was placed at his wier but no further interference was detected.

Mrs. Bertha Giessner complained of interference with her diversion but the trouble appeared to arise from faulty headworks. After installation of new headworks no further trouble was experienced.

Ralph Bidwell complained of interference with his minimum flow. The interference resulted from the operation of the Harry Lonquist power plant. The headworks and measuring devices are not so constructed as to eliminate this interference without considerable expense.

RECOMMENDATIONS

Ralph Bidwell should tap Hat Creek at his home to secure his minimum flow and thus eliminate the Harry Lonquist power interference and eliminate the conveyance loss in the Lonquist-Reynolds-Bidwell Ditch.

The old measuring devices in the various diversions should be changed to Parshall Measuring Flumes whenever replacements are required.

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 calendar year 1930 for the Hat Creek Water Master District.

FINANCIAL STATEMENT

HAT CREEK WATER DISTRICT FUND

CALENDAR YEAR 1930

RECEIPTS		
Contributed by State	$700.00	
Contributed by Taxpayers	701.90	
		$1401.90
DISBURSEMENTS		
Water Master Compensation	$721.58	
Water Master Travel Expense	297.76	
Cost of Publication of Financial Statement	31.50	
Contingencies	7.05	
		1057.89
BALANCE		$ 344.01

T A B L E S

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	1.98	1.49	0.09	0.18	1.86	18.89
1925-26	0.53	2.26	0.48	2.57	2.45	0.75	2.39	1.06	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	1.76	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
Mean	0.98	2.08	2.17	1.81	2.88	1.56	1.59	1.26	0.95	0.05	0.18	0.67	16.13

TABLE 2

DAILY DISCHARGE IN CUBIC FEET PER SECOND
OF HAT CREEK ABOVE ALL DIVERSIONS FOR
THE PERIOD ENDING SEPTEMBER 30, 1930.

Day	May	June	July	Aug.	Sept.	
1	133	148	123	97	98	
2	140	153	122	96	98	
3	156	152	121	96	98	
4	144	153	119	96	98	
5	137	158	117	96	98	
6	140	166	116	96	100	
7	140	169	111	96	101	
8	137	166	114	96	94	
9	133	163	113	103	97	
10	133	178	104	100	103	
11	117	176	106	100	101	
12	125	176	106	99	100	
13	131	170	104	98	97	
14	134	166	104	98	97	
15	135	166	104	98	95	
16	135	166	106	99	95	
17	148	160	107	99	95	
18	150	154	107	100	101	
19	156	150	107	96	98	
20	166	135	112	102	98	
21	172	135	110	102	98	
22	154	137	110	102	98	
23	156	132	106	102	98	
24	160	131	105	101	98	
25	160	128	102	101	98	
26	160	125	99	100	98	
27	160	125	99	100	98	
28	166	122	99	100	92	
29	166	122	98	104	95	
30	158	127	93	100	98	
31	140		96	98		
Total Sec. Ft. Days	4542	4509	3340	3071	2933	153 Day Period
Mean Sec. Ft.	147	150	108	99	98	120
Max. Sec. Ft.	172	178	123	104	103	178
Min. Sec. Ft.	117	122	93	96	92	92
Total Ac. Ft.	9010	8940	6620	6090	5820	36500

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

TABLE 3

WATER DELIVERIES ON HAT CREEK - 1930
SEASON

Irrigation Period	Dates	Average Flow of Hat Creek above all Diversions C. F. S.	Average Combined Diversions C. F. S.	Channel Loss C. F. S.		Average Irrigation Delivery C. F. S.		Average Irrigation Delivery Per Cent of Full Allotments	
				Upper Users	Lower Users	Upper Users	Lower Users	Upper Users	Lower Users
1	May 1 - May 11	143	128	15		117		95	
2	May 11 - May 21	155	130		25		115		88
3	May 21 - May 31	156	140	16		123		100	
4	May 31 - June 10	160	133		27		118		90
5	June 10 - June 20	155	138	17		123		100	
6	June 20 - June 30	148	120		28		105		80
7	June 30 - July 10	127	108	19		96		75	
8	July 10 - July 20	116	90		26		75		55
9	July 20 - July 30	105	85	20		74		60	
10	July 30 - Aug. 9	100	74		26		59		45
11	Aug. 9 - Aug. 19	95	78	17		68		55	
12	Aug. 19 - Aug. 29	96	73		23		59		45
13	Aug. 29 - Sept. 8	96	80	16		69		55	
14	Sept. 8 - Sept. 18	105	82		23		68		50
15	Sept. 18 - Sept. 28	96	81	15		70		55	
16	Sept. 28 - Oct. 8	100	77		23		68		48
17	Oct. 8 - Oct. 18	100	85	15		72		55	
Mean		121	100	17	25	90	83	72	63

