STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

Reports of the
Division of Water Resources
Edward Hyatt, State Engineer

REPORT ON

WATER MASTER SERVICE

ON

PIT RIVER IN BIG VALLEY

MODOC AND LASSEN COUNTIES, CALIFORNIA

1942 SEASON

By

Harrison Smitherum
Senior Hydraulic Engineer
Sacramento, California

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STATE OF CALIFORNIA

Department of Public Works

SACRAMENTO

DIVISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

Attention: Mr. Gordon Zander
Supervising Hydraulic Engineer

Dear Sir:

Herewith is submitted the annual report covering water master service on Pit River in Big Valley, Modoc and Lassen Counties, California, for the 1942 season.

The report presents a general description of the work and a discussion of the results obtained. Records of precipitation, run-off and other pertinent data are included.

Respectfully submitted,

Harrison Smitherum

Senior Hydraulic Engineer.

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Hydrograph of Pit River near Canby, April 1 to September 30, 1942

REPORT ON
WATER MASTER SERVICE
ON
PIT RIVER IN BIG VALLEY
MODOC AND LASSEN COUNTIES, CALIFORNIA
DURING SEASON 1942.

INTRODUCTION

The Big Valley Water Master District was created by order of the Division of Water Resources under date of November 13, 1934, to embrace all of the rights on Pit River in Big Valley as ascertained and determined by an agreement in writing entitled "Agreement Determining Rights to Water and to the Use Thereof from Pit River in Big Valley in Modoc and Lassen Counties, California," dated October 10, 1933, and duly recorded in each of the offices of the County Recorder of Modoc and Lassen Counties in ~~December~~ November, 1934.

Water master service in the Big Valley Water Master District was carried on throughout the 1942 season in accordance with the "Distribution of Water" procedure contained in Sections 37 to 37f, inclusive of the Water Commission Act. Such service extended over the period from April 1 to October 1. The distribution of water was administered by the writer assisted at times by G. M. Vickroy, Water Master.

WATER SUPPLY

Precipitation

The results of annual snow surveys made by the Division of Water Resources on three established snow courses in the Upper Pit River watershed are shown in Table I of this report. The data have been arranged to

show the water content of the snow on the ground at the beginning of the runoff period, April 1 to July 31, inclusive, as compared with an average water content deduced from a long time runoff record and as compared with the average water content covering the period of actual measurements.

Table 2 gives the monthly, seasonal and average amounts of precipitation in inches for three stations in the Upper Pit River watershed. Based upon these records over the past thirteen years, the precipitation over the area was 120 per cent of the mean for that period. Precipitation for the months of April, May and June was unusually heavy over the area.

Stream Flow

The U.S.G.S. maintains a streamflow measuring station on Pit River near Canby, which is used as the measuring point for water available for distribution in Big Valley. During the early part of the irrigation season, additional water is available from small tributaries between the Canby station and Lookout Dam. However, during the critical period of each season the flow at Canby station is indicative of the amount available for distribution. The record of runoff at this station for the 1941-42 season is presented in Table 3. The monthly and total runoff for each irrigation season from 1932 to 1942 is presented in the following table:

Runoff in Acre-feet

	April	May	June	July	August	September	Total
1932	17100	37500	9520	3170	480	684	68454
1933	2420	4780	803	1010	151	412	9576
1934	77	427	934	427	13	16	1894
1935	39150	18760	14810	3490	350	525	77083
1936	30120	13170	5770	1410	864	1710	53044
1937	20630	2560	1990	1280	582	1860	28902
1938	112100	72160	19760	3680	1310	3210	212220
1939	5300	2440	1750	1320	710	1200	12720
1940	23200	5370	3080	1090	2450	2190	37380
1941	7790	14660	9340	4150	2310	4210	42460
1942	29930	34100	21010	4670	1710	3750	95170

DISTRIBUTION OF WATER

Distribution for the 1942 season was in accordance with the provisions of the agreement heretofore mentioned. The practices initiated during the past several seasons were followed with little or no modification. The usual procedure is to simultaneously irrigate as many ranches as the available water supply will cover. As the flow decreases and rotation becomes necessary the available water is passed successively downstream from dam to dam until each ranch has received its quota of water.

