STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

REPORTS OF THE
DIVISION OF WATER RESOURCES
EDWARD HYATT, STATE ENGINEER

REPORT ON

WATER MASTER SERVICE

ON

SUSAN RIVER AND TRIBUTARIES

LASSEN COUNTY, CALIFORNIA

DURING SEASON OF 1938

By

G. M. Vickroy

Water Master

Sacramento, California

March, 1943

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SACRAMENTO

DIVISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

April 19, 1943

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

Attention: Mr. Gordon Zander, Supervising Hydraulic Engineer

Dear Sir:

A report on water master service on the Susan River in Lassen County, during the season of 1938, is submitted herewith.

The report includes a history of the court reference proceedings during the year, a discussion of precipitation, water supply and use of water and a brief description of results obtained.

Tables showing precipitation and water supply data are included.

Respectfully submitted,

Water Master

FOR VICTORY
BUY
UNITED
STATES
SAVINGS
BONDS
AND STAMPS

Report on

Water Master Service

on

Susan River and Tributaries

Lassen County, California

During Season of 1938

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INTRODUCTION

Subsequent to the 1937 report on water master service the court reference proceedings was occupied with the disposition of demurrers and finally after answers had been filed, the case came up for trial on November 14, 1938.

Water master service was provided during the 1938 irrigation season under the authority of the stipulation for judgment signed in 1936. Mr. T. R. Simpson, Senior Hydraulic Engineer, was again in general charge of the field work with G. M. Vickroy, water master, in charge of the detail work of water distribution. Water master service was provided as needed from April 20 to September 30, 1938.

DISCUSSION OF RESULTS

Precipitation during 1937-38

Table 1 has been prepared from the records of the United States Weather Bureau to show the monthly precipitation at Susanville for the seasonal year beginning October 1, 1937 and ending September 30, 1938, together with the 39 year monthly and annual means. The recorded and longtime mean snowfall are also shown for the station. A companion of the seasonal precipitation with the annual mean indicates that the precipitation during the 1937-38 season was 181.6 per cent of normal. Observation of the snowfall data in the table shows that the snowfall at Susanville during the year was about 13 per cent above normal. A large part of the snow fell during the month of February and was followed by above normal precipitation in March. A precipitation combination which left a thick layer of wet snow above five thousand feet elevation at the beginning of the spring run-off season.

The results of the "California Cooperative Snow Surveys" published April 11, 1938, showed that the snow pack as of April 1, 1938, at Feather River stations adjoining this area was above normal at all stations. The water content of the snow at the three stations nearest to the Susan River water shed was as follows:

Station	Elevation(feet)	Water Content(inches)	Percentage of Normal
Fredonia Pass	6400	89.3	262
Harkness Flat	6400	52.3	175
Mt. Lassen	8400	152.5	157

With the above data in mind it was estimated that the run-off of Susan River from April 1 to July 1, 1938 would be near 200 per cent of normal with a probability that it might be even more, as a larger percentage of the snow crop goes off as run-off when the crop is heavy than it does when there

is a nominal or light snowpack.

Water Supply

The high water during December 1937 washed out or made unsafe for use, every recorder station in the area so that no complete records of run-off are available. However, by comparison with the stream flow of other streams with similar run-off characteristics, tables 2 and 3 have been prepared to show the estimated run-off of Susan River at Susanville and of Gold Run Creek above diversion. It was impossible to deduce amounts or use for the other stations near Susanville and Johnstonville. On Willow Creek no reasonable basis of derivation of run-off was found as the flow from melting snow on that stream is very erratic. Data is available showing that the flow at Cummings Bridge on Willow Creek the middle of April was upwards of 500 cubic feet per second. Also, that by May 15 the flow had dropped to approximately the natural spring flow both on upper and lower Willow Creek. The springs above Willow Creek Valley maintained a steady flow during the summer of about twenty cubic feet per second and those below Willow Creek Valley a flow of about the same amount.

The water supply on the stream system as a whole was greatly above normal, with water running into Honey Lake as late as July 1. The excess water during the winter and spring was sufficient to change Honey Lake from a dry waste to a full lake with the water backing onto the lower meadows in the Tule area. Previous to 1938 the lake had been dry or almost dry during the fall months for almost twenty years.

