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

1948 SEASON

Sacramento, California

January 18, 1949

Mr. Gordon Zander
Principal Hydraulic Engineer
Sacramento, California

Dear Sir:

Herewith is submitted the annual report covering watermaster service within the Big Valley Watermaster Service Area, Modoc and Lassen Counties, California, during the 1948 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,

/s/ L. C. JOPSON
L. C. Jopson
Senior Hydraulic Engineer

ORGANIZATION

C. H. Purcell . . . . . Director of Public Works

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The report was prepared under the direction of

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INTRODUCTION

The Big Valley Watermaster Service Area, Counties of Modoc and Lassen, California, was created by order of the Division of Water Resources, entered November 13, 1934. Originally the service area 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 respective offices of the County Recorders of Modoc and Lassen Counties in December 1934.

Watermaster service in the Big Valley Watermaster Service Area was rendered throughout the 1948 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, 1948. W. A. Carver and G. M. Vickroy, Deputy Watermasters, administered the distribution of water for periods of five and one months, respectively. L. C. Jopson was the Supervising Watermaster.

WATER SUPPLY

Precipitation

The monthly, seasonal and average amounts of precipitation covering the period 1929 to 1948 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 1947-48 was about 120 per cent of the nineteen year mean. Precipitation during the months of April, May and June was unusually heavy over the area.

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 about April 1 of each year for the period 1930 to 1948, inclusive, for the first three courses and for the period 1940 to 1948, inclusive, for the Blue Lake ranch course. On April 1, 1948 the water content of the snow for the first three courses averaged 90 per cent of the mean for the 19 year period of record.

Stream Flow

The record of the daily discharges of the Pit River at the U. S. Geological Survey gaging station near Canby for the year ending September 30, 1948 is presented in Table 3. During the watermaster season, the discharges at this station are taken as the amounts available for distribution in Big Valley. At the beginning of the season, however, additional water is available from small tributaries whose confluences with Pit River are downstream from Canby but above Lookout Dam. A hydrograph, prepared from the data contained in Table 3, is shown on Plate 1. The monthly and total runoff of the Pit River at the Canby station for each irrigation season from 1932 to 1948, inclusive, and the 17 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
1944	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
1947	3,500	2,050	4,820	2,010	1,670	1,420	15,470
1948	23,020	33,480	38,450	8,140	2,460	3,800	110,350
1932-48 17 Yr. Means	24,312	20,110	12,615	2,803	1,480	2,512	64,030

DISTRIBUTION OF WATER

The distribution of water during the 1948 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 1948 season. Because of the late spring rains there was a surplus of water in the River until about June 7. During this period the available supply was sufficient to provide for simultaneous irrigation of all ranches within the watermaster service area.

After June 7, the flow in the river decreased rapidly and the available supply was no longer sufficient to meet the irrigation demand. It was then necessary to establish a system of rotation in the use of the available water among the various users on the basis of the individual allotments and priorities. By July 1 the available supply was decreased to a flow only sufficient to provide water for stock. This condition of flow continued until August 23 when the releases from Hot Spring Valley began. After that date there was a surplus of water within the area.

In distributing the waters of the Pit River in Big Valley, the stream system is divided into the various units discussed below.

Lookout Dam

Due to the large stream discharges the Lookout dam was not installed until June 15. Flashboards were placed on or removed from the structure according to the supply and the requirements of the Gerig and Metzger ranches. Careful regulation of the diversions to these ranches was necessary during periods of low flow.

Gerig Dam

Haying generally began in Big Valley in the middle of July and lasted about one month. The Gerig Dam was not required for diversion of water for irrigation before haying. It was not until August 2 that this dam was installed.

Bieber Dam

The Bieber Dam was installed June 22 for the purpose of irrigating the E. Babcock ranch. During this irrigation several people

in Bieber complained of the high water. This matter is discussed in more detail under the heading of "Controversies". All users under the Bieber Dam system received all the water required until the beginning of haying. During the early part of the season little or no regulation of the diversions was necessary.

All users under the Bieber Dam System received an irrigation from the return flow from Hot Springs Valley between August 23 and September 30. No water was purchased from the Hot Spring Valley Irrigation District during the 1948 season.

McArthur and Avilla Dams

The McArthur and Avilla Dams were not installed during the 1948 season.

Big Sage Reservoir Water

There was sufficient flow of return irrigation water from Hot Spring Valley to satisfy the late season irrigation requirements of the Big Valley users. Consequently, no water was purchased from the Hot Spring Valley Irrigation District during the 1948 season.

