

WEBER BASIN RESERVOIRS

Weber River and Tributaries, Utah

**REPORT ON RESERVOIR REGULATION
FOR FLOOD CONTROL**

JULY 1971

DEPARTMENT OF THE ARMY

**SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA**

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**Department of the Army
Sacramento District, Corps of Engineers
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**WEBER BASIN RESERVOIRS
WEBER RIVER AND TRIBUTARIES, UTAH**

PERTINENT DATA

(IP Units)

GENERAL

Drainage Areas

Weber River at Weber-Provo	
Diversion Canal	167 sq miles
Weber River at Wanship Dam	320 sq miles
Weber River at Echo Dam	732 sq miles
Lost Creek at Lost Creek Dam	133 sq miles
East Canyon Creek at East Canyon Dam	155 sq miles
Weber River at Gateway	1,610 sq miles
South Fork Ogden River at Causey Dam	81 sq miles
Ogden River at Pineview Dam	310 sq miles
Weber River at Plain City	2,060 sq miles

Flows (mean annual)

Weber River at Wanship Dam (1928-1965)	134,500 ac-ft
Weber River at Echo Dam (1928-1965)	188,700 ac-ft
Lost Creek at Lost Creek Dam (1921-1923 & 1941-1965)	23,600 ac-ft
East Canyon Creek at East Canyon Dam (1931-1965)	36,130 ac-ft
Ogden River at Pineview (1928-1965)	151,700 ac-ft

WANSHIP DAM AND ROCKPORT LAKE

Reservoir

Elevation	
Minimum power pool	5,930 feet
Gross pool	6,037 feet
Spillway flood pool	6,049 feet
Area	
Minimum power pool	121 acres
Gross pool	1,077 acres
Spillway flood pool	1,189 acres
Storage	
Minimum power pool	1,260 ac-ft
Gross pool (active)	60,860 ac-ft
Gross pool (total)	62,120 ac-ft
Spillway flood pool	75,730 ac-ft

ECHO DAM AND RESERVOIR

Reservoir

Elevation, gross pool	5,560 ft
Area, gross pool	1,455 acres
Storage, gross pool	73,942 ac-ft

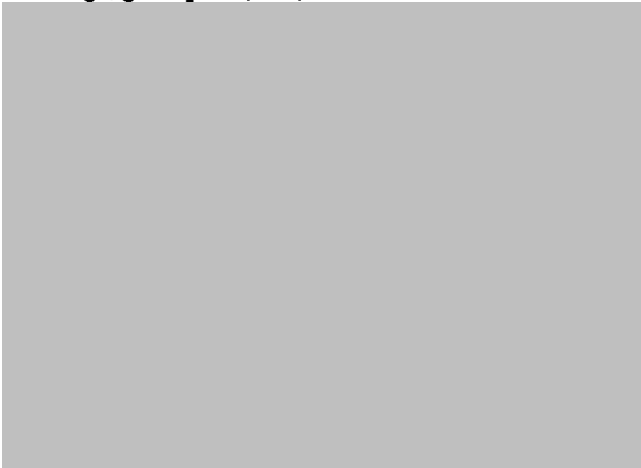
LOST CREEK DAM AND RESERVOIR

Reservoir	
Elevation, gross pool	6,005 ft
Area, gross pool	365 acres
Storage, gross pool (active)	20,010 ac-ft
Storage, gross pool (total)	22,510 ac-ft



CAUSEY DAM AND RESERVOIR

Reservoir	
Elevation, gross pool	5,692 ft
Area, gross pool	136 acres
Storage, gross pool (active)	6,870 ac-ft
Storage, gross pool (total)	7,870 ac-ft



EAST CANYON DAM AND RESERVOIR

Reservoir	
Elevation, gross pool	5,705 ft
Area, gross pool	684 acres
Storage, gross pool (active)	48,110 ac-ft
Storage, gross pool (total)	51,200 ac-ft



PINEVIEW DAM AND RESERVOIR

Reservoir	
Elevation	
Gross pool	4,900 ft
Spillway flood pool	4,902 ft
Area	
Gross pool	2,874 acres
Spillway flood pool	2,921 acres
Storage	
Gross pool	110,149 ac-ft
Spillway flood pool	115,000 ac-ft



WEBER BASIN RESERVOIRS WEBER RIVER AND TRIBUTARIES, UTAH

PERTINENT DATA

(SI Units)

GENERAL

Drainage Areas

Weber River at Weber-Provo	
Diversion Canal	269 sq km
Weber River at Wanship Dam	515 sq km
Weber River at Echo Dam	1,178 sq km
Lost Creek at Lost Creek Dam	214 sq km
East Canyon Creek at East	
Canyon Dam	249 sq km
Weber River at Gateway	2,591 sq km
South Fork Ogden River at	
Causey Dam	130 sq km
Ogden River at Pineview Dam	499 sq km
Weber River at Plain City	3,315 sq km

Flows (mean annual)

Weber River at Wanship Dam	
(1928-1965)	166 hm ³
Weber River at Echo Dam	
(1928-1965)	233 hm ³
Lost Creek at Lost Creek Dam	
(1921-1923 & 1941-1965)	29 hm ³
East Canyon Creek at East Canyon Dam	
(1931-1965)	45 hm ³
Ogden River at Pineview	
(1928-1965)	187 hm ³

WANSHIP DAM AND ROCKPORT LAKE

Reservoir

Elevation	
Minimum power pool	1,807 m
Gross pool	1,840 m
Spillway flood pool	1,844 m
Area	
Minimum power pool	49 ha
Gross pool	436 ha
Spillway flood pool	481 ha
Storage	
Minimum power pool	1.5 hm ³
Gross pool (active)	75.0 hm ³
Gross pool (total)	76.6 hm ³
Spillway flood pool	93.4 hm ³

ECHO DAM AND RESERVOIR

Reservoir

Elevation, gross pool	1,695 m
Area, gross pool	589 ha
Storage, gross pool	91 hm ³

LOST CREEK DAM AND RESERVOIR

Reservoir	
Elevation, gross pool	1,830 m
Area, gross pool	148 ha
Storage, gross pool (active)	24.7 m ³ /s
Storage, gross pool (total)	27.7 m ³ /s



CAUSEY DAM AND RESERVOIR

Reservoir	
Elevation, gross pool	1,735 m
Area, gross pool	55 ha
Storage, gross pool (active)	8.5 hm ³
Storage, gross pool (total)	9.7 hm ³



EAST CANYON DAM AND RESERVOIR

Reservoir	
Elevation, gross pool	1,739 m
Area, gross pool	277 ha
Storage, gross pool (active)	59.3 hm ³
Storage, gross pool (total)	63.2 hm ³



PINEVIEW DAM AND RESERVOIR

Reservoir	
Elevation	
Gross pool	1,493.5 m
Spillway flood pool	1,494.1 m
Area	
Gross pool	1,163 ha
Spillway flood pool	1,182 ha
Storage	
Gross pool	135.9 hm ³
Spillway flood pool	141.8 hm ³



REPORT ON RESERVOIR REGULATION
FOR FLOOD CONTROL

WEBER BASIN RESERVOIRS
WEBER RIVER AND TRIBUTARIES, UTAH

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REPORT ON RESERVOIR REGULATION FOR FLOOD CONTROL

WEBER BASIN RESERVOIRS WEBER RIVER AND TRIBUTARIES, UTAH

CHAPTER 1 - GENERAL INFORMATION

1. AUTHORITY AND SCOPE

This report on reservoir regulation for flood control, Weber Basin Reservoirs, is prepared in accordance with instructions contained in ER 1110-2-240, EM 1110-2-3600, and EC 1110-2-67, which require a report on reservoir regulation for flood control for all reservoirs covered by Section 7 of the Flood Control Act of 1944 (58 Stat. 890, 33 U.S.C. 709). The pertinent portion of that act reads as follows:

"Hereafter it shall be the duty of the Secretary of War to prescribe regulations for the use of storage allocated for flood control or navigation at all reservoirs constructed wholly or in part with Federal funds provided on the basis of such purposes, and the operation of any such project shall be in accordance with such regulations . . ."

This report comprises descriptive information about the Weber Basin Reservoirs, the method of operation and the proposed regulations for flood control operation. Diagrams and other illustrations are included to show the seasonal variation in flood control storage space. A portion of the material used in the preparation of this report was supplied by the United States Bureau of Reclamation, Region 4, Salt Lake City, Utah. Prior flood control regulation publications including a reservoir regulation manual for Weber Basin Project, Echo, Wanship and Pineview Reservoirs dated January, 1960, and Interim Instructions for Flood Control Operation of Weber Basin Reservoirs (Comprehensive Plan) dated November 1966 have been incorporated into this report and will be superseded upon its final approval. The operation of Weber Basin reservoirs for flood control will be supplemented by levee and channel improvements provided for in the Weber River and Tributaries Project, Utah, Flood Control Act of 3 July 1958, HD 158/84/1 as extended by the Flood Control Act of 13 August 1968.

2. AUTHORIZATION FOR FLOOD CONTROL ALLOCATIONS

Public Law No. 273, 81st Congress, 1st Session, authorized the multiple-purpose Weber Basin Project for construction by the Bureau of Reclamation for irrigation; municipal, industrial, and domestic water supply; flood control; hydroelectric power; and other beneficial purposes. The project included increasing storage capacity by constructing four new reservoirs of which Wanship Reservoir on Weber River near Wanship, Lost Creek Reservoir on Lost Creek and Causey Reservoir on South Fork of Ogden River have flood control significance; and enlarging two existing reservoirs, Pineview

Reservoir on Ogden River, and East Canyon Reservoir on East Canyon Creek. Willard Reservoir constructed off stream on the shore of Great Salt Lake has no flood control functions. Pineview Reservoir, along with Echo Reservoir on Weber River (not part of Weber Basin Project) were constructed by the Bureau of Reclamation for irrigation purposes with capacities of about 44,000 acre-feet and 74,000 acre-feet, respectively. These two reservoirs have been transferred to local interests for operation, but title is maintained by the United States. These reservoirs occasionally have provided incidental flood reduction but have not afforded dependable flood control. Provisions for enlargement of Pineview Reservoir to a capacity of about 110,000 acre-feet were included in the Weber Basin authorization. Echo Reservoir was not included in the authorizing act as part of the Weber Basin Project, but suitable agreements with the operating interests are contemplated by the Bureau of Reclamation to permit its operation as an effective flood control unit of the reservoir system. Until such agreements are consummated, the Regional Director, Region 4, Bureau of Reclamation has made informal arrangements for the flood control operation of Echo Reservoir.

CHAPTER II - BASIN DESCRIPTION

3. DESCRIPTION OF THE AREA

a. The area drained by Weber River and its tributaries comprises about 2,200 square miles of north central Utah, located in Summit, Morgan, Davis and Weber Counties (see chart 1). This area includes a substantial section of the most highly developed part of Utah that is commonly known as the Wasatch Front. Population of the area, exclusive of Davis County whose population centers lie outside the drainage basin, was about 120,000 in 1960 of which about 70,000 represents the city of Ogden. Ogden, the second largest city in Utah, is the focal point for most activity in the Weber River Basin, and is located at the confluence of the Weber and Ogden Rivers.

b. The area is served by a variety of transportation facilities. Mainlines of the Union Pacific and Southern Pacific Railroads cross the area, making Ogden a railroad center of regional and national importance. U. S. Highway No. 89 and Interstate Highway No. 15 traverse the area in a north-south direction, and Interstate Highway No. 80 extends in an east-west direction. Hill Air Force Base and other defense installations located in the area are of national importance.

c. The principal income-producing activity in the area is agriculture. Manufacturing and defense follow in the order named. Agriculture includes mainly dairying, livestock raising, fruit growing and truck farming. Approximately 90 percent of the acreage farmed is irrigated.

d. Topography of the area varies from rugged mountain slopes, narrow canyons, and mountain valleys to bench and delta lands. Elevations range from about 12,000 feet near the Weber River headwaters to about 4,200 feet above mean sea level where the Weber River discharges into the Great Salt Lake. The stream gradient over the 135 mile long main stem ranges from 500 feet per mile in the upper reaches to an average of less than 3 feet per mile through its final 30-mile reach across the bench land and delta area of the Wasatch Front. Weber Basin Stream profiles are shown on chart 2.

e. Important tributaries to Weber River include Ogden River and Cottonwood, East Canyon, Lost, Echo Canyon, Chalk, Silver, and Beaver Creeks. Ogden River, the most important tributary originates in the Wasatch Mountains east of Ogden and is formed by the junction of three branches at Pineview Reservoir. Below the reservoir, the river flows in a narrow canyon from which it emerges near the city of Ogden. Ogden River flows through the city of Ogden and joins the Weber River near the western limits of the city about 23 miles upstream from Great Salt Lake. The other principal tributaries to Weber River are steep mountain streams which contribute to flood runoff but which have only small sustained flows during most of the year.

f. Soils in the area are primarily alluvial material from adjacent mountains. Soil mantle is generally deep making the agricultural lands among the most productive in the state.

g. Native vegetation consists of scattered shad scale, greasewood and salt grass on the low lying lands adjacent to Great Salt Lake changing to sagebrush, bunch grass and cheat grass on the bench and higher delta lands. The foothills and mountain slopes, to an elevation of about 7,500 feet support a natural cover of chaparral, sagebrush, service berry and other small brush, while above 7,500 feet, fir, pine, spruce and aspen exist intermixed with scattered clumps of snowberry and other brush. Meadow grasses intermixed with native grasses are predominant in the mountain valleys.

h. The flood plain of the Weber River system comprises an estimated 42,300 acres. The locations of areas subject to flooding are delineated on chart 4. Of the total area subject to flooding, 1,400 acres containing residential, business, industrial, and manufacturing improvements, railroads and railroad yards, irrigation structures, utilities, and public property are located in the city of Ogden; and 100 acres consisting of residential, business, utility, and public property are located in the town of Morgan. Outside the urban areas of the basin, about 19,800 acres containing farm residences and improvements, cultivated and non-cultivated agricultural lands, irrigation structures, utilities, manufacturing plants, railroads, and highways are located within the rural flood plain of the Weber River system. An additional area of about 21,000 acres of pastureland, most of which contains heavily concentrated salts, is located within the flood plain along the lower reaches of Weber River adjacent to Great Salt Lake, but this area contains no improvements of important value. A summary of the location, extent, and character of development within the Weber River system flood plain is as follows:

Extent of reach	Acres subject to flooding			
	Agricultural			
	Cultivated	Noncultivated	Urban	Total
Weber River				
Oakley to Morgan	800	2,300	100	3,200
Morgan to Ogden River	3,400	5,050	700	9,150
Ogden River to Great Salt Lake	3,900	23,600(a)	100	27,600(a)
Ogden River				
Pineview Dam to mouth	90	10	600	700

Extent of reach	Acres subject to flooding			
	Agricultural			
	Cultivated	Noncultivated	Urban	Total
East Canyon Creek East Canyon Reservoir to mouth	960	240	0	1,200
Lost Creek Lost Creek Reservoir to mouth	<u>100</u>	<u>350</u>	<u>0</u>	<u>450</u>
Total	9,250	31,550(a)	1,500	42,300(a)

(a) Includes 21,000 acres of pastureland near Great Salt Lake.

4. CLIMATE

The climate in the Weber River Basin is generally temperate and semiarid. Temperature extremes range from 105 degrees to minus 40 degrees. Measurable precipitation occurs on about 60 days per year, on the average. Climatic conditions of the basin (see chart 3) are considerably influenced by local topography and elevation. Although some precipitation normally occurs during all months of the year, only about 30 percent of average annual precipitation occurs during the growing season. Average annual precipitation varies greatly in the area and ranges from about 13 inches along the shore of Great Salt Lake to more than 30 inches over the high mountain ranges. Snowfall normally constitutes a large part of the precipitation in the area, and the proportion decreases markedly with decreasing elevation from almost 100 percent in the higher mountains to about 50 percent along the shore of Great Salt Lake. The quantity of snowfall at the higher elevations and the rate at which it melts are primary factors affecting the total annual runoff volumes and the magnitudes of floodflows on Weber River and its tributaries. Although summer storms may be of considerable areal extent, these storms produce significant rainfall only on small areas where there is intense convection activity. These local convection storms range from 1 to 20 square miles in size, but movement of the storm may spread the precipitation over a somewhat larger area. The rate of precipitation approaches cloudburst intensity (between 5 and 7 inches were observed in a period of about one hour near Morgan, 16 August 1958). High rates of rainfall rarely last more than 60 to 90 minutes, and basin runoff is not significantly affected. Chart 4 shows the location of climatological stations and snow courses in and adjacent to the drainage basin which are used to forecast runoff and aid in managing the water resource.

5. RUNOFF CHARACTERISTICS

Weber River and its important tributaries are perennial streams fed primarily by melting of snow on the high mountain ranges. About 75 percent of the annual runoff occurs during the four months of maximum snowmelt, April through July, with maximum runoff during either May or June (see chart 3). In general, streams which originate below 8,000 feet elevation tend to produce their maximum runoff in May, while streams which originate above 8,000 feet tend to produce their maximum runoff in June. High flows resulting from snowmelt runoff, sometimes augmented by concurrent rainfall, are characterized by prolonged high stages. Flows in excess of channel capacities, lasting more than a month, are common during flood years, particularly on the main stream near Ogden. Streamflow measurement data are currently collected at over 30 gaging stations located within the drainage area as shown on chart 5. These data are used extensively as a basis for water distribution and operation of the basin reservoirs. Chart 6 shows rating curves for several of the key gaging stations.

6. FLOOD CHARACTERISTICS

a. Floodflows in the Weber Basin area have resulted primarily from melting of mountain snowpack, cloudbursts, and general rainstorms. Snowmelt floods occur primarily during the period April through June. Cloudburst floods occur generally during the summer and early fall (July through September). General rains can occur at any time of year but are most common during the spring and fall seasons.

b. Historically there have been cloudburst type floods in the area but the areal extent has been limited generally to individual tributaries and the damages and other effects confined to local areas. Other infrequent floods outside of the major snowmelt period have resulted from a combination of a general rainstorm occurring simultaneously with snowmelt. Recent floods of this nature occurred on 23 December 1955 and 10 February 1962. The peak flow of Weber River at Gateway was 3,120 cubic feet per second and 2,570 cubic feet per second, respectively for these events. The mean daily flows were 1,220 and 1,270 cubic feet per second, respectively indicating the short duration of these high flows.

c. Historically the maximum floods of record have occurred during the April through June snowmelt period and have resulted in prolonged periods of high flows varying from a few days up to more than a month. Flows during the flood of 1907 equaled or exceeded channel capacity near Gateway for nearly three months. Total runoff volume during this flood was the maximum of record on both the Weber and Ogden Rivers for the snowmelt season of March through July, amounting to about 826,000 and 301,000 acre-feet, respectively. Other relatively large floods have occurred in the Weber River Basin during the period from 1890 to 1969, the last major flood occurring in 1952. Comparison of maximum mean daily flows in cubic feet per second at selected gaging stations on the Weber and Ogden Rivers for the principal floods of record is shown in the following tabulation.

	Weber River				Ogden River
Year	Near	At Devils		Near	near
	Oakley	Slide	At Gateway	Plain City	Ogden
1893	(a)	(a)	7,280	(a)	(a)
1896	(a)	(a)	7,980	(a)	(a)
1907	4,010	4,620	6,750(c)	8,900(c)	2,860
1909	4,010	5,120	7,480(c)	9,500(c)	2,250
1917	2,760	4,120	5,680	8,700(c)	3,220
1920	2,340	5,500	7,240	9,000(c)	2,300
1921	3,480	3,810	5,400	7,000	(a)
1922	2,540	4,140	6,570	7,270	2,600
1936	1,730	2,180(b)	4,180(b)	6,050(b)	3,430
1950	1,830	3,450(b)	4,730(b)	5,440(b)	1,620(b)
1952	2,040	4,700(b)	7,390	9,970	2,760

(a) No record available.

(b) Affected by incidental regulation of existing reservoirs.

(c) Estimated. Published records not available or inconsistent.

d. A standard project flood for the Weber River Basin was presented in Appendix A to the Corps of Engineers' Survey Report for Flood Control, dated 10 December 1952. Development of this flood was based on the observation that all historical floods of significant areal scope in the Weber River Basin have been produced primarily by snowmelt, occasionally augmented by rain. The standard project flood for Weber Basin represents the flood which would occur from the following coincident-conditions: (a) a wet winter during which an extremely heavy snowpack had accumulated (slightly greater than that of 1907), (b) an unusually warm and early melt season such as 1936, and (c) a general rainstorm which would have a reasonable likelihood of occurring near the time of maximum snowmelt. The resulting flood has a March-July volume of about 1,079,000 acre-feet which is about 10 percent greater than the 1907 maximum of record and about 25 percent greater than the March-July 1952 flood volume for the Weber River below Ogden River.

7. PREPROJECT DEVELOPMENT

a. The distribution of natural streamflow of the Weber River system has been significantly altered by diversions and reservoir regulation. Diversions from Weber River and tributaries were made by many canals and ditches prior to 1900. In addition small storage reservoirs ranging from 50 to 1,250 acre-feet capacity were constructed by private interests at an early date to conserve the high spring runoff for use during the late summer months. East Canyon Reservoir was the largest of the early day reservoirs. It was formed in 1886 by a 58 foot rockfill dam that provided 3,850 acre-feet of storage. The dam was raised in 1900 and again in 1902 and was replaced by a concrete arch dam in 1917. The arch dam formed a reservoir of 25,790 acre-feet.

b. The Weber River Project, constructed by the Bureau of Reclamation in the late 1920's included Echo Dam and Reservoir as the major feature (see charts 7 through 11). Storage in the 74,000 acre-foot reservoir began in 1930. Operation of the reservoir has since been transferred to the Weber River Water Users Association. Weber-Provo Diversion Canal was also constructed as a feature of the project to convey up to 210 c.f.s. from the Weber River near Oakley to the Provo River. The Weber-Provo Canal was enlarged during the 1941 to 1947 period to its present capacity of 1,000 c.f.s. under the Provo River Project, constructed by the Bureau of Reclamation.

c. Ogden River Project including Pineview Dam and Reservoir was constructed in the 1930's by the Bureau of Reclamation. The 44,200 acre-foot Pineview Reservoir initially impounded water in 1936 for subsequent release and use for irrigation, municipal, industrial and other uses.

d. These developments prior to the Weber Basin Project were built primarily for conservation storage purposes with only incidental flood control regulation.

CHAPTER III - PROJECT FEATURES

8. DESCRIPTION OF PROJECT

The Weber Basin Project was constructed by the Bureau of Reclamation to supplement earlier developments in providing full practicable control and utilization of the waters of the Weber River system. Major project features include four new reservoirs and enlargement of two existing reservoirs. This increased storage capacity will control the water resources to provide new and supplemental irrigation water, additional municipal and industrial water supplies, and will permit effective flood control regulation. In addition, the project will provide benefits to stream fishery and waterfowl refuges and will provide recreational opportunities and other benefits to the area. Project features exclusive of the dams and reservoirs include two power plants, two diversion dams, several new conveyance and distribution facilities, and many other appurtenant works. Features of principal significance to flood control include all project reservoirs, except the offstream Willard Reservoir, the Gateway Canal, and the Willard Canal. A description of these features is included in the following subparagraphs:

a. Echo Dam (constructed prior to authorization of the Weber Basin Project)

b. Wanship Dam

(see charts 12 through 18). The outlet works, with a capacity of 1,575 c.f.s. at gross pool level, elevation 6,037, [REDACTED]. The [REDACTED] concrete spillway has a capacity of 10,800 c.f.s. The reservoir formed by Wanship Dam is officially named "Rockport Lake". All references in this manual to Wanship Reservoir or to Rockport Lake refer to the reservoir formed by the Wanship Dam which has a capacity of 62,120 acre-feet, and controls runoff from 320 square miles of Weber River drainage area.

c. Lost Creek Dam creates a reservoir of 22,510 acre-feet which includes 20,010 acre-feet of space for conservation and flood control use (see charts 19 through 24).

[REDACTED] spill- capacity of 2,455 c.f.s. at maximum water surface elevation. The outlet works has a capacity of 775 c.f.s. at the gross pool elevation. The drainage area above Lost Creek Dam is about 120 square miles.

d. East Canyon Reservoir

[REDACTED] The reservoir capacity was enlarged from about 28,000 acre-feet to 51,200 acre-feet including 48,110

acre-feet of joint use storage capacity for conservation and flood control.

The drainage area above East Canyon Dam is 155 square miles.

e. Pineview Dam

The spillway, rebuilt to conform to the enlarged dam, has a capacity of 10,000 c.f.s. The outlet works have a capacity of 2,300 c.f.s. and were modified to permit greater flexibility of operation. Pineview Dam controls runoff from 310 square miles of Ogden River drainage area.

f. Causey Dam

The reservoir capacity totals 7,870 acre-feet and includes 6,870 acre-feet of storage space available for conservation and flood control. An spillway it, has a capacity of 7,570 c.f.s.

A drainage area of about 81 square miles is located above the dam.

g. Willard Reservoir is an offstream reservoir located on an embayment of Great Salt Lake, with a capacity of 215,000 acre-feet, and with a spillway discharging into Great Salt Lake.

Water for storage in this reservoir is diverted from Weber River at a point just below the Ogden River. It is diverted through the Willard Canal, which has a slope of about 0.5 feet to the mile, and a capacity of about 1,100 c.f.s. in the reach above the diversion to the enlarged Warren Canal and the new Plain City Canal, and 800 c.f.s. beyond these canals. The canal is used to withdraw stored water from the reservoir by pumping to reverse the flow when required for irrigation or other uses. Although Willard Reservoir has no allocated flood control storage space, the Willard Canal will provide an additional 800 c.f.s. channel capacity available for conveyance of floodflows below Ogden River through the Willard Reservoir spillway to Great Salt Lake, and may be operated in such manner for flood control.

h. Stoddard Diversion Dam located on Weber River near the town of Stoddard

The structure forms the head works of the 700 c.f.s. Gateway Canal. Flows diverted to the canal are conveyed about 8 miles where part of the flow is diverted to the Gateway powerplant penstock. Up to 435 c.f.s. of water continues through the 3 mile long Gateway Tunnel to the head works of the Weber and Davis Aqueducts. Weber Aqueduct, constructed to a capacity of 80 c.f.s., conveys flows 5 miles northward toward Ogden. Davis Aqueduct, constructed to a capacity of 355 c.f.s., delivers water southward to Davis County users. It has a length of about 23 miles.

i. Slaterville Diversion Works is located on Weber River downstream from the confluence with the Ogden River.

The diversion dam forms the head works of the 260 c.f.s. Layton Canal to the south and the 1,050 c.f.s. Willard Canal to the north.

9. HYDROLOGIC BASIS FOR DESIGN

Weber Basin Project reservoirs and related facilities were sized by the Bureau of Reclamation primarily for conservation and better utilization of the available water resource. Joint studies by the Bureau of Reclamation and the Corps of Engineers were made to determine the justifiable optimum flood control benefits associated with the project. From these studies criteria were developed for operating the reservoirs to obtain a high degree of flood control without causing conflict with the other project uses. Flood control diagrams were developed and hypothetical operation studies were made to verify the use of these diagrams and the associated forecast methods. The flood control diagrams developed are included as charts A-1 through A-5. The maximum flood control reservation for each reservoir is shown below, and corresponds to the total conservation pool in each case.

<u>Reservoir</u>	<u>Maximum flood control reservation (acre-feet)</u>
Rockport Lake (Wanship Dam)	60,860
Echo	73,942
Lost Creek	20,010
East Canyon	48,110
Causey	6,870
Pineview	<u>110,149</u>
Total	319,941

10. RECREATION FACILITIES

a. Recreation facilities constructed at Causey Reservoir include: trails, picnic area, toilets, parking area, and access road. It is planned that additional trails will be built, the access road will be surfaced with asphalt, and culinary water will be provided. The reservoir area is administered by the Forest Service. It has sustained 7,000 recreation days during the 1969 season.

b. Recreation facilities for East Canyon Reservoir will be provided at two sites. Facilities provided at the north site include: boat launching ramp, camping area, comfort stations, access road, parking areas, culinary and irrigation water, and concession development. It is planned to improve the camping facilities, the interior roads, and to landscape the area. Facilities at the south site have not been constructed, but it is planned that camping and picnicking areas will be developed along with toilets and culinary water. This area is administered by the Utah Division of Parks and Recreation. It sustained 158,500 recreation days during the 1969 season.

c. Recreation facilities at Lost Creek Reservoir include: boat launching ramp, temporary toilets, parking area and access road. It is expected that permanent toilets, a water system, docks, picnic and campground areas will be added in the near future. The area is being administered by the Utah Division of Parks and Recreation. Use figures were not kept during the 1969 season but will be during 1970.

d. Recreation facilities at Pineview Reservoir have been constructed at three sites. Facilities at each of these areas include: boat launching ramp, marina area, access road, parking area, landscaping, picnic area, campground, comfort stations, and water system. This area is administered by the Forest Service. It sustained 215,900 recreation days during the 1969 season.

e. Recreation facilities at Rockport Lake (Wanship Reservoir) include: access roads, parking areas, picnic area, campground, comfort stations, boat launching ramp, landscaping, culinary and irrigation water systems. In addition, there is a concession development providing groceries, lunch counter, boat rental and repairs, and rental cabins. This area is administered by the Utah Division of Parks and Recreation. It sustained 173,100 recreation days during the 1969 season.

f. Recreation facilities at Willard Reservoir have been constructed at two areas. Facilities at each of these include: boat launching ramp, docks, access and circulatory roads, comfort stations, picnic area, water systems and concessions. It is expected that additional docks, picnic areas, campgrounds, and administrative headquarters will be constructed. The area is administered by the Utah Division of Parks and Recreation. It sustained 186,828 recreation days during the 1969 season.

11. CONSTRUCTION HISTORY

Construction of the Weber Basin Project reservoirs was initiated in 1952 and completed in 1969. The completion date and the initial date of use for each of the facilities relating to flood control operation are tabulated below.

Feature	Date completed	Initial storage
Pineview Dam enlargement	Sep 1957	Nov 1936(a)
Wanship Dam	Mar 1957	fall of 1956
Willard Dam	Nov 1964	Nov 1964
Lost Creek Dam	Dec 1966	Apr 1967
East Canyon Dam	Jul 1966	1896(a)
Causey Dam	Jul 1966	Jan 1966
Willard Canal	1963	-
Gateway Canal	1956	-

(a) Reflects preproject use of the original facilities.

CHAPTER IV - GENERAL PROJECT OPERATION

12. RESPONSIBILITY FOR OPERATION

Wanship, Causey and Lost Creek Reservoirs are operated by the Weber Basin Water Conservancy District. Operation of these reservoirs by the water district for conservation and flood control are included in the repayment contract between the United States Bureau of Reclamation and the Weber Basin Water Conservancy District. Pineview Reservoir is operated and maintained by the Ogden River Water Users Association for conservation and flood control use under a contractual agreement among the U. S. Bureau of Reclamation, the Weber Basin Water Conservancy District and the Ogden River Water Users Association. East Canyon Reservoir is operated for conservation storage and flood control by the Davis and Weber Counties Canal Company under an agreement among the canal company, Weber Basin Water Conservancy District and the U. S. Bureau of Reclamation. Echo Reservoir is also operated by local irrigation interests. Flood control operation has been carried out under informal agreement to date but is provided in a pending agreement among the U. S. Bureau of Reclamation, the Weber Basin Water Conservancy District and the Weber River Water Users Association. Under these contracts the Bureau of Reclamation will give direction to the operating entities in carrying out rules and regulations prescribed by the Secretary of the Army pursuant to Section 7 of the 1944 Flood Control Act. Details concerning the responsibility for flood control operation are discussed in paragraph 23.

13. UPSTREAM REGULATION

a. There are a number of existing lakes and reservoirs in the drainage basin with capacities ranging from 50 to 1,250 acre-feet. These reservoirs are filled during the winter and spring months and have only negligible influence on moderate flood flows.

b. The Weber-Provo Diversion Canal diverting near Oakley diverts up to 1,000 c.f.s. of Weber River water to the Provo River for storage in Deer Creek Reservoir and Utah Lake in accordance with water rights. Flows diverted to Provo River during the high runoff period are often restricted or discontinued due to limited storage capacity in Deer Creek Reservoir and Utah Lake, and because of the similarity in flood characteristics of the two streams and the increased flood damage on Provo River caused by the importation.

14. DOWNSTREAM CHANNEL CAPACITIES

The tabulation below shows the channel capacities for critical points or reaches below the various project reservoirs.

Dam and reservoir	Control point or reach	Channel capacity (c.f.s.)
Wanship (Rockport Lake)	Weber River at Coalville	1,700
Echo	Weber River below Echo Dam	2,000
	Weber River at Lost Creek	2,200
Lost Creek	Lost Creek below Lost Creek Dam	250
	Lost Creek at mouth	350
	Weber River - Lost Creek to Morgan	3,000
East Canyon	East Canyon Creek below East Canyon Dam	250
	East Canyon Creek at mouth	450
	Weber River - Morgan to Ogden River	2,800(a)
Causey	South Fork Ogden River below Causey Dam	800
	South Fork Ogden River near Huntsville	1,000
Pineview	Ogden River below Pineview Dam to Weber River	1,600
	Weber River - Ogden River to Willard Canal	5,000
	Weber River - Willard Canal to Great Salt Lake	4,400

(a) Would be increased to 4,000 c.f.s. under the Corps' proposed Weber River Channel Improvement Project.

15. FLOOD DAMAGES

a. Flood losses in the Weber Basin consist of damages to agricultural lands and improvements, residential and industrial property, transportation facilities, irrigation works, and other utilities, caused by prolonged inundation aggravated by high streamflow velocities. The losses involve mainly reduction in crop yields; damage to crop and pastureland by erosion and silt deposition; destruction of railroad, highway, irrigation and utility structures; and damage to urban property by inundation. Curves relating average damages to river stages at key locations are shown on chart 46. Based on 1970 prices and economic development, the estimated primary damage from a recurrence of various large observed floods in Weber River Basin is as follows:



b. Under the operation of the Weber Basin Project, all but the largest snowmelt floods will be controlled to nondamaging flows along the main streams below the project reservoirs. Others will be greatly reduced as shown on chart 51. Partial control of the 1909 snowmelt flood by project operation would have materially reduced flood damages, eliminating all urban damage and confining the remaining damage to agricultural areas. Rain-floods resulting from summer storms, as previously indicated, have been rare and have affected only relatively small local areas without significantly influencing basin runoff. Flood damages from these isolated occurrences will not be significantly affected under project operation.

16. CONSERVATION OPERATION

Waters of the Weber River and tributaries are distributed in accordance with water rights defined in the Ogden River Decree dated 1 April 1968, the Weber River Decree dated 2 June 1937, appropriate contracts and agreements which alter these decrees, and other subsequent rights which have been recognized. Storage rights for Weber Basin Project were filed primarily in October 1955 and are junior to the early direct flow rights and thus take effect only after such prior rights are satisfied. The majority of water stored under project water rights is stored during the snowmelt period April through June. Some water is also stored during the winter months. Water is withdrawn from storage throughout the year for irrigation, municipal, industrial, and fish and wildlife purposes depending upon demands. Municipal and industrial water is released throughout the year from Pineview Reservoir and also from the Weber River Reservoirs except during high runoff periods when local sources below the reservoirs are sufficient to supply requirements. Water is released for stream fishery purposes when other releases are inadequate to maintain the stream fishery. Irrigation water is required starting in May and continuing through October. Irrigation releases vary widely depending on runoff patterns during the year and in the case of abnormal and subnormal years. The operation of the reservoirs for conservation purposes greatly reduces the uncontrolled runoff during high flow periods and is compatible with flood control regulations. Evacuation of conservation storage capacity based on runoff forecasts and the flood control diagrams will have only a minor effect on the conservation storage in that the reservoirs are essentially assured of filling in controlling the potential high flows.

17. OUTLET GATE OPERATIONS

Releases during high runoff periods will be obtained by manipulating the reservoir outlet gates until the appropriate downstream discharges at critical control points are reached. Discharge curves for the various outlet works are included with the drawings and details of the dams and may be used as a guide in estimating gate openings for obtaining desired releases.

18. RELATION TO OTHER PROJECTS

No other existing or proposed reservoir projects will significantly affect the flood control operation of the Project reservoirs in Weber Basin. An authorized channel improvement project for Weber River from the town of Morgan downstream to the Ogden River confluence proposes to increase channel capacities in rural areas to 4,000 c.f.s. and in the communities of Morgan and Ogden to 5,500 and 7,300 c.f.s., respectively. This project proposed by the Corps of Engineers, when complete, will permit increased releases from the Weber Basin reservoirs. The improvement will also protect highly developed areas from occasional floods originating below the project reservoirs and from reservoir spills in occasional years. Frequency studies indicate this protection would limit damaging floods to annual occurrence interval of about once in 50 years in rural areas and once in 100 years in urban areas.

