STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

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EARL WARREN, Governor

C. H. PURCELL, Director of Public Works

EDWARD HYATT, State Engineer

REPORT ON WATERMASTER SERVICE IN

BIG VALLEY WATERMASTER SERVICE AREA
MODOC AND LASSEN COUNTIES, CALIFORNIA

1946 SEASON

Sacramento, California

EDWARD HYATT, STATE ENGINEER
CHIEF OF DIVISION

EARL WARREN
GOVERNOR OF CALIFORNIA

C. H. PURCELL
DIRECTOR

STATE OF CALIFORNIA
Department of Public Works
SACRAMENTO 5

DIVISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

November 15, 1946

Mr. Gordon Zander
Principal Hydraulic Engineer
Sacramento, California

Attention: Mr. Harrison Smitherum
Supervising Hydraulic Engineer

Dear Sir:

Herewith is submitted the annual report covering watermaster service within the Big Valley Watermaster Service Area, Modoc and Lassen Counties, California, for the 1946 season.

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

Respectfully submitted

A. S. WHEELER
Watermaster

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2. Snow Survey Data - Upper Pit River Area

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PLATE

Hydrograph of Pit River near Canby, April 1 to September 30, 1946.

INTRODUCTION

The Big Valley Watermaster District, now termed Watermaster Service Area, Counties of Modoc and Lassen, California, was created by order of the Division of Water Resources, entered November 13, 1934. As created, the District embraced all of the water rights on the Pit River in Big Valley as ascertained and determined by an agreement in writing entitled "Agreement Determining Rights to Water and the Use Thereof from Pit River in Big Valley in Modoc and Lassen Counties, California," dated October 10, 1933. The agreement was duly recorded in the offices of the County Recorders of both Modoc and Lassen Counties in December 1934.

Watermaster service in Big Valley Watermaster Service Area was rendered throughout the 1946 season in accordance with the "Distribution of Water" procedure contained in Sections 4000 to 4360, inclusive, of the Water Code. The service extended over the period from April 1 to September 30, 1946. G. M. Vickroy and A. S. Wheeler, deputy watermasters, administered the distribution of water for periods of two and four months; respectively. Harrison Smitherum was the Supervising Watermaster.

WATER SUPPLY

Precipitation

The monthly, seasonal and average amounts of precipitation covering the period 1929 to 1946 as recorded at four stations in the general area of the Upper Pit River Basin are presented in Table 1. These data indicate that the precipitation for the seasonal year 1945-46 was about

90 per cent of the seventeen year mean.

The results of the annual snow surveys on courses located on Eagle Peak, Cedar Pass, Adin Mountain and Blue Lake ranch are shown in Table 2. The tabulation presents the record of the water content of the snow on or about April 1 of each year for the period 1930 to 1946 inclusive, for the first three courses and for the period 1940 to 1946, inclusive, for the Blue Lake ranch course. On about April 1, 1946 the water content of the snow for the first three courses averaged 130 per cent of the mean for the seventeen year period of record.

Stream Flow

The record of the daily discharge of the Pit River at the U. S. Geological Survey gaging station near Canby for the year ending September 30, 1946 is presented in Table 3. During the watermaster service season, the discharges at this station are taken as the amounts available for distribution in Big Valley. Near the beginning of the season, however, additional water is available from small tributaries whose confluence with Pit River are between Canby and Lookout dam. A hydrograph, prepared from the data in Table 3, is shown on Plate 1. The monthly and total runoff of the Pit River at the Canby station for the irrigation seasons from 1932 to 1946 and the 15 year means are presented in the following table:

RUNOFF IN ACRE-FEET

Year	April	May	June	July	Aug.	Sept.	Totals
1932	17,100	37,500	9,520	3,170	480	684	68,454
1933	2,420	4,780	803	1,010	151	412	9,576
1934	77	427	934	427	13	16	1,894
1935	39,150	18,760	14,810	3,490	350	525	77,085
1936	30,120	13,170	5,770	1,410	864	1,710	53,044
1937	20,630	2,560	1,990	1,280	582	1,860	28,902
1938	112,100	72,160	19,760	3,680	1,310	3,210	212,220
1939	5,300	2,440	1,750	1,320	710	1,200	12,720
1940	23,200	5,370	3,080	1,090	2,450	2,190	37,380
1941	7,790	14,660	9,340	4,150	2,310	4,210	42,460
1942	29,930	34,100	21,010	4,670	1,710	3,750	95,170
1943	42,500	31,360	19,620	4,420	3,380	5,190	106,470
44	10,820	8,520	15,430	3,470	1,950	4,970	45,160
1945	18,080	45,430	46,080	4,950	2,950	4,910	122,400
1946	22,550	15,110	4,680	2,960	1,820	2,640	49,760
1932-1946 15 Yr. Means	25,451	20,423	11,638	2,766	1,402	2,498	64,178

The total runoff for the 1946 irrigation season of 49,760 acre-feet was 77 per cent of the 15 year mean of 64,178 acre-feet.