In general the water supply was ample to fill all requirements until after the first of July with some water available for irrigation purposes throughout the season. On Plate 1 is shown a hydrograph of the

estimated 1938 discharge of Susan River and of Gold Run Creek compared with a hydrograph of the flow at the same stations in 1938.

Use of Water

The distribution of water on the Susan River was much simplified in 1938 by the large flow available during most of the season. It was possible to supply all demands for water throughout the season. The main problem of distribution was to distribute the water to the various channels as the high water had filled some water courses and washed out the controlling section in others so that the water was difficult to control.

The distribution of water on Willow Creek showed some shortage in the lower Willow Creek Valley area after June 15th by which date the reservoir built on the Walsh ranch in Willow Creek Valley was drained. However, due to the difficulty of by-passing water past land being cut for hay, delivery difficulties would have prohibited the use of more water than was available. In the lower Willow Creek area there was enough water to fill all requirements.

Gold Run, Piute and Lassen Creeks supplied ample water for all allotments prior to July 1st and ample to fill the requirements thereafter.

Discussion of Results

In summarizing the water supply and use of water discussion, it is apparent that there was ample water available under all schedules to fully supply allotments therein until quite late in the season. In some areas where the channels became clogged or new water courses were formed, material damage occurred from overflow and flood conditions. In fact a great deal of the alfalfa along the bottomland of the river was

killed in 1938 by the continued overflowing of the water. On the land not hurt by overflow the crops were exceptionally good due to the ample water supply.

In order to show the relationship of the available water supply in the period 1935 to 1938, the following table has been compiled:

Susan River above Ramsey Ditch (ac. ft.)

Year	April	May	June	Total
1935	23,300	~~14,900~~ 15200	~~4,470~~ 2790	~~42,670~~ 41,290
1936	11,000	~~5,950~~ 6310	~~4,740~~ 2810	~~21,690~~ 20,120
1937	13,100	7,660	1,590	22,350
1938	67,700	82,800	21,500	~~171,800~~ 172,000

It will be seen that the water supply in 1938 was by far the greatest of any of the years since this series of records was initiated. In the "Report on Water Supply and Use of Water on Susan River and Tributaries" dated February 1936, a few old records of run-off on Susan River are given which indicate that the run-off in 1938 must have been at least 200 per cent of normal. A summary of the records is shown below:

Monthly Discharge in Ac. Ft.

Year	April	May	June	Total
1901	22,200	25,800	3,450	51,450
1902	26,900	18,000	4,100	48,000
1903	22,200	16,400	3,760	42,360
1904	41,300	36,900	9,530	87,730
1905	15,700	9,850	3,650	29,200
1919	16,300	6,390	5,090	27,780
1920	6,310	4,580	3,100	13,990
1921	10,600	13,300	6,960	30,860

There was ample water in 1938 for the Lassen Irrigation Company's use without requiring any withdrawal from their mountain storage until July 22nd. A total withdrawal of about 4000 acre feet was made thereafter.

Efficiency of Distribution

The flood of December 1937 and the high spring run-off in 1938 wrought havoc with measuring devices, recording stations and division structures. As stated before all the recorder stations were rendered useless either by destruction of stilling well structures or by the washing out of the controls. The stream channels in some cases were filled with debris so that the water did not follow the usual courses and prevented the proper division of the flow into the various channels leading to the irrigated lands. The filling of the Old Channel of Susan River below the Woodstock Dam prevented the usual proportion of the low flow being taken that way. Further down the stream the head dam in Tanner Slough washed out, letting almost all the water in lower Susan River go that way with a consequent shortage in Dill Slough and Fish Slough.

The water users on Susan River in conjunction with the Lassen County Board of Supervisors were able in the summer of 1938, to get an allotment of flood damage repair money, as provided by the state legislature, to repair a portion of the damage caused by the high water. The work done in 1938 was confined to the construction of a by-pass channel for the Tule canal along the course of the old Tanner Slough channel. A concrete head dam was constructed in the new channel to divide the flow between it and the Tule Canal.

The water users in the Tule area reconstructed an old rock dam at the head of Tanner Slough when low water occurred to provide a means of regulating Tanner and Dill Sloughs.

TABLES

Table 1

Precipitation at Susanville, California
Elevation 4268 feet.

