STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

EARL WARREN, Governor

G. 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
1945 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, 1945

Mr. Gordon Zander
Supervising Hydraulic Engineer
Sacramento, California

Attention: Mr. Harrison Smitherum, Senior 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 1945 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,

_____
Watermaster

TABLE OF CONTENTS

	Page
LETTER OF TRANSMITTAL	
INTRODUCTION	1
WATER SUPPLY	1
Precipitation	1
Stream Flow	2
Distribution of Water	3
Lookout Dam	3
Gerig Dam	4
Bieber Dam	4
Big Sage Water	4
Roberts Reservoir	4
SUMMARY	4
CONTROVERSIES	5
OWNERSHIP OF LANDS AND WATER RIGHTS	5

TABLES

1. Precipitation Upper Pit River 1929-1945. Monthly, seasonal and average amounts in inches.
2. Snow Survey Data - Upper Pit River Area.
3. Daily Discharges in Cubic Feet per Second - Pit River Near Canby for the Year Ending September 30, 1945.

PLATE

Hydrograph of Pit River near Canby April 1 to September 30, 1945.

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, and duly recorded in each of the 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 1945 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, 1945. F. M. Vickroy administered the distribution of water under the direction of Harrison Smitherum, Supervising Watermaster.

WATER SUPPLY

Precipitation

The monthly, seasonal and average amounts of precipitation covering the period 1929 to 1945 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 1944-45 was about 115 per cent of the 16-year mean. Precipitation during the month of May was usually 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 1945, inclusive, for the first three courses and for the period 1940 to 1945, inclusive, for the Blue Lake ranch course. On April 1, 1945 the water content of the snow for the first three courses averaged about 135 per cent of the mean for the 16-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, 1945, 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. For a short period near the beginning of the season, however, additional water is available from small tributaries whose confluences with the Pit River are between Canby and Lookout Dam. A hydrograph, prepared from the data given in Table 3, is shown on Plat 1.

The monthly and total runoff of the Pit River for each irrigation season from 1932 to 1945 and the 14-year means for the U.S.G.S. Station are presented in the following tabulation.

RUNOFF IN ACRE-FEET

Year	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	77085
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

Runoff in Acre-Feet (Cont'd.)

Year	April	May	June	July	August	September	Total
1941	7790	14660	9340	4150	2310	4210	42460
1942	29930	34100	21010	4670	1710	3750	95170
1943	42500	31360	19620	4420	3380	5190	106470
1944	10820	8520	15430	3470	1950	4970	45160
1945	18080	45430	46080	4950	2950	4910	122400
14-Yr Means	25658	20803	12136	2753	1372	2488	65210

From the tabulation it is seen that the runoff during the 1945 irrigation season was 122,400 acre-feet or 188 per cent of the 14-year mean of 65,210 acre-feet for the period 1932 to 1945, inclusive.

DISTRIBUTION OF WATER

The distribution of water during the 1945 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 years were followed with little or no modification during the 1945 season.

The flow in the Pit River at Canby during the 1945 irrigation season was exceeded in amount only once, during the extremely wet year of 1938, in the 14-year period of record. Accordingly, the supply was sufficient to meet all requirements until July 1 and when supplemented by water from Big Sage reservoir to provide irrigation water from about August 10 to September 10 on a rotation system.

The distribution of water in Big Valley is divided into the various units discussed below.

LOOKOUT DAM

Due to the abnormally large stream flow in the Pit River, the Lookout Dam was not installed until about August 1. During the period of the spring irrigation the dam was not needed for the diversion of water to

the Gerig and Metzger ranches.

GERIG DAM

In general haying began in Big Valley about the middle of July and lasted about one month. The Gerig dam was installed during the first of August for the second irrigation.

BIEBER DAM

All users under the Bieber dam system received all the water desired for the spring irrigation. Little or no regulation of the diversions were required until after the dam was installed for the summer irrigation. All users under the system received an irrigation from the return flow from Hot Springs Valley supplemented by purchased water from Big Sage reservoir.

