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 & LASSEN COUNTIES, CALIFORNIA FOR THE SEASON OF 1941

By
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SACRAMENTO

DIVISION OF WATER RESOURCES
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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 season of 1941.

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,

H. S.

Senior Hydraulic Engineer

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REPORT ON
WATER MASTER SERVICE
ON
PIT RIVER IN BIG VALLEY
MODOC & LASSEN COUNTIES, CALIFORNIA
DURING SEASON OF 1941

INTRODUCTION

The Big Valley Water Master District was created by order of the Division of Water Resources, under date of November 15, 1954, to embrace all of the water 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, 1953, and duly recorded in each of the offices of the County Recorder of Modoc and Lassen Counties in December, 1954.

Water master service in the Big Valley Water Master District was carried on throughout the 1941 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 writer administered the distribution of water within the Big Valley Water Master District until about June 10. Subsequent to that date W. A. Alexander, Deputy Water Master, Big Valley Water Master District, administered the distribution of water within this district along with similar work in the Hat Creek and Burney Creek Water Master Districts.

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 run-off period, April 1 to July 31, inclusive, as compared with an average water content deduced from a long time run-off 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 the records over the past twelve years, the precipitation over the area was 127 percent of the mean for that period. Percipitation for the months of May and June was unusually heavy over the area.

Stream Flow

The U.S.G.S. maintains a stream flow 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 and from Gooch Swamp, Ash Creek and other tributaries below Lookout Dam. However, during the critical period of each season the flow at Canby station is indicative of the amount of water available for distribution. The record of run-off at this station for the 1940-41 season is presented in Table 3. The monthly and total run-off for each irrigation season from 1932 to 1941 is presented in the following table.

Run-off 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	954	427	13	16	1894
1935	39150	18760	14810	3490	550	523	77083
1936	30120	15170	5770	1410	964	1710	53044
1937	20830	2560	1990	1280	582	1860	28902
1938	112100	72160	19760	3690	1310	3210	212220
1939	5300	2440	1750	1320	710	1200	12720
1940	25200	3370	3080	1090	2450	2190	37380
1941	7790	14680	8340	4150	2310	4210	42480

DISTRIBUTION OF WATER

Distribution for the 1941 season, in accordance with the provisions of the agreement heretofore mentioned, followed the practices initiated during the past several seasons with little or no modification. The usual procedure is to simultaneously irrigate as many ranches as the available water supply will provide for. 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.

The main river dams were put into operation during the last week in April--Lookout Dam, April 23; Bieber Dam, April 26; Gerig Dam, April 30. The McArthur dams were put in during the first week in May. The dams on the South Fork of Pit River and on Pit River in Hot Springs Valley were put in at about the same time Lookout Dam was checked up, causing a temporary shortage of water to the water users served from Lookout Dam and Gerig Dam. The users below the Gerig Dam, however, were supplied with water from Ash

Creek. Beginning about May 5, the spring run-off from Pit River above Canby reached Lookout Dam and water was in excess of all demands throughout the remainder of May through the month of June, and for the first two weeks of July. Haying operations were generally in progress throughout the month of July after which the only water available for irrigation was the return flow from water released from Big Sage Reservoir for irrigation in Hot Spring Valley and Big Sage Reservoir water purchased by the Big Valley Water Users Association from the Hot Spring Valley Irrigation District.

The detail of operations for the 1941 season follow.

Lookout Dam

The top logs on Lookout Dam were replaced with new logs and the dam was put in operation on April 23. Regulation of the dam was necessary thereafter to by-pass high water and to maintain the required water level at the dam. A gage height of between seven and eight feet was maintained at the dam throughout the season. A gage height of 7.1 feet is required to supply the minimum flow allotment to the Oilar Ditch (Leventon and Hartmann).

On April 23 water was turned to Will Gerig through the Three Corners headgate, but following the temporary shortage ending about May 5 the water supply was sufficient to serve all users from Lookout Dam throughout May and June and up to haying time, without rotation. Will Kramer received water in May and June under his third priority right but due to haying operations did not take water during the month of July, although water was available for his use prior to July 18.