Due to continued high water in 1942, the main river dams were not put in until June ; Lookout Dam, June 12; Gerig Dam, June 12; Bieber Dam, June 2 and McArthur Dams, June 23. The water supply was sufficient to meet all demands up to about July 1, with little or no regulation of diversions being required. Haying operations were generally in progress throughout the month of July and water was available for any one who had use for it up to about July 23. Subsequent to that date and throughout the month of August the flow was barely sufficient to maintain storage behind the dams and provide

stock water as required in the various sloughs. Stock water was especially short to Kate Gerig and Ernest Babcock. Water for irrigation was again available commencing on August 30 when return flow from water released from Big Sage Reservoir for irrigation in Hot Springs Valley, together with Big Sage Reservoir water purchased by the Big Valley Water Users Association from the Hot Spring Valley Irrigation District, reached Lookout Dam.

The detail of operations for the 1942 season follows:

Lookout Dam

The dam was put in with considerable difficulty due to high water. The upright needles were installed on June 11 and the flashboards on June 12. Following installation of the dam, water was available to all users from Lookout Dam up to haying time without regulation. On July 29, it became necessary to pull and reset the flashboards on the dam to stop the leakage and enable the proper depth of storage to be held behind the dam. Following this operation the dam slowly filled until on August 11 a flush head, due to the failure of the Hagge Dam in Hot Springs Valley, filled the dam to gage reading 7.20 and provided some water for irrigation.

John Hartmann and Will Gerig received an irrigation from the water thus made available. John Hartmann again received an irrigation commencing on August 30 when return flow from irrigation and water purchased from Hot Spring Valley Irrigation District became available to Big Valley. Will Gerig subsequently was irrigated by return flow from Hot Springs Valley and by water from Roberts Reservoir.

Gerig Dam

The Gerig Dam was put in on June 12, following installation of the Lookout Dam. Water was available to all users from the Gerig Dam from

that date up to the time water was turned off for haying. The third priority rights under the Watson Ditch were not exercised either prior to July 1 or during the month of July when water was available for their use. On July 29, the uprights on the Gerig Dam failed and the storage behind the dam was lost. The dam was immediately replaced and the storage gradually built up to a depth of 1.8 feet below the top of the dam by August 22. Subsequent to that date the water surface behind the dam was held at about that level until about August 31 when the return flow from Hot Springs Valley almost caused overtopping of the dam.

Commending on August 30, Jim Holl, Pete Gerig and A. J. Hollenbeak received a partial irrigation. Ward Kramer did not take any water at that time. On September 13, water was turned through the Fulcher Pipe for Kramer, Holl and other west side users and through the Gerig pipes for Pete Gerig. This was return water from irrigation in Hot Springs Valley together with water released from Roberts Reservoir. Arad Babcock and Lester A. Babcock also received water released from Roberts Reservoir through the Watson Ditch.

Bieber Dam

The main dams on the Bieber Dam System, namely Bieber, Ricketts and Caldwell Road dams, were put in on June 2. All users under this system received two irrigations between June 2 and July 4 with little or no regulation. It, however, was necessary for the water master to make sure that sufficient water got through to fill the Upper and Lower Thompson Dams, which are at the tail end of the Bieber Dam System.

The upper ranches served from Bieber Dam received some irrigation when the Gerig Dam failed on July 29, however, as soon as matters could be straightened out it was endeavored to run this water through the various

sloughs without spreading to replenish the stock water supply. Stock water was very short to the Gerig and E. Babcock ranches during the month of August due mainly to the fact that the major part of the available supply was used in refilling the storage behind Gerig Dam after its failure on July 29.

All users under the Bieber Dam System received an irrigation from return flow and from water purchased from Hot Spring Valley Irrigation District. This water was delivered between September 1 and 12, inclusive.

McArthur Dams

The McArthur Pit River and Goble Slough dams were put in on June 23. High water and the necessity for considerable levee repair had prevented their installation at an earlier date. Two irrigations were had on the McArthur Ranch between June 23 and July 15. The next irrigation on the McArthur Ranch occurred on September 12 from return water from irrigation in Hot Springs Valley.

Avilla Dams

The Avilla Dams were not repaired and consequently not used during the 1942 season. The Avilla Ranch was pastured to sheep and the herder advised the writer that the land would not be irrigated. Water was available to the Avilla Ranch when releases were made from the McArthur irrigation systems on the dates given above under "McArthur Dams".

Big Sage Reservoir Water

Water purchased from the Hot Spring Valley Irrigation District by the Big Valley Water Users Association was released from Big Sage Reservoir between August 27 and 31. The total amount of water purchased was 300 acre-feet and was contracted for the members of the Big Valley Water Users Association as follows:

John Hartmann, Merlin Kennedy, Kate Gerig, T. Walters (De Mange), Frank Iverson (Brown), E. Babcock and J. Thompson.