Roberts Reservoir.

The irrigation requirements of the L. A. Babcock and A. Babcock ranches were satisfied from natural stream flow until after haying. During the month of August the impounded waters of Roberts reservoir were released as needed.

SUMMARY

At the beginning of the watermaster season on April 1, the outlook for a successful irrigation season was very poor due to the small snow pack and an extremely dry winter. During the subsequent period lasting until the end of the first week of June, precipitation

occurred intermittently over the entire Pit River watershed. Under these favorable moisture conditions, a minimum of irrigation was necessary and the crops produced in the valley were better than the normal yield. During the early part of the season abnormally low temperatures retarded plant growth and delayed the maturing of the crops.

After haying, the return flow from Hot Spring Valley provided a late season irrigation.

CONTROVERSIES

Only one minor controversy arose during the 1948 season in the Big Valley Watermaster Service Area. Bieber Dam, a river structure located just south of Bieber, is installed each spring in order to create a reservoir whose water surface is at sufficient elevation to cause water to be diverted to the Hollenbeck, K. Gerig, De Mange, Babcock and Thompson ranches. This year several people in Bieber, including a Mr. E. Jones, owner of the motel located between the slough and the highway, complained to the Watermaster that the high water resulted in the flooding of their basements. At an informal conference with Mr. Jones, he decided that the proper course would be to construct a watertight wall in his basement. The other complainants have apparently withdrawn their objections.

OWNERSHIP OF LANDS AND WATER RIGHTS

Water Right Ownership Changes for 1949

Name of Water Right Owner appearing in 1948 Statement	Name of Water Right Owner to appear in 1949 Statement	Amount of Water c.f.s
Brown, Wayne; Brown, Gladys; Brown, Asa L.; Brown, Gray	Brown, Asa L. and Brown, Gray	2.82
Nunes, Manuel and Armstrong, W. B.	Armstrong, Albert and Armstrong e.a.	7.73
Kramer, William	Mamath, Cyril	5.66

TABLE 1

PRECIPITATION - UPPER PIT RIVER STATIONS - 1929-1948
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. 5400 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
1946-1947	1.61	1.10	1.77	0.67	0.45	1.56	0.93	3.08	2.13	0	0.05	0.27	13.62
1947-1948	1.71	1.88	1.63	0.61	1.12	2.30	2.31	2.36	3.83	0.25	0.30	0.90	19.20
19 Yr. Total	24.04	29.82	34.31	35.94	37.33	34.92	33.25	34.23	28.43	7.04	3.77	12.80	315.88
19 Yr. Rec. Mean	1.26	1.57	1.80	1.89	1.96	1.84	1.75	1.80	1.50	0.37	0.20	0.67	16.62
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
1945-46	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
1946-47	0.83	1.67	1.08	0.31	0.88	0.83	0.69	1.20	1.08	0	0.47	0.26	9.30
1947-48	1.58	1.38	0.48	0.84	0.51	1.57	2.47	2.12	2.34	0.20	0	0.81	14.30
19 Yr. Total	20.66	24.52	29.64	32.06	27.27	23.49	20.81	20.73	15.74	4.34	3.41	6.98	229.65
19 Yr. Rec. Mean	1.08	1.29	1.56	1.69	1.44	1.24	1.10	1.09	0.83	0.23	0.18	0.37	12.09
Lakeview, Lake County, Oregon, Elev. 4,750 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
1945-46	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
1946-47	1.45	1.81	1.55	0.29	0.67	1.97	0.74	1.80	2.96	0	0.06	0.32	13.62
1947-48	2.39	1.17	0.49	1.88	0.93	1.86	1.88	1.24	2.81	0.26	0.01	0.91	15.83
19 Yr. Total	22.95	25.19	32.92	31.17	32.06	27.60	23.46	25.04	24.34	3.10	3.02	9.93	260.78
19 Yr. Rec. Mean	1.21	1.33	1.73	1.64	1.69	1.45	1.23	1.32	1.28	0.16	0.16	0.52	13.72
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
1945-46	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
1946-47	0.54	1.98	2.74	0.60	1.56	1.91	0.79	2.25	1.17	0	0.35	0.28	14.17
1947-48	3.52	1.22	0.69	2.68	0.86	4.16	4.03	2.71	2.27	0.42	0.16	0.75	23.47
19 Yr. Total	28.12	31.82	48.31	45.60	47.98	39.27	28.94	27.18	14.84	3.63	1.50	7.91	325.10
19 Yr. Rec. Mean	1.48	1.67	2.54	2.40	2.53	2.07	1.52	1.43	0.78	0.19	0.08	0.41	17.10