Will Gerig and John Hartmann received irrigation after haying from water purchased from Hot Spring Valley Irrigation District.

Gerig Dam

The Gerig Dam was put in operation on April 30, after the top logs on the dam were reinforced by the addition of one new log.

Fulcher Pipe was opened on April 30 and closed on May 3 to begin a rotation schedule, however, beginning May 5 the flow of Pit River increased to such an extent that rotation was not necessary throughout the remainder of May and through the month of June. All users served from Gerig Dam received irrigations as desired during this period. The third priority rights on the Watson Ditch took water during May and June but could not use surplus water available in July due to haying operations on the Peter Gerig Ranch.

The Peter Gerig, Jim Hall, Lester Babcock and T. Babcock properties were irrigated after haying with water purchased from Hot Spring Valley Irrigation District.

Bieber Dam

The Bieber Dam and the supporting Ricketts and Caldwell Road dams were put in operation on April 26 and the various users served from Bieber Dam were successively irrigated from April 28 to May 6 and from May 17 to May 26. All users received an irrigation from June 15 to 30, after which the water was turned off to permit the lands to dry for haying.

All the users under the Bieber Dam received an irrigation after haying from return flow or water purchased from the Hot Spring Valley Irrigation District

McArthur Dams

The McArthur Dams were put in about May 1. Bieber Dam was pulled on May 6 and the McArthur Ranch was completely irrigated by May 9. Subsequent irrigations occurred from June 18 to 21, July 3 to 6, July 11 to 15 and September 5 to 10.

The irrigations received in July were during the time when haying was in progress on the other ranches and the demand for water was at a minimum. The September irrigation was from return flow from irrigation in Hot Spring Valley and from water purchased by the other Big Valley users.

Avilla Dams

The Avilla Dams are in such a state of disrepair that little or no irrigation was accomplished during the 1941 season. Water released from the McArthur irrigation system was available for the Avilla Ranch on the dates, shown above under McArthur Dams, when irrigations were completed on the McArthur properties.

Big Sage Reservoir Water

Water purchased from the Hot Spring Valley Irrigation District by the Big Valley water users was released from Big Sage Reservoir between August 15 and September 1. The total amount purchased was 800 acre-feet at 50 cents per acre-foot. The total cost was distributed among the Big Valley water users in accordance with the acreage irrigated. The following parties received and paid for water from Big Sage Reservoir.

John Hartmann, Will Gerig, C. W. Clarke Co., Peter Gerig, Lester Babcock, T. Babcock, Merlin Kennedy, T. Walters (De Mange), Kate Gerig, Ernest Babcock and J. Thompson.

About 960 acre-feet return flow from Big Sage Reservoir water used for irrigation in Hot Spring Valley passed the Canby measuring station simultaneously with the purchased water. Such return flow is little more than sufficient to fill the channels and sloughs in the Big Valley area for stock water requirements. Little or no water would have been available for irrigation subsequent to haying without the additional water purchased from Hot Spring Valley Irrigation District.

