STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

REPORTS OF THE
DIVISION OF WATER RESOURCES
EDWARD HYATT, STATE ENGINEER

REPORT ON

WATER MASTER SERVICE

ON

NORTH FORK OF PIT RIVER AND ITS TRIBUTARIES

EXCEPT FRANKLIN CREEK

MODOC COUNTY, CALIFORNIA

1957 SEASON

BY

H. E. von Bergen
Assistant Hydraulic Engineer

Sacramento, California
February, 1958

ORGANIZATION

Earl Lee Kelly	Director of Public Works
Edward Hyatt	State Engineer
Harold Conkling	Deputy State Engineer

GORDON ZANDER

Supervising Hydraulic Engineer

T. Russel Simpson	Senior Hydraulic Engineer
H. E. von Bergen	Assistant Hydraulic Engineer

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STATE OF CALIFORNIA

Department of Public Works

SACRAMENTO

'ISION OF WATER RESOURCES
401 PUBLIC WORKS BUILDING

EDWARD HYATT, STATE ENGINEER
CHIEF OF DIVISION

February 16, 1938

Mr. Harold Conkling
Deputy State Engineer
Sacramento, California

Attention: Mr. Gordon Zander
Supervising Hydraulic Engineer

Dear Sir:

Herewith is submitted a report covering the water distribution work on the North Fork of Pit River and Tributaries in Modoc County from April 1 to September 31, 1937.

Watermaster service in this area has been provided for the first time in 1937 under an agreement for trial distribution of the waters of the North Fork of Pit River and its Tributaries as provided in Section 37 of the Water Commission Act.

This report considers the climatologic and hydrographic features of the 1937 season together with a description of results of the watermaster service. Reference is directed to Report on Water Supply and Use of Water on North Fork of Pit River and Tributaries for more detailed description of the physical features of the area.

Respectfully submitted,

H. G. von Bergen
Assistant Hydraulic Engineer

INTRODUCTION

An agreement was entered into by all of the water users on North Fork of Pit River and all its tributaries except Franklin Creek at a meeting held in Alturas on March 30, 1937. The agreement provided for a trial distribution of water among the various water right claimants in the North Fork of Pit River Stream System in accordance with the schedules contained in said agreement.

Watermaster service was provided on the North Fork of Pit River and its tributaries in accordance with Section 37 of the Water Commission Act.

A copy of the 1937 Agreement for Trial Distribution is presented herewith under Appendix "A".

Engineers Simpson, von Bergen, McPartland, and Alexander participated in the work of distribution of the water on the North Fork of Pit River and its tributaries.

GENERAL DESCRIPTION OF WORK

Period of Work During 1937

Watermaster service on the North Fork of Pit River area was commenced on April 1 and continued until October 15 in 1937.

Watermaster

The work of water distribution in the area along Linville and Joseph Creeks was done by W. A. Alexander, Assistant Watermaster, along Thoms Creek by J. M. McFartland, Deputy Watermaster, and along Parker Creek and the North Fork of Pit River by H. E. von Bergen, Deputy Watermaster, all under the Supervision of T. R. Simpson, Supervising Watermaster.

Regulation of Diversions

All of the diversion systems throughout the area were operated or observed at various times during the 1937 season as the available water supply warranted.

Regulation of diversions was made in accordance with and under the provisions of the agreement hereinbefore mentioned.

DISCUSSION OF RESULTS

Precipitation During 1937

The results of the snow surveys made annually by the Division of Water Resources at the three snow courses in the Upper Pit River Watershed is shown in Table 1 at the end of this report. Table 1 is arranged to show the water content of the snow pack at the beginning of the run-off period (assumed to be during the period from April 1 to July 31) as compared with a normal that has been deduced from a long time run-off record, and as compared with the average water content for the period of actual measurement.

Table 2 of this report gives a monthly and an annual record of precipitation at Alturas and Jess Valley stations since 1929. Compared to the mean precipitation, based on the records of the past eight years, the precipitation for the twelve-month season of 1936-37 at Alturas was 84% and at Jess Valley was 62%. The precipitation for the assumed four-month run-off period of 1937 was approximately one-half of normal at Alturas and about 10% above normal at the Jess Valley station with a frequency of about one shower per month.

Water Supply 1937

The continuous record of discharge at a recording station below the Bettanderff Ranch at Chalk Cliff is shown in Table 3 of this report.

A comparison of the water supplies of the North Fork area recorded at this station are given in the following tabulation:

Year	1929	1930	1931	1932	1936	1937
April*	2000	4390.	204.	12,900.	15,400.	11,850.
May	998	3380.	69.8	16,200.	4,750.	3,300.
June	1200	441.	109.	2,900.	1,350.	880.
July	191	820.	70.0	93.5	139.	160.
Aug.	141	60.9	33.9	81.5	*60.	*60.
Sept.	120	138.	131.	76.8	*80.	*80.
Season Total	4650	8650.	617.	32,200.	21,800.	15,710.

* Estimated

The above tabulation does not include the water consumed in irrigation on the North Fork of Pit River and its tributaries above the recording station but are the only past records available.

Table 4, at the end of this report, gives the basic data for a comparison of the run-off in the North Fork of Pit River Area to the results of the annual snow surveys. As indicated the average of the Seasonal Run-off Factors from measurements on Cedar Peak Course and Eagle Peak Course is 22.88 inches for 1937 and the Deduced Mean is 25.8.

The following is an explanation of the process of deduction in the determination of the probable run-off during the four months period subsequent to April 1, the date of the snow surveys:

1. The total run-off (full natural flow) for the North Fork of Pit River during the assumed four months run-off period following April 1 is directly proportional to average run-off factor calculated for Cedar Peak and Eagle Peak on the basis that the snow on Eagle Peak affects the Parker Creek run-off and snow on Cedar Peak the other tributaries involved.

2. The effect of additional precipitation during the run-off period is very pronounced when the season's snowfall is low; consequently this four months precipitation is included in the computations of run-off factors.

3. The mean four months precipitation for Alturas is added to the Cedar Peak snow measurement and the Jess Valley precipitation mean is added to the Eagle Peak snow measurement. The average of the two is then calculated to obtain the Run-off Factor for the North Fork of Pit River.

4. The Computed Natural Flow involves the actual precipitation of the four months run-off period; however, for advance computation, to be made immediately following the snow surveys on April 1, the procedure is to add the mean precipitation of the four-months period, obtained from past records, to the measured water content to give the Seasonal Run-off Factor. Some slight correction would be necessary when the actual precipitation had been recorded.

5. The water crop for the 1937 season fell short of what the snow pack indicated on April 1 due to the fact that the snow fell on dry ground during the winter months and that during the run-off period there was an unusual amount of dry north wind causing abnormal evaporation.

6. The equation for computing the seasons natural flow of the North Fork of Pit River is that the ra-

tio of the Seasonal Run-off Factor to the Deduced Normal should equal the ratio of Computed Natural Run-off to the Mean Natural Flow or: (Refer to Table 1)

$$\frac{\text{Seasonal Run-off Factor}}{\text{Deduced Normal}} = \frac{\text{Computed Natural Flow}}{\text{Mean Natural Flow}}$$

Example for 1937 for North Fork of Pit River:

$$\text{Computed Natural Flow} = \frac{22.83}{25.80} \times 29,700 = 26,350 \text{ Acre-Ft.}$$

In addition to the register station at Bettandorff's Ranch herein before discussed, there were installed twelve other automatic water stage recorders at various points throughout the stream system in 1936 and described in the report on Water Supply and use of Water on North Fork of Pit River and Tributaries submitted August 20, 1937. All of these water stage recorders were re-installed on about April 1, 1937 and operated during the summer season except the station on Thoms Creek above the Jones Ranch, and on Parker Creek at Fogarty's Ranch.

Use of Water During 1937

The total of all water allotments from the North Fork of Pit River and its Tributaries under the agreement in Appendix "A" is 119.30 cubic feet per second.

The full allotments on North Fork of Pit River were satisfied until about May 20. Parker Creek began failing rapidly about June 1 and by the early part of July supplied only stock-water to the upper users on Parker Creek above Fogarty's Ranch. Shields Creek was then called upon to supply all other users on Shields Creek and Parker for stock-water. Shields Creek being supplied by springs shows much less fluctuation during the season than Parker Creek.

Thoms Creek and Joseph Creek are similar to Parker Creek and Linville Creek is similar to Shields Creek as to the characteristics mentioned in the foregoing paragraph.

The Jim Porter Reservoir, the Pearl F. Porter Reservoir and the Page-Porter Reservoir were filled early in April and the Dorris Reservoir Supply Canal was closed on about April 20 at which date the Dorris Reservoir was full. The other reservoirs in the area collected an ample supply of storage.

There was some difficulty in delivering the proper quantities of water through the North Fork Ditch due to unintentional lack of cooperation on the part of the water users. Also at the Hughes dam the proper water level was difficult to maintain due to faulty head gates in the Dorris Canal and Slough. The water level at the Hughes Dam controls the diversion into the Gloster Ditch.

There was considerable difficulty in delivering a sufficient supply of stock-water to the J. C. Porter Ranch all during the fall months due to attempts of water users on Shields Creek to irrigate some of their meadows. Each time an attempt was made to irrigate on Shields Creek, any time after haying season, the supply of stock-water to J. C. Porter failed.

On Joseph Creek during the haying season on the Black, McElwain and Wilson Ranches the water was passed on down to the head of the X L Ditch and used on the X L acreage irrigated from Joseph Creek. This flow occurred for about ten days during the latter part of July and averaged about .80 cubic foot per second.

The water flowing in Linville Creek was rotated during haying season among all the users except the Page Ranch which is owned by the Lakeshore Cattle Company.

RECOMMENDATIONS

There is a necessity for the improvement in number and quality of headgates and measuring devices over the entire area. Temporary expedients such as simple weirs built of one-inch lumber were installed at some of the more important and strategic points. There are a few headgates and diversion dams in a fair state of repair but in general the diversion works could be greatly improved.

FINANCIAL STATEMENT

The assessment of $700.00 was levied against the water users on the North Fork of Pit River and Tributaries and the balance of the cost of watermaster service and distribution of water was paid by the Division of Water Resources.

APPENDIX "A"

BEFORE THE DIVISION OF WATER RESOURCES

DEPARTMENT OF PUBLIC WORKS OF THE STATE OF CALIFORNIA

In the Matter of the Determination of the Rights of the Various Claimants to the Water of North Fork of Pit River and All its Tributaries except Franklin Creek, in Modoc County, California	)	1937 AGREEMENT FOR TRIAL DISTRIBUTION

WHEREAS the above entitled proceeding is pending before the Division of Water Resources, in which the rights in and to the water, and in and to the use thereof, from North Fork of Pit River and all its tributaries, except Franklin Creek, of all the parties hereunto subscribed are involved, and

WHEREAS said Division has made a survey of the diversion systems and irrigated lands in said stream systems and has collected other data relative to the water rights involved in said action, and

WHEREAS it appears from the data collected by said Division that it may be possible to work out an allocation of the waters of said stream system among the parties hereto that will be acceptable to all of said parties and afford the basis for a settlement of the water rights involved in said proceedings, and

WHEREAS the parties hereto desire that a tentative allocation of the waters of said stream system be administered by the said Division of Water Resources during the 1937 season as a demonstration of what may be accomplished,

NOW THEREFORE IT IS HEREBY AGREED by and between each and every party hereunto subscribed and among all of said parties, that said Division of Water Resources may undertake to distribute the waters of said North Fork of Pit River and its tributaries among the various parties hereunto subscribed as hereinafter set forth, it being understood and agreed that the following plan of distribution and apportionment of water shall be for the period from April 1st to September 30th, in 1937, only, and subject to such provisions as are hereinafter contained, to-wit:

1. C. T. Watkins shall at all times be entitled to divert from the

natural flow of Linville Creek, through the Linville Power Ditch, 2.50 cubic feet per second, or as much thereof as he directly applies to beneficial use for power purposes at the Linville Creek Power House situated within the SE$\frac{1}{4}$ SW$\frac{1}{4}$ of Section 34, T. 45 N., R. 14 E., M.D.B. & M.; provided, however, that all water diverted under the right provided in this paragraph, with the exception of that reasonably lost in transportation, shall be returned directly to said Linville Creek from said power house.

2. The rights in and to the waters, and in and to the use thereof, from each of the five following tributary systems of North Fork of Pit River - namely, Parker Creek at its tributaries above Gleason Creek, Gleason Creek and its tributaries, Thoms Creek and its tributaries, Joseph Creek and its tributaries, and Linville Creek and its tributaries - shall be separate groups, all rights in each of said groups being superior to all rights in and to the waters and in and to the use thereof, from the group of rights on said North Fork of Pit River.

3. Subject to the foregoing rights and provisions, the various parties enumerated in Schedules 1, 2, 3 and 4, hereunto annexed and made a part hereof, shall be entitled to rights in and to the use of the natural flows of Parker Creek and its tributaries above Gleason Creek, Thoms Creek and its tributaries, Joseph Creek and its tributaries, Linville Creek and its tributaries, Gleason Creek and its tributaries, and North Fork of Pit River during the period from April 1st to September 30th, in 1937, for domestic, stock watering and irrigation purposes upon their respective lands involved in said proceeding, as shown on the Division of Water Resources Map, in accordance with the acreages to be supplied, priorities and quantities of water allotted, and through the diversions from the sources named as set forth in said Schedules 1, 2, 3 and 4; and said rights shall be further subject to the provisions of various decrees entered by the Superior Court of the State of California, in and for the County of Modoc, insofar as said rights have heretofore been determined by the decrees of said court.

4. All allotments set forth in said Schedules 1, 2, 3 and 4, which

are within the same priority class and within the same group are equal in priority and correlative in right and at all times when the water supply available for rights within a priority is inadequate to supply all rights and allotments within said class, then during the continuance of such shortage, the owners of such allotments shall prorate the available water supply, if any in excess of the quantity required for prior rights, or rotate in the use thereof, in accordance with their respective allotments in that class.

5. Subject to the foregoing rights and provisions, the parties hereinafter named in this paragraph shall be entitled to impound the natural flow of tributaries of North Fork of Pit River in the reservoirs set opposite their respective names in amounts equal to the respective present capacities of said reservoirs as follows:

Name	Reservoir	Capacity Acre-feet
Pearl Porter	Upper Porter	100
Pearl Porter	J. L. Porter	180
James C. Porter and Phear E. Porter	James Porter	293
John Page and Lydia Page, and Alice Porter, et al.	Plum Canyon	180
P. S. Dorris and W. J. Dorris	Dorris	5900
Bixby-Huffman Cattle Co., Ltd.	Crowder	168
Frank McArthur	Lauer	600
Thomas and Raker	Mud Lake	295
Lawrence McHugh, and George L. Dewey and Elizabeth Dewey	Kelley-Greiner	284

said water so impounded to be used for domestic and stock watering purposes and for irrigation of the lands of said parties as shown on the Division of Water Resources Map.

6. All rights set forth in Schedules 1, 2, 3 and 4 hereof shall be for continuous usage during the period from April 1st to September 30th, in 1931, except where otherwise determined by prior agreements or decrees.

7. The points of measurement of all allotments of water hereinbefore

provided shall be at or near the respective points of diversion from North Fork of Pit River and its tributaries, except that the allotments to the owners of Diversions 31 to 59, inclusive, and 61 to 74, inclusive, from Thoms Creek and its tributaries are to be measured as the average difference during any seven-day period between the waters available for use on the acreage to be supplied and the waters passing off of said acreage.

8. Said Division of Water Resources shall have power and authority to deviate from the plan of distribution herein provided if in its opinion any changes are necessary or convenient in order to expedite the accomplishment of the purpose of said plan of distribution.

9. Nothing herein contained shall be, or shall be construed as, an admission by any party that his legal rights or the rights of any other party are as herein provided; and that the distribution of water in accordance with this agreement shall not in any manner prejudice the rights which are now claimed or may hereafter be asserted by any of the parties hereto.

10. Said Division of Water Resources may appoint a water master to distribute the waters of North Fork of Pit River and its tributaries, as herein provided for, during the 1937 season and that said water master shall have power and authority to inspect and regulate the diversions of all the parties hereto in accordance with this agreement, and in the exercise of such authority may enter upon the lands of said parties for the purpose of such inspection and regulation, and may establish and maintain such gaging stations and measuring devices in said stream system and diversion conduits as may be necessary or convenient. The several ditch owners shall furnish the necessary labor and material for the construction and installation of diversion works, headgates and measuring devices for their respective ditches.

11. It is finally agreed that in order to meet the costs of such distribution by the water master during the 1937 season, the parties hereto will pay to the Division of Water Resources on or before May 1, 1937, the amount of $700.00, which amount shall be apportioned among the various parties hereto in accordance with the assessments set forth in Schedule 5 hereunto annexed and made a part hereof.

IN WITNESS WHEREOF the parties hereto have affixed their hands and

SCHEDULE 1

PRIORITIES AND ALLOTMENTS TO VARIOUS WATER USERS
FROM PARKER CREEK AND TRIBUTARIES ABOVE GLEASON CREEK

Name of User	Acreage to be Supplied	Diversion Number as per D.W.R. Map	Allotment Cubic feet per Second: First Priority Class	Second Priority Class	Third Priority Class	Fourth Priority Class	Total
P. D. McDowell and Garle McDowell	145.0	93 to 99	0.21	1.89			2.10
W. E. Pepperdine and Nettie L. Pepperdine	46.5	93,97 & 100	0.07	0.63			0.70
W. S. Trumbo	80.0	101 & 102	0.20	1.00			1.20
W. S. Trumbo	31.5)			0.50			0.50
Myrtle O. Stanton	47.0)	103 and 110		0.65			0.65
John Page and Lydia Page	14.2)			0.20			0.20
W. S. Trumbo	12.4)			0.20			0.20
John Page and Lydia Page	121.0)	111 and 112	0.20	1.50			1.70
Electa Fogarty	9.0)			0.15			0.15
Myrtle O. Stanton	3.0)			0.05			0.05
John Page and Lydia Page	23.0)	95, 133 and			0.35		0.35
Alice Porter, et al.	46.0)	134			0.70		0.70
A. R. Conklin	72.0	158				0.63	0.63
G. B. Dorris	126.0	104 to 106	0.20	1.60			1.80
W. S. Trumbo	100.0	105,107 108 and 109		1.30			1.30
Myrtle O. Stanton	90.0	109	0.20	1.10			1.30
Electa Fogarty	93.0)	113	0.20	1.10			1.30
John Page and Lydia Page	24.0)	and 114		0.35			0.35
Electa Fogarty	10.0	115		0.15			0.15
Alice Porter, et al.	143.0	116 to 118 and 124	0.20	1.80			2.00
Pearl F. Porter	108.0)	113 & 121				1.60	1.60
	10.0)	123	0.20				0.20

SCHEDULE 1 (Cont'd.)

Name of User	Acreage to be Supplied	Diversion Number as per D.W.R. Map	Allotment Cubic feet per Second: First Priority Class	Second Priority Class	Third Priority Class	Fourth Priority Class	Total
Pearl F. Porter	33.5)			0.45			0.45
Phear E. Porter	22.0)		0.20	0.10			0.30
James C. Porter and Phear E. Porter	10.0)	120		0.15			0.15
James C. Porter	86.5)		0.20	1.05			1.25
X L Land and Cattle Co.	160.0)		0.20	2.10			2.30
Pearl F. Porter	41.5)			0.60			0.60
James C. Porter and Phear E. Porter	47.0)	125 to		0.67			0.67
James C. Porter	20.5)	127		0.30			0.30
Phear E. Porter	20.5	128 & 129	0.30				0.30
James C. Porter	80.0)	113				1.15	1.15
	28.0)	& 128 131		0.40			0.40
TOTALS	1904.1		2.58	19.99	1.05	3.38	27.00

SCHEDULE 2

PRIORITIES AND ALLOTMENTS TO VARIOUS WATER USERS
FROM THOMS CREEK AND ITS TRIBUTARIES

Name of Users	Acreage to be Supplied	Diversion number as per D.W.R. Map	Allotment Cubic Feet per Second: First Priority Class	Second Priority Class	Third Priority Class	Total
J. F. Kerr,	137.0		2.05*			2.05*
F. L. Wallace, and	98.0	159	2.75*			2.75*
Koenig Bros.	15.0		0.20*			0.20*
Lee Wortman	1.0	31 & 32	0.05			0.05
Herman Acty	2.9	38 to 40	0.05			0.05
Geo. I. Jones and Geo. W. Jones	18.9	33 to 36		0.25		0.25
Alfred DeWitt	15.1	37		0.20		0.20
	54.0	41 to 45		0.65		0.65
Clyde Hays and Ruth Hays	31.7	46 47 to 53 57 to 59 61		0.40		0.40
Howard Royce and Pearl Royce	38.4	54 to 56		0.45		0.45
J. M. Royce	7.6	62 & 63		0.10		0.10
	37.0	60, 77 to 81	0.80*			0.80*
David Reid	110.0	60 82 & 83	2.40*			2.40*
Albert Stiner, H. A. Stiner, and H. J. Stiner	17.0	64 & 65		0.20		0.20
C. A. Spaulding and Elsie Spaulding	42.3	66 to 70		0.85		0.85
Rufus S. Carter, et al.	21.1	69			0.30	0.30
The Federal Land Bank of Berkeley	32.4	71 to 73		0.40		0.40
W. F. Dukes and H. B. Dukes	1.3	74		0.05		0.05
TOTALS	680.7		8.30	3.55	0.30	12.15

* To be measured at or near point of diversion. All allotments in above schedule except through Diversions 60 and 159, are to be measured as the average difference during any seven day period between the

SCHEDULE 3

PRIORITIES AND ALLOTMENTS TO VARIOUS WATER USERS FROM
JOSEPH, LINVILLE AND GLEASON CREEKS AND THEIR TRIBUTARIES

Name of User	Acreage to be Supplied	Diversion Number as per D.W.R. Map	Creek	Allotments Cubic Feet per Second: First Priority Class	Second Priority Class	Third Priority Class	Total
Martin Espil and Lucie Espil	54.0	14 & 15 16 to 18	Shingle Couch	0.80			0.80
V. L. Jacobs and Georgia Jacobs	29.1	19 152 and 153	Joseph Jacobs Springs	0.40			0.40
Irvin K. Wilson	79.7	20 to 23	Joseph	0.95	0.20		1.15
E. S. McElwain	21.6	22	Joseph		0.30		0.30
E. S. McElwain	16.4	24	Joseph	0.10	0.15		0.25
R. A. Laird, et al.	19.7			0.10	0.15		0.25
The Federal Land Bank of Berkeley	228.5	24 & 25	Joseph	2.25	1.00		3.25
The Federal Land Bank of Berkeley	51.4	27 & 28	Joseph		0.75		0.75
R. A. Laird, et al.	39.6				0.55		0.55
X L Land and Cattle Co.	62.8	26	Joseph		1.30		1.30
The Federal Land Bank of Berkeley	150.5	29 & 30	Joseph		2.15		2.15
Totals	753.3			4.60	6.55		11.15
Grace F. Bonner	4.9	1 147	Linville Spring	0.10			0.10
J. W. Watkins and Dottie Watkins	112.6	2 to 5	Linville	0.60	1.00		1.60
C. C. Clark and Belle Clark	113.5	6 & 7	Linville	0.40	0.12	1.13	1.65
Belle Clark	37.2	8 to 10	Linville	0.55			0.55
Milan S. Renner and Ruth O. Allen	70.0	11 & 12	Linville	0.65	0.36		1.01
Bixby-Huffman Cattle Company, Ltd.	323.2	12 148 to 150	Linville			3.39	3.39
Totals	661.4			2.30	1.48	4.52	8.30
Harry Russell and Ella Russell	2.6	84 to 86	Gleason	0.20			0.20
Georgia M. Jones	78.8	87 to 91	Gleason	0.20	0.95		1.15

SCHEDULE 4

PRIORITIES AND ALLOTMENTS TO VARIOUS WATER USERS
FROM NORTH FORK OF PIT RIVER

Name of User	Acreage to be Supplied	Diversion Number as per D.W.R. Map	Allotment Cubic feet per Second: First Priority Class	Second Priority Class	Third Priority Class	Fourth Priority Class	Total
M. R. Woody and Inez D. Woody	19.5	13	0.35				0.35
Alpha E. Henderson	2.6	None	0.05				0.05
X L Land and Cattle Company	423.0	135, 137 and 138	7.00				7.00
C. W. Clarke Co.	10.3	137	0.20				0.20
Frank McArthur	635.2	136				10.60	10.60
Charles Bettandorff	56.7		2.00				2.00
Hans A. Heesch and Margaret M. Heesch	152.7		3.20				3.20
Mary Forest Hughes	40.0	139	0.50				0.50
T. J. Laird Estate	136.9		4.00				4.00
B. F. Lynip	529.5		4.00			4.85	8.85
Smith and Jackson	130.5		3.20				3.20
Arnold Bollinger & August Keller	118.7	141 &		2.00			2.00
Mary Forest Hughes	118.0	142		2.00			2.00
P. S. Dorris	1985.9				22.50		22.50
W. J. Dorris	1626.2				22.50		22.50
Addie F. McDowell	75.0	142			1.25		1.25
W. E. Minard	5.0				0.10		0.10
John C. Neer	2.0			0.05			0.05
M. J. Gloster and Annie G. Gloster	65.7	141,		1.10			1.10
Mary E. Walls and E. W. Asher	81.8	143, & 144		1.35			1.35
P. S. Dorris	77.0	146				1.30	1.30
Bank of Modoc County	39.0					0.65	0.65
Arnold Bollinger and August Keller	15.2	139				0.25	0.25
Totals	6346.4		24.50	6.50	46.35	17.65	95.00

SCHEDULE 5

APPORTIONMENT OF COST OF INVESTIGATION AND
WATER MASTER SERVICE ON NORTH FORK OF PIT RIVER AND TRIBUTARIES
DURING 1937 SEASON

Name of Owner	Continuous Flow Equivalent-Cubic feet per Second	Portion of Expense
Herman Acty	0.05	$1.44
Bank of Modoc County	0.325	2.90
Charles Bettandorff	2.00	11.75
Bixby-Huffman Cattle Co., Ltd.	3.39	19.09
Arnold Bollinger and August Keller	2.125	12.41
Grace F. Bonner	0.10	1.71
Rufus S. Carter, et al.	0.30	2.76
Belle Clark	0.55	4.08
C. C. Clark and Belle Clark	1.65	9.90
C. W. Clarke Co.	0.20	2.24
A. R. Conklin	0.63	4.51
Alfred DeWitt	0.85	5.68
G. B. Dorris	1.80	10.70
P. S. Dorris	11.90	64.03
W. J. Dorris	11.25	60.60
W. F. Dukes and H. B. Dukes	0.05	1.44
Martin Espil and Lucie Espil	0.80	5.41
The Federal Land Bank of Berkeley	6.55	35.78
Electa Fogarty	1.60	9.64
M. J. Gloster and Annie G. Gloster	1.10	7.00
Clyde Hays and Ruth Hays	0.40	3.30
Hans A. Heesch and Margaret M. Heesch	3.20	18.09
Alpha E. Henderson	0.05	1.44
Mary Forest Hughes	2.50	14.39
V. L. Jacobs and Georgia Jacobs	0.40	3.30
Geo. I. Jones and Geo. W. Jones	0.25	2.50
Georgia M. Jones	1.15	7.26
R. A. Laird, et al.	0.80	5.41
T. J. Laird Estate	4.00	22.31
B. F. Lynip	6.425	35.12
Frank McArthur	5.30	29.18
Addie F. McDowell	0.625	4.49
P. D. McDowell and Garle McDowell	2.10	12.20
E. S. McElwain	0.55	4.09
W. E. Minard	0.05	1.44
John C. Neer	0.05	1.44
John Page and Lydia Page	2.60	14.92
Wheeler E. Pepperdine and Nettie L. Pepperdine	0.70	4.89
Alice Porter, et al.	2.70	15.45
James C. Porter	3.10	17.56
James C. Porter and Phear E. Porter	0.82	5.52
Phear E. Porter	0.60	4.35
Pearl F. Porter	2.85	16.24
David Reid	2.40	13.86
Milan S. Renner and Ruth O. Allen	1.01	6.52
Howard Royce and Pearl Royce	0.45	3.56
J. M. Royce	0.90	5.94
Harry Russell and Ella Russell	0.20	2.24
Smith and Jackson	3.20	18.09
C. A. Spaulding and Elsie Spaulding	0.85	5.68
Myrtle O. Stanton	2.00	11.75
Albert Stiner, H. A. Stiner and H. J. Stiner	0.20	2.24
W. S. Trumbo	3.20	18.09
Mary E. Walls and Eleanor W. Asher	1.35	8.32
J. W. Watkins and Dottie Watkins	1.60	9.64
Irwin K. Wilson	1.15	7.26

TABLES

TABLE 1

DIVISION OF WATER RESOURCES

SNOW SURVEY - UPPER PIT RIVER

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
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			
Depth of Snow - Inches	24.3	13.3	43.8	38.1	9.9	66.1	52.0	47.3			
Water Content - Inches	11.0	5.2	18.7	14.3	3.3	22.6	22.0	17.5			
Density - Per cent	45.3	39.1	42.6	37.5	33.3	34.2	42.3	37.1			
Deduced Normal Water Content								20.0			
% of Deduced Normal	55.0	27.0	94.0	71.5	16.5	113.0	110.0	87.5			
Record Average - In.								14.32			
% of Record Average	78.0	36.3	131.0	100.0	23.0	158.0	154.0	122.0			
Cedar Peak Course - Elev. 7200 ft. Date of Survey	3/31	3/31	3/26	3/28	3/31	3/27	4/5	4/10			
Depth of Snow - In.	29.3	22.1	49.2	43.9	2.2	56.4	68.2	54.2			
Water Content - In.	13.0	8.0	19.8	16.3	0.9	21.1	26.2	21.6			
Density - Per cent	44.4	37.6	40.3	37.1	40.8	37.4	38.4	40.0			
Deduced Normal Water Content								22.2			
% of Deduced Normal	58.7	36.1	88.4	73.4	4.1	98.2	118.0	97.4			
Record Average - In.								15.9			
% of Record Average	82.0	50.4	118.0	102.5	5.7	133.0	165.0	136.0			
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			
Depth of Snow - In.	13.3	6.1	30.0	37.6	0	45.9	47.2	37.4			
Water Content - In.	6.1	2.9	13.3	14.1	0	18.8	20.0	16.7			
Density - Per Cent	45.6	47.3	44.3	37.5	0	40.9	42.3	44.8			
Deduced Normal Water Content								16.1			
% of Deduced Normal	37.9	18.0	82.5	87.6	0	116.6	124.3	104.0			
Record Average - In.								11.5			
% of Record Average	53.0	25.2	115.6	122.5	0	163.7	174.0	145.2			

TABLE 2

Division of Water Resources

PRECIPITATION - UPPER PIT RIVER

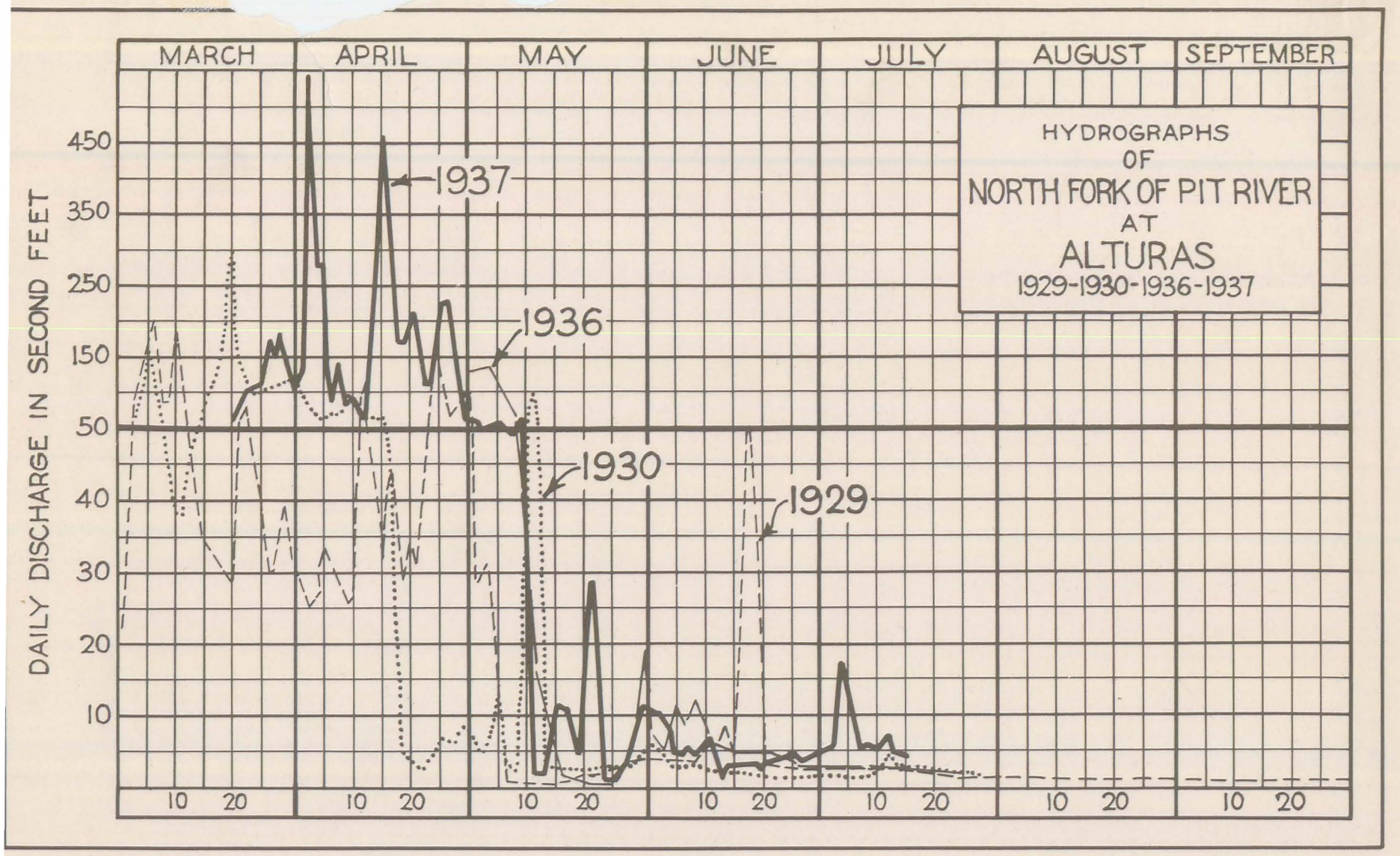
	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39
Jess Valley Elev.5400 Ft										
Oct		.90	1.67	.24	.90	.61	1.80	.00		
Nov		1.19	2.24	.52	.07	2.67	.18	.00		
Dec	2.41	.13	1.58	1.64	1.14	2.12	.83	.23		
Jan	2.72	.80	2.20	3.09	1.36	1.53	1.41	.00		
Feb	2.01	.88	.74	.85	1.58	2.02	.94	.49		
Mar	1.29	1.64	2.45	1.03	2.04	1.71	.17	1.26		
Apr	1.01	.39	3.37	1.84	.65	4.37	.84	1.53		
May	1.57	1.01	2.64	1.53	1.77	2.25	1.11	.87		
June	.13	.61	.53	.19	2.32	.00	1.67	1.00		
July	.02	.00	.11	.08	.11	T	.38	1.89		
Aug	.05	.28	.00	T	.10	.09	.37	.00		
Sept	1.94	.46	.08	T	.40	T	.91	.28		
Total	13.15	8.29	17.61	11.01	12.44	17.37	10.61	7.55		
Alturas Elev.4360 Ft.										
Oct	.54	1.15	1.78	0.07	1.00	.52	1.22	.01		
Nov	.00	.57	1.54	.33	.00	2.02	.56	.03		
Dec	1.60	.83	1.78	1.53	.74	1.56	1.54	.96		
Jan	2.24	.67	1.65	3.12	.54	2.52	4.93	2.05		
Feb	1.77	.67	.46	.23	.94	1.23	2.95	2.44		
Mar	1.14	1.03	1.10	.70	.87	1.44	.72	1.63		
Apr	.64	.46	1.51	1.44	.42	2.74	.56	.97		
May	.90	.06	1.26	1.08	2.01	.81	1.03	.27		
June	.10	.57	.29	.24	1.88	.00	.82	.30		
July	T	.00	.00	.31	.00	T	.19	.15		
Aug	.03	T	.00	.70	.00	T	.18	.00		
Sept	1.00	.64	.00	.42	.59	.03	.49	.06		
Total	9.96	6.05	11.37	10.17	8.99	12.87	15.20	8.87		
Bieber Elev.4200 Ft										
Oct	.83	.43	2.25	.86	2.16	1.05	1.96	.10		
Nov	.00	.90	1.18	.73	.00	3.23	.38	.00		
Dec	4.51	.28	4.09	1.78	1.67	1.89	2.69	1.70		
Jan	3.78	1.38	1.94	3.39	1.17	2.51	5.56	2.03		
Feb	2.75	1.98	.69	.31	1.79	1.60	3.40	5.05		
Mar	.67	1.44	1.25	2.57	1.33	2.91	.95	1.85		
Apr	.92	.26	1.72	1.28	.12	4.75	.80	1.46		
May	1.54	1.37	1.23	2.59	1.93	1.01	.81	.36		
June	.02	.31	.20	T	.56	.04	.75	1.04		
July	T	T	.22	T	.21	.02	.10	.18		
Aug	.20	.04	.00	T	.00	.00	.10	.00		
Sept	1.25	.59	T	.42	.50	.04	.54	.10		
Total	16.47	8.98	14.77	13.93	11.44	19.05	18.04	13.87		

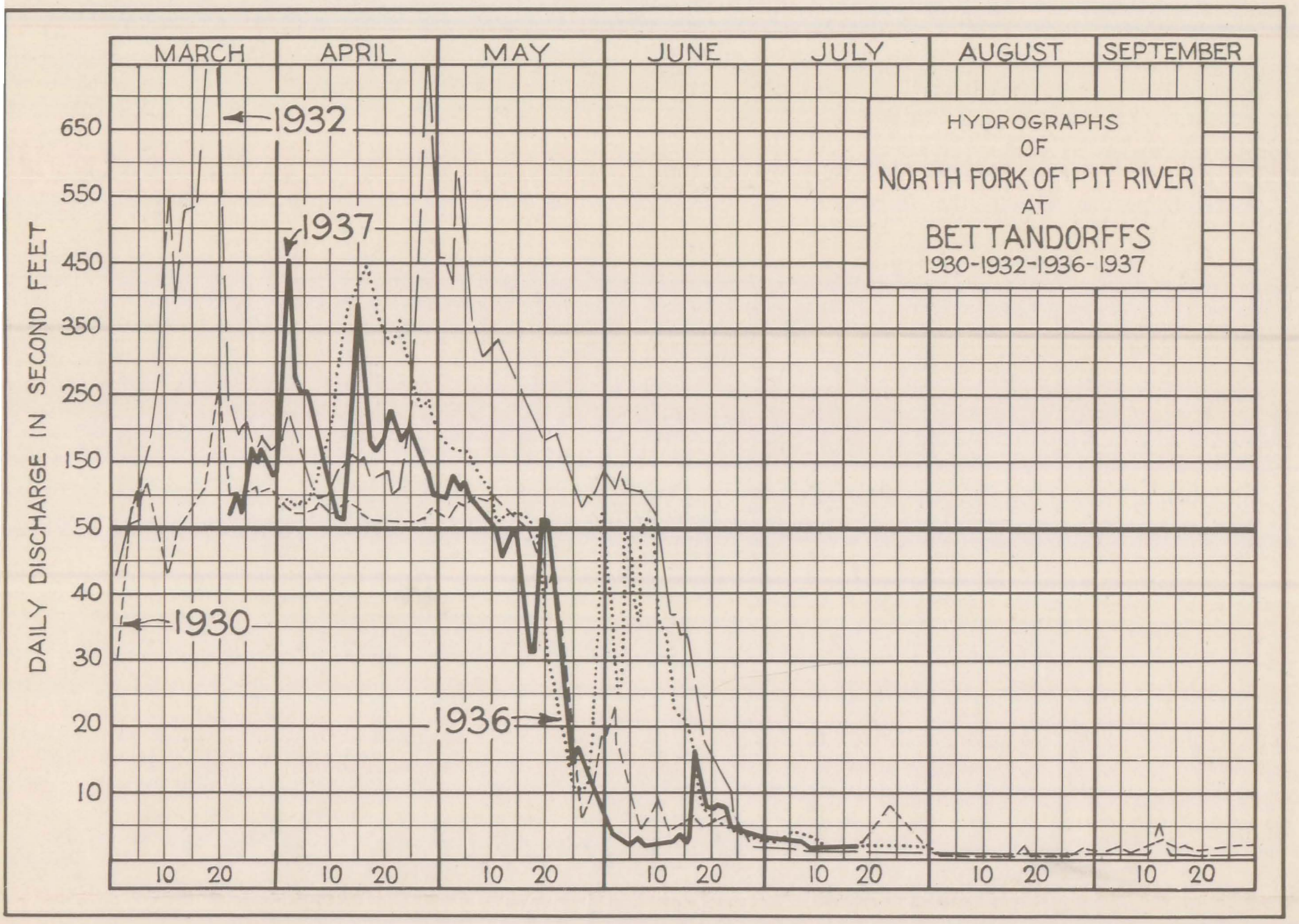
TABLE 4

WATER CROP OF NORTH FORK OF PIT RIVER AND ITS TRIBUTARIES COMPARED WITH THE PINE CREEK NEAR ALTURAS AND DEDUCED SNOW SURVEY RUN-OFF FOR THE PERIOD APRIL 1 TO JULY 31.

Year	Natural Flow: Pine Creek Acre-Feet	Natural Flow-North Fork of Pit River Acre-Feet	Seasonal Run-off Factor- Average- Cedar Pass & Eagle Peak
1919	5,953		
1920	6,675		
1921	10,260		
1922	7,780		
1923	5,110		
1924	5,100		
1925	7,920		
1926	6,199		
1927	10,080		
1928	7,640		
1929	5,495		
1930	5,894	15,400	14.73
1931	2,615	7,400	8.76
1932	10,300	36,600	25.90
1933	5,665		18.94
1934	5,453		6.95
1935	9,293		26.71
1936	9,300	28,600	27.90
1937	6,810	21,700	22.89
19 Year Mean	6,850	22,350*	19.45*
Average 1930-31-32-36-37	6,724	21,940	19.10
48 Year Mean	9,100*	29,700*	25.80*

*Calculated by comparison to record at Ydalpom.


HYDROGRAPHS
OF
NORTH FORK OF PIT RIVER
AT
ALTURAS
1929-1930-1936-1937
DAILY DISCHARGE IN SECOND FEET
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
1937
1936
1930
1929


HYDROGRAPHS
OF
NORTH FORK OF PIT RIVER
AT
BETTANDORFFS
1930-1932-1936-1937
DAILY DISCHARGE IN SECOND FEET
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
1932
1937
1930
1936

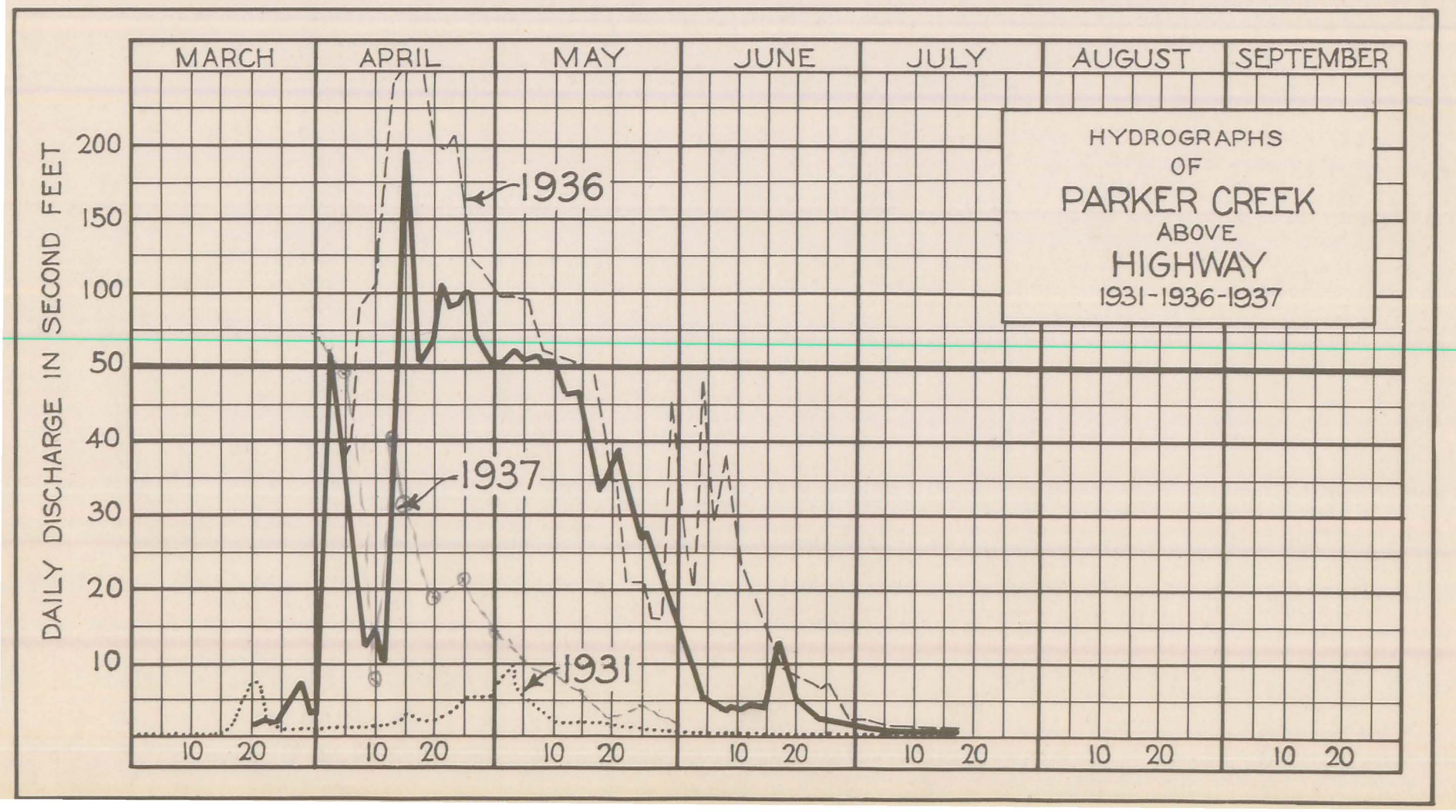

HYDROGRAPHS
OF
PARKER CREEK
ABOVE
HIGHWAY
1931-1936-1937
DAILY DISCHARGE IN SECOND FEET
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
1936
1937
1931

PLATE 4