All the above named are under the Bieber Dam system with the exception of Hartmann who receives water under Lookout Dam.

About 2900 acre-feet of water passed the Canby station between August 27 and September 15, in addition to the 300 acre-feet of purchased water. This water became available for distribution in Big Valley between August 30 and about September 20, during which period all users received their prorate share of free water. The 300 acre-feet of purchased water was delivered to the parties who had contracted for same.

Roberts Reservoir

Homer Jack, Ward Kramer, Pete Gerig, Will Gerig, Merlin Kennedy, Arad Babcock and Lester A. Babcock took up the option of the Big Valley Mutual Water Company and purchased the Roberts Reservoir. On about August 31, the gate on Roberts Reservoir was opened preparatory to draining the reservoir but was closed later the same day due to high water in Nichols Slough. The gate was again opened on September 6, to 20" measured on the gate stem, and remained at that opening throughout the remainder of the season. The discharge from the reservoir probably averaged 15 cubic feet per second for the month of September. This water entered Pit River above Lookout Dam and was distributed to Pete Gerig, et al along with Pit River water to which they were entitled. Arad Babcock and Lester A. Babcock received Roberts Reservoir water through the Watson Ditch.

TABLE 1
SNOW SURVEY DATA—UPPER PIT RIVER

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
Eagle Peak Course Elev. 7500 Ft. Date of Survey	4/3	4/1	3/30	3/30	4/2	4/10	4/9	3/29	3/31	3/30	4/4	3/26	3/29				
Depth of Snow—Inches	24.3	13.3	43.8	38.1	9.9	66.1	50.5	47.3	71.3	27.2	38.4	35.1	38.6				
Water Content—Inches	11.0	5.2	18.7	14.3	3.3	22.6	22.1	17.5	23.6	10.4	15.6	13.8	14.7				
Density—Percent	45.3	39.1	42.6	37.5	33.3	34.2	43.7	37.1	33.1	38.2	40.6	39.3	38.1				
Record Average—Inches								14.32	15.35	14.8	14.9	14.8	14.8				
% of Record Aver.	78.0	36.3	131.0	100.0	23.0	158.0	154.0	122.0	153.7	70.5	104.7	93.3	99.3				
Cedar Pass Course Elev. 7200 Ft. Date af Survey	3/31	3/30	3/26	3/28	3/31	3/27	4/5	4/10	3/26	3/28	3/22	3/24	3/27				
Depth of Snow Inches	29.3	22.1	49.2	43.9	2.2	56.4	68.2	54.4	79.1	28.2	35.9	40.8	47.4				
Water Content Inches	13.0	8.3	19.8	16.3	0.9	21.1	26.2	21.6	25.2	10.5	14.6	17.9	19.3				
Density—Percent	44.4	37.6	40.3	37.1	40.8	37.4	38.4	39.6	31.8	37.2	40.7	43.8	40.7				
Record Average—Inches								15.9	16.9	16.3	16.1	16.3	16.0				
% of Record Average	82.0	50.4	118.0	102.5	5.7	133.0	165.0	136.0	149.1	64.4	90.7	109.0	120.6				

TABLE 1 (Continued)

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
Blue Lake Ranch Course Elev. 7300 Ft.			New Course 1940														
Date of Survey											4/11	3/28	3/31				
Depth of Snow-Inches											16.3	18.8	28.9				
Water Content-Inches											6.4	8.5	11.7				
Density—Percent											39.2	45.2	40.5				
Record Average-Inches																	
% of Record Average																	
Adin Mountain Course—Elev. 6500 Ft.																	
Date of Survey	3/27	3/27	3/24	3/27	4/1	4/17	3/26	4/7	4/8	3/31	4/7	3/31	4/2				
Depth of Snow-In.	13.3	6.1	30.0	37.6	0	45.9	47.2	37.4	61.4	17.5	10.8	24.6	32.1				
Water Content-In.	6.1	2.9	13.3	14.1	0	18.8	20.0	16.7	28.1	8.1	4.3	11.3	13.9				
Density—Percent	45.6	47.3	44.3	37.5	0	40.9	42.4	44.8	45.8	46.2	39.8	45.9	43.3				
Record Average-In.								11.5	13.3	12.8	12.0	12.0	12.1				
% of Record Aver.	53.0	25.2	115.6	122.5	0	163.7	174.0	145.2	211.3	63.3	35.8	94.1	114.9				