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

TABLE 2.
SNOW SURVEY DATE—UPPER PIT RIVER

	1945	1956	1947	1948	1949	1950
Eagle Peak Course Elev. 7500 Ft.						
Date of Survey	3/30	4/5	4/2	3/29		
Depth of Snow—Inches	63.5	53.3	22.2	42.9		
Water Content—Inches	22.2	21.2	6.4	14.4		
Density—Percent	35.0	39.8	28.8	33.6		
Record Average—Inches	15.8	16.1	15.5	15.5		
% of Record Aver.	140.5	131.7	41.0	92.9		
Cedar Pass Course Elev. 7200 Ft.						
Date of Survey	3/29	3/28	3/31	3/32		
Depth of Snow Inches	67.5	55.4	26.0	40.1		
Water Content Inches	22.4	22.9	10.3	15.7		
Density—Percent	33.2	41.3	39.6	31.9		
Record Average—Inches	17.2	17.5	17.1	17.1		
% of Record Average	130.2	130.8	60.0			

	1945	1946	1947	1948	1949	1950
Adin Mountain Course—Elev. 6500 Ft.						
Date of Survey	4/3	3/26	3/31	3/31		
Depth of Snow—In.	41.2	44.0	13.4	28.4		
Water Content—In.	15.8	16.2	4.4	9.9		
Density—Percent	38.4	37.0	32.8	34.9		
Record Average—In	12.2	12.5	12.0	11.9		
% of Record Aver.	129.5	129.6	36.6	83.2		
Blue Lake Ranch Course Elev. 7300 Ft.			New Course 1940			
Date of Survey	4/3	4/3	4/1	4/1		
Depth of Snow—Inches	44.0	44.9	17.5	27.3		
Water Content—Inches	15.8	16.2	5.3	10.1		
Density—Percent	35.9	36.1	30.4	37.0		
Record Average—Inches			11.0	10.9		
% of Record Average			48.0	92.7		

For records prior to 1945, see 1946 report.

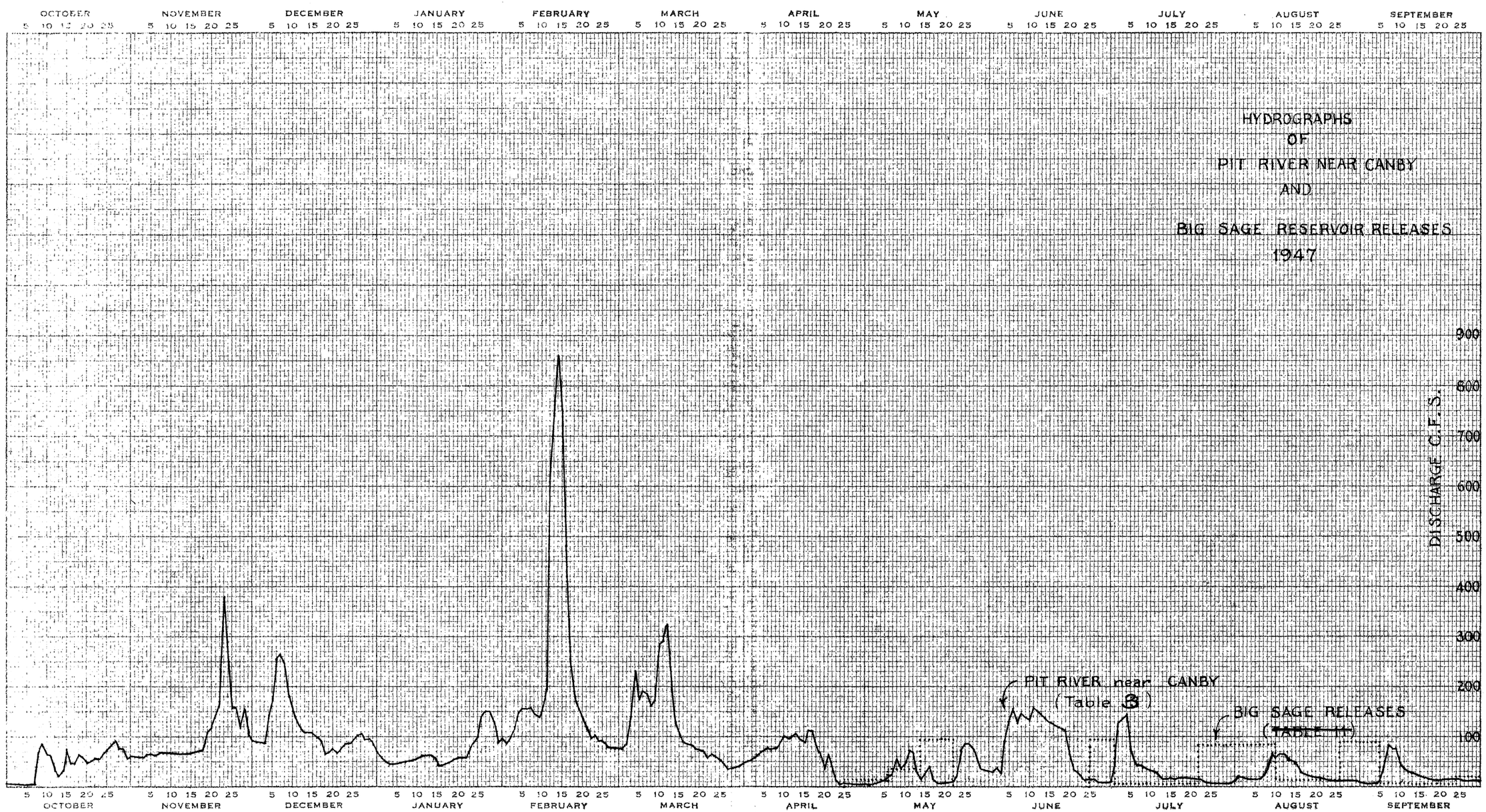
TABLE 3

DAILY DISCHARGE IN CUBIC FEET PER SECOND

PIT RIVER NEAR CANBY

Year Mean – 198 | For Year Ending September 30, 1948 | Acre-Feet – 143,900

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	12	60	90	72	50	82	116	395	632	125	28	69
2	13	60	101	74	50	69	79	335	614	82	27	51
3	14	56	87	79	45	62	77	285	582	38	26	38
4	15	65	85	104	40	51	85	250	543	19	21	28
5	17	70	85	158	50	32	113	241	554	16	17	14
6	19	65	82	395	50	44	184	250	592	22	11	14
7	21	65	77	609	50	40	300	295	740	79	6.7	32
8	28	65	72	782	49	40	488	375	860	250	8.9	113
9	38	60	65	668	51	37	543	406	1050	214	11	175
10	30	55	50	570	45	32	614	380	1230	92	10	132
11	30	55	60	340	45	22	866	345	1290	82	9.5	98
12	54	60	60	175	40	26	1120	265	1240	104	8.9	98
13	40	55	65	125	50	27	1030	205	1150	90	7.2	82
14	33	50	65	110	49	27	866	158	1050	77	7.2	42
15	32	55	67	85	67	24	782	214	944	62	8.9	40
16	40	60	51	85	104	26	668	236	830	101	7.2	47
17	54	65	74	85	132	37	614	210	692	79	6.7	44
18	45	65	67	80	122	49	609	155	532	67	7.7	47
19	27	60	74	70	110	49	592	494	385	62	14	47
20	18	55	74	80	132	42	510	1060	395	60	42	47
21	23	55	69	70	101	44	444	1130	438	56	49	47
22	92	55	72	70	90	45	428	1110	455	44	110	47
23	110	60	72	70	82	125	438	1100	477	30	107	45
24	77	60	70	65	82	315	406	1170	482	22	92	60
25	74	60	70	60	79	466	375	1120	444	26	90	69
26	67	62	70	60	74	521	325	1020	360	33	92	65
27	62	54	74	60	77	472	315	860	290	32	90	77
28	65	65	77	60	74	380	330	764	223	30	74	92
29	58	77	70	60	82	330	380	710	162	32	62	79
30	62	82	65	55		340	428	686	147	32	90	79
31	69		60	60		175		656		30	98	
Total	1339	*1831	*2220	*5436	*2072	*4031	*14125	*16880	*19383	*2088	*1239.9	*1918
Mean	43.2	61.0	71.6	175	71.4	130	471	545	646	67.4	40.0	63.9
Acre-Feet	2,660	3,630	4,400	10,780	4,110	8,000	28,020	33,480	38,450	4,140	2,460	3,800


HYDROGRAPHS
OF
PIT RIVER NEAR CANBY
AND
BIG SAGE RESERVOIR RELEASES
1947
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
5 10 15 20 25
DISCHARGE C.F.S.
900
800
700
600
500
400
300
200
100
PIT RIVER near CANBY
(Table 3)
BIG SAGE RELEASES
(TABLE 11)

K & E CO., N.Y.