STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

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GOODWIN J. KNIGHT, Governor

FRANK B. DURKEE, Director of Public Works

HARVEY O. BANKS, State Engineer

REPORT ON WATERMASTER SERVICE IN BIG VALLEY WATERMASTER SERVICE AREA MODOC AND LASSEN COUNTIES, CALIFORNIA 1955 SEASON

Sacramento, California

March, 1956

SUBMISSION TO, AND ADOPTION BY
DEPARTMENT OF PUBLIC WORKS

I, J. M. Page, Senior Hydraulic Engineer, Division of Water Resources, Department of Public Works of the State of California, submit this "Report on Watermaster Service in Big Valley Watermaster Service Area, Modoc and Lassen Counties, 1955 Season".

/s/ J. M. Page
Senior Hydraulic Engineer

I, W. R. Gianelli, Supervising Hydraulic Engineer, Division of Water Resources, Department of Public Works of the State of California, approve this "Report on Watermaster Service in Big Valley Watermaster Service Area, Modoc and Lassen Counties, California, 1955 Season".

/s/ W. R. Gianelli
Supervising Hydraulic Engineer

I, L. C. Jopson, Assistant State Engineer, Division of Water Resources, Department of Public Works of the State of California, approve and adopt this "Report on Watermaster Service in Big Valley Watermaster Service Area, Modoc and Lassen Counties, California 1955 Season", as a report of the Department of Public Works.

WITNESS my hand and the seal of the Department of Public Works of the State of California, this day of , 1956.

DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

By /s/ L. C. Jopson
Assistant State Engineer

(SEAL)

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STATE DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

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Stream flow

The major source of water for Big Valley is the Pit River, which is measured at the United States Geological Survey gaging station at Canby. Daily mean discharge of Pit River near Canby as obtained from preliminary records of the United States Geological Survey Station are presented in Table 2. The amount of water which is measured at this point is considered to be the amount of water available for distribution in Big Valley from Pit River. There are however, three other minor sources which contribute to Pit River between Canby and the uppermost diversion in Big Valley, namely; Turner Creek, located approximately four miles downstream from the Canby gaging station; Stone Coal Creek, located approximately two miles further downstream; and Roberts Reservoir located about two miles north of Lookout. Turner Creek contributed approximately one cubic foot per second up until about June 15, and Stone Coal Creek contributed less than one cubic foot per second until about May 15. Stone Coal Creek was found to be dry by the first of June of the 1955 season.

Roberts Reservoir is a source of supply to a number of users in Big Valley. It was used for irrigation and stockwater, between August 1 and September 10. Daily mean releases from Roberts Reservoir are presented in Table 4.

The flow of Pit River at Canby during the irrigation season is comprised of natural flow of North Fork and South Fork of Pit River, together with return flow and drainage from lands irrigated with water released from Big Sage Reservoir, West Valley Reservoir and numerous smaller reservoirs, all of which are located above Canby. After July 1, drainage and return flow from irrigated lands comprises all of the flow in Pit River at the Canby Gaging Station. Due to the type of irrigation in Hot Springs Valley located above Canby, the times during which large heads of water will be available for distribution in Big Valley is

unpredictable. From about July 25 to about August 20 of this season, there was less flow in Pit River than during the same period of any of the last 10 years. This caused considerable reduction in yields of meadow hay and pasture in Big Valley.

It was agreed by the shareholders that releases from Roberts Reservoir be held to a minimum, due to the shortage of stored water.

Drainage and return flow together with water in excess of demands of the users in Big Valley is measured by the United States Geological Survey Station on Pit River, approximately six miles south of Bieber. Daily mean discharge of Pit River near Bieber as obtained from preliminary records of the United States Geological Survey are presented in Table 3.

A graphic comparison of the available water supply to drainage and return flow out of Big Valley is shown by hydrographs of Pit River near Canby, and Pit River near Bieber on Plates 1 and 2.

A recorder was maintained on Watson Ditch near Bieber. The Watson Ditch Station was used to measure the water delivered to L. Babcock and C. Hawkins Ranches. These ranches are entitled to third priority allotments from Pit River and their proportionate share of water released from Roberts Reservoir. The daily mean discharge of this station is presented in Table 8.

The water supply on the Ash Creek Stream System was more nearly normal than in the remainder of Big Valley. Stream gaging stations, equipped with automatic water stage recorders, were maintained on Willow Creek near Knudson Ranch, Rush Creek above Round Valley and Ash Creek at Adin. The records of daily mean discharge at these stations are presented in Tables 5, 6, and 7 respectively.

DISTRIBUTION OF WATER

The water rights in the Big Valley Watermaster Service Area are grouped as follows: (1) Pit River in Big Valley as defined in Schedules 2 and 3 of the Big Valley Agreement, and (2) Ash Creek and tributaries which includes Rush Creek, Butte Creek, Willow Creek and Ash Creek. The rights on these creeks are defined in Schedules 3, 4, 5 and 6, respectively, of the Ash Creek Decree.

In conjunction with distribution of water from Pit River according to the rights as set forth above, the watermaster regulates the re-diversions from Pit River of water released from Roberts Reservoir.

Pit River in Big Valley (Schedules 2 and 3) and Roberts Reservoir.

Irrigation in Big Valley for the 1955 season began about May 18, at which time Lookout Dam and Gerig Dam were put in. From May 18 to about July 1 there was sufficient water to complete three rotations among the owners of second priority rights and to intermittently deliver water to owners of third priority rights. During this period the John Britton Ranch did not irrigate. On June 19 Lookout Dam broke, due to failure of one of the vertical pins. At the time of the failure, the flow in Pit River was about 260 cubic feet per second, the Gerig and Bieber Dams were full, and water was being diverted at the Bieber Dam to the west side. In order to pass downstream the large flow caused by the failure of Lookout Dam, Gerig Dam was pulled down 28 inches with the result that the flow at Bieber Dam exceeded the capacity of the diversion works from that Dam, resulting in approximately 200 acre-feet flowing out of the valley. Water was actually out of control for approximately 10 hours; however, the water which passed Bieber during the

10-hour period flowed by the station at the lower end of the valley for about 10 days, and caused controversy throughout the remainder of the season.

Haying operation started about July 7 and ended about August 1. During this interval the lower users, namely, the McArthur Ranch and Britton Ranch received an excellent irrigation on their pasture lands. Cilar Ditch and Three Corners Slough (Lookout Dam) also diverted water during this period to pasture and grain lands that were unaffected by haying. Water was also diverted through the Cilar Ditch to supply stockwater to the Holl and Knox Ranches. Very little water passed directly through the valley.

Between August 2 and August 15, 435 acre-feet of water was released from Roberts Reservoir for use by the shareholders of this Reservoir. Water released at the Reservoir was measured by an 8-foot Parshall Flume. Amounts of water rediverted from Pit River were measured to all share holders excepting the Peter Gerig, W. H. Gerig and W. H. Hunt Estate Company Ranches. Amounts of water used by these Ranches were computed on a duty of water of one-half acre-foot per acre per irrigation. This duty has been found applicable in this area for this type of irrigation, based on continuing measurements made each season. Of the 435 acre-feet released from Roberts Reservoir there was a measured return flow from the irrigated lands of 9 acre-feet, which was caught and stored by Bieber Dam.

On August 22, it was necessary to release 115 acre-feet from Lookout and Gerig Dams to regain storage behind Bieber Dam and deliver stockwater to the McArthur (Kate Gerig) Ranch.

Between August 24 and September 18 sufficient water was available to satisfy irrigation requirements on all ranches to which second allotments attach. The McArthur Ranch elected to use no water and the Britton Ranch irrigated only a portion of their lands. After September 19 water was available to satisfy all irrigation demands.

A summary of the distribution of the natural flow of Pit River is presented in the following tabulation:

Month	Per cent of allotments available			
	First Priority	Second Priority	Third Priority	Fourth Priority
April	Sufficient to supply all demands			
May	Sufficient to supply all demands			
June	98	51	19	13
July	98	33	6	6
August	74	13	0	0
September	100	40	0	0

Use of water during the season by the shareholders of Roberts Reservoir is presented in the following tabulation:

Name of shareholder	Number of shares	Amount of water, in acre-feet
Peter Gerig	5	69
Oral Gerig	3	50
Ward Kramer	2	92
Merlin Kennedy	1	50
Whaley Land and Cattle Company	1	93
Cyril R. Mamath	1	0
W. H. Hunt Estate Company	2	20
Lester Babcock Clarence Hawkins	3) 1)	162
Lewis Monchamp	1	not measured
TOTALS	20	536*

* Does not include water used by Lewis Monchamp.

Water used by Lewis Monchamp was not rediverted from Pit River, but was diverted directly from the reservoir. Consequently the amount used was not measured by the watermaster. The water used by Lester Babcock and Clarence Hawkins was rediverted from Pit River through the Watson Ditch. The two shareholders rotated the water between the two ranches.

Ash Creek and Tributaries

Distribution from Ash Creek and tributaries during the 1955 irrigation season followed the methods and practices initiated in past seasons with little or no modification.

Rush Creek (Schedule 3). Water in excess of allotments was available during April and May. Thereafter the flow decreased gradually until the first part of August and remained nearly constant throughout the remainder of the irrigation season.

A summary of the water distribution made during the 1955 season is shown in the following tabulation:

Month	Per cent of allotments available First Priority
April	Sufficient to satisfy demands
May	Sufficient to satisfy demands
June	85
July	73
August	60
September	64

Butte Creek (Schedule 4). The water supply was in excess of total allotments until about May 15. Subsequent to this date the flow decreased steadily and reached a nearly constant flow of about 1.4 cubic feet per second during August and September.

Willow Creek (Schedule 5). The water supply was sufficient to satisfy about 80 per cent of second priority allotments until June 3. By July 20 the flow had stabilized at approximately four cubic feet per second and remained nearly constant until the end of the irrigation season.

A summary of the distribution made during the 1955 season is shown in the following tabulation:

Month	Average per cent of allotments available			
	First Priority	Second Priority	Third Priority	Fourth Priority
May	Sufficient to satisfy demands			
June	100	52	0	0
July	100	47	0	0
August	100	40	0	0
September	100	44	0	0

Ash Creek (Schedule 6). The available flow in Ash Creek was sufficient to satisfy all demands until about June 1. Throughout the remainder of the irrigation season water supply remained nearly constant and was sufficient to satisfy about 40 per cent of the second priority allotments.

A summary of the distribution made during the 1955 season is presented in the following tabulation:

Month	Average per cent of allotments available				
	First priority	Second priority	Third priority	Fourth priority	Fifth priority
April	Sufficient to satisfy demands				
May	Sufficient to satisfy demands				
June	100	100	40	0	0
July	100	100	42	0	0
August	100	100	42	0	0
September	100	100	40	0	0

CHANGES IN OWNERSHIP OF LANDS AND WATER RIGHTS

No changes in ownership of lands and water rights occurred during period covered by this report as shown in the "Statement for Big Valley Watermaster Service Area, Counties of Modoc and Lassen, California, for 1955".

TABLE 1

PRECIPITATION AT BIEBER, LASSEN COUNTY, CALIFORNIA
1954-1955

In Inches

Month	Mean precipitation	1954-1955 precipitation
October	1.80	0.35
November	1.75	2.48
December	2.21	2.18
January	2.44	0.96
February	2.35	0.74
March	1.86	1.29
April	1.28	2.92
May	1.28	0.43
June	0.41	0.22
July	0.23	0.42
August	0.14	0.00
September	0.48	1.09
Totals	16.23	13.08

TABLE 2

DAILY MEAN DISCHARGE OF PIT RIVER NEAR CANBY

April 1 to September 30, 1955

In Cubic Feet per Second

Day	April	May	June	July	August	September
1	198	214	144	70	19	77
2	166	202	117	70	22	94
3	146	182	127	57	27	77
4	131	167	151	48	25	57
5	117	144	120	59	25	46
6	111	134	95	63	26	44
7	108	109	65	95	16	42
8	111	174	44	194	8.2	39
9	111	230	42	190	7.4	34
10	128	214	46	111	16	37
11	149	210	48	82	19	108
12	140	186	44	75	8.2	89
13	149	198	44	72	7.4	84
14	183	230	42	63	5.2	67
15	152	194	108	48	4.2	65
16	169	153	302	41	5.2	59
17	166	100	302	41	9.9	87
18	218	137	222	48	21	75
19	293	67	159	72	19	84
20	345	59	111	63	14	79
21	365	89	75	52	20	75
22	380	87	52	39	26	72
23	345	75	39	34	44	65
24	293	75	30	34	72	52
25	218	322	25	32	70	92
26	218	302	21	32	79	57
27	239	298	17	32	119	46
28	244	257	21	26	79	48
29	244	222	72	21	61	44
30	244	182	97	19	50	46
31		159		21	57	
Mean	203	173	92.7	61.4	31.7	64.7
Runoff, in acre-feet	12,060	10,660	5,520	3,780	1,950	3,850

Total for period - 37,820 acre-feet.

TABLE 3

DAILY MEAN DISCHARGE OF PIT RIVER NEAR BIESEN

April 1 to September 30, 1955

In Cubic Feet per Second

Day	April	May	June	July	August	September
1	490	475	68	10	3.0	0
2	404	422	93	8.4	2.0	0
3	435	366	72	12	1.4	0
4	430	339	38	13	1.2	0
5	346	312	29	28	1.1	0
6	305	285	45	21	0.8	0
7	260	257	53	7.9	0.7	0
8	220	218	33	5.8	0.6	0
9	204	171	30	5.4	0.5	0
10	196	132	57	22	0.4	0
11	193	187	19	135	0.2	1.6
12	202	171	3.4	246	0.2	1.9
13	213	152	3.0	108	0.1	1.6
14	207	114	3.0	81	0.1	1.9
15	248	136	3.4	68	0.1	2.6
16	272	150	3.0	67	0	1.9
17	266	203	3.2	52	0	2.2
18	370	281	14	30	0.1	41
19	510	235	82	3.6	0	28
20	656	148	46	2.5	0	20
21	768	63	48	3.0	0	34
22	854	30	25	2.8	0	12
23	1,040	17	43	1.6	0	7.4
24	896	14	18	1.4	0.1	7.9
25	782	13	112	1.4	0.4	6.6
26	638	22	132	1.4	0.4	4.2
27	620	110	89	16	0.3	3.2
28	620	171	23	26	0.2	3.0
29	574	235	17	20	0.1	4.2
30	525	225	13	9.6	0.1	57
31		136		5.1	0.1	
Mean	458	187	40.6	32.7	.46	8.07
Runoff, in acre-feet	27,260	11,480	2,420	2,010	28	480

Total for period = 43,678 acre-feet.

TABLE NO. 4

DAILY MEAN RELEASES FROM ROBERTS RESERVOIR

April 1 to September 30, 1955

In Cubic Feet per Second

Day	April	May	June	July	August	September
1					0	13.4
2					18.2	29
3	N	N	N	N	30	8.3
4	O	O	O	O	34	N
5					34	O
6					34	
7					22	
8	R	R	R	R	3.2	R
9	E	E	E	E	3.2	E
10					3.2	
11	L	L	L	L	15.8	L
12	E	E	E	E	22	E
13	A	A	A	A		A
14	S	S	S	S	N	S
15	E	E	E	E	O	E
16						
17						
18						
19					R	
20					E	
21					L	
22					E	
23					A	
24					S	
25					E	
26						
27						
28						
29						
30						
31						
Mean					20.0[a]	16.9[b]
Release, in acre-feet					435	101

[a] 11-day period

[b] 3-day period

Total for period - 536 acre-feet.