CHAPTER V - FLOOD CONTROL OPERATION

19. FLOOD CONTROL OPERATION REQUIREMENTS

Echo, Wanship (Rockport Lake), Lost Creek, East Canyon, Causey, and Pineview Dams and Reservoirs, will be operated for flood control in accordance with flood control regulations prescribed by the Secretary of the Army. A draft of proposed flood control regulations constitutes Appendix A to this report. The regulations provide that when water is stored within the flood control reservation of any of the above named reservoirs, releases will be made as rapidly as possible without exceeding nondamaging capacities of downstream channels as shown in paragraph 14 of this report and as noted on the respective flood control diagrams. An aggregate total of 319,914 acre-feet of space is dedicated to flood control in the Weber Basin, and whenever any part of this space is not required for flood control, it may be used for other purposes. Variable flood control space requirements are defined on the respective flood control diagram for each reservoir, during months of maximum snowmelt flood hazard, by parameters of forecasted snowmelt runoff. At Echo-Wanship Reservoir combination and at Pineview Reservoir, fixed minimum rainflood reservations have been provided extending from October through May with the maximum requirement during the winter months (November through March). Small flood control reservations have also been provided at these reservoirs for control of cloudburst floods in July, August, September, and October.

20. LIMITATIONS ON STORAGE

Operational limitations on storage for each reservoir are specified on the flood control diagrams included in the appendix as charts A-1 through A-5. The tabulation below also shows in summary the minimum flood control reservation and the period each is in effect.

Reservoir	Flood control reservation	
	Period covered	Amount (acre-feet)
Echo Reservoir - Rockport Lake	3 Feb-20 Jul	135,000(a)
	20 Jul-31 Oct	5,000
	1 Nov-31 Mar	25,000
Lost Creek	1 Jan-15 Jun	20,000(a)
East Canyon	1 Jan-15 Jun	48,000(a)
Causey	1 Jan-30 Jun	6,900(a)
Pineview	1 Jan-30 Jun	110,000(a)
	15 Jul-31 Oct	5,000
	1 Nov-31 Mar	20,000

(a) Maximum, varies with forecasted runoff and time of year.

21. LIMITATIONS ON RELEASES

a. Releases shall be restricted, insofar as possible, to limit flows in the various reaches of the Weber River and its tributaries so as not to exceed the channel capacities tabulated in paragraph 14 and given on the respective flood control diagrams included in Appendix A to this report.

b. Emergency spillway release diagrams for Echo and Pineview Reservoirs as contained in Appendix A charts A-6 and A-7 of this report are for purposes of safeguarding the dams while preventing releases in excess of inflow. They are to be used when the reservoirs are filling rapidly, and are approaching or have exceeded gross pool level. The diagrams were derived in accordance with procedures in EM 1110-2-3600 and are designed to defer emergency releases as long as possible. The emergency spillway release diagrams should be used without hesitation when conditions of inflow and reservoir storage indicate that emergency releases are to be made. Thus, the operator at each dam should be thoroughly familiar with the applicable emergency spillway release diagram and he should be empowered with standing instructions to operate in accordance with the diagram in the event that conditions require its use when communications with the project operation office are disrupted.

22. FLOOD CONTROL REGULATIONS

A draft of the flood control regulations for the Weber Basin reservoirs prepared for publication in the Federal Register is contained in Appendix A to this report.

CHAPTER VI - OPERATION CONTROLS

23. OPERATIONAL RESPONSIBILITIES

Responsibilities of the Bureau of Reclamation and the Corps of Engineers for the operation of the Weber Basin reservoirs for flood control are summarized below and in subsequent paragraphs. A list of personnel involved in operation of the reservoirs for flood control is included at the front of this report.

a. The Regional Director, Region 4, Bureau of Reclamation, is responsible for:

(1) Accomplishing the physical operation of the reservoir and associated facilities for any and all purposes including flood control, in accordance with the official regulations.

(2) Advising the District Engineer, Sacramento District, Corps of Engineers, of any need for emergency change in operation.

(3) Annually inspecting channel conditions to determine if any deterioration in channel capacities has occurred which could inhibit release of water corresponding to those flows tabulated in paragraph 14 and as noted on the flood control diagrams.

(4) Reporting to the District Engineer, Sacramento District, Corps of Engineers, any unusual condition in the reservoirs or along downstream channels which might temporarily interfere with the planned flood control operation of any of the reservoirs.

(5) Keeping downstream interests advised of impending changes in flood control releases which may affect them.

(6) Reporting by telephone to the Reservoir Regulation Section of the Sacramento District, Corps of Engineers, the data outlined in paragraph 27a and other data that may be requested from time to time.

(7) Immediately after the end of each month, transmitting to the Reservoir Regulation Section of the Sacramento District, Corps of Engineers, the data specified in paragraph 27b.

b. The District Engineer of the Sacramento District of the Corps of Engineers is responsible for:

(1) Approving or disapproving emergency changes in operation recommended by the operating agency, or issuing instructions for such changes on his own initiative.

(2) Advising the operating agency and the Chief of Engineers of any departure from the flood control regulations.

(3) Preparing monthly operation and other special reports required by the Office, Chief of Engineers, relative to operation of the reservoirs.

24. STANDING INSTRUCTIONS

Whenever communications between any reservoir and the operating agency are broken during a flood period, the reservoir operator shall continue to operate in accordance with the latest instructions until communications are restored or until emergency spillway operations (where applicable in accordance with paragraph 21b of this report) become necessary.

25. MODIFICATION OF REGULATIONS

a. The District Engineer, Sacramento District, Corps of Engineers, may temporarily modify the flood control regulations for the Weber Basin Reservoirs (Appendix A), if necessary in time of emergency. Requests for and action on such modification may be made by any available means of communication to the Regional Director, Region 4, U. S. Bureau of Reclamation, and the action taken by the District Engineer shall be confirmed in writing under date of same day to the office of the Regional Director of the Bureau of Reclamation.

b. The Regional Director of the Bureau of Reclamation may temporarily suspend application of the flood control regulations for Weber Basin Reservoirs in the event this is deemed necessary for emergency reasons to protect the safety of the dams or to avoid other severe hazards. Revision of the flood control diagrams, for Weber Basin Reservoirs, may be made when necessary with the mutual consent of the Corps of Engineers and the Bureau of Reclamation.

26. HYDROLOGIC FACILITIES

There are about thirty recording stream gages located in the basin as shown on chart 5, of which one station is located below each project reservoir. Rating curves for gages located below the reservoirs and the gages on Weber River at Oakley, Gateway, and Plain City are included as chart 6. Gage heights for above stations can be obtained by telephone from the U. S. Geological Survey in Salt Lake City. Reservoir level gages of various types are installed at project reservoirs as shown in the tabulation below.

Reservoir	:	Gage type	:	Observed
Rockport Lake		mercury		daily
Echo		staff		daily
Lost Creek		tape		twice a week
East Canyon		reference marks		weekly
Causey		mercury		daily
Pineview		staff		daily
Willard		staff		daily

There are approximately 35 snow courses in and adjacent to the Weber River drainage basin from which snow depth, water content, precipitation and soil moisture data are collected as shown on chart 4. These data are collected and published by the U. S. Soil Conservation Service in cooperation with other Federal, State and private interests. Monthly publications for the January through June period entitled, "Water Supply Outlook for Utah" are distributed and include current information on the watershed conditions, comparisons with prior year's data and give the estimated streamflow forecasts for critical periods. The U. S. Weather Bureau in cooperation with other Federal, State and private interests publish "Water Supply Outlook for Northern Utah." This publication released each month for the January through May period includes precipitation patterns, amounts and comparisons, and includes a forecast of streamflow at key locations in the area for the period between the release date and 1 September. Climatological data stations locations and the type of data collected are shown on chart 4.

27. OPERATION REPORTS

a. The operating agency shall report the following data by telephone to the Reservoir Regulation Section of the Sacramento District, Corps of Engineers, each work day between 8:00 and 9:00 a.m. during flood periods, and at other times upon request.

(1) The amount of flood control space required in Wanship, Echo, Lost Creek, East Canyon, Causey, and Pineview Reservoirs.

(2) Elevation, storage, inflow, outflow and anticipated outflow changes in the above reservoirs.

(3) Precipitation at the dams and at other pertinent stations in or adjacent to the drainage basin.

(4) Flow in the Weber River system at Plain City, Weber River at the Willard Canal Diversion, Gateway and upstream index points upon request.

b. Immediately after the end of each month, the operating agency shall dispatch to the Reservoir Regulation Section of the Sacramento District, Corps of Engineers, a summary of the following operation data:

(1) Daily inflow, outflow, elevation, and storage at Wanship, Echo, Lost Creek, East Canyon, Causey, and Pineview Reservoirs.

(2) Daily requirement of flood control space in the above reservoirs.

28. COORDINATION WITH OTHER AGENCIES

In order to assure that the flood control operation of the Weber Basin reservoirs will be as effective and reasonable as possible, it is essential that the operating agency keep advised at all times of possible flood hazards, weather conditions, inflow to the reservoirs, and flow at downstream control points on the main stem of the Weber River and tributaries. This requires close liaison with other agencies, including the Soil Conservation Service, National Weather Service and the Corps of Engineers.

29. OPERATION FORECASTS

Forecasts of inflow into the reservoirs of the Weber Basin are prepared by the Regional Office of the Bureau of Reclamation, Salt Lake City, Utah. These forecasts are prepared as of the first of each month, January through June, inclusive, and are based on multiple correlation of streamflow, water content of the snowpack, and precipitation measurements obtained from climatological stations in and adjacent to the Weber Basin. While these point forecasts are made independent of the published forecasts referred to in paragraph 26, they are compared where possible and the differences are analyzed. A month-by-month summary of the correlation equations, the standard error ($\bar{S}$), the coefficients of multiple correlation ($\bar{R}$), and other pertinent data are shown for each reservoir, with exception of Causey Reservoir, in chart 47. Parameters for Causey Reservoir are currently based on the predicted inflow into Pineview Reservoir. Historical forecast data for the 1962-68 period based on Bureau of Reclamation forecast equation are included on chart 48. Charts 49 and 50 show historical forecast data at key points based on the Soil Conservation Service published forecasts and those of the Weather Bureau. It is the U. S. Bureau of Reclamation's practice to periodically review, and update their equations and to incorporate data from recently established climatological stations as appropriate.

CHAPTER VII - PROJECT ACCOMPLISHMENTS

30. EXAMPLES OF OPERATION

a. A hypothetical operation of the Weber Basin reservoirs during the period 1927 to 1947, as prepared by the Bureau of Reclamation, is illustrated on chart 51. This operation was based on ultimate project conditions. Hypothetical operation during a recurrence of the 1950 and 1952 floods, and during the standard project flood is detailed on sheets 1 through 3, chart 52.

b. Wanship Dam spillway design flood routing is shown on sheet 4, chart 52. This flood was routed beginning at normal full pool elevation 6,037.0 feet. A maximum storage of 73,500 acre-feet with a maximum pool elevation of 6,049.0 feet and a peak outflow of 11,800 c.f.s. were obtained. Lost Creek Dam flood routing curves for the inflow design flood are shown on sheet 5, chart 52. This flood was routed beginning at elevation 6,005.0 feet (spillway crest). The flood was then released through both the spillway and outlet works, with outflow not to exceed inflow. A maximum storage of 26,760 acre-feet with a maximum pool elevation of 6,015.9 feet and a peak outflow of 3,260 c.f.s. were obtained. Causey Dam flood routing of the inflow design flood is shown on sheet 6, chart 52. A maximum storage of 8,730 acre-feet (with a surcharge of 860 acre-feet), a maximum pool elevation of 5,698.1 feet, and a peak discharge of 8,330 c.f.s. were obtained. The last three mentioned flood routings were furnished by the U. S. Bureau of Reclamation.

c. The Echo Reservoir inflow design flood routing is shown on sheet 7, chart 52. The hydrograph was furnished by the U. S. Bureau of Reclamation. This flood was routed beginning at normal full pool elevation 5,560.0 feet with releases made according to the Emergency Spillway Release Diagram shown on chart A-6. A maximum storage of 76,600 acre-feet (with a maximum pool elevation of 5,561.8 feet) and a peak outflow of 16,300 c.f.s. were obtained.

d. Pineview Reservoir inflow design flood routing is shown on sheet 7, chart 52. The flood hydrograph (snowmelt flood, followed by a rainflood 10 days later) was furnished by the U. S. Bureau of Reclamation. It was assumed that the snowmelt flood began on 1 May, with 60,000 acre-feet of storage in the reservoir. Flood routing was in accordance with criteria given on the flood control diagram shown on chart A-5. When the rainflood began on 11 May, reservoir releases were based on criteria given on Emergency Spillway Release Diagram shown on chart A-7. A maximum storage of 114,600 acre-feet (with a maximum pool elevation of 4,902.0 feet) and a peak outflow of 9,200 c.f.s. were obtained.

e. East Canyon Reservoir inflow design flood routing is shown on sheet 7, chart 52. The flood hydrograph of the design rainstorm occurring near the end of the snowmelt season was furnished by the U. S. Bureau of Reclamation. The flood was routed beginning at normal full pool elevation 5,705.0

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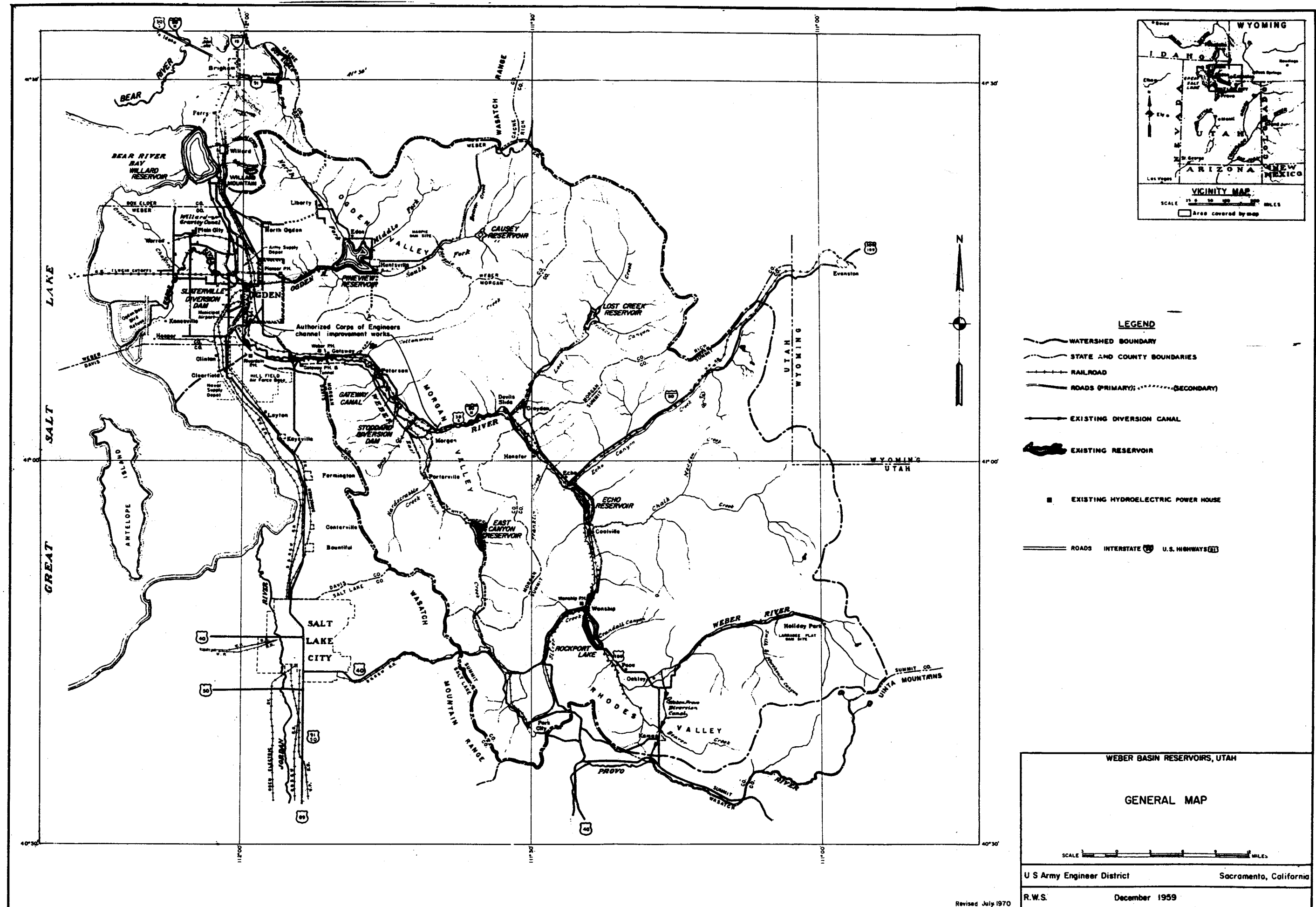
feet (51,200 acre-feet). Outlet gates were closed, using ungated spillway outflow only. Flood routing is in accordance with the flood control diagram shown on chart A-3. A maximum storage of 58,100 acre-feet (with a maximum pool elevation of 5,714.7 feet) and a maximum outflow of 5,930 c.f.s. were obtained.31.

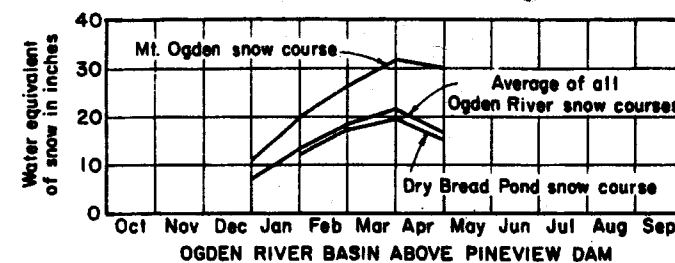
31. OPERATION RECORD

a. The official record of reservoir storage and outflow values is that published in the Water Supply Papers of the U. S. Geological Survey.

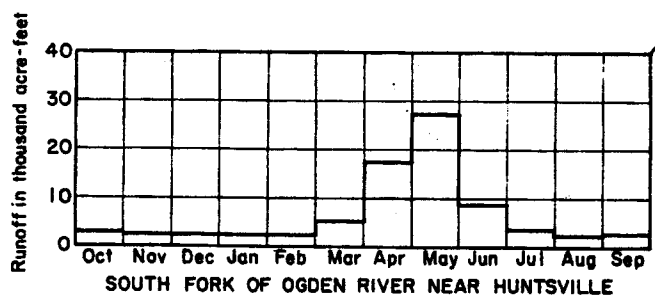
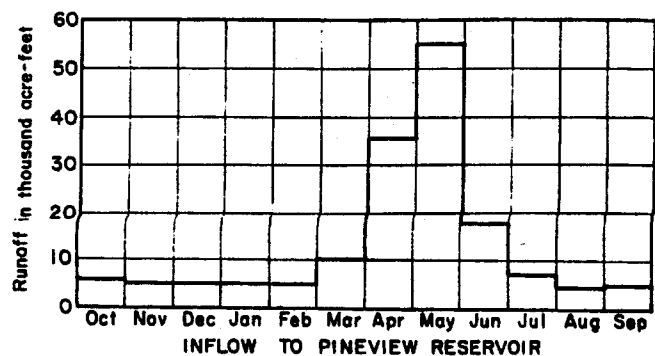
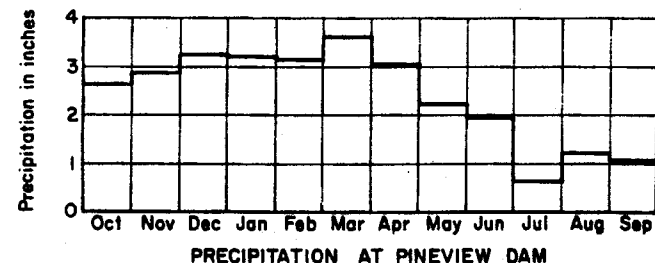
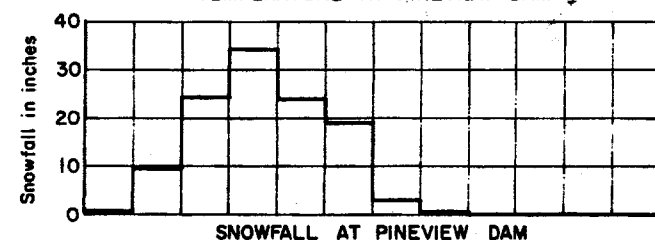
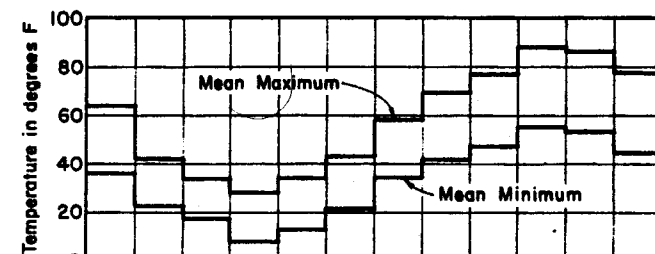
b. The historical operation of the Weber River Basin reservoirs as shown by storage levels in comparison with flows measured at Oakley and Huntsville (above significant diversions or regulation) and at Plain City (below all significant diversions and tributary inflow) is illustrated on chart 53.

c. Beginning in March 1959, a record of flood control space requirements and of storage and flow pertinent to the flood control operation of Weber Basin Project reservoirs is contained in the monthly operation reports submitted to the Chief of Engineers by the District Engineer, Corps of Engineers, Sacramento, California. Copies of these monthly report forms are shown on chart 54.

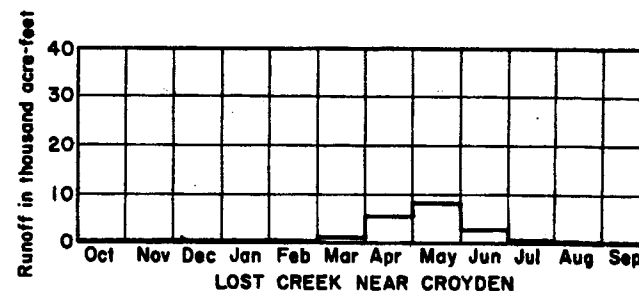




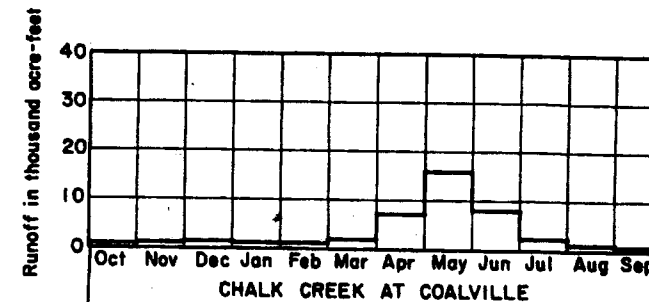
NORMAL SNOW ACCUMULATION



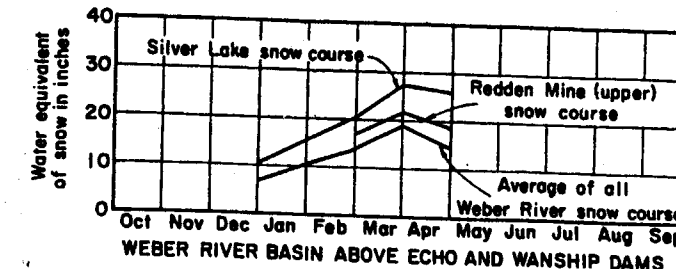
SEASONAL DISTRIBUTION OF RUNOFF



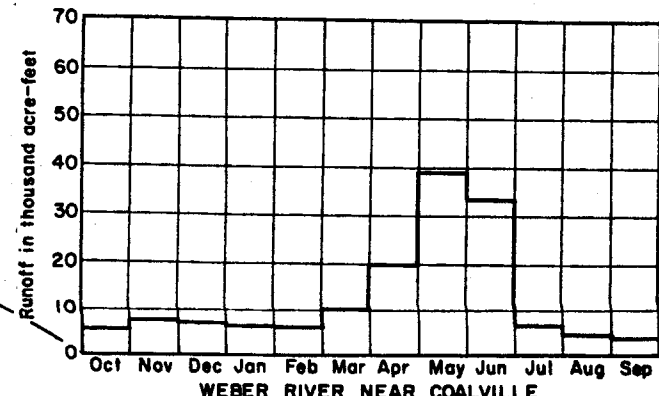
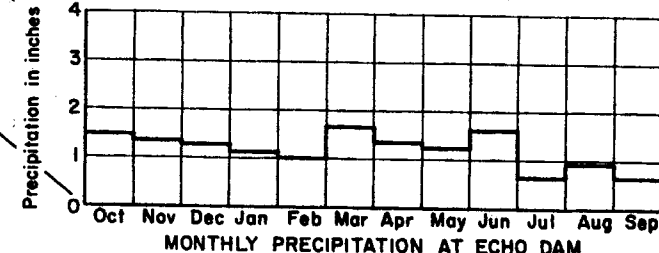
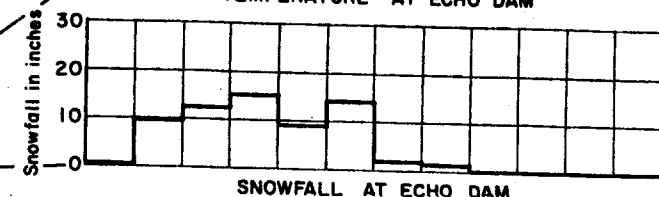
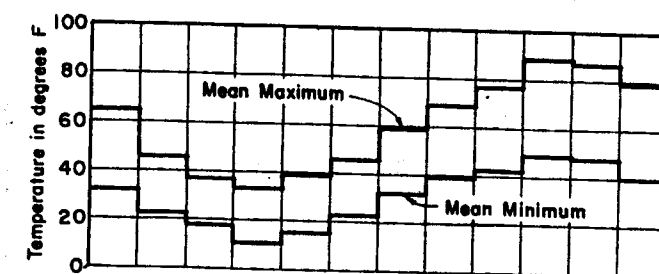
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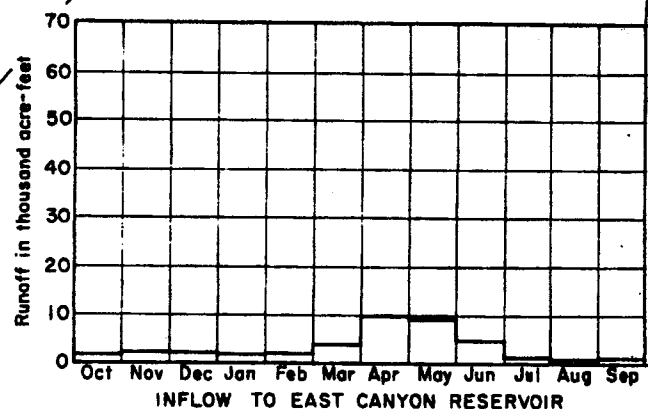
SEASONAL DISTRIBUTION OF RUNOFF



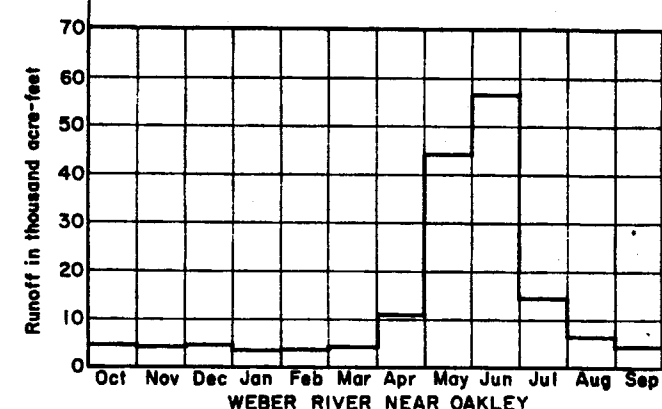
NORMAL SNOW ACCUMULATION



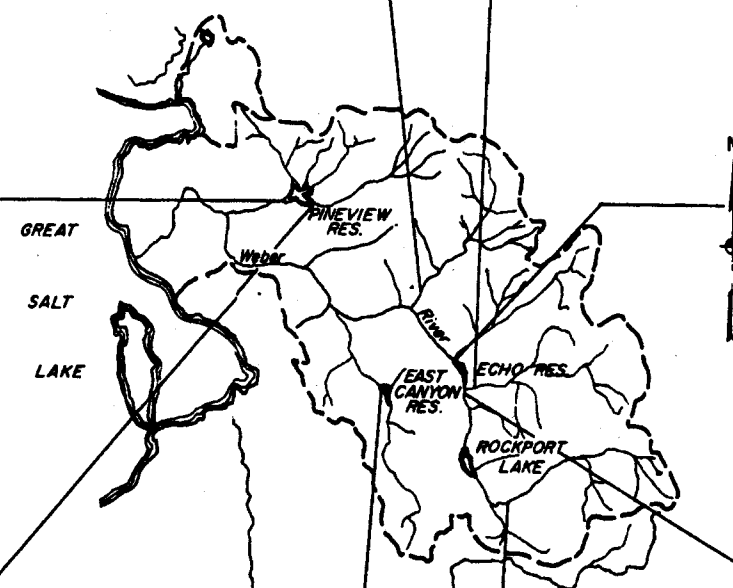
SEASONAL DISTRIBUTION OF RUNOFF



SEASONAL DISTRIBUTION OF RUNOFF



SEASONAL DISTRIBUTION OF RUNOFF



WEBER BASIN RESERVOIRS, UTAH

HYDROCLIMATIC CHARACTERISTICS

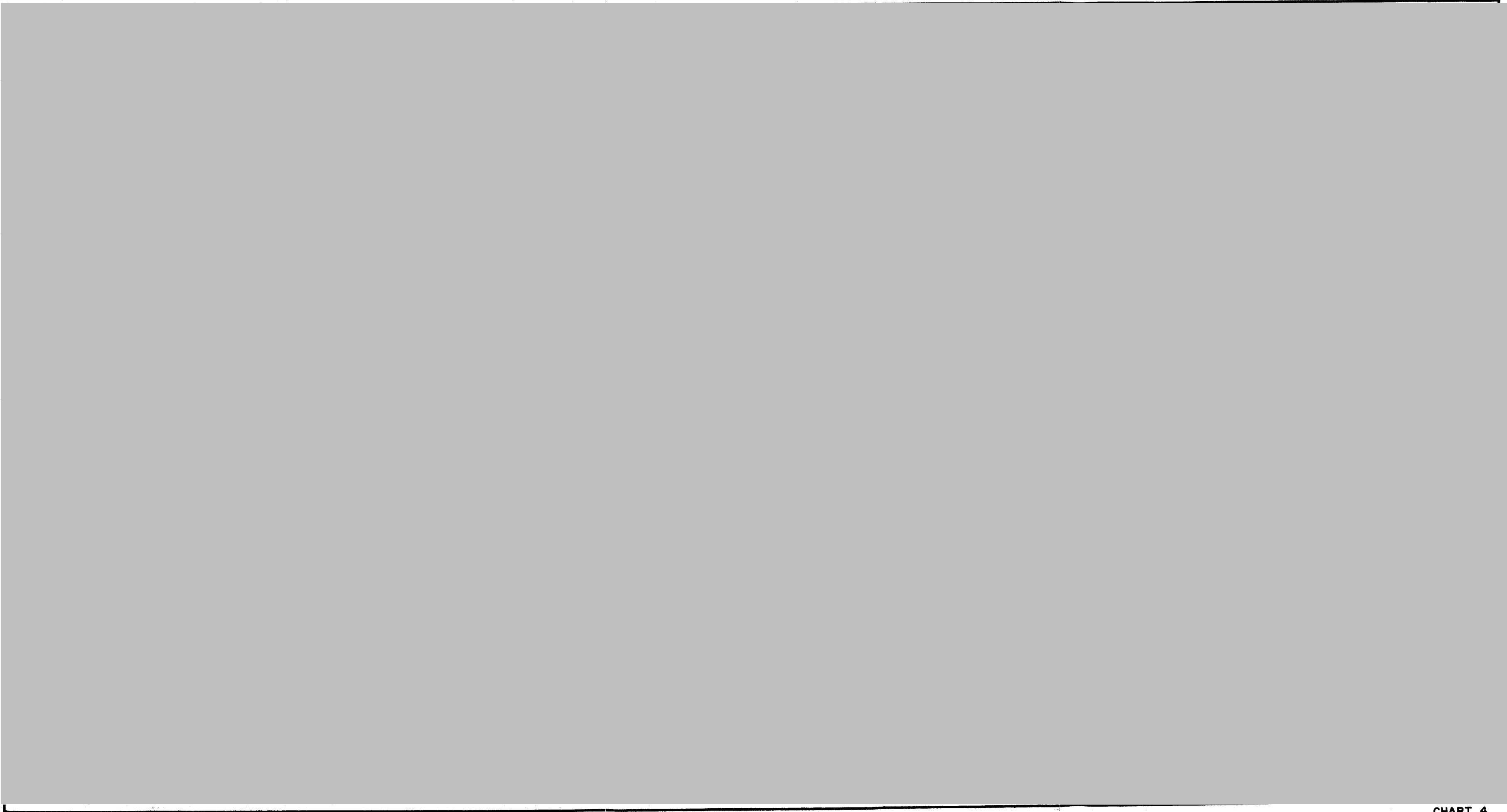
U S Army Engineer District

Sacramento, California

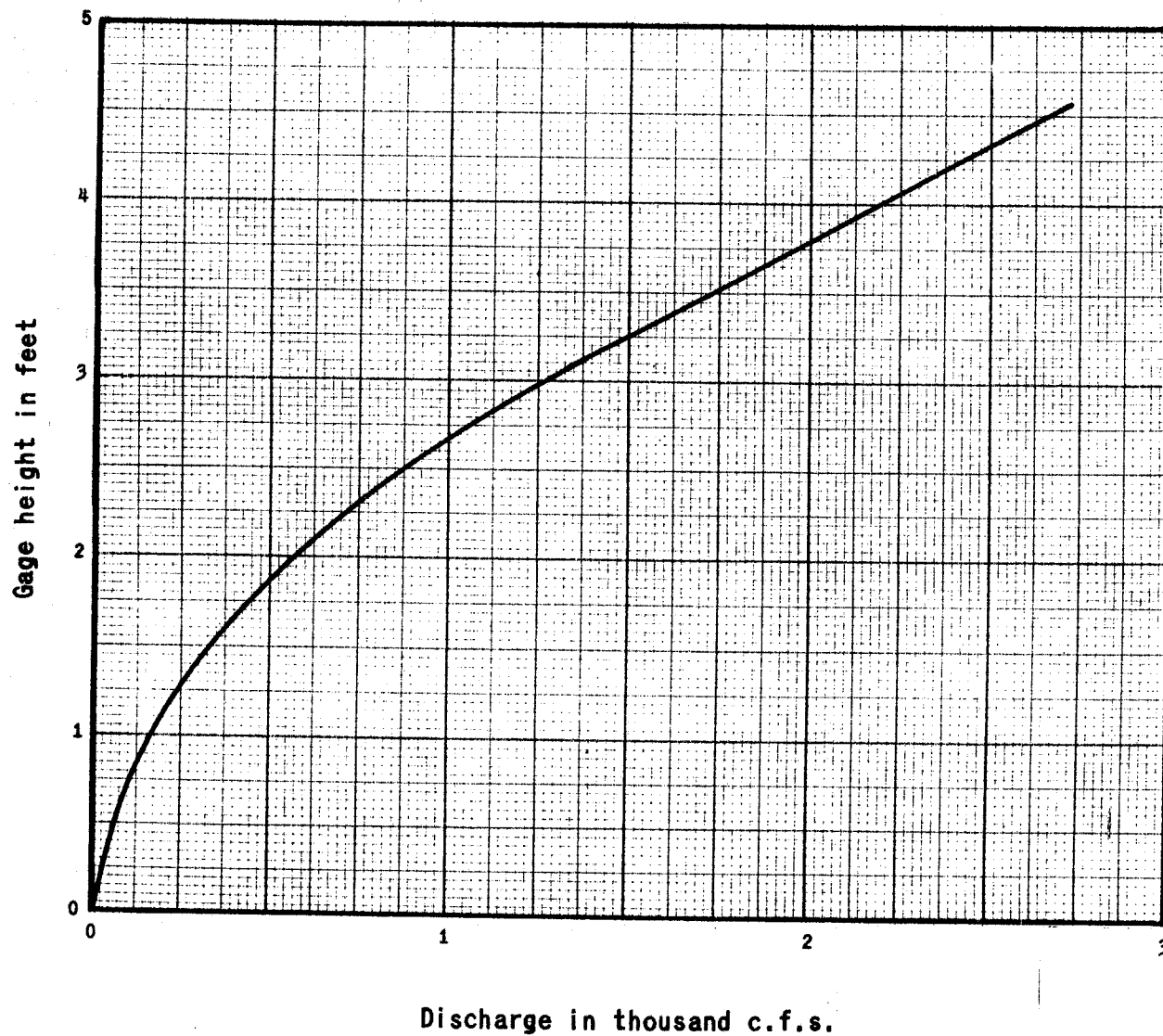
R.W.S.

December 1959

Revised July 1970





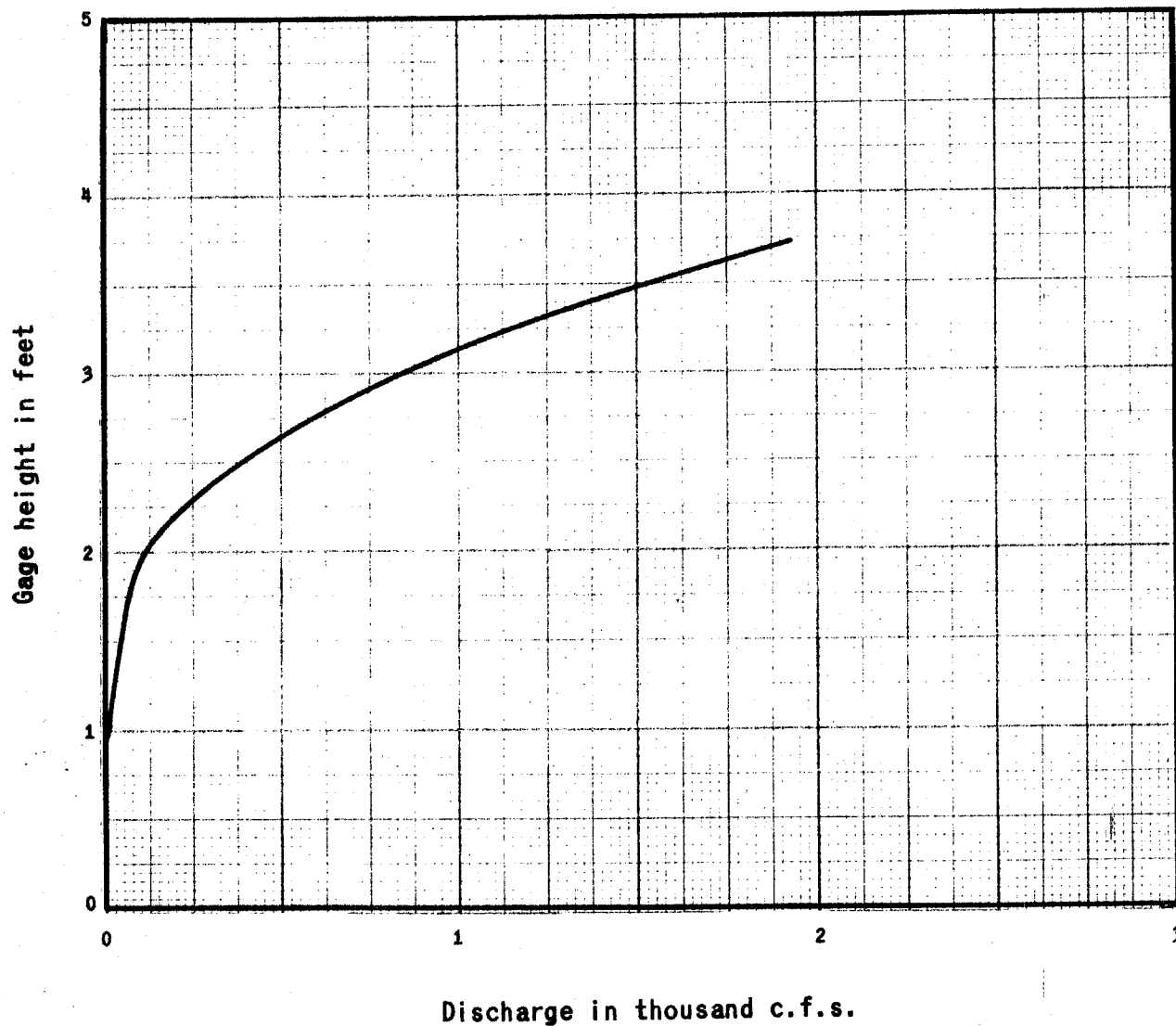


WEBER RIVER RESERVOIRS
UTAH

STAGE-DISCHARGE CURVE
WEBER RIVER NEAR OAKLEY

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M. Date: July, 1970
Drawn: B.E.W. & S.K.N.

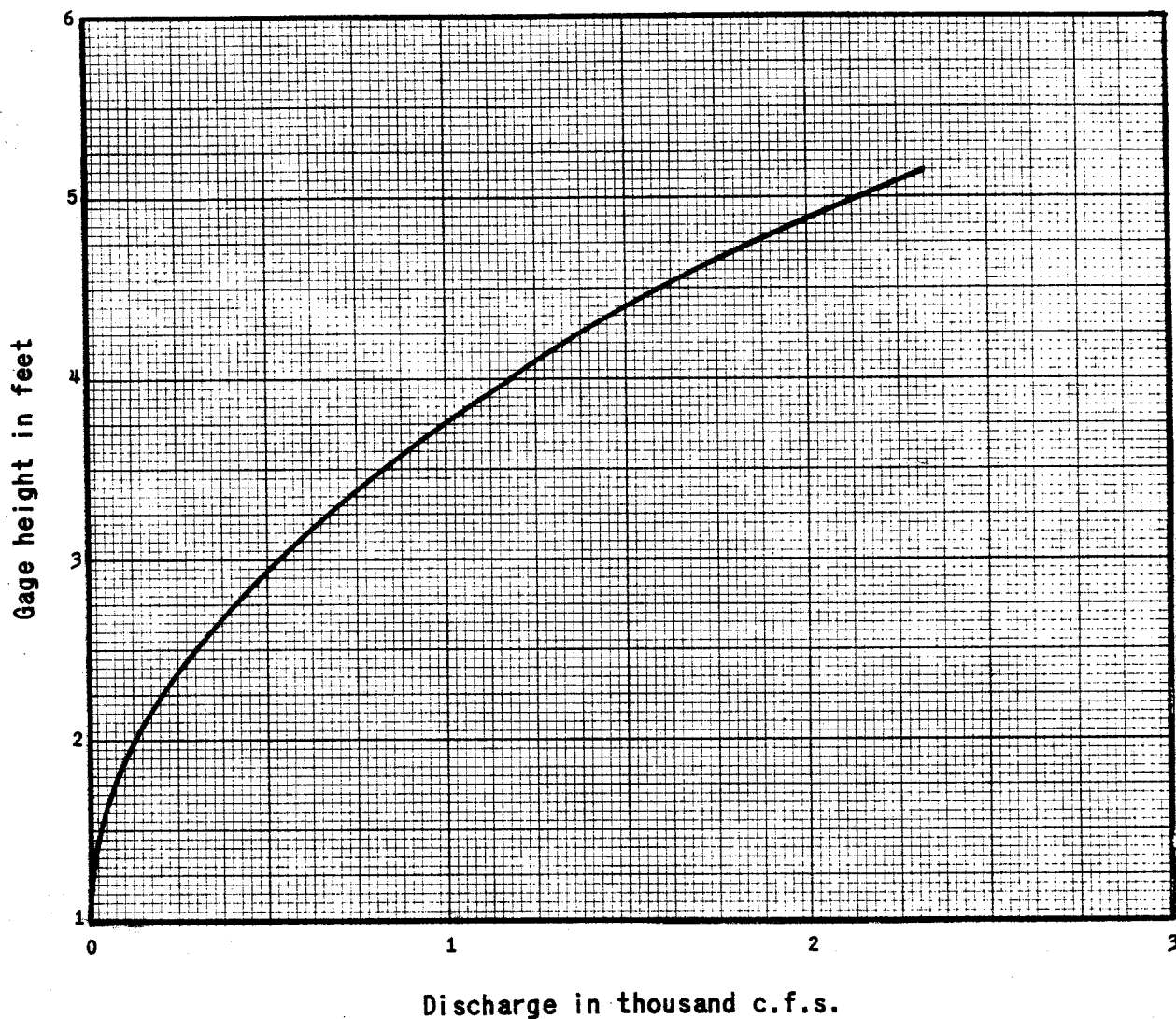


WEBER RIVER RESERVOIRS
UTAH

STAGE-DISCHARGE CURVE
WEBER RIVER NEAR WANSHIP

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M. Date: July 1970
Drawn: B.E.W. & S.K.N.



NOTE:

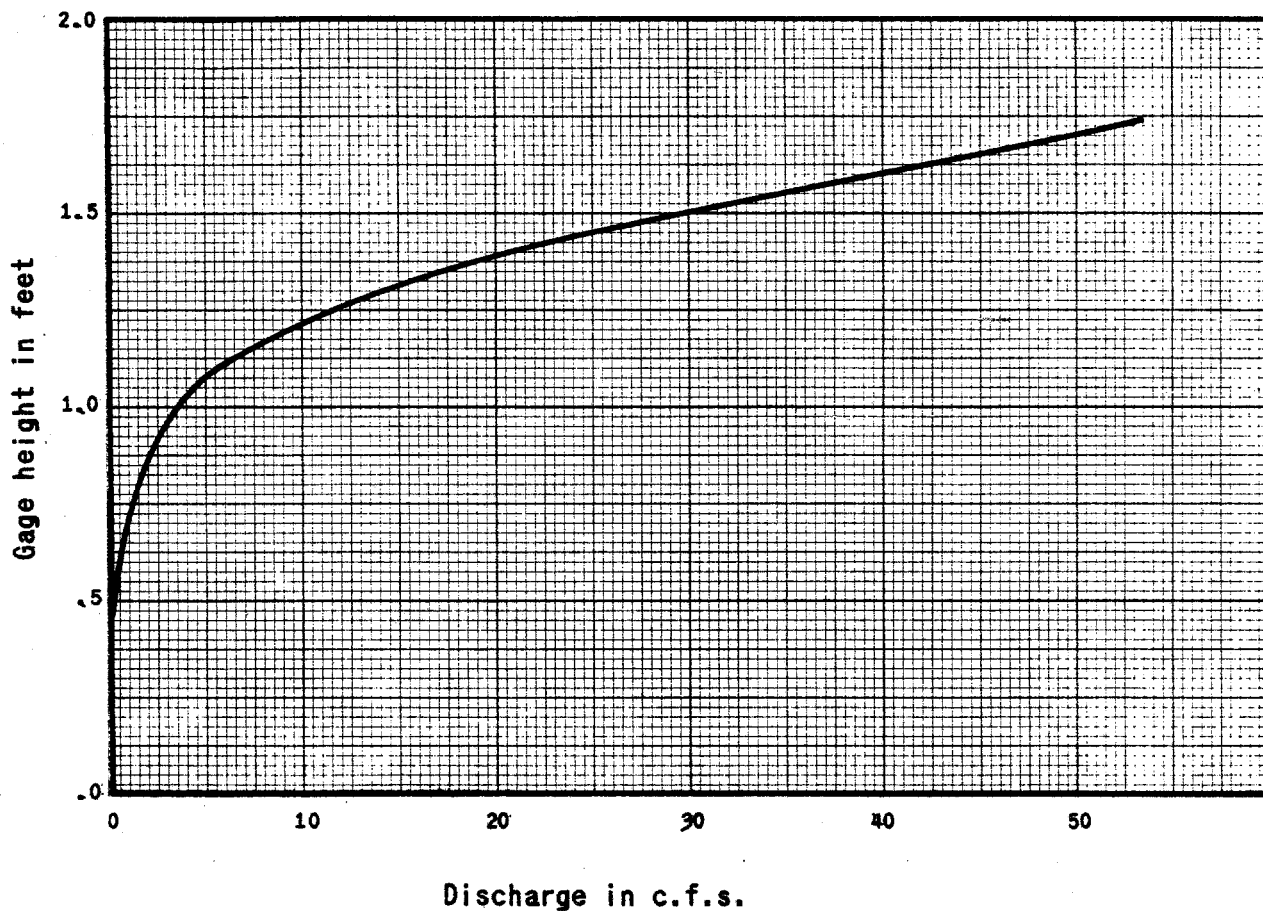
Station has shifting control
and requires periodic adjust-
ment of the rating curve.

WEBER RIVER RESERVOIRS
UTAH

STAGE-DISCHARGE CURVE
WEBER RIVER AT ECHO

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M. Date: July 1970
Drawn: B.E.W. & S.K.N.

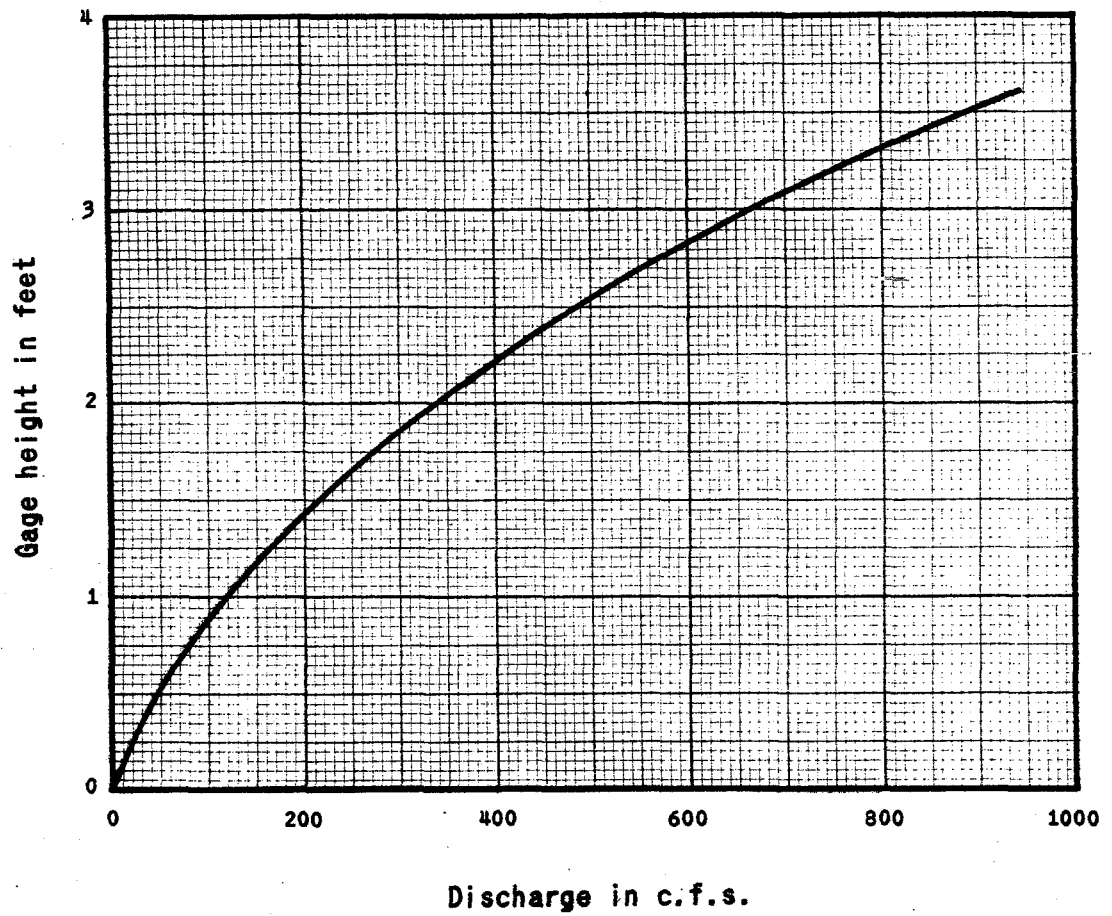


WEBER RIVER RESERVOIRS
UTAH

STAGE-DISCHARGE CURVE
LOST CREEK NEAR CROYDEN

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M.
Drawn: B.E.W. & S.K.N. Date: July 1970



WEBER RIVER RESERVOIRS
UTAH

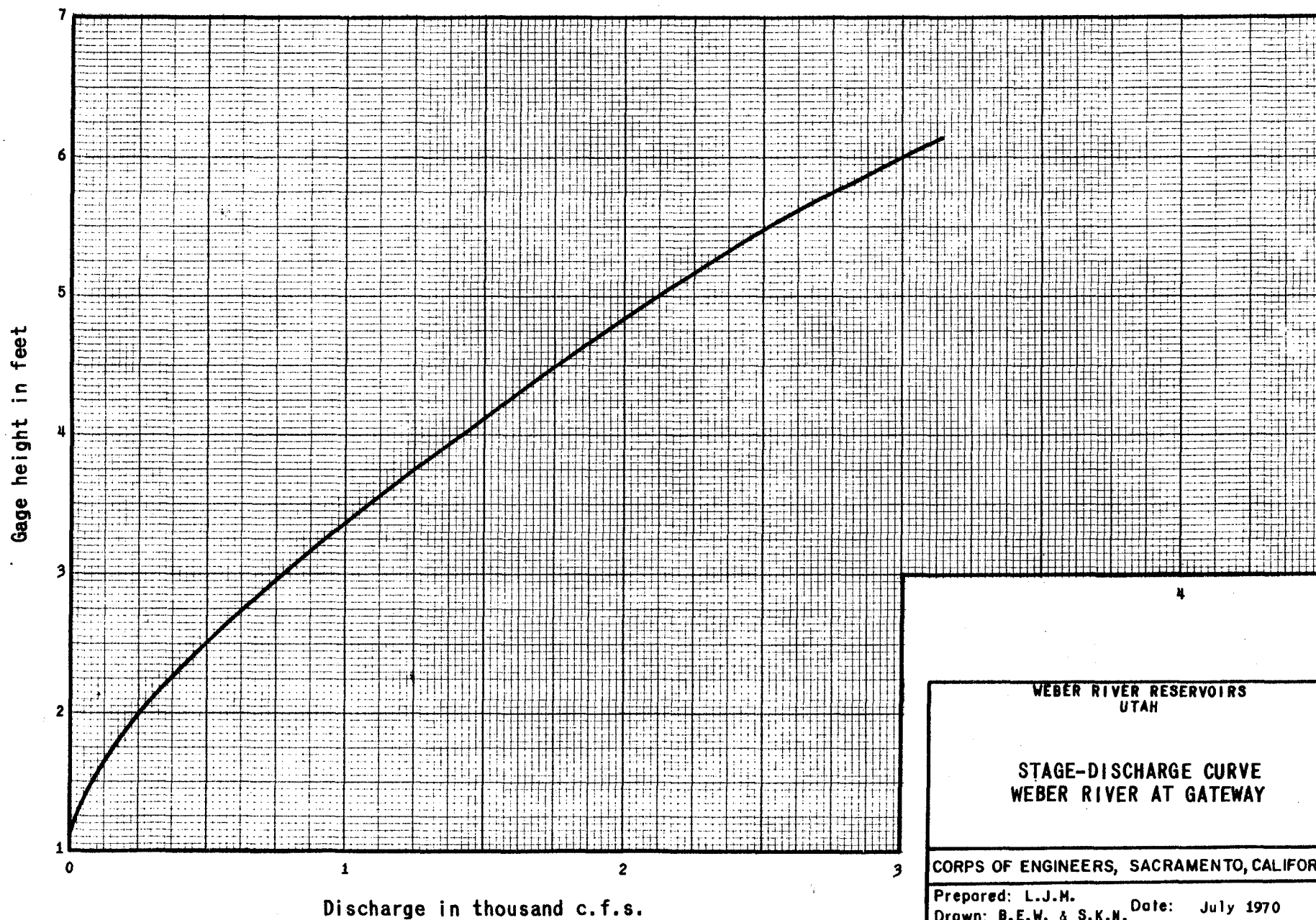
STAGE-DISCHARGE CURVE
EAST CANYON CREEK NEAR MORGAN

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M.

Date: July 1970

Drawn: B.E.W. & S.K.N.



WEBER RIVER RESERVOIRS
UTAH

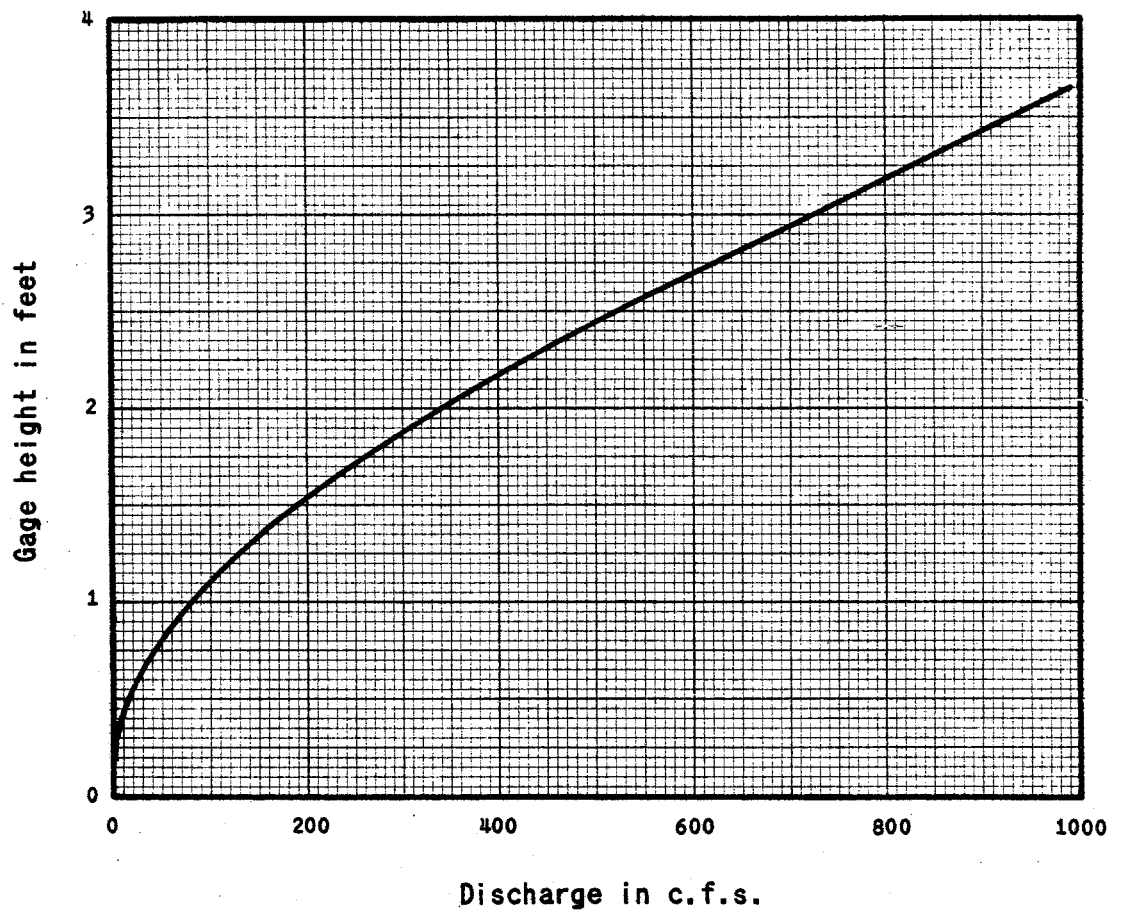
STAGE-DISCHARGE CURVE
WEBER RIVER AT GATEWAY

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M.

Drawn: B.E.W. & S.K.N.

Date: July 1970



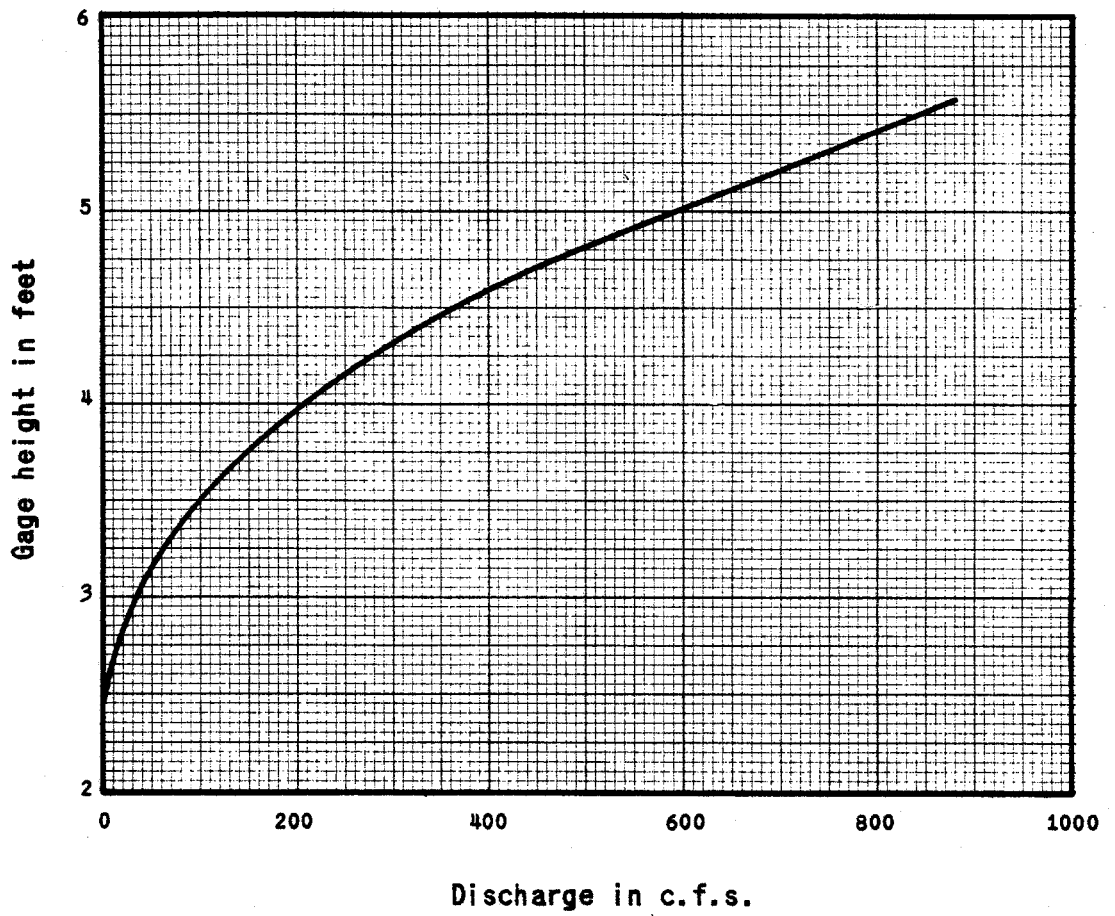
WEBER RIVER RESERVOIRS
UTAH

STAGE-DISCHARGE CURVE
SOUTH FORK OGDEN RIVER BELOW
CAUSEY DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M.

Drawn: B.E.W. & S.K.N. Date: July 1970

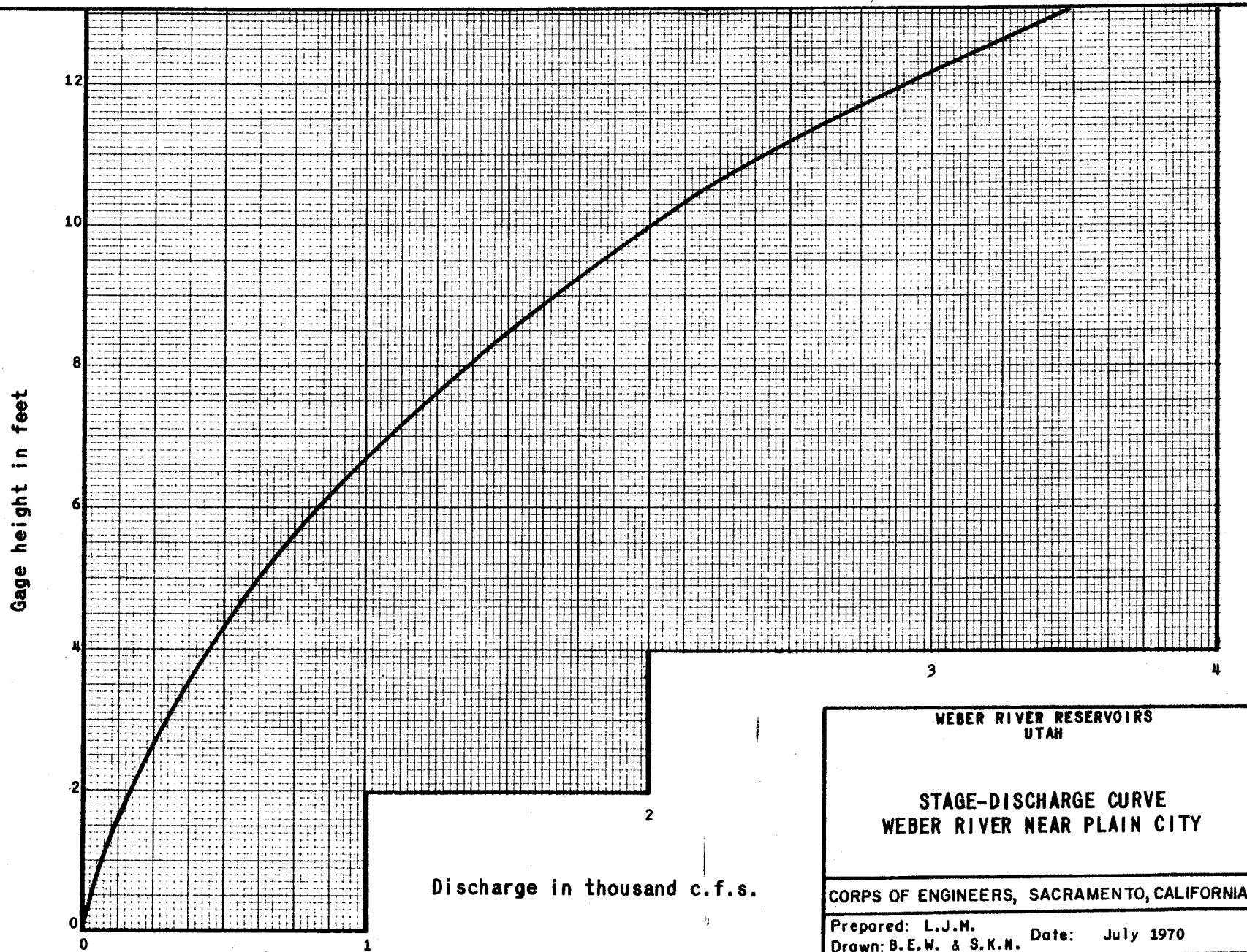


WEBER RIVER RESERVOIRS
UTAH

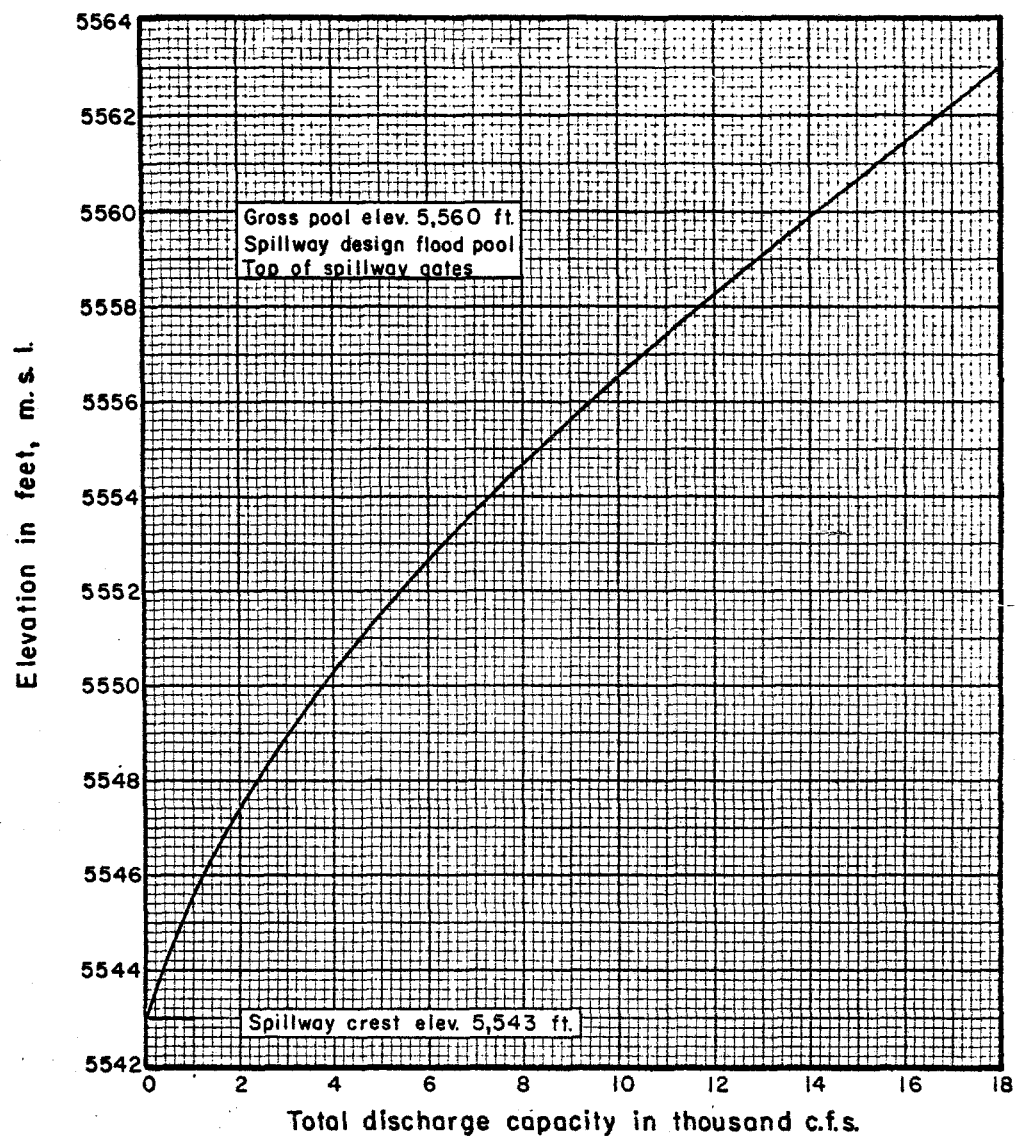
STAGE-DISCHARGE CURVE
OGDEN RIVER BELOW PINEVIEW DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M. Date: July 1970
Drawn: B.E.W. & S.K.N.







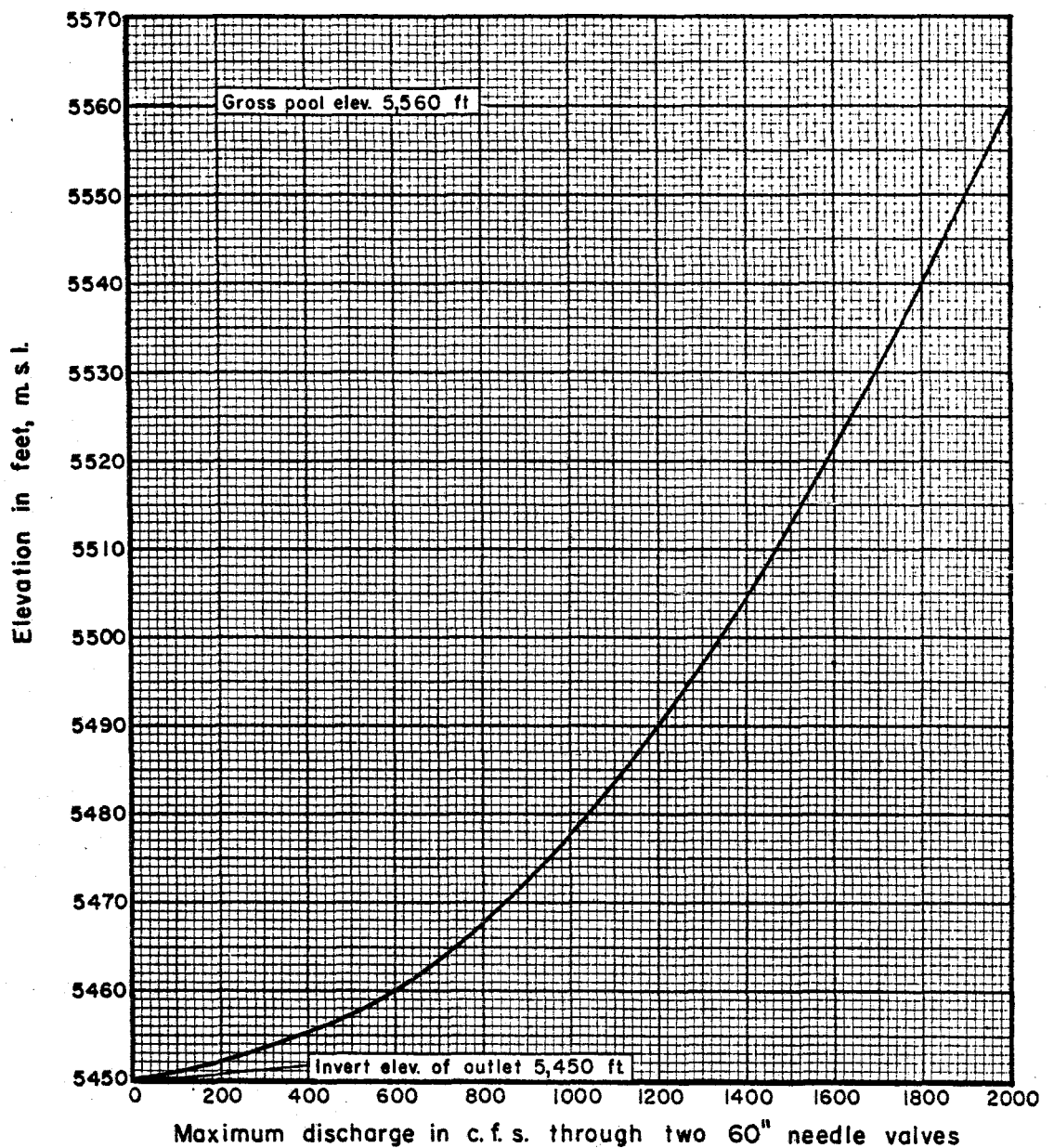
Notes: Top of dam elev. 5,570 ft.
Rating is for 4 bays equipped
with 18' x 17' radial gates.