Comparison Between Precipitation for Seasonal Year
1937-38 and the 39-year Mean

Month	Monthly Means 39 year		1937-38		Snowfall in Inches	
	Inches	Percent of total mean	Inches	Percent of Total Mean	Normal	1937-38
October	1.13	6.1	0.72	3.9		
November	2.09	11.3	5.71	30.8		
December	3.08	16.6	6.12	33.0	15.3	1.0
January	3.38	18.2	2.97	16.0	26.3	7.0
February	2.79	15.0	9.75	52.5	11.0	64.5
March	2.50	13.5	5.73	30.8	9.6	T
April	1.12	6.0	.53	2.9	1.9	0
May	.83	4.5	.27	1.5		
June	.49	2.6	.92	5.0		
July	.28	1.5	.86	4.6		
August	.33	1.8	.00	.0		
September	.54	2.9	.11	.6		
Totals	18.56	100.0	33.69	181.6	64.1	72.5

Table 2

Estimated Natural Flow in Cubic Feet per second
of Susan River above Ramsey Ditch - 1938

Day	April	May	June	July	August	September	
1		1800	710	132	12.0		
2		1800	690	121	12.0		
3		1500	650	110	11.0		
4		1400	640	102	11.0		
5		1300	620	93.0	10.0		
6		1200	580	84.0	10.0		
7		1200	550	77.0	9.50		
8		1200	520	72.0	9.50		
9		1300	500	64.0	9.50		
10		1400	470	59.0	9.00		
11		1500	420	55.0	8.50	No	
12		1700	380	50.0	8.00		
13		1900	360	44.0	7.60	Record	
14		2100	330	41.0	7.60		
15		2200	320	37.0	7.60		
16		2200	310	37.0	7.20		
17		2000	290	36.0	7.00		
18		1700	260	34.0	6.80		
19		1500	230	29.0	6.80		
20	1500	1300	210	26.0	6.60		
21	1700	1100	230	23.0	6.60		
22	1700	1000	210	20.0	6.60		
23	1600	900	200	18.0	6.40		
24	1600	800	190	16.0	6.00		
25	1600	800	180	15.0	6.00		
26	1500	900	170	18.0	6.00		
27	1400	900	160	19.0	6.00		
28	1400	900	160	15.0	6.00		
29	1500	800	150	13.0	6.00		
30	1600	750	140	13.0	6.00		
31	-	730	-	12.0	6.00		
Tot.Sec. Ft.Days	*17,100	41,780	10,850	1,485.0	244.80		134 Day Period
Mean Sec. Ft	* 1,555	1,348	361	47.9	7.90		533.1
Max. Sec.Ft.	* 1,700	2,200	710	132	12.0		2200
Min. Sec. Ft	* 1,400	730	140	12.0	6.0		6.0
Total Ac. Ft.	*33,900	82,800	21,500	2940	485		142,000

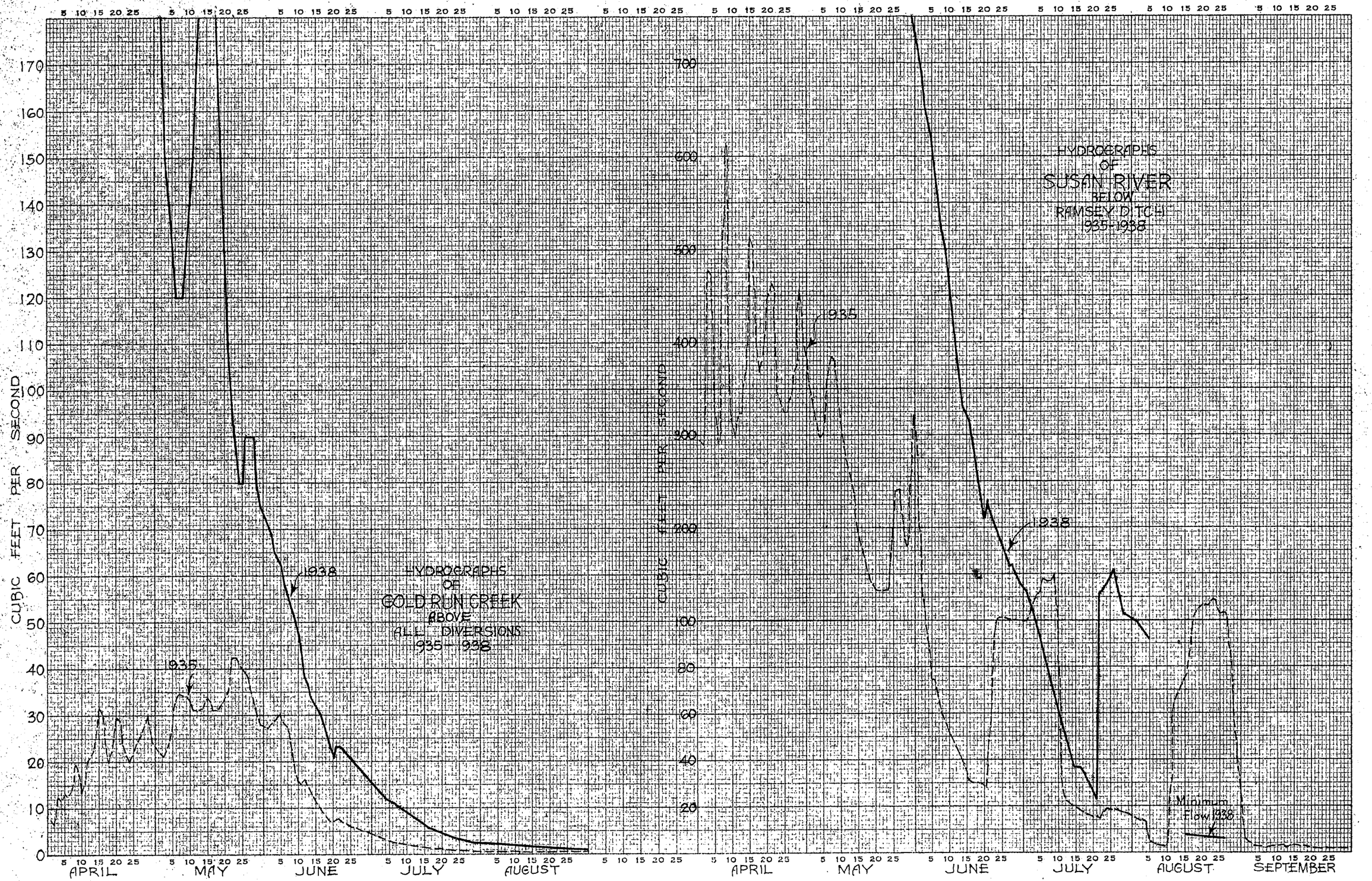
*11 Day Period

Table 3

Estimated Daily Discharge in Cubic Feet per second
of Gold Run Creek above Diversion - 1938

Day	May	June	July	August	
1	180	71.0	15.0	2.50	
2	180	69.0	14.0	2.40	
3	150	65.0	13.0	2.40	
4	140	64.0	12.0	2.30	
5	130	62.0	11.5	2.20	
6	120	58.0	11.0	2.10	
7	120	55.0	10.5	2.00	
8	120	52.0	10.0	2.00	
9	130	50.0	9.50	1.90	
10	140	47.0	9.00	1.80	
11	150	42.0	8.50	1.70	
12	170	38.0	8.00	1.60	
13	190	36.0	7.50	1.60	
14	210	33.0	6.80	1.50	
15	220	32.0	6.40	1.50	
16	220	31.0	5.80	1.40	
17	200	29.0	5.60	1.40	
18	170	26.0	5.20	1.40	
19	150	23.0	4.80	1.40	
20	130	21.0	4.50	1.30	
21	110	23.0	4.20	1.30	
22	100	23.0	3.80	1.30	
23	90.0	22.0	3.60	1.20	
24	80.0	22.0	3.20	1.20	
25	80.0	21.0	3.00	1.20	
26	90.0	20.0	2.90	1.20	
27	90.0	19.0	3.10	1.00	
28	90.0	18.0	2.90	1.00	
29	80.0	17.0	2.90	1.00	
30	75.0	16.0	2.70	1.00	
31	73.0	-	2.60	1.00	
Total Sec.Ft. Days	4178.0	1105.0	213.5	48.00	123 Day Period
Mean Sec.Ft.	134.8	36.8	6.89	1.55	45.1
Max. Sec.Ft.	220	71.0	15.0	2.50	220
Min. Sec.Ft.	73.0	16.0	2.60	1.00	1.00
Total Ac. Ft.	8270.	2190.	423	95.1	11,000.

PLATE



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