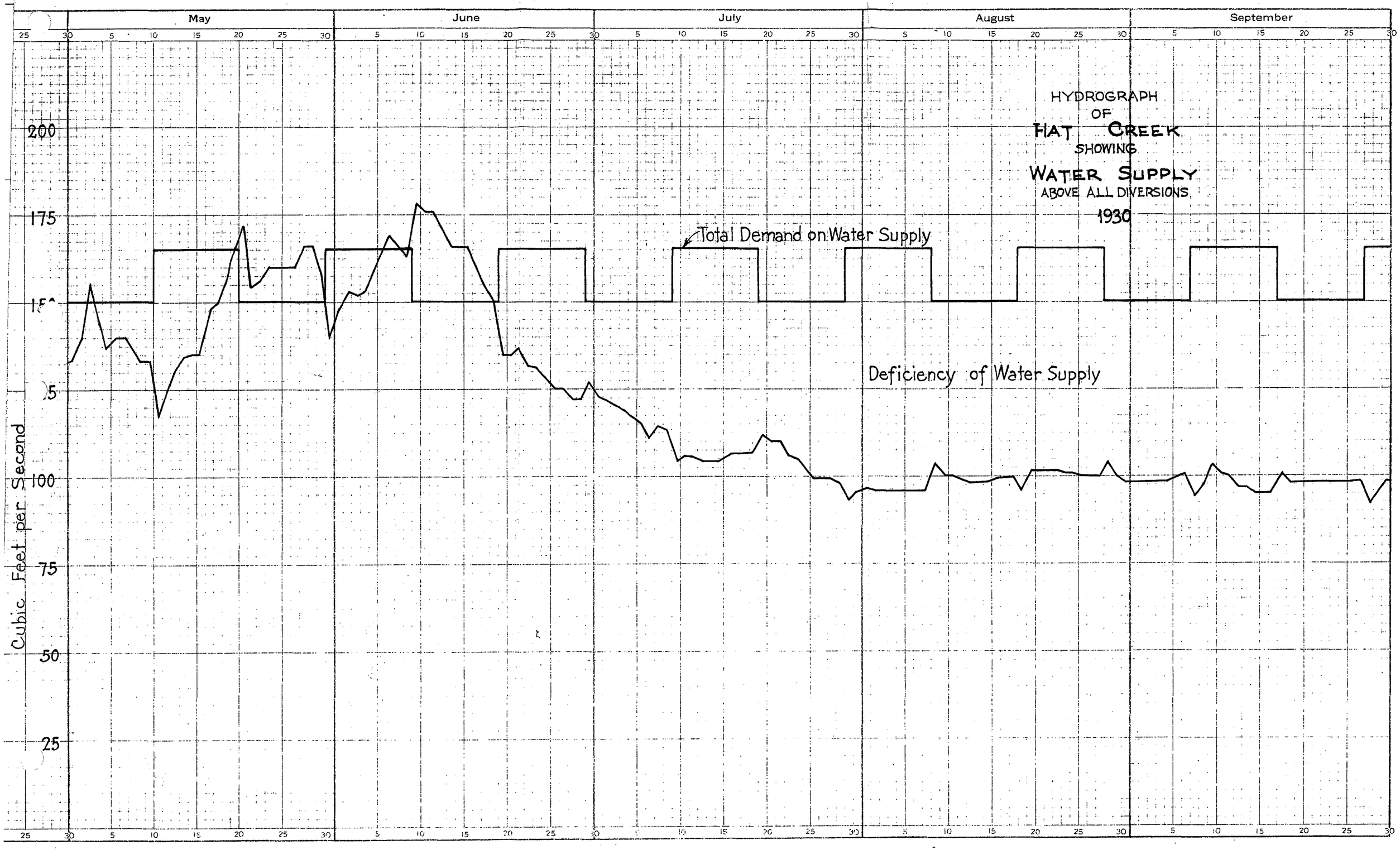
TABLE 4

CROP PRODUCTION ON TYPICAL LANDS
IRRIGATED FROM HAT CREEK - 1930 SEASON

Owner	Crop	Acres	Total Yield		Yield per Acre	
			Sacks	Tons	Sacks	Tons
Asa L. Doty	Alfalfa2	200		375		1.9
	Wheat	22	242		11	
	Potatoes	2	400		200	
	Pasture		(Fall pasture for 125 cattle)			
Harry Lonquist	Alfalfa	86		155		1.8
	Grain Hay	12		20		1.7
	Wheat	10	106		11	
	Potatoes	0.5	100		200	
Ralph Bidwell	Alfalfa	60	155			2.6
	Meadow Hay	10	20			2.0
	Pasture		(Fall pasture for 300 cattle)			
Mcg. Snook	Meadow Hay	20		18		0.9
Ward Smith	Potatoes	2	200		100	
	Pasture	211	(2000 sheep for 4 months)			
Harvey Wilcox	Alfalfa	30		16		0.5
	Pasture	60	(70 Cattle for 2 months)			
L. H. Sullivan	Alfalfa	40		40		1.0
Harvey Wilcox Est.	Alfalfa	180		180		1.0
	Pasture		(200 Cattle for 7 months)			
W. P. Hall	Alfalfa	12		35		3.0
	Pasture	20	(Good)			
Vernon March	Alfalfa	125		200		1.6
	Potatoes	7	1500		214	
Vint Stevenson	Pasture	100	(70 cattle for 2 months)			

Owner	Crop	Acres	Total Yield		Yield per acre	
			Sacks	Tons	Sacks	Tons
W. W. Brown	Alfalfa	60		150		2.5
	Meadow Hay	3		6		2.0
	Grain Hay	6		10		1.7
	Pasture		(120 stock for 1 month)			
S. U. Lonquist	Alfalfa	68		140		2.1
	Meadow Hay	20		25		1.2
	Wheat	10	86		8.6	
	Pasture		(15 cattle for 5 months)			
U.S.F.S.	Alfalfa	4		3		0.8
	Meadow Hay	3		3		1.0
Otto Giessner	Alfalfa	8		22		2.8
	Meadow Hay	80		90		1.1
	Wheat	20	120		6.	
	Potatoes	1.5	100		67	
	Pasture		(325 stock for 6 months)			

PLATES


HYDROGRAPH
OF
HAT CREEK
SHOWING
WATER SUPPLY
ABOVE ALL DIVERSIONS
1930
Total Demand on Water Supply
Deficiency of Water Supply
Cubic Feet per Second
200
175
100
75
50
25
May
June
July
August
September