DISTRIBUTION OF WATER

The distribution of water during the 1946 watermaster service season was made in accordance with both the provisions of the agreement and the sections of the Water Code heretofore mentioned. The methods of distribution initiated and practiced during the past were followed with little or no modification during the 1946 season.

Except for two short periods in May, the available water supply was sufficient to meet all irrigation requirements until June 1. During June and lasting until haying began, about July 10, the natural stream flow, supplemented with water from Big Sage reservoir, was sufficient to provide satisfactory irrigation to all users on a rotation system. The haying operation lasted until about August 10, Again, Big Sage reservoir water along with the natural stream flow provided enough water to provide rotation irrigation until September 10. After that date there was only sufficient water for gardens and stock.

The distribution of the waters of the Pit River in Big Valley is divided into the various units discussed below.

Lookout Dam

With the sharp decrease in the water supply during the first week of June, it became necessary to install the Lookout Dam. The subsequent fluctuations in the stream discharge required carefully regulation in the diversions to the Gerig and Metzger ranches.

Gerig Dam

The Gerig dam was installed during the first week in June. The regulation of this dam likewise required close attention by the watermaster for the first month after its installation.

Bieber Dam

Until haying began, most of the users under the Bieber dam system were supplied sufficient water to have a successful crop. Prior to June 1 there was enough water for the simultaneous irrigation of all ranches. After that date it became necessary to practice rotation of the available water. During the latter part of August and the first week of September the various users under the Bieber Dam system received an irrigation.

Big Sage Reservoir Water

During the 1946 irrigation season 400 acre-feet of Big Sage reservoir water was purchased by users in Big Valley. In addition to the purchased water, Big Valley also received considerable return water from Hot Springs Valley irrigation.

SUMMARY

In spite of a below normal water year, it was possible through rotation of the available supply and carefully regulation of diversions to satisfy the irrigation requirements sufficiently to produce a crop of normal yield. During the first two weeks of August the available supply was only sufficient to provide stockwater. The return flow from Hot Springs Valley and the purchased water from Big Sage reservoir added to the natural stream flow provide water for a Fall irrigation.

CONTROVERSIES

There were no serious controversies during the 1946 season.

OWNERSHIP OF LANDS AND WATER RIGHTS

There was no changes in ownership of lands and water rights in the Big Valley Watermaster Service Area subsequent to the filing of the statement for said service area for 1945.

TABLE 1

PRECIPITATION - UPPER PIT RIVER STATION - 1929 to 1946
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.													
16 Yr. Total	19.36	23.59	28.62	33.22	34.48	28.53	29.42	27.47	21.49	6.00	3.22	11.22	266.62
1945-1946	1.36	3.25	2.29	1.44	1.28	2.53	0.59	1.32	0.98	0.79	0.20	0.41	16.44
17 Yr. Total	20.72	26.84	30.91	34.66	35.76	31.06	30.01	28.79	22.47	6.79	4.21	12.62	283.06
17 Yr. Rec. Mean	1.22	1.58	1.82	2.04	2.10	1.83	1.76	1.69	1.32	0.49	.25	0.74	16.72
Alturas, Modoc County, California, Elev. 4,460 ft.													
16 Yr. Total	16.16	19.39	26.61	30.19	25.30	19.60	17.17	16.69	11.84	3.47	2.94	5.79	195.15
1945-1946	2.09	2.08	1.47	0.72	0.58	1.49	0.48	0.72	0.48	0.67	T	0.12	10.90
17 Yr. Total	18.25	21.47	28.08	30.91	25.88	21.09	17.65	17.41	12.32	4.14	2.94	5.91	206.05
17 Yr. Rec. Mean	1.07	1.27	1.65	1.82	1.52	1.24	1.04	1.02	0.72	0.24	0.17	0.35	12.12
Lakeview, Lake County, Oregon, Elev. 4,759 ft.													
16 Yr. Total	17.92	20.61	29.07	27.81	29.56	22.50	20.63	21.68	18.19	2.42	2.95	8.45	221.79
1945-1946	1.19	1.60	1.81	1.19	0.90	1.27	0.21	0.32	0.38	0.42	T	0.25	9.54
17 Yr. Total	19.11	22.21	30.88	29.00	30.46	23.77	20.84	22.00	18.57	2.84	2.95	8.70	231.33
17 Yr. Rec. Mean	1.12	1.31	1.82	1.71	1.79	1.40	1.26	1.29	1.09	0.17	0.17	0.51	13.60
Bieber, Lassen County, California, Elev. 4,200 ft.													
16 Yr. Total	21.63	25.65	41.95	40.52	43.24	31.50	22.85	21.40	11.13	2.71	0.99	6.66	270.23
1945-1946	2.43	2.97	2.93	1.80	2.32	1.70	1.27	0.82	0.27	0.50	0	0.22	17.23
17 Yr. Total	24.06	28.62	44.88	42.32	45.56	33.20	24.12	22.22	11.40	3.21	0.99	6.88	287.46
17 Yr. Rec. Mean	1.41	1.68	2.64	2.49	2.68	1.95	1.42	1.31	0.67	0.19	0.06	0.41	16.90

