STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

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REPORT ON WATERMASTER SERVICE IN BUTTE CREEK WATERMASTER SERVICE AREA BUTTE COUNTY, CALIFORNIA 1953 SEASON

Sacramento, California
January, 1955

TABLE OF CONTENTS

	Page
SUBMISSION TO, AND ADOPTION BY DEPARTMENT OF PUBLIC WORKS	iii
ORGANIZATION	iv
INTRODUCTION	1
WATER SUPPLY	2
Precipitation	2
Stream Flow	2
DISTRIBUTION OF WATER	5
Distribution Procedure	5
CHANGES IN OWNERSHIP OF LANDS AND WATER RIGHTS	9

TABLES

1.	Precipitation at Chico, Butte County, California, 1952-53	11
2.	Daily Mean Discharge of Butte Creek Near Chico, California	12
3.	Daily Mean Discharge of Hendricks Canal	13
4.	Daily Mean Discharge of Parrott Ditch	14
5.	Daily Mean Discharge of Butte Creek Below Parrott Dam	15
6.	Daily Mean Discharge of Upper Colony Ditch	16
7.	Daily Mean Discharge of Butte Creek Above Lower Colony Dam	17
8.	Daily Mean Discharge of Lower Colony Ditch	18
9.	Combined Daily Mean Discharge of Upper and Lower Colony Ditches	19
10.	Daily Mean Discharge of Butte Creek at Durham Bridge	20
11.	Daily Mean Discharge of Butte Creek Below Adams Dam	21
12.	Daily Mean Discharge of Hamlin Slough at Adams Ranch	22

TABLE OF CONTENTS (Continued)

Page

13. Comparison of Deliveries of Water From Butte Creek to Allotments.

Sheet 1 - June 1953 23

Sheet 2 - July 1953 24

Sheet 3 - August 1953 25

Sheet 4 - September 1953 26

PLATES

1. Hydrographs of Butte Creek at United States Geological Survey Station and Butte Creek Below Parrott Dam Showing Daily Mean Flow at Both Stations With Daily Minimum Flow and Allotments Below Parrott Dam - 1953.

2. Hydrographs of Parrott Ditch Showing Daily Mean, Daily Maximum and Daily Minimum Flows Compared with Total and Natural Flow Alltoments - 1953.

3. Hydrographs of Combined Flow, Upper and Lower Colony Ditches Showing Daily Mean and Daily Minimum Flows and Allotment of the Colony Ditches - 1953.

SUBMISSION TO, AND ADOPTION BY
DEPARTMENT OF PUBLIC WORKS

I, L. C. Jopson, Principal Hydraulic Engineer, Division of Water Resources, Department of Public Works of the State of California, submit this "Report on Watermaster Service in Butte Creek Watermaster Service Area, Butte County, California, 1953 Season".

/s/ L. C. Jopson
Principal Hydraulic Engineer

I, Harvey O. Banks, Assistant State Engineer, Division of Water Resources, Department of Public Works of the State of California, approve this "Report on Watermaster Service in Butte Creek Watermaster Service Area, Butte County, California, 1953 Season".

/s/ Harvey O. Banks
Assistant State Engineer

I, A. D. Edmonston, State Engineer and Chief of the Division of Water Resources, Department of Public Works of the State of California, approve and adopt this "Report on Watermaster Service in Butte Creek Watermaster Service Area, Butte County, California, 1953 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 20th day of January , 1955.

DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

By /s/ A. D. Edmonston
A. D. Edmonston
State Engineer

(SEAL)

ORGANIZATION

STATE DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

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INTRODUCTION

This report describes the eleventh season of watermaster service in Butte Creek Watermaster Service Area and covers the period of water distribution beginning about June 1 and ending September 30, 1953.

The service area was created by order of the Department of Public Works on 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 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 during each irrigation season since the service area was created.

The report is presented herein under four headings as follows: Introduction, Water Supply, Distribution of Water, and Changes in Ownership of Lands and Water Rights. Following the text are tables presenting precipitation and water supply records in the area and plates showing hydrographs of Butte Creek at United States Geological Survey station near Chico, Butte Creek below Parrott Dam, Parrott Ditch at head, and of the combined flow of the Colony ditches.

WATER SUPPLY

Precipitation

Monthly precipitation data at Chico, California, as compiled from records of the United States Weather Bureau are presented in Table 1. The total precipitation for the 1952-53 season was 109.1 per cent of the normal for this station.

Stream Flow

Water supply and diversion records were collected at ten stations equipped with water stage recorders in 1953. The location of the stations and their purposes are as follows:

Butte Creek Near Chico (U. S. Geological Survey Station). This station, located below the confluence of Butte Creek and Little Butte Creek, is used to measure the combined foreign water and natural flow which is available at the Parrott Dam located 2-1/2 miles downstream.

Discharge at the station is comprised of natural flow of Butte Creek and foreign water brought into the stream system from the West Branch of Feather River. The foreign water is controlled by the Pacific Gas and Electric Company and is released into Butte Creek as needed to supply power demands of that company. Daily mean discharge from May 1 through September 30 is set forth in Table 2.

Hendricks Canal. This station is located on Hendricks Canal (also known as Toadtown 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. A new 8-foot parshall

flume, equipped with an automatic water level recording device was built by the Pacific Gas and Electric Company at the station during June 1953. This recorder station and parshall flume, which is referred to as Gage No. BW12 on the records of the Pacific Gas and Electric Company, will be maintained and operated by that company, and a copy of the recorded flow will be forwarded to the Division of Water Resources each month. Daily mean discharge from May 1 through September 30 is set forth in Table 3.