TABLE 1

SNOW SURVEY DATA - UPPER PIT RIVER

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941
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	4/30	3/26
Depth of Snow - Inches	24.3	13.3	43.8	38.1	9.9	66.1	52.0	47.3	71.3	27.2	38.4	35.1
Water Content - Inches	11.0	5.2	18.7	14.3	3.3	22.6	22.0	17.5	23.6	10.4	15.6	13.8
Density - per cent	45.3	39.1	42.6	37.5	33.3	34.2	42.3	37.1	33.1	38.2	40.6	39.3
Deduced Normal Water Content								20.0	20.0	20.0	20.0	20.0
% of Deduced Norm	55.0	27.0	94.0	71.5	16.5	113.0	110.0	87.5	118.0	52.0	78.0	69.0
Record Average-In								14.32	15.35	14.8	14.9	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
Cedar Pass Course Elev. 7200 ft. Date of Survey	3/31	3/31	3/26	3/28	3/31	3/27	4/5	4/10	3/26	3/28	3/22	3/24
Depth of Snow-In.	29.3	22.1	49.2	43.9	2.2	56.4	68.2	54.2	79.1	28.2	35.9	40.8
Water Content-In.	13.0	8.0	19.8	16.3	0.9	21.1	26.2	21.6	25.2	10.5	14.6	17.9
Density - Percent	44.4	37.6	40.3	37.1	40.8	37.4	38.4	40.0	31.8	37.2	40.7	43.8
Deduced Normal Water Content								22.2	22.2	22.2	22.2	22.2
% of Deduced Normal	58.7	36.1	88.4	73.4	4.1	98.2	118.0	97.4	114.0	47.4	65.8	80.7
Record Average-In								15.9	16.9	16.3	16.1	16.3
% 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
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
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
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
Density -Per cent	45.6	47.3	44.3	37.5	0	40.9	42.3	44.8	45.8	46.2	39.8	45.9
Deduced Normal Water Content								16.1	16.1	16.1	16.1	16.1
% of Deduced Norm	37.9	18.0	82.5	87.6	0	116.6	124.3	104.0	174.	50.2	26.7	70.2
Record Average-In								11.5	13.3	12.8	12.0	12.0
% 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

TABLE 2

Precipitation-Upper Pit River - 1929 to 1941
Monthly, seasonal and average amounts in inches

		Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Season
Jess Valley	1929 - 30			2.41	2.72	2.01	1.29	1.01	1.57	.13	.02	.05	1.94	
	1930 - 31	.90	1.19	.13	.80	.88	1.64	.39	1.01	.61	.00	.28	.46	8.29
Elev. 5400 ft.	1931 - 32	1.67	2.24	1.58	2.20	.74	2.45	3.37	2.64	.53	.11	.00	.08	17.61
	1932 - 33	.24	.52	1.64	3.09	.85	1.03	1.84	1.53	.19	.08	T	.72	11.73
	1933 - 34	.90	.07	1.14	1.36	1.58	2.04	.65	1.77	2.32	.11	.10	.40	12.44
	1934 - 35	.61	2.87	2.12	1.53	2.02	1.71	4.31	2.25	.00	T	.09	T	17.51
	1935 - 36	2.49	1.13	2.17	3.67	2.94	1.44	0.92	1.11	1.67	.38	.37	.91	19.20
	1936 - 37	.00	.00	1.06	2.78	2.43	1.72	1.83	.87	1.00	1.89	.00	.28	13.86
	1937 - 38	1.41	3.45	4.42	1.25	2.56	4.13	2.60	1.23	1.22	1.30	.00	.54	24.11
	1938 - 39	1.87	1.59	.40	1.66	1.87	1.54	.59	.81	.87	.80	.15	.60	12.75
	1939 - 40	1.72	0.01	2.41	2.17	3.06	2.54	2.86	0.15	0.37	0.10	0	2.71	18.10
	1940 - 41	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
	12 Yr. Record Mean	1.25	1.40	1.92	2.04	2.00	1.83	1.76	1.49	0.94	0.42	0.24	0.81	16.10
Alturas	1929 - 30	0.54	.00	1.60	2.24	1.77	1.14	0.64	0.90	0.10	T	0.03	1.00	9.96
	1930 - 31	1.15	0.57	0.23	0.67	0.67	1.03	0.46	0.06	0.57	.00	T	0.64	6.05
Elev. 4460 ft.	1931 - 32	1.33	1.54	2.50	1.65	0.46	1.10	1.51	1.26	0.29	T	T	T	11.64
	1932 - 33	0.07	0.33	1.53	3.12	0.23	0.70	1.44	1.08	0.24	0.31	0.70	0.42	10.17
	1933 - 34	1.00	.00	0.74	0.54	0.94	0.87	0.42	2.01	1.88	T	0.18	0.59	9.17
	1934 - 35	0.52	3.04	1.56	2.52	1.23	1.44	2.74	0.81	.00	0.12	T	0.03	14.01
	1935 - 36	1.22	0.57	1.54	4.93	2.95	0.72	0.56	1.03	0.82	0.19	0.18	0.49	15.20
	1936 - 37	0.01	0.03	0.96	2.05	2.44	1.63	0.97	0.27	0.30	0.15	.00	0.06	8.87
	1937 - 38	1.14	3.75	5.68	1.01	2.24	3.21	1.04	0.53	0.71	0.98	.00	0.43	20.72
	1938 - 39	1.56	0.98	0.07	1.07	0.45	0.98	0.28	0.38	0.36	0.78	0.08	0.57	7.56
	1939 - 40	2.00	0.02	1.60	1.70	3.08	1.98	1.03	0.27	0.05	.00	.00	0.37	12.10
	1940 - 41	2.00	1.05	2.73	1.35	2.20	0.68	0.51	1.39	1.69	0.02	1.16	0.46	15.24
	12 Yr. Record Mean	1.04	0.99	1.73	1.91	1.55	1.29	0.97	0.84	0.58	0.21	0.19	0.42	11.72
	32 Yr. Record Mean	0.92	1.15	1.46	1.76	1.40	1.46	1.13	0.92	0.62	0.39	0.26	0.56	12.03