Big Sage Reservoir Water

During 1945, 500 acre-feet of Big Sage reservoir water was purchased by Big Valley users. This water was used as a supplementary irrigation supply after haying. The water was released from July 10 to August 10.

ROBERTS RESERVOIR

The irrigation requirements of L. A. Babcock and A. Babcock were satisfied until after haying from the natural stream flow. After August 15 the impounded waters of Roberts reservoir were used to supplement the natural flow.

SUMMARY

At the beginning of the watermaster season on April 1, the outlook was favorable for a successful irrigation season. With a better than normal snow pack in the mountains and a very large amount of precipitation during the month of May, the resulting runoff was extremely high until July

15. Until this date, all requirements for water were satisfied with very little regulation by the watermaster. Subsequently, the natural stream flow was supplemented by return water from Hot Springs Valley and purchased water from Big Sage Reservoir. From about August 10 to September 10 the available supply was sufficient to provide an irrigation to most of the users on a rotation basis.

Under the favorable moisture conditions the crops produced in the valley were better than the normal yield.

CONTROVERSIES

There were no serious controversies during the 1945 season.

OWNERSHIP OF LANDS AND WATER RIGHTS

There were no changes in the ownership of lands and water rights during 1945.

TABLE 1

PRECIPITATION-UPPER PIT RIVER STATIONS - 1929 to 1945
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
1942-1943	0.33	2.60	3.25	3.00	2.69	1.76	2.68	1.31	1.76	0.71	0	0	20.09
1943-1944	2.25	0.60	0.62	2.32	2.46	1.12	2.27	0.61	4.74	0.25	0	0.71	17.95
1944-1945	1.54	3.00	.55	1.73	3.80	2.70	.99	4.28	2.67	.05	.04	.59	21.94
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
16 Yr. Rec. Mean	1.21	1.47	1.79	2.07	2.16	1.78	1.83	1.72	1.34	0.38	0.20	0.70	16.66
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	0.20	15.58
1942-1943	0.35	2.51	1.97	3.68	1.81	1.39	1.72	0.70	0.29	0.27	0	0.03	14.72
1943-1944	1.30	0.58	0.51	0.96	0.80	0.75	1.99	0.06	2.74	0.30	0	0.29	10.28
1944-1945	0.57	2.59	0.41	0.54	2.26	1.39	0.49	4.03	1.69	0.35	0.05	0.17	14.54
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
16 Yr. Rec. Mean	1.01	1.21	1.66	1.89	1.58	1.22	1.07	1.04	0.74	0.22	0.18	0.36	12.20
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	2.59	0.46	1.76	2.46	0.65	T	0.18	0.63	17.40
1942-1943	0.79	2.70	3.56	3.39	1.37	1.38	2.16	1.42	1.29	0.13	0	0	18.19
1943-1944	2.34	0.61	1.01	1.07	1.70	1.35	1.46	0.82	5.47	0.38	0.03	0.89	17.13
1944-1945	0.45	3.32	0.84	1.03	2.35	1.19	0.39	4.30	1.18	0.02	0.05	0.21	15.33
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
16 Yr. Rec. Mean	1.12	1.29	1.82	1.74	1.85	1.41	1.29	1.36	1.14	0.15	0.18	0.53	13.86
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
1942-1943	0.73	3.39	3.19	5.44	2.28	2.07	2.22	0.63	1.97	0.09	0	T	22.01
1943-1944	1.71	0.73	1.07	1.83	1.65	1.02	2.45	0.32	1.86	0.41	T	0.35	13.40
1944-1945	0.72	4.43	1.77	0.86	2.71	2.50	.67	3.13	1.21	0	0	0	18.00
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
16 Yr. Rec. Mean	1.35	1.60	2.62	2.53	2.70	1.97	1.43	1.34	0.70	0.17	0.06	0.42	16.89

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

TABLE [illegible]
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	
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	
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	
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	
Record Average—Inches								14.32	15.35	14.8	14.9	14.8	14.8	[illegible]	15.3	15.8	
% 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	[illegible]	68.2	140.5	
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	
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	47.5	
Water Content—Inches	13.3	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	
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	
Record Average—Inches								15.9	16.9	16.3	16.1	16.3	16.0	[illegible]	16.9	17.2	
% 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	

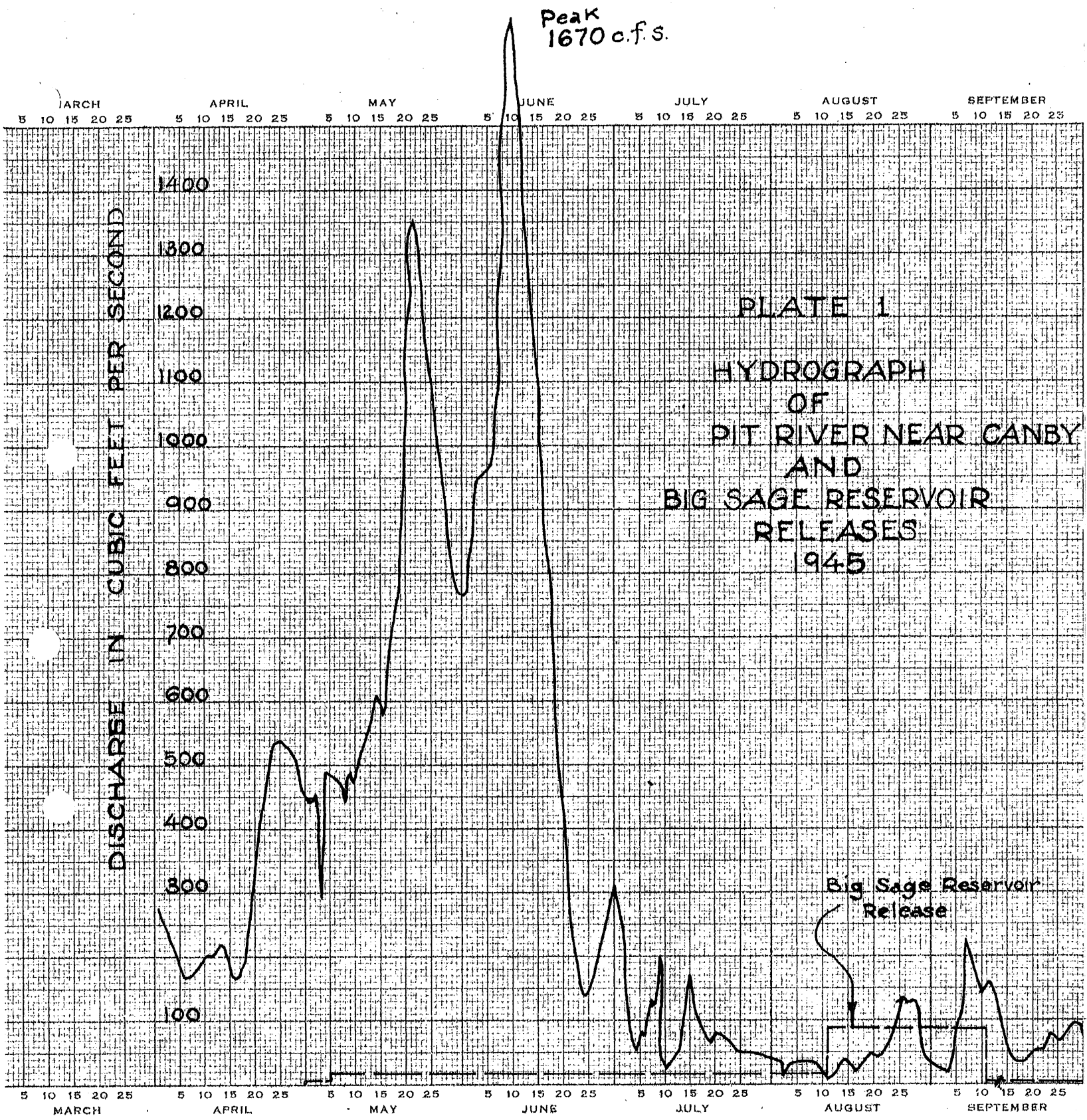
TABLE 2 (Continued)

	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	
Depth of Snow—Inches											16.3	18.8	28.9	24.5	23.0	41.0	
Water Content—Inches											6.4	8.5	11.7	15.3	8.5	15.8	
Density—Percent											39.2	45.2	40.5	43.8	37.0	35.9	
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	
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	21.9	41.2	
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	
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	
Record Average—In.								11.5	13.3	12.8	12.0	12.0	12.1	12.2	12.0	12.2	
% 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	

TABLE 3
DAILY DISCHARGE IN CUBIC FEET PER SECOND
PIT RIVER NEAR CANBY
For Year Ending September 30, 1945

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.
1	47	60	168	65	122	139	278	440	772	269	37	26
2	45	60	190	70	234	132	256	461	826	190	12	24
3	79	74	214	70	368	128	234	287	946	90	30	18
4	60	98	194	75	498	132	210	493	952	51	32	33
5	47	92	146	87	552	139	183	487	904	74	33	82
6	49	90	128	98	440	132	168	482	1000	74	38	113
7	47	104	122	116	314	146	164	466	1070	128	37	226
8	47	122	116	139	323	150	179	440	1280	125	37	187
9	45	119	107	153	343	146	190	487	1610	58	24	150
10	47	160	92	168	388	146	202	477	1670	20	16	139
11	45	179	85	164	373	171	198	514	1570	38	5.2	153
12	47	194	80	190	251	202	206	546	1460	47	13	142
13	54	202	75	190	238	210	222	568	1330	54	27	119
14	49	175	75	168	420	214	206	606	1190	116	38	85
15	51	146	75	171	689	226	183	579	1050	175	32	51
16	69	128	75	179	958	238	168	590	910	125	17	40
17	60	104	75	156	958	264	175	700	784	90	29	33
18	60	95	80	132	814	273	218	736	662	79	37	33
19	58	90	87	119	579	242	251	820	546	62	49	44
20	58	80	107	95	404	218	319	1120	440	69	40	49
21	37	75	125	80	296	206	399	1310	310	69	44	47
22	47	75	156	70	242	210	456	1340	234	65	49	54
23	51	85	168	75	214	226	514	1230	150	58	79	79
24	51	90	164	75	206	319	530	1180	142	54	98	69
25	54	90	150	80	187	358	535	1110	150	49	136	67
26	56	95	128	80	164	273	530	1020	183	51	122	77
27	58	85	110	85	150	291	519	952	218	51	132	82
28	62	92	95	85	142	363	503	892	247	45	113	92
29	56	136	85	85		378	466	826	296	42	60	90
30	58	132	70	95		363	451	772	319	40	40	72
31	65		65	101		323		772		38	30	
Total	1659	3327	3607	3516	10869	6958	9113	22903	23230	2496	1486.2	2476
Mean	53.5	111	116	113	388	224	304	739	774	80.5	47.9	82.5
Acre-Feet	3290	6600	7150	6970	21550	13800	18080	45430	46080	4950	2950	4910

Year Mean - 251 Acre-Feet - 181,800


Peak
1670 c.f.s.
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
5 10 15 20 25
DISCHARGE IN CUBIC FEET PER SECOND
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
100
PLATE 1
HYDROGRAPH
OF
PIT RIVER NEAR CANBY
AND
BIG SAGE RESERVOIR
RELEASES
1945
Big Sage Reservoir
Release