For records prior to 1940-1941, see 1940 Report.
For records prior to 1945-1946, see 1945 Report.

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	[illegible]	3/27	3/30	4/5
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	[illegible]	35/5	63.5	53.3
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	[illegible]	13.5	22.2	21.2
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	[illegible]	38.0	35.0	39.8
Record Average—Inches								14.32	15.35	14.8	14.9	14.8	14.8	[illegible]	15.3	15.8	16.1
% 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	[illegible]	88.2	140.5	131.7
Cedar Pass Course Elev. 7200 Ft. Date of 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	[illegible]	3/25	3/29	3/28
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	[illegible]	33.4	67.5	55.4
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	[illegible]	12.3	22.4	22.9
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	[illegible]	36.8	33.2	41.3
Record Average—Inches								15.9	16.9	16.3	16.1	16.3	16.0	[illegible]	16.9	17.2	17.5
% 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	[illegible]	72.8	130.2	130.8

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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	3/26	3/31	4/3	4/3
Depth of Snow-Inches											16.3	18.8	28.9	34.9	23.0	44.0	44.9
Water Content-Inches											6.4	8.5	11.7	15.3	8.5	15.8	16.2
Density—Percent											39.2	45.2	40.5	43.8	37.0	35.9	36.1
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	3/31	3/30	4/3	3/26
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	30.4	24.9	41.2	44.0
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	13.2	9.4	15.8	16.2
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	43.4	37.8	38.4	37.0
Record Average-In.								11.5	13.3	12.8	12.0	12.0	12.1	12.2	12.0	12.2	12.5
% 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	108.2	78.3	129.5	129.6

TABLE 3

DAILY DISCHARGE IN CUBIC FEET PER SECOND

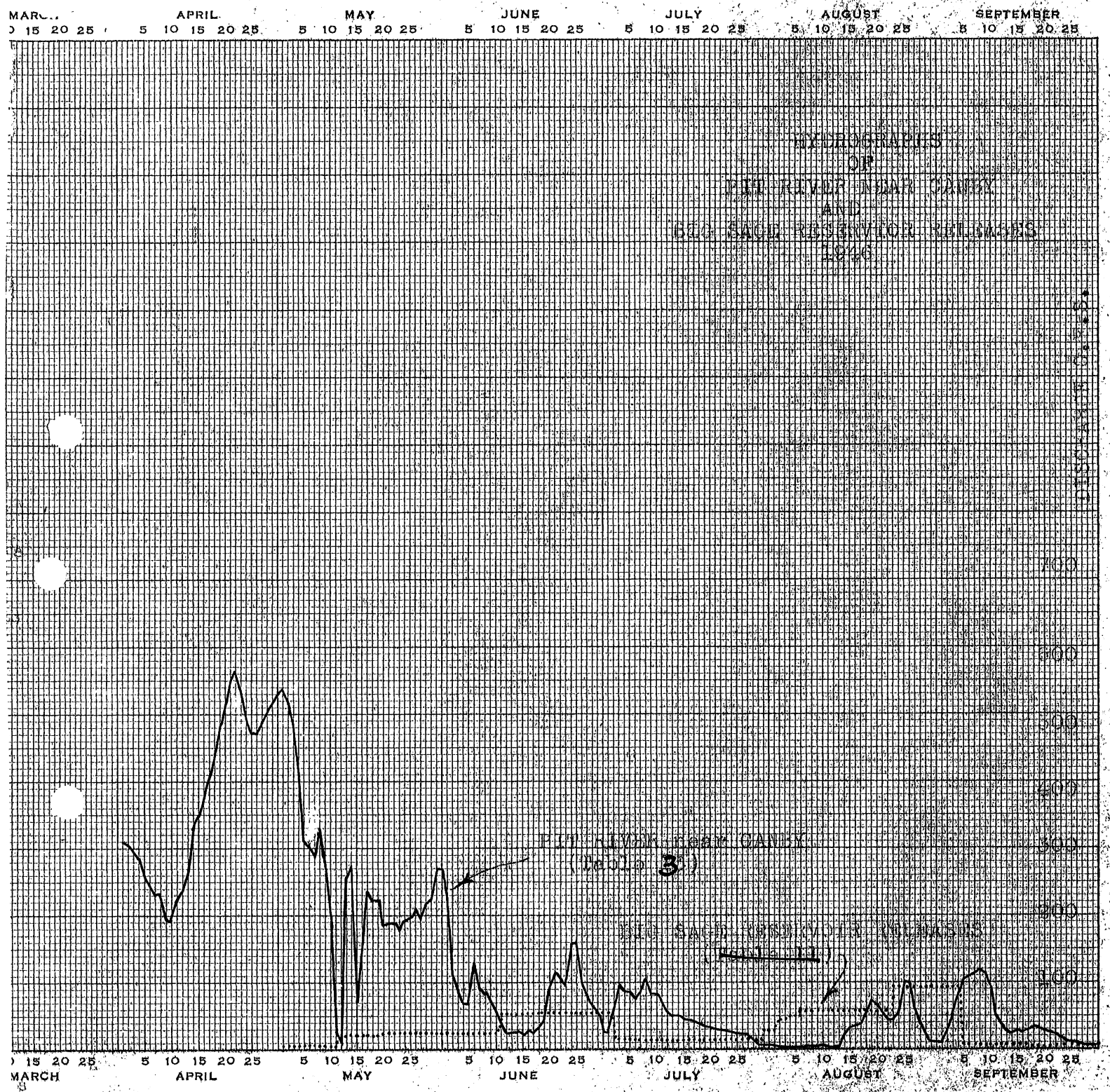
PIT RIVER NEAR CANBY

For Year Ending September 30, 1946

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	127	134	968	100	692	310	538	228	24	6.1	10
2	58	157	114	944	100	674	305	516	144	54	4.3	24
3	56	143	105	818	95	592	295	482	87	95	3.4	51
4	53	120	102	620	85	488	285	406	69	87	3.1	90
5	47	108	108	582	75	411	255	310	69	85	2.9	104
6	40	114	102	488	70	400	241	305	129	77	2.9	110
7	39	124	108	385	70	406	232	290	90	85	3.4	113
8	39	140	108	210	70	428	232	330	82	104	2.9	119
9	40	154	108	190	70	422	196	285	72	82	3.1	116
10	42	172	102	180	70	385	196	154	56	82	5.1	95
11	42	157	95	170	70	375	223	24	35	74	4.3	51
12	45	154	85	160	70	380	236	9.0	25	58	4.6	38
13	64	147	80	150	70	390	315	258	24	51	8.5	29
14	66	147	75	140	80	400	335	275	27	51	17	25
15	64	150	70	130	98	416	350	72	26	47	32	30
16	83	161	69	130	116	433	370	171	29	44	37	27
17	62	191	66	130	132	477	411	236	25	42	40	29
18	37	180	65	130	132	504	444	223	38	40	49	33
19	13	207	65	130	158	587	488	223	47	37	72	32
20	9.0	236	74	130	192	614	516	184	92	35	69	30
21	7.5	288	81	140	285	770	554	188	119	32	56	27
22	6.6	261	137	147	365	878	565	188	101	30	47	26
23	5.6	195	199	147	433	842	538	179	98	29	44	27
24	17	165	279	156	516	770	488	192	158	27	51	25
25	76	165	316	170	620	650	472	196	166	24	101	18
26	117	165	370	160	662	494	472	205	98	24	101	14
27	100	172	465	140	662	395	488	196	77	24	60	12
28	97	165	586	120	662	365	510	214	65	20	40	10
29	81	191	886	110		380	516	228	56	15	22	9.0
30	100	157	1140	100		360	532	270	26	8.5	12	8.0
31	111		1060	100		325		270		7.0	11	
Total	1679.7*	5013 *	7354 *	8285 *	6128 *	15703 *	11370 *	7617 *	2358 *	1494.5*	915.6 *	1332.6*
Mean	54.2	167	237	267	219	507	379	246	78.6	48.2	29.5	44.4
Acre-Feet	3,330	9,940	14,590	16,430	12,150	31,150	22,550	15,110	4,680	2,960	1,820	2,640

Year Mean - 190 Acre-Feet - 137,400

PLATE 1



MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
5 10 15 20 25
HYDROGRAPHS
OF
PIT RIVER NEAR CANBY
AND
BIG SAGE RESERVOIR RELEASES
1946
DISCHARGE C.F.S.
700
600
500
400
300
200
100
PIT RIVER near CANBY
(Table 3)
BIG SAGE RESERVOIR RELEASES
(Table 11)