TABLE 2 (Continued)

		Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Season
Lakeview	1929 - 30	0.45	T	3.22	1.69	1.18	1.05	0.90	1.11	0.21	T	0.51	0.85	11.17
	1930 - 31	0.29	1.02	0.07	0.38	1.10	1.39	0.22	0.19	0.89	T	T	0.26	5.81
	1931 - 32	1.32	0.96	1.60	1.26	0.39	1.89	2.33	1.17	0.98	T	0.02	0.00	11.92
Elev. 4759 Ft.	1932 - 33	0.44	0.39	1.01	1.53	0.70	1.04	0.96	1.36	0.59	0.27	T	0.24	8.53
	1933 - 34	1.48	0.01	1.14	1.31	1.60	1.50	1.06	1.81	1.20	0.00	T	0.60	11.71
	1934 - 35	0.97	3.09	1.35	1.63	1.16	1.38	3.36	0.99	0.33	0.34	0.00	T	14.60
	1935 - 36	0.95	0.56	1.73	4.30	2.78	0.78	1.06	1.15	0.52	0.00	0.16	0.35	14.34
	1936 - 37	T	0.00	0.59	1.10	2.78	1.74	1.57	0.41	1.53	0.04	0.00	0.17	9.93
	1937 - 38	2.31	2.69	3.92	1.42	2.61	3.02	0.92	0.67	0.32	0.66	0.10	0.66	19.30
	1938 - 39	1.47	1.70	0.66	0.98	1.00	1.02	0.17	0.78	0.53	0.47	0.08	1.00	9.86
	1939 - 40	0.95	0.05	3.41	1.92	3.34	2.45	0.86	0.42	0.36	0.11	T	1.76	15.63
	1940 - 41	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
	12 Yr. Record Mean	1.06	1.05	1.69	1.66	1.79	1.51	1.24	1.06	0.80	0.16	0.22	0.56	12.80
	28 Yr. Record Mean	0.88	1.41	1.40	1.35	1.53	1.14	1.13	1.04	0.69	0.29	0.36	0.58	11.80
Bieber	1929 - 30	.83	.00	4.51	3.78	2.75	.67	.92	1.54	.02	T	.20	1.25	16.47
	1930 - 31	.43	.90	.28	1.38	1.98	1.44	.26	1.37	.31	T	.04	.59	8.98
Elev. 4200 Ft	1931 - 32	2.25	1.18	4.09	1.94	.69	1.25	1.72	1.23	.20	.22	.00	T	14.77
	1932 - 33	.86	.73	1.78	3.39	.31	2.57	1.28	2.59	T	T	T	.42	13.93
	1933 - 34	2.16	.00	1.67	1.19	1.79	1.33	.12	1.93	.56	.21	.00	.50	11.46
	1934 - 35	1.05	3.23	1.89	2.38	1.60	2.91	4.75	1.01	.04	.02	.00	.04	18.92
	1935 - 36	1.96	.38	2.69	5.56	3.40	.95	.80	.81	.75	.10	.10	.54	18.04
	1936 - 37	.10	.00	1.70	2.03	5.05	1.85	1.46	.36	1.04	.18	.00	.10	13.87
	1937 - 38	2.10	5.30	5.46	1.82	4.62	6.59	1.01	0.54	0.60	0.70	.00	.45	29.19
	1938 - 39	1.30	.95	.59	1.83	.46	1.28	.68	.55	.31	.60	.00	.47	9.02
	1939 - 40	1.68	.02	3.53	2.84	5.64	3.50	1.19	1.19	0.04	0	0	1.46	21.09
	1940 - 41	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
	12 Yr. Record Mean	1.49	1.28	2.64	2.50	2.73	2.06	1.23	1.28	0.43	0.18	0.05	0.52	16.39