TABLE 2

PRECIPITATION-UPPER PIT RIVER STATIONS-1929 TO 1942
MONTHLY, SEASONAL AND AVERAGE AMOUNTS IN INCHES

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Season
Jess Valley, Modoc County, California, Elev. 5,400 ft.													
1940-1941	1.95	2.31	1.62	1.28	3.02	0.48	0.77	2.89	2.39	0.20	1.90	1.13	19.94
1941-1942	1.48	1.71	3.10	1.66	1.57	0.94	2.34	3.44	1.02	0	0.24	0.15	17.65
13 Year Record Mean	1.27	1.42	1.86	2.01	1.96	1.77	1.81	1.64	0.95	0.39	0.25	0.76	16.09
Alturas, Modoc County, California, Elev. 4,460 ft.													
1940-1941	2.00	1.05	2.73	1.35	2.13	0.68	0.51	1.59	0.86	0.02	1.16	0.50	14.58
1941-1942	1.40	1.83	2.98	2.16	1.84	0.59	1.37	1.71	0.94	0	0.56	—	—
13 Year Record Mean	1.08	1.05	1.80	1.93	1.46	1.22	1.00	0.92	0.55	0.20	0.22	0.42	11.85
Lakeview, Lake County, Oregon, Elev. 4,759 ft.													
1940-1941	2.11	2.18	1.62	2.40	2.91	0.86	1.45	2.62	2.14	T	1.82	0.83	20.94
1941-1942	1.60	1.33	3.34	2.40	—	0.46	1.76	2.46	0.65	T	0.18	0.63	—
13 Year Record Mean	1.10	1.08	1.82	1.79	1.80	1.43	1.28	1.16	0.79	0.15	0.22	0.56	13.18
Bieber, Lassen County, California, Elev. 4,200 ft.													
1940-1941	3.15	2.66	3.45	1.90	4.52	0.44	0.57	2.33	1.25	0.18	0.30	0.41	21.16
1941-1942	0.60	1.75	4.28	2.35	3.79	1.13	2.75	1.87	0.97	0	0.35	0.08	19.92
13 Year Record Mean	1.44	1.32	2.77	2.53	2.81	2.00	1.35	1.33	0.47	0.17	0.08	0.48	16.75

For records prior to 1940-1941, see 1940 Report.

TABLE 3

DAILY DISCHARGE IN CUBIC FEET PER SECOND
PIT RIVER NEAR CANBY
For Year Ending September 30, 1942

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	39	89	59	130	1300	310	325	450	770	166	22	119
2	38	132	77	120	1340	325	345	472	764	162	17	87
3	39	118	295	120	1380	350	365	472	740	132	16	56
4	46	140	335	110	1340	370	406	477	692	140	9	40
5	50	159	285	100	1250	380	438	466	644	101	6	32
6	45	178	295	100	2090	406	472	450	598	62	5	25
7	37	151	270	90	2500	416	494	433	587	65	14	44
8	32	126	233	105	2300	411	488	390	565	90	25	98
9	40	122	186	140	1890	455	477	390	521	95	40	116
10	40	108	147	195	1760	482	488	395	494	85	40	98
11	38	92	118	280	1560	548	516	400	460	85	42	116
12	38	83	105	330	1320	632	560	411	360	104	35	107
13	39	72	99	390	986	716	609	406	350	132	30	98
14	40	66	155	450	758	782	656	455	380	125	24	90
15	40	63	310	430	609	764	692	554	255	74	17	82
16	45	66	430	386	526	782	680	609	214	51	16	69
17	63	68	528	320	472	722	680	614	218	65	16	62
18	59	77	486	280	422	662	656	656	196	77	16	60
19	46	83	498	229	395	570	620	686	192	74	16	56
20	50	75	486	178	375	510	570	716	113	72	14	47
21	51	70	464	170	360	466	554	728	92	69	14	44
22	51	59	403	170	350	438	504	698	196	67	15	40
23	54	56	370	216	335	406	472	644	218	62	14	40
24	54	56	340	345	335	390	466	598	162	49	14	45
25	52	59	300	750	335	375	450	604	136	42	14	47
26	72	59	252	1330	325	365	433	604	132	26	15	42
27	63	56	210	2640	315	345	428	592	144	17	26	37
28	68	56	180	3070	310	325	428	638	129	12	51	33
29	86	59	160	2210		305	416	698	125	17	67	32
30	92	61	150	1920		305	400	728	144	18	90	30
31	86		140	1540		305		758		20	122	
Total	1593	2659	8366	18844	27238	14618	15088	17192	10591	2356	862	1892
Mean	51.4	88.6	270	608	973	472	503	555	353	76.0	27.8	63.1
Acre-Feet	3160	5270	16590	37380	54030	28990	29930	34100	21010	4670	1710	3750