WEBER BASIN RESERVOIRS, UTAH

SPILLWAY RATING CURVE
ECHO DAM

US Army Engineer District Sacramento, California

R.W.S. Dec 1959



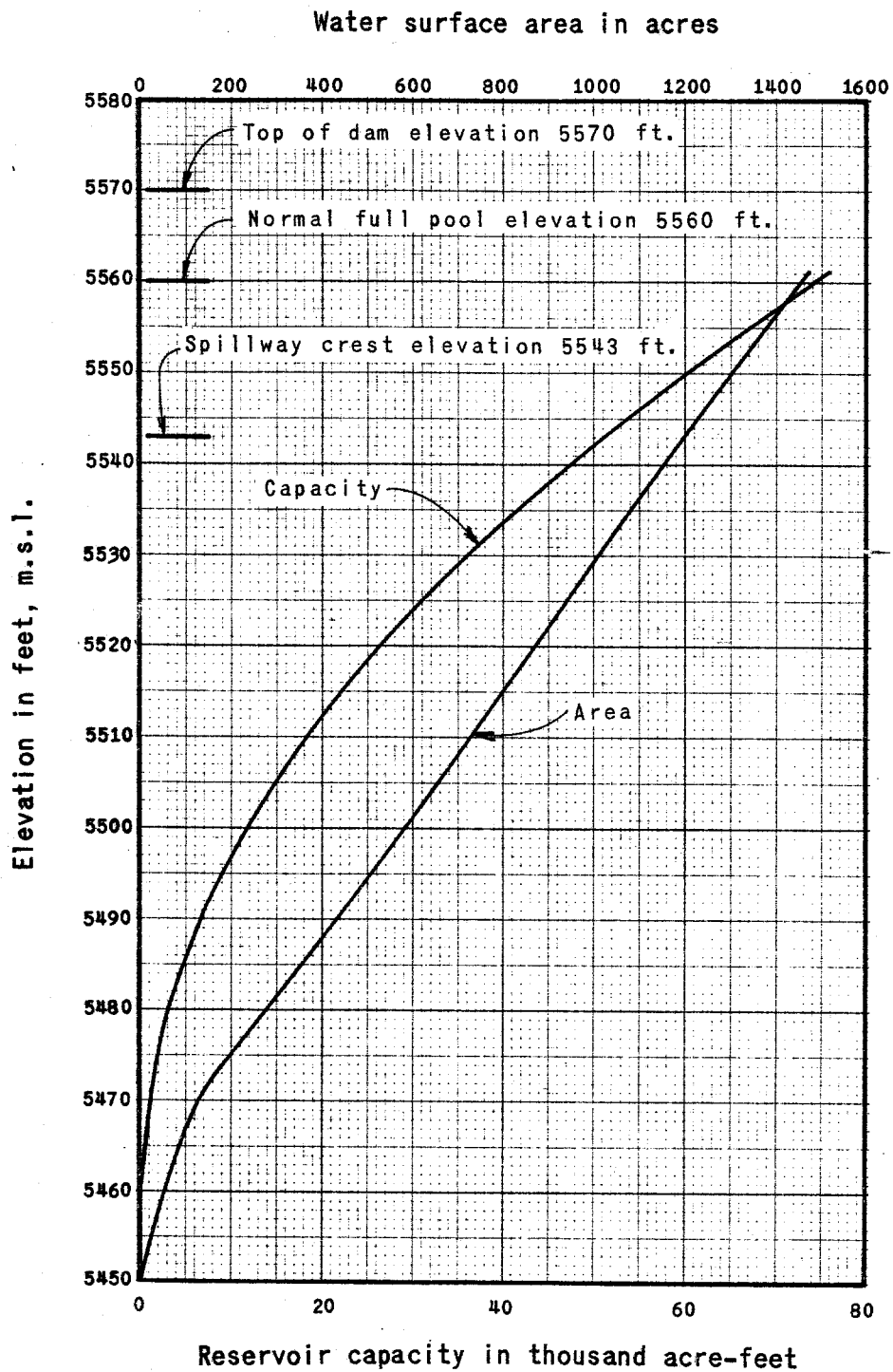
Note: Data furnished by U. S. Bureau
of Reclamation.

WEBER BASIN RESERVOIRS, UTAH

OUTLET RATING CURVE
ECHO DAM

US Army Engineer District Sacramento, California

R.W.S. Dec 1959



NOTE:

Data furnished by
U.S. Bureau of Reclamation.

WEBER BASIN RESERVOIRS
UTAH

AREA AND CAPACITY CURVES
ECHO RESERVOIR

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: T.V.H.

Drawn: R.E.Y. & S.K.N.

Date: July 1970

Revised 1971

CHART 10

WEBER RIVER PROJECT ECHO RESERVOIR

AREA IN ACRES

JUNE 1, 1963

ELEV.	0	1	2	3	4	5	6	7	8	9
5450	0	5	10	15	20	25	30	35	40	45
5460	50	57	65	72	80	87	95	102	110	117
5470	125	139	153	167	181	195	210	225	240	255
5480	270	285	301	316	332	347	363	378	394	410
5490	425	440	456	471	487	502	518	533	549	565
5500	580	594	608	622	636	650	664	678	692	706
5510	720	734	749	763	778	792	807	821	836	850
5520	865	879	894	909	923	938	952	967	981	995
5530	1010	1024	1039	1053	1068	1082	1097	1111	1126	1140
5540	1155	1170	1185	1200	1215	1230	1245	1260	1270	1290
5550	1305	1320	1335	1350	1365	1380	1395	1410	1425	1440
5560	1455	1470								

WEBER RIVER PROJECT

ECHO RESERVOIR

CAPACITY IN ACRE FEET

JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5450	0	1	2	2	3	4	5	5	6	7
5451	8	9	10	10	11	12	13	14	15	16
5452	17	18	19	20	21	22	24	25	26	27
5453	28	29	30	31	33	34	35	36	38	39
5454	40	41	43	44	46	47	48	50	51	52
5455	54	55	57	58	60	61	63	64	66	68
5456	69	71	72	74	76	78	79	81	83	84
5457	86	88	90	92	94	96	98	100	101	103
5458	105	107	110	112	114	116	118	121	123	125
5459	127	130	132	135	138	140	143	145	148	150
5460	153	156	159	162	166	169	172	175	178	181
5461	184	188	192	196	200	204	208	211	215	219
5462	223	228	232	237	241	246	250	255	260	264
5463	269	274	280	285	291	296	302	307	313	318
5464	324	330	337	343	350	356	363	369	376	382
5465	389	396	404	412	419	427	435	442	450	457
5466	465	474	482	491	500	509	518	526	535	544
5467	553	563	573	583	593	603	613	623	633	643
5468	653	665	676	687	699	710	722	733	744	756
5469	767	780	792	805	818	830	843	856	869	881
5470	894	908	922	937	951	965	979	993	1010	1020
5471	1040	1050	1070	1080	1100	1120	1130	1150	1160	1180
5472	1190	1210	1230	1240	1260	1280	1300	1320	1330	1350
5473	1370	1380	1400	1420	1440	1460	1480	1500	1520	1540
5474	1560	1580	1600	1620	1640	1660	1680	1700	1720	1740
5475	1760	1780	1810	1830	1850	1870	1900	1920	1940	1980
5476	1990	2010	2040	2060	2080	2110	2130	2160	2180	2200
5477	2230	2260	2280	2310	2330	2360	2380	2410	2440	2460
5478	2490	2520	2540	2570	2600	2630	2660	2680	2710	2740
5479	2760	2800	2820	2850	2880	2910	2940	2970	3000	3030
5480	3060	3090	3120	3150	3180	3210	3240	3270	3300	3340
5481	3370	3400	3430	3460	3500	3530	3560	3590	3620	3660
5482	3690	3720	3750	3790	3820	3850	3890	3920	3950	3990
5483	4020	4050	4090	4120	4160	4190	4230	4260	4300	4330
5484	4360	4400	4440	4470	4510	4540	4580	4610	4650	4680
5485	4720	4760	4800	4830	4870	4910	4940	4980	5020	5060
5486	5090	5130	5170	5210	5250	5290	5320	5360	5400	5440
5487	5480	5520	5560	5600	5640	5680	5720	5760	5800	5840
5488	5880	5920	5970	6010	6050	6090	6130	6170	6220	6260
5489	6300	6340	6390	6430	6470	6520	6560	6600	6650	6690

FURNISHED BY U S B R

Sheet 2, CHART 11

WEBER RIVER PROJECT

ECHO RESERVOIR

CAPACITY IN ACRE FEET

JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5490	6730	6780	6820	6870	6910	6960	7000	7040	7090	7130
5491	7180	7220	7270	7320	7360	7410	7460	7500	7550	7590
5492	7640	7690	7740	7780	7830	7880	7920	7970	8020	8070
5493	8120	8160	8210	8260	8310	8360	8410	8460	8510	8560
5494	8600	8650	8700	8760	8800	8860	8910	8960	9010	9060
5495	9110	9160	9210	9260	9310	9370	9420	9470	9520	9570
5496	9620	9680	9730	9780	9840	9890	9940	10000	10050	10100
5497	10150	10210	10260	10320	10370	10430	10480	10540	10590	10640
5498	10700	10750	10810	10870	10920	10980	11030	11090	11140	11200
5499	11260	11310	11370	11430	11480	11540	11600	11660	11710	11770
5500	11830	11890	11940	12000	12060	12120	12180	12240	12300	12350
5501	12410	12470	12530	12590	12650	12710	12770	12830	12890	12950
5502	13010	13080	13140	13200	13260	13320	13380	13450	13510	13570
5503	13630	13700	13760	13820	13890	13950	14010	14080	14140	14200
5504	14270	14330	14400	14470	14530	14600	14660	14730	14790	14860
5505	14920	14990	15060	15130	15200	15260	15330	15400	15460	15530
5506	15600	15670	15740	15810	15880	15950	16020	16090	16160	16230
5507	16300	16370	16440	16510	16580	16650	16720	16800	16870	16940
5508	17010	17080	17160	17230	17300	17380	17450	17520	17590	17670
5509	17740	17810	17890	17960	18040	18110	18190	18260	18340	18410
5510	18480	18560	18640	18710	18790	18860	18940	19010	19090	19160
5511	19240	19320	19390	19470	19550	19620	19700	19780	19860	19930
5512	20010	20090	20170	20240	20320	20400	20480	20560	20640	20710
5513	20790	20870	20950	21030	21110	21190	21270	21350	21430	21510
5514	21590	21670	21750	21830	21910	21990	22070	22150	22230	22310
5515	22390	22470	22560	22640	22720	22800	22880	22960	23050	23130
5516	23210	23290	23380	23460	23540	23630	23710	23790	23880	23960
5517	24040	24130	24210	24300	24380	24470	24550	24630	24720	24800
5518	24890	24970	25060	25150	25230	25320	25400	25490	25580	25660
5519	25750	25830	25920	26010	26100	26180	26270	26360	26440	26530
5520	26620	26710	26800	26880	26970	27060	27150	27240	27330	27410
5521	27500	27590	27680	27770	27860	27950	28040	28130	28220	28310
5522	28400	28490	28580	28670	28760	28860	28950	29040	29130	29220
5523	29310	29400	29500	29590	29680	29770	29870	29960	30050	30140
5524	30240	30330	30420	30520	30610	30710	30800	30900	30990	31080
5525	31180	31270	31370	31460	31560	31650	31750	31840	31940	32040
5526	32130	32230	32320	32420	32520	32620	32710	32810	32910	33000
5527	33100	33200	33300	33400	33490	33590	33690	33790	33890	33990
5528	34080	34180	34280	34380	34480	34580	34680	34780	34880	34980
5529	35080	35190	35290	35390	35490	35590	35700	35800	35900	36000

FURNISHED BY U S B R

Sheet 3, CHART 11

WEBER RIVER PROJECT

ECHO RESERVOIR

CAPACITY IN ACRE FEET

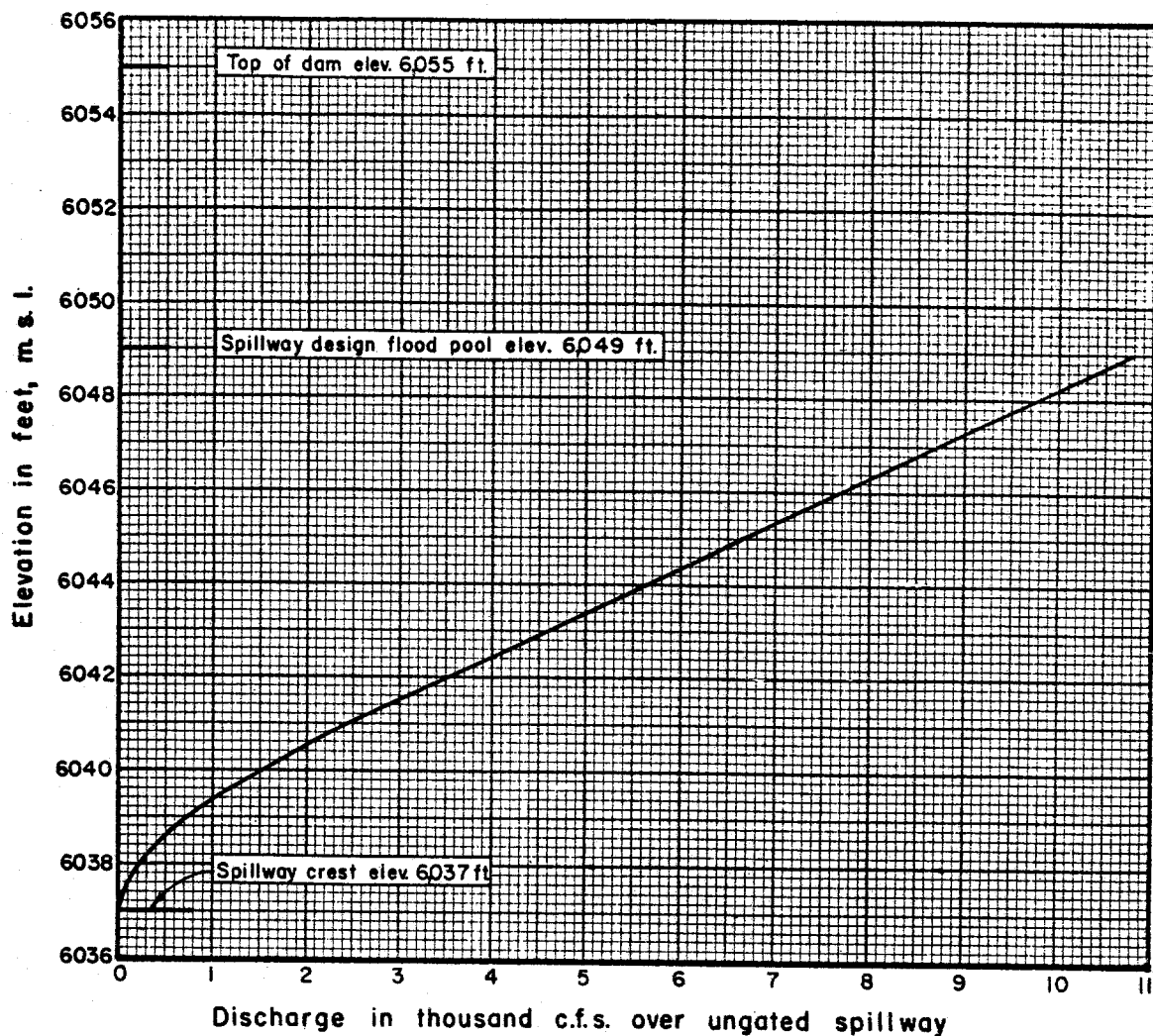
JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5530	36100	36200	36310	36410	36520	36620	36720	36820	36930	37030
5531	37130	37240	37340	37450	37550	37660	37760	37870	37970	38080
5532	38180	38290	38400	38500	38610	38720	38820	38930	39040	39140
5533	39250	39360	39470	39580	39680	39790	39900	40010	40120	40230
5534	40330	40440	40560	40660	40780	40880	41000	41110	41220	41330
5535	41440	41550	41660	41770	41880	42000	42110	42220	42330	42440
5536	42550	42670	42780	42900	43010	43120	43240	43350	43460	43580
5537	43700	43810	43920	44040	44150	44270	44380	44500	44610	44730
5538	44840	44960	45080	45190	45310	45430	45540	45660	45780	45900
5539	46010	46130	46250	46370	46490	46610	46720	46840	46960	47080
5540	47200	47320	47440	47560	47680	47800	47920	48040	48160	48280
5541	48400	48520	48650	48770	48890	49010	49130	49250	49380	49500
5542	49620	49740	49870	49990	50110	50240	50360	50480	50610	50730
5543	50850	50980	51100	51230	51350	51480	51600	51720	51850	51970
5544	52100	52220	52350	52480	52600	52730	52860	52980	53110	53230
5545	53360	53490	53620	53740	53870	54000	54120	54250	54380	54510
5546	54640	54760	54890	55020	55150	55280	55410	55540	55670	55800
5547	55920	56060	56190	56320	56450	56580	56710	56840	56970	57100
5548	57230	57360	57490	57620	57760	57890	58020	58150	58280	58410
5549	58550	58680	58810	58940	59080	59210	59340	59480	59610	59740
5550	59880	60010	60150	60280	60420	60550	60680	60820	60950	61090
5551	61220	61360	61490	61630	61760	61900	62040	62170	62310	62440
5552	62580	62720	62860	62990	63130	63270	63400	63540	63680	63820
5553	63950	64090	64230	64370	64510	64650	64780	64920	65060	65200
5554	65340	65480	65620	65760	65900	66040	66180	66320	66460	66600
5555	66740	66880	67020	67160	67300	67440	67590	67730	67870	68010
5556	68150	68290	68440	68580	68720	68860	69010	69150	69290	69440
5557	69580	69720	69870	70010	70150	70300	70440	70590	70730	70880
5558	71020	71160	71310	71460	71600	71750	71890	72040	72180	72330
5559	72470	72620	72770	72920	73060	73210	73360	73500	73650	73800
5560	73940	74090	74240	74390	74540	74680	74830	74980	75130	75280
5561	75420									









Notes: Control of spillway design flood includes release of 1,000 c.f.s. through outlet.

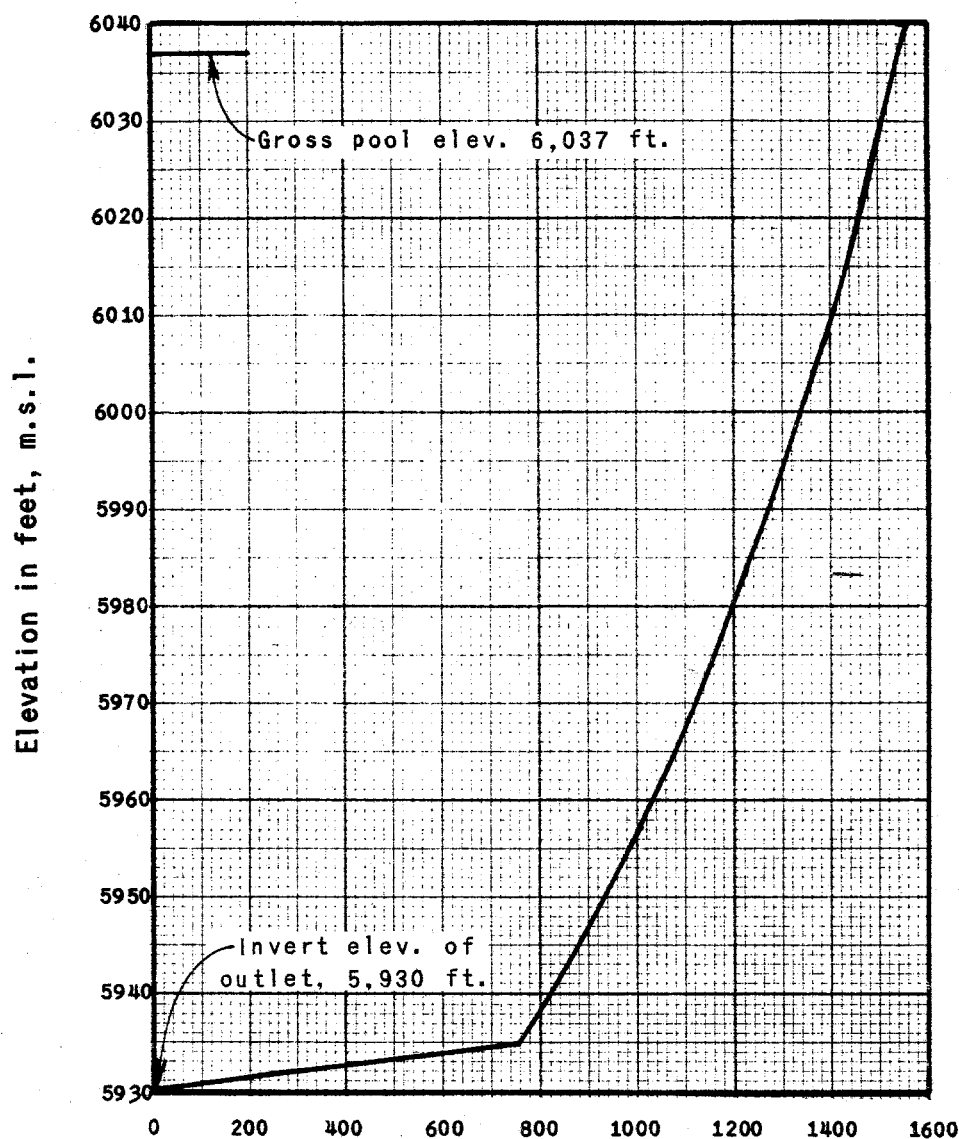
Data furnished by U. S. Bureau of Reclamation.

WEBER BASIN RESERVOIRS, UTAH

SPILLWAY RATING CURVE
WANSHIP DAM

US Army Engineer District Sacramento, California

R.W.S. Dec 1959



NOTE:

Data furnished by U.S. Bureau of Reclamation.

WEBER BASIN RESERVOIRS
UTAH

OUTLET RATING CURVE
WANSHIP DAM

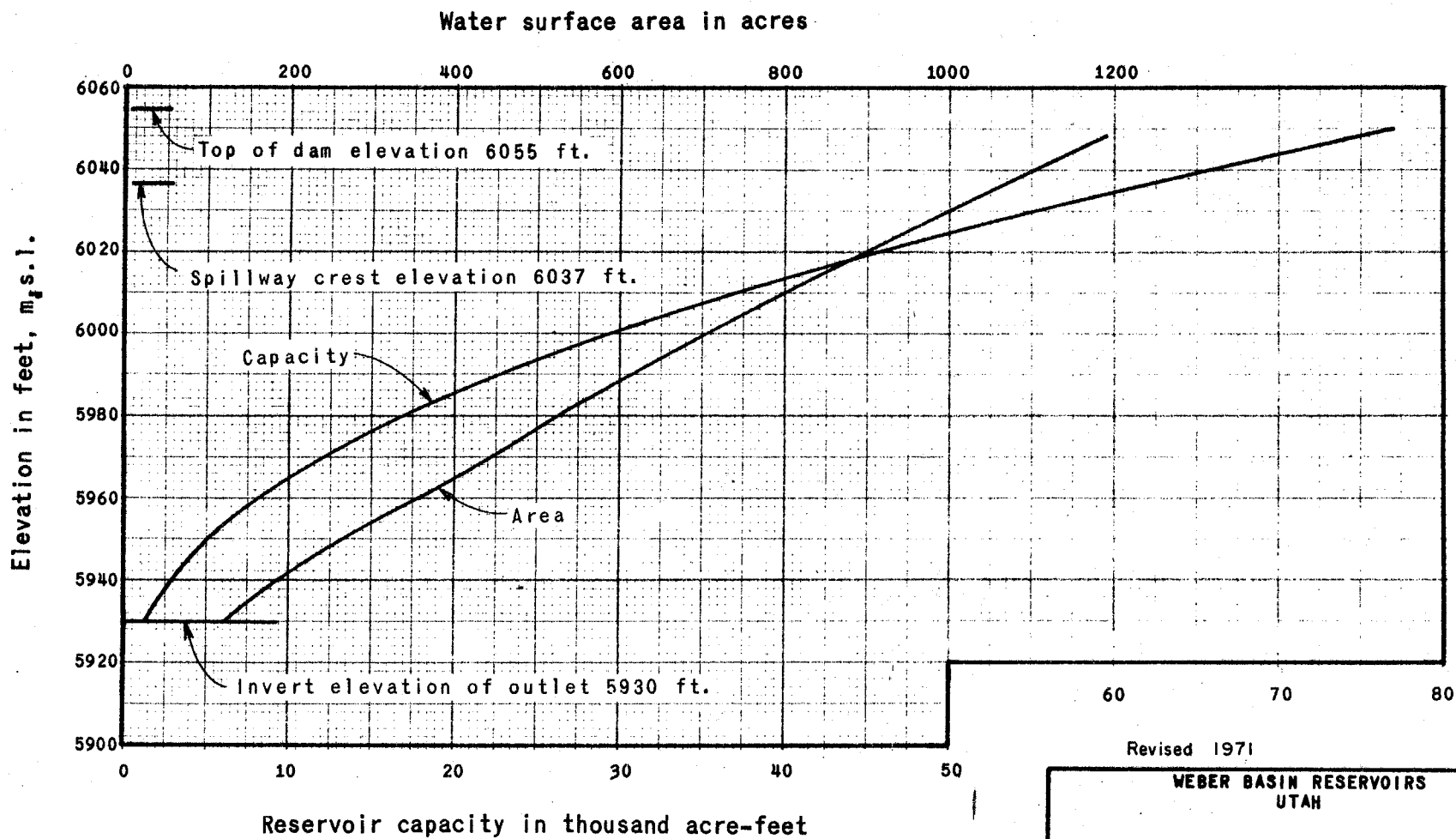
Rev. July 1970

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: R. W. S.

Date: December 1959

Drawn:



NOTE:

Data furnished by
U.S. Bureau of Reclamation

Revised 1971

**WEBER BASIN RESERVOIRS
UTAH**

**AREA AND CAPACITY CURVES
ROCKPORT LAKE**

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: T.V.H. Date: July 1970
Drawn: R.E.Y. & S.K.N.

WEBER BASIN PROJECT

ROCKPORT LAKE

AREA IN ACRES

JUNE 1, 1963

ELEV.	0	1	2	3	4	5	6	7	8	9
5930	121	129	137	144	151	158	165	172	179	186
5940	192	198	205	212	219	226	233	240	247	255
5950	265	277	290	303	314	323	331	338	345	352
5960	358	365	373	381	391	400	411	421	430	438
5970	446	454	462	470	478	487	496	504	512	520
5980	528	536	544	552	559	566	574	582	590	599
5990	608	617	626	636	646	657	668	679	689	699
6000	708	717	726	735	743	751	759	768	777	786
6010	795	804	813	823	833	843	854	866	877	887
6020	897	907	917	927	938	949	960	970	980	990
6030	1000	1010	1021	1032	1043	1055	1066	1077	1087	1097
6040	1107	1117	1127	1136	1144	1152	1160	1169	1179	1189

WEBER BASIN PROJECT

ROCKPORT LAKE

CAPACITY IN ACRE FEET

JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5930	1260	1270	1280	1300	1310	1320	1330	1350	1360	1370
5931	1380	1400	1410	1420	1440	1450	1460	1480	1490	1500
5932	1520	1530	1540	1560	1570	1590	1600	1620	1630	1640
5933	1660	1670	1690	1700	1720	1730	1750	1760	1780	1790
5934	1800	1820	1840	1850	1870	1880	1900	1910	1930	1940
5935	1960	1980	1990	2010	2020	2040	2060	2070	2090	2100
5936	2120	2140	2160	2170	2190	2200	2220	2240	2260	2270
5937	2290	2310	2320	2340	2360	2380	2400	2410	2430	2450
5938	2460	2480	2500	2520	2540	2560	2570	2590	2610	2630
5939	2650	2670	2680	2700	2720	2740	2760	2780	2800	2820
5940	2840	2860	2880	2890	2910	2930	2950	2970	2990	3010
5941	3030	3050	3070	3090	3110	3130	3150	3170	3190	3210
5942	3230	3250	3280	3300	3320	3340	3360	3380	3400	3420
5943	3440	3460	3480	3510	3530	3550	3570	3590	3610	3640
5944	3660	3680	3700	3720	3750	3770	3790	3810	3840	3860
5945	3880	3900	3920	3950	3970	3990	4020	4040	4060	4090
5946	4110	4130	4160	4180	4200	4230	4250	4270	4300	4320
5947	4340	4370	4390	4420	4440	4470	4490	4520	4540	4560
5948	4590	4610	4640	4660	4690	4710	4740	4760	4790	4820
5949	4840	4870	4890	4920	4940	4970	5000	5020	5050	5070
5950	5100	5130	5150	5180	5210	5240	5260	5290	5320	5340
5951	5370	5400	5430	5460	5480	5510	5540	5570	5600	5630
5952	5660	5680	5710	5740	5770	5800	5830	5860	5890	5920
5953	5950	5980	6010	6040	6070	6100	6140	6170	6200	6230
5954	6260	6290	6320	6350	6390	6420	6450	6480	6510	6540
5955	6580	6610	6640	6680	6710	6740	6770	6810	6840	6870
5956	6900	6940	6970	7000	7040	7070	7100	7140	7170	7200
5957	7240	7270	7310	7340	7380	7410	7450	7480	7510	7550
5958	7580	7620	7650	7680	7720	7750	7790	7820	7860	7890
5959	7930	7960	8000	8030	8070	8110	8140	8180	8210	8250
5960	8280	8320	8360	8390	8430	8460	8500	8540	8570	8610
5961	8640	8680	8720	8760	8790	8830	8860	8900	8940	8980
5962	9010	9050	9090	9130	9160	9200	9240	9280	9320	9350
5963	9390	9430	9470	9510	9540	9580	9620	9660	9700	9740
5964	9780	9820	9860	9890	9930	9970	10010	10050	10090	10130
5965	10170	10210	10250	10290	10330	10370	10410	10450	10500	10540
5966	10580	10620	10660	10700	10740	10780	10830	10870	10910	10950
5967	10990	11040	11080	11120	11160	11200	11250	11290	11330	11380
5968	11420	11460	11500	11550	11590	11640	11680	11720	11760	11810
5969	11850	11900	11940	11980	12030	12070	12120	12160	12210	12250

FURNISHED BY U S B R

Sheet 2, CHART 18

WEBER BASIN PROJECT

ROCKPORT LAKE

CAPACITY IN ACRE FEET

JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5970	12290	12340	12380	12430	12470	12520	12560	12610	12650	12700
5971	12740	12790	12840	12880	12930	12970	13020	13060	13110	13160
5972	13200	13250	13300	13340	13390	13440	13480	13530	13580	13620
5973	13670	13720	13760	13810	13860	13900	13950	14000	14050	14100
5974	14140	14190	14240	14290	14340	14380	14430	14480	14530	14580
5975	14620	14670	14720	14770	14820	14870	14920	14970	15020	15070
5976	15120	15170	15220	15270	15320	15370	15420	15470	15520	15570
5977	15620	15670	15720	15770	15820	15870	15920	15970	16020	16070
5978	16120	16180	16230	16280	16330	16380	16430	16480	16540	16590
5979	16640	16690	16740	16800	16850	16900	16950	17010	17060	17110
5980	17160	17220	17270	17320	17380	17430	17480	17540	17590	17640
5981	17700	17750	17800	17860	17910	17970	18020	18070	18130	18180
5982	18240	18290	18350	18400	18460	18510	18560	18620	18670	18730
5983	18780	18840	18900	18950	19010	19060	19120	19170	19230	19280
5984	19340	19400	19450	19510	19560	19620	19680	19730	19790	19850
5985	19900	19960	20020	20070	20130	20190	20240	20300	20360	20420
5986	20470	20530	20590	20640	20700	20760	20820	20880	20930	20990
5987	21050	21110	21170	21230	21280	21340	21400	21460	21520	21580
5988	21640	21700	21760	21810	21870	21930	21990	22050	22110	22170
5989	22230	22290	22350	22410	22470	22530	22590	22650	22710	22770
5990	22830	22900	22960	23020	23080	23140	23200	23260	23320	23380
5991	23450	23510	23570	23630	23700	23760	23820	23880	23940	24010
5992	24070	24130	24190	24260	24320	24380	24450	24510	24570	24640
5993	24700	24760	24830	24890	24960	25020	25080	25150	25210	25280
5994	25340	25400	25470	25540	25600	25670	25730	25800	25860	25930
5995	25990	26060	26120	26190	26260	26320	26390	26460	26520	26590
5996	26650	26720	26790	26860	26920	26990	27060	27120	27190	27260
5997	27330	27400	27460	27530	27600	27670	27740	27810	27870	27940
5998	28010	28080	28150	28220	28290	28360	28430	28500	28570	28640
5999	28700	28780	28850	28920	28990	29060	29130	29200	29270	29340
6000	29410	29480	29550	29620	29690	29760	29840	29910	29980	30050
6001	30120	30190	30260	30340	30410	30480	30550	30630	30700	30770
6002	30840	30920	30990	31060	31140	31210	31280	31350	31430	31500
6003	31570	31650	31720	31800	31870	31940	32020	32090	32160	32240
6004	32310	32390	32460	32540	32610	32690	32760	32840	32910	32980
6005	33060	33130	33210	33290	33360	33440	33510	33590	33660	33740
6006	33810	33890	33970	34040	34120	34200	34270	34350	34420	34500
6007	34580	34660	34730	34810	34890	34960	35040	35120	35200	35270
6008	35350	35430	35510	35580	35660	35740	35820	35900	35980	36050
6009	36130	36210	36290	36370	36450	36530	36610	36680	36760	36840

FURNISHED BY U S B R

Sheet 3, CHART 18

WEBER BASIN PROJECT

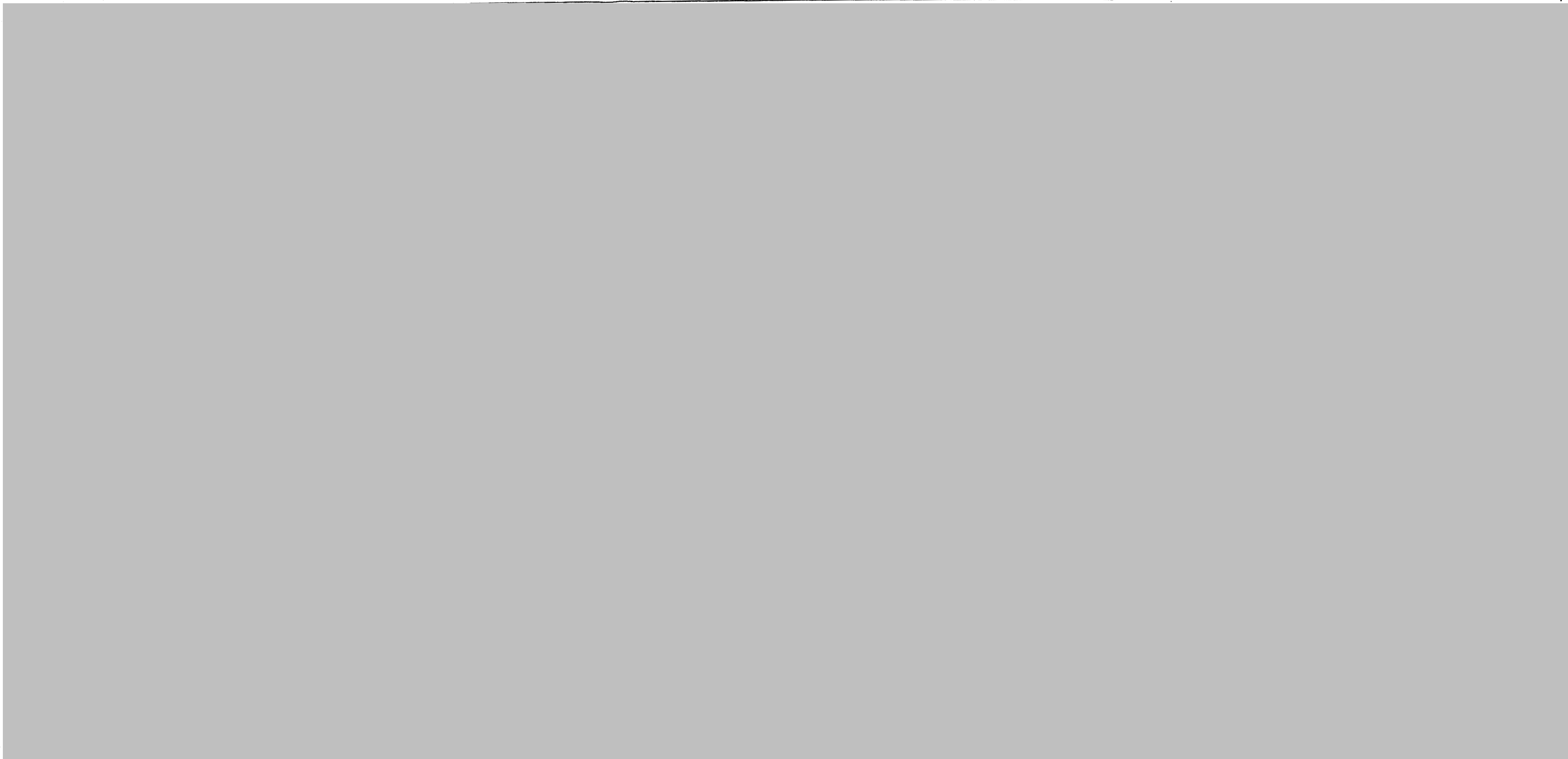
ROCKPORT LAKE

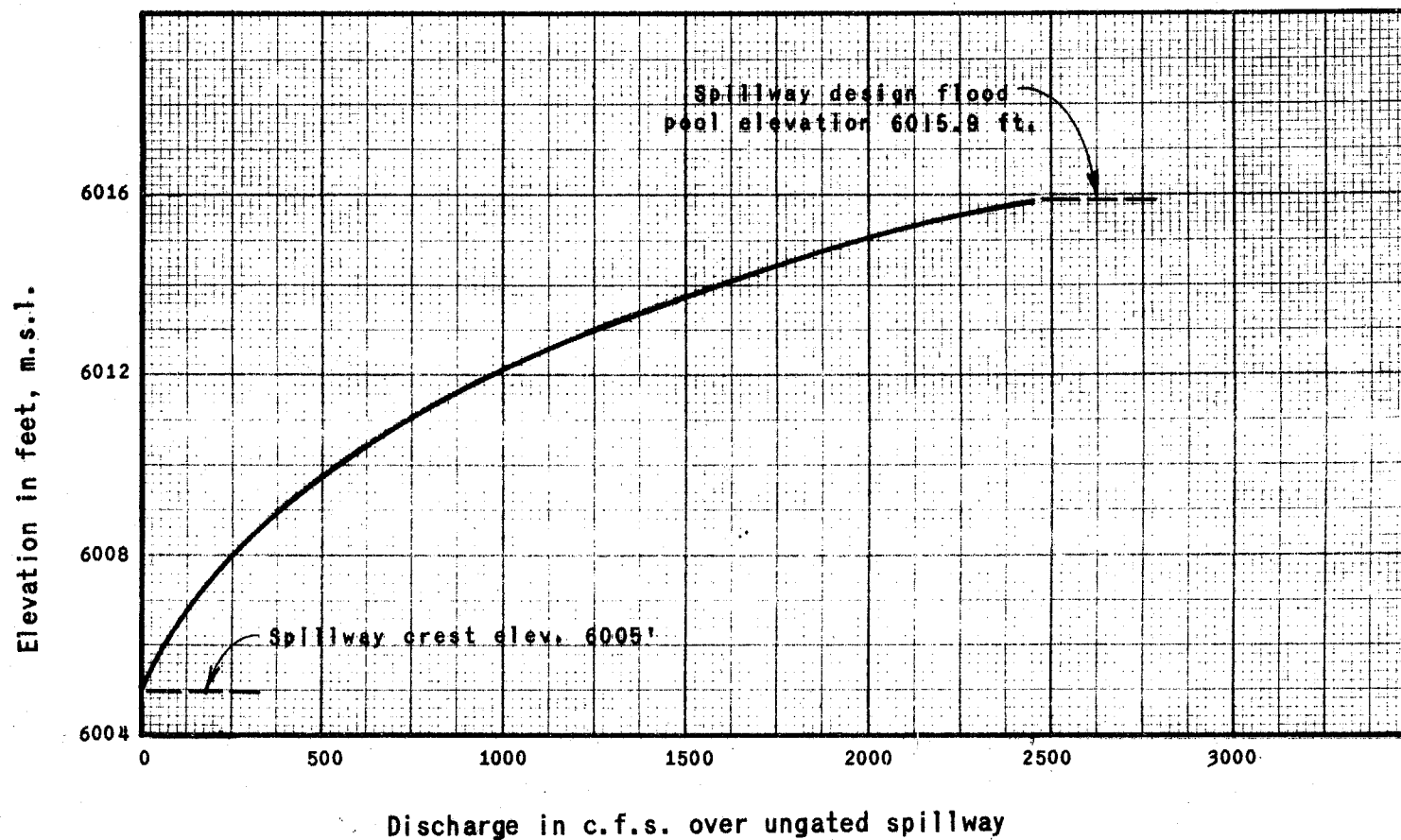
CAPACITY IN ACRE FEET

JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
6010	36920	37000	37080	37160	37240	37320	37400	37480	37560	37640
6011	37720	37800	37880	37960	38040	38130	38210	38290	38370	38450
6012	38530	38610	38690	38780	38860	38940	39020	39100	39180	39270
6013	39350	39430	39510	39600	39680	39760	39840	39930	40010	40090
6014	40180	40260	40340	40430	40510	40600	40680	40760	40850	40930
6015	41010	41100	41180	41270	41350	41440	41520	41610	41690	41780
6016	41860	41950	42040	42120	42210	42290	42380	42460	42550	42640
6017	42720	42810	42900	42980	43070	43160	43250	43330	43420	43510
6018	43590	43680	43770	43860	43950	44040	44120	44120	44300	44390
6019	44480	44560	44650	44740	44830	44920	45010	45100	45190	45280
6020	45390	45460	45550	45640	45730	45820	45910	46000	46090	46180
6021	46270	46360	46450	46540	46640	46730	46820	46910	47000	47090
6022	47180	47270	47370	47460	47550	47640	47740	47830	47920	48010
6023	48100	48200	48290	48380	48480	48570	48660	48760	48850	48940
6024	49040	49130	49230	49320	49410	49510	49600	49700	49790	49890
6025	49980	50080	50170	50270	50360	50460	50550	50650	50740	50840
6026	50940	51030	51130	51220	51320	51420	51510	51610	51710	51800
6027	51900	52000	52100	52190	52290	52390	52480	52580	52680	52780
6028	52880	52970	53070	53170	53270	53370	53470	53560	53660	53760
6029	53860	53960	54060	54160	54260	54360	54460	54560	54660	54760
6030	54860	54960	55060	55160	55260	55360	55460	55560	55660	55760
6031	55860	55960	56060	56160	56270	56370	56470	56570	56670	56770
6032	56880	56980	57080	57180	57290	57390	57490	57590	57700	57800
6033	57900	58010	58110	58210	58320	58420	58520	58630	58730	58840
6034	58940	59040	59150	59250	59360	59460	59570	59670	59780	59880
6035	59990	60090	60200	60310	60410	60520	60620	60730	60840	60940
6036	61050	61160	61260	61370	61480	61580	61690	61800	61910	62010
6037	62120	62230	62340	62440	62550	62660	62770	62880	62990	63090
6038	63200	63310	63420	63530	63640	63750	63860	63970	64070	64180
6039	64290	64400	64510	64620	64740	64840	64960	65060	65180	65290
6040	65400	65510	65620	65730	65840	65950	66060	66170	66290	66400
6041	66510	66620	66730	66840	66960	67070	67180	67290	67410	67520
6042	67630	67740	67860	67970	68080	68200	68310	68420	68540	68650
6043	68760	68880	68990	69100	69220	69330	69450	69560	69670	69790
6044	69900	70020	70130	70250	70360	70480	70590	70710	70820	70940
6045	71050	71170	71280	71400	71510	71630	71740	71860	71980	72090
6046	72210	72320	72440	72560	72670	72790	72900	73020	73140	73250
6047	73370	73490	73600	73720	73840	73960	74070	74190	74310	74430
6048	74540	74660	74780	74900	75020	75140	75250	75370	75490	75610
6049	75730	75850	75970	76090	76210	76330	76440	76560	76680	76800







WEBER BASIN RESERVOIRS
UTAH

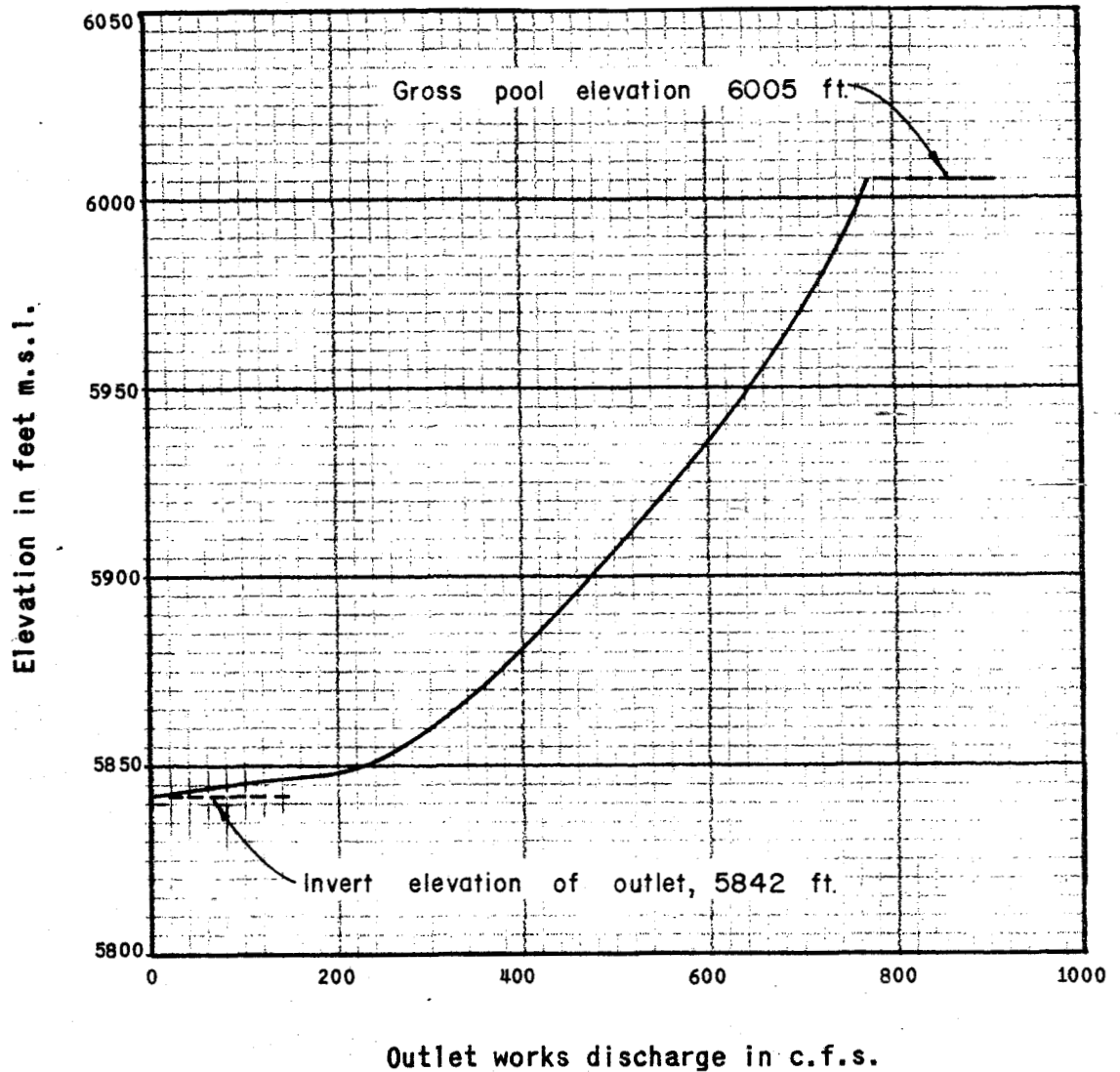
**SPILLWAY RATING CURVE
LOST CREEK DAM**

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M.

Drawn: B.E.W. & S.K.N. Date: July 1970

Revised 1971



WEBER BASIN RESERVOIRS
UTAH

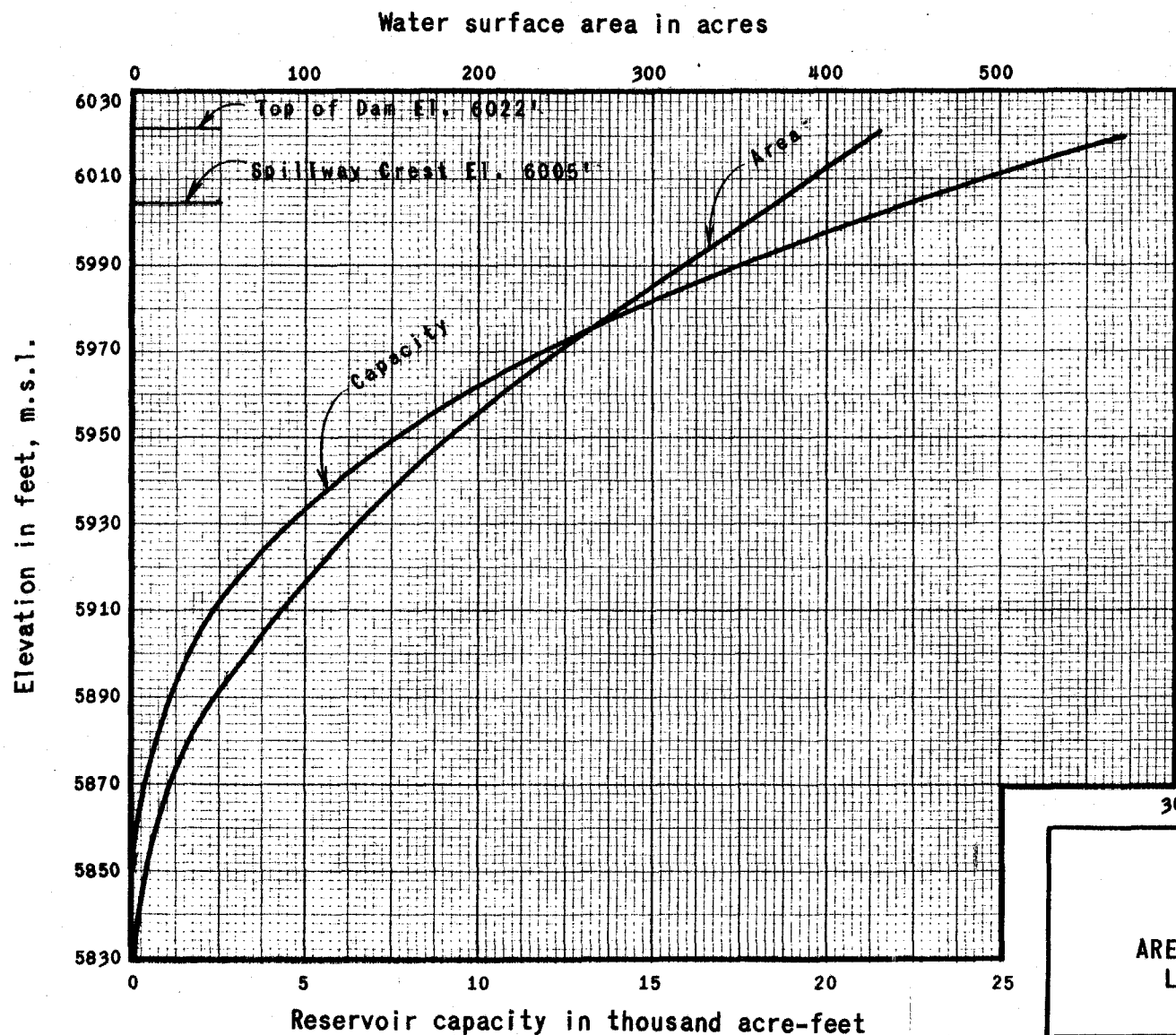
OUTLET RATING CURVE
LOST CREEK DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L. J. M.

Drawn: B. E. W. & S. K. N. Date: July 1970

Revised 1971



WEBER RIVER RESERVOIRS
UTAH

AREA AND CAPACITY CURVES LOST CREEK RESERVOIR

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: T.V.H. Date: July 1970
Drawn: B.E.W.&S.K.N.

NOTE:

Data furnished by US Bureau of Reclamation.

WEBER BASIN PROJECT LOST CREEK RESERVOIR

CAPACITY IN ACRE FEET

JULY 30, 1962

ELEV.		1	2	3	4	5	6	7	8	9
5830						1	1	2	3	4
5840	5	7	9	12	16	20	25	30	36	42
5850	48	56	63	71	80	89	99	110	121	133
5860	146	159	174	189	205	222	240	259	278	299
5870	320	342	365	388	413	439	466	494	524	554
5880	586	619	653	688	725	763	802	843	886	930
5890	976	1020	1070	1120	1180	1230	1290	1350	1410	1470
5900	1530	1600	1670	1740	1810	1880	1960	2040	2120	2210
5910	2290	2380	2470	2570	2660	2760	2860	2970	3070	3180
5920	3290	3400	3510	3630	3740	3860	3990	4110	4230	4360
5930	4490	4620	4760	4890	5030	5170	5310	5460	5600	5750
5940	5910	6060	6220	6380	6540	6700	6870	7030	7200	7380
5950	7550	7730	7920	8100	8290	8480	8680	8880	9080	9290
5960	9490	9710	9920	10140	10370	10590	10820	11050	11290	11520
5970	11760	12010	12260	12520	12780	13040	13310	13580	13850	14130
5980	14410	14690	14980	15260	15560	15850	16150	16460	16770	17080
5990	17390	17710	18030	18350	18680	19010	19340	19680	20020	20370
6000	20720	21070	21420	21780	22140	22510	22870	23240	23620	24000
6010	24390	24780	25180	25580	25980	26390	26810	27220	27640	28060
6020	28490									

WEBER BASIN PROJECT LOST CREEK RESERVOIR

AREA IN ACRES

JULY 30, 1962

ELEV.		1	2	3	4	5	6	7	8	9
5830										
5840	2	2	3	3	4	4	1 5	1 5	1 6	1 6
5850	7	7	8	8	9	10	10	11	12	12
5860	13	14	15	16	17	17	18	19	20	21
5870	21	22	23	24	25	26	28	29	30	31
5880	32	34	35	36	37	39	40	42	43	45
5890	47	49	50	52	53	55	57	59	61	64
5900	66	68	69	71	73	75	78	80	83	86
5910	89	91	93	95	97	99	101	104	106	109
5920	110	112	114	116	118	120	122	124	126	128
5930	130	132	135	137	139	141	144	146	149	151
5940	154	155	157	160	162	164	167	169	172	175
5950	178	181	184	187	191	194	197	201	204	207
5960	211	214	218	221	224	227	230	233	236	239
5970	242	248	253	258	262	266	269	272	275	278
5980	280	284	287	291	295	298	302	305	309	313
5990	316	319	322	325	329	332	336	339	343	347
6000	351	353	356	359	362	365	369	374	379	384
6010	390	395	399	403	407	411	415	418	421	424
6020	427									

WEBER BASIN PROJECT LOST CREEK RESERVOIR

CAPACITY IN ACRE FEET

JULY 30, 1962

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5830 5831 5832 5833 5834								1	1	1
5835 5836 5837 5838 5839	1 1 2 3 4	1 1 2 3 4	1 1 2 3 4	1 1 2 3 4	1 1 2 3 4	1 1 2 3 4	1 1 2 3 5	1 2 2 3 5	1 2 2 3 5	1 2 3 4 5
5840 5841 5842 5843 5844	5 7 9 12 16	5 7 10 13 16	5 7 10 13 17	6 8 10 13 17	6 8 11 14 18	6 8 11 14 18	6 8 11 15 18	6 9 12 15 19	7 9 12 15 19	7 9 12 16 20
5845 5846 5847 5848 5849	20 25 30 36 42	21 25 30 36 42	21 26 31 37 43	21 26 32 37 44	22 27 32 38 44	22 27 33 39 45	23 28 33 39 46	23 28 34 40 46	24 29 34 40 47	24 29 35 41 48
5850 5851 5852 5853 5854	48 56 63 71 80	49 56 64 72 81	50 57 65 73 82	51 58 66 74 83	51 59 66 75 84	52 59 67 76 85	53 60 68 77 86	53 61 69 77 86	54 62 70 78 87	55 62 71 79 88
5855 5856 5857 5858 5859	89 99 110 121 133	90 100 111 122 134	91 101 112 123 136	92 102 113 125 137	93 103 114 126 138	94 104 115 127 139	95 106 116 128 141	96 107 118 129 142	97 108 119 131 143	98 109 120 132 144
5860 5861 5862 5863 5864	146 159 174 189 205	147 161 175 191 207	148 162 177 192 209	150 164 178 194 210	151 165 180 196 212	152 167 181 197 214	154 168 183 199 215	155 169 184 200 217	157 171 186 202 219	158 172 188 204 221
5865 5866 5867 5868 5869	222 240 259 278 299	224 242 261 280 301	226 244 263 282 303	228 246 265 284 305	229 248 267 286 307	231 249 269 288 309	233 251 270 290 311	235 253 272 292 313	237 255 274 295 315	238 257 276 297 318
5870 5871 5872 5873 5874	320 342 365 388 413	322 344 367 391 416	324 346 369 393 418	326 348 372 396 421	328 351 374 398 423	331 353 376 401 426	333 355 379 403 429	335 358 381 406 431	337 360 384 408 434	339 362 386 411 436

WEBER BASIN PROJECT LOST CREEK RESERVOIR

CAPACITY IN ACRE FEET

JULY 30, 1962

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5875	439	442	444	447	450	452	455	458	461	463
5876	466	469	472	474	477	480	483	486	489	491
5877	494	497	500	503	506	509	512	515	518	521
5878	524	527	530	533	536	539	542	545	548	551
5879	554	557	560	564	567	570	573	576	579	583
5880	586	589	592	596	599	602	606	609	612	616
5881	619	622	626	629	632	636	639	643	646	650
5882	653	657	660	664	667	671	674	678	681	685
5883	688	692	696	699	703	707	710	714	718	721
5884	725	729	732	736	740	744	748	751	755	759
5885	763	767	771	775	778	782	786	790	794	798
5886	802	806	810	814	818	822	827	831	835	839
5887	843	847	851	856	860	864	868	873	877	881
5888	886	890	894	899	903	908	912	916	921	925
5889	930	934	939	943	948	953	957	962	967	971
5890	976	981	985	990	995	1000	1000	1010	1010	1020
5891	1020	1030	1030	1040	1040	1050	1050	1060	1060	1070
5892	1070	1080	1080	1090	1090	1100	1100	1110	1110	1120
5893	1120	1130	1130	1140	1140	1150	1160	1160	1170	1170
5894	1180	1180	1190	1190	1200	1200	1210	1210	1220	1230
5895	1230	1240	1240	1250	1250	1260	1260	1270	1280	1280
5896	1290	1290	1300	1300	1310	1320	1320	1330	1330	1340
5897	1350	1350	1360	1360	1370	1380	1380	1390	1390	1400
5898	1410	1410	1420	1420	1430	1440	1440	1450	1460	1460
5899	1470	1470	1480	1490	1490	1500	1510	1510	1520	1530
5900	1530	1540	1550	1550	1560	1570	1570	1580	1590	1590
5901	1600	1610	1610	1620	1630	1630	1640	1650	1650	1660
5902	1670	1670	1680	1690	1700	1700	1710	1720	1720	1730
5903	1740	1750	1750	1760	1770	1770	1780	1790	1800	1800
5904	1810	1820	1830	1830	1840	1850	1850	1860	1870	1880
5905	1880	1890	1900	1910	1910	1920	1930	1940	1950	1950
5906	1960	1970	1980	1980	1990	2000	2010	2020	2020	2030
5907	2040	2050	2060	2060	2070	2080	2090	2100	2110	2110
5908	2120	2130	2140	2150	2150	2160	2170	2180	2190	2200
5909	2210	2210	2220	2230	2240	2250	2260	2270	2280	2280
5910	2290	2300	2310	2320	2330	2340	2350	2360	2360	2370
5911	2380	2390	2400	2410	2420	2430	2440	2450	2460	2470
5912	2470	2480	2490	2500	2510	2520	2530	2540	2550	2560
5913	2570	2580	2590	2600	2610	2620	2630	2640	2650	2660
5914	2660	2670	2680	2690	2700	2710	2720	2730	2740	2750
5915	2760	2770	2780	2790	2800	2810	2820	2830	2840	2850
5916	2860	2870	2880	2890	2900	2910	2920	2930	2950	2960
5917	2970	2980	2990	3000	3010	3020	3030	3040	3050	3060
5918	3070	3080	3090	3100	3110	3120	3130	3150	3160	3170
5919	3180	3190	3200	3210	3220	3230	3240	3250	3260	3280

WEBER BASIN PROJECT LOST CREEK RESERVOIR

CAPACITY IN ACRE FEET

JULY 30, 1962

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5920	3290	3300	3310	3320	3330	3340	3350	3360	3380	3390
5921	3400	3410	3420	3430	3440	3450	3470	3480	3490	3500
5922	3510	3520	3530	3550	3560	3570	3580	3590	3600	3620
5923	3630	3640	3650	3660	3670	3690	3700	3710	3720	3730
5924	3740	3760	3770	3780	3790	3800	3820	3830	3840	3850
5925	3860	3880	3890	3900	3910	3920	3940	3950	3960	3970
5926	3990	4000	4010	4020	4030	4050	4060	4070	4080	4100
5927	4110	4120	4130	4150	4160	4170	4180	4200	4210	4220
5928	4230	4250	4260	4270	4290	4300	4310	4320	4340	4350
5929	4360	4370	4390	4400	4410	4430	4440	4450	4470	4480
5930	4490	4500	4520	4530	4540	4560	4570	4580	4600	4610
5931	4620	4640	4650	4660	4680	4690	4700	4720	4730	4740
5932	4760	4770	4780	4800	4810	4820	4840	4850	4860	4880
5933	4890	4910	4920	4930	4950	4960	4970	4990	5000	5020
5934	5030	5040	5060	5070	5090	5100	5110	5130	5140	5160
5935	5170	5180	5200	5210	5230	5240	5260	5270	5280	5300
5936	5310	5330	5340	5360	5370	5380	5400	5410	5430	5440
5937	5460	5470	5490	5500	5520	5530	5550	5560	5580	5590
5938	5600	5620	5630	5650	5660	5680	5690	5710	5720	5740
5939	5750	5770	5790	5800	5820	5830	5850	5860	5880	5890
5940	5910	5920	5940	5950	5970	5980	6000	6020	6030	6050
5941	6060	6080	6090	6110	6120	6140	6160	6170	6190	6200
5942	6220	6230	6250	6270	6280	6300	6310	6330	6340	6360
5943	6380	6390	6410	6420	6440	6460	6470	6490	6500	6520
5944	6540	6550	6570	6590	6600	6620	6630	6650	6670	6680
5945	6700	6720	6730	6750	6770	6780	6800	6820	6830	6850
5946	6870	6880	6900	6920	6930	6950	6970	6980	7000	7020
5947	7030	7050	7070	7080	7100	7120	7140	7150	7170	7190
5948	7200	7220	7240	7260	7270	7290	7310	7320	7340	7360
5949	7380	7390	7410	7430	7450	7460	7480	7500	7520	7540
5950	7550	7570	7590	7610	7620	7640	7660	7680	7700	7710
5951	7730	7750	7770	7790	7810	7820	7840	7860	7880	7900
5952	7920	7930	7950	7970	7990	8010	8030	8050	8060	8080
5953	8100	8120	8140	8160	8180	8200	8210	8230	8250	8270
5954	8290	8310	8330	8350	8370	8390	8410	8420	8440	8460
5955	8480	8500	8520	8540	8560	8580	8600	8620	8640	8660
5956	8680	8700	8720	8740	8760	8780	8800	8820	8840	8860
5957	8880	8900	8920	8940	8960	8980	9000	9020	9040	9060
5958	9080	9100	9120	9140	9160	9180	9200	9220	9240	9260
5959	9290	9310	9330	9350	9370	9390	9410	9430	9450	9470
5960	9490	9520	9540	9560	9580	9600	9620	9640	9660	9690
5961	9710	9730	9750	9770	9790	9810	9840	9860	9880	9900
5962	9920	9940	9970	9990	10010	10030	10050	10080	10100	10120
5963	10140	10160	10190	10210	10230	10250	10280	10300	10320	10340
5964	10370	10390	10410	10430	10460	10480	10500	10520	10550	10570

WEBER BASIN PROJECT LOST CREEK RESERVOIR

CAPACITY IN ACRE FEET

JULY 30, 1962

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5965	10590	10610	10640	10660	10680	10710	10730	10750	10770	10800
5966	10820	10840	10870	10890	10910	10940	10960	10980	11010	11030
5967	11050	11080	11100	11120	11150	11170	11190	11220	11240	11260
5968	11290	11310	11330	11360	11380	11410	11430	11450	11480	11500
5969	11520	11550	11570	11600	11620	11640	11670	11690	11720	11740
5970	11760	11790	11810	11840	11860	11890	11910	11940	11960	11990
5971	12010	12030	12060	12080	12110	12130	12160	12180	12210	12230
5972	12260	12290	12310	12340	12360	12390	12410	12440	12460	12490
5973	12520	12540	12570	12590	12620	12650	12670	12700	12720	12750
5974	12780	12800	12830	12850	12880	12910	12930	12960	12990	13010
5975	13040	13070	13090	13120	13150	13170	13200	13230	13250	13280
5976	13310	13330	13360	13390	13420	13440	13470	13500	13520	13550
5977	13580	13610	13630	13660	13690	13710	13740	13770	13800	13820
5978	13850	13880	13910	13930	13960	13990	14020	14050	14070	14100
5979	14130	14160	14180	14210	14240	14270	14300	14320	14350	14380
5980	14410	14440	14460	14490	14520	14550	14580	14600	14630	14660
5981	14690	14720	14750	14780	14800	14830	14860	14890	14920	14950
5982	14980	15000	15030	15060	15090	15120	15150	15180	15210	15240
5983	15260	15290	15320	15350	15380	15410	15440	15470	15500	15530
5984	15560	15590	15620	15650	15680	15710	15740	15760	15790	15820
5985	15850	15880	15910	15940	15970	16000	16030	16060	16090	16120
5986	16150	16180	16210	16240	16280	16310	16340	16370	16400	16430
5987	16460	16490	16520	16550	16580	16610	16640	16670	16700	16730
5988	16770	16800	16830	16860	16890	16920	16950	16980	17010	17040
5989	17080	17110	17140	17170	17200	17230	17260	17300	17330	17360
5990	17390	17420	17450	17490	17520	17550	17580	17610	17640	17680
5991	17710	17740	17770	17800	17840	17870	17900	17930	17960	18000
5992	18030	18060	18090	18130	18160	18190	18220	18260	18290	18320
5993	18350	18390	18420	18450	18480	18520	18550	18580	18610	18650
5994	18680	18710	18750	18780	18810	18840	18880	18910	18940	18980
5995	19010	19040	19080	19110	19140	19180	19210	19240	19280	19310
5996	19340	19380	19410	19450	19480	19510	19550	19580	19610	19650
5997	19680	19720	19750	19780	19820	19850	19890	19920	19950	19990
5998	20020	20060	20090	20130	20160	20200	20230	20260	20300	20330
5999	20370	20400	20440	20470	20510	20540	20580	20610	20650	20680
6000	20720	20750	20790	20820	20860	20890	20930	20960	21000	21030
6001	21070	21100	21140	21180	21210	21250	21280	21320	21350	21390
6002	21420	21460	21500	21530	21570	21600	21640	21670	21710	21750
6003	21780	21820	21850	21890	21930	21960	22000	22030	22070	22110
6004	22140	22180	22210	22250	22290	22320	22360	22400	22430	22470
6005	22510	22540	22580	22620	22650	22690	22730	22760	22800	22840
6006	22870	22910	22950	22980	23020	23060	23100	23130	23170	23210
6007	23240	23280	23320	23360	23390	23430	23470	23510	23540	23580
6008	23620	23660	23700	23730	23770	23810	23850	23890	23920	23960
6009	24000	24040	24080	24120	24160	24190	24230	24270	24310	24350

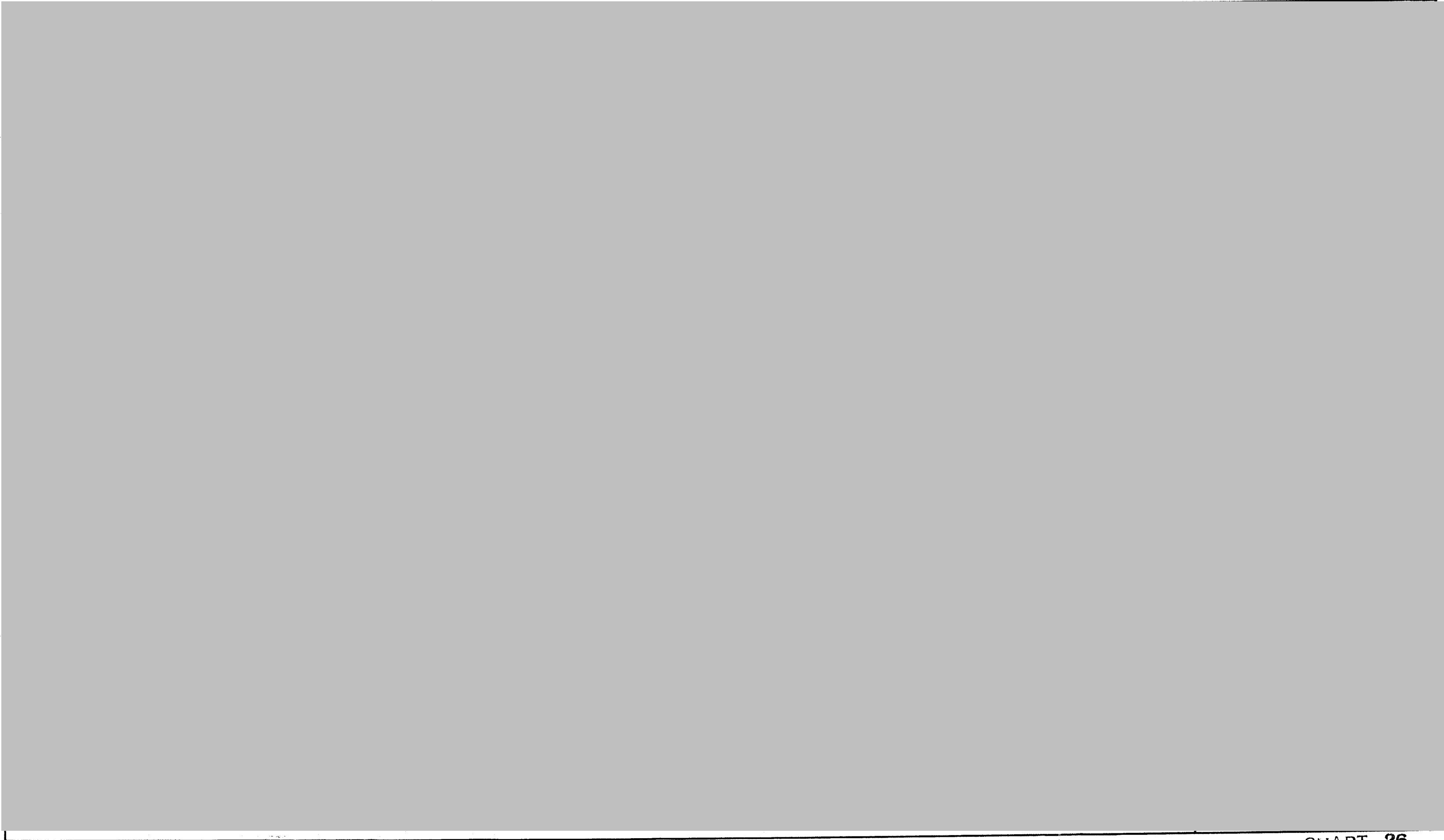
WEBER BASIN PROJECT
LOST CREEK RESERVOIR

CAPACITY IN ACRE FEET

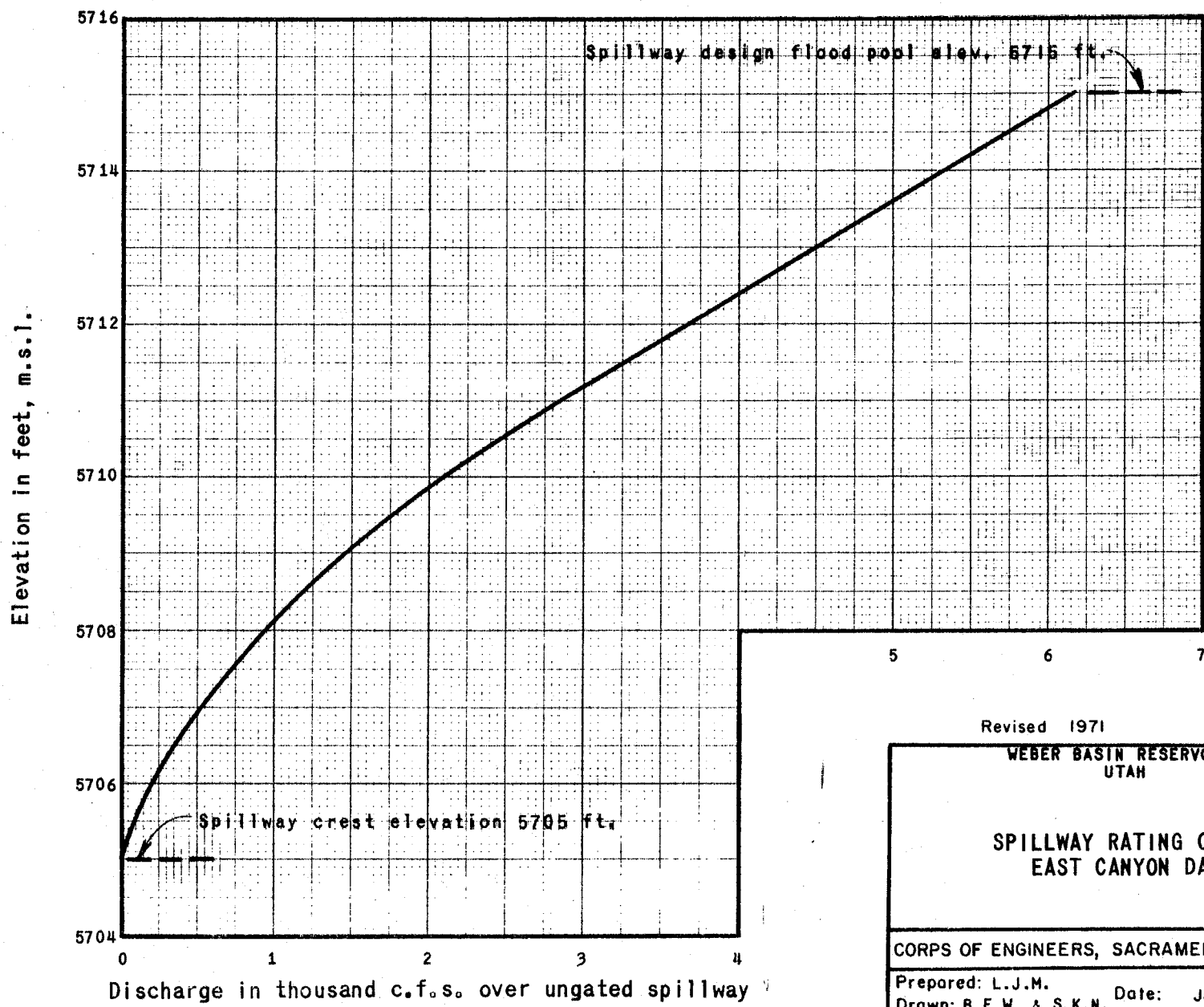
JULY 30, 1962

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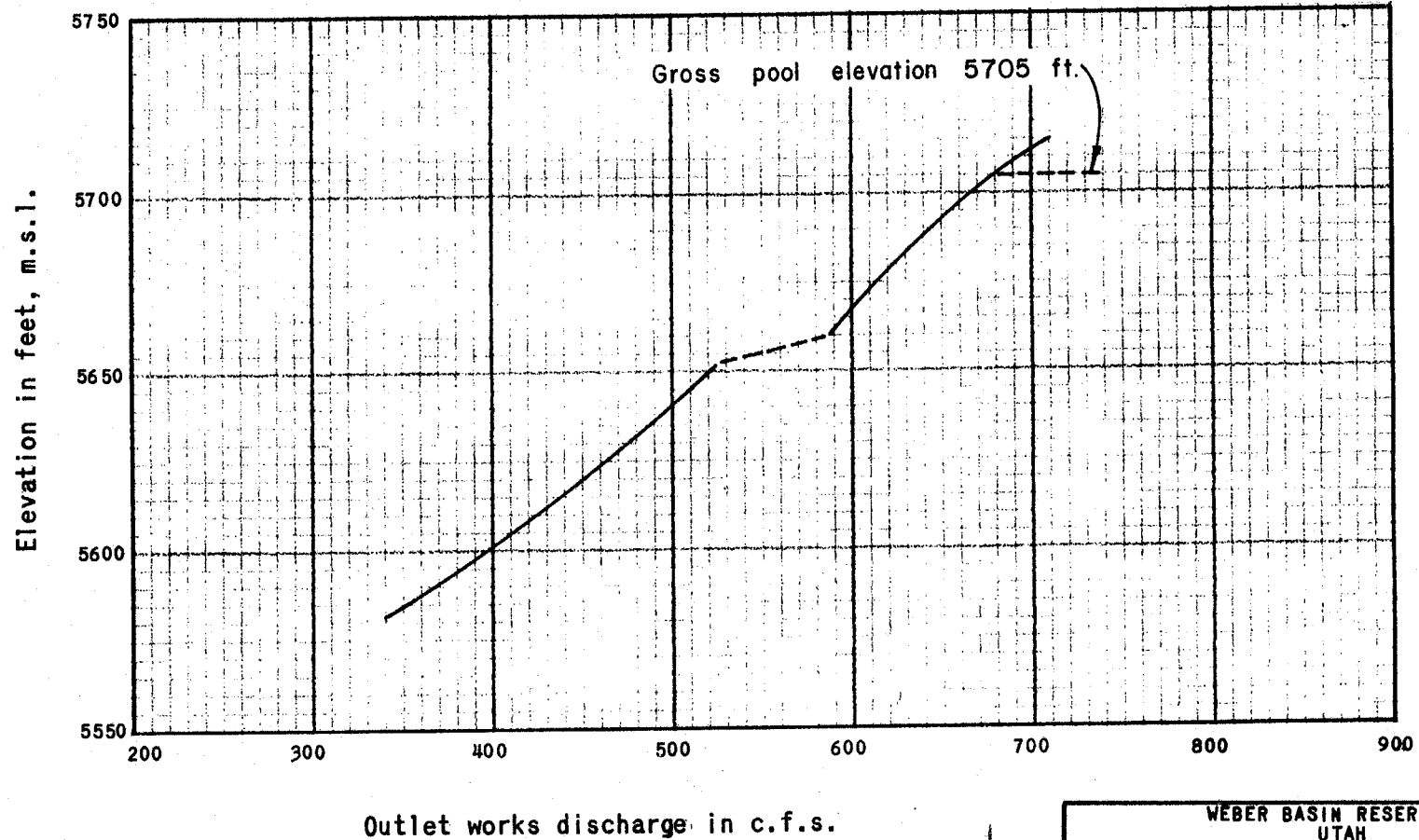
Revised 1971

WEBER BASIN RESERVOIRS
UTAH

SPILLWAY RATING CURVE
EAST CANYON DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M. Date: July 1970
Drawn: B.E.W. & S.K.N.



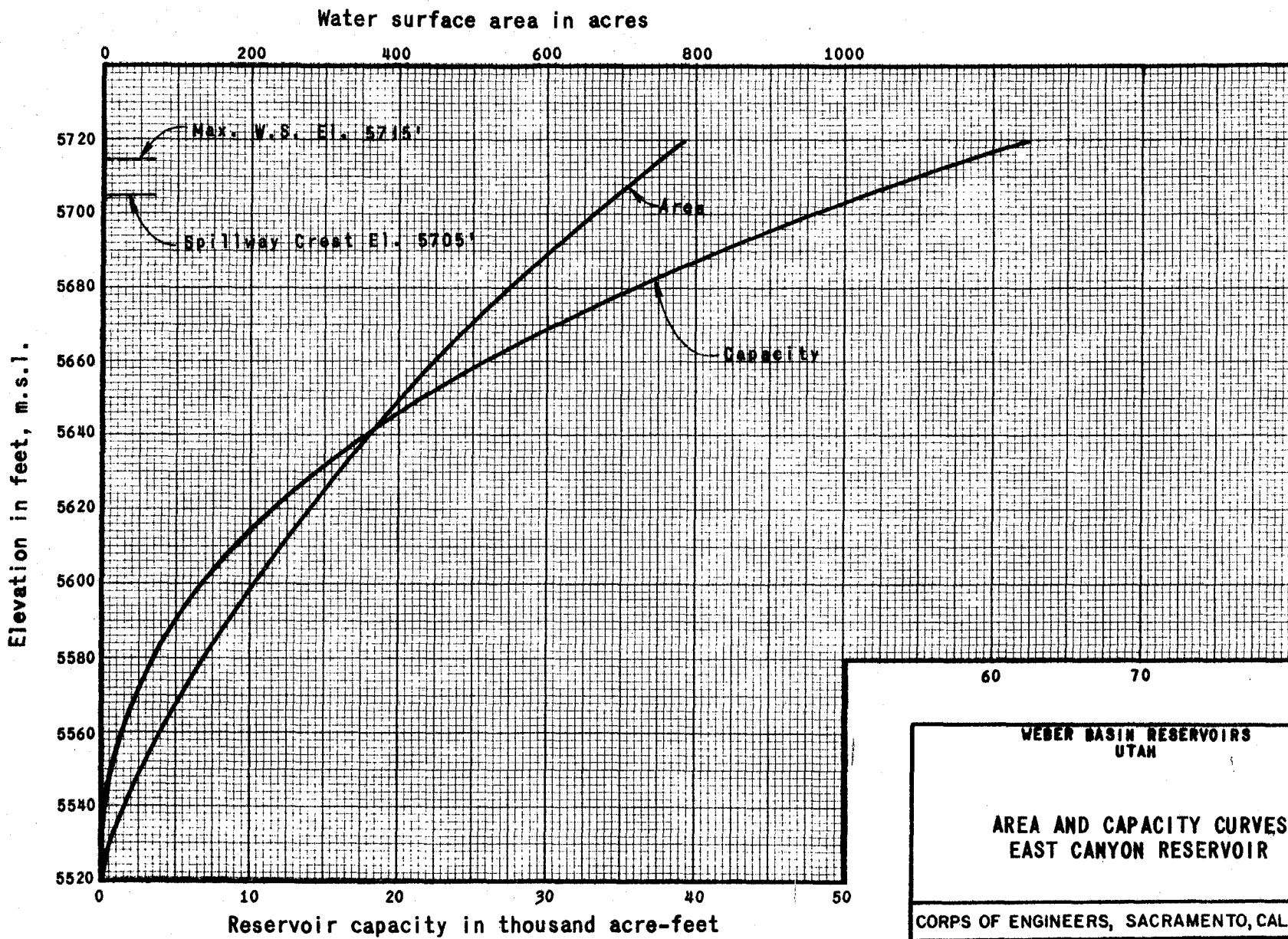
WEBER BASIN RESERVOIRS
UTAH

OUTLET RATING CURVE
EAST CANYON DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M. Date: July 1970
Drawn: B.E.W. & S.K.N.

Revised 1971



NOTE: Data furnished by US Bureau of Reclamation.

WEBER BASIN RESERVOIRS
UTAH

AREA AND CAPACITY CURVES
EAST CANYON RESERVOIR

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: T.V.H. Date: July 1970
Drawn: B.E.W.&S.K.N.

**WEBER BASIN PROJECT
EAST CANYON RESERVOIR
AREA IN ACRES**

JULY 1, 1963

ELEVATION FEET		1	2	3	4	5	6	7	8	9
5520				1	1	2	2	3	4	6
5530	7	8	10	12	14	16	18	20	23	26
5540	28	31	34	36	39	42	44	47	50	53
5550	55	58	61	63	66	69	71	74	77	80
5560	82	85	88	91	94	97	100	103	105	108
5570	110	113	115	118	120	123	125	127	130	132
5580	134	137	140	143	146	149	152	155	158	162
5590	165	169	172	176	180	184	188	192	196	200
5600	205	208	211	215	218	222	225	229	232	236
5610	239	243	247	250	254	258	262	266	270	274
5620	278	282	286	290	294	299	303	307	311	315
5630	319	323	326	330	334	338	342	345	349	353
5640	356	361	365	369	373	377	381	386	390	394
5650	399	403	407	412	416	421	425	430	434	439
5660	444	448	453	458	463	468	473	478	483	488
5670	493	498	503	508	513	518	523	528	533	539
5680	544	550	556	562	568	574	579	585	591	597
5690	602	608	613	619	624	629	635	640	645	650
5700	656	661	667	673	678	684	690	696	702	709
5710	715	721	727	734	740	747	753	760	767	774
5720	781									

WEBER BASIN PROJECT EAST CANYON RESERVOIR

CAPACITY IN ACRE-FEET

JULY 1, 1963

ELEVATION FEET		1	2	3	4	5	6	7	8	9
5520				1	2	3	5	8	12	17
5530	23	31	40	51	63	78	95	114	136	160
5540	187	217	249	284	322	363	406	452	500	551
5550	605	662	721	783	848	915	986	1060	1130	1210
5560	1290	1380	1460	1550	1650	1740	1840	1940	2050	2150
5570	2260	2370	2490	2600	2720	2840	2970	3090	3220	3350
5580	3490	3620	3760	3900	4050	4190	4340	4500	4650	4810
5590	4980	5140	5320	5490	5670	5850	6030	6220	6420	6620
5600	6820	7030	7230	7450	7660	7880	8110	8330	8560	8800
5610	9040	9280	9520	9770	10020	10280	10540	10800	11070	11340
5620	11620	11900	12180	12470	12760	13060	13360	13660	13970	14280
5630	14600	14920	15250	15580	15910	16250	16580	16930	17270	17620
5640	17980	18340	18700	19070	19440	19810	20190	20580	20970	21360
5650	21750	22160	22560	22970	23380	23800	24230	24650	25090	25520
5660	25960	26410	26860	27320	27780	28240	28710	29190	29670	30150
5670	30640	31140	31640	32140	32650	33170	33690	34210	34750	35280
5680	35820	36370	36920	37480	38050	38620	39200	39780	40360	40970
5690	41560	42160	42770	43390	44010	44640	45270	45910	46550	47200
5700	47850	48510	49170	49840	50520	51200	51890	52580	53280	53990
5710	54700	55420	56140	56870	57610	58350	59100	59860	60620	61390
5720	62170									

FURNISHED BY U S B R

Sheet 2, CHART 31

WEBER BASIN PROJECT EAST CANYON RESERVOIR

CAPACITY IN ACRE-FEET

JULY 1, 1963

ELEVATION FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5520										
5521										
5522								1	1	1
5523	1	1	1	1	1	1	1	1	1	1
5524	2	2	2	2	2	2	2	2	3	3
5525	3	3	3	4	4	4	4	4	5	5
5526	5	5	6	6	6	6	7	7	7	8
5527	8	8	9	9	9	10	10	11	11	11
5528	12	12	13	13	14	14	15	15	16	16
5529	17	17	18	19	19	20	20	21	22	22
5530	23	24	24	25	26	27	28	28	29	30
5531	31	32	32	33	34	35	36	37	38	39
5532	40	41	42	43	44	45	46	47	49	50
5533	51	52	53	55	56	57	58	60	61	62
5534	63	65	66	68	69	71	72	74	75	77
5535	78	80	82	83	85	87	88	90	92	93
5536	95	97	99	101	103	105	107	109	110	112
5537	114	116	119	121	123	125	127	129	132	134
5538	136	138	141	143	146	148	151	153	155	158
5539	160	163	166	168	171	174	176	179	182	185
5540	187	190	193	196	199	202	205	208	211	214
5541	217	220	223	227	230	233	236	240	243	246
5542	249	253	256	260	263	267	270	274	277	281
5543	284	288	292	296	300	303	307	311	315	318
5544	322	326	330	334	338	343	347	351	355	359
5545	363	367	371	376	380	384	389	393	397	402
5546	406	410	415	420	424	429	433	438	443	447
5547	452	457	461	466	471	476	481	486	491	495
5548	500	505	510	513	521	526	531	536	541	546
5549	551	557	562	568	573	578	584	589	595	600
5550	605	611	617	622	628	634	639	645	651	656
5551	662	668	674	680	686	692	698	704	709	715
5552	721	727	734	740	746	752	759	765	771	777
5553	783	790	796	803	809	816	822	829	835	842
5554	848	855	861	868	875	882	888	895	902	909
5555	915	922	929	936	943	951	958	965	972	979
5556	986	993	1000	1010	1010	1020	1030	1040	1040	1050
5557	1060	1070	1070	1080	1090	1100	1100	1110	1120	1130
5558	1130	1140	1150	1160	1170	1170	1180	1190	1200	1200
5559	1210	1220	1230	1240	1240	1250	1260	1270	1280	1290
5560	1290	1300	1310	1320	1330	1340	1340	1350	1360	1370
5561	1380	1390	1390	1400	1410	1420	1430	1440	1450	1460
5562	1460	1470	1480	1490	1500	1510	1520	1530	1540	1540
5563	1550	1560	1570	1580	1590	1600	1610	1620	1630	1640
5564	1650	1660	1670	1680	1680	1690	1700	1710	1720	1730
5565	1740	1750	1760	1770	1780	1790	1800	1810	1820	1830
5566	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930
5567	1940	1950	1960	1970	1980	1990	2000	2010	2020	2040
5568	2050	2060	2070	2080	2090	2100	2110	2120	2130	2140
5569	2150	2160	2170	2180	2200	2210	2220	2230	2240	2250

FURNISHED BY U S B R

Sheet 3, CHART 31

WEBER BASIN PROJECT EAST CANYON RESERVOIR

CAPACITY IN ACRE-FEET

JULY 1, 1963

ELEVATION FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5570	2260	2270	2280	2290	2310	2320	2330	2340	2350	2360
5571	2370	2380	2400	2410	2420	2430	2440	2450	2460	2480
5572	2490	2500	2510	2520	2530	2550	2560	2570	2580	2590
5573	2600	2620	2630	2640	2650	2660	2680	2690	2700	2710
5574	2720	2740	2750	2760	2770	2780	2800	2810	2820	2830
5575	2840	2860	2870	2880	2890	2910	2920	2930	2940	2960
5576	2970	2980	2990	3010	3020	3030	3040	3060	3070	3080
5577	3090	3110	3120	3130	3150	3160	3170	3180	3200	3210
5578	3220	3240	3250	3260	3280	3290	3300	3310	3330	3340
5579	3350	3370	3380	3390	3410	3420	3430	3450	3460	3470
5580	3490	3500	3510	3530	3540	3560	3570	3580	3600	3610
5581	3620	3640	3650	3660	3680	3690	3710	3720	3730	3750
5582	3760	3780	3790	3800	3820	3830	3850	3860	3870	3890
5583	3900	3920	3930	3950	3960	3970	3990	4000	4020	4030
5584	4050	4060	4080	4090	4110	4120	4140	4150	4160	4180
5585	4190	4210	4220	4240	4250	4270	4280	4300	4310	4330
5586	4340	4360	4380	4390	4410	4420	4440	4450	4470	4480
5587	4500	4510	4530	4540	4560	4580	4590	4610	4620	4640
5588	4650	4670	4690	4700	4720	4730	4750	4770	4780	4800
5589	4810	4830	4850	4860	4880	4900	4910	4930	4950	4960
5590	4980	4990	5010	5030	5040	5060	5080	5090	5110	5130
5591	5140	5160	5180	5200	5210	5230	5250	5260	5280	5300
5592	5320	5330	5350	5370	5380	5400	5420	5440	5450	5470
5593	5490	5510	5520	5540	5560	5580	5600	5610	5630	5650
5594	5670	5690	5700	5720	5740	5760	5780	5790	5810	5830
5595	5850	5870	5890	5900	5920	5940	5960	5980	6000	6020
5596	6030	6050	6070	6090	6110	6130	6150	6170	6190	6210
5597	6220	6240	6260	6280	6300	6320	6340	6360	6380	6400
5598	6420	6440	6460	6480	6500	6520	6540	6560	6580	6600
5599	6620	6640	6660	6680	6700	6720	6740	6760	6780	6800
5600	6820	6840	6860	6880	6900	6920	6940	6960	6980	7000
5601	7030	7050	7070	7090	7110	7130	7150	7170	7190	7210
5602	7230	7260	7280	7300	7320	7340	7360	7380	7400	7430
5603	7450	7470	7490	7510	7530	7560	7580	7600	7620	7640
5604	7660	7690	7710	7730	7750	7770	7800	7820	7840	7860
5605	7880	7910	7930	7950	7970	8000	8020	8040	8060	8080
5606	8110	8130	8150	8180	8200	8220	8240	8270	8290	8310
5607	8330	8360	8380	8400	8430	8450	8470	8490	8520	8540
5608	8560	8590	8610	8630	8660	8680	8700	8730	8750	8770
5609	8800	8820	8850	8870	8890	8920	8940	8960	8990	9010
5610	9040	9060	9080	9110	9130	9160	9180	9200	9230	9250
5611	9280	9300	9330	9350	9370	9400	9420	9450	9470	9500
5612	9520	9550	9570	9600	9620	9650	9670	9700	9720	9750
5613	9770	9800	9820	9850	9870	9900	9920	9950	9970	10000
5614	10020	10050	10070	10100	10130	10150	10180	10200	10230	10250
5615	10280	10310	10330	10360	10380	10410	10430	10460	10490	10510
5616	10540	10570	10590	10620	10640	10670	10700	10720	10750	10780
5617	10800	10830	10860	10880	10910	10940	10960	10990	11020	11040
5618	11070	11100	11120	11150	11180	11210	11230	11260	11290	11320
5619	11340	11370	11400	11420	11450	11480	11510	11540	11560	11590

FURNISHED BY U S B R

Sheet 4, CHART 31

**WEBER BASIN PROJECT
EAST CANYON RESERVOIR**
CAPACITY IN ACRE-FEET

JULY 1, 1963

ELEVATION FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5620	11620	11650	11670	11700	11730	11760	11790	11810	11840	11870
5621	11900	11920	11950	11980	12010	12040	12070	12100	12120	12150
5622	12180	12210	12240	12270	12300	12330	12350	12380	12410	12440
5623	12470	12500	12530	12560	12590	12620	12650	12680	12710	12730
5624	12760	12790	12820	12850	12880	12910	12940	12970	13000	13030
5625	13060	13090	13120	13150	13180	13210	13240	13270	13300	13330
5626	13360	13390	13420	13450	13480	13510	13540	13570	13600	13630
5627	13660	13690	13720	13760	13790	13820	13850	13880	13910	13940
5628	13970	14000	14030	14070	14100	14130	14160	14190	14220	14250
5629	14280	14320	14350	14380	14410	14440	14470	14510	14540	14570
5630	14600	14630	14670	14700	14730	14760	14790	14830	14860	14890
5631	14920	14950	14990	15020	15050	15090	15120	15150	15180	15220
5632	15250	15280	15310	15350	15380	15410	15450	15480	15510	15540
5633	15580	15610	15640	15680	15710	15740	15780	15810	15840	15880
5634	15910	15940	15980	16010	16040	16080	16110	16150	16180	16210
5635	16250	16280	16310	16350	16380	16420	16450	16480	16520	16550
5636	16580	16620	16650	16690	16720	16760	16790	16820	16860	16890
5637	16930	16960	17000	17030	17070	17100	17140	17170	17200	17240
5638	17270	17310	17340	17380	17410	17450	17480	17520	17550	17590
5639	17620	17660	17700	17730	17770	17800	17840	17870	17910	17940
5640	17980	18020	18050	18090	18120	18160	18200	18230	18270	18300
5641	18340	18380	18410	18450	18480	18520	18560	18590	18630	18670
5642	18700	18740	18780	18810	18850	18890	18920	18960	19000	19030
5643	19070	19110	19140	19180	19220	19250	19290	19330	19370	19400
5644	19440	19480	19510	19550	19590	19630	19660	19700	19740	19780
5645	19810	19850	19890	19930	19970	20000	20040	20080	20120	20160
5646	20190	20230	20270	20310	20350	20390	20420	20460	20500	20540
5647	20580	20620	20650	20690	20730	20770	20810	20850	20890	20930
5648	20970	21000	21040	21080	21120	21160	21200	21240	21280	21320
5649	21360	21400	21440	21480	21520	21560	21600	21640	21670	21710
5650	21750	21790	21830	21870	21910	21950	21990	22030	22070	22120
5651	22160	22200	22240	22280	22320	22360	22400	22440	22480	22520
5652	22560	22600	22640	22680	22720	22770	22810	22850	22890	22930
5653	22970	23010	23050	23090	23140	23180	23220	23260	23300	23340
5654	23380	23430	23470	23510	23550	23590	23640	23680	23720	23760
5655	23800	23840	23890	23930	23970	24010	24060	24100	24140	24180
5656	24230	24270	24310	24350	24400	24440	24480	24530	24570	24610
5657	24650	24700	24740	24780	24830	24870	24910	24960	25000	25040
5658	25090	25130	25170	25220	25260	25300	25350	25390	25440	25480
5659	25520	25570	25610	25650	25700	25740	25790	25830	25880	25920
5660	25960	26010	26050	26100	26140	26190	26230	26280	26320	26370
5661	26410	26460	26500	26550	26590	26640	26680	26730	26770	26820
5662	26860	26910	26950	27000	27040	27090	27130	27180	27230	27270
5663	27320	27360	27410	27450	27500	27550	27590	27640	27680	27730
5664	27780	27820	27870	27920	27960	28010	28060	28100	28150	28200
5665	28240	28290	28340	28380	28430	28480	28520	28570	28620	28670
5666	28710	28760	28810	28860	28900	28950	29000	29050	29090	29140
5667	29190	29240	29280	29330	29380	29430	29480	29520	29570	29620
5668	29670	29720	29770	29810	29860	29910	29960	30010	30060	30100
5669	30150	30200	30250	30300	30350	30400	30450	30500	30550	30590

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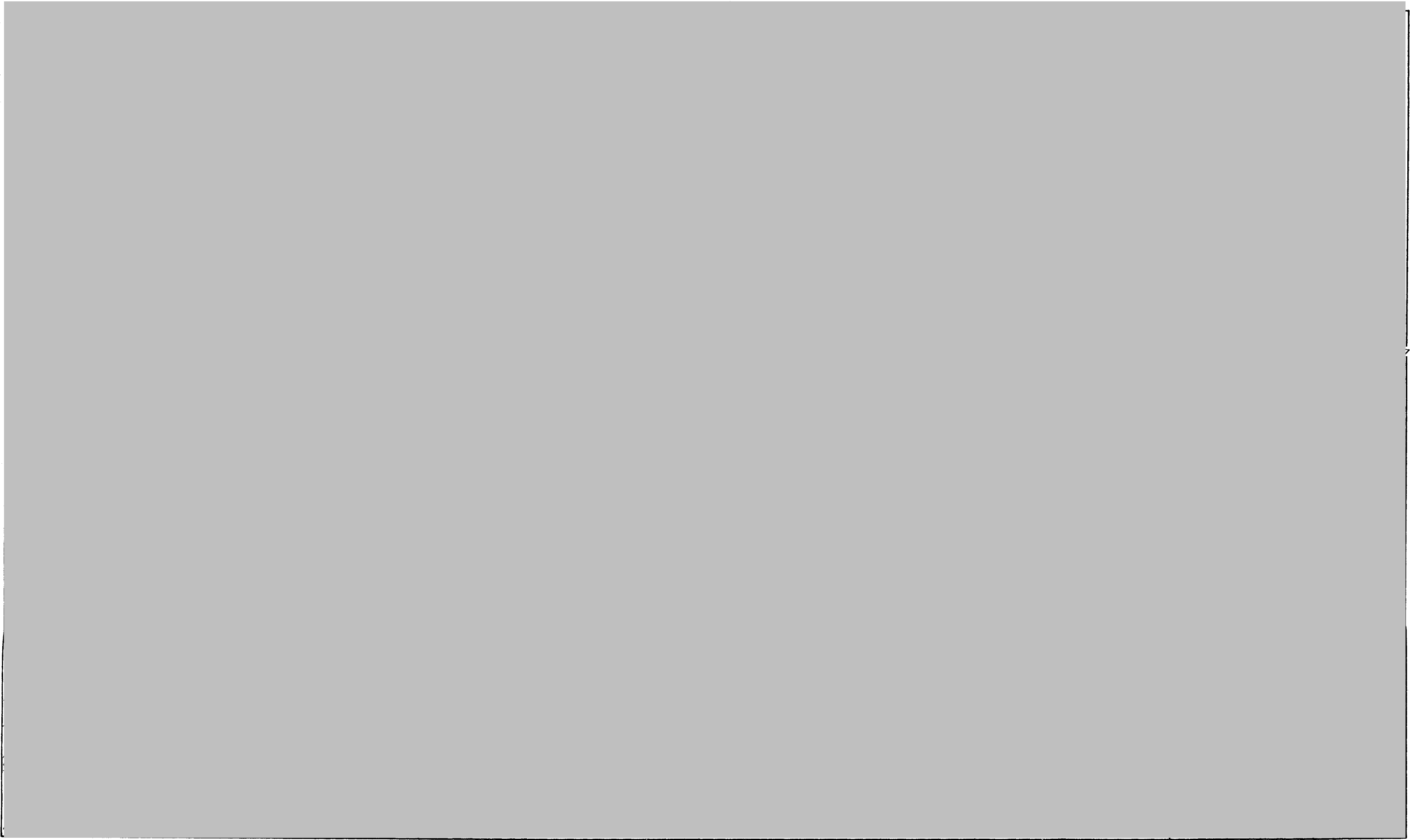
Sheet 5, CHART 31

WEBER BASIN PROJECT EAST CANYON RESERVOIR

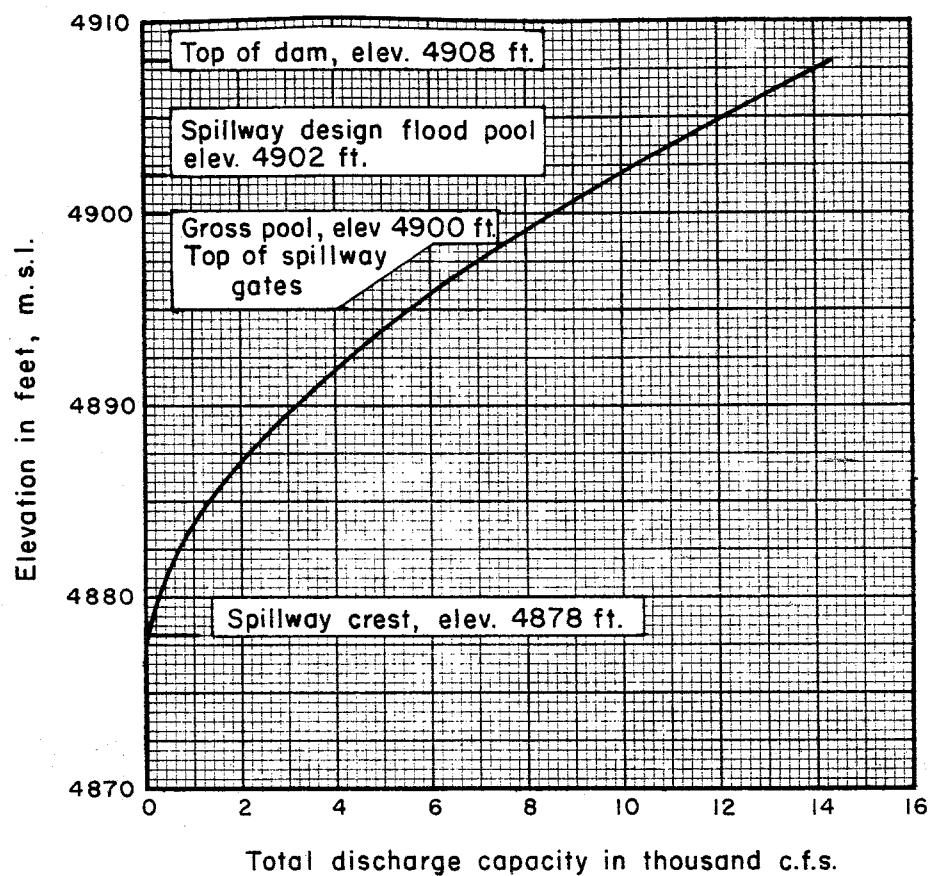
CAPACITY IN ACRE-FEET

JULY 1, 1963

ELEVATION FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5670	30640	30690	30740	30790	30840	30890	30940	30990	31040	31090
5671	31140	31190	31240	31290	31340	31390	31440	31490	31540	31590
5672	31640	31690	31740	31790	31840	31890	31940	31990	32040	32090
5673	32140	32190	32250	32300	32350	32400	32450	32500	32550	32600
5674	32650	32700	32760	32810	32860	32910	32960	33010	33070	33120
5675	33170	33220	33270	33330	33380	33430	33480	33530	33590	33640
5676	33690	33740	33790	33850	33900	33950	34000	34060	34110	34160
5677	34210	34270	34320	34370	34430	34480	34530	34590	34640	34690
5678	34750	34800	34850	34910	34960	35010	35070	35120	35170	35230
5679	35280	35340	35390	35440	35500	35550	35610	35660	35710	35770
5680	35820	35880	35930	35990	36040	36100	36150	36200	36260	36310
5681	36370	36420	36480	36540	36590	36650	36700	36760	36810	36870
5682	36920	36980	37040	37090	37150	37200	37260	37320	37370	37430
5683	37480	37540	37600	37650	37710	37770	37830	37880	37940	38000
5684	38050	38110	38170	38220	38280	38330	38390	38450	38500	38560
5685	38620	38670	38730	38790	38850	38910	38970	39020	39080	39140
5686	39200	39260	39320	39370	39430	39490	39550	39600	39660	39720
5687	39780	39840	39890	39950	40010	40070	40130	40190	40250	40310
5688	40360	40420	40480	40540	40600	40660	40720	40780	40850	40910
5689	40970	41020	41080	41140	41200	41260	41320	41380	41440	41500
5690	41560	41620	41680	41740	41800	41860	41920	41980	42040	42100
5691	42160	42230	42290	42350	42410	42470	42530	42590	42650	42710
5692	42770	42840	42900	42960	43020	43080	43150	43210	43270	43330
5693	43390	43460	43520	43580	43640	43700	43760	43820	43890	43950
5694	44010	44070	44130	44200	44260	44320	44390	44450	44510	44570
5695	44640	44700	44760	44830	44890	44950	45010	45080	45140	45200
5696	45270	45330	45400	45460	45520	45590	45650	45720	45780	45850
5697	45910	45970	46040	46100	46160	46230	46290	46360	46420	46480
5698	46550	46610	46680	46740	46810	46870	46940	47000	47070	47130
5699	47200	47260	47330	47390	47460	47520	47590	47650	47720	47790
5700	47850	47920	47980	8050	48110	48180	48250	48310	48380	48440
5701	48510	48580	48640	48710	48780	48840	48910	48970	49040	49110
5702	49170	49240	49310	49370	49440	49510	49580	49640	49710	49780
5703	49840	49910	49980	50050	50110	50180	50250	50320	50380	50450
5704	50520	50590	50660	50720	50790	50860	50930	51000	51060	51130
5705	51200	51270	51340	51410	51480	51540	51610	51680	51750	51820
5706	51890	51960	52030	52100	52170	52230	52300	52370	52440	52510
5707	52580	52650	52720	52790	52860	52930	53000	53070	53140	53210
5708	53280	53350	53420	53490	53560	53630	53700	53770	53840	53920
5709	53990	54060	54130	54200	54270	54340	54410	54480	54560	54630
5710	54700	54770	54840	54910	54980	55060	55130	55200	55270	55340
5711	55420	55490	55560	55630	55710	55780	55850	55920	55990	56070
5712	56140	56210	56290	56360	56430	56500	56580	56650	56720	56800
5713	56870	56940	57020	57090	57170	57240	57310	57390	57460	57530
5714	57610	57680	57760	57830	57910	57980	58050	58130	58200	58280
5715	58350	58430	58500	58580	58650	58730	58800	58880	58950	59030
5716	59100	59180	59250	59330	59400	59480	59560	59630	59710	59780
5717	59860	59930	60010	60090	60160	60240	60320	60390	60470	60550
5718	60620	60700	60780	60850	60930	61010	61080	61160	61240	61320
5719	61390	61470	61550	61630	61700	61780	61860	61940	62010	62090







NOTES:

Rating is for two bays equipped with 12' x 22' radial gates.

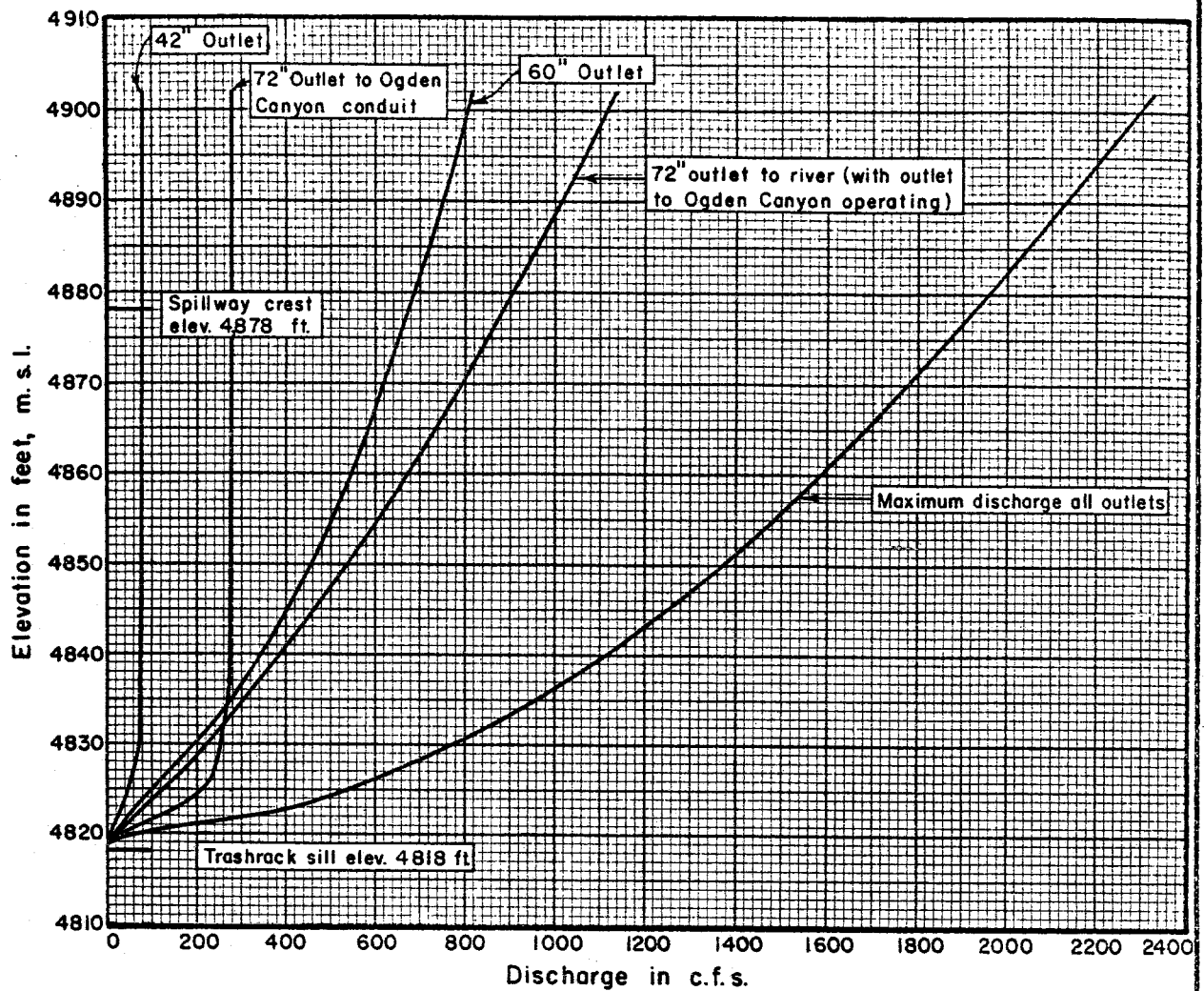
Data furnished by U.S. Bureau of Reclamation.

WEBER BASIN RESERVOIRS, UTAH

SPILLWAY RATING CURVE
PINEVIEW DAM

U S Army Engineer District
Sacramento California
R.W.S. Dec 1959

Revised 1971



Notes: Gross pool elev. 4900 ft.

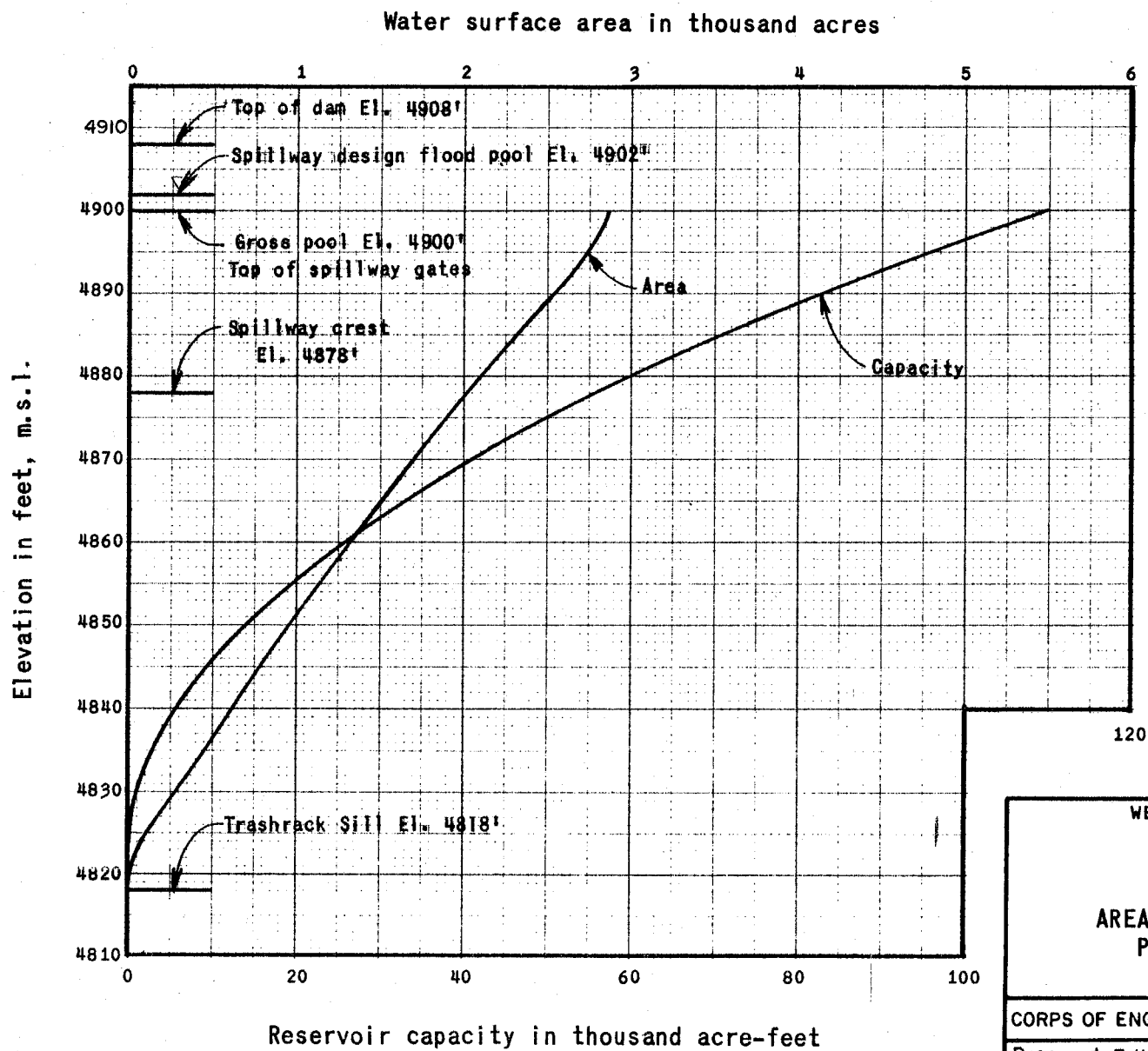
Data furnished by U. S. Bureau
of Reclamation.

WEBER BASIN RESERVOIRS, UTAH

OUTLET RATING CURVES
PINEVIEW DAM

US Army Engineer District Sacramento, California

R.W.S. Dec 1959



Revised 1971

WEBER BASIN RESERVOIRS
UTAHAREA AND CAPACITY CURVES
PINEVIEW RESERVOIR

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: T.V.H.

Drawn: R.E.Y. & S.K.N.

Date: July 1970

**OGDEN RIVER PROJECT
WEBER BASIN PROJECT
PINEVIEW RESERVOIR**

AREA IN ACRES

JUNE 1, 1963

ELEV.	0	1	2	3	4	5	6	7	8	9
4810									0	3
4820	13	24	40	58	78	107	145	189	235	282
4830	326	362	395	425	452	476	506	537	568	599
4840	630	661	692	723	753	783	823	861	898	935
4850	970	1007	1040	1073	1105	1134	1173	1212	1251	1290
4860	1329	1368	1407	1445	1483	1521	1559	1597	1635	1672
4870	1710	1748	1785	1822	1859	1896	1937	1976	2014	2053
4880	2092	2136	2181	2225	2270	2314	2359	2404	2448	2493
4890	2538	2582	2627	2671	2716	2760	2783	2806	2828	2851
4900	2874									

OGDEN RIVER PROJECT
WEBER BASIN PROJECT

PINEVIEW RESERVOIR

CAPACITY IN ACRE FEET

JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
4818	0	0	1	1	1	2	2	2	2	3
4819	3	4	5	6	7	8	9	10	11	12
4820	13	15	17	19	21	22	24	26	28	30
4821	32	35	38	41	44	46	49	52	55	58
4822	61	65	69	73	77	82	86	90	94	98
4823	102	108	114	120	126	131	137	143	149	155
4824	161	170	179	188	197	205	214	223	232	241
4825	250	263	276	289	302	315	323	341	354	367
4826	380	398	416	435	453	471	489	507	526	544
4827	562	585	608	632	655	678	701	724	748	771
4828	794	822	849	876	904	932	959	986	1010	1040
4829	1070	1100	1130	1160	1190	1220	1260	1290	1320	1350
4830	1380	1410	1450	1480	1520	1550	1580	1620	1650	1690
4831	1720	1760	1800	1830	1870	1910	1940	1980	2020	2060
4832	2090	2130	2170	2210	2250	2290	2330	2370	2410	2450
4833	2490	2540	2580	2620	2670	2710	2750	2800	2840	2880
4834	2920	2970	3020	3060	3110	3150	3200	3250	3290	3340
4835	3380	3430	3480	3530	3580	3630	3680	3730	3780	3830
4836	3880	3930	3980	4030	4080	4140	4190	4240	4290	4350
4837	4400	4450	4510	4560	4620	4670	4730	4780	4840	4900
4838	4950	5010	5070	5120	5180	5240	5300	5360	5420	5470
4839	5530	5590	5660	5720	5780	5840	5900	5960	6020	6080
4840	6150	6210	6280	6340	6400	6470	6530	6600	6660	6730
4841	6790	6860	6930	7000	7060	7130	7200	7270	7330	7400
4842	7470	7540	7610	7680	7760	7820	7900	7970	8040	8110
4843	8180	8250	8330	8400	8470	8550	8620	8700	8770	8840
4844	8920	8980	9070	9150	9220	9300	9380	9450	9530	9610
4845	9680	9760	9840	9920	10000	10080	10160	10240	10320	10400
4846	10480	10570	10650	10730	10820	10900	10980	11070	11150	11230
4847	11320	11400	11490	11580	11670	11760	11840	11930	12020	12100
4848	12190	12280	12370	12470	12560	12650	12740	12830	12920	13010
4849	13100	13200	13290	13390	13480	13580	13680	13770	13860	13960
4850	14060	14150	14250	14350	14450	14550	14650	14750	14840	14940
4851	15040	15140	15250	15350	15450	15550	15660	15760	15860	15960
4852	16070	16170	16280	16380	16490	16590	16700	16800	16910	17020
4853	17120	17230	17340	17450	17560	17660	17770	17880	17990	18100
4854	18210	18320	18430	18540	18660	18770	18880	18990	19100	19210

FURNISHED BY U S B R

Sheet 2, CHART 37

**OGDEN RIVER PROJECT
WEBER BASIN PROJECT**

PINEVIEW RESERVOIR

CAPACITY IN ACRE FEET

JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
4855	19330	19440	19560	19670	19790	19900	20020	20130	20250	20360
4856	20480	20600	20720	20840	20950	21070	21190	21310	21430	21550
4857	21670	21790	21920	22040	22160	22280	22410	22530	22650	22780
4858	22900	23030	23150	23280	23410	23530	23660	23790	23920	24040
4859	24170	24300	24430	24560	24690	24820	24960	25090	25220	25350
4860	25480	25610	25750	25880	26020	26150	26290	26420	26560	26690
4861	26830	26970	27110	27240	27380	27520	27660	27800	27940	28080
4862	28220	28360	28500	28640	28790	28930	29070	29210	29360	29500
4863	29640	29790	29940	30080	30230	30370	30530	30670	30810	30960
4864	31110	31260	31410	31560	31710	31860	32010	32160	32310	32460
4865	32610	32760	32920	33070	33230	33380	33540	33690	33840	34000
4866	34150	34310	34460	34620	34780	34940	35100	35250	35410	35570
4867	35730	35890	36050	36210	36370	36530	36690	36850	37020	37180
4868	37340	37500	37670	37830	38000	38160	38330	38490	38660	38820
4869	38990	39190	39330	39500	39660	39830	40000	40170	40340	40810
4870	40680	40850	41020	41200	41370	41540	41780	41890	42060	42240
4871	42410	42540	42760	42940	43120	43290	43470	43640	43820	44000
4872	44180	44360	44540	44720	44900	45080	45260	45440	45620	45800
4873	45980	46160	46350	46530	46720	46900	47080	47270	47450	47640
4874	47820	48010	48200	48380	48570	48760	48950	49140	49320	49510
4875	49700	49890	50080	50270	50470	50660	50850	51040	51230	51420
4876	51620	51810	52010	52200	52400	52600	52790	52990	53180	53380
4877	53570	53770	53910	54170	54370	54570	54770	54970	55170	55370
4878	55570	55770	55980	56180	56380	56580	56790	56990	57200	57400
4879	57600	57810	58020	58220	58430	58640	58900	59050	59260	59470
4880	59670	59880	60100	60310	60520	60730	60940	61150	61360	61580
4881	61790	62000	62220	62440	62650	62870	63080	63300	63510	63730
4882	63950	64170	64390	64610	64830	65050	65270	65490	65710	65930
4883	66150	66370	66600	66820	67050	67270	67500	67720	67950	68170
4884	68400	68630	68860	69080	69310	69540	69770	70000	70230	70460
4885	70690	70920	71160	71390	71620	71860	72090	72320	72560	72790
4886	73020	73260	73500	73740	73980	74220	74450	74690	74930	75170
4887	75410	75650	75890	76140	76380	76620	76860	77100	77350	77590
4888	77830	78080	78330	78570	78820	79070	79320	79560	79810	80060
4889	80300	80560	80810	81060	81310	81560	81810	82060	82320	82570
4890	82820	83080	83330	83590	83840	84100	84360	84610	84870	85120
4891	85380	85640	85900	86160	86420	86680	86940	87200	87460	87720
4892	87980	88250	88510	88780	89040	89310	89570	89840	90100	90370
4893	90630	90900	91170	91440	91710	91980	92250	92520	92790	93060
4894	93330	93600	93870	94150	94420	94700	94970	95240	95520	95790

FURNISHED BY U S B R

Sheet 3, CHART 37

OGDEN RIVER PROJECT
WEBER BASIN PROJECT

PINEVIEW RESERVOIR

CAPACITY IN ACRE FEET

JUNE 1, 1963

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
4895	96060	96340	96620	96900	97170	97450	97730	98000	98280	98560
4896	98840	99120	99400	99670	99950	100230	100510	100790	101070	101350
4897	101630	101910	102190	102480	102760	103040	103320	103600	103880	104160
4898	104450	104730	105020	105300	105580	105870	106150	106440	106720	107000
4899	107290	107570	107860	108150	108430	108720	109000	109290	109580	109860
4900	110150									

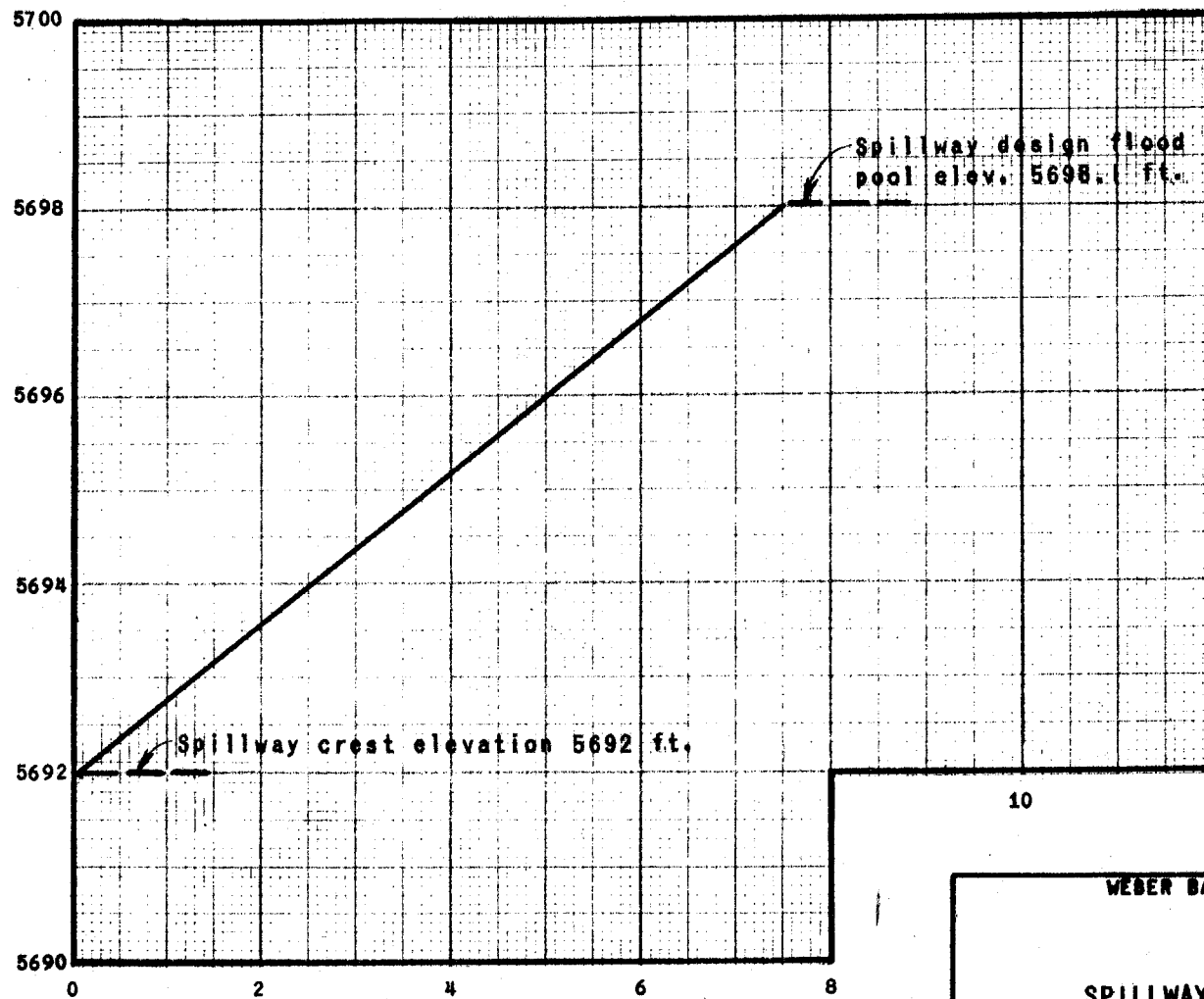








Elevation in feet, m.s.l.



Spillway discharge in thousand c.f.s.

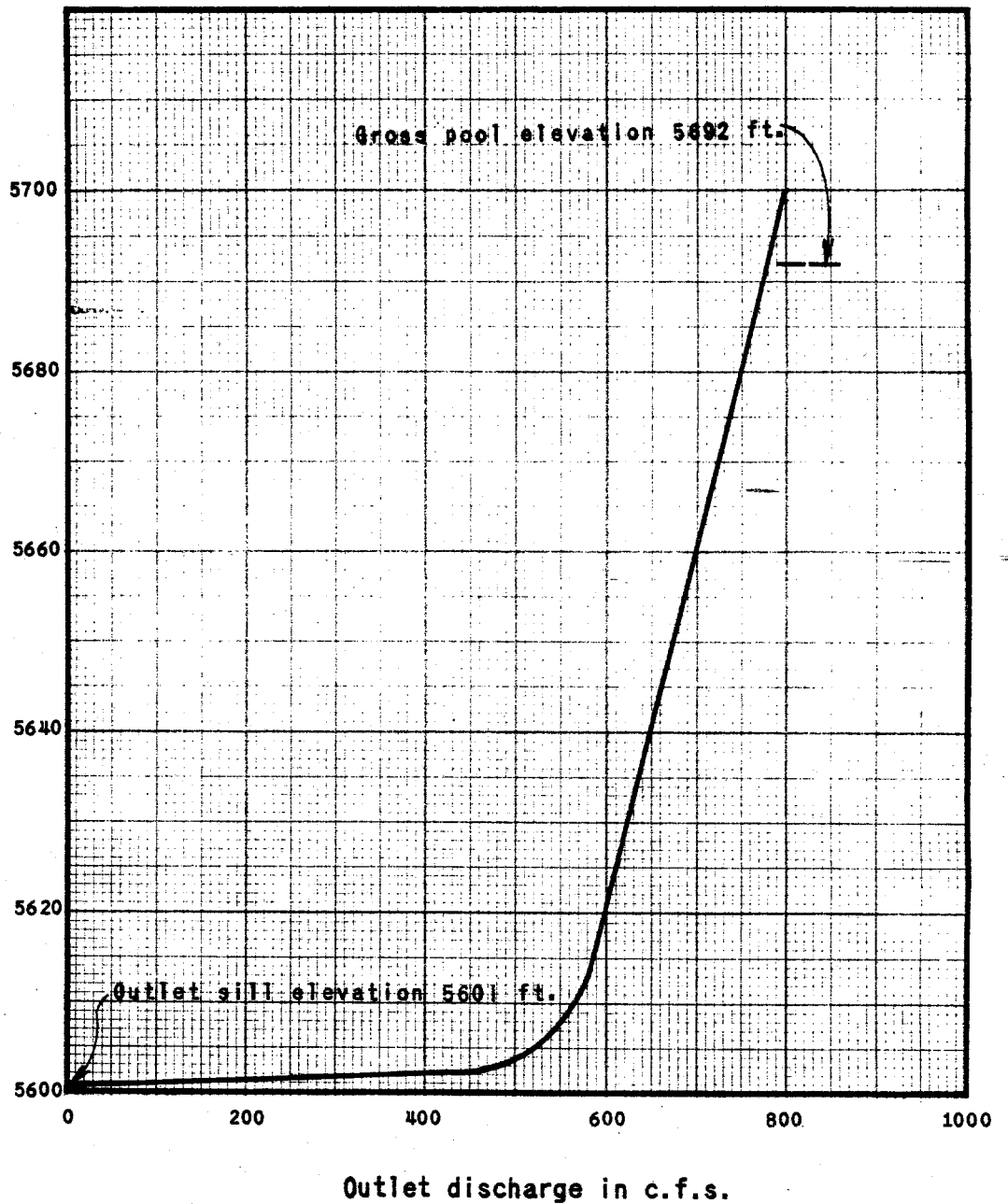
WEBER BASIN RESERVOIRS
UTAH

SPILLWAY RATING CURVE
CAUSEY DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M. Date: July 1970
Drawn: B.E.W. & S.K.N.

Elevation in feet, m.s.l.



WEBER BASIN RESERVOIRS
UTAH

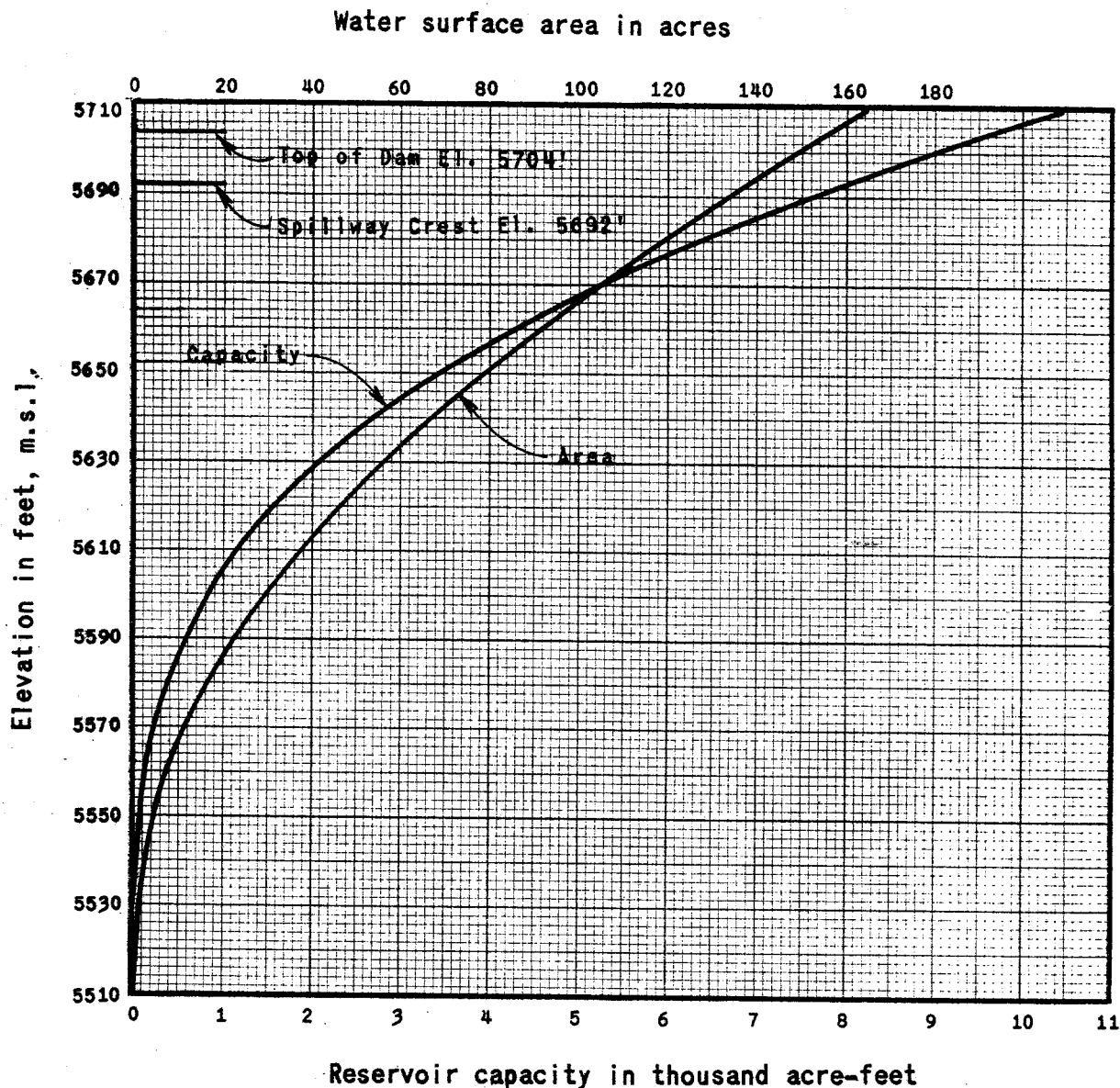
OUTLET RATING CURVE
CAUSEY DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.J.M.

Drawn: B.E.W. & S.K.N. Date: July 1970

CHART 43



NOTE:

Data furnished by
US Bureau of Reclamation.

**WEBER BASIN RESERVOIRS
UTAH**

**AREA AND CAPACITY CURVES
CAUSEY RESERVOIR**

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: T.V.H.

Drawn: B.E.W. & S.K.N. Date: July 1970

WEBER BASIN PROJECT CAUSEY RESERVOIR

AREA IN ACRES

OCTOBER 19, 1961

ELEV.		1	2	3	4	5	6	7	8	9
5510										
5520							1	1	1	1
5530	1	1	1	1	1	1	1	1	1	1
5540	1	1	2	2	2	2	3	3	3	4
5550	4	4	4	5	5	5	6	6	6	7
5560	7	7	8	8	9	9	9	10	10	11
5570	11	12	12	13	13	14	14	15	15	16
5580	16	17	17	18	19	19	20	20	21	22
5590	22	23	24	25	25	26	27	28	28	29
5600	30	31	31	32	33	34	34	35	36	37
5610	37	38	39	40	41	41	42	43	44	45
5620	46	47	48	49	50	51	52	53	54	55
5630	56	57	58	59	60	61	62	63	64	66
5640	67	68	69	70	71	73	74	75	76	77
5650	79	80	81	83	84	85	87	88	89	91
5660	92	93	95	96	97	99	100	102	103	105
5670	106	107	109	110	111	113	114	115	117	118
5680	119	121	122	124	125	126	128	129	130	132
5690	133	135	136	137	139	140	142	143	145	146
5700	148	149	151	153	154	156	157	159	161	162
5710	164									

WEBER BASIN PROJECT CAUSEY RESERVOIR

CAPACITY IN ACRE FEET

OCTOBER 19, 1961

ELEV.		1	2	3	4	5	6	7	8	9
5510					1	1	1	1	2	2
5520	2	3	3	3	4	4	5	5	6	6
5530	7	8	8	9	10	11	11	12	13	14
5540	16	17	19	20	22	24	27	29	32	36
5550	39	44	48	52	57	62	68	74	80	86
5560	93	100	107	115	124	132	142	151	161	172
5570	183	194	206	219	232	245	259	274	288	304
5580	320	336	353	371	389	408	428	448	468	490
5590	512	535	558	582	607	633	660	687	715	744
5600	774	804	835	867	900	933	967	1000	1040	1070
5610	1110	1150	1190	1230	1270	1310	1350	1390	1440	1480
5620	1530	1570	1620	1670	1720	1770	1820	1870	1920	1980
5630	2030	2090	2150	2200	2260	2320	2390	2450	2510	2580
5640	2640	2710	2780	2850	2920	2990	3070	3140	3220	3290
5650	3370	3450	3530	3610	3700	3780	3870	3950	4040	4130
5660	4220	4320	4410	4510	4600	4700	4800	4900	5000	5110
5670	5210	5320	5430	5540	5650	5760	5870	5990	6100	6220
5680	6340	6460	6580	6700	6830	6950	7080	7210	7340	7470
5690	7600	7740	7870	8010	8150	8290	8430	8570	8710	8860
5700	9010	9160	9310	9460	9610	9770	9920	10080	10240	10400
5710	10560									

WEBER BASIN PROJECT CAUSEY RESERVOIR

CAPACITY IN ACRE FEET

OCTOBER 19, 1961

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5510										
5511										
5512										
5513										1
5514	1	1	1	1	1	1	1	1	1	1
5515	1	1	1	1	1	1	1	1	1	1
5516	1	1	1	1	1	1	1	1	1	1
5517	1	1	1	1	1	1	1	1	1	2
5518	2	2	2	2	2	2	2	2	2	2
5519	2	2	2	2	2	2	2	2	2	2
5520	2	2	2	2	2	2	2	2	2	3
5521	3	3	3	3	3	3	3	3	3	3
5522	3	3	3	3	3	3	3	3	3	3
5523	3	3	3	4	4	4	4	4	4	4
5524	4	4	4	4	4	4	4	4	4	4
5525	4	4	4	4	5	5	5	5	5	5
5526	5	5	5	5	5	5	5	5	5	5
5527	5	5	5	6	6	6	6	6	6	6
5528	6	6	6	6	6	6	6	6	6	6
5529	6	7	7	7	7	7	7	7	7	7
5530	7	7	7	7	7	7	7	8	8	8
5531	8	8	8	8	8	8	8	8	8	8
5532	8	8	8	9	9	9	9	9	9	9
5533	9	9	9	9	9	9	9	10	10	10
5534	10	10	10	10	10	10	10	10	10	10
5535	11	11	11	11	11	11	11	11	11	11
5536	11	12	12	12	12	12	12	12	12	12
5537	12	12	13	13	13	13	13	13	13	13
5538	13	13	14	14	14	14	14	14	14	14
5539	14	15	15	15	15	15	15	15	15	16
5540	16	16	16	16	16	16	17	17	17	17
5541	17	17	17	18	18	18	18	18	18	18
5542	19	19	19	19	19	19	20	20	20	20
5543	20	20	21	21	21	21	21	22	22	22
5544	22	22	23	23	23	23	23	24	24	24
5545	24	25	25	25	25	26	26	26	26	26
5546	27	27	27	27	28	28	28	29	29	29
5547	29	30	30	30	31	31	31	31	32	32
5548	32	33	33	33	34	34	34	35	35	35
5549	36	36	36	37	37	38	38	38	39	39
5550	39	40	40	41	41	41	42	42	43	43
5551	44	44	44	45	45	46	46	47	47	47
5552	48	48	49	49	50	50	51	51	52	52
5553	52	53	53	54	54	55	55	56	56	57
5554	57	58	58	59	59	60	60	61	61	62

WEBER BASIN PROJECT CAUSEY RESERVOIR

CAPACITY IN ACRE FEET

OCTOBER 19, 1961

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5555	62	63	64	64	65	65	66	66	67	67
5556	68	68	69	70	70	71	71	72	72	73
5557	74	74	75	75	76	77	77	78	78	79
5558	80	80	81	82	82	83	83	84	85	85
5559	86	87	87	88	89	89	90	91	91	92
5560	93	94	94	95	96	96	97	98	99	99
5561	100	101	101	102	103	104	104	105	106	107
5562	107	108	109	110	111	111	112	113	114	115
5563	115	116	117	118	119	119	120	121	122	123
5564	124	124	125	126	127	128	129	130	131	131
5565	132	133	134	135	136	137	138	139	140	141
5566	142	142	143	144	145	146	147	148	149	150
5567	151	152	153	154	155	156	157	158	159	160
5568	161	162	163	164	165	166	168	169	170	171
5569	172	173	174	175	176	177	178	180	181	182
5570	183	184	185	186	187	189	190	191	192	193
5571	194	196	197	198	199	200	202	203	204	205
5572	206	208	209	210	211	213	214	215	216	218
5573	219	220	222	223	224	225	227	228	229	231
5574	232	233	235	236	237	239	240	241	243	244
5575	245	247	248	249	251	252	254	255	256	258
5576	259	261	262	263	265	266	268	269	271	272
5577	274	275	277	278	279	281	282	284	285	287
5578	288	290	292	293	295	296	298	299	301	302
5579	304	305	307	309	310	312	313	315	317	318
5580	320	321	323	325	326	328	330	331	333	335
5581	336	338	340	341	343	345	347	348	350	352
5582	353	355	357	359	360	362	364	366	368	369
5583	371	373	375	377	378	380	382	384	386	388
5584	389	391	393	395	397	399	401	402	404	406
5585	408	410	412	414	416	418	420	422	424	426
5586	428	430	432	434	436	438	440	442	444	446
5587	448	450	452	454	456	458	460	462	464	466
5588	468	471	473	475	477	479	481	483	486	488
5589	490	492	494	496	499	501	503	505	507	510
5590	512	514	516	519	521	523	525	528	530	532
5591	535	537	539	542	544	546	549	551	553	556
5592	558	561	563	565	568	570	573	575	578	580
5593	582	585	587	590	592	595	597	600	602	605
5594	607	610	613	615	618	620	623	625	628	631
5595	633	636	639	641	644	646	649	652	654	657
5596	660	663	665	668	671	673	676	679	682	684
5597	687	690	693	695	698	701	704	707	710	712
5598	715	718	721	724	727	730	732	735	738	741
5599	744	747	750	753	756	759	762	765	768	771

FURNISHED BY U S B R

Sheet 4, CHART 45

WEBER BASIN PROJECT CAUSEY RESERVOIR

CAPACITY IN ACRE FEET

OCTOBER 19, 1961

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5600	774	777	780	783	786	789	792	795	798	801
5601	804	807	810	813	816	819	823	826	829	832
5602	835	838	841	845	848	851	854	857	860	864
5603	867	870	873	877	880	883	886	890	893	896
5604	900	903	906	909	913	916	919	923	926	929
5605	933	936	940	943	946	950	953	957	960	964
5606	967	970	974	977	981	984	988	991	995	998
5607	1000	1010	1010	1010	1020	1020	1020	1030	1030	1030
5608	1040	1040	1040	1050	1050	1060	1060	1060	1070	1070
5609	1070	1080	1080	1080	1090	1090	1100	1100	1100	1110
5610	1110	1110	1120	1120	1130	1130	1130	1140	1140	1140
5611	1150	1150	1160	1160	1160	1170	1170	1180	1180	1180
5612	1190	1190	1200	1200	1200	1210	1210	1210	1220	1220
5613	1230	1230	1230	1240	1240	1250	1250	1250	1260	1260
5614	1270	1270	1280	1280	1280	1290	1290	1300	1300	1300
5615	1310	1310	1320	1320	1320	1330	1330	1340	1340	1350
5616	1350	1350	1360	1360	1370	1370	1380	1380	1380	1390
5617	1390	1400	1400	1410	1410	1410	1420	1420	1430	1430
5618	1440	1440	1450	1450	1450	1460	1460	1470	1470	1480
5619	1480	1490	1490	1490	1500	1500	1510	1510	1520	1520
5620	1530	1530	1540	1540	1540	1550	1550	1560	1560	1570
5621	1570	1580	1580	1590	1590	1600	1600	1610	1610	1620
5622	1620	1620	1630	1630	1640	1640	1650	1650	1660	1660
5623	1670	1670	1680	1680	1690	1690	1700	1700	1710	1710
5624	1720	1720	1730	1730	1740	1740	1750	1750	1760	1760
5625	1770	1770	1780	1780	1790	1790	1800	1800	1810	1810
5626	1820	1820	1830	1830	1840	1840	1850	1850	1860	1870
5627	1870	1880	1880	1890	1890	1900	1900	1910	1910	1920
5628	1920	1930	1930	1940	1950	1950	1960	1960	1970	1970
5629	1980	1980	1990	1990	2000	2010	2010	2020	2020	2030
5630	2030	2040	2040	2050	2060	2060	2070	2070	2080	2080
5631	2090	2090	2100	2110	2110	2120	2120	2130	2130	2140
5632	2150	2150	2160	2160	2170	2180	2180	2190	2190	2200
5633	2200	2210	2220	2220	2230	2230	2240	2250	2250	2260
5634	2260	2270	2280	2280	2290	2290	2300	2310	2310	2320
5635	2320	2330	2340	2340	2350	2360	2360	2370	2370	2380
5636	2390	2390	2400	2410	2410	2420	2420	2430	2440	2440
5637	2450	2460	2460	2470	2470	2480	2490	2490	2500	2510
5638	2510	2520	2530	2530	2540	2550	2550	2560	2570	2570
5639	2580	2590	2590	2600	2600	2610	2620	2620	2630	2640
5640	2640	2650	2660	2660	2670	2680	2680	2690	2700	2710
5641	2710	2720	2730	2730	2740	2750	2750	2760	2770	2770
5642	2780	2790	2790	2800	2810	2820	2820	2830	2840	2840
5643	2850	2860	2860	2870	2880	2890	2890	2900	2910	2910
5644	2920	2930	2940	2940	2950	2960	2960	2970	2980	2990

FURNISHED BY U S B R

Sheet 5, CHART 45

WEBER BASIN PROJECT CAUSEY RESERVOIR

CAPACITY IN ACRE FEET

OCTOBER 19, 1961

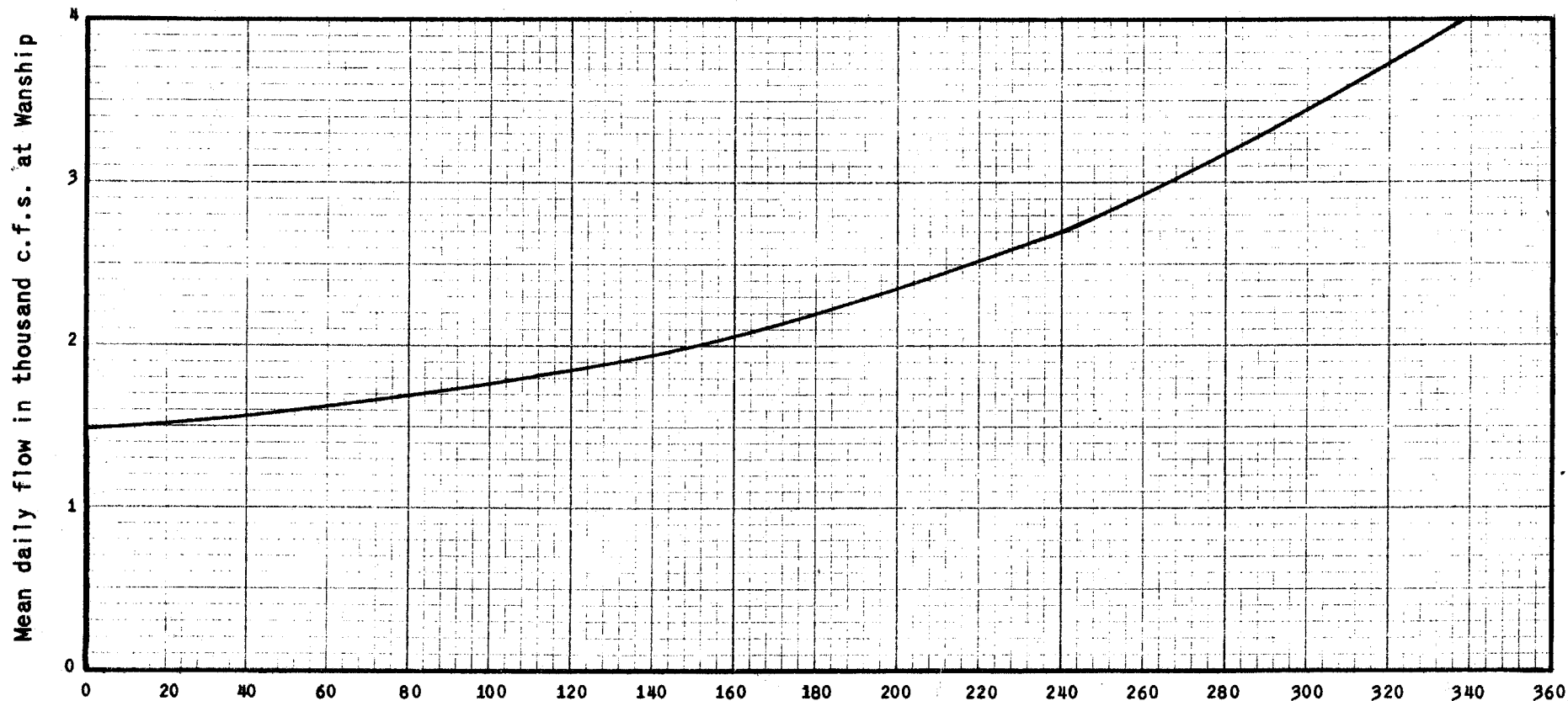
ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5645	2990	3000	3010	3010	3020	3030	3040	3040	3050	3060
5646	3070	3070	3080	3090	3100	3100	3110	3120	3130	3130
5647	3140	3150	3160	3160	3170	3180	3190	3190	3200	3210
5648	3220	3220	3230	3240	3250	3250	3260	3270	3280	3290
5649	3290	3300	3310	3320	3320	3330	3340	3350	3360	3360
5650	3370	3380	3390	3390	3400	3410	3420	3430	3430	3440
5651	3450	3460	3470	3470	3480	3490	3500	3510	3520	3520
5652	3530	3540	3550	3560	3560	3570	3580	3590	3600	3600
5653	3610	3620	3630	3640	3650	3650	3660	3670	3680	3690
5654	3700	3700	3710	3720	3730	3740	3750	3760	3760	3770
5655	3780	3790	3800	3810	3820	3820	3830	3840	3850	3860
5656	3870	3880	3880	3890	3900	3910	3920	3930	3940	3950
5657	3950	3960	3970	3980	3990	4000	4010	4020	4020	4030
5658	4040	4050	4060	4070	4080	4090	4100	4110	4110	4120
5659	4130	4140	4150	4160	4170	4180	4190	4200	4210	4210
5660	4220	4230	4240	4250	4260	4270	4280	4290	4300	4310
5661	4320	4330	4340	4340	4350	4360	4370	4380	4390	4400
5662	4410	4420	4430	4440	4450	4460	4470	4480	4490	4500
5663	4510	4520	4530	4530	4540	4550	4560	4570	4580	4590
5664	4600	4610	4620	4630	4640	4650	4660	4670	4680	4690
5665	4700	4710	4720	4730	4740	4750	4760	4770	4780	4790
5666	4800	4810	4820	4830	4840	4850	4860	4870	4880	4890
5667	4900	4910	4920	4930	4940	4950	4960	4970	4980	4990
5668	5000	5010	5020	5030	5050	5060	5070	5080	5090	5100
5669	5110	5120	5130	5140	5150	5160	5170	5180	5190	5200
5670	5210	5220	5230	5240	5260	5270	5280	5290	5300	5310
5671	5320	5330	5340	5350	5360	5370	5380	5400	5410	5420
5672	5430	5440	5450	5460	5470	5480	5490	5500	5510	5530
5673	5540	5550	5560	5570	5580	5590	5600	5610	5630	5640
5674	5650	5660	5670	5680	5690	5700	5710	5730	5740	5750
5675	5760	5770	5780	5790	5800	5820	5830	5840	5850	5860
5676	5870	5880	5900	5910	5920	5930	5940	5950	5960	5980
5677	5990	6000	6010	6020	6030	6050	6060	6070	6080	6090
5678	6100	6120	6130	6140	6150	6160	6170	6190	6200	6210
5679	6220	6230	6240	6260	6270	6280	6290	6300	6320	6330
5680	6340	6350	6360	6380	6390	6400	6410	6420	6440	6450
5681	6460	6470	6480	6500	6510	6520	6530	6550	6560	6570
5682	6580	6590	6610	6620	6630	6640	6660	6670	6680	6690
5683	6700	6720	6730	6740	6750	6770	6780	6790	6800	6820
5684	6830	6840	6850	6870	6880	6890	6900	6920	6930	6940
5685	6950	6970	6980	6990	7000	7020	7030	7040	7060	7070
5686	7080	7090	7110	7120	7130	7150	7160	7170	7180	7200
5687	7210	7220	7240	7250	7260	7270	7290	7300	7310	7330
5688	7340	7350	7370	7380	7390	7400	7420	7430	7440	7460
5689	7470	7480	7500	7510	7520	7540	7550	7560	7580	7590

WEBER BASIN PROJECT CAUSEY RESERVOIR

CAPACITY IN ACRE FEET

OCTOBER 19, 1961

ELEV.	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5690	7600	7620	7630	7640	7660	7670	7680	7700	7710	7720
5691	7740	7750	7760	7780	7790	7800	7820	7830	7840	7860
5692	7870	7890	7900	7910	7930	7940	7950	7970	7980	7990
5693	8010	8020	8040	8050	8060	8080	8090	8100	8120	8130
5694	8150	8160	8170	8190	8200	8220	8230	8240	8260	8270
5695	8290	8300	8310	8330	8340	8360	8370	8380	8400	8410
5696	8430	8440	8460	8470	8480	8500	8510	8530	8540	8560
5697	8570	8580	8600	8610	8630	8640	8660	8670	8690	8700
5698	8710	8730	8740	8760	8770	8790	8800	8820	8830	8850
5699	8860	8870	8890	8900	8920	8930	8950	8960	8980	8990
5700	9010	9020	9040	9050	9070	9080	9100	9110	9130	9140
5701	9160	9170	9190	9200	9220	9230	9250	9260	9280	9290
5702	9310	9320	9340	9350	9370	9380	9400	9410	9430	9440
5703	9460	9470	9490	9500	9520	9530	9550	9560	9580	9600
5704	9610	9630	9640	9660	9670	9690	9700	9720	9730	9750
5705	9770	9780	9800	9810	9830	9840	9860	9880	9890	9910
5706	9920	9940	9950	9970	9990	10000	10020	10030	10050	10060
5707	10080	10100	10110	10130	10140	10160	10180	10190	10210	10220
5708	10240	10260	10270	10290	10300	10320	10340	10350	10370	10390
5709	10400	10420	10430	10450	10470	10480	10500	10520	10530	10550
5710	10560									



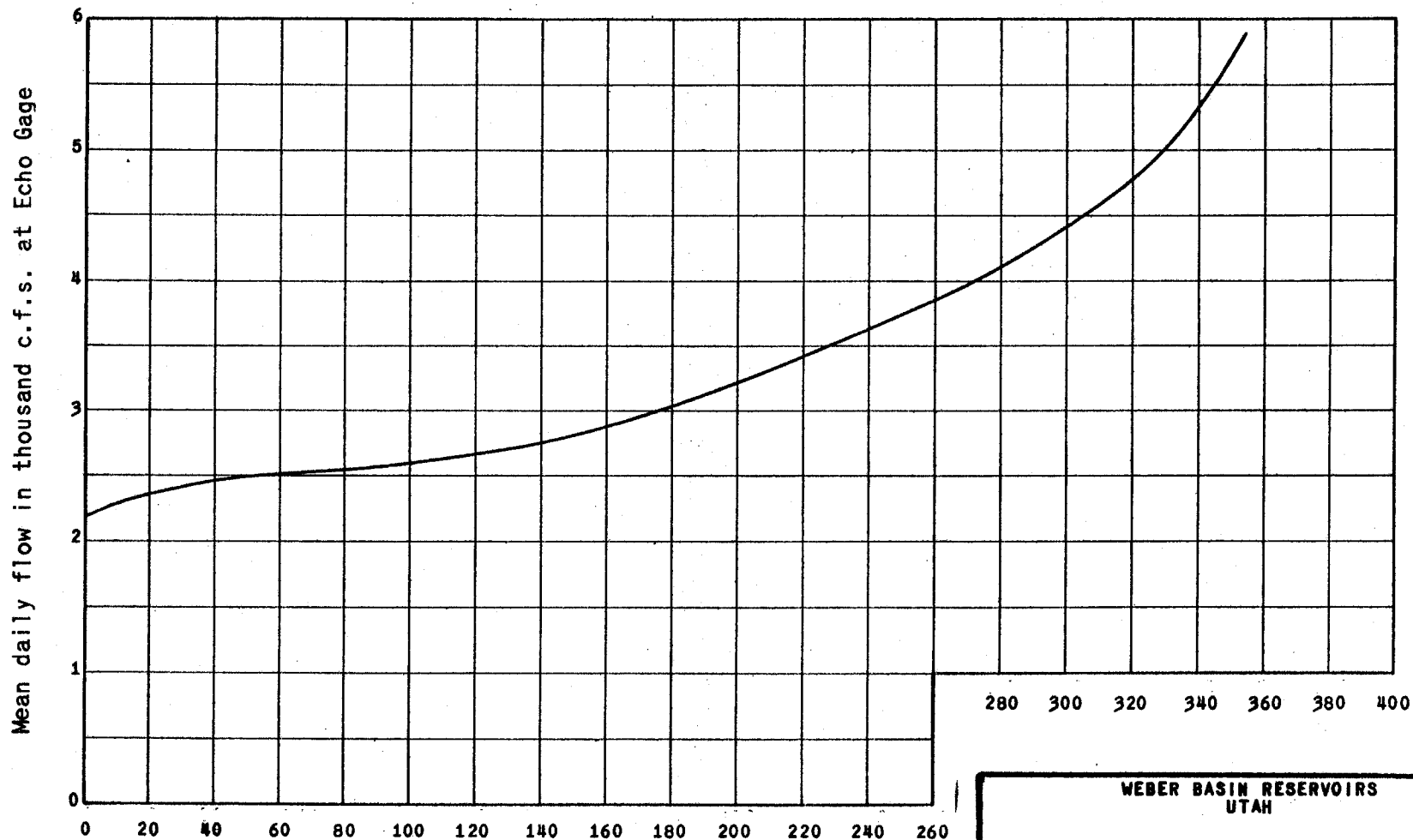
Primary damage in thousand dollars
(1970 prices and economic conditions)

WEBER BASIN RESERVOIRS
UTAH

DAMAGE FLOW CURVE
WEBER RIVER
ROCKPORT LAKE TO ECHO RESERVOIR

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

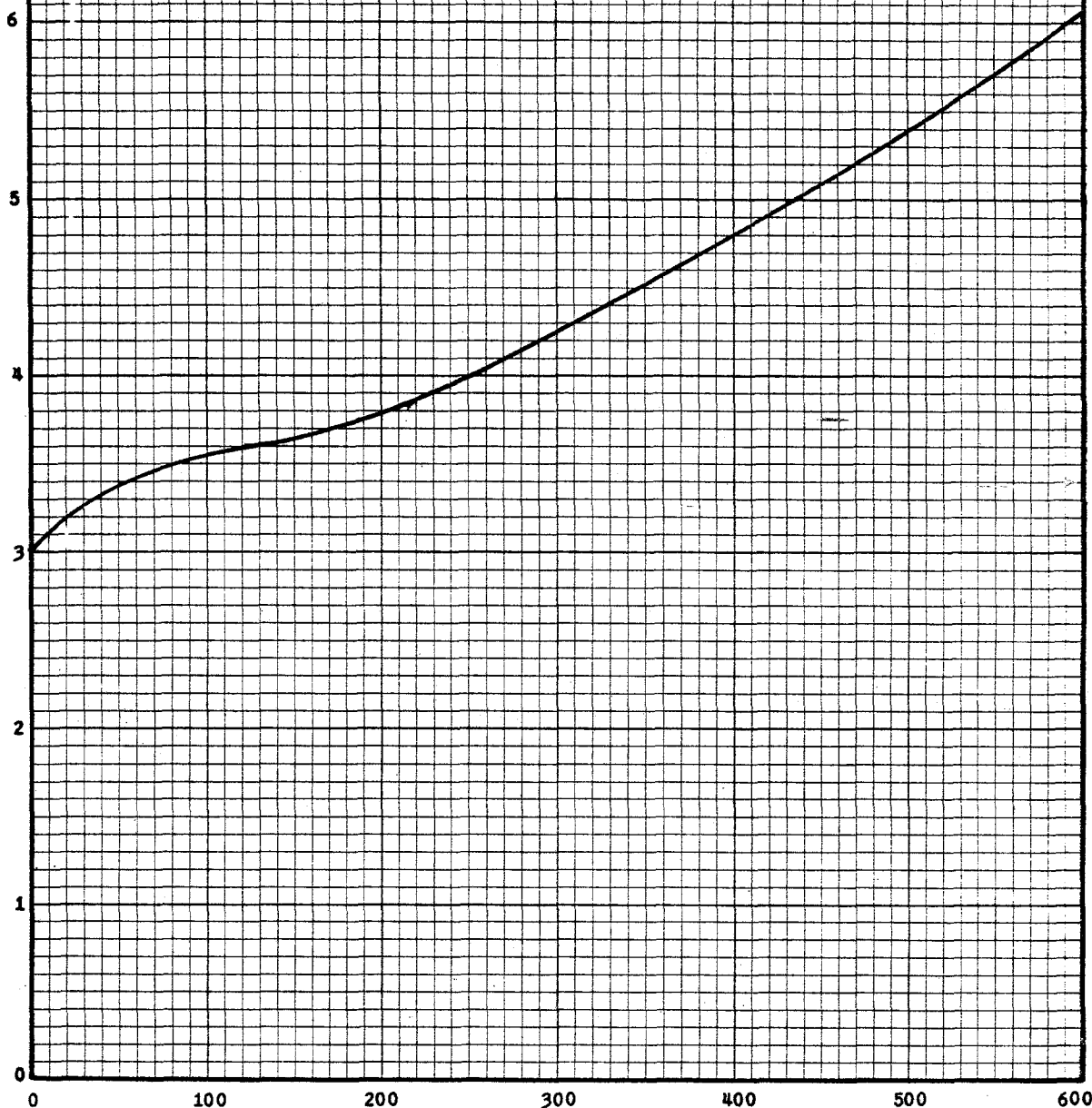
Prepared: N.R.E. Date: July 1970
Drawn: R.E.Y. & S.K.N.



Primary damage in thousand dollars
(1970 prices and economic conditions)

WEBER BASIN RESERVOIRS UTAH	
DAMAGE FLOW CURVE WEBER RIVER ECHO RESERVOIR TO MOUTH OF LOST CREEK	
US Army Engineer District	Sacramento, California
Prepared: N.R.E.	Date: July 1970
Drawn: R.E.Y. & S.K.N.	

Mean daily flow in thousand c.f.s. at Devils Slide



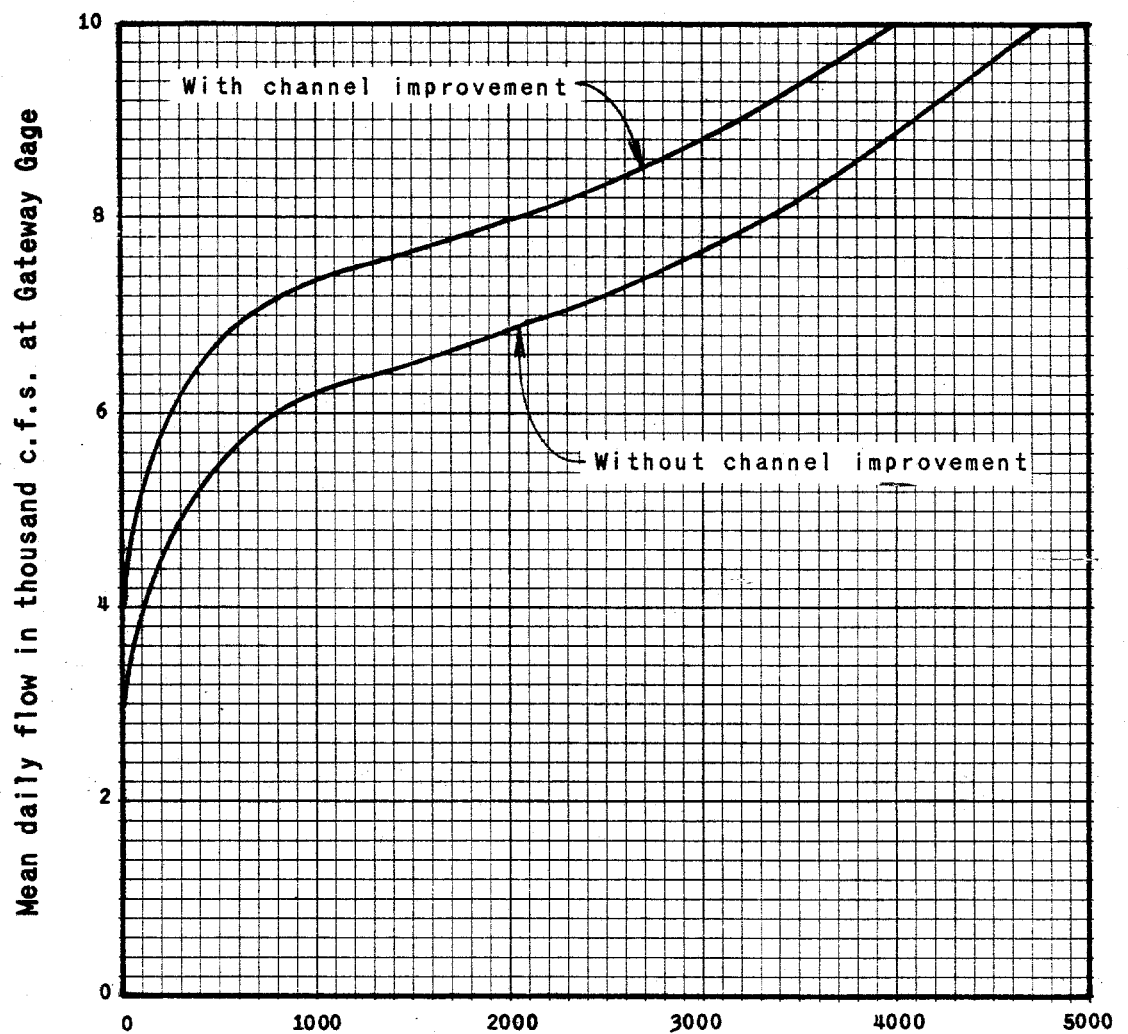
Primary damage in thousand dollars
(1970 prices and economic conditions)

WEBER BASIN RESERVOIRS
UTAH

DAMAGE FLOW CURVE
WEBER RIVER
LOST CREEK TO MORGAN

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: N.R.E. Date: July 1970
Drawn: R.E.Y. & S.K.N.



Primary damage in thousand dollars
(1970 prices and economic conditions)

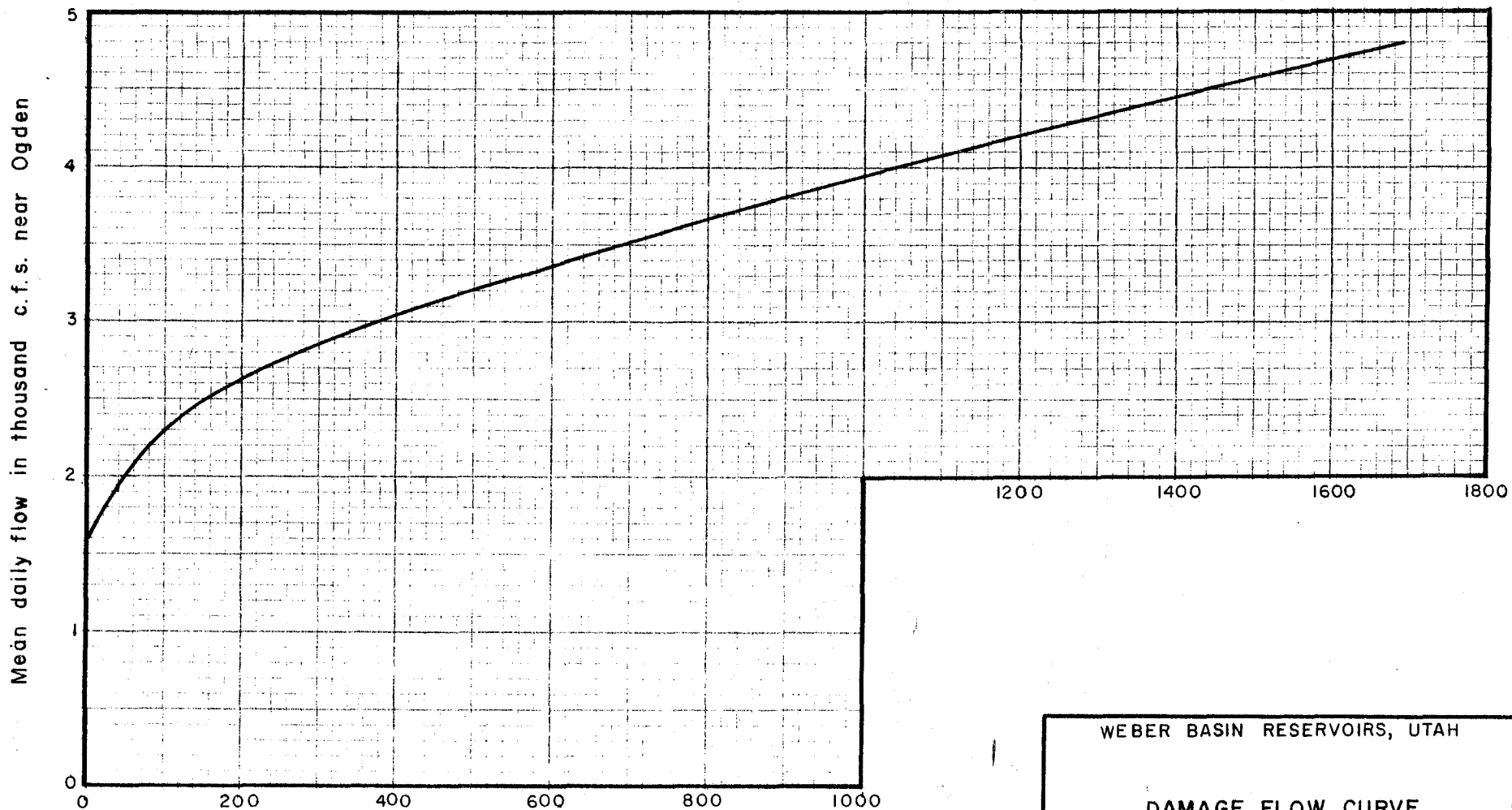
WEBER BASIN RESERVOIRS
UTAH

DAMAGE FLOW CURVE
WEBER RIVER
MORGAN TO OGDEN RIVER

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: M.R.E.

Drawn: R.E.Y. & S.K.N. Date: July 1970



Primary damage in thousand dollars
(1970 prices and economics conditions)

WEBER BASIN RESERVOIRS, UTAH

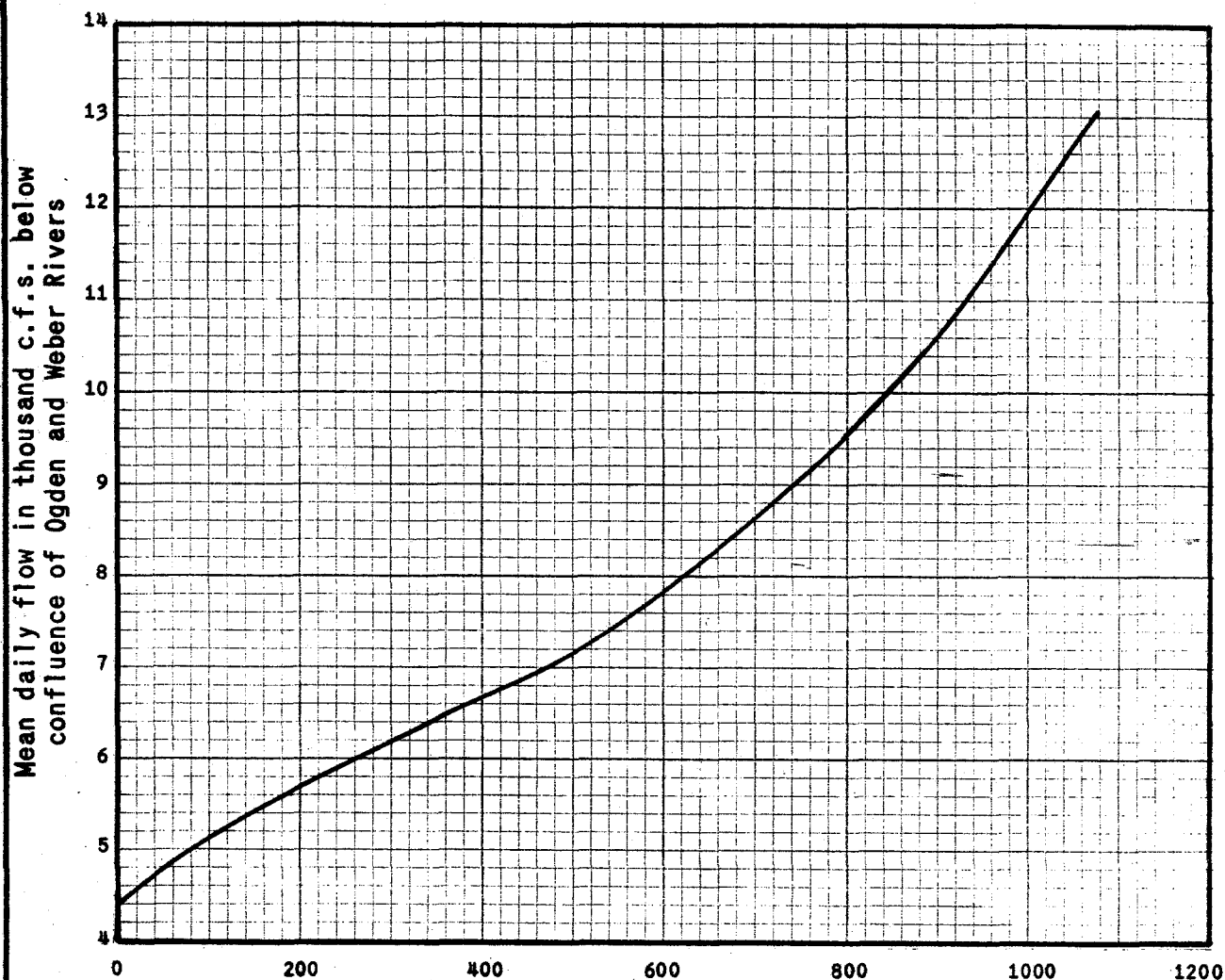
DAMAGE FLOW CURVE
OGDEN RIVER
PINEVIEW RESERVOIR TO MOUTH

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: N.R.E.
Drawn: R.E.Y.

Date: June 1970

Revised 1971



Primary damage in thousand dollars
(1970 prices and economic conditions)

WEBER BASIN RESERVOIRS
UTAH

DAMAGE FLOW CURVE
WEBER RIVER
OGDEN RIVER TO GREAT SALT LAKE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: N.R.E.

Drawn: R.E.Y. & S.K.N. Date: July 1970

SUMMARY OF FORECAST EQUATIONS ROCKPORT LAKE, WEBER BASIN RESERVOIRS, UTAH

DATE OF FORECAST	PERIOD OF FORECAST	YEARS CORRE- LATED	SNOW COURSES USED	PRECIPIT- ATION STA. USED	EQUATIONS UNIT: 10,000 AC-FT	R	$\bar{s}$ 10,000 AC-FT
Jan 1	Jan 1- July 31	1936-60	None	Snake Crk. Heber Coalville	$y = 3.50 + .302 x_1 + .700 x_2$ $x_1 = \text{Oct-Dec precip.}$ $x_2 = \text{Average Jan precip}$	.72	2.70
Feb 1	Feb 1- July 31	1936-60	None	Snake Crk. Heber Coalville	$y = 3.50 + .302 x_1 + .700 x_2$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan precip}$	.72	2.70
Mar 1	Mar 1- July 31	1936-62	11-J-4 10-J-8	Snake Crk. Heber Coalville	$y = -.002 + .150 x_1 + .063 x_2 + .279 x_3$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Feb precip}$ $x_3 = \text{Mar 1 water content of snow}$	.89	2.17
Apr 1	Apr 1- July 31	1936-62	11-J-1 11-J-4 11-J-5 11-J-24 10-J-7	Kamas Coalville	$y = -3.639 + .309 x_1 + .245 x_2 + .633 x_3$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April 1 water content of snow}$	.88	1.92
May 1	May 1- July 31	1936-62	11-J-1 11-J-4 11-J-5 11-J-24 10-J-7	Kamas Coalville	$y = -5.460 + .167 x_1 + .172 x_2 + 1.154 x_3 + .561 x_4$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April precip}$ $x_4 = \text{April 1 water content of snow}$	.90	1.54
June 1	May 1- July 31	1936-62	11-J-1 11-J-4 11-J-5 11-J-24 10-J-7	Kamas Coalville	$y = -5.022 + .174 x_1 + .266 x_2 + .657 x_3 + .448 x_4$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{Apr-May precip}$ $x_4 = \text{April 1 water content of snow}$	.92	1.39

SUMMARY OF FORECAST EQUATIONS ECHO RESERVOIR, WEBER BASIN RESERVOIRS, UTAH

DATE OF FORECAST	PERIOD OF FORECAST	YEARS CORRE- LATED	SNOW COURSES USED	PRECIPIT- ATION STA. USED	EQUATIONS UNIT: 10,000 AC-FT	R	$\bar{s}$ 10,000 AC-FT
Jan 1	Jan 1- July 31	1936-60	None	Snake Crk. Heber Coalville	$y = 2.779 + .519 x_1 + 1.047 x_2$ $x_1 = \text{Oct- Dec precip}$ $x_2 = \text{Average Jan precip}$	.71	4.40
Feb 1	Feb 1- July 31	1936-60	None	Snake Crk. Heber Coalville	$y = 2.779 + .519 x_1 + 1.047 x_2$ $x_1 = \text{Oct- Dec precip}$ $x_2 = \text{Jan precip}$	.71	4.40
Mar 1	May 1- July 31	1936-62	10-J-8 11-J-2 11-J-4 11-J-5	Kamas Coalville	$y = - 1.334 + .305 x_1 + .422 x_2$ $x_1 = \text{Oct-Feb precip}$ $x_2 = \text{March 1 water content of snow}$	.81	3.73
Apr 1	Apr 1- July 31	1936-62	10-J-7 11-J-1 11-J-2 11-J-4 11-J-5 11-J-6 11-J-24	Kamas Coalville	$y = - 9.019 + .517 x_1 + .420 x_2 + .984 x_3$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April 1 water content of snow}$	.89	2.99
May 1	May 1- July 31	1936-62	10-J-7 11-J-1 11-J-2 11-J-4 11-J-5 11-J-6 11-J-24	Kamas Coalville	$y = - 10.876 + .268 x_1 + .226 x_2 + 1.564 x_3 + .894 x_4$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April precip}$ $x_4 = \text{April 1 water content of snow}$	.88	2.52
June 1	May 1 July 31	1936-62	10-J-7 11-J-1 11-J-2 11-J-4 11-J-5 11-J-6 11-J-24	Kamas Coalville	$y = - 10.181 + .284 x_1 + .358 x_2 + .734 x_3 + .887 x_4$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{Apr-May precip}$ $x_4 = \text{April 1 water content of snow}$	.90	2.36

SUMMARY OF FORECAST EQUATIONS
LOST CREEK RESERVOIR, WEBER BASIN RESERVOIRS, UTAH

DATE OF FORECAST	PERIOD OF FORECAST	YEARS CORRE- LATED	SNOW COURSES USED	PRECIPIT- ATION STA. USED	EQUATIONS UNIT: 1,000 AC-FT	R	$\bar{s}$ 1,000 AC-FT
Jan 1	Jan 1- July 31	1936-62	None	Morgan Coalville	$y = - 5.381 + 1.522 x_1$ $+ 3.314 x_2$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Average Jan precip}$	.70	7.15
Feb 1	Feb 1- July 31	1936-62	11-H-13 11-H-14	Morgan Coalville	$y = - 8.656 + 1.157 x_1 +$ $.963 x_2 + 2.402 x_3$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan precip}$ $x_3 = \text{February 1 water}$ content of snow		
Mar 1	Mar 1- July 31	1940-62	11-H-13	Morgan Coalville	$y = - 17.687 + .554 x_1$ $+ .527 x_2 + 1.709 x_3$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Feb precip}$ $x_3 = \text{March 1 water}$ content of snow	.76	6.79
Apr 1	Apr 1- July 31	1940-62	11-H-12 11-H-13	Morgan Coalville	$y = - 25.738 + .703 x_1 +$ $1.333 x_2 + .538 x_3$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April 1 water}$ content of snow	.87	5.20
May 1	May 1- July 31	1940-62	11-H-13	Morgan	$y = - 13.776 + .468 x_1$ $+ 1.199 x_2$ $x_1 = \text{Jan-Apr precip}$ $x_2 = \text{April 1 water}$ content of snow	.79	4.80
June 1				None			

SUMMARY OF FORECAST EQUATIONS
EAST CