STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

GOODWIN J. KNIGHT, Governor
HARVEY O. BANKS, Director of Water Resources
M. J. SHELTON, Deputy Director of Water Resources

REPORT ON WATERMASTER SERVICE IN BUTTE CREEK WATERMASTER SERVICE AREA BUTTE COUNTY, CALIFORNIA 1957 SEASON

Sacramento, California
April, 1958

TABLE OF CONTENTS

	Page
SUBMISSION TO, AND ADOPTION BY DEPARTMENT OF WATER RESOURCES	iii
ORGANIZATION	iv
INTRODUCTION	1
WATER SUPPLY	1
Precipitation	2
Stream Flow	2
DISTRIBUTION OF WATER	5
Distribution Procedure	6
Parrott Ditch	7
U. S. Plant Garden Pump	8
Compton-Entler Ditch, Marybill Ditch and the Upper Colony Ditch	8
Van Nuys, Wakefield, and Baxter Pumps	9
Hansen Pump	9
Lower Colony Ditch	9
CHANGES IN OWNERSHIP OF LANDS AND WATER RIGHTS	10

APPENDIX

A. Water Supply and Use of Water

Table No.		
A-1	Precipitation at Chico, Butte County, California, 1956-1957	A-1
A-2	Daily Mean Discharge of Butte Creek above Lower Colony Dam	A-2
A-3	Daily Mean Discharge of Butte Creek at Durham Bridge	A-3

Table No.

A-4 Daily Mean Discharge of Lower Colony Ditch below Limpkes Ranch A-4

A-5 Daily Mean Discharge of Hamlin Slough at Adams Ranch A-5

A-6 Comparison of Deliveries of Water from Butte Creek to Allotments

a. Daily Mean Discharge of Butte Creek near Chico

b. Computed Daily Mean Discharge of Butte Creek above Parrott Ditch

c. Daily Mean Discharge of Hendricks Canal

d. Daily Mean Discharge of Butte Creek below Parrott Dam

e. Daily Mean Discharge of Parrott Ditch

f. Combined Daily Mean Discharge of Upper Colony and Lower Colony Ditches

May, 1957 . . . . . A-6

June, 1957 . . . . . A-7

July, 1957 . . . . . A-8

August, 1957 . . . . . A-9

September, 1957 . . . . . A-10

PLATES

1. Hydrographs of Butte Creek above Parrott Ditch - 1957

2. Hydrographs of Combined Flow of Upper and Lower Colony Ditches - 1957

SUBMISSION TO, AND ADOPTION BY
DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

I, William R. Gianelli, Chief, Water Rights Section, Department of Water Resources of the State of California, approve this "Report on Watermaster Service in Butte Creek Watermaster Service Area, Butte County, California, 1957 Season".

/s/ William R. Gianelli
Chief, Water Rights Section

I, Harvey O. Banks, Director of the Department of Water Resources, of the State of California, approve and adopt this "Report on Watermaster Service in Butte Creek Watermaster Service Area, Butte County, California, 1957 Season", as a report of the Department of Water Resources.

WITNESS my hand and the seal of the Department of Water Resources of the State of California, this 30th day of April 1958.

State of California
Department of Water Resources

/s/ Harvey O. Banks

HARVEY O. BANKS
Director

(SEAL)

ORGANIZATION

STATE DEPARTMENT OF WATER RESOURCES

Harvey O. Banks . . . . . .Director of Water Resources

M. J. Shelton . . . . . Deputy Director of Water Resources

The activity covered by this report is under the direction of

William R. Gianelli
Chief, Water Rights Section

This report was prepared under the supervision of

Orville L. Abbott
Supervising Watermaster

By

Floyd P. McFadin
Assistant Civil Engineer and Watermaster

P. A. Towner . . . . . Chief Counsel

Paul L. Barnes . . . . . Chief, Division of Administration

Isabel C. Nessler . . . . . Coordinator of Reports

INTRODUCTION

This is the fifteenth annual report on watermaster service in Butte Creek Watermaster Service Area and covers the period of water distribution in 1957 beginning May 15 and terminating September 30.

The service area was created by order of the Department of Public Works January 7, 1943, to include the water rights defined in Paragraphs 71 through 86 and in Schedule 7 of the decree entered November 6, 1942, in the proceeding entitled "In the Matter of the Determination of the Water Rights of the Various Claimants to the Waters of That Portion of Butte Creek and its Tributaries Situate above the Western Canal Dam near Nelson, in Butte County, California," Superior Court, Butte County, No. 18917. Watermaster service has been provided to administer the decree provisions during each irrigation season since the service area was created and reports prepared to show the results accomplished.

The report is presented under four headings as follows: Introduction, Water Supply, Distribution of Water, and Changes in Ownership of Lands and Water Rights. Appendix A presents records of precipitation and water supply in the area. Plates 1 and 2, respectively, present hydrographs of Butte Creek above Parrott Ditch at its intake, and the combined daily mean flows of the Colony ditches.

WATER SUPPLY

Water supply on Butte Creek was below normal at the beginning of the 1957 season. Heavy rains occurred in the upper tributary regions during the latter part of May. This unanticipated heavy rain caused damage to some water right owners along Butte Creek.

Precipitation

Monthly precipitation data at Chico, California, as compiled from records of the United States Weather Bureau are presented in Table A-1. The total precipitation for the 1956-1957 season was 78.7 per cent of the mean for this station.

Stream Flow

Water supply and diversion records were collected at nine stations equipped with water stage recorders in 1957. The location of the stations and their purposes are as follows:

Butte Creek near Chico. This station, located below the confluence of Butte Creek and Little Butte Creek, is used by the United States Geological Survey to measure the combined foreign water and natural flow of Butte Creek two and one-half miles above Parrott Ditch. This station was not used for distribution purposes during the 1957 irrigation season as experience has shown that the flow at this station has differed in past years with the measured flow above Parrott Ditch. It is believed that a more accurate measurement of the water available for distribution at this point is obtained by adding flows measured by a ten-foot Parshal flume at the head of Parrott Ditch, and the flow measured at an accurately rated station in Butte Creek below Parrott Ditch. This computed daily mean discharge is presented in Table A-6.

The discharge at this station is comprised of natural flow of Butte Creek and foreign water brought into Butte Creek through Hendricks Canal, Flow in Hendricks Canal, designated as Toadtown Canal on the records of the Pacific Gas and Electric Company, is released into Butte Creek as

needed to supply power demands of the company. Daily mean discharge at this station is presented in Table A-6.

Hendricks Canal. This station is located on Hendricks Canal a short distance above its confluence with Butte Creek Canal above De Sabla Reservoir. Discharge at the station consists of foreign water brought into the Butte Creek watershed from West Branch Feather River and is measured by an eight-foot Parshal flume equipped with an automatic water stage recorder. This recorder station and Parshal flume, which is referred to as Gage No. BW-12 on the records of the Pacific Gas and Electric Company, is maintained and operated by that company, and a copy of the recorded flow is forwarded to the Department of Water Resources each month.

Each Monday during the summer season, the watermaster obtains the daily discharges for the past seven days from the Pacific Gas and Electric Company. Daily mean discharge at this station is presented in Table A-6.

Parrott Ditch. This station is located near the head of Parrott Ditch above the Crouch and Hale Ditches. The record of discharge, as measured by a ten-foot Parshal flume, shows the amount of water diverted for use by the Parrott, M. & T. Inc., Dayton Mutual Water Company, and Taylor (Hale) interests. Daily mean discharge at this station is presented in Table A-6.

Butte Creek below Parrott Ditch. This station is located above the Skyway Highway Bridge, about one and one-half miles below the Parrott Ditch. The record of discharge represents the water supply available for natural flow rights on Butte Creek below Parrott Ditch. Daily mean discharge at this station is presented in Table A-6.

Upper Colony Ditch. This station is located near the head of Upper Colony Ditch. The record of discharge represents a portion of the

water diverted by Durham Mutual Water Company. Combined daily mean flows of Upper Colony and Lower Colony Ditches are presented in Table A-6.

Butte Creek above Lower Colony Dam. This station was installed at the first of the season and was used through the summer to assist in measuring the flow diverted by Durham Mutual Water Company through the Lower Colony Ditch. This was accomplished by taking the flow passing the recorder at this station and subtracting the flow of Butte Creek at Durham Bridge, the next downstream station. This operation was continued until the early part of July when this latter station was abandoned because of backwater effects from a swimming dam built in Butte Creek at Durham Bridge. In lieu of this station, another station was rated and established in the Lower Colony Ditch below Limpkes Ranch. This station was used in conjunction with the Butte Creek above Lower Colony Dam to regulate flows into the Lower Colony Ditch throughout the remainder of the season.

Lower Colony Ditch. Lower Colony Ditch is used by the Durham Mutual Water Company to divert that part of its allotment not taken through the Upper Colony Ditch. Combined daily mean flows of Lower and Upper Colony Ditches are presented graphically on Plate 2.

Butte Creek at Durham Bridge. This station is located on Butte Creek above the Oroville-Durham highway bridge. The record of discharge represents the water supply available for diversion at the Brandt Pump, Adams Ditch, Corrill Ditch, and E. E. White Pumps.

This station was abandoned in the early part of July, as explained above. Flows passing this station were computed by subtracting flows in the Lower Colony Ditch at Limpkes Station from the flows passing the Butte Creek above Lower Colony Dam Station.

Daily mean discharges at this station for the period May 15 through July 10 are presented in Table A-3.

Lower Colony Ditch below Limpkes Ranch. This station was put in operation July 10 to take the place of the abandoned station on Butte Creek at Durham Bridge.

Hamlin Slough at Adams Ranch. This station is located on Hamlin Slough at Adams Ranch. The record of discharge shows the water supply of Hamlin Slough available for diversion by the Gorrill Ranch. The flow consists of Gorrill's allotment, when this is diverted at Adams Dam, plus natural flow of Hamlin Slough, plus some well water from the Adams Ranch, and return flow from Durham Mutual Water Company lands and Adams Ranch. Daily mean discharge at this station is presented in Table A-5.

DISTRIBUTION OF WATER

Distribution during the 1957 season was based on the computed mean discharge of Butte Creek above Parrott Dam as presented in Table A-6. The discharge at this station was computed by adding the discharge of Parrott Ditch as presented in Table A-6, and the discharge of Butte Creek below Parrott Ditch as presented in Table A-6. The flow at this station is comprised of the natural flow of Butte Creek, together with foreign water diverted from West Branch of Feather River through Hendricks Canal.

Water was available to supply all demands, including surplus rights, until the middle of June. From then until the first week of August, the flow was sufficient, to fill all priorities. All first priorities were filled until the first week of September; however, rainfall supplemented the low flows of September to give the water right owners a sufficient amount of water to complete their irrigation season.

Hydrographs of the flow of Butte Creek near Chico (United States Geological Survey Station) and the computed flow of Butte Creek above Parrott Ditch are shown on Plate 1.

Distribution Procedure

It is the practice to pass the natural flow allotments of Butte Creek water right owners below Parrott Ditch through Parrott Dam without fluctuation. The foreign water in the creek is all diverted into Parrott Ditch along with the natural flow allotment for the ditch. The foreign water is regulated through De Sabla Reservoir to supply peak power demands, resulting in wide variations in discharge during periods when the natural flow of Butte Creek is low. The Parrott Dam and diversion structure, however, maintains the natural flow of the creek below the dam without fluctuation.

The weekly average natural flow of Butte Creek is determined by averaging the computed daily discharge of Butte Creek above Parrott Ditch over a seven-day period and deducting the weekly average discharge of Hendricks Canal less five per cent. Table A-6 presents this computation. The seven-day period used extended from Monday through Sunday as the reservoir was generally recharged over the weekends.

Inflow to Butte Creek from Hendricks Canal varied from a daily mean of 94 second-feet on May 19 to 61 second-feet on September 8. The weekly average natural flow of Butte Creek reached a low of 85 second-feet during the week starting September 2.

According to the "Memorandum and Order" entered May 10, 1949, by the Superior Court, Butte County, full natural flow allotments of the users below Parrott Dam must be provided at all times without undue fluctuation caused by intermittent presence of foreign water. It is believed that regulations, as accomplished under conditions existing during this season, resulted in a minimum measurable fluctuation below Parrott Dam.

During the latter part of the irrigation season, the Darrough Construction Company under contract with the United States Corp of Engineers relocated and constructed levees on the lower portion of Butte Creek. The construction of levees took place on that portion of Butte Creek lying between the Durham Bridge and Gorrill Dam. During August water was needed by the company to add mositure to the fill material being placed in the new levees. The watermaster, in cooperation with the Parrott Investment Company, Durham Mutual Water Company, and E. L. Adams made arrangements to supply approximately two second-feet to the Darrough Construction Company during the period of low flow. This made it possible for the company to continue work at a time when the limited available supply would have forced the discontinuance of work until water was available later in the season.

A summary of the distribution of water and the regulation of diversions in order to insure compliance with the "Memorandum and Order" entered May 10, 1949, follows.

Parrott Ditch

Regulation of the Parrott Ditch was accomplished by a combination weir and orifice structure in the head of the Parrott Ditch, and a combination orifice and fish ladder in the north abutment of Parrott Dam. A removable and adjustable submerged gate was installed in the fish ladder orifice for simpler and more accurate regulation of natural flow passing Parrott Ditch. These structures were adjusted so that during periods of daily high flow (i.e. when foreign water was present) the water level above Parrott Dam rose and allowed the major portion of the foreign water to flow freely over the weir into the ditch. During the time that water was discharging over the weir, the increased

water level above Parrott Dam also forced slightly more water through the orifice in Parrott Dam which had been adjusted for low flow conditions. However, during the 1957 season very little foreign water was lost by the Parrott Ditch in this manner. The natural flow allotment for the Parrott Ditch was discharged through an orifice installed in the structure at the head of Parrott Ditch, assuring them their natural flow allotment when the foreign water flows were at a minimum.

Hydrographs on Plate 1 show daily mean flow of Butte Creek near Chico (United States Geological Survey station) and Butte Creek above Parrott Ditch.

U. S. Plant Garden Pump

Plant Garden pump, rated at 1,000 gallons per minute, operated approximately six hours a day, five days a week throughout the 1957 season. This represents a use considerably less than their allotment (2.0 cubic feet per second, first priority) and consequently no regulation of this diversion was required.

Compton-Entler Ditch, Marybill Ditch and the Upper Colony Ditch

These three diversions are located on Butte Creek immediately above Upper Colony Dam.

The Marybill Ditch and Compton-Entler Ditch diverted their full allotment throughout the season. Flood damage of 1955 was repaired before the 1957 season started. These repairs eliminated most of the problems encountered during 1956 at the Upper Colony Dam and the Marybill, Compton-Entler diversion structure.

Durham Mutual Water Company chose to divert approximately 70 per cent of the water to which it was entitled through the Upper Colony Ditch, and regulation was done throughout the season on this basis. The remainder of the allotment together with allotments of users below Upper Colony Dam were passed over and through the dam.

Van Nuys, Wakefield, and Baxter Pumps

These pumps, located between Upper and Lower Colony Ditches, have an aggregate total first priority allotment of 4.61 second-feet. The pumps operated largely during the daylight hours with the exception of the Baxter Pump, which was operated at night at the suggestion of the watermaster. This helped reduce the fluctuation of the creek due to operation of the pumps. The average amounts diverted by the pumps was about equal to their continuous flow allotment. Very little regulation was required in 1957.

Hansen Pump

This pump has only a surplus allotment with no first priority right. Water was diverted until July 9, at which time the pump was shut off by the watermaster.

Lower Colony Ditch

Lower Colony Dam was maintained at a height of about three and one-half feet, thus providing considerable storage in the rather flat channel behind the dam. The Lower Colony Ditch headgates were regulated to provide Durham Mutual Water Company with the remainder of the water to which it was entitled through the irrigation season.

Daily mean flow reaching the pool above Lower Colony Dam was never less than the amount required to fill the Durham Mutual Water Company's share of the available supply.

The amount diverted by Durham Mutual Water Company is presented in Table A-6.

CHANGES IN OWNERSHIP OF LANDS AND WATER RIGHTS

The changes in ownership of lands and water rights which will be included in "Statement for Butte Creek Watermaster Service Area, County of Butte, California," for 1958 are listed in the following tabulation:

Tract no.	Name of water right owner appearing in 1957 statement	Name of water right owner to appear in 1958 statement	Amount of water in second-feet
13-18	Hook, D.A. and Hook W. S.	Bell, J. C.	0.39
13-25	Estate of Bee P. Compton	Patrick, Gerrison	3.33
13- 4	White, E. E.	White, Minnie M.	10.50

APPENDIX A

RECORDS OF WATER SUPPLY AND USE OF WATER

Table No.		Page
A-1	Precipitation at Chico, Butte County, California, 1956-1957	A-1
A-2	Daily Mean Discharge of Butte Creek above Lower Colony Dam	A-2
A-3	Daily Mean Discharge of Butte Creek at Durham Bridge	A-3
A-4	Daily Mean Discharge of Lower Colony Ditch below Limpkes Ranch	A-4
A-5	Daily Mean Discharge of Hamlin Slough at Adams Ranch . . .	A-5
A-6	Comparison of Deliveries of Water from Butte Creek to Allotments	
	a. Daily Mean Discharge of Butte Creek near Chico	
	b. Computed Daily Mean Discharge of Butte Creek above Parrott Ditch	
	c. Daily Mean Discharge of Hendricks Canal	
	d. Daily Mean Discharge of Butte Creek below Parrott Dam	
	e. Daily Mean Discharge of Parrott Ditch	
	f. Combined Daily Mean Discharge of Upper Colony and Lower Colony Ditches	
	May, 1957	A-6
	June, 1957	A-7
	July, 1957	A-8
	August, 1957	A-9
	September, 1957	A-10

TABLE A-1

PRECIPITATION AT CHICO, BUTTE COUNTY, CALIFORNIA

1956 - 1957

In Inches

Month	Mean precipitation	Precipitation 1956 - 1957
October	1.30	1.54
November	2.65	0.04
December	4.50	0.07
January	4.70	4.74
February	4.15	3.86
March	3.21	2.60
April	1.78	1.57
May	0.99	1.80
June	0.41	0.02
July	0.02	0
August	0.03	0
September	0.48	2.82
TOTALS	24.22	19.06

TABLE A-2

DAILY MEAN DISCHARGE OF BUTTE CREEK
ABOVE LOWER COLONY DAM

May 15 to September 15, 1957

In Second-Feet

Day	May	June	July	August	September
1	N	287	52	26	25
2	O	258	52	25	24
3		232	51	26	11
4	R	218	50	28	12
5	E	192	50	39	9
	C				
6	O	385	50	38	6
7	R	171	51	35	5
8	D	162	43	36	14
9		152	35	35	13
10		166	40	35	11
11		135	37	37	9
12		114	38	28	12
13		99	38	15	16
14		97	36	16	22
15	197	87	36	22	27
16	193	87	36	19	N
17	181	82	45	21	O
18	2079	73	38	22	
19	1970	67	36	18	R
20	1256	63	35	14	E
					C
21	943	63	46	16	O
22	780	54	45	17	R
23	647	51	41	18	D
24	563	45	41	20	
25	501	51	40	18	
26	457	54	40	14	
27	410	57	40	15	
28	382	57	42	15	
29	348	53	36	19	
30	331	44	31	20	
31	317	-	26	20	
Mean	668[a]	122	41	23	14[b]
Runoff ac-ft	22,500	7,260	2,520	1,410	420

a. 17-day period.
b. 15-day period.

Total for period - 34,110 acre-feet

TABLE A-3

DAILY MEAN DISCHARGE OF BUTTE CREEK
AT DURHAM BRIDGE

May 15 to July 10, 1957

In Second-Feet

Day	April	May	June	July
1	N	N	266	34
2	O	O	236	33
3			209	34
4	R	R	195	34
5	E	E	169	30
	C	C		
6	O	O	64	32
7	R	R	151	34
8	D	D	142	23
9			132	15
10			145	21
11			116	N
12			95	O
13			79	
14			79	R
15		173	71	E
				C
16		173	72	O
17		161	67	R
18		2058	55	D
19		1947	48	
20		1232	45	
21		919	49	
22		754	39	
23		625	39	
24		538	33	
25		476	39	
26		432	32	
27		386	34	
28		358	34	
29		325	40	
30		309	29	
31		294	-	
Mean		656[a]	93	29[b]
Runoff ac-ft		22,120	5,530	580

a. 17-day period.
b. 10-day period.

Total for period - 28,230 acre-feet

TABLE A-4

DAILY MEAN DISCHARGE OF LOWER COLONY DITCH
BELOW LIMPKES RANCH

July 11 to September 15, 1957

In Second-Feet

Day	July	August	September
1	N	20	23
2	O	20	22
3		21	11
4	R	19	12
5	E	26	8
	C		
6	O	23	5
7	R	20	5
8	D	19	14
9		19	13
10		20	11
11	20	22	9
12	24	27	12
13	22	14	16
14	22	15	22
15	20	21	27
16	21	18	N
17	22	20	O
18	24	21	
19	25	18	R
20	25	14	E
			C
21	25	16	O
22	26	17	R
23	26	19	D
24	22	17	
25	22	14	
26	22	12	
27	23	13	
28	23	13	
29	23	17	
30	22	18	
31	22	17	
Mean	23[a]	18	14[b]
Runoff ac-ft	960	1,130	416

a. 21-day period.
b. 15-day period.

Total for period - 2,506 acre-feet.

TABLE A-5

DAILY MEAN DISCHARGE OF HAMLIN SLOUGH
AT ADAMS RANCH

May 27 to August 15, 1957

In Second-Feet

Day	May	June	July	August
1		27	26	6
2	N	24	27	5
3		22	16	5
4	O	24	13	5
5		25	16	3
6		24	14	4
7	R	23	19	3
8		22	8	3
9	E	19	8	5
10		24	6	4
	C			
11		25	6	3
12	O	25	5	3
13		28	8	2
14	R	27	7	2
15		25	5	2
	D			
16		24	5	
17		19	4	N
18		14	4	
19		10	4	O
20		11	4	
21		12	4	
22		13	4	R
23		14	5	
24		17	6	E
25		19	5	
				C
26	-	19	5	
27	20	25	5	O
28	25	26	5	
29	27	27	5	R
30	28	26	5	
31	28	-	6	D
Mean	26[a]	21	8	4[b]
Runoff ac-ft	260	1,250	490	120

a. 5-day period.
b. 15-day period.

Total for period - 2,120 acre-feet.

TABLE A-6

COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS

MAY 1957

In Cubic Feet Per Second

Day	Flow at U.S.G.S. station a.	Total flow above Parrott Ditch b.	Flow in Hendricks Ditch c.	Hendricks Canal less 5% (mean)	Natural flow of Butte Creek (mean)	Butte Creek below Parrott Dam: Nat. flow allotment (mean)	Butte Creek below Parrott Dam: Flow delivered d.	Parrott Ditch: Nat. flow allotment (mean)	Parrott Ditch: Total allotment (mean)	Parrott Ditch: Flow delivered e.	Durham Colony Ditches: Nat. flow allotment (mean)	Durham Colony Ditches: Flow delivered f.
15	405	405	78				270			135		63
16	387	387	80				256			131		63
17	375	375	81	75	1046	902	244	144	219	131	51.25	63
18	2290	2290	64				2141			149		65
19	2150	2150	92				2032			118		65
20	1440	1440	94				1311			129		59
21	1120	1120	93				996			124		57
22	952	952	87				830			122		56
23	824	824	84	84	820	676	707	144	228	117	51.25	52
24	720	720	85				613			107		55
25	660	660	86				554			106		58
26	615	615	86				510			105	58	58
27	570	570	88				465			105		59
28	542	542	89				437			105		59
29	521	521	87				417			104		61
30	494	494	90				391			103		62
31	480	480	88				377			103		63
				84	413	269		144	228		51.25	

TABLE A-7

COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS

JUNE 1957

In Cubic Feet Per Second

Day	Flow at U.S.G.S. station a.	Total flow above Parrott Ditch b.	Flow in Hendricks Ditch c.	Hendricks Canal less 5% (mean)	Natural flow of Butte Creek (mean)	Butte Creek below Parrott Dam: Nat. flow allotment (mean)	Butte Creek below Parrott Dam: Flow delivered d.	Parrott Ditch: Nat. flow allotment (mean)	Parrott Ditch: Total allotment (mean)	Parrott Ditch: Flow delivered e.	Durham Colony Ditches: Nat. flow allotment (mean)	Durham Colony Ditches: Flow delivered f.
1	448	448	89				347			101		61
2	423	423	87				318			105		62
3	399	400	86				291			109		62
4	387	387	88				278			109		63
5	363	363	85				251			112		62
6	557	560	87	82	308	164	444	144	226	116	51.25	60
7	345	348	86				232			116		61
8	333	340	86				225			115		63
9	327	330	86				215			115		63
10	345	345	86				230			115		65
11	315	315	87				199			116		65
12	298	300	86				183			117		67
13	293	295	86	82	216	131	176	85	167	119	51.25	72
14	288	287	86				168			119		73
15	276	275	84				160			115		76
16	271	271	84				154			117		74
17	260	260	86				149			111		73
18	251	252	82				138			114		76
19	246	250	82				133			117		77
20	246	248	83	78	165	131	131	34	111	117	51.25	76
21	236	237	82				120			117		73
22	232	227	79				107			120		73
23	227	227	79				107			120		68
24	227	227	81				110			117		66
25	218	219	83				113			106		63
26	213	215	80				113			102		69
27	209	211	80	74	140	121	116	19	93	95	51.25	66
28	205	211	79				113			98		62
29	205	211	74				105			106		61
30	190	203	70				89			114		59

TABLE A-8

COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS

JULY 1957

IN CUBIC FEET PER SECOND

Day	Flow at U.S.G.S. station a.	Total flow above Parrott Ditch b	Flow in Hendricks Ditch c.	Hendricks Canal less 5% (mean)	Natural flow of Butte Creek (mean)	Butte Creek below Parrott Dam: Nat. flow allotment (mean)	Butte Creek below Parrott Dam: Flow delivered d.	Parrott Ditch: Nat. flow allotment (mean)	Parrott Ditch: Total allotment (mean)	Parrott Ditch: Flow delivered e.	Durham Colony Ditches: Nat. flow allotment (mean)	Durham Colony Ditches: Flow delivered f.
1	202	211	67				111			100		64
2	194	201	72				117			84		68
3	186	184	69				108			76		66
4	183	176	67	65	123	104	109	19	84	67	51.25	66
5	179	180	65				112			68		70
6	179	184	68				112			72		68
7	183	183	68				112			71		67
8	175	198	67				108			90		64
9	175	182	68				87			95		64
10	175	184	66				93			91		67
11	175	184	64	64	121	102	93	19	83	91	51.25	60
12	175	184	65				93			91		58
13	175	183	67				93			90		59
14	169	179	69				93			86		59
15	169	179	68				93			86		61
16	169	174	67				94			80		64
17	166	181	65				98			83		64
18	166	176	64	63	113	94	92	19	82	84	51.25	64
19	166	175	64				92			83		67
20	166	173	66				93			80		68
21	166	171	67				96			75		66
22	166	168	67				92			76		65
23	160	166	67				89			77		67
24	169	176	65				90			86		63
25	166	167	67	62	104	85	89	19	81	78	51.25	57
26	166	167	62				89			78		59
27	151	157	66				89			68		60
28	160	162	64				88			73		60
29	160	165	64				89			76		60
30	160	164	63				80			84		56
31	151	152	67				79			76		59

TABLE A-9

COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS

AUGUST 1957

In Cubic Feet Per Second

Day	Flow at U.S.G.S. station a.	Total flow above Parrott Ditch b.	Flow in Hendricks Ditch c.	Hendricks Canal less 5% (mean)	Natural flow of Butte Creek (mean)	Butte Creek below Parrott Dam: Nat. flow allotment (mean)	Butte Creek below Parrott Dam: Flow delivered d.	Parrott Ditch: Nat. flow allotment (mean)	Parrott Ditch: Total allotment (mean)	Parrott Ditch: Flow delivered e.	Durham Colony Ditches: Nat. flow allotment (mean)	Durham Colony Ditches: Flow delivered f.
1	157	160	67	63	95	76	77	19	82	83	51.25	58
2	148	151	67				76			75		58
3	157	157	66				77			80		59
4	160	159	65				77			82		58
5	154	156	65				78			78		65
6	157	160	67				77			83		61
7	157	161	65				73			88		55
8	154	157	64	63	95	76	72	19	82	85	51.25	55
9	157	163	67				73			90		54
10	160	164	67				74			90		55
11	145	148	67				74			74		59
12	157	156	66				78			78		66
13	145	143	66				68			75		47
14	154	155	66				70			85		48
15	148	153	64	63	89	70	70	19	82	83	51.25	54
16	148	154	67				70			84		51
17	148	155	66				71			84		53
18	145	151	65				70			81		54
19	145	154	61				69			85		52
20	140	150	61				69			81		48
21	140	153	68				69			84		50
22	143	153	68	63	89	70	70	19	82	83	51.25	52
23	148	154	68				69			85		53
24	143	152	67				69			83		51
25	140	149	67				69			80		48
26	145	155	68				69			86		46
27	145	153	65				70			83		48
28	145	149	66				70			79		48
29	148	154	65	63	90	71	71	19	82	83	51.25	51
30	143	153	67				71			82		53
31	148	153	67				72			81		53

TABLE A-10

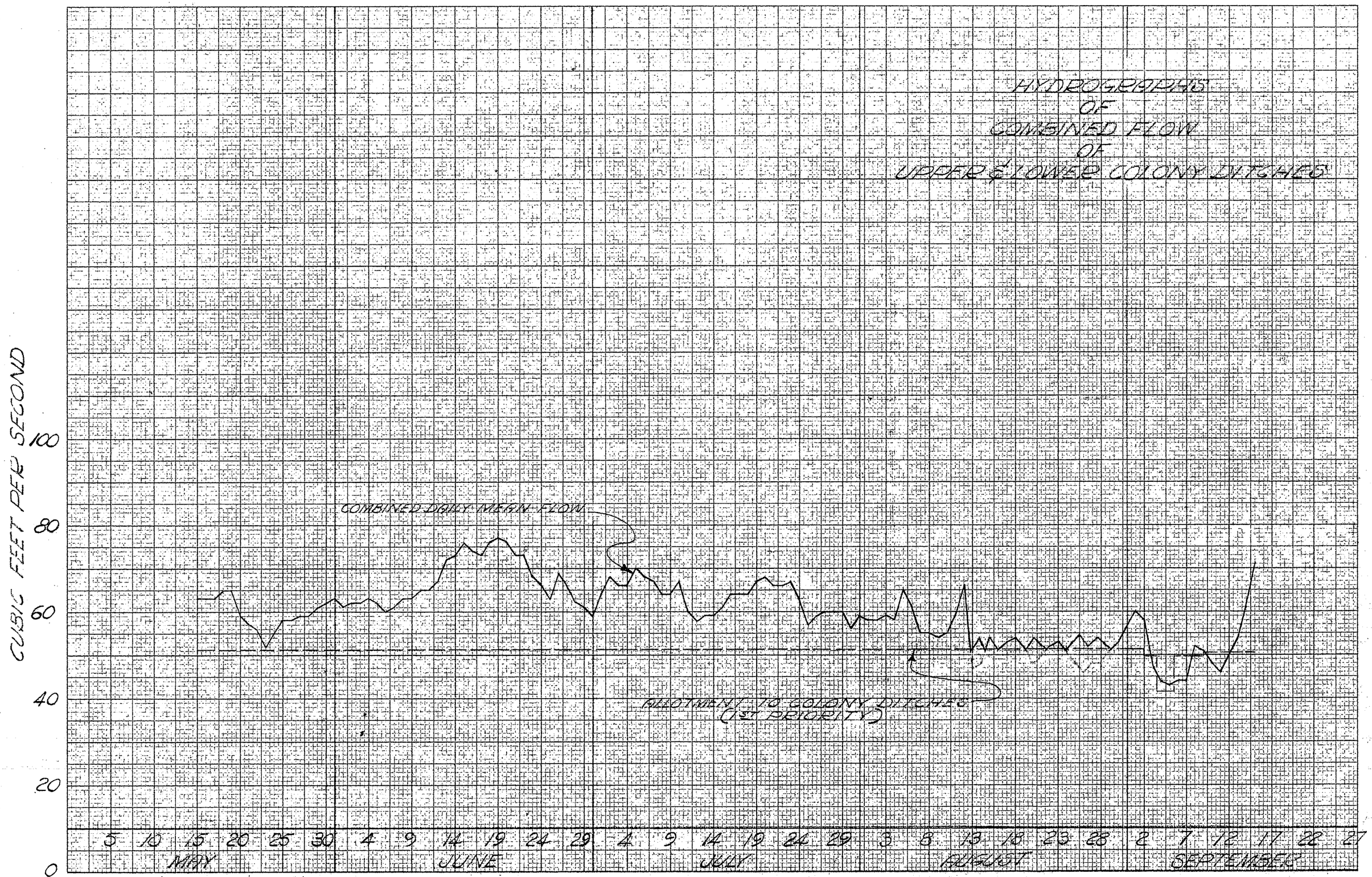
COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS

SEPTEMBER 1957

In Cubic Feet Per Second

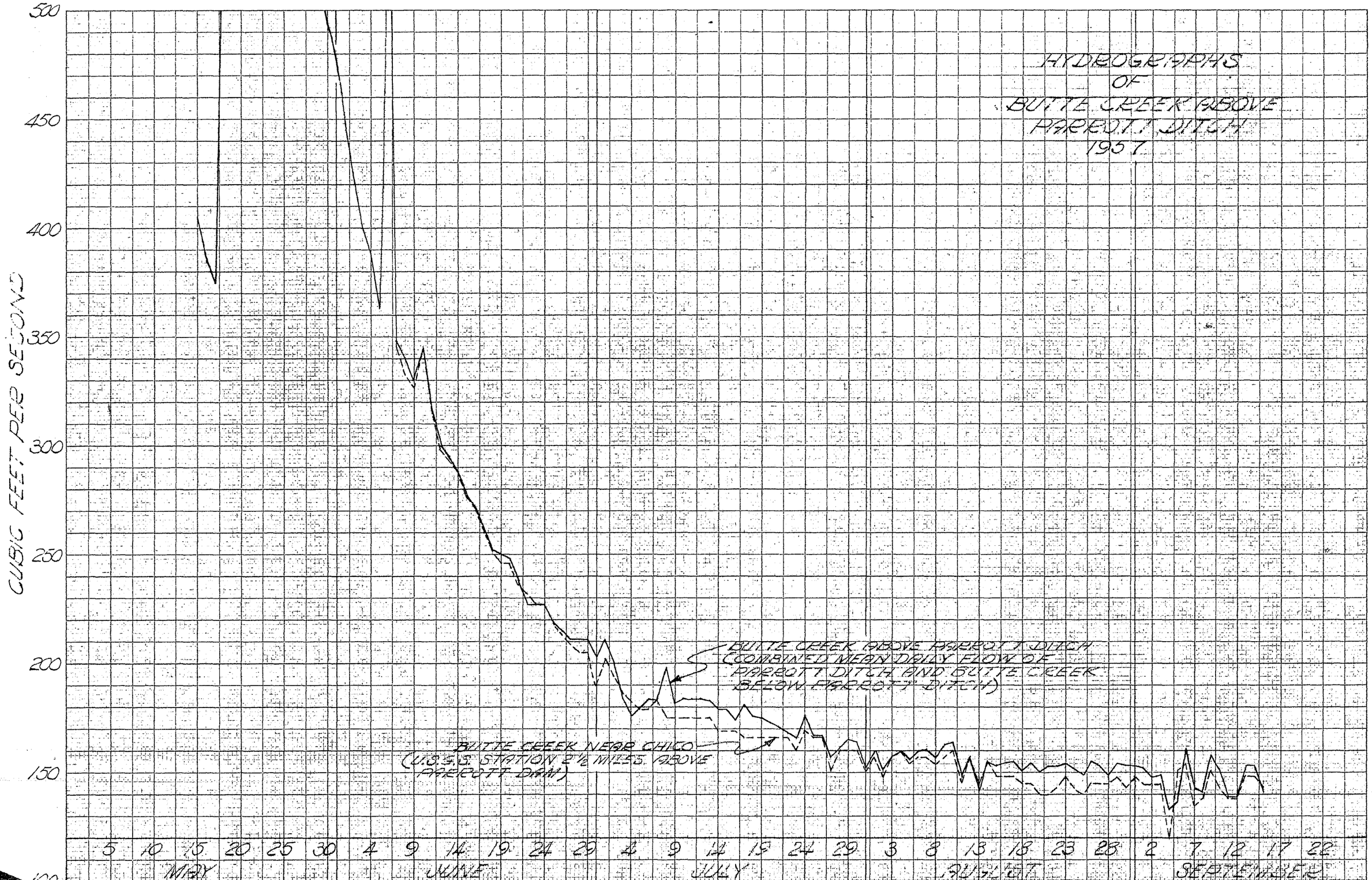
Day	Flow at U.S.G.S. station a.	Total flow above Parrott Ditch b	Flow in Hendricks Ditch c.	Hendricks Canal less 5% (mean)	Natural flow of Butte Creek (mean)	Butte Creek below Parrott Dam: Nat. flow allotment (mean)	Butte Creek below Parrott Dam: Flow delivered c.	Parrott Ditch: Nat. flow allotment (mean)	Parrott Ditch: Total allotment (mean)	Parrott Ditch: Flow delivered e.	Durham Colony Ditches: Nat. flow allotment (mean)	Durham Colony Ditches: Flow delivered f.
1	145	152	67				74			78		60
2	145	148	66				69			79		58
3	145	149	65				68			81		47
4	121	133	64				65			68		44
5	151	137	60	60	85	67	66	18	78	71	49.82	43
6	154	161	61				68			93		44
7	135	143	61				67			76		44
8	138	141	61				67			74		52
9	151	158	61				68			90		51
10	143	151	62				68			83		48
11	138	139	61				66			73		46
12	138	139	61	61	87	68	66	19	80	73	50.57	50
13	148	153	64				67			86		54
14	148	153	69				71			82		61
15	143	141	68				73			68		70

PLATE 2



ENGRAVING 334-3, 10 X 10 TO THE HALF INCH.
WHEN ORDERING STATE COLOR, DRAWING OR TRACING PAPER.
KEUFFEL & ESSER CO. MADE IN U.S.A.
100% RAG PAPER

PLATE 1



ENGRAVING 334-3, 10 X 10 TO THE HALF INCH.
WHEN ORDERING STATE COLOR, DRAWING OR TRACING PAPER.
MADE IN U.S.A.
100% RAG PAPER

KEUFFEL & ESSER CO. N. Y.