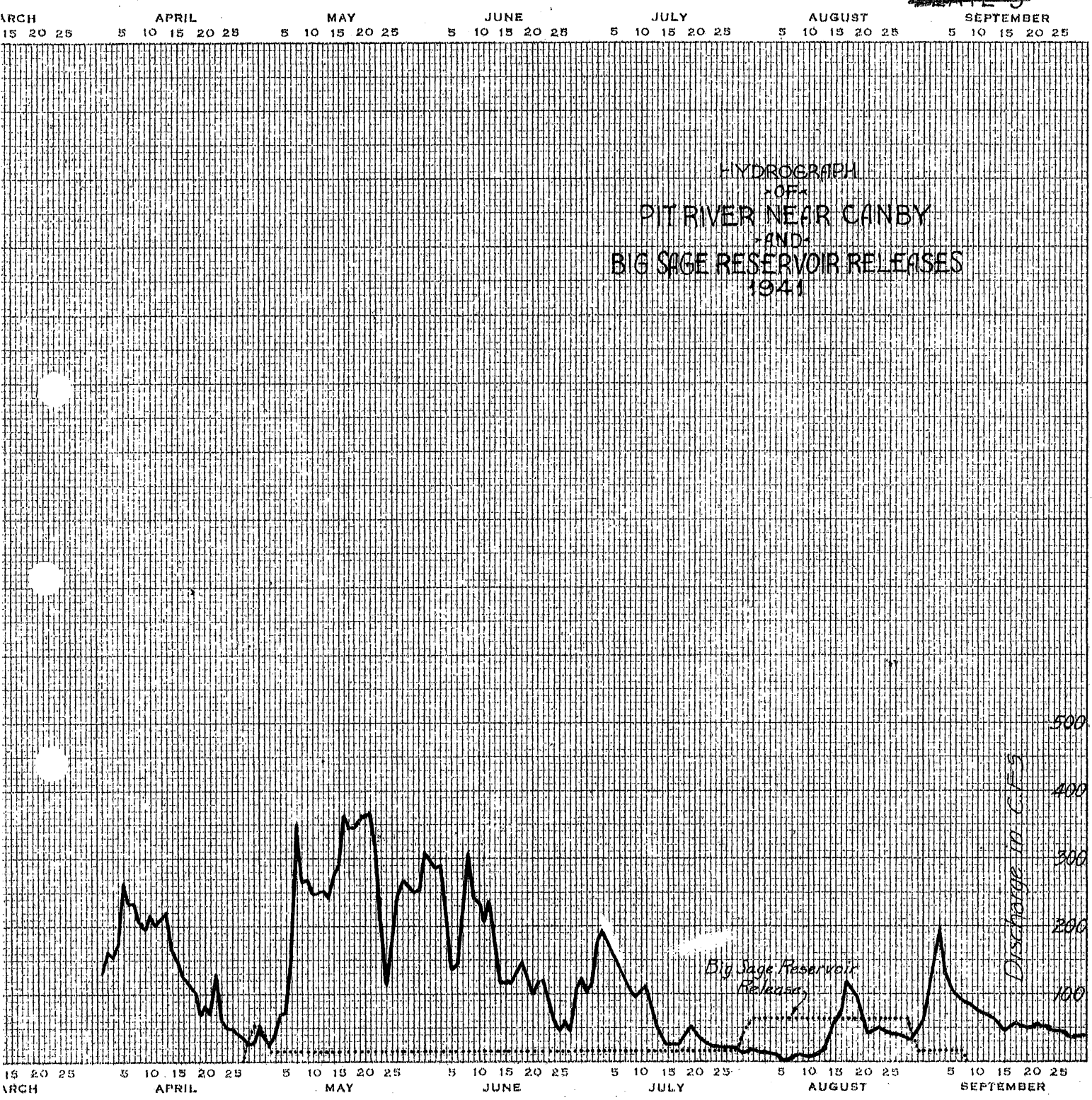
TABLE 3

PIT RIVER NEAR CANBY - DAILY DISCHARGE IN CUBIC FEET PER SECOND FOR YEAR ENDING SEPTEMBER 30, 1941

DAY	October	November	December	January	February	March	April	May	June	July	August	September
1	29	87	62	455	179	652	132	33	300	115	16	99
2	32	104	62	428	171	521	162	26	285	174	15	155
3	30	136	62	335	196	460	155	42	290	195	11	199
4	29	147	60	255	218	460	172	72	211	174	12	152
5	33	201	60	184	196	472	265	72	136	147	5.0	112
6	42	214	58	144	171	444	232	160	143	143	3.0	99
7	45	210	58	122	158	400	232	350	224	126	6.0	89
8	51	179	56	129	162	370	205	265	305	105	8.5	83
9	62	188	56	144	196	335	196	270	238	96	9.0	83
10	62	210	51	144	405	295	214	247	233	102	6.5	75
11	54	188	45	147	1340	275	201	252	207	112	8.5	72
12	54	166	45	155	2050	260	210	252	238	80	12	68
13	42	152	56	179	1730	252	216	242	182	48	20	61
14	38	116	45	300	1300	214	162	275	115	33	42	54
15	37	104	35	335	1140	210	147	290	115	26	63	46
16	35	98	33	466	1000	205	125	365	115	24	75	52
17	35	87	33	422	872	192	116	345	132	24	118	59
18	35	79	60	315	728	184	104	345	147	39	108	52
19	35	74	67	250	620	192	69	360	129	51	96	50