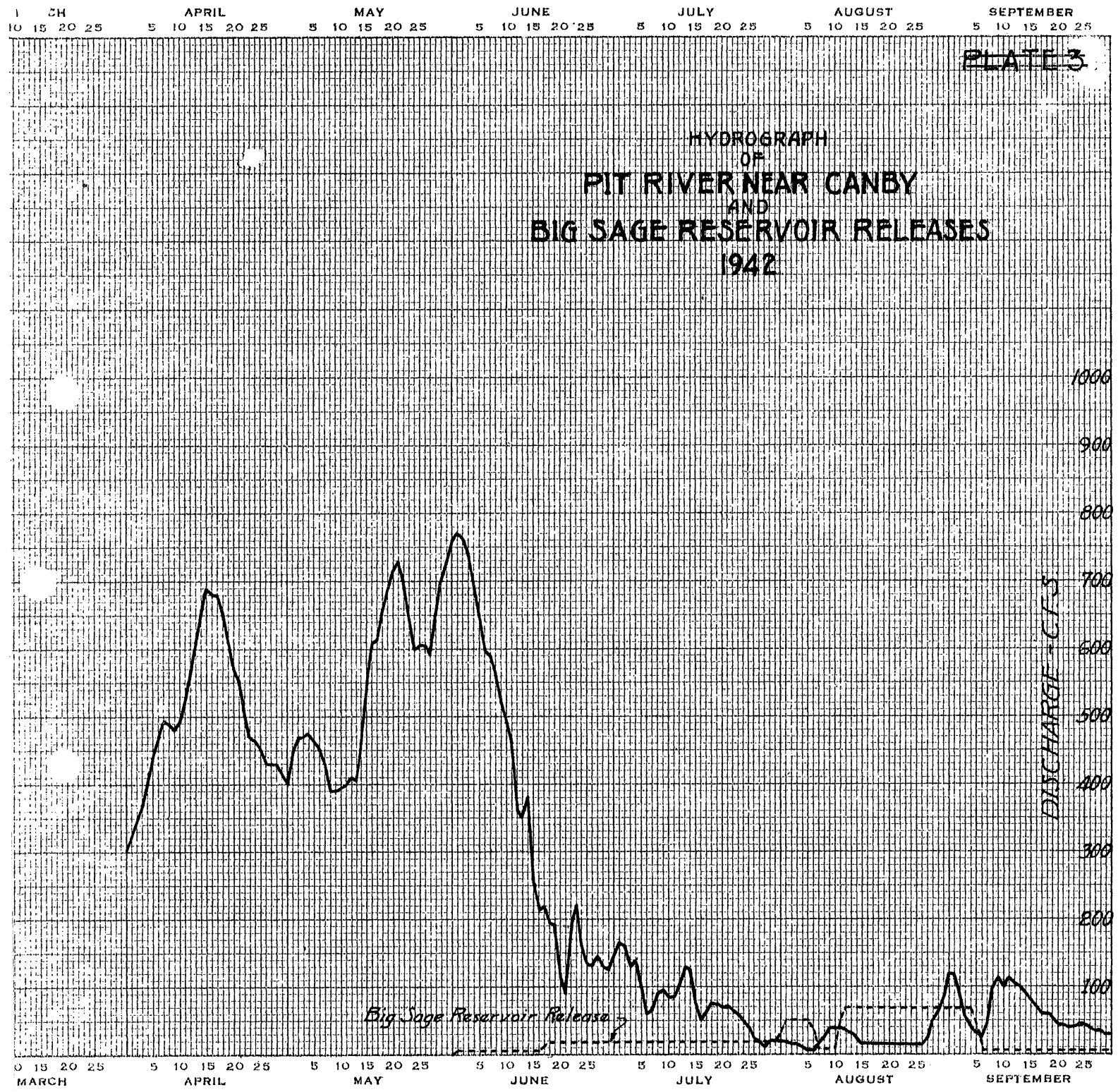
PLATE 3
HYDROGRAPH
OF
PIT RIVER NEAR CANBY
AND
BIG SAGE RESERVOIR RELEASES
1942
DISCHARGE - C.F.S.
1000
900
800
700
600
500
400
300
200
100
Big Sage Reservoir Release
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER