Personal C.H. Lee

REPORT

on the

POSSIBLE UTILIZATION OF WATER SUPPLY

derived from

RUSH AND LEEVINING CREEKS

FOR THE DEVELOPMENT OF HYDRO-ELECTRIC POWER AT PLANTS

Located on

RUSH CREEK, LEEVINING, AND OWENS RIVER GORGE

Proposed by

CITY OF LOS ANGELES

DEPARTMENT OF PUBLIC SERVICE

BUREAU OF POWER AND LIGHT

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List of Tables.

LIST OF PLATES.

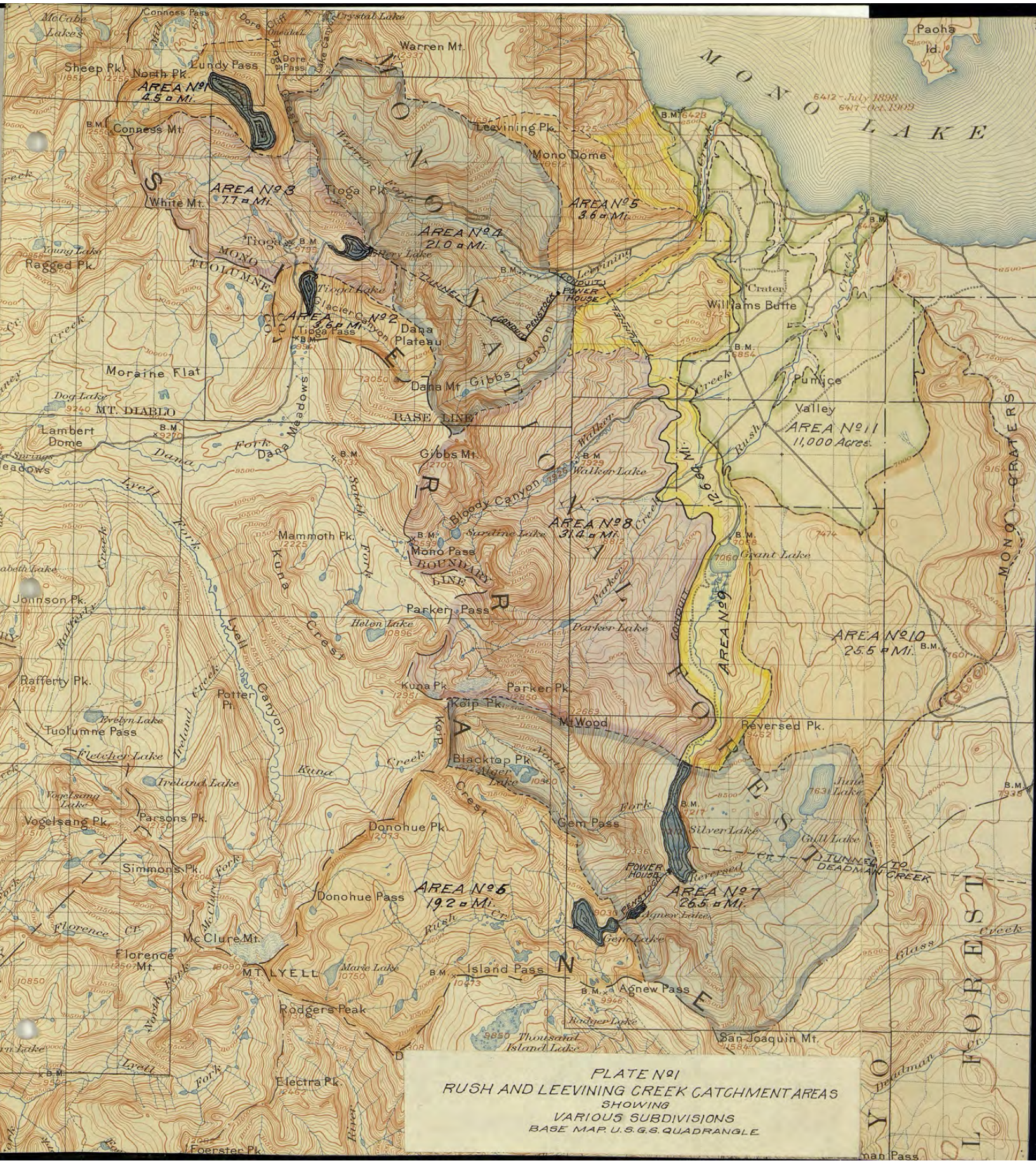

PLATE No 1
RUSH AND LEEVINING CREEK CATCHMENT AREAS
SHOWING
VARIOUS SUBDIVISIONS
BASE MAP. U.S.G.S. QUADRANGLE

THE TOPOGRAPHIC MAPS OF THE UNITED STAT

The United States Geological Survey is making a topographic atlas of the United States. This work has been in progress since 1882, and more than 38 per cent of the area of the country, excluding outlying possessions, has now been mapped. The areas mapped are widely distributed, every State being represented, as shown on the progress maps accompanying each annual report of the Director.

This atlas is being published in sheets of convenient size, about 16½ by 20 inches. The four-sided area of land represented on an atlas sheet is bounded by parallels and meridians and is called a *quadrangle*. The quadrangles mapped cover 1° of latitude by 1° of longitude, 30′ of latitude by 30′ of longitude, 15′ of latitude by 15′ of longitude, or smaller areas, the size of the area mapped depending on the scale used. Several scales are employed. The smallest scale, that used for quadrangles covering 1°, is 1:250,000, or very nearly 4 miles to an inch—that is, 4 linear miles on the ground is represented by 1 linear inch on the map. This scale is used for maps of the desert regions and some other parts of the far West. For the greater part of the country, which is mapped by quadrangles covering 30′, a larger scale, 1:125,000, or about 2 miles to an inch, is employed. A still larger scale, 1:62,500, or about a mile to an inch, is used for quadrangles covering 15′, the unit selected for mapping thickly settled or industrially important areas. A fourth scale, 1:31,680, or one-half mile to an inch, is employed for maps that are to be used in connection with irrigation or drainage, and a few maps of mining districts are published on still larger scales.

A topographic survey of Alaska has been in progress since 1898 and nearly 30 per cent of its entire area has now been mapped. One-third of the area mapped, or 10 per cent of the Territory, has been covered only by reconnaissance work, the results of which have been mapped on a scale of about 10 miles to an inch. The maps of nearly all the remaining two-thirds of the surveyed area have been published on a scale of 1:250,000, or about 4 miles to an inch. These maps are large, each representing 2° of latitude by 4° of longitude. A few areas that are of economic importance, aggregating about 3,000 square miles, have been surveyed in greater detail and mapped on a scale of 1:62,500, or about a mile to an inch.

A survey of the Hawaiian Islands was begun in 1910 and the resulting maps are being published on a scale of 1:62,500.

The features shown on these atlas sheets or maps may be classed in three groups—(1) *water*, including seas, lakes, rivers, canals, swamps, and other bodies of water; (2) *relief*, including mountains, hills, valleys, and other elevations and depressions; (3) *culture* (works of man), such as towns, cities, roads, railroads, and boundaries. The conventional signs used for these features are shown below, with explanations. Variations appear on some earlier maps.

All water features are printed in *blue*, the smaller streams and canals in full blue lines and the larger streams, lakes, and the sea in blue water-lining. Intermittent streams—those whose beds are dry at least three months in the year—are shown by lines of dots and dashes.

Relief is shown by contour lines in *brown*. A contour on the ground passes through points that have the same altitude. One who follows a contour will go neither uphill nor downhill but on a level. The contour lines on the map show not only the shapes of the hills, mountains, and valleys but also their elevations. The line of the sea coast itself is a contour line, the datum or zero of elevation being mean sea level. The contour at, say, 20 feet above sea level would be the shore line if the sea were to rise or the land to sink 20 feet. On a gentle slope this contour is far from the present coast; on a steep slope it is near the coast. Where successive contour lines are far apart on the map they indicate a gentle slope; where they are close together they indicate a steep slope; and where they run together in one line they indicate a cliff.

The manner in which contour lines express altitude, form, and grade is shown in the figure below.

The sketch represents a river valley between two hills. In the foreground is the sea, with a bay that is partly inclosed by a hooked sand bar. On each side of the valley is a terrace into which small streams have cut narrow gullies. The hill on the right has a rounded summit and gently sloping spurs separated by ravines. The spurs are truncated at their lower ends

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INTRODUCTION.

The purpose of this report is to determine the probable hydro-electric power output which may be developed at plants to be located on Rush and Leevining Creeks and Owen River Gorge, Mono and Inyo counties, California, as proposed by the city of Los Angeles, Department of Public Service, Bureau of Power and Light (Plate 1)

This report considers the utilization to the fullest extent of the available head on Rush and Leevining Creeks and that portion of the Owens river known as the gorge, lying between Long Valley and the head of Owens Valley; and of the stream flow of Leevining Creek and Rush Creek.

The water supply consists of the flow of Leevining Creek in Sec. 24. T. 1, N. R. 25, E. M.D.M. and the flow of Rush Creek below Silver Lake in N.W. 1/4 of Sec. 9. T. 2, S. R. 26, E. M.D.M. after allowing a liberal supply for present and future irrigation in Mono Basin.

Storage for power flow in Leevining Creek plant is provided in the Saddlebags, Tioga and Ellery Reservoirs, located in the upper part of Leevining Creek drainage. Storage for power flow in Rush Creek plant is provided in the Gem Lake and Agnew Lake reservoirs, on Upper Rush Creek. The Silver Lake reservoir, lying just below the Rush Creek power house, receives the discharge through that plant, and also the discharge from Leevining Creek plant, the latter flow being diverted below the power house

and conveyed by conduit to Silver Lake. The purpose of Silver Lake reservoir is to regulate its supply for irrigation use in Mono basin and power flow through tunnel to Deadman Creek, thence to Long Valley reservoir. Long Valley reservoir impounds this flow along with run-off from its own drainage and delivers a uniform draft to the three Owens River gorge power plants lying immediately below it.

The data upon which this report is based was obtained from Water Supply Papers 294 and 300 of the U.S. Geological Survey, and from records and maps on file in the offices of the Bureau of Water Works and Supply, and Power and Light, of the Department of Public Service, City of Los Angeles.

RUN-OFF.

Leevining Creek.

Discharge measurements of Rush Creek have been made since 1910-11 by the United States Geological Survey, but the station is considered to be poorly located, and therefore the measurements have not been used.

Discharge measurements of Leevining Creek have been made from 1910-11 to date by the United States Geological Survey. The station is well located and these measurements are used.

The period of actual measurement is very short and in order to determine the run-off from these catchment areas it is necessary to have data covering a much longer period.

The catchment area of west fork of Carson River, above Woodford, Cal., where characteristics are similar, and where discharge measurements have been kept for a much longer period, is used to obtain the mean discharge in second feet per square mile and the monthly variation therefrom.

In table No. 1 is given the monthly discharge of west fork of Carson River, at Woodford, Cal., as copied from Water Supply Paper No. 300, at page 156, et seq., for the period 1900-01 to 1910-11, and the percent which each months run-off bears to the mean run-off (2.41 second feet per square mile) as shown in Table No. 2.

The mean run-off from the catchment area of west fork of Carson River, above Woodford, Cal., for the seasonal year 1910-11, is shown by Table No. 1 to be 2.93 second feet

per square mile, or 122 percent of the mean.

The mean run-off from the catchment area of Leevining Creek above Rangers Station for the seasonal year 1910-11 is shown in Table No. 3 to be 2.66 second feet per square mile. It is assumed that the seasonal variations on Leevining Creek are similar to those prevailing on West Fork of Carson River, and that 2.66 second feet per square mile is 122 percent of the mean discharge from the Leevining Creek catchment area, which would be 2.18 second feet per square mile. The monthly discharge per square mile has then been computed for Leevining Creek for the years 1900-01 to 1910-11, as shown in Table No. 4, by using 2.18 second feet per square mile for the mean and the monthly percentage of the mean as shown in Table No. 1. Table No. 4, with Table No. 3, which are actual measured discharges of Leevining Creek for the period 1910-11 to 1913-1914, gives a complete record from 1900-01 to 1913-14.

The run-off from areas Nos. 1, 2, 3 and 4, Plate I, is shown in tables Nos. 5, 6, 7 and 8. These areas extend to the crest and drain the immediate easterly slope of the Sierra Nevada mountains and the full unit run-off as obtained from meter measurements at Rangers Station has been used. This, however, is conservative, as the meter measurements include the run-off from area No. 5, which is much smaller than that from areas 1, 2, 3 and 4, as explained in the following, and as shown in Table No. 9, which would undoubtedly increase the run-off from the higher areas.

Seasonal Discharge in Second Feet per sq. mile at mouth of canyon of creeks near Independence, having 60% or more of area above 10,000 feet.

Creek	Year Beginning Sept. 1, 1904	1905	1906	1907	1908	1909	Observed 6 year mean	Computed 21 yr. mean
Shepard	0.90	2.56	1.54	1.10	1.70	1.15	1.49	1.26
George	0.90	2.62	1.81	1.08	2.06	1.13	1.60	1.36
LonePine	0.83	2.31	1.94	1.69	2.37	1.31	1.74	1.47
Average	.88	2.50	1.76	1.29	2.04	1.20	1.61	1.36

Seasonal Discharge in Second Feet per sq. mile at mouth of canyon of creeks near Independence, having less than 60% of area above 10,000 feet.

Creek	Year Beginning Sept. 1, 1904	1905	1906	1907	1908	1909	Observed 6 year mean	Computed 21 yr. mean
Bairs	0.62	1.71	1.11	0.61	1.36	0.69	1.02	0.86

The above tables are copied from Water Supply Paper No. 294, page 113, and show the run-off per square mile from drainage areas having less than 60 percent of area above 10,000 feet and somewhat removed from the crest of the Sierra Nevada mountains to be 63 percent of the run-off per square mile from a drainage area having 60 percent or more area above 10,000 feet, and adjacent to the crest.

The relative position of that portion of the drainage area tributary to Leevining Creek below Ellery Lake, area No. 5, and that portion above Ellery Lake, area No. 3, is similar to the relative positions of the creeks given in the above tables. Therefore, a run-off of 63 percent of 2.18, the mean run-off in second feet per square mile above Ellery Lake, or 1.37 second feet per square mile, is used as the mean run-off for area No. 5, that portion of Leevining Creek drainage area tributary to the stream below Ellery Lake.

R U S H C R E E K

That portion of the drainage area tributary to Rush Creek below Gem Lake and above Silver Lake, area No. 7, although extending to the crest of the Sierra Nevada mountains, has a large portion lying below the 10,000 feet elevation not draining the immediate easterly slope of the Sierra Nevada mountains. This drainage area is so situated and the topographical features are such as to indicate a good run-off, although not as large as those areas draining only the immediate easterly slope of the Sierra Nevadas. Therefore a mean of 2.18, the mean run-off per square mile of areas draining

the immediate easterly slope of the Sierra Nevadas, and 1.37, the mean run-off per square mile as used for that drainage area of Leevining Creek below Ellery Lake, area No. 5, or 1.77 second feet per square mile is considered to be consistent. The monthly discharge for this area is given in Table No. 11.

Drainage areas Nos. 6 and 8 lie similarly to areas Nos. 1, 2 and 3 and the same unit run-off is used. Monthly discharges for these areas are found in tables Nos. 10 and 12.