20	33	69	82	232	604	192	82	365	99	44	59	50
21	33	65	107	228	565	184	70	365	118	35	42	54
22	32	62	155	232	499	179	129	315	122	29	45	51
23	32	62	265	225	472	175	60	207	86	25	50	50
24	38	62	265	210	592	166	49	112	59	22	42	44
25	47	60	305	232	740	158	47	192	46	21	42	44
26	45	60	325	340	938	151	42	242	59	21	39	44
27	51	62	350	360	878	140	33	270	46	22	37	37
28	60	62	330	482	746	132	24	261	105	20	33	35
29	72	62	340	455	—	147	27	247	122	12	32	37
30	77	62	370	305	—	158	49	252	102	13	48	38
31	82	—	395	214	—	184	—	310	—	16	59	—
Total	1582	3408	4313	8422	18,864	8319	3929	7391	4709	2094	1162	2124
Mean	44.6	114	139	272	674	268	131	238	157	67.5	37.4	70.8
Runoff in ac. ft.	2740	6760	8550	16700	37,420	16500	7790	14660	9340	4150	2310	4210

Data includes return flow from Big Sage Reservoir releases, ~~(see Table 13)~~ subsequent to about August 12.
Data furnished by U.S.G.S.

~~PLATE 3~~


HYDROGRAPH
-OF-
PIT RIVER NEAR CANBY
-AND-
BIG SAGE RESERVOIR RELEASES
1941
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
15 20 25
5 10 15 20 25
500
400
300
200
100
Discharge in C.F.S.
Big Sage Reservoir Release