Parrott Ditch. This station is located near the head of Parrott ditch above the Crouch and Hale takeouts. The record of discharge 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 from May 1 through September 30 is set forth in Table 4.

Butte Creek Below Parrott Ditch. This station is located immediately below Parrott Dam. The record of discharge shows the water supply available for natural flow rights on Butte Creek below Parrott ditch. Daily mean discharge from May 27 through September 30 is set forth in Table 5.

Upper Colony Ditch. This station is located near the head of Upper Colony ditch. The record of discharge shows a portion of the water diverted by Durham Mutual Water Company. Daily mean discharge from May 6 through September 30 is set forth in Table 6.

Butte Creek above Lower Colony Dam. This station is located on Butte Creek between the Baxter Pump and Lower Colony Dam. The record of discharge shows the water supply available for diversion by Lower Colony, Brandt, Adams, Gorrill, and White diversions. Daily mean discharges from July 1 through September 25 is set forth in Table 7.

Lower Colony Ditch. Lower Colony ditch is used by the Durham Mutual Water Company to divert the portion of its water not taken through the Upper Colony ditch. Diversion is by means of a submerged orifice with varying water levels both above and below this orifice. Two recorders were installed, one to measure the water level above the orifice and the other to measure the discharge water level. Daily mean discharge was computed as the flow through an orifice with a head equivalent to the difference in the two water levels. Orifice area is controlled by a screw gate which was locked. Current meter measurements taken during past years have established the coefficient of the orifice as 0.70.

Daily mean discharge from June 1 through September 30 is set forth in Table 8.

Butte Creek at Durham Bridge. This station is located on Butte Creek below the Oroville-Durham highway bridge. The record of discharge shows the water supply available for diversion at the Brandt pump, Adams ditch, Gorrill ditch, and E. E. White pumps. Daily mean discharge from June 1 through July 11 is set forth in Table 10. Because all sections of the channel and adjacent levee were being repaired the control for the station changed and therefore the recorder was removed on July 12.

Butte Creek below Adams Dam. This station is located on Butte Creek immediately below Adams Dam. The record of discharge shows the water supply available for diversion from Butte Creek by the Roy White, Gorrill, and E. E. White ranches. Daily discharge from June 22 through September 27 is set forth in Table 11.

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 its diversion is made at Adams Dam, plus natural flow of Hamlin Slough and return flow from Durham Mutual Water Company lands and Adams ranch. Daily mean discharge from June 22 to September 15 is set forth in Table 12.

DISTRIBUTION OF WATER

Water was distributed in accordance with the rights as set forth in the aforementioned Butte Creek decree as supplemented by "Memorandum and Order", dated May 10, 1949. Compliance with the aforementioned Memorandum and Order was accomplished by regulation of diversions from Butte Creek between Parrott ditch and Lower Colony ditch, inclusive.

Distribution Procedure

Distribution during the 1953 irrigation season was based upon the water supply available at the United States Geological Survey gaging station. Flow at this station comprises natural flow of Butte Creek and foreign water brought in from the West Branch of Feather River through Hendricks Canal.

In utilizing the water for power generation above the gaging station, it is the practice to pass Butte Creek water through at all times without fluctuation. The foreign water, however, is regulated through De Sabla Reservoir and the power plants to supply peak power demands resulting in wide variations in discharge during periods of low flow.

Prior to about June 25 natural flow of Butte Creek was sufficient to provide full allotments for all priorities including surplus rights. Due

to the large natural runoff during this period little fluctuation of flow occurred and maximum flow through the De Sabla and Centerville power house plants was maintained.

After July 5 the power company regulated the foreign water by storage in De Sabla reservoir during periods of low power demands and drew on this storage to supply peak power demands. The result of this operation was an increasing fluctuation of flow in Butte Creek at the United States Geological Survey gaging station as the water supply decreased.

Since the amount of foreign water released from De Sabla Reservoir varied from day to day it was necessary to average daily discharge at the United States Geological Survey station over a seven-day period and deduct the average discharge of Hendricks Canal less 5 per cent in order to determine the natural flow of Butte Creek. Table 13 has been prepared to show this computation. The seven-day period used extended from Monday through Sunday as the reservoir was generally recharged over the week ends.

Delivery of foreign water into Butte Creek stream system from West Branch of Feather River commenced May 12 and varied from a high of 74.4 cubic feet per second during the forepart of June to a low of 46.4 cubic feet per second during the second week in August. Beginning about August 12 the supply of foreign water was increased by release of stored water from Philbrook and Round Valley Reservoirs into the system. Thereafter, the flow of foreign water was maintained at slightly over 50 cubic feet per second for the remainder of the season

Natural flow of Butte Creek varied from a high of about 448 cubic feet per second during the first two weeks in June to a low of 90 cubic feet per second during the last two weeks of September. During August some water

was available for "surplus class" rights, but throughout September the entire supply was diverted for use by rights set forth in Schedule 7 of the Butte Creek decree. Even during the lowest period of flow, water was available for 100 per cent of first and second priority rights.

Parrott Diversion. According to the "Memorandum and Order" entered May 10, 1949, by the Superior Court, Butte County, full natural flow allotment of the users below Parrott Dam must be provided at all times without undue fluctuation caused by intermittent presence of foreign water. In order to better accomplish this regulation a combination weir and orifice structure was placed in the head of Parrott ditch. In addition to this structure a combination orifice and fish ladder was constructed in the north abutment of Parrott Dam during October 1952. The floor of this orifice was constructed about three feet below the floor of the Dam in order to increase the pressure head and maintain a more uniform flow in Butte Creek below the Dam.

The ditch structure was adjusted so that during periods of daily low flow (i.e. when no foreign water was present) the natrual flow allotment of the Parrott ditch passed through the orifice into the ditch and the remainder of the flow passed through Parrott Dam for downstream users. During the periods of 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 more water through the openings in Parrott Dam which had been adjusted for low flow conditions. A daily average flow of about five cubic feet per second of foreign water was lost to the Parrott ditch in this manner.

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 1953 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-Marybill Ditch and the Upper Colony Ditch. These two diversions are located on opposite sides of Butte Creek immediately above Upper Colony Dam.

Compton-Entler-Marybill Ditch was regulated to divert its full first priority allotment of 10 cubic feet per second on June 15. Subsequent regulations maintained the flow at 10 cubic feet per second during the remainder of the season.

Durham Mutual Water Company elected to divert approximately 70 per cent of the water to which it was entitled through the Upper Colony ditch, and regulation was made throughout the season on this basis. The remainder of its water and allotments of the diverters below Upper Colony Dam were passed over and through Upper Colony Dam along with foreign water which had passed Parrott Dam.

Van Nuys, Wakefield, and Baxter Pumps. These pumps, located between Upper and Lower Colony Dams, have an aggregate total first priority allotment of 4.61 cubic feet per second. The pumps operate largely during daylight hours and divert an average amount somewhat less than their continuous flow allotment. No regulation was required in 1953.

Lower Colony Ditch. Lower Colony Dam was maintained at a height of about 3-1/2 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 throughout the irrigation season. At no time during the season was the flow reaching the pool above Lower Colony Dam less than the amount required to fill allotments.

Foreign water passing Parrott Dam caused an average fluctuation between high and low flow, in the Lower Colony ditch, of about three cubic feet per second. During low flow periods most of the foreign water which passed Parrott Dam became available to the Adams ranch.

The amount diverted by Durham Mutual Water Company is set forth in Table 9. A comparison of total allotment to amount diverted is shown graphically on Plate 3.

Hydrographs on Plates 1 and 2 show daily mean flow of Butte Creek at the United States Geological Survey station, Butte Creek below the Parrott ditch and Parrott ditch at its head.

CHANGES IN OWNERSHIP OF LANDS AND WATER RIGHTS

Changes in ownership of lands and water rights, which occurred subsequent to filing "Statement for Butte Creek Watermaster Service Area, County of Butte, State of California, for 1953", and which have been included in the statement for the service area for 1954 are listed in the following tabulation:

Tract no.	Name of water right owner appearing in 1953 statement	Name of water right owner appearing in 1954 statement	Amount of water cubic feet per second
13-6	Whitten, Herbert W. and Whitten, Marjorie C.	Adams, E. L. and Adams, Lou R.	11.58
13-21 and 13-23	Atkins, Lester J. and Buck, Barbara Ina	Atkins, Lester J. and Atkins, Barbara Ina	0.54

TABLE 1

PRECIPITATION AT CHICO, BUTTE COUNTY, CALIFORNIA
1952-1953

In Inches

Month	Normal precipitation (82-year record)	Precipitation 1952-1953
October	1.27	0.27
November	2.69	2.08
December	4.53	9.79
January	4.86	4.70
February	4.25	0.40
March	3.15	2.59
April	1.76	3.40
May	0.99	2.01
June	0.41	1.07
July	0.02	0
August	0.02	0.40
September	0.50	0
TOTALS	24.45	26.71

TABLE 2

DAILY MEAN DISCHARGE OF BUTTE CREEK NEAR CHICO, CALIFORNIA

May 1 to September 30, 1953

In Cubic Feet per Second

Day	May	June	July	August	September
1	920	498	259	176	170
2	822	473	267	176	161
3	770	455	259	167	161
4	734	449	255	173	158
5	727	449	248	164	158
6	713	596	223	167	158
7	699	657	240	164	158
8	636	643	234	158	158
9	615	582	220	158	155
10	530	518	226	158	155
11	550	485	226	158	155
12	537	485	209	158	146
13	556	467	206	158	149
14	582	443	212	158	141
15	570	437	202	158	161
16	576	449	199	158	146
17	544	431	199	158	146
18	570	437	206	158	146
19	713	425	189	158	143
20	755	404	199	158	146
21	762	372	176	158	149
22	636	358	183	158	149
23	657	339	179	158	149
24	650	334	186	158	149
25	636	316	186	158	146
26	576	312	179	155	141
27	550	304	183	158	164
28	537	295	176	158	138
29	518	286	176	167	146
30	498	278	176	176	141
31	498		176	176	
Mean	633	433	208	162	151
Runoff, in acre-feet	38,950	25,740	12,800	9,960	9,010

Total for period - 96,460 acre-feet

TABLE 5

DAILY MEAN DISCHARGE OF BUTTE CREEK BELOW PARROTT DAM

May 27 to September 30, 1953

In Cubic Feet per Second

Day	April	May	June	July	August	September
1			390	137	95	104
2			390	135	95	104
3	N	N	390	135	95	104
4	O	O	390	135	95	104
5			400	135	95	104
6			500	135	95	104
7			560	135	95	104
8	R	R	560	132	95	104
9	E	E	500	132	95	105
10	C	C	450	132	95	106
	O	O				
11	R	R	400	130	95	105
12	D	D	400	130	95	102
13			390	130	95	102
14			375	130	95	102
15			325	130	95	104
16			300	120	95	104
17			300	112	95	104
18			295	112	100	104
19			295	112	102	104
20			290	112	102	104
21			230	112	102	104
22			210	114	102	104
23			178	114	102	104
24			175	114	102	104
25			160	114	102	104
26		415	155	114	102	104
27		410	155	110	102	104
28		400	150	95	102	104
29		400	150	95	102	104
30		390	143	95	102	104
31				95	102	
Mean		403	320	120	98	104
Total, in acre-feet		4,000	18,900	7,400	6,020	6,170

Total for period - 42,490 acre-feet.

TABLE 6

DAILY MEAN DISCHARGE OF UPPER COLONY DITCH

May 6 to September 30, 1953

In Cubic Feet per Second

Day	April	May	June	July	August	September
1			28	49	35	32
2		NO	30	53	35	32
3		RECORD	30	45	35	32
4			38	45	36	32
5			44	45	36	32
6		23	49	45	35	32
7		24	54	45	34	32
8	N	23	55	44	34	32
9	O	23	54	44	34	32
10		22	52	44	32	32
11		22	49	40	28	32
12	R	22	48	40	28	32
13	E	23	48	39	31	32
14	C	23	48	39	33	32
15	O	23	44	38	33	32
16	R D	23	44	38	32	32
17		25	43	38	32	30
18		35	42	38	32	30
19		37	40	38	32	29
20		41	40	31	32	29
21		41	37	32	31	36
22		37	44	34	31	32
23		36	52	32	29	30
24		36	51	32	30	29
25		36	51	34	31	29
26		34	52	35	32	29
27		33	52	37	32	29
28		31	52	40	32	29
29		30	52	40	32	29
30		30	52	41	32	29
31		30		41	32	
Mean		29	46	40	32	31
Total, in acre-feet		1,520	2,720	2,450	1,990	1,840

Total for period - 10,520 acre-feet.

TABLE 7

DAILY MEAN DISCHARGE OF BUTTE CREEK ABOVE LOWER COLONY DAM

July 1 to September 25, 1953

In Cubic Feet per Second

Day	June	July	August	September
1		56	32	19
2		52	32	19
3		50	32	22
4		50	29	22
5		50	29	24
6		55	29	24
7		56	28	22
8		57	28	22
9	N	57	30	22
10	O	57	31	22
11		57	26	24
12		57	20	26
13	R	55	15	26
14	E	50	16	26
15	C	52	19	27
16	O	52	22	28
17	R	52	22	28
18	D	52	22	28
19		46	25	30
20		40	25	30
21		39	26	45
22		39	25	45
23		39	24	45
24		39	25	45
25		39	25	45
26		37	26	
27		37	26	NO
28		37	26	
29		36	25	RECORD
30		35	23	
31		35	23	
Mean		52	25	29
Runoff, in acre-feet		2,900	1,560	1,420

Total for period = 5,880 acre-feet

TABLE 8

DAILY MEAN DISCHARGE OF LOWER COLONY DITCH

June 1 to September 30, 1953

In Cubic Feet per Second

Day	June	July	August	September
1	15	22	16	19
2	15	22	17	19
3	15	22	16	20
4	15	22	16	20
5	15	22	16	20
6	16	22	20	20
7	16	22	20	20
8	16	22	20	20
9	16	22	20	20
10	16	22	20	20
11	16	20	20	20
12	22	18	20	20
13	22	18	22	20
14	22	18	22	20
15	22	18	18	20
16	22	18	18	20
17	22	18	18	20
18	22	18	18	20
19	22	18	18	10
20	22	18	18	10
21	22	18	22	10
22	22	18	20	10
23	22	18	20	10
24	22	18	20	10
25	22	18	20	10
26	22	18	20	10
27	22	20	20	10
28	22	22	20	10
29	22	20	20	10
30	22	20	20	10
31		20	20	
Mean	20	20	20	16
Runoff, in acre-feet	1,170	1,210	1,180	865

Total for period - 4,425 acre-feet

TABLE 9

COMBINED DAILY MEAN DISCHARGE OF UPPER AND LOWER COLONY DITCHES

June 1 to September 30, 1953

In Cubic Feet Per Second

Day	June	July	August	September
1	43	71	51	51
2	45	75	52	51
3	45	67	51	52
4	53	67	52	52
5	59	67	52	52
6	65	67	55	52
7	70	67	54	52
8	71	66	54	52
9	70	66	54	52
10	67	66	52	52
11	65	60	48	52
12	70	58	48	52
13	70	57	53	52
14	70	57	55	52
15	66	56	51	52
16	66	56	50	52
17	65	56	50	50
18	64	56	50	50
19	62	56	50	39
20	62	49	50	39
21	59	50	53	46
22	66	52	51	42
23	74	50	49	39
24	73	50	50	39
25	73	52	51	39
26	74	53	52	39
27	74	57	52	39
28	74	62	52	39
29	74	60	52	39
30	74	61	52	39
31		61	52	
Mean	60	60	52	47
Runoff, in acre-feet	3,900	3,660	3,160	2,800

Total for period - 13,520 acre-feet

TABLE 10

DAILY MEAN DISCHARGE OF BUTTE CREEK AT DURHAM BRIDGE

June 1 to July 11, 1953 *

In Cubic Feet per Second

Day	April	May	June	July	August	September
1			340	50		
2			350	45		
3			320	43		
4			290	50		
5			280	46		
6			310	40		
7			400	40		
8	N	N	455	37	N	N
9	O	O	300	25	O	O
10			260	32		
11			240	30		
12			220			
13	R	R	210	N	R	R
14	E	E	200	O	E	E
15	C	C	195		C	C
	O	O		R	O	O
16	R	R	180	E	R	R
17	D	D	180	C	D	D
18			175	O		
19			160	R		
20			153	D		
21			140			
22			134			
23			102			
24			93			
25			80			
26			57			
27			65			
28			70			
29			60			
30			60			
31						
Mean			202	40		
Runoff, in acre-feet			12,200	870		

Total for period - 13,070 acre-feet

* - Removed recorder on July 12 because of channel cleaning and levee repair.

TABLE 11

DAILY MEAN DISCHARGE OF BUTTE CREEK BELOW ADAMS DAM

June 22 to September 27, 1953

In Cubic Feet per Second

Day	April	May	June	July	August	September
1				28	1.0	
2				28	1.0	
3				28	1.0	
4				28	1.0	
5				24	1.0	
6				12.0	0.9	
7				12.0	0.9	
8				13.0	0.9	
9	N	N	N	14.0	0.9	N
10	O	O	O	14.0	0.9	O
11				12.0	0.8	
12				14.0	0.7	
13				10.0	0.7	
14				9.0	0.7	
15	R	R	R	8.0	0.7	R
	E	E	E			E
16	C	C	C	1.6	0.7	C
17	O	O	O	1.6	0.7	O
18	R	R	R	1.6	0.7	R
19	D	D	D	1.6		D
20				1.6	N	
					O	
21				1.6		
22			102	1.6		
23			80	1.6		
24			70	1.6	R	
25			50	1.6	E	
					C	
26			20	1.5	O	
27			17	1.2	R	
28			12	1.2	D	
29			25	1.2		
30			32	1.2		
31				1.2		
Mean			46	7.4	0.8	
Runoff, in acre-feet			810	452.	30.	

Total for period - 1,292 acre-feet

TABLE 12

DAILY MEAN DISCHARGE OF HAMLIN SLOUGH AT ADAMS RANCH

June 22, to September 15, 1953

In Cubic Feet per Second

Day	April	May	June	July	August	September
1				16.0	12.0	10.0
2				16.0	12.0	9.7
3				16.0	8.5	9.5
4			N	14.6	9.0	8.5
5			O	14.0	9.0	9.5
6				14.0	9.0	9.4
7				17.6	9.0	9.7
8			R	16.0	9.0	8.0
9	N	N	E	16.4	9.0	9.0
10	O	O	C	17.0	8.3	10.4
			O			
11			R	17.8	8.2	15.4
12			D	18.0	8.3	16.3
13				18.0	8.0	17.0
14				17.6	8.3	17.0
15	R	R		17.0	9.0	17.3
	E	E				
16	C	C		16.0	9.0	
17	O	O		15.0	10.1	
18	R	R		14.0	10.0	
19	D	D		15.0	9.2	N
20				15.0	10.0	O
21				13.4	11.6	
22			15.0	13.4	11.2	
23			14.8	13.4	11.2	R
24			16.4	13.6	10.7	E
25			17.0	13.0	9.0	C
						O
26			17.0	14.0	9.6	R
27			17.0	12.2	9.0	D
28			17.4	12.3	9.6	
29			16.0	13.0	10.9	
30			14.8	13.2	12.0	
31				13.2	11.3	
Mean			16	15	10	12
Runoff, in acre-feet			288	924	597	351

Total for period - 2,142 acre-feet

TABLE 13

COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS
JUNE, 1953

In Cubic Feet per Second

Day	Flow at U.S.G.S. station	Flow in Hendricks canal	Hendricks canal less 5 per cent	Natural flow of Butte Cr.	Butte Creek below Parrott dam: Nat. flow allotment	Butte Creek below Parrott dam: Flow delivered	Parrott ditch: Nat. flow allotment	Parrott ditch: Total allotment	Parrott ditch: Flow delivered	Durham Colony ditches: Nat. flow allotment	Durham Colony ditches: Flow delivered
1	498	65				390			133		43
2	473	66				390			98		45
3	455	65				390			99		45
4	449	61	60	451	150	390	169	229	100	51.25	53
5	449	37				400			100		59
6	596	74				500			102		65
7	657	71				560			103		70
8	643	73				560			103		71
9	582	72				500			102		70
10	518	70				450			101		67
11	485	69	66	451	150	400	169	235	101	51.25	65
12	485	67				400			101		70
13	467	67				390			102		70
14	443	67				375			109		70
15	437	67				325			122		66
16	449	65				300			122		66
17	431	64				300			125		65
18	437	64	61	361	150	295	169	230	138	51.25	64
19	425	63				295			150		62
20	404	63				290			148		62
21	372	63				230			152		59
22	358	62				210			158		66
23	339	61				178			155		74
24	334	60				175			156		73
25	316	61	58	264	135	160	129	189	156	51.25	73
26	312	61				155			152		74
27	304	61				155			140		74
28	295	60				150			139		74
29	286	60				150			136		74
30	278	60				143			135		74

Sheet 1

TABLE 13 (Cont'd)

COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS
JULY, 1953

In Cubic Feet per Second

Day	Flow at U.S.G.S. station	Flow in Hendricks canal	Hendricks canal less 5 per cent	Natural flow of Butte Cr.	Butte Creek below Parrott dam: Nat. flow allotment	Butte Creek below Parrott dam: Flow delivered	Parrott ditch: Nat. flow allotment	Parrott ditch: Total allotment	Parrott ditch: Flow delivered	Durham Colony ditches: Nat. flow allotment	Durham Colony ditches: Flow delivered
1	259	60				137			132		71
2	267	60				135			132		75
3	259	59	57	207	135	135	72	126	123	51.25	67
4	255	59				135			120		67
5	248	59				135			114		67
6	223	59				135			100		67
7	240	59				135			104		67
8	234	59				132			109		66
9	220	59	56	169	135	132	34	87	105	51.25	66
10	226	59				132			106		66
11	226	59				130			101		60
12	209	59				130			88		58
13	206	59				130			86		57
14	212	58				130			91		57
15	202	58				130			83		56
16	199	58	55	147	128	120	19	74	67	51.25	56
17	199	58				112			85		56
18	206	58				112			93		56
19	189	56				112			84		56
20	199	54				112			91		49
21	176	57				112			73		50
22	183	58				114			70		52
23	179	58	54	130	111	114	19	73	73	51.25	50
24	186	57				114			73		50
25	186	57				114			74		52
26	179	56				114			72		53
27	183	56				110			73		57
28	176	54				95			76		62
29	176	54	50	127	108	95	19	69	74	51.25	60
30	176	53				95			75		61
31	176	53				95			75		61

Sheet 2

TABLE 13 (Cont'd)

COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS
AUGUST, 1953

In Cubic Feet per Second

Day	Flow at U.S.G.S. station	Flow in Hendricks canal	Hendricks canal less 5 per cent	Natural flow of Butte Cr.	Butte Creek below Parrott dam: Nat. flow allotment	Butte Creek below Parrott dam: Flow delivered	Parrott ditch: Nat. flow allotment	Parrott ditch: Total allotment	Parrott ditch: Flow delivered	Durham Colony ditches: Nat. flow allotment	Durham Colony ditches: Flow delivered
1	176	52				95			75		51
2	176	52				95			75		52
3	167	52				95			68		51
4	173	54				95			72		52
5	164	54				95			67		52
6	167	50	47	117	98	95	19	66	68	51.25	55
7	164	48				95			66		54
8	158	47				95			63		54
9	158	46				95			62		54
10	158	46				95			61		52
11	158	48				95			61		48
12	158	47				95			61		48
13	158	48	47	111	92	95	19	66	61	51.25	53
14	158	49				95			61		55
15	158	51				95			60		51
16	158	51				95			59		50
17	158	52				95			58		50
18	158	53				100			57		50
19	158	52				102			58		50
20	158	53	50	108	89	102	19	69	58	51.25	50
21	158	55				102			58		53
22	158	54				102			58		51
23	158	54				102			57		49
24	158	56				102			57		50
25	158	56				102			60		52
26	155	55				102			57		52
27	158	55	53	108	89	102	19	72	60	51.25	52
28	158	56				102			61		52
29	167	56				102			65		52
30	176	56				102			70		52
31	176	57				102			66		52

Sheet 3

TABLE 13 (Cont'd)

COMPARISON OF DELIVERIES OF WATER FROM BUTTE CREEK TO ALLOTMENTS
SEPTEMBER, 1953

In Cubic Feet per Second

Day	Flow at U.S.G.S. station	Flow in Hendricks canal	Hendricks canal less 5 per cent	Natural flow of Butte Cr.	Butte Creek below Parrott dam: Nat. flow allotment	Butte Creek below Parrott dam: Flow delivered	Parrott ditch: Nat. flow allotment	Parrott ditch: Total allotment	Parrott ditch: Flow delivered	Durham Colony ditches: Nat. flow allotment	Durham Colony ditches: Flow delivered
1	170	57				104			66		51
2	161	56				104			61		51
3	161	56	52	111	92	104	19	71	61	51.25	52
4	158	54				104			60		52
5	158	54				104			60		52
6	158	54				104			60		52
7	158	54				104			59		52
8	158	54				104			59		52
9	155	52				104			57		52
10	155	52	51	103	84	105	19	70	56	51.25	52
11	155	52				106			58		52
12	146	56				105			56		52
13	149	56				102			59		52
14	141	56				102			56		52
15	161	56				104			66		52
16	146	56				104			70		52
17	146	59	54	93	74	104	19	73	67	51.25	50
18	146	59				104			68		50
19	143	58				104			67		39
20	146	58				104			68		39
21	149	58				104			68		46
22	149	58				104			50		42
23	149	58				104			30		39
24	149	55	54	95	77	104	19	73	25	51.25	38
25	146	56				104			25		39
26	141	58				104			25		39
27	164	57				104			22		39
28	138	56				104			22		39
29	146	51				104			20		39
30	141	56				104			20		39

Sheet 4

PLATE I

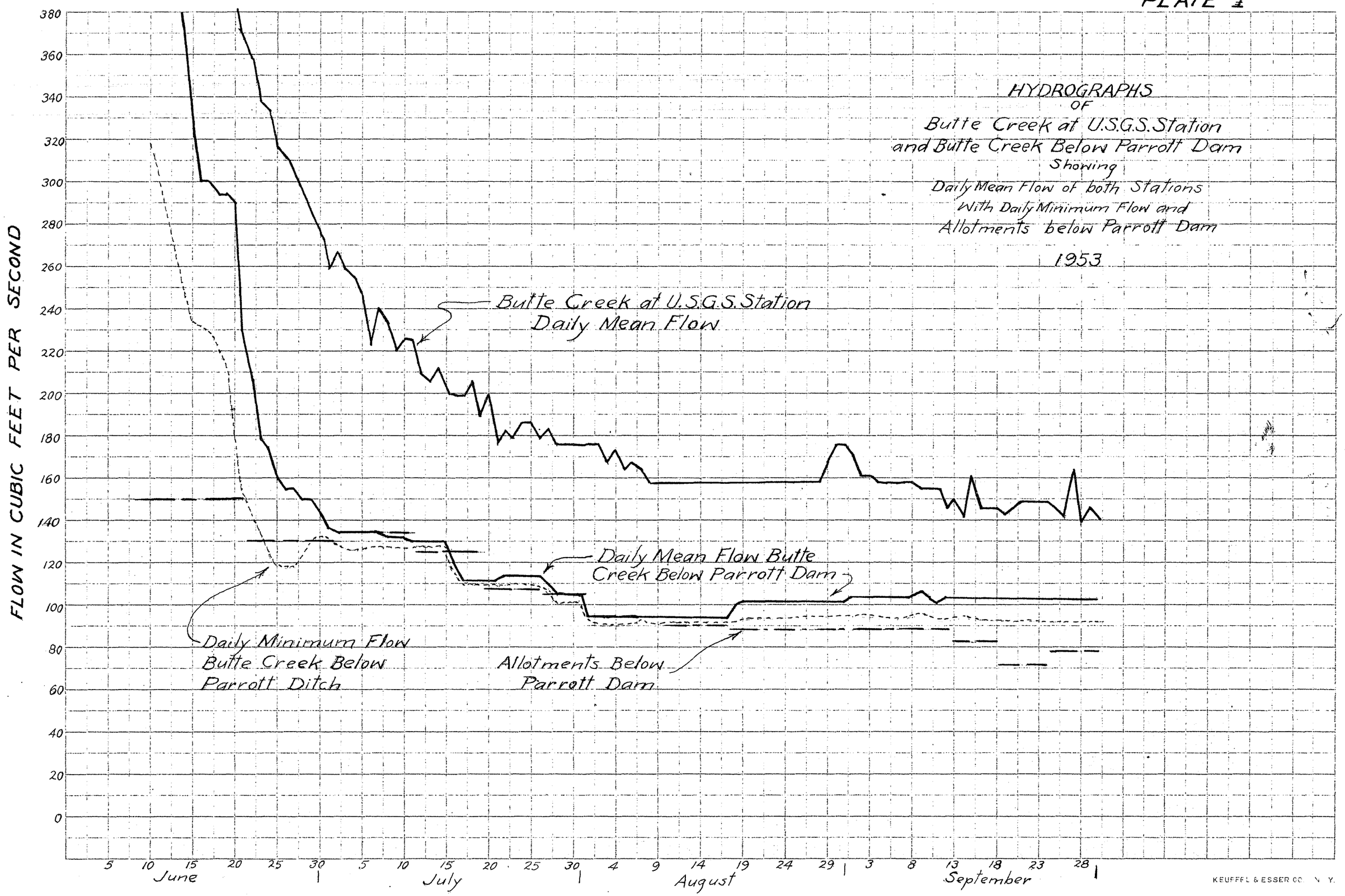
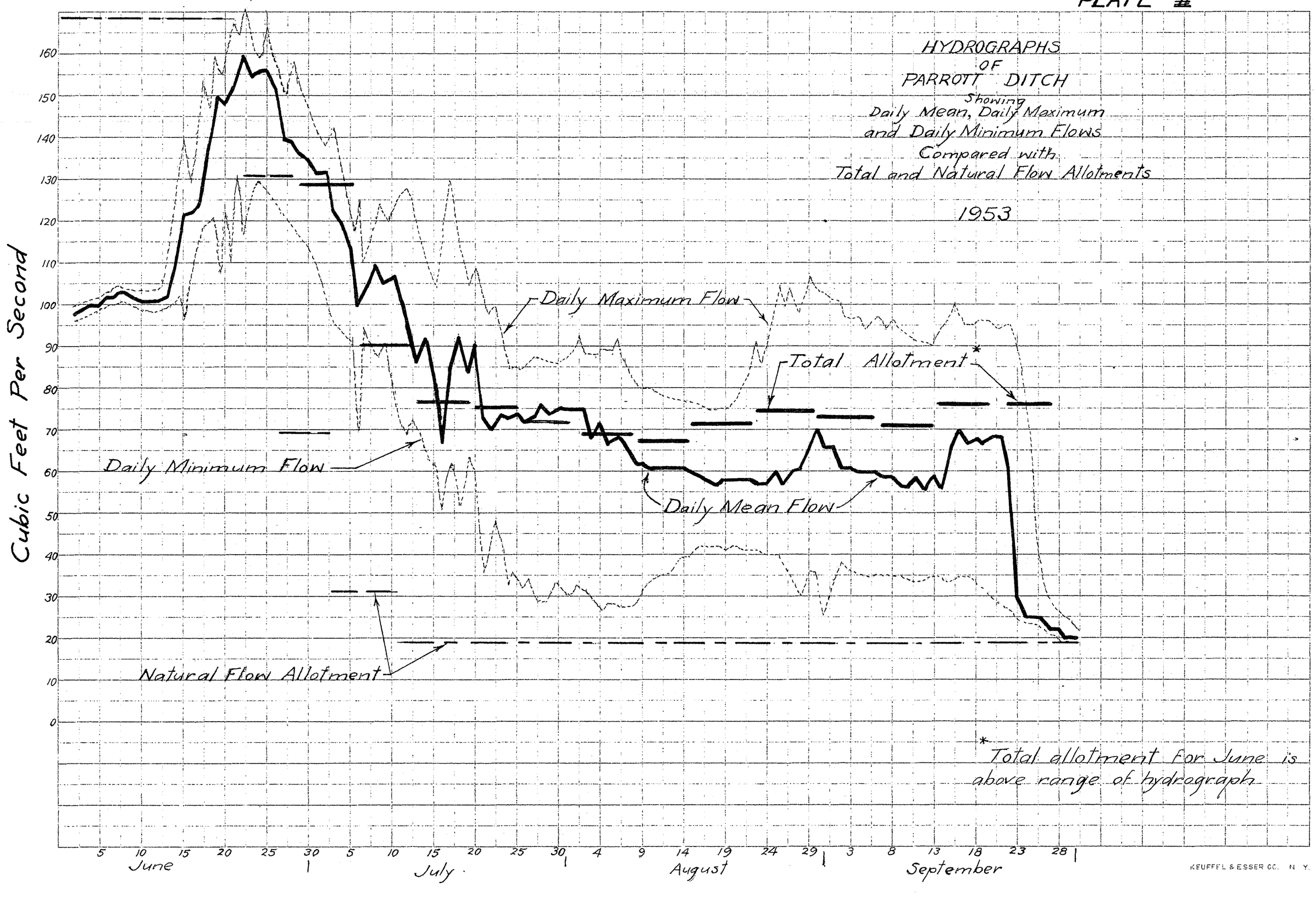

HYDROGRAPHS
OF
Butte Creek at U.S.G.S. Station
and Butte Creek Below Parrott Dam
Showing
Daily Mean Flow of both Stations
With Daily Minimum Flow and
Allotments below Parrott Dam
1953
FLOW IN CUBIC FEET PER SECOND
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
Butte Creek at U.S.G.S. Station
Daily Mean Flow
Daily Mean Flow Butte
Creek Below Parrott Dam
Daily Minimum Flow
Butte Creek Below
Parrott Ditch
Allotments Below
Parrott Dam
5 10 15 20 25 30 5 10 15 20 25 30 4 9 14 19 24 29 3 8 13 18 23 28
June
July
August
September
KEUFFEL & ESSER CO. N. Y.

PLATE #2

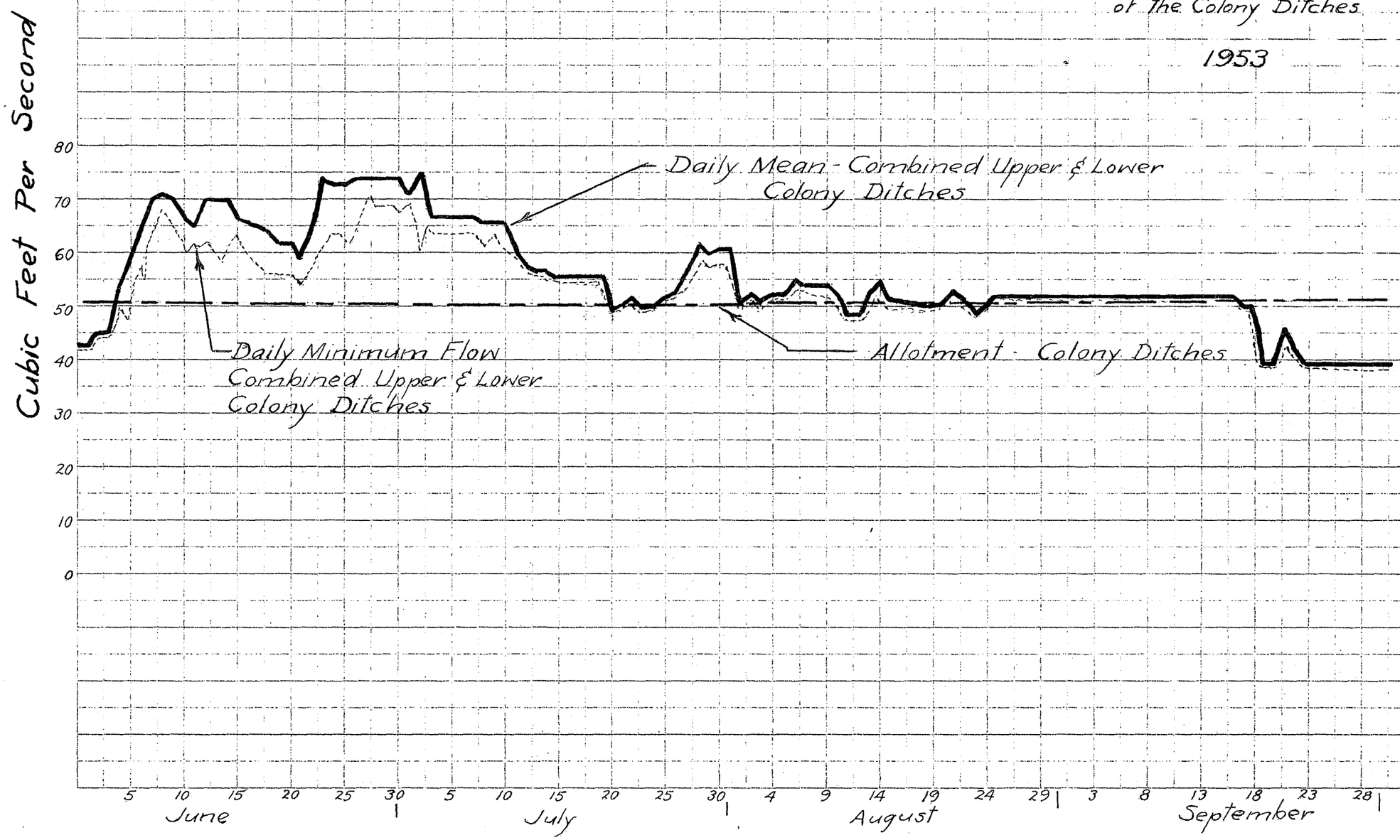


KEUFFEL & ESSER CO. N. Y.

PLATE 3

HYDROGRAPHS
OF
COMBINED FLOW
UPPER & LOWER COLONY DITCHES
Showing
Daily Mean and Daily
Minimum Flows and Allotment
of the Colony Ditches

1953



KEUFFEL & ESSER CO. N. Y.