Table Showing Mean Annual Run-off in Second Feet Per Sq. Mile as Measured for Streams Draining East Slope of Sierra Nevada Mountains in Owens Valley

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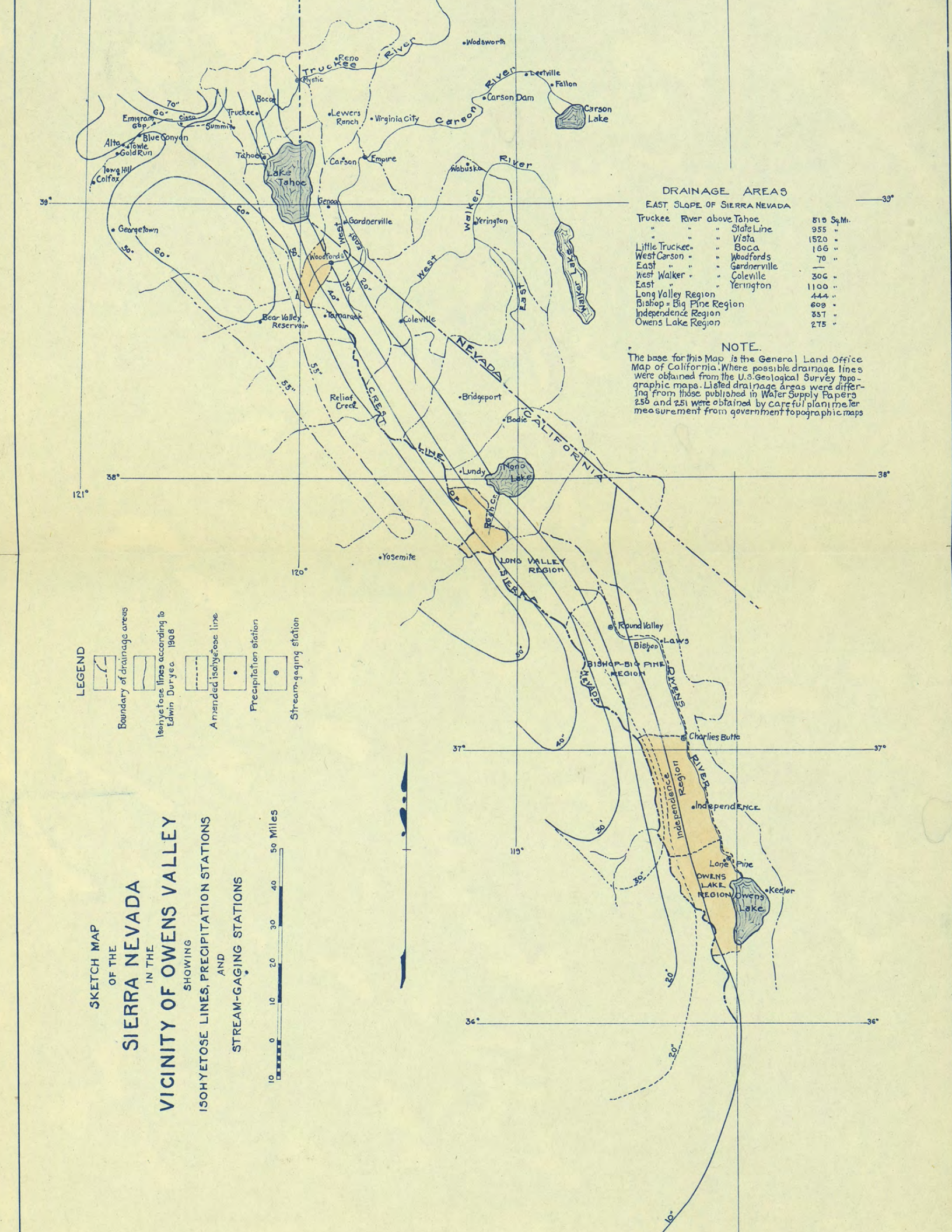
Compiled by Charles H. Lee, Hydraulic Engineer from U.S.G.S. and City of Los Angeles Records

Stream	Drainage Area Square Miles	Observed 6 Yr. Mean Discharge	Computed 21 Yr. Mean Discharge Based on Kings River Record
Bishop Creek	6.30	1.99	1.75
Big Pine Creek	27.0	2.00	1.78
Tinamaha Creek	5.2	2.09	1.92
Taboose Creek	6.99	2.14	1.81
Goodale Creek	4.97	1.96	1.66
Division Creek	3.88	2.04	1.73
Oak Creek	15.36	1.98	1.68
Independence Creek	8.42	2.15	1.82
Georges Creek	9.10	1.60	1.36
Lone Pine Creek	11.94	1.74	1.47
Cottonwood Creek	41.68	0.88	0.77
Ash Creek	14.70	0.55	0.43

A study of the above table and Plate No. 2, which is copied from Watter Supply Paper No. 294, will show the decrease in the unit run-off between west fork of Carson River and Rush and Leevining Creeks to be consistent.


SKETCH MAP
OF THE
SIERRA NEVADA
IN THE
VICINITY OF OWENS VALLEY
SHOWING
ISOHYETOSE LINES, PRECIPITATION STATIONS
AND
STREAM-GAGING STATIONS
LEGEND
Boundary of drainage areas
Isohyetose lines according to Edwin Duryea 1908
Amended isohyetose line
Precipitation station
Stream-gaging station
10 0 10 20 30 40 50 Miles
DRAINAGE AREAS
EAST SLOPE OF SIERRA NEVADA
Truckee River above Tahoe 518 Sq.Mi.
" " " State Line 955 "
" " " Vista 1520 "
Little Truckee " " Boca 166 "
West Carson " " Woodfords 70 "
East " " " Gardnerville —
West Walker " " Coleville 306 "
East " " " Yerington 1100 "
Long Valley Region 444 "
Bishop = Big Pine Region 609 "
Independence Region 357 "
Owens Lake Region 275 "
NOTE.
The base for this Map is the General Land Office Map of California. Where possible drainage lines were obtained from the U.S. Geological Survey topographic maps. Listed drainage areas were differing from those published in Water Supply Papers 256 and 251 were obtained by careful planimeter measurement from government topographic maps
Wadsworth
Reno
Truckee River
Mystic
Boca
Truckee
Emigrant Gap
Cisco
Summit
Alta
Towle
Blue Canyon
Gold Run
Dong Hill
Colfax
Georgetown
Tahoe
Lake Tahoe
Lewers Ranch
Virginia City
Carson River
Carson Dam
Leetville
Fallon
Carson Lake
Carson
Empire
Genoa
Gardnerville
Wabuska
Walker River
Yerington
Walker Lake
Woodfords
West Carson
East Carson
West Walker
East Walker
Bear Valley Reservoir
Tamarack
Coleville
Reliaf Creek
Bridgeport
Bodie
Lundy
Mono Lake
Yosemite
NEVADA
CALIFORNIA
CREST LINE
LONG VALLEY REGION
Round Valley
Bishop
Laws
BISHOP-BIG PINE REGION
Charlies Butte
Owens River
Independence Region
INDEPENDENCE
Lone Pine
OWENS LAKE REGION
Owens Lake
Keeler
39°
38°
37°
36°
121°
120°
119°
70"
60"
50"
40"
30"
20"
10"
55"

REGULATION OF RUN-OFF

In the preceding paragraphs the unit run-off and the tabulation and computation of the monthly discharges of Rush and Leevining Creeks have been discussed. Of this only a portion is available for power development.

A careful inspection of Plate No. 1 will show the project as herein considered. Above the proposed power development on both Rush and Leevining Creeks there is a regulation of run-off from areas Nos. 1, 2, 3 and 6 by storage reservoirs (see capacity and area curves, Plates Nos. 5, 6, 7, 8 and 9). The run-off from area No. 7 and all overflow from Gem and Agnew Reservoirs flows directly into Silver Lake Reservoir (see area and capacity curve Plate No. 10), where it is regulated for diversion to Deadman Creek. The run-off from areas Nos. 4 and 8 is unregulated and is diverted into Silver Lake Reservoir by means of an open canal having a capacity of 150 second feet, or 8,300 acre feet in 28 days; 8,900 acre feet in 30 days, and 9,200 acre feet in 31 days.

The run-off having been tabulated in acre feet per month, the determination of the quantity of water passing over the canal during high water periods is made in terms of the mean monthly run-off.

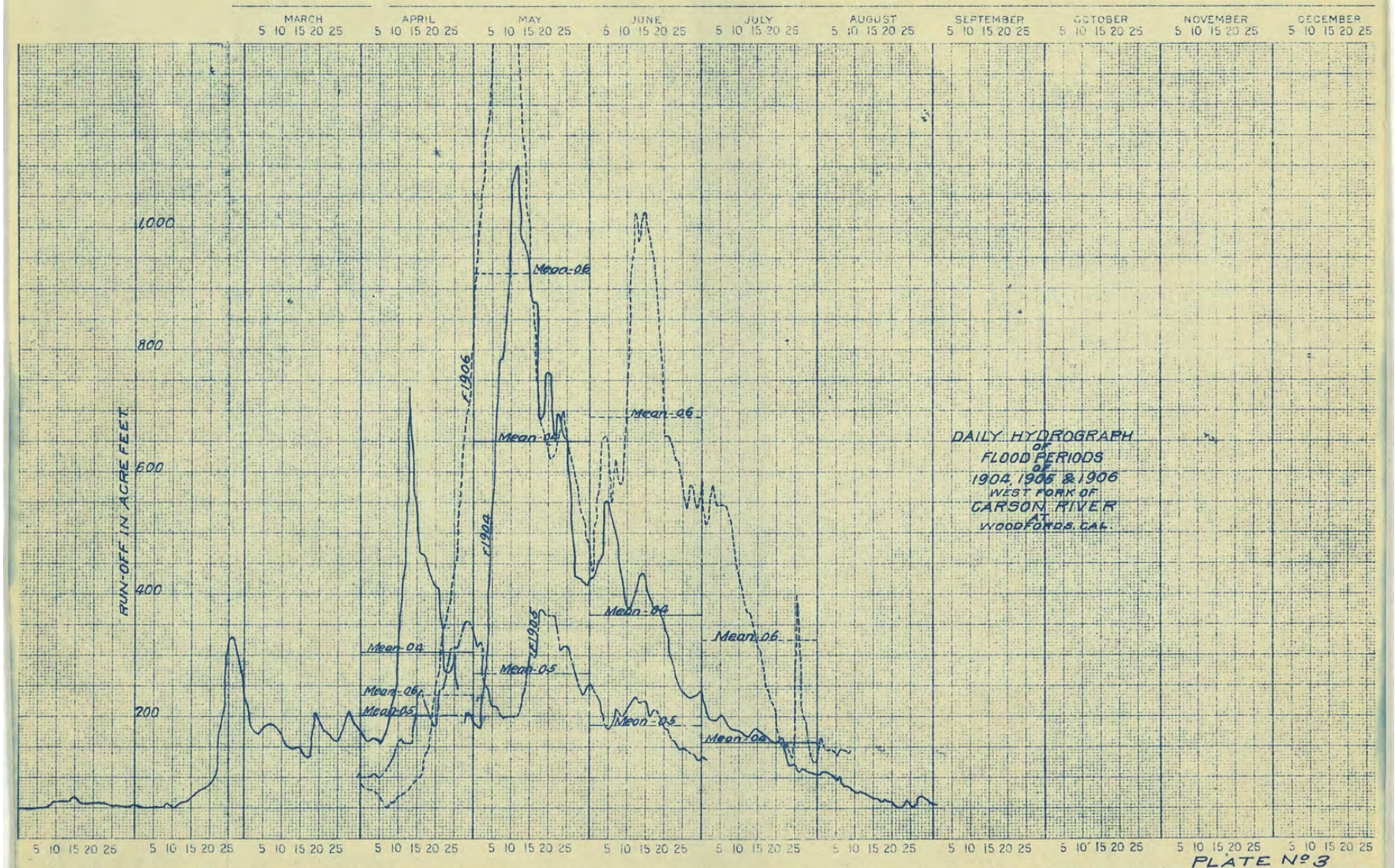

MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
5 10 15 20 25
1,000
800
600
400
200
RUN-OFF IN ACRE FEET.
Mean-06
Mean-04
Mean-06
Mean-04
Mean-05
Mean-06
Mean-04
Mean-05
Mean-05
Mean-06
Mean-04
1906
1904
1905
DAILY HYDROGRAPH
OF
FLOOD PERIODS
OF
1904 1905 & 1906
WEST FORK OF
CARSON RIVER
AT
WOODFORDS. CAL.

PLATE No 3

Monthly Mean and Maximum Discharge of west fork of Carson River and percent of monthly run-off above monthly mean; Above 75 percent monthly mean; Above 50 percent monthly mean and above 25 percent monthly mean, during high water periods.

Month	Mean	Maximum	Percent of mean	Percent of Monthly Run-off Above			
				Mean	75% of mean	50% of mean	25% of mean
1904							
April	305	729	239	25	39	58	82
May	651	1085	167	20	37	59	81
June	368	543	148	13	30	56	83
July	158	200	127	12	29	54	78
1905							
April	202	348	172	19	36	57	83
May	271	370	136	10	27	48	70
June	187	241	129	-	-	-	-
1906							
April	236	865	366	44	53	66	82
May	975	1570	170	16	26	47	75
June	690	1010	146	12	26	50	75
July	324	570	176	23	37	54	75
Mean	392	685	180	19.4	34.0	54.9	78.4

The above computation is made from planimeter measurements of Plate No. 3, which is a daily hydrograph of the west fork of Carson River, at Woodford, Cal., plotted from measurements by the United States Geological Survey during the high water periods of 1904, 1905 and 1906.

It will be noticed that the percents of monthly run-off above mean, 75 percent of mean; 50 percent of mean, and 25 percent of mean, do not vary greatly with a change in stage of river, hence the data obtained from the three high water periods is considered sufficiently reliable to construct the curve shown by Plate No. 4.

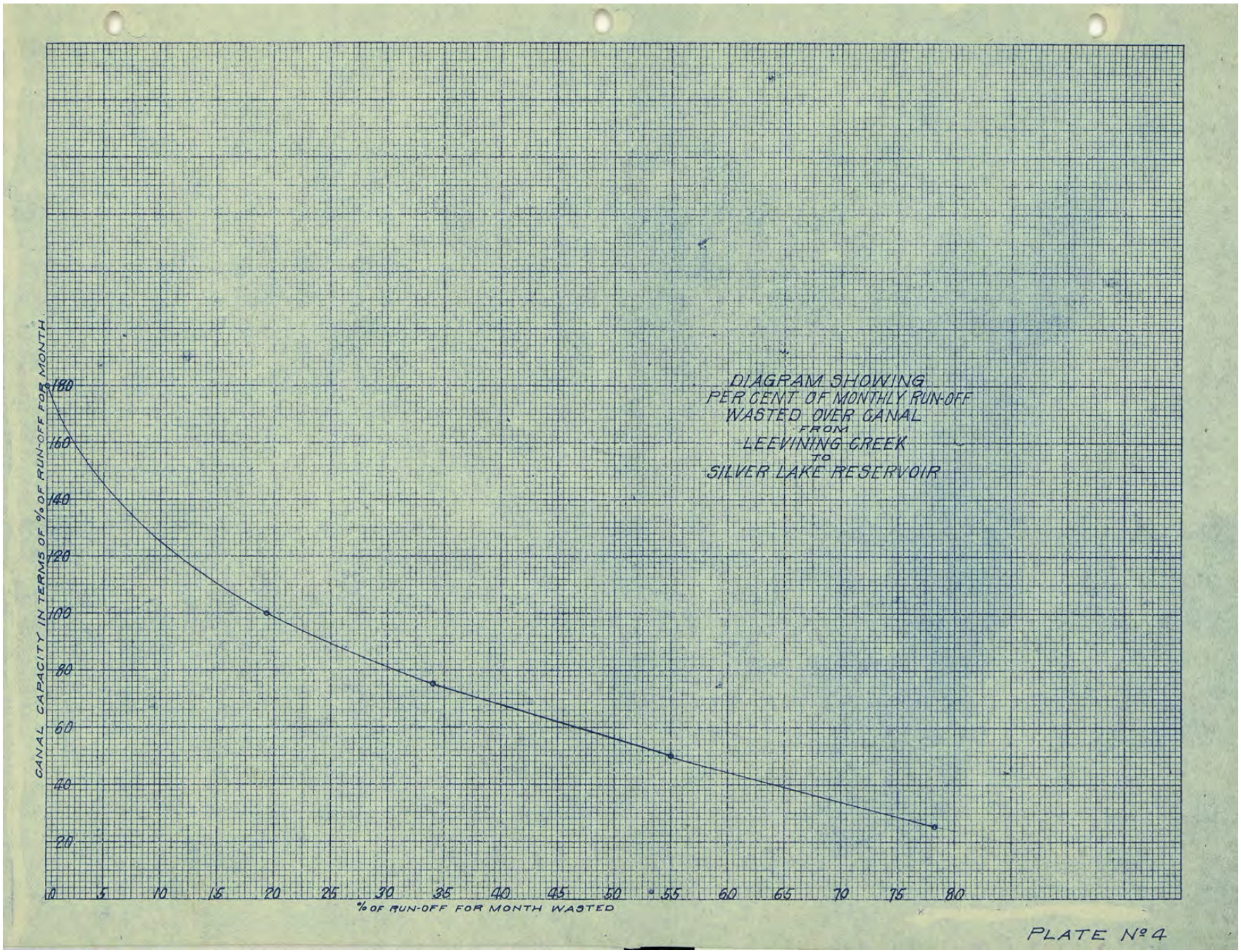


DIAGRAM SHOWING
PER CENT OF MONTHLY RUN-OFF
WASTED OVER CANAL
FROM
LEEVINING CREEK
TO
SILVER LAKE RESERVOIR
CANAL CAPACITY IN TERMS OF % OF RUN-OFF FOR MONTH
180
160
140
120
100
80
60
40
20
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
% OF RUN-OFF FOR MONTH WASTED

PLATE Nº 4

In the construction of this curve it is considered that when the canal capacity is 180 percent of the mean monthly run-off it is sufficient to divert the entire run-off, and when the canal capacity is 100 percent of the mean monthly run-off the canal is insufficient to divert the entire run-off, 19.4 percent of which will pass over. The points for 75, 50 and 25 percent of mean are plotted in the same manner.

EVAPORATION

The elevations of Saddlebag, Tioga, Ellery, Gem and Agnew reservoirs range from 8,700 to 10,000 feet above sea level and are situated similarly to Lake Tahoe, which is at an elevation of 6,225 feet above sea level, where a study of evaporation has been made by Edwin Duryea, Jr. The difference between the elevation of the proposed reservoirs of this project and the elevation of Lake Tahoe will tend to materially decrease the evaporation loss as given by Mr. Duryea.

From Colorado Agricultural Experimental Station Bulletin No. 45, page 43. "The effect of lower temperatures is greater than the increasing effect of the barometric pressure and probably greater than the effect of the wind, except in exposed places, and when we take into account the fact that the water is frozen for a much longer period of the year it is safe to conclude that the evaporation for the year is much less than at lower elevations."

"The evaporation seems to vary directly with the difference of vapor pressure corresponding to the temperature of the water surface and the air, and as the pressure

decreases much faster there than the temperature, the same difference in degrees means a greater difference in vapor pressure, or a greater capacity for moisture at a high temperature than at a low.

	For 10 degrees difference	Difference in vapor pressure
between	80° and 70°	0.29 inches
	70° and 60°	0.22
	60° and 50°	0.16
	50° and 40°	0.11
	40° and 30°	0.08

Since the evaporation varies directly as this difference of vapor pressure, or so far as this factor is involved, when temperature of the water surface is 80 degrees the evaporation would be 3-1/2 times as fast as when the temperature is 40 degrees, the excess above dew point being 10 degrees in each case."

To be conservative the results of Mr. Duryea Jr.'s study have been used for loss by evaporation from the exposed areas of Saddlebag, Tioga, Ellery, Gem and Agnew reservoirs in excess of the natural lake surfaces without modification either for elevation or added run-off, which occurs from summer rains falling on this excess of water surface.

Silver Lake reservoir is almost 1,000 feet above Lake Tahoe, but is considered to have a much larger loss by evaporation on account of its exposed location and its nearness to an arid region (areas 10 and 11). The condition here lies between those prevailing at Lake Tahoe and Lahonton reservoir, which is situated at the west border of the Carson sink at an elevation of 4,500 feet. The following

table is a copy of the records made from pan observations in the enlarged end of the Truckee Canal where it discharges into Lahonton reservoir and a computation of the mean rate of evaporation between this and Lake Tahoe.

The following tables are copied from a study of the evaporation at Lake Tahoe by Edwin Duryea, Jr., published in the Engineering News of Feb. 29, 1912.

The basis data for these tables is a more or less disconnected record of daily evaporations covering the period 1899-1900 to 1906-07.

Evaporation, Lake Tahoe, California.

Month	Minimum		Maximum		Means of all months		Mean of all
	Inches	Percent	Inches	Percent	Inches	Percent	Percent
Oct.	2.15	10	3.82	9	3.09	10	9
Nov.	1.35	7	2.78	7	2.15	7	7
Dec.	0.62	3	1.85	5	1.30	4	5
Jan.	0.70	4	1.81	4	1.11	4	4
Feb.	0.47	2	1.30	3	0.86	3	3
March	0.56	3	1.88	5	1.24	4	4
April	1.25	6	2.75	7	1.85	6	6
May	1.08	5	3.20	8	2.44	8	8
June	2.39	11	3.90	10	3.32	11	11
July	3.40	17	5.62	14	4.42	14	14
Aug.	3.45	17	6.50	16	4.90	16	16
Sept.	3.10	15	4.74	12	3.83	13	13
	20.52	100	40.15	100	30.51	100	100

The assumed safe yearly evaporation is 90 percent of the sum of the maximum months for the observed eight year period 40.15 in.

Assumed Safe Monthly Evaporations, Lake Tahoe, Calif.

Month	Assumed Percent Distribution (= mean of all months)	Corresponding Monthly Evaporation in Inches
Oct.	10	3.60
Nov.	7	2.52
Dec.	4	1.44
Jan.	4	1.44
Feb.	3	1.08
March	4	1.44
April	6	2.16
May	8	2.88
June	11	3.96
July	14	5.04
Aug.	16	5.76
Sept.	13	4.68
Total	100	36.00

It should be noted that the assumed percent distribution differs very little from the mean of all percents.

Record at Lahanton, Nevada, ~~Pass~~ in Main Truckee Canal

Month	11-12	12-13	13-14	14-15	Mean	Percent
Oct.		3.19	4.01	4.28	3.82	7
Nov.		2.04	1.61	1.26	1.64	3
Dec.		.00	.00	.00	.00	0
Jan.	.00	.00	.00		.00	0
Feb.	1.53	.00	.00		0.51	1
March	3.11	3.38	3.38		3.29	6
April	4.40	6.72	3.68		4.94	9
May	6.10	6.57	8.61		7.09	13
June	8.34	7.71	8.05		8.03	14
July	9.56	9.40	13.21		10.72	19
Aug.	8.81	8.81	12.21		9.94	17
Sept.	5.74	6.57	6.89		6.40	11
	47.59	54.39	61.65	5.54	56.38	100

Monthly EVaporation at Lake Tahoe and at Lahanton

Month	Lake Tahoe	Lahanton	Mean
Oct.	3.60	3.82	3.71
Nov.	2.52	1.64	2.08
Dec.	1.44	.00	0.72
Jan.	1.44	.00	0.72
Feb.	1.08	0.51	0.79
March	1.44	3.29	2.36
April	2.16	4.94	3.55
May	2.88	7.09	4.98
June	3.96	8.03	5.99
July	5.04	10.72	7.88
Aug.	5.76	9.94	7.85
Sept.	4.68	6.40	5.54
	36.00	56.38	46.17

The combined area of the lakes on Rush Creek is much larger than of those on Leevining Creek, where the loss by evaporation has been taken into account in the meter measurements, and to compensate this difference, if any exists, the above rate of evaporation has been applied to the entire flooded area of Silver Lake reservoir.

IRRIGATION

There is an area of about 11,000 acres, as shown on Plate No. 1, area No. 11, which may be termed irrigable land.

The irrigation season in the Boise and upper Snake River Valley, Idaho, is similar to that prevailing in the Mono Lake region. The following is a copy of the summary of tables determining the duty of water in the Boise and Upper Snake River Valley, Idaho, by Don H. Bark, Irrigation Engineer, United States Department of Agriculture, published in the NinthBiennialReport of the State Engineer of Idaho for 1911-12, and shows the monthly distribution of water.

Percent of Seasonal Requirements

	Apr.	May	June	July	Aug.	Sep.
Medium Clay & Sandy Loam	.82	16.08	31.66	32.25	16.38	2.79
Porous, Sandy & Gravely Soils	3.29	13.57	30.57	26.46	24,99	1.11
Mean	2.05	14.87	21.11	29.35	20.68	1.95

Allowing a duty of 1.5 acre feet to the acre and an irrigating season of 150 days, although it is stated by residents in this region that the duty of water is 1.0 acre feet to the acre, and that the irrigating season is but 120 days, there has been allowed enough water to have irrigated 6,000 acres during the driest years.

To quote from Irrigation Engineering by Herbert M. Wilson: "From estimates made in well irrigated portions of the west it appears that if water is provided for 500 out of every 640 acres, it will be sufficient to supply all the demands of the cultivator. Keeping this in mind it will be seen that the

actual duty of water entering the canal head, when estimated on large areas, is at least 20 percent greater than the theoretic duty per acre."

Considering the above there has been allowed sufficient water to have irrigated 7,500 acres, and in view of the lack of transportation facilities and competition of other lands in California more favorably situated as to soil, climatic conditions, market conditions and residential advantages, 7,500 acres is considered to be the limit of economical irrigation.

MASS COMPUTATION

In order that a reliable estimate may be made of the salient features of this study a mass computation has been made (Table No. 13) showing effect of storage on the run-off from the areas tributary to the various reservoirs, loss by evaporation, regulated flow in Rush and Leevining Creeks for the development of power thereon, the final diversion to Deadman Creek and the consideration of irrigation month by month for the period 1901-02 to 1913-14.

Take for example the month of April, 1903. There is a regulated run-off from Leevining Creek of 23 second feet or 1,368 acre feet, and an unregulated run-off from area No. 4 of 2,811 acre feet. The capacity of the canal is 150 second feet or 8,900 acre feet, of which there will remain, after allowing the regulated flow to enter, 7,532 acre feet. The canal capacity being 268 percent of the unregulated run-off and by reference to Plate No. 4 it is seen that the en-

tire run-off from this area may be diverted to Silver Lake reservoir. From area No. 8 there is an unregulated run-off of 4,200 acre feet. The high water occurring at the same time from both areas No. 4 and No. 8 it is necessary to consider the combined run-off from these two areas as against the canal capacity to determine that portion of the run-off from area No. 8, which the canal will not carry, 2,811 + 4,200 = 7,011 acre feet, which is 107 percent of the canal capacity. Plate No. 4 shows that portion of the run-off which will pass over the canal when run-off is 107 percent of the canal capacity to be 16 percent of the entire run-off. 16 percent of 7,011 acre feet is 1,122 acre feet, this taken from 4,200 acre feet leaves 3,078 acre feet, which is that portion of the run-off from area No. 8 that is diverted to Silver Lake reservoir, 1,122 acre feet having passed on down Rush Creek and may be used for irrigation. We then have available for diversion from Silver Lake reservoir to Deadman Creek 1,368 acre feet regulated flow from areas 1, 2 and 3, plus 2,811 acre feet diverted from area No. 4, plus 3,078 acre feet diverted from area No. 8, plus 2,880 acre feet from area No. 7, plus 2,260 acre feet regulated flow from area No. 6, minus 33 acre feet, loss by evaporation from Silver Lake reservoir, or 12,364 acre feet. The capacity of the tunnel from Silver Lake to Deadman Creek being 230 second feet, or 13,700 acre feet, it is possible to divert the entire 12,364 acre feet during this month. When possible the entire dis-

charge into Silver Lake reservoir is immediately discharged into Deadman Creek, which is a tributary of Long Valley reservoir, where it is regulated for power purposes on the Owens River Gorge.

For irrigation during this month there is a run-off of 302 acre feet from area No. 5 and 1.122 acre feet from area No. 8. During months below normal, when there is no water passing over the canal, Silver Lake reservoir is drawn on for irrigation.

ESTIMATE OF POWER OUTPUT AND CAPACITY.

From the computations referred to above it is found that on Leevining Creek there is a regulated discharge of 38 second feet. On Owens river gorge there will be a regulated discharge of 148 second feet derived from the Rush and Leevining Creek drainage areas.

The available heads are computed as follows.

Power Plnt.	Leevining Creek.	Rush Creek:	Owens River Gorge Plant #1 :	Plant #2 :	Plant #3
Elev.Intake	9500	8960	6682.2	5673.0	4839.0
El. Forebay or reservoir.	9466	9020	6764.0	5660.8	4821.0
El. Nozzle.	7397	7265	5715.0	4850.0	4455.0
Statix Head.	2069	1755	1049.0	810.8	366.0
Fric. Loss	23	5	69.1	14.3	8.5
Effect. Hd.	2046	1750	979.9	796.5	357.5

The average power output for these plants for the average flows above and 70% plant efficiency, is computed as follows.

Leevining Creek Plant:

$$\frac{23 \text{ sec. ft.} + 2046 \text{ ft} + 62.5}{550} * .70 = 3.743 \text{ H.P.}$$

Rush Creek Plant:

$$\frac{38 \text{ sec. ft} \times 1750 \text{ ft} \times 62.5}{550} \times .70 = 5.290 \text{ H.P.}$$

Three Owens Gorge Plants Combined:

$$\frac{148 \text{ sec. ft.} \times 2133.9 \text{ ft} \times 62.5}{550} \times .70 = 25.122 \text{ H.P.}$$

The changes of water flow due to hourly fluctuations in load will be amply cared for by reservoirs in the Leevining and Rush Creeks systems (Plate 1) and by Long Valley reservoir and Pondage works on the gorge system (See Owens River Gorge Project Report of January 31, 1916.

A load factor of 60% is determined to be correct for these plants. The electrical power capacities for the Leevining and Rush Creek water supply will then be as follows:

Leevining Creek Plant.

$$\frac{3.743 \text{ H.P.}}{0.60} \times .746 = 4.653 \text{ K.W.}$$

Rush Creek Plant.

$$\frac{5.290 \text{ H.P.}}{0.60} \times .746 = 6.581 \text{ K.W.}$$

Three Owens Gorge plants combined:

$$\frac{25.122 \text{ H. P.}}{0.60} \times .746 = 31.109 \text{ K.W.}$$

CONCLUSIONS:

1. The water supply and storage facilities of Leevining and Rush Creeks are sufficient for diversion of an average of 148 second feet into the Long Valley, after having allowed an ample supply (over 48000 ac. ft. per year) for irrigation in Mono Basin.
2. The average regulated discharge for power at Leevining Creek plant is 23 second feet.

3. The average regulated discharge for power at Rush Creek plant is 38 second feet.

4. Storage can be accomplished by five reservoirs in the Lee-vining and Rush Creek watersheds. (Plate 1)

5. The average hydro-electric power output available with the Rush and Leevining Creek water supply is as follows:

Leevining Creek Plant,	3.743	H.P.
Rush Creek Plant,	5.290	H.P.
Combined gorge plants	25.122	H.P.
Total	34.155	H.P.

6. The possible power capacities at 60 per cent daily load factor are as follows:

Leevining Creek Plant,	4.635	K.W.
Rush Creek Plant,	6.551	K.W.
Combined gorge plants,	31.109	K.W.
Total	42.295	K.W.

Compiled by Robt. P. Cowles.
March, 1916.

TABLE No. 1

Monthly Discharge of West Fork of Carson River at Woodfords, Cal.
(Catchment Area 70 sq.mi. U.S.G.S.)

Month	Discharge per Sq. mi. in Second Feet	Run-off Acre Feet	Percentage of Mean
	1900-01		
October	0.63	1,222	26.2
November	0.69	2,856	28.6
December	.76	3,259	31.6
January	.73	3.136	30.3
February	1.59	6.165	66.0
March	2.43	10,453	101.0
April	3.34	13,924	138.5
May	6.80	29.268	282.2
June	4.13	17,197	171.5
July	1.94	8,363	80.6
August	1.10	4,735	45.7
September	.61	2,559	25.3
Year	2.06	103,137	86.0
	1901-02		
October	.70	3,013	29.2
November	.80	3,332	33.2
December	1.17	5,042	48.6
January	1.53	6,579	63.5
February	3.40	13,218	141.2
March	1.97	8,485	81.8
April	2.50	10,413	103.8
May	4.10	17,647	170.0
June	4.56	18,982	189.3
July	1.73	7,440	71.8
August	.57	2,460	23.7
September	.46	1,904	19.1
Year	1.96	98,500	81.4
	1902-03		
October	.49	2,091	20.3
November	.66	2,737	27.4
December	.83	3,566	34.4
January	.70	3,013	29.1
February	.90	3,499	37.3
March	.91	3,935	37.8
April	2.49	10,354	103.2
May	5.56	23,919	231.0
June	5.04	21,005	209.0
July	1.51	6,518	62.8
August	.60	2,582	24.9
September	.43	1,785	17.8
Year	1.67	85,000	69.8

TABLE No. 1 (Cont.)

Monthly Discharge of West Fork of Carson River at Woodfords, Cal.

Month	Discharge per Sq. mi. in Second Feet	Run-off Acre Feet	Percentage of Mean
	1903-04		
October	.44	1,906	18.3
November	.90	3,749	37.4
December	.94	4,058	39.0
January	.769	3,201	31.9
February	1.63	6,113	67.7
March	2.41	10,390	100.0
April	4.36	18,150	181.0
May	9.30	40,030	386.0
June	5,26	21,200	218.0
July	2.26	9,715	94.0
August	1.06	4,575	44.0
September	.959	3,993	39.8
Year	2.52	127,080	105.0
	1904-05		
October	1.12	4,821	46.5
November	.923	3,844	38.3
December	.921	3,966	38.2
January	1.30	4,332	54.0
February	1.46	5,665	60.6
March	1.79	7,686	74.3
April	2.89	12,020	120.0
May	3.87	16,660	161.0
June	2.67	11,130	111.0
July	1.08	4,661	44.9
August	.410	1,765	17.0
September	.339	1,410	14.0
Year	1.55	77,960	65.0
	1905-06		
October	.447	1,925	18.6
November	.491	2,047	20.4
December	.807	3,474	33.5
January	1.03	4,450	42.8
February	.933	3,630	38.8
March	.950	4,090	39.4
April	3.37	14,000	140.0
May	13.20	56,900	548.0
June	9.86	41,100	409.0
July	4.63	19,900	192.0
August	2.20	9.470	91.4
September	.720	3,000	29.9
Year	3.22	164,000	133.5

TABLE No. 1 (Cont.)

Monthly Discharge of West Fork of Carson River at Woodfords, Cal.

Month	Discharge per Sq. mi. in Second Feet.	Run-off Acre Feet	Percentage of Mean
	1906-07		
October	.754	3,250	31.3
November	1.10	4,580	45.7
December	.834	3,590	34.6
January	1.13	4,850	46.9
February	1.99	7,720	82.7
March	3.01	13,000	125.00
April	7.17	29,900	297.0
May	12.0	51,700	498.0
June	9.49	39,500	394.0
July	7.50	32,300	311.0
August	3.19	13,700	132.5
September	1.53	6,370	63.5
Year	4.14	210,000	172.0
	1907-08		
October	1.08	4,660	44.9
November	.94	3,920	39.0
December	1.10	4,720	45.7
January	.974	4,190	40.4
February	.951	3,830	39.4
March	1.29	5,550	53.5
April	2.73	11,400	113.2
May	3.26	14,000	135.3
June	2.36	9,820	98.0
July	.830	3,570	34.4
August	1.08	4,640	44.9
September	.500	2,080	20.7
Year	1.41	72,400	59.0
	1908-09		
October	.663	2,850	27.5
November	.504	2,100	20.9
December	.539	2,320	22.4
January	2.41	10,400	100.0
February	1.46	5,660	60.6
March	1.33	5,710	55.2
April	4.90	20,400	203.5
May	8.97	38,600	372.0
June	9.03	37,600	375.0
July	2.34	10,100	97.2
August	.977	4,210	40.5
September	.364	1,520	15.1
Year	2.78	141,000	115.8

TABLE No. 1 (Cont.)

Monthly Discharge of West Fork of Carson River at Woodfords, Cal.

Month	Discharge per Sq. mi. in Second Feet	Run-off Acre Feet	Percentage of Mean
	1909-10		
October	.744	3,200	30.9
November	1.99	8,270	82.6
December	1.76	7,560	73.1
January	.633	2,720	26.3
February	1.05	4,070	43.6
March	2.23	9,590	92.6
April	6.44	26,800	267.0
May	5.37	23,100	222.5
June	2.37	9,880	98.5
July	.994	4,280	41.2
August	.387	1,670	16.1
September	.389	1,620	16.1
Year	2.02	103,000	84.3
	1910-11		
October	.350	1,510	14.5
November	.407	1,700	16.9
December	.621	2,670	25.8
January	.441	1,910	18.3
February	.771	3,000	32.0
March	.814	3,500	33.8
April	3.10	12,900	128.8
May	8.43	36,300	350.0
June	13.3	55,600	552.0
July	5.17	22,300	214.5
August	1.27	5,470	52.7
September	.657	2,740	27.2
Year	2.93	150,000	122.0

TABLE No. 2

Seasonal Run-off West Fork Carson River at Woodfords, Cal.

Year	Discharge Sq. Mi. Second Feet.	Total Run-off Acre Feet
1900-01	2.06	142,000
01-02	1.96	98,500
02-03	1.67	85,000
03-04	2.52	128,500
04-05	1.55	78,800
05-06	3.22	164,000
06-07	4.14	210,000
07-08	1.41	72,400
08-09	2.78	141,000
09-10	2.02	103,000
10-11	2.93	150,000
Mean	2.41	122,700

TABLE No. 3

Monthly Discharge of Leevining Creek at Rangers Camp
Catchment Area 40.4 Sq. Mi.

Month	Discharge per Sq. Mi. Second Feet.	Run-off Acre Feet
	1910-11	
October	.54	(1330)
November	.55	(1330)
December	.560	1,390
January	.645	1,600
February	.820	1,840
March	.645	1,600
April	1.100	2,620
May	2.350	5,840
June	10.38	24,900
July	10.47	26,000
August	2.725	6,760
September	1,135	2,730
Season	2.66	77,750
	1911-12	
October	.69	1,720
November	.63	1,520
December	.52	1,290
January	.49	1,210
February	.48	1,080
March	.43	(1,080)
April	.79	(1,900)
May	3.22	(8,000)
June	4.34	10,200
July	2.25	5,580
August	1.27	3,140
September	0.63	1,520
Season	1.31	38,240

TABLE No. 3 (Cont.)

Monthly Discharge of Leevining Creek at Rangers Camp
Catchment Area 40.4 Sq. Mi.

Month	Discharge per Sq. Mi. Second Feet	Run-off Acre Feet
	1912-13	
October	.27	679
November	.26	626
December	.22	539
January	.22	(540)
February	.24	(540)
March	.22	(540)
April	.33	(790)
May	1.42	3,528
June	1.62	3,884
July	1.42	3,537
August	1.02	2,534
September	0.72	1,728
Season	0.66	19,465
	1913-14	
October	.28	701
November	.26	632
December	.25	(630)
January	.25	(630)
February	.28	(630)
March	.25	(630)
April	.40	(950)
May	1.93	(4,800)
June	3.48	8,397
July	3.82	9,472
August	1.93	4,780
September	0.60	1,449
Season	1.14	33,701

Missing months have been estimated from an inspection of other years and are shown in brackets.

TABLE No. 4

Monthly Discharge per square mile West Fork Carson River, above Woodford, Cal., and Leevining Creek at Rangers Station. Also per cent of 11 year mean.

Month	Carson Measured	Leevining Computed	Percent eleven year mean
		1900-01	
October	0.63	.57	26.2
November	0.69	.62	28.6
December	0.76	.69	31.6
January	0.73	.66	30.3
February	1.59	1.44	66.0
March	2.43	2.20	101.0
April	3.34	3.01	138.5
May	6.80	6.15	282.2
June	4.13	3.74	171.5
July	1.94	1.76	80.6
August	1/10	1.00	45.7
September	0.61	.55	25.3
Year	2.06	1.86	85.3
		1901-02	
October	0.70	.63	29.2
November	0.80	.72	33.2
December	1.17	1.06	48.6
January	1.53	1.38	63.5
February	3.40	3.08	141.2
March	1.97	1.78	81.8
April	2.50	2.26	103.8
May	4.10	3.70	170.0
June	4.56	4.13	189.3
July	1.73	1.56	71.8
August	0;57	.52	23.7
September	0.46	.42	19.1
Year	1.96	1.77	81.4
		1902-03	
October	0.49	.44	20.3
November	0.66	.60	27.3
December	0.83	..75	34.4
January	0.70	.64	29.1
February	0.90	.81	37.3
March	0.91	.82	37.8
April	2.49	2.25	103.2
May	5.56	5.04	231.0
June	5.04	4.55	209.0
July	1.51	1.37	62.8
August	.60	.54	24.9
September	0.43	.39	17.8
Year	1.68	1.52	69.8

TABLE No. 4 (Cont.)

Monthly Discharge per square mile West Fork Carson River, above Woodford, Cal., and Leevining Creek at Rangers Station. Also per cent of 11 year mean.

Month	Carson Measured	Leevining Computed	Percent eleven year mean.
		1903-04	
October	0.44	.40	18.3
November	0.90	.81	37.4
December	0.94	.85	39.0
January	0.769	.70	31.9
February	1.63	1.47	67.7
March	2.41	2.18	100.0
April	4.36	3.94	181.0
May	9.30	8.41	386.0
June	5.26	4.75	218.0
July	2.26	2.05	94.0
August	1.06	.96	44.0
September	0.96	.87	39.8
Year	2.53	2.28	104.5
		1904-05	
October	1.12	1.01	46.5
November	0.92	0.83	38.3
December	0.92	0.83	38.2
January	1.30	1.18	54.0
February	1.46	1.32	60.6
March	1.79	1.62	74.3
April	2.89	2.62	120.0
May	3.87	3.50	161.0
June	2.67	2.42	111.0
July	1.08	0.98	44.9
August	0.41	0.38	17.0
September	0.34	0.31	14.1
Year	1.56	1.42	65.2
		1905-06	
October	0.45	0.41	18.6
November	0.49	0.44	20.4
December	0.82	0.73	33.5
January	1.03	0.94	42.8
February	0.93	0.85	38.8
March	0.95	0.86	39.4
April	3.37	3.05	140.0
May	13.20	11.95	548.0
June	9.86	8.90	409.0
July	4.63	4.18	192.0
August	2.20	1.99	91.4
September	0.72	0.65	29.9
Year	3.22	2.91	133.5

TABLE No. 4 (Cont.)

Monthly Discharge per square mile West Fork Carson River, Above Woodford, Cal., and Leevining Creek at Rangers Station. Also per cent of 11 year mean.

Month	Carson Measured	Leevining Computed	Percent eleven year mean.
		1906-07	
October	0.75	0.68	31.4
November	1.10	0.99	45.7
December	0.83	0.75	34.6
January	1.13	1.02	46.9
February	1.99	1.80	82.7
March	3.01	2.72	125.0
April	7.17	6.48	297.0
May	12.00	10.85	498.0
June	9.49	8.58	394.0
July	7.50	6.78	311.0
August	3.19	2.89	132.5
September	1.53	1.38	63.5
Year	4.14	3.75	172.0
		1907-08	
October	1.08	0.98	44.9
November	0.94	0.85	39.0
December	1.10	0.99	45.7
January	0.97	0.88	40.4
February	0.95	0.86	39.4
March	1.29	1.16	53.5
April	2.73	2.47	113.2
May	3.26	2.95	135.3
June	2.36	2.14	98.0
July	0.86	0.75	34.4
August	1.08	0.98	44.9
September	0.50	0.45	20.7
Year	1.42	1.29	59.1
		1908-09	
October	0.66	.60	27.5
November	0.50	.63	29.0
December	0.54	.49	22.4
January	3.41	2.18	100.0
February	1.46	1.32	60.6
March	1.33	1.20	55.2
April	4.90	5.09	233.5
May	8.97	8.10	372.0
June	9.03	8.17	375.0
July	2.34	2.12	97.2
August	0.98	..88	40.5
September	0.36	.33	15.1
Year	2.79	2.52	115.8

TABLE No. 4 (Cont.)

Monthly Discharge per square mile West Fork Carson River, above Woodford, Cal., and Leevining Creek at Rangers Station. Also per cent of 11 year mean.

Month	Carson Measured	Leevining Computed	Percent eleven year mean
		1909-10	
October	0.74	.67	30.9
November	1.99	1.80	82.6
December	1.76	1.59	73.1
January	0.63	.57	26.3
February	1.05	.95	43.6
March	2.23	2.02	92.6
April	6.44	5.82	267.0
May	5.37	4.85	222.5
June	2.37	2.14	98.5
July	0.99	.90	41.2
August	0.39	.35	16.6
September	0.39	.35	16.1
Year	2.03	1.84	84.3

TABLE No. 5

Monthly Discharge of Leevining Creek above Saddlebag Lake.
(Eleven year Mean Discharge per sq. mile 2.18 sec. feet)
Catchment Area 4.5 Sq. Mi.
Area No. 1

Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
	1900-01			1902-03	
Oct.	157	157	Oct.	121	11,892
Nov.	166	323	Nov.	161	12,053
Dec.	190	513	Dec.	207	12,260
Jan.	182	695	Jan.	177	12,437
Feb.	359	1,054	Feb.	202	12,639
Mar.	612	1,666	Mar.	226	12,865
Apr.	807	2,473	Apr.	603	13,468
May	1,707	4,180	May	1,391	14,859
Jun.	1,002	5,182	Jun.	1,219	16,078
Jul.	486	5,668	Jul,	378	16,456
Aug.	276	5,944	Aug.	149	16,605
Sep.	147	6,091	Sep.	104	16,709
	1901-02			1903-04	
Oct.	175	6,266	Oct.	110	16,819
Nov.	182	6,448	Nov.	217	17,036
Dec.	292	6,740	Dec.	234	17,270
Jan.	380	7,120	Jan.	193	17,463
Feb.	768	7,888	Feb.	367	17,830
Mar.	471	8,359	Mar.	602	18,432
Apr.	606	8,965	Apr.	1,056	19,488
May	1,021	9,986	May	2,321	21,809
Jun.	1,097	11,083	Jun.	1,273	23,082
Jul.	431	11,514	Jul.	566	23,648
Aug.	144	11,658	Aug.	265	23,913
Sep.	113	11,771	Sep.	233	24,146
	1904-05			1905-06	
Oct.	278	24,425	Oct.	110	28,864
Nov.	222	24,647	Nov.	118	28,982
Dec.	229	24,876	Dec.	203	29,185
Jan.	326	25,202	Jan.	262	29,447
Feb.	330	25,532	Feb.	212	29,659
Mar.	447	25,979	Mar.	238	29,897
Apr.	703	26,682	Apr.	818	30,715
May	966	27,648	May	3,300	34,015
Jun.	650	28,298	Jun.	2,380	36,395
Jul.	271	28,569	Jul.	1,150	37,545
Aug.	102	28,671	Aug.	550	38,095
Sep.	83	28,754	Sep.	174	38,269

TABLE No. 5 (Cont.)

Monthly Discharge of Leevining Creek above Saddlebag Lake.
(Eleven Year Mean Discharge per sq. mile 2.18 sec. feet)
Catchment Area 4.5 Sq. Mi.
Area No. 1

Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
	1906-07			1907-08	
Oct.	187	38,483	Oct.	270	50,771
Nov.	265	38,748	Nov.	228	50,999
Dec.	206	38,954	Dec.	273	51,272
Jan.	282	39,236	Jan.	242	51,514
Feb.	450	39,686	Feb.	214	51,728
Mar.	750	40,436	Mar.	320	52,048
Apr.	1,730	42,166	Apr.	660	52,708
May	3,000	45,166	May	815	53,523
Jun.	2,300	47,466	Jun.	574	54,097
Jul.	1,870	49,336	Jul.	207	54,304
Aug.	795	50,131	Aug.	270	54,574
Sep.	370	50,501	Sep.	124	54,698
	1908-09			1909-10	
Oct.	165	54,863	Oct.	185	63,531
Nov.	159	55,032	Nov.	482	64,013
Dec.	135	55,167	Dec.	440	64,453
Jan.	602	55,769	Jan.	157	64,610
Feb.	329	56,098	Feb.	237	64,847
Mar.	332	56,430	Mar.	558	65,405
Apr.	1,580	58,010	Apr.	1,560	66,965
May	2,230	60,240	May	1,340	68,395
Jun.	2,190	62,430	Jun.	573	68,878
Jul.	585	63,015	Jul.	248	69,126
Aug.	243	63,258	Aug.	97	69,223
Sep.	88	63,346	Sep.	94	69,317
	1910-11			1911-12	
Oct.	152	69,469	Oct.	190	78,190
Nov.	145	69,614	Nov.	169	78,359
Dec.	154	69,768	Dec.	143	78,502
Jan.	178	69,746	Jan.	135	78,637
Feb.	204	70,150	Feb.	120	78,757
Mar.	178	70,328	Mar.	119	78,876
Apr.	295	70,623	Apr.	212	79,088
May	650	71,273	May	888	79,976
Jun.	2,780	70,053	Jun.	1,140	81,116
Jul.	2,890	76,943	Jul.	620	81,736
Aug.	753	77,696	Aug.	350	82,086
Sep.	304	78,000	Sep.	169	82,255

TABLE No. 5 (Cont.)

Monthly Discharge of Leevining Creek above Saddlebag Lake.
(Eleven Year Mean Discharge per sq. mile 2.18 sec. feet)
Catchment Area 4.5 Sq. Mi.
Area No. 1

Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
	1912-13			1913-14	
Oct.	75	82,330	Oct.	77	84,502
Nov.	70	82,400	Nov.	70	84,572
Dec.	61	82,461	Dec.	69	84,641
Jan.	61	82,522	Jan.	69	84,710
Feb.	60	82,582	Feb.	70	84,780
Mar.	61	82,643	Mar.	69	84,849
Apr.	88	82,731	Apr.	107	84,956
May	392	83,123	May	533	85,489
Jun.	435	83,558	Jun.	932	86,421
Jul.	392	83,950	Jul.	1,050	87,471
Aug.	282	84,232	Aug.	533	88,004
Sep.	193	84,425	Sep.	161	88,165

TABLE No. 6

Monthly Discharge of Leevining Creek above Tioga Lake
Eleven Year Mean Discharge per Sq. Mi. 218 Sec. Ft.
Catchment Area 3.6 Sq. Mi.
Area No. 2

Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
	1900-01			1903-04	
Oct.	126	126	Oct.	88	13,372
Nov.	133	259	Nov.	173	13,545
Dec.	152	411	Dec.	188	13,733
Jan.	146	557	Jan.	154	13,887
Feb.	187	744	Feb.	293	14,180
Mar.	486	1,230	Mar.	482	14,662
Apr.	644	1,874	Apr.	843	15,505
May	1,359	3,233	May	2,059	17,564
Jun.	800	4,033	Jun.	1,016	18,580
Jul.	389	4,422	Jul.	453	19,033
Aug.	221	4,643	Aug.	212	19,245
Sep.	118	4,761	Sep.	186	19,431
	1901-02			1904-05	
Oct.	139	4,900	Oct.	223	19,654
Nov.	153	5,053	Nov.	177	19,831
Dec.	234	5,287	Dec.	183	20,014
Jan.	305	5,592	Jan.	261	20,275
Feb.	614	6,206	Feb.	264	20,539
Mar.	393	6,599	Mar.	358	20,897
Apr.	484	7,083	Apr.	560	21,457
May	818	7,901	May	774	22,231
Jun.	884	8,785	Jun.	518	22,749
Jul.	345	9,130	Jul.	216	22,965
Aug.	115	9,245	Aug.	82	23,047
Sep.	90	9,335	Sep.	66	23,113
	1902-03			1905-06	
Oct.	97	9,432	Oct.	88	23,201
Nov.	128	9,560	Nov.	94	23,295
Dec.	166	9,726	Dec.	161	23,456
Jan.	141	9,867	Jan.	208	23,664
Feb.	162	10,029	Feb.	170	23,834
Mar.	181	10,210	Mar.	190	24,024
Apr.	481	10,691	Apr.	652	24,676
May	1,114	11,805	May	2,640	27,316
Jun.	974	12,779	Jun.	1,900	29,216
Jul.	303	13,082	Jul.	925	30,141
Aug.	119	13,201	Aug.	440	30,581
Sep.	83	13,284	Sep.	139	30,720

TABLE No. 6 (Cont.)

Monthly Discharge of Leevining Creek above Tioga Lake
Eleven Year Mean Discharge per Sq. Mi. 2.18 Sec. Ft.
Catchment Area 3.6 Sq. Mi.
Area No. 2.

Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
	1906-07			1909-10	
Oct.	150	30,870	Oct.	148	50,733
Nov.	212	31,082	Nov.	386	51,119
Dec.	166	31,248	Dec.	352	51,471
Jan.	226	31,474	Jan.	126	51,597
Feb.	359	31,833	Feb.	129	51,786
Mar.	602	32,435	Mar.	446	52,232
Apr.	1,390	33,825	Apr.	1,240	53,472
May	2,400	36,225	May	1,070	54,542
Jun.	1,830	38,055	Jun.	458	55,000
Jul.	1,490	39,545	Jul.	199	55,199
Aug.	640	40,185	Aug.	77	55,276
Sep.	295	40,480	Sep.	75	55,351
	1907-08			1910-11	
Oct.	216	40,696	Oct.	121	55,472
Nov.	182	40,878	Nov.	115	55,587
Dec.	218	41,096	Dec.	124	55,711
Jan.	194	41,290	Jan.	142	55,833
Feb.	171	41,461	Feb.	164	56,017
Mar.	256	41,717	Mar.	142	56,159
Apr.	530	42,247	Apr.	235	56,394
May	653	42,900	May	525	56,919
Jun.	458	43,358	Jun.	2,220	59,139
Jul.	166	43,524	Jul.	2,320	61,459
Aug.	216	43,740	Aug.	603	62,062
Sep.	96	43,836	Sep.	243	62,305
	1908-09			1911-12	
Oct.	132	43,968	Oct.	152	62,457
Nov.	135	44,103	Nov.	135	62,592
Dec.	108	44,211	Dec.	115	62,707
Jan.	482	44,693	Jan.	108	62,815
Feb.	264	44,957	Feb.	96	62,911
Mar.	265	45,222	Mar.	95	63,006
Apr.	1,090	46,312	Apr.	169	63,175
May	1,790	48,102	May	712	63,887
Jun.	1,750	49,852	Jun.	905	64,792
Jul.	468	50,320	Jul.	497	65,289
Aug.	194	50,514	Aug.	280	65,569
Sep.	71	50,585	Sep.	135	65,704

TABLE No. 6 (Cont.)

Monthly Discharge of Leevining Creek above Tioga Lake
Eleven Year Mean Discharge per Sq.Mi. 2.18 Sec. Ft.
Catchment Area 3.6 Sq. Mi.
Area No. 2

Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
	1912-13			1913-14	
Oct.	60	65,764	Oct.	62	67,503
Nov.	56	65,820	Nov.	56	67,559
Dec.	49	65,869	Dec.	55	67,614
Jan.	49	65,918	Jan.	55	,67,669
Feb.	48	65,966	Feb.	56	67,725
Mar.	49	66,015	Mar.	55	67,780
Apr.	71	66,086	Apr.	86	67,866
May	314	66,400	May	426	68,292
Jun.	347	66,747	Jun.	745	69,037
Jul.	314	67,061	Jul.	845	69,882
Aug.	226	67,287	Aug.	426	70,308
Sep.	154	67,441	Sep.	128	70,436

TABLE No. 7

Monthly Run-off of Leevining Creek, above Ellery Lake.
Eleven Year Mean Discharge per sq. mile 2.18 sec. ft.
Catchment Area 7.7 sq. miles.
Area No. 3

Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
	1900-01			1903-04	
Oct.	270	270	Oct.	189	28,719
Nov.	284	554	Nov.	371	29,090
Dec.	325	879	Dec.	392	29,482
Jan.	301	1,180	Jan.	331	29,813
Feb.	615	1,795	Feb.	628	30,441
Mar.	1,041	2,836	Mar.	1,031	31,472
Apr.	1,378	4,214	Apr.	1,784	33,256
May	2,809	7,023	May	3,978	37,234
Jun.	1,714	8,737	Jun.	2,175	39,409
Jul.	832	9,569	Jul.	970	40,379
Aug.	473	10,042	Aug.	454	40,833
Sep.	252	10,294	Sep.	398	41,231
	1901-02			1904-05	
Oct.	289	10,592	Oct.	479	41,710
Nov.	330	10,922	Nov.	380	42,090
Dec.	501	11,423	Dec.	392	42,482
Jan.	653	12,076	Jan.	560	43,042
Feb.	1,315	13,391	Feb.	564	43,606
Mar.	842	14,233	Mar.	766	44,372
Arp.	1,035	15,268	Apr.	1,200	45,572
May	1,750	17,018	May	1,650	47,222
Jun.	1,891	18,909	Jun.	1,110	48,332
Jul.	738	19,647	Jul.	463	48,795
Aug.	246	19,893	Aug.	175	48,970
Sep.	192	20,085	Sep.	142	49,112
	1902-03			1905-06	
Oct.	208	20,293	Oct.	189	49,301
Nov.	275	20,568	Nov.	202	49,503
Dec.	355	20,923	Dec.	345	49,848
Jan.	293	21,216	Jan.	445	50,293
Feb.	346	21,562	Feb.	363	50,656
Mar.	388	21,950	Mar.	407	51,063
Apr.	1,030	22,980	Apr.	1,400	52,463
May	2,384	25,364	May	5,650	58,113
Jun.	2,084	27,448	Jun.	4,080	62,193
Jul.	648	28,096	Jul.	1,970	64,163
Aug.	255	28,351	Aug.	940	65,103
Sep.	179	28,530	Sep.	298	65,401

TABLE No. 8

Monthly Discharge of Leevining Creek above Elev. 7,300 and below Ellery Lake.
Catchment Area 21 Square Miles
Area No. 4

Month	Discharge sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
	1900-01				1903-04		
Oct.	.57	736	736	Oct.	.40	516	78,739
Nov.	.63	787	1,523	Nov.	.81	1,012	79,751
Dec.	.69	891	2,414	Dec.	.85	1,097	80,848
Jan.	.66	852	3,266	Jan.	.70	903	81,751
Feb.	1,44	1,680	4,946	Feb.	1,47	1,715	83,466
Mar.	2.20	2,841	7,787	Mar.	2.18	2,815	86,281
Apr.	3.01	3,760	11,547	Apr.	3.94	4,923	91,204
May	6.15	7,941	19,488	May	8.41	10,860	102,064
Jun.	3.74	4,673	24,161	Jun.	4.75	5,935	107,999
Jul.	1.76	2,272	26,433	Jul.	2.05	2,647	110,646
Aug.	1.00	1,291	27,724	Aug.	.96	1,239	111,885
Sep.	.55	687	28,411	Sep.	.87	1,087	112,972
	1901-02				1904-05		
Oct.	.64	826	29,237	Oct.	1.01	1,304	114,276
Nov.	.72	899	30,136	Nov.	.83	1,037	115,313
Dec.	1.06	1,369	31,505	Dec.	.83	1,071	116,384
Jan.	1.37	1,769	33,274	Jan.	1.18	1,524	117,908
Feb.	3.08	3,594	36,868	Feb.	1.32	1,540	119,448
Mar.	1.78	2,298	39,166	Mar.	1.62	2,093	121,541
Apr.	2.26	2,824	41,990	Apr.	2.62	3,274	124,815
May	3.70	4,778	46,768	May	3.50	4,519	129,334
Jun.	4.13	5,161	51,929	Jun.	2.42	3,024	132,358
Jul.	1.56	2,014	53,943	Jul.	.98	1,265	133,623
Aug.	.52	671	54,614	Aug.	.38	490	134,113
Sep.	.42	525	55,139	Sep.	.31	387	134,500
	1902-03				1905-06		
Oct.	.45	581	55,720	Oct.	.41	529	135,029
Nov.	.60	749	56,469	Nov.	.44	549	135,578
Dec.	.75	968	57,437	Dec.	.73	942	136,520
Jan.	.64	826	58,263	Jan.	.94	1,214	137,734
Feb.	.81	945	59,208	Feb.	.85	992	138,726
Mar.	.82	1,059	60,267	Mar.	.86	1,110	139,836
Apr.	2.25	2,811	63,078	Apr.	3.05	3,810	143,646
May	5.04	6,507	69,585	May	11.95	15,430	159,076
Jun.	4.55	5,685	75,270	Jun.	8.90	11,120	170,196
Jul.	1.37	1,769	77,039	Jul.	4.18	5,397	175,593
Aug.	.54	697	77,736	Aug.	1.99	2,569	178,162
Sep.	.39	487	78,223	Sep.	.65	812	178,974

TABLE No. 8

Monthly Discharge of Leevining Creek above Elev. 7,300
and below Ellery Lake.
Catchment Area 21 Square Miles
Area No. 4

Month	Discharge sec. feet per sq,mi.	Run-off Acre Ft.	Accumulated Run-off in Acre ft.	Month	Discharge sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
	1906-07					1909-10	
Oct.	.68	878	179,852	Oct.	.67	865	295,909
Nov.	.99	1,237	181,089	No.v	1.80	2,249	298,158
Dec.	.75	968	182,057	Dec.	1.59	2,053	300,211
Jan.	1.02	1,317	183,374	Jan.	.57	736	300,947
Feb.	1.80	2,106	185,480	Feb.	.95	1,108	302,055
Mar.	2.72	3,512	188,992	Mar.	2.02	2,608	304,663
Apr.	6.48	8,096	197,088	Apr.	5.82	7,272	311,935
May	10.85	14,010	211,098	May	4.85	6,262	318,197
Jun.	8.58	10,720	221,818	Jun.	2.14	2,674	320,871
Jul.	6.78	8,754	230,572	Jul.	.90	1,162	322,033
Aug.	2.89	3,731	234,303	Aug.	.35	452	322,485
Sep.	1.38	1,724	236,027	Sep.	.35	437	322,922
	1907-08					1910-11	
Oct.	.98	1,265	237,292	Oct.	.54	697	323,619
Nov.	.85	1,062	238,354	Nov.	.55	687	324,306
Dec.	.99	1,278	239,632	Dec.	.56	723	325,029
Jan.	.88	1,136	240,768	Jan.	.65	839	325,868
Feb.	.86	1,003	241,771	Feb.	.82	957	326,825
Mar.	1.16	1,498	243,269	Mar.	.65	839	327,664
Apr.	2.47	3,086	246,355	Apr.	1.10	1,374	329,038
May	2.95	3,809	250,164	May	2.35	3,034	332,072
Jun.	2.14	2,674	252,838	Jun.	10.38	12,970	345,042
Jul.	.75	968	253,806	Jul.	10.47	13,518	358,560
Aug.	.98	1,265	255,071	Aug.	2.73	3,524	362,084
Sep.	.45	562	255,633	Sep.	1.14	1,424	363,508
	1908-09					1911-12	
Oct.	.60	774	256,407	Oct.	.69	891	364,399
Nov.	.63	787	257,194	Nov.	.63	787	365,186
Dec.	.49	632	257,826	Dec.	.52	671	365,857
Jan.	2.18	2,815	260,641	Jan.	.49	632	366,489
Feb.	1.32	1,540	262,181	Feb.	.48	560	367,049
Mar.	1.20	1,550	263,731	Mar.	.43	555	367,604
Apr.	5.09	6,360	270,091	Apr.	.79	987	368,591
May	8.10	10,460	280,551	May	3.22	4,157	372,748
Jun.	8.17	10,208	290,759	Jun.	4.24	5,298	378,046
Jul.	2.12	2,737	293,496	Jul.	2.25	2,905	380,951
Aug.	.88	1,136	294,632	Aug.	1.27	1,639	382,590
Sep.	.33	412	295,044	Sep.	.63	787	383,377

TABLE No. 8 (Cont.)

Monthly Discharge of Leevining Creek agove Elev. 7,300
and below Ellery Lake.
Catchment Area 21 Square Miles
Area No. 4.

Month	Discharge sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
	1912-13				1913-14		
Oct.	.27	348	383,725	Oct.	.28	361	393,861
Nov.	.26	325	384,050	Nov.	.26	325	394,186
Dec.	.22	284	384,334	Dec.	.25	323	394,509
Jan.	.22	284	384,618	Jan.	.25	323	394,832
Feb.	.24	280	384,898	Feb.	.28	327	395,159
Mar.	.22	284	385,182	Mar.	.25	323	395,482
Apr.	.33	412	385,594	Apr.	.40	499	395,981
May	1.42	1,833	387,427	May	1.93	2,492	398,473
Jun.	1.62	2,024	389,451	Jun.	3.48	4,348	402,821
Jul.	1.42	1,833	391,284	Jul.	3.82	4,932	407,753
Aug.	1.02	1,317	392,601	Aug.	1.93	2,492	410,245
Sep.	.72	899	393,500	Sep.	.60	750	410,995

TABLE No. 9

Monthly Discharge of Leevining Creek below 7,300
and above Rangers Station
Catchement Area 3.6 Square Miles.
Area No. 5

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
		1900-01				1903-04	
Oct.	.36	80	80	Oct.	.25	55	8,463
Nov.	.39	83	163	Nov.	.51	109	8,572
Dec.	.43	95	258	Dec.	.53	117	8,689
Jan.	.41	91	349	Jan.	.44	97	8,786
Feb.	.90	180	529	Feb.	.93	186	8,972
Mar.	1.38	305	834	Mar.	1.37	303	9,275
Apr.	1.90	406	1,240	Apr.	2.48	530	9,805
May	3.86	855	2,095	May	5.30	1,170	10,975
Jun.	2.35	503	2,598	Jun.	2.98	638	11,613
Jul,	1.10	243	2,841	Jul.	1.29	285	11,898
Aug.	.63	139	2,980	Aug.	.60	133	12,031
Sep.	.35	75	3,055	Sep.	.55	118	12,149
Season		3,055		Season		3,741	
		1901-02				1904-05	
Oct.	.40	88	3,143	Oct.	.64	141	12,290
Nov.	.45	96	3,239	Nov.	.52	111	12,401
Dec.	.67	148	3,387	Dec.	.52	115	12,516
Jan.	.87	192	3,579	Jan.	.74	163	12,679
Feb.	1.93	386	3,965	Feb.	.83	166	12,845
Mar.	1.12	248	4,213	Mar.	1.02	226	13,071
Apr.	1.42	304	4,517	Apr.	1.64	351	13,422
May	2.33	515	5,032	May	2.20	487	13,909
Jun.	2.59	554	5,586	Jun.	1.52	325	14,234
Jul.	.97	214	5,800	Jul.	.62	137	14,371
Aug.	.32	71	5,871	Aug.	.23	51	14,471
Sep.	.26	56	5,927	Sep.	.19	41	14,463
Season		2,872		Season		2,314	
		1902-03				1905-06	
Oct.	.28	62	5,989	Oct.	.25	55	14,518
Nov.	.37	79	6,068	Nov.	.28	60	14,578
Dec.	.47	104	6,172	Dec.	.46	102	14,680
Jan.	.40	88	6,260	Jan.	.59	130	14,810
Feb.	.51	102	6,362	Feb.	.53	106	14,916
Mar.	.52	115	6,477	Mar.	.54	119	15,035
Apr.	1.41	302	6,779	Apr.	1.92	411	15,446
May	3.16	700	7,479	May	7.50	1,660	17,106
Jun.	2.86	613	8,092	Jun.	5.60	1,200	18,306
Jul.	.86	190	8,282	Jul.	2.63	582	18,888
Aug.	.34	75	8,357	Aug.	1.25	277	19,165
Sep.	.24	51	8,408	Sep.	.41	88	19,253
Season		2,481		Season		4,790	

Mean Run-off per square mile 1.37 sec. ft.

TABLE No. 9 (Cont.)

Monthly Discharge of Leevining Creek below 7,300
and above Rangers Station
Catchment Area 3.6 Square Miles
Are No. 5

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.
		1906-07				1909-10	
Oct.	.43	95	19,348	Oct.	.42	93	31,861
Nov.	.63	136	19,483	Nov.	1.13	242	32,103
Dec	.47	104	19,587	Dec.	1.00	221	32,324
Jan.	.64	141	19,728	Jan.	.36	80	32,404
Feb.	1.13	226	19,954	Feb.	.60	120	32,524
Mar.	1.71	378	20,332	Mar.	1.27	280	32,804
Apr.	4.07	872	21,204	Apr.	3.66	784	33,588
May	6.82	1,520	22,724	May	3.04	672	34,260
Jun.	5.40	1,155	23,879	Jun.	1.35	289	34,549
Jul.	4.26	940	24,819	Jul.	.56	124	34,673
Aug.	1.81	400	25,219	Aug.	.23	51	34,724
Sep.	.86	184	25,403	Sep.	.22	47	34,771
Season		6,150		Season		3,003	
		1907-08				1910-11	
Oct.	.61	135	25,538	Oct.	.34	75	34,846
Nov.	.53	113	25,651	Nov.	.35	75	34,921
Dec.	.63	139	25,790	Dec.	.35	77	34,998
Jan.	.55	122	25,912	Jan.	.41	91	35,089
Feb.	.54	108	26,020	Feb.	.52	104	35,193
Mar.	.73	161	26,181	Mar.	.41	91	35,284
Apr.	1.55	332	26,513	Apr.	.69	148	35,432
May	1.65	419	26,932	May	1.48	327	35,759
Jun.	1.34	287	27,219	Jun.	6.54	1,400	37,159
Jul.	.47	104	27,323	Jul.	6.60	1,460	38,619
Aug.	.62	137	27,460	Aug.	1.72	380	38,999
Sep.	.28	60	27,520	Sep.	.71	157	39,156
Season		2,117		Season		4,385	
		1908-09				1911-12	
Oct.	.38	84	27,604	Oct.	.43	95	39,251
Nov.	.40	86	27,690	Nov.	.40	86	39,337
Dec.	.31	68	27,758	Dec.	.33	73	39,410
Jan.	1.37	302	28,060	Jan.	.31	68	39,478
Feb.	.83	166	28,226	Feb.	.30	60	39,538
Mar.	.76	168	28,394	Mar.	.27	60	39,598
Apr.	3.19	683	29,077	Apr.	.50	107	39,705
May	5.10	1,130	30,207	May	2.03	448	40,153
Jun.	5.14	1,100	31,307	Jun.	2.67	571	40,724
Jul.	1.33	294	31,601	Jul.	1.42	314	41,038
Aug.	.55	122	31,723	Aug.	.80	177	41,215
Sep.	.21	45	31,768	Sep.	.40	86	41,301
Season		4,248		Season		2,145	

Mean run-off per square mile 1.37 sec. ft

TABLE No. 9 (Cont.)

Monthly Discharge of Leevining Creek below 7,300
and above Rangers Station
Catchment Area 3.6 Square Miles
Area No. 5

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
		1912-13				1913-14	
Oct.	.17	38	41,339	Oct.	.18	40	42,430
Nov.	.16	34	41,373	Nov.	.16	34	42,464
Dec.	.14	31	41,404	Dec.	.16	35	42,499
Jan.	.14	31	41,435	Jan.	.16	35	42,534
Feb.	.15	30	41,465	Feb.	.18	36	42,570
Mar.	.14	31	41,496	Mar.	.16	35	42,605
Apr.	.21	45	41,541	Apr.	.25	54	42,659
May	.89	197	41,738	May	1.22	270	42,929
Jun.	1.02	218	41,956	Jun.	2.19	469	43,398
Jul.	.89	197	42,153	Jul.	2.47	545	43,943
Aug.	.64	141	42,294	Aug.	1.22	270	44,213
Sep.	.45	96	42,390	Sep.	.38	81	44,294
Season		1,089		Season		1,904	

Mean run-off per square mile 1.37 sec. ft.

TABLE No. 10

Monthly Discharge of Rush Creek above Gem Lake
(Eleven Year Mean Discharge per sq. mile 2.18 sec. ft.)
Catchment Area 19.2 sq. mi.
Area No. 6.

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq. mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
		1900-01				1903-04	
Oct.	.57	672	672	Oct.	.40	472	71,946
Nov.	.63	720	1,720	Nov.	.81	925	72,871
Dec.	.69	814	2,206	Dec.	.85	1,003	73,874
Jan.	.66	778	2,984	Jan.	.70	825	74,699
Feb.	1.44	1,533	4,517	Feb.	1.47	1,564	76,263
Mar.	2.20	2,600	7,117	Mar.	2.18	2,570	78,833
Apr.	3.01	3,440	10,557	Apr.	3.94	4,500	83,333
May	6.15	7,250	17,807	May	8.41	9,920	93,253
Jun.	3.74	4,275	22,082	Jun.	4.75	5,435	98,688
Jul.	1.70	2,040	24,122	Jul.	2.05	2,420	101,108
Aug.	1.00	1,180	25,302	Aug.	.96	1,132	102,240
Sep.	.55	629	25,931	Sep.	.87	994	103,234
		1901-02				1904-05	
Oct.	.64	755	26,686	Oct.	1.01	1,191	104,425
Nov.	.72	823	27,509	Nov.	.83	948	105,373
Dec.	1.06	1,251	28,760	Dec.	.83	980	106,353
Jan.	1.37	1,618	30,378	Jan.	1.18	1,390	107,743
Feb.	3.09	3,280	33,658	Feb.	1.32	1,406	109,149
Mar.	1.78	2,100	35,758	Mar.	1.62	1,912	111,061
Apr.	2.26	2,583	38,341	Apr.	2.62	2,997	114,058
May	3.70	4,370	42,711	May	3.50	4,130	118,188
Jun.	4.13	4,730	47,441	Jun.	2.42	2,763	120,951
Jul.	1.56	1,841	49,282	Jul.	.98	1,157	122,108
Aug.	.52	614	49,896	Aug.	.38	448	122,556
Sep.	.42	480	50,376	Sep.	.31	354	122,910
		1902-03				1905-06	
Oct.	.45	531	50,907	Oct.	.41	484	123,394
Nov.	.60	685	51,592	Nov.	.44	503	123,897
Dec.	.75	885	52,477	Dec.	.73	861	124,758
Jan.	.64	755	53.232	Jan.	.94	1,110	125,868
Feb.	.81	862	54,094	Feb.	.85	990	126,858
Mar.	.82	966	55,060	Mar.	.86	1,015	127,873
Apr.	2.25	2,572	57,632	Apr.	3.05	3,485	131,358
May	5.04	5,942	63,574	May	11.95	14,100	145,458
Jun.	4.55	5,200	68,774	Jun.	8.90	10,180	155,638
Jul.	1.37	1,618	70,392	Jul.	4.18	4,932	160,570
Aug.	.54	637	71,029	Aug.	1.99	2,343	162,913
Sep.	.39	445	71,474	Sep.	.65	743	163,656

TABLE No. 10 (Cont.)

Monthly Discharge of Rush Creek above Gem Lake
(Eleven Year Mean Discharge per sq. mile 2.18 sec. ft.)
Catchment Area 19.2 sq. mi.
Area No. 6.

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
		1906-07				1909-10	
Oct.	.68	802	164,458	Oct.	.67	790	270,643
Nov.	.99	1,131	165,589	Nov.	1.80	2,029	272,672
Dec.	.75	885	166,474	Dec.	1.59	1,875	274,547
Jan.	1.02	1,240	167,714	Jan.	.57	673	275,220
Feb.	1.80	1,940	169,654	Feb.	.95	1,012	276,232
Mar.	2.72	3,212	172,866	Mar.	2.02	2,383	278,615
Apr.	6.48	7,400	180,266	Apr.	5.82	6,650	285,265
May	10.85	12,800	193,066	May	4.85	5,720	290,985
Jun.	8.58	9,800	202,866	Jun.	2.14	2,443	293,428
Jul.	6.78	8,000	210,866	Jul.	.90	1,061	294,489
Aug.	2.89	3,412	214,278	Aug.	.35	413	294,902
Sep.	1.38	1,576	215,854	Sep.	.35	400	295,302
		1907-08				1910-11	
Oct.	.98	1,157	217,011	Oct.	.54	638	295,940
Nov.	.85	972	217,983	Nov.	.55	628	296,568
Dec.	.99	1,168	219,151	Dec.	.56	661	297,229
Jan.	.88	1,037	220,188	Jan.	.65	767	297,996
Feb.	.86	915	221,103	Feb.	.82	874	298,870
Mar.	1.16	1,369	222,472	Mar.	.65	766	299,636
Apr.	2.47	2,820	225,292	Apr.	1.10	1,257	300,893
May	2.95	3,483	228,775	May	2.35	2,772	303,665
Jun.	2.14	2,446	231,221	Jun.	10.38	11,860	315,525
Jul.	.75	885	232,106	Jul.	10.47	12,360	327,885
Aug.	.98	1,157	233,263	Aug.	2.73	3,220	331,105
Sep.	.45	514	233,777	Sep.	1.14	1,302	332,407
		1908-09				1911-12	
Oct.	.60	707	234,484	Oct.	.69	815	333,222
Nov.	.63	720	235,204	Nov.	.63	720	333,942
Dec.	.49	578	235,782	Dec.	.52	614	334,556
Jan.	2.18	2,573	238,355	Jan.	.49	578	335,134
Feb.	1.32	1,450	239,805	Feb.	.48	511	335,645
Mar.	1.20	1,414	241,219	Mar.	.43	507	336,152
Apr.	5.09	5,830	247,049	Apr.	.79	903	337,055
May	8.10	9,550	256,599	May	3.22	3,800	340,855
Jun.	8.17	9,340	265,939	Jun.	4.24	4,850	345,705
Jul.	2.12	2,500	268,439	Jul.	2.25	2,653	348,358
Aug.	.88	1,038	269,477	Aug.	1.27	1,499	349,857
Sep.	.33	376	269,853	Sep.	.63	720	350,577

TABLE No. 10 (Cont.)

Monthly Discharge of Rush Creek above Gem Lake
(Eleven Year Mean Discharge per sq. mile 2.18 sec. ft.)
Catchment Area 19.2 sq. mi.
Area No. 6.

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. Feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
		1912-13				1913-14	
Oct.	.27	318	350,895	Oct.	.28	332	360,164
Nov.	.26	297	351,192	Nov.	.26	296	360,460
Dec.	.22	260	351,452	Dec.	.25	295	360,755
Jan.	.22	260	351,712	Jan.	.25	295	361,050
Feb.	.24	256	351,968	Feb.	.28	298	361,348
Mar.	.22	260	352,228	Mar.	.25	295	361,643
Apr.	.33	377	352,605	Apr.	.40	457	362,100
May	1.42	1,675	354,280	May	1.93	2,278	364,378
Jun.	1.62	1,851	356,131	Jun.	3.48	3,980	368,358
Jul.	1.42	1,675	357,806	Jul.	3.82	4,510	372,868
Aug.	1.02	1,203	359,009	Aug.	1.93	2,278	375,146
Sep.	.72	823	359,832	Sep.	.60	685	375,831

TABLE No. 11

Monthly Discharge of Rush Creek below Gem and above Silver Lake
(Mean Run-off per square mile 1.77 sec. ft.)
Catchment Area 26.5 sq. miles.
Area No. 7.

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
		1900-01				1903-04	
Oct.	.46	750	750	Oct.	.32	520	80,615
Nov.	.50	790	1,540	Nov.	.66	1,040	81,655
Dec.	.56	913	2,453	Dec.	.69	1,120	82,775
Jan.	.54	880	3,333	Jan.	.57	930	83,705
Feb.	1.17	1,710	5,043	Feb.	1.19	1,740	85,445
Mar.	1.78	2,900	7,943	Mar.	1.77	2,880	88,325
Apr.	2.44	3,850	11,793	Apr.	3.20	5,040	93,365
May	5.00	8,150	19,943	May	6.83	11,130	104,495
Jun.	3.04	4,790	24,733	Jun.	3.86	6,080	110,575
Jul.	1.43	2,330	27,063	Jul.	1.66	2,710	113,285
Aug.	.81	1,320	28,383	Aug.	.78	1,270	114,555
Sep.	.45	710	29,093	Sep.	.71	1,120	115,675
Season		29,093		Season		35,580	
		1901-02				1904-05	
Oct.	.51	830	29,923	Oct.	.82	1,340	117,015
Nov.	.58	910	30,833	Nov.	.67	1,060	118,075
Dec.	.86	1,400	32,233	Dec.	.67	1,090	119,165
Jan.	1.12	1,830	34,063	Jan.	.96	1,570	120,735
Feb.	2.50	3,650	37,713	Feb.	1.07	1,560	122,295
Mar.	1.45	2,360	40,073	Mar.	1.31	2,140	124,435
Apr.	1.83	2,880	42,953	Apr.	2.12	3,340	127,775
May	3.00	4,890	47,843	May	2.84	4,630	132,405
Jun.	3.35	5,280	53,123	Jun.	1.96	3,080	135,485
Jul.	1.27	2.070	55,193	Jul.	.80	1,300	136,785
Aug.	.42	685	55,878	Aug.	.31	510	137,295
Sep.	.34	540	56,418	Sep.	.25	390	137,685
Season		27,325		Season		22,010	
		1902-03				1905-06	
Oct.	.36	587	57,005	Oct.	.33	540	138,225
Nov.	.49	770	57,775	Nov.	.36	570	138,795
Dec.	.61	990	58,765	Dec.	.59	960	139,755
Jan.	.52	850	59,615	Jan.	.76	1,240	140,995
Feb.	.66	960	60,575	Feb.	.69	1,010	142,005
Mar.	.67	1,090	61,665	Mar.	.70	1,140	143,145
Apr.	1.83	2,880	64,545	Apr.	2.48	3,910	147,055
May	4.10	6,690	71,235	May	9.70	15,800	162,855
Jun.	3.70	5,830	77,065	Jun.	7.22	11,380	174,235
Jul.	1.11	1,810	78,875	Jul.	3.39	5,530	179,765
Aug.	.44	720	79,595	Aug.	1.61	2,620	182,385
Sep.	.32	500	80,095	Sep.	.53	840	183,225
Season		23,677		Season		45,540	

TABLE No. 11 (Cont.)

Monthly Discharge of Rush Creek below Gem and above Silver Lake
(Mean Run-off per square mile 1.77 sec. ft.)
Catchment Area 26.5 sq. miles.
Area No. 7.

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
		1906-07				1909-10	
Oct.	.55	900	184,125	Oct.	.54	680	302,755
Nov.	.80	1,260	185,385	Nov.	1.46	2,300	305,055
Dec.	.61	990	186,375	Dec.	1.29	2,100	307,155
Jan.	.83	1,350	187,725	Jan.	.46	750	307,905
Feb.	1.46	2,130	189,855	Feb.	.77	1,120	309,025
Mar.	2.21	3,600	193,455	Mar.	1.64	2,680	311,705
Apr.	5.26	8,300	201,755	Apr.	4.73	7,460	319,165
May	8.80	14,350	216,105	May	3.94	6,430	325,595
Jun.	6.96	10,960	227,065	Jun.	1.74	2,740	328,335
Jul.	5.50	8,970	236,035	Jul.	.73	1,190	329,525
Aug.	2.35	3,830	239,865	Aug.	.28	460	329,985
Sep.	1.12	1,760	241,625	Sep.	.28	440	330,425
Season		58,400		Season		28,350	
		1907-08				1910-11	
Oct.	.80	1,300	242,925	Oct.	.44	720	331,145
Nov.	.69	1,090	244,015	Nov.	.45	710	331,855
Dec.	.80	1,300	245,315	Dec.	.45	730	332,585
Jan.	.71	1,160	246,475	Jan.	.52	850	333,435
Feb.	.70	1,020	247,495	Feb.	.67	980	334,415
Mar.	.94	1,530	249,025	Mar.	.52	850	335,265
Apr.	2.00	3,160	252,185	Apr.	.89	1,400	336,665
May	2.39	3,900	256,085	May	1.91	3,120	339,785
Jun.	1.74	2,740	258,825	Jun.	8.43	13,280	353,065
Jul.	.61	990	259,815	Jul.	8.50	13,850	366,915
Aug.	.80	1,300	261,115	Aug.	2.21	3,600	370,515
Sep.	.36	570	261,685	Sep.	.92	1,450	371,965
Season		20,060		Season		41,540	
		1908-09				1911-12	
Oct.	.49	800	262,485	Oct.	.56	910	372,875
Nov.	.51	800	263,285	Nov.	.51	800	373,675
Dec.	.40	650	263,935	Dec.	.42	680	374,355
Jan.	1.77	2,890	266,825	Jan.	.40	650	375,005
Feb.	1.07	1,560	268,385	Feb.	.39	570	375,575
Mar.	.97	1,580	269,965	Mar.	.35	570	376,145
Apr.	4.14	6,530	276,495	Apr.	.64	1,010	377,155
May	6.59	10,730	287,225	May	2.62	4,280	381,435
Jun.	6.64	10,450	297,675	Jun.	3.44	5,420	386,855
Jul.	1.72	2,810	300,485	Jul.	1.83	2,980	389,835
Aug.	.71	1,160	301,645	Aug.	1.03	1,680	391,515
Sep.	.27	430	302,075	Sep.	.51	800	392,315
Season		40,390		Season		20,350	

TABLE No. 11 (Cont.)

Monthly Discharge of Rush Creek below Gem and above Silver Lake
(Mean Run-off per square mile 1.77 sec. ft.)
Catchment Area 26.5 sq. miles.
Area No. 7.

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off
		1912-13				1913-14	
Oct.	.22	366	392,675	Oct.	.23	370	403,033
Nov.	.21	330	393,005	Nov.	.21	330	403,363
Dec.	.18	290	393,295	Dec.	.20	330	403,693
Jan.	.18	290	393,585	Jan.	.20	330	404,023
Feb.	.19	278	393,863	Feb.	.23	330	404,353
Mar.	.18	290	394,153	Mar.	.20	330	404,683
Apr.	.27	430	394,583	Apr.	.32	500	405,183
May	1.15	1,870	396,453	May	1.57	2,560	407,703
Jun.	1.32	2,080	398,533	Jun.	2.82	4,450	412,193
Jul.	1.15	1,870	400,403	Jul.	3.10	5,060	417,253
Aug.	.83	1,250	401,753	Aug.	1.57	2,560	419,813
Sep.	.58	910	402,663	Sep.	.49	770	420,583
Season		10,348		Season		17,920	

TABLE No. 12

Monthly Discharge Tributary to Rush Creek below Silver Lake and above Elev. 7,300.
Catchment Area 31.4 sq. miles.
Area No.8.

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq. mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft
		1900-01				1903-04	
Oct.	.57	1,098	1,098	Oct.	.40	772	117,657
Nov.	.62	1,156	2,254	Nov.	.81	1,505	119,162
Dec.	.69	1,329	3,583	Dec.	.85	1,640	120,802
Jan.	.66	1,271	4,854	Jan.	.70	1,350	122,152
Feb.	1.44	2,510	7,364	Feb.	1.47	2,560	124,712
Mar.	2.20	4,240	11,604	Mar.	2.18	4,210	128,922
Apr.	3.01	5,610	17,214	Apr.	3.94	7,350	136,272
May	6.15	11,850	29,064	May	8.41	16,100	152,372
June	3.75	7,000	36,064	Jun.	4.75	8,860	161,232
Jul.	1.76	3,398	39,462	Jul.	2.05	3,950	165,182
Aug.	1.00	1,927	41,389	Aug.	.96	1,850	167,032
Sep.	.55	1,025	42,414	Sep.	.87	1,623	168,655
		1901-02				1904-05	
Oct.	.63	1,214	43,628	Oct.	1.01	1,949	170,604
Nov.	.72	1,343	44,971	Nov.	.83	1,548	172,152
Dec.	1.06	2,044	47,015	Dec.	.83	1,600	173,752
Jan.	1.38	2,660	49,675	Jan.	1.18	2,275	176,027
Feb.	3.08	5,360	55,035	Feb.	1.32	2,280	178,307
Mar.	1.78	3,432	58,467	Mar.	1.62	3,113	181,420
Apr.	2.26	4,220	62,687	Apr.	2.62	4,885	186,305
May	3.70	7,140	69,826	May	3.50	5,750	192,055
Jun.	4.13	7,700	77,527	Jun.	2.42	4,520	196,575
Jul.	1.56	3,001	80,528	Jul.	.98	1,889	198,464
Aug.	.52	1,002	81,530	Aug.	.38	732	199,196
Sep.	.42	783	82,313	Sep.	.31	577	199,773
		1902-03				1905-06	
Oct.	.44	848	83,161	Oct.	.41	791	200,564
Nov.	.60	1,119	84,280	Nov.	.44	822	201,386
Dec.	.75	1,445	85,725	Dec.	.73	1,415	202,801
Jan.	.64	1,233	86,958	Jan.	.94	1,812	204,613
Feb.	.81	1,410	88,368	Feb.	.85	1,480	206,093
Mar.	.82	1,580	89,948	Mar.	.86	1,658	207,751
Apr.	2.25	4,200	94,148	Apr.	3.05	5,680	213,431
May	5.04	9,800	103,948	May	11.95	23,000	236,431
Jun.	4.55	8,490	112,438	Jun.	8.90	16,600	253,031
Jul.	1.37	2,640	115,078	Jul.	4.18	8,050	261,081
Aug.	.54	1,080	116,158	Aug.	1.99	3,837	264,918
Sep.	.39	727	116,885	Sep.	.65	1,288	266,208

TABLE No. 12 (Cont.)

Monthly Discharge Tributary to Rush Creek below Silver Lake and above Elev. 7,300.
Catchment Area 31.4 sq. miles.
Area No. 8.

Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft/	Accumulated Run-off in Acre Ft.	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft/	Accumulated Run-off in Acre Ft
		1906-07				1909-10	
Oct.	.68	1,310	267,518	Oct.	.67	1,290	440,252
Nov.	.99	1,837	269,355	Nov.	1.80	3,360	443,612
Dec.	.75	1,446	270,801	Dec.	1.59	3,062	446,674
Jan.	1.02	1,964	272,765	Jan.	.57	1,117	447,791
Feb.	1.80	3,134	275,899	Feb.	.95	1,655	449,446
Mar.	2.72	5,240	281,139	Mar.	2.02	3,890	453,336
Apr.	6.48	12,100	293,239	Apr.	5.82	10,850	464,186
May	10.85	20,100	313,339	May	4.85	9,340	473,526
Jun.	8.58	16,000	329,339	Jun.	2.14	3,990	477,516
Jul.	6.78	13,120	342,459	Jul.	.90	1,732	479,248
Aug.	2.89	5,570	348,029	Aug.	.35	675	479,923
Sep.	1.38	2,573	350,602	Sep.	.35	654	480,577
		1907-08				1910-11	
Oct.	.98	1,886	352,488	Oct.	.55	1,060	481,637
Nov.	.85	1,587	354,075	Nov.	.54	1,008	482,645
Dec.	.99	1,905	355,980	Dec.	.56	1,080	483,725
Jan.	.88	1,693	357,943	Jan.	.65	1,253	484,978
Feb.	.86	1,498	359,441	Feb.	.82	1,430	486,408
Mar.	1.16	2,235	361,676	Mar.	.65	1,251	487,659
Apr.	2.47	4,620	366,296	Apr.	1.10	2,053	489,712
May	2.95	5,680	371,976	May	2.35	4,530	494,242
Jun.	2.14	3,990	375,966	Jun.	10.38	19,350	513,592
Jul.	.75	1,445	377,411	Jul.	10.47	20,170	533,672
Aug.	.98	1,888	379,299	Aug.	2.73	5,260	539,022
Sep.	.45	840	380,139	Sep.	1.14	2,123	541,145
		1908-09				1911-12	
Oct.	.60	1,157	381,296	Oct.	.69	1,328	542,473
Nov.	.63	1,174	382,470	Nov.	.63	1,174	543,647
Dec.	.49	945	383,415	Dec.	.52	1,000	544.647
Jan.	2.18	4,200	387,615	Jan.	.49	944	545,591
Feb.	1.32	2,300	389,915	Feb.	.48	836	546,427
Mar.	1.20	2,317	392,232	Mar.	.43	827	547,254
Apr.	5.09	9,500	401,732	Apr.	.79	1,472	548,726
May	8.10	15,620	417,352	May	3.22	6,200	554,926
Jun.	8.17	15,210	432,562	Jun.	4.24	7,910	562,836
Jul.	2.12	4,090	436,652	Jul.	2.25	4,330	567,166
Aug.	.88	1,694	438,346	Aug.	1.27	2,443	569,609
Sep.	.33	616	438,962	Sep.	.63	1,172	570,781

TABLE No. 12 (Cont.)

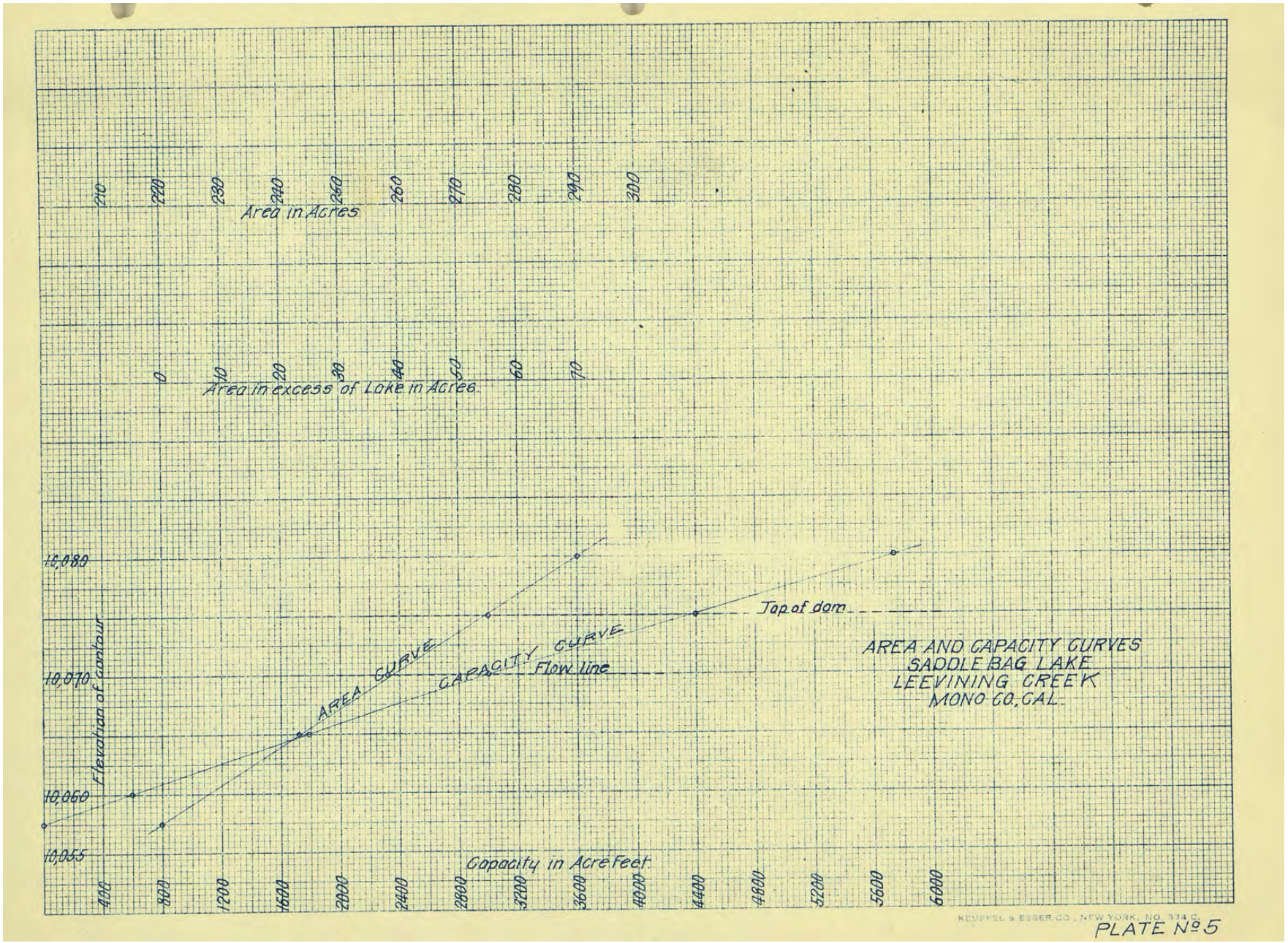
Monthly Discharge Tributary to Rush Creek below Silver Lake and above Elev. 7,300.
Catchment Area 31.4 sq.miles.
Area No. 8.

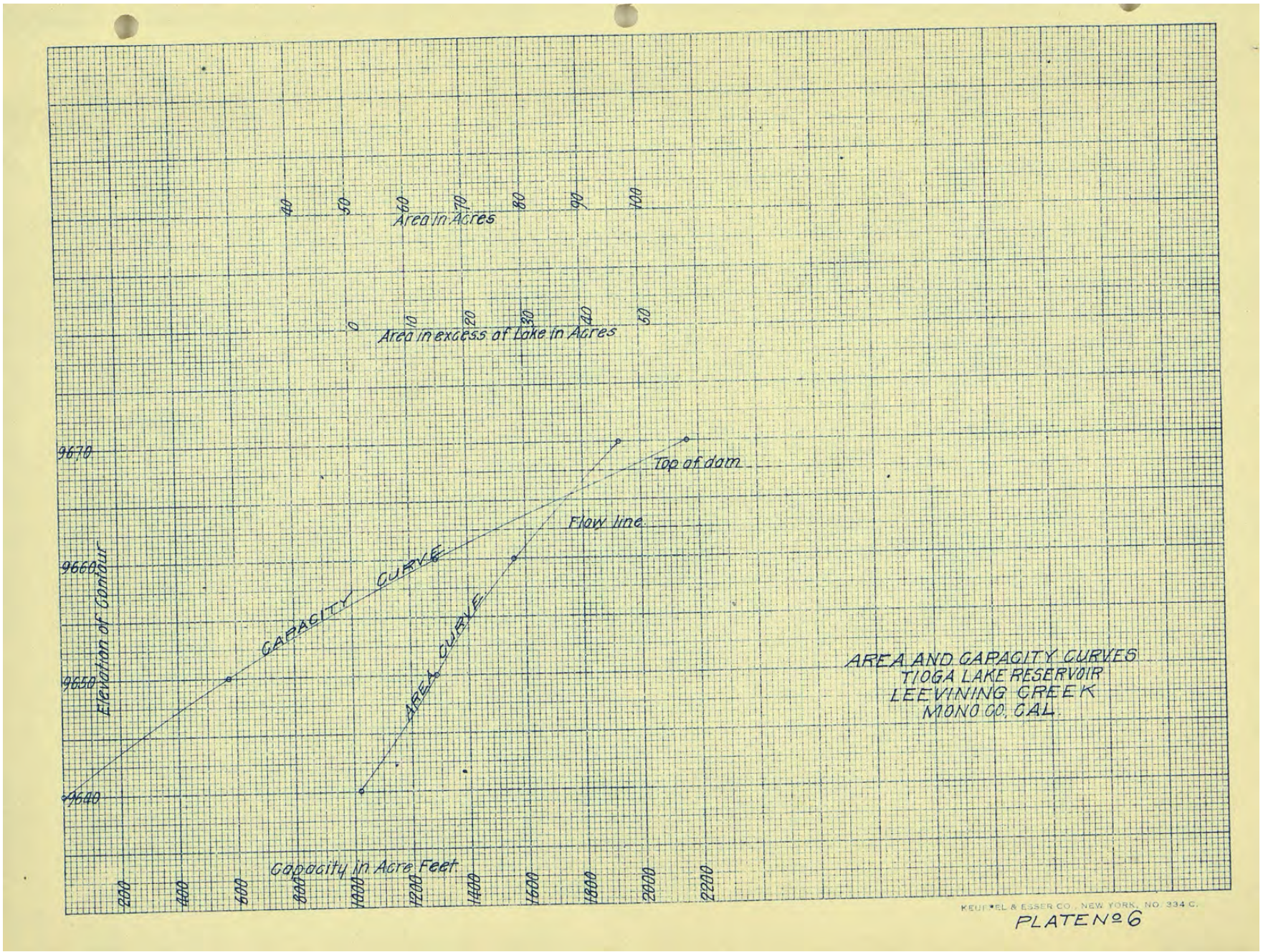
Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in Acre Ft/	Month	Discharge Sec. feet per sq.mi.	Run-off Acre Ft.	Accumulated Run-off in acre Ft
		1912-13				1913-14	
Oct.	.27	520	571,301	Oct.	.28	539	586,373
Nov.	.26	485	571,786	Nov.	.26	485	586,858
Dec.	.22	423	572,209	Dec.	.25	481	587,339
Jan.	.22	423	572,632	Jan.	.25	481	587,820
Feb.	.24	418	573,050	Feb.	.28	488	588,308
Mar.	.22	423	573,473	Mar.	.25	481	588,789
Apr.	.33	616	574,089	Apr.	.40	746	589,535
May	1.42	2,715	576,804	May	1.93	3,715	593,250
Jun.	1.62	3,007	579,811	Jun.	3.48	6,490	599,740
Jul.	1.42	2,718	582,529	Jul.	3.82	7,350	607,090
Aug.	1.02	1,963	584,492	Aug.	1.93	3,720	610,810
Sep.	.72	1,342	575,834	Sep.	.60	1,119	611,929

Table No. 14

Summary of Seasonal Run-off and Distribution thereof 1901-02 to 1913-14

Season	Run-off	Withdrawn from storage	Stored	Diverted to Deadman Creek	Evaporation Loss	Required for Irrigation Apr.to Sep.	Available for Irrigation Apr.to Sep.	Domestic Supply Oct. to March
1901-02			21,643					
1902-03	122,244	6,809	- ---	102,555	1,440	9,000	24,508	550
1903-04	183,885	- ---	4,997	121,747	1,613	9,000	53,608	1,920
1904-05	112,816	9,593	- ---	108,791	1,165	9,000	10,911	1,542
1905-06	235,394	- ---	16,014	121,408	1,623	9,000	95,797	552
1906-07	301,066	- ---	7,502	137,151	2,098	9,000	150,689	3,626
1907-08	103,705	19,008	- ---	108,318	1,190	9,000	12,427	778
1908-09	208,766	- ---	8,021	124,010	1,703	9,000	73,108	1,924
1909-10	147,211	3,579	- ---	113,681	1,681	9,000	33,142	2,286
1910-11	214,665	- ---	12,987	114,236	1,581	9,000	85,348	513
1911-12	105,083	17,358	- ---	104,975	1,165	9,000	15,859	442
1912-13	53,482	14,817	- ---	58,611	493	9,000	9,000	195
1913-14	92,469	- ---	6,312	71,146	774	9,000	14,022	215
Total	1,880,786	- ---		1,286,629	16,526	108,000	578,419	14,543
Mean Acre Feet	156,732			107,219	1,377	9,000	48,202	1,212
Mean Sec. Feet	216.4			148.1		12.4	133.0	


210
220
230
240
250
260
270
280
290
300
Area in Acres
0
10
20
30
40
50
60
70
Area in excess of Lake in Acres
15,080
10,070
10,060
10,055
Elevation of contour
Top of dam
AREA CURVE
CAPACITY CURVE
Flow line
AREA AND CAPACITY CURVES
SADDLE BAG LAKE
LEEVINING CREEK
MONO CO, CAL.
400
800
1200
1600
2000
2400
2800
3200
3600
4000
4400
4800
5200
5600
6000
Capacity in Acre Feet
KEUFFEL & ESSER CO., NEW YORK, NO. 334 C.
PLATE No 5


40
50
60
70
80
90
100
Area in Acres
0
10
20
30
40
50
Area in excess of Lake in Acres
9670
9660
9650
9640
Elevation or Contour
Top of dam
Flow line
CAPACITY CURVE
AREA CURVE
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
Capacity in Acre Feet
AREA AND CAPACITY CURVES
TIOGA LAKE RESERVOIR
LEEVINING CREEK
MONO CO. CAL.
KEUFFEL & ESSER CO., NEW YORK, NO. 334 C.
PLATE No 6

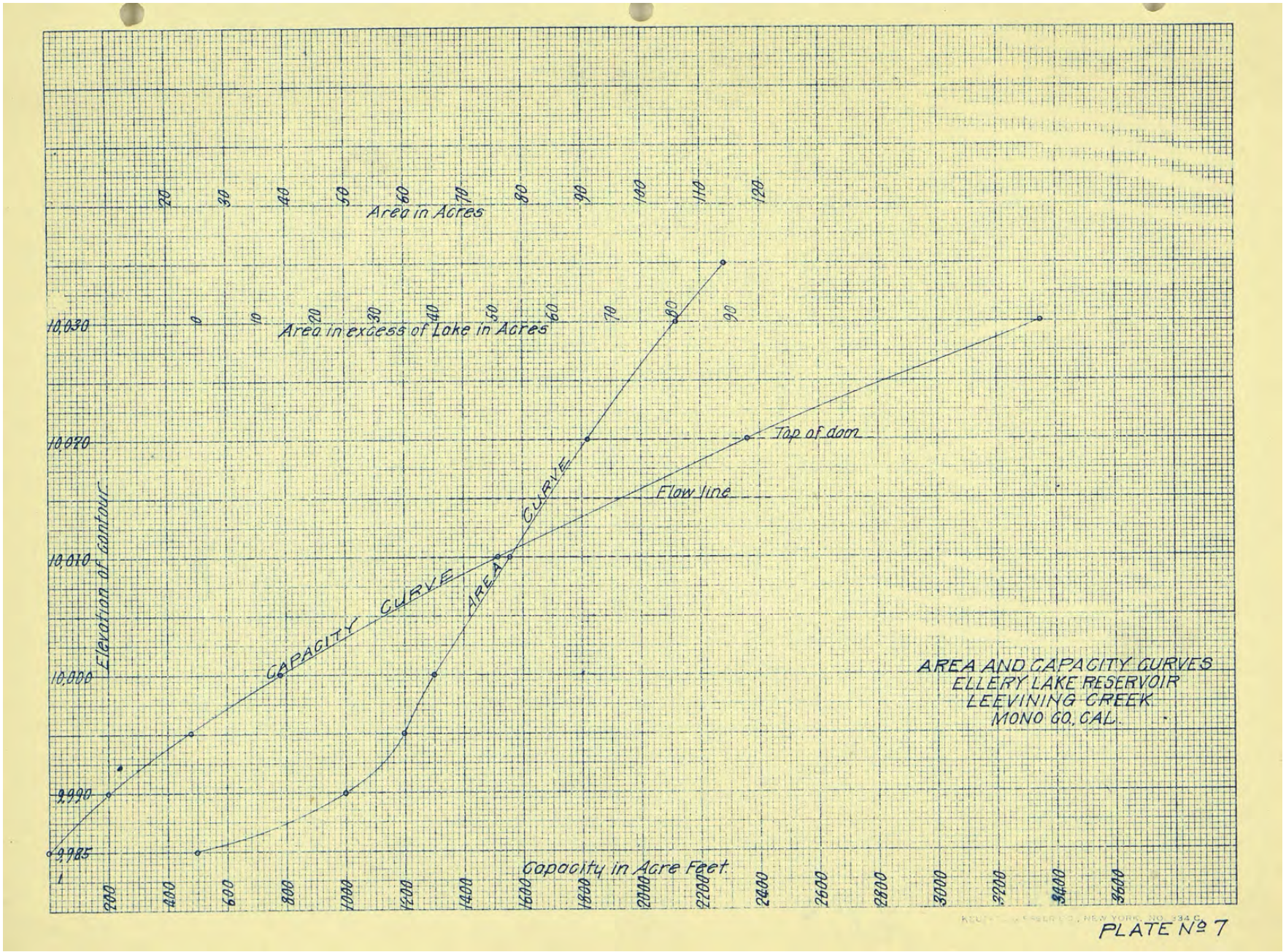
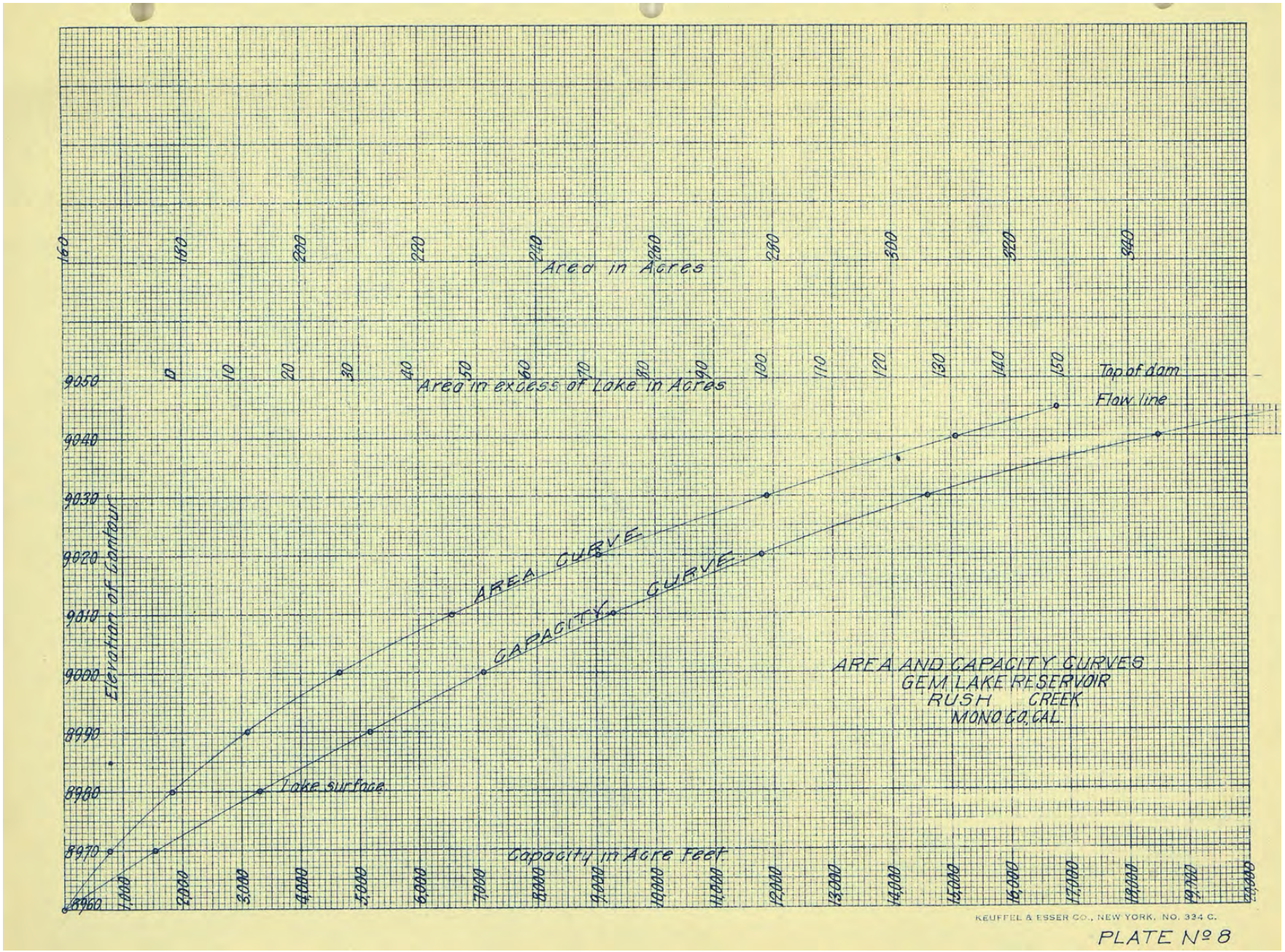
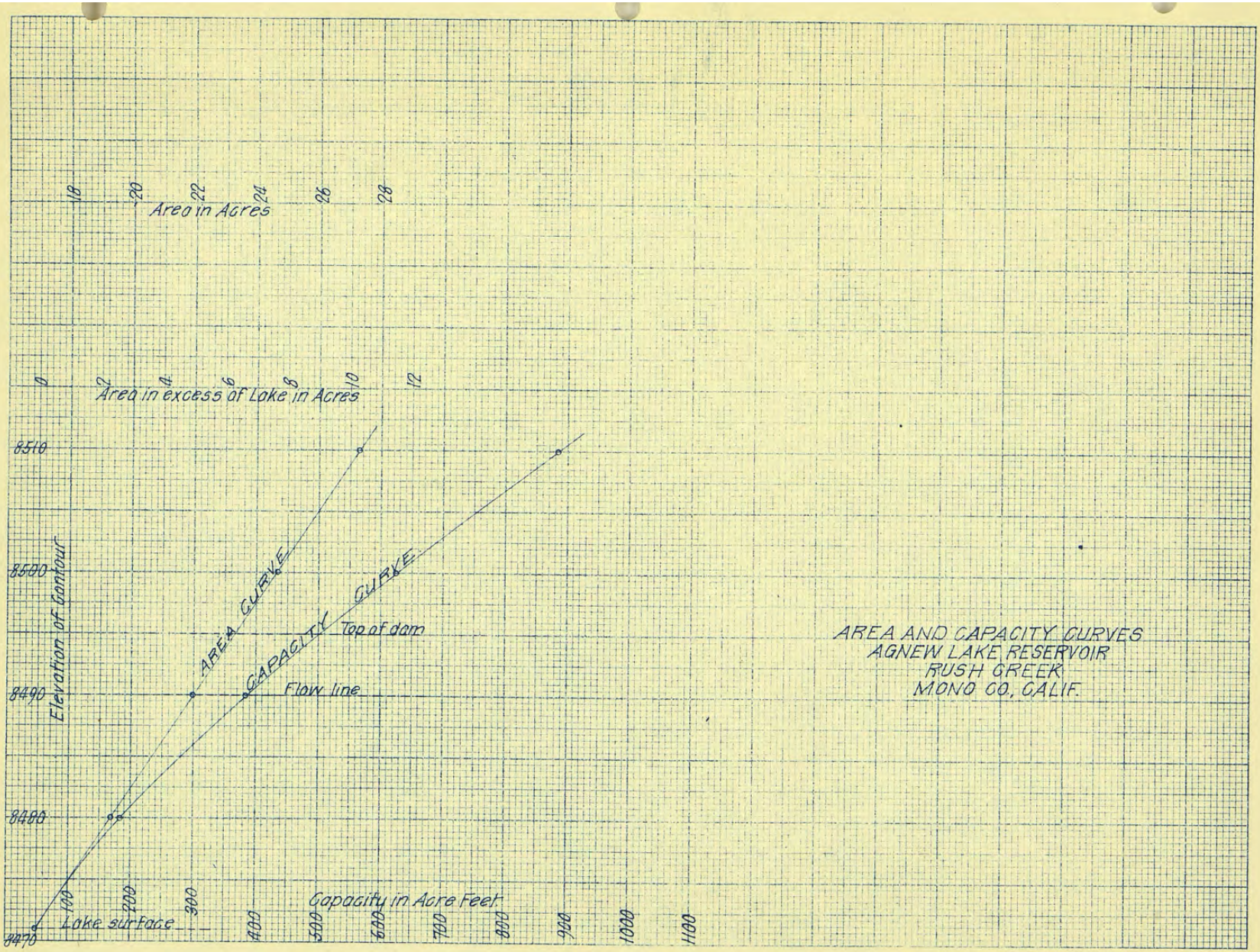

Area in Acres
20
30
40
50
60
70
80
90
100
110
120
Area in excess of Lake in Acres
0
10
20
30
40
50
60
70
80
90
10,030
10,020
10,010
10,000
9990
9985
Elevation of contour
Top of dam
Flow line
CAPACITY CURVE
AREA CURVE
Capacity in Acre Feet
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
AREA AND CAPACITY CURVES
ELLERY LAKE RESERVOIR
LEEVINING CREEK
MONO CO. CAL.

PLATE No 7



KEUFFEL & ESSER CO., NEW YORK, NO. 334 C.

PLATE Nº 8



AREA AND CAPACITY CURVES
AGNEW LAKE RESERVOIR
RUSH CREEK
MONO CO., CALIF.

PLATE No 9

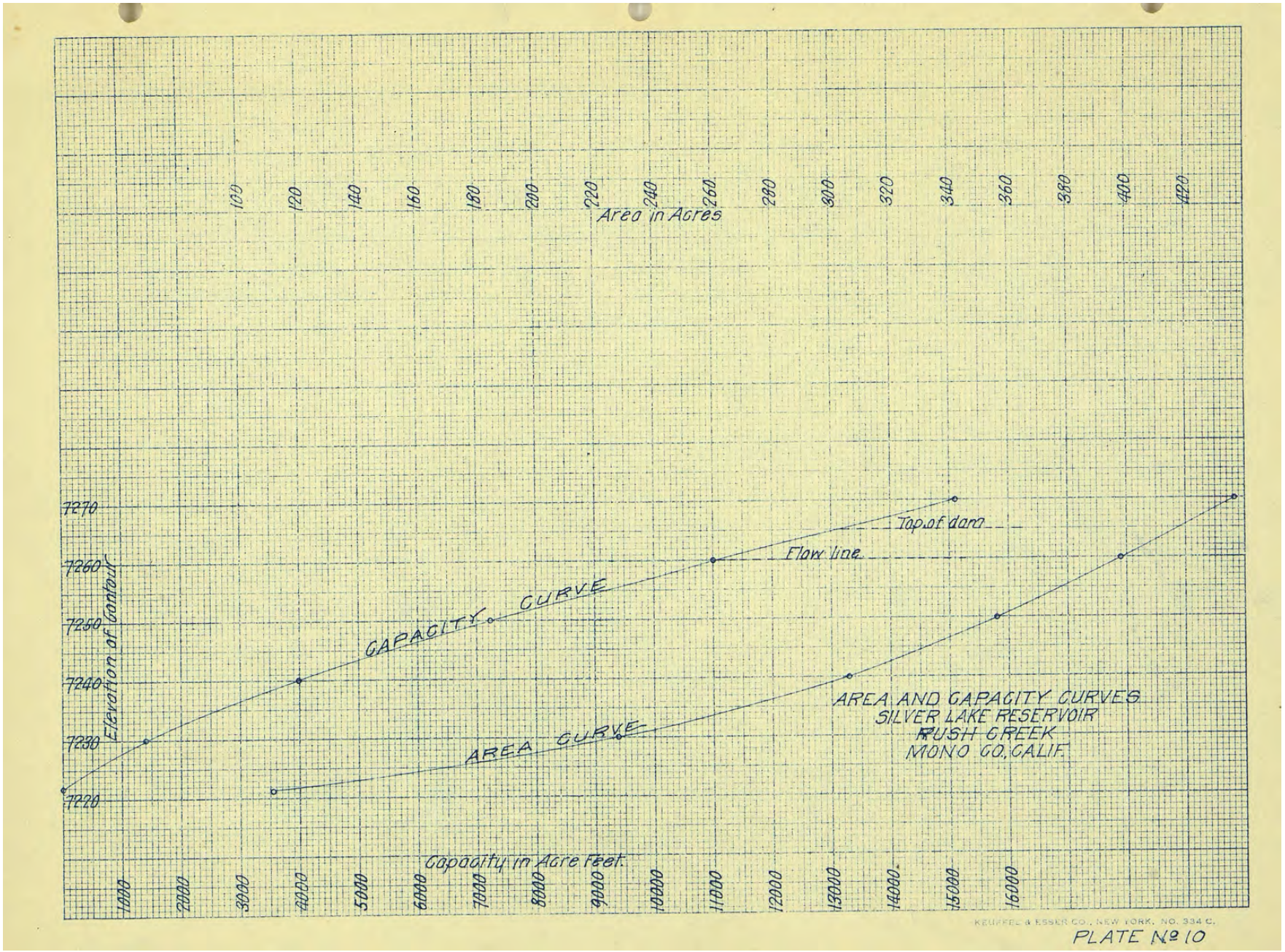


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PLATE No 10