TABLE 5

DAILY MEAN DISCHARGE OF WILLOW CREEK NEAR KNUDSON RANCH

May 27 to September 20, 1955

In Cubic Feet per Second

Day	May	June	July	August	September
1		7.0	5.0	4.2	4.4
2		7.0	5.0	4.2	4.4
3		7.0	5.0	4.2	4.4
4	N	6.4	5.0	4.2	4.4
5	O	6.4	5.0	4.2	4.4
6		5.0	5.0	4.2	4.4
7		5.0	5.0	4.2	4.4
8		5.0	5.0	4.2	4.4
9	R	5.0	5.0	4.2	4.4
10	E	5.0	5.0	4.2	4.4
11	C	5.0	5.0	4.2	4.4
12	O	5.0	5.0	4.2	4.4
13	R	5.0	5.0	4.2	4.4
14	D	5.0	5.0	4.2	4.4
15		5.0	5.0	4.2	4.4
16		4.7	5.0	4.2	4.4
17		4.7	4.7	4.4	4.4
18		4.7	4.7	4.4	4.4
19		4.4	4.7	3.9	4.4
20		4.4	4.2	3.9	4.4
21		4.4	4.2	3.6	
22		4.2	4.2	3.6	
23		4.2	4.2	3.6	
24		4.4	4.2	3.6	N
25		4.4	4.2	3.6	O
26		4.7	4.2	3.9	R
27	7.0	4.7	4.2	3.9	E
28	7.0	4.7	4.2	4.2	C
29	7.0	4.7	4.2	4.4	O
30	7.0	4.7	4.2	4.2	R
31	7.0		4.2	4.2	D
Mean	7.0[a]	5.1	4.7	4.1	4.4[b]
Runoff, in acre-feet	69	301	286	251	174

[a] 5-day period
[b] 20-day period

Total for period - 1,080 acre-feet.

TABLE 6

DAILY MEAN DISCHARGE OF RUSH CREEK ABOVE ROUND VALLEY

May 27 to September 30, 1955

In Cubic Feet per Second

Day	May	June	July	August	September
1		4.7	3.1	2.9	2.8
2		4.7	3.1	2.8	2.8
3		4.7	3.1	2.8	2.8
4		4.5	3.1	2.6	2.8
5		4.3	3.1	2.6	2.8
6		4.1	3.1	2.5	2.8
7		3.9	3.1	2.5	2.8
8		3.7	3.1	2.4	2.8
9		3.7	3.1	2.4	2.8
10		3.7	3.1	2.4	2.8
11		3.9	3.1	2.5	2.8
12		3.9	3.1	2.5	2.8
13		4.1	3.1	2.5	2.8
14		4.1	3.1	2.7	2.8
15		4.3	3.1	2.7	2.8
16	N	4.1	3.1	2.7	2.8
17	O	3.9	3.1	2.7	2.8
18		3.7	3.1	2.7	2.8
19	R	3.5	3.1	2.7	2.8
20	E	3.3	3.1	2.7	2.8
21	C	3.1	3.1	2.7	2.8
22	O	3.1	3.1	2.7	2.8
23	R	3.1	3.3	2.7	2.8
24	D	3.1	3.3	2.7	2.8
25		3.1	3.5	2.7	2.8
26		3.1	3.7	2.7	2.8
27	7.5	3.1	3.7	2.7	2.8
28	7.2	3.1	3.5	2.7	2.8
29	6.6	3.1	3.3	2.7	2.8
30	6.3	3.1	3.1	2.7	2.8
31	6.0		3.1	2.7	
Mean	6.7*	3.7	3.2	2.6	2.8
Runoff, in acre-feet	67	221	195	162	167

* 5-day period

Total for period - 812 acre-feet.

TABLE 7

DAILY MEAN DISCHARGE OF ASH CREEK AT ADIN

May 27 to September 15, 1955

In Cubic Feet per Second

Day	May	June	July	August	September
1		19.3	18.5	22	17.8
2		18.9	17.8	22	17.1
3		18.1	18.5	22	15.7
4		18.1	22	22	16.7
5		17.4	21	23	17.4
6		16.7	20	20	18.5
7		16.1	20	20	18.9
8		16.1	20	20	18.9
9	N	17.1	21	20	20
10	O	17.4	21	18.1	20
11		17.8	21	19.3	20
12		22	21	20	20
13		26	20	20	19.3
14	R	27	22	20	21
15	E	26	20	20	22
16	C	24	20	20	
17	O	22	20	20	
18	R	19.3	20	20	
19	D	18.1	20	20	N
20		18.5	19.3	20	O
21		18.5	18.9	18.9	
22		18.5	18.5	18.5	
23		18.5	18.1	18.9	
24		18.1	17.8	19.3	R
25		18.1	17.4	19.3	E
26		18.1	17.8	20	C
27	22	18.1	18.5	20	O
28	20	18.1	20	21	R
29	20	19.3	28	20	D
30	17.8	19.3	23	20	
31	19.3		22	19.3	
Mean	19.8[a]	19.4	20	20	18.9[b]
Runoff, in acre-feet	196	1,150	1,230	1,230	561

[a] 5-day period

[b] 15-day period

Total for period - 4,370 acre-feet.

TABLE NO. 8

DAILY MEAN DISCHARGE OF WATSON DITCH NEAR BIEBER

June 1 to September 19, 1955

In Cubic Feet per Second

Day	June	July	August	September
1	17.0	0.3	0	10.2
2	22	0.3	0	7.8
3	23	0.2	0	5.7
4	21	0.2	1.1	4.4
5	16.7	0.2	5.8	3.6
6	10.7	2.5	1.8	2.5
7	5.2	0.6	1.8	2.5
8	1.2	0.4	1.8	1.0
9	1.2	0	5.8	0.5
10	1.2	0	4.8	0.5
11	0	0	3.7	0.5
12	0	0	2.8	0.5
13	0	0	2.3	0
14	0	0	1.4	1.8
15	0	0	5.4	2.0
16	0	0	7.3	2.2
17	0.3	0	7.9	2.2
18	0.3	0	5.3	2.1
19	0.3	0	4.6	2.2
20	0.3	0	4.6	N
21	3.4	0	3.9	O
22	2.0	0	3.9	
23	0.9	0	3.9	
24	0.9	0	2.7	R
25	0.2	0	1.4	E
26	0.1	0	0.7	C
27	0.3	0	0	O
28	0.3	0	0	R
29	0.3	0	1.8	D
30	0.3	0	1.8	
31		0	11.6	
Mean	4.3	0.2	3.2	2.8*
Runoff in acre-feet	256	9.3	198	104

* 19-day period

Total for period - 567 acre-feet

PLATE I

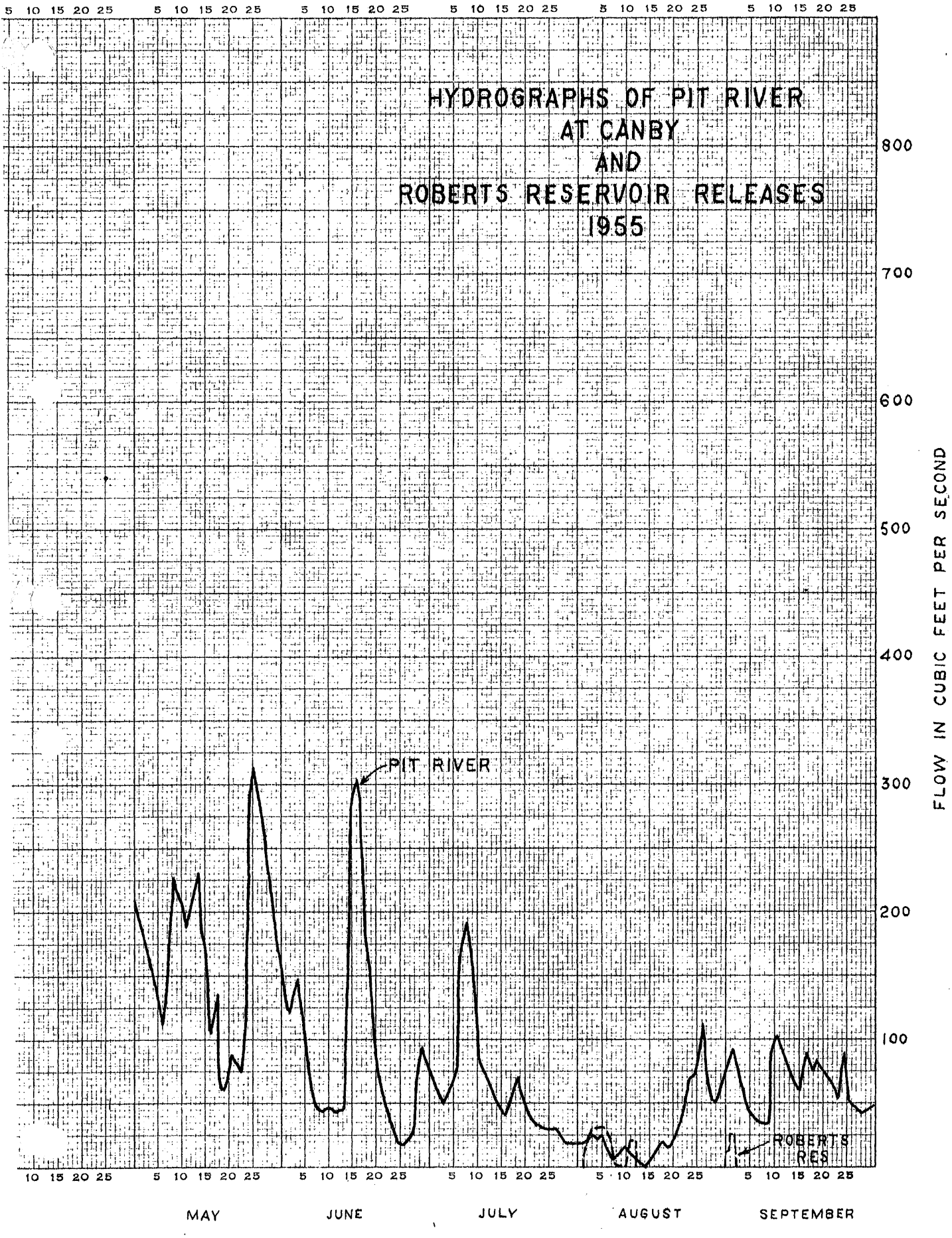
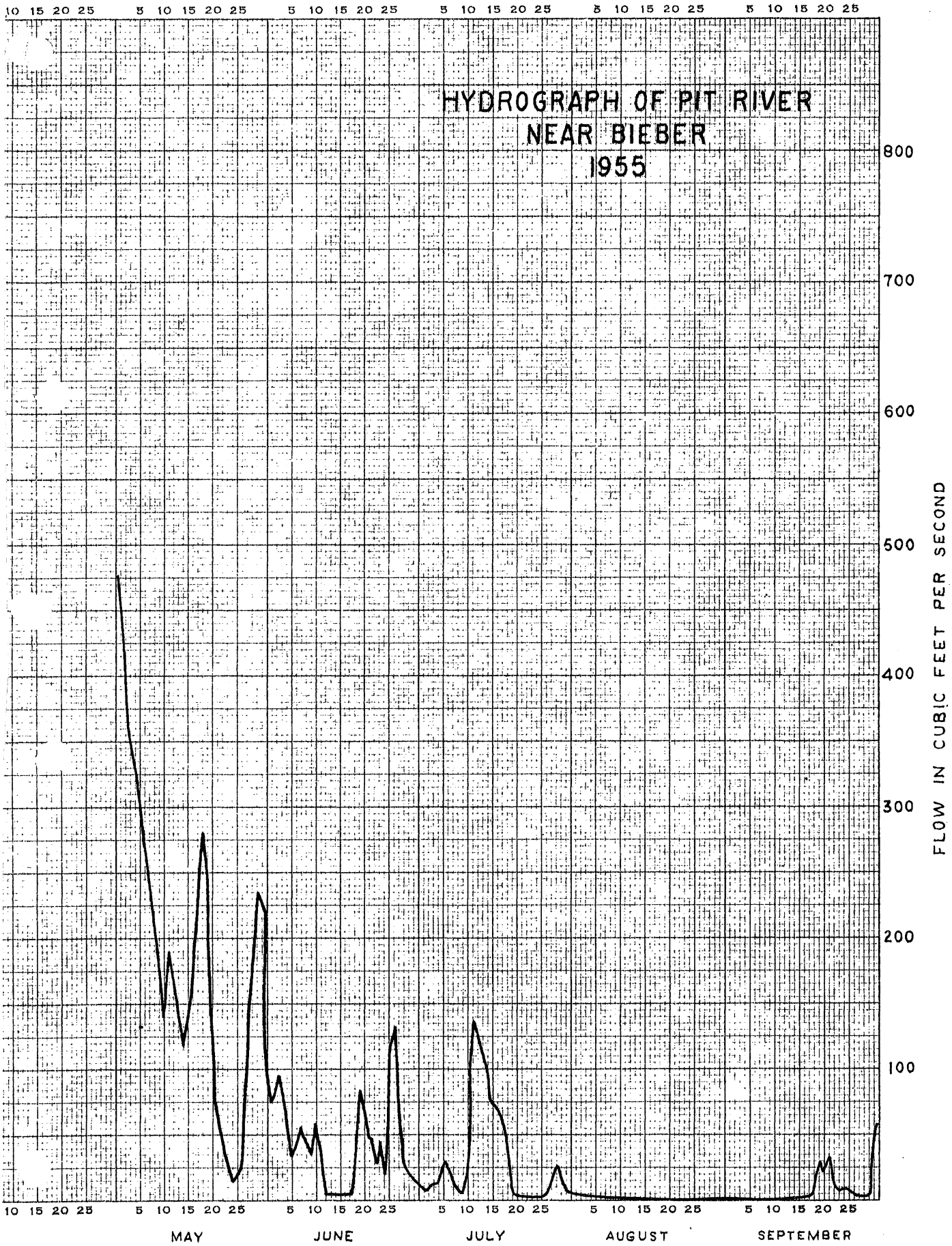

HYDROGRAPHS OF PIT RIVER
AT CANBY
AND
ROBERTS RESERVOIR RELEASES
1955
PIT RIVER
ROBERTS RES
FLOW IN CUBIC FEET PER SECOND
800
700
600
500
400
300
200
100
5 10 15 20 25
MAY
JUNE
JULY
AUGUST
SEPTEMBER

PLATE 2


HYDROGRAPH OF PIT RIVER
NEAR BIEBER
1955
10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25 5 10 15 20 25
800
700
600
500
400
300
200
100
FLOW IN CUBIC FEET PER SECOND
MAY
JUNE
JULY
AUGUST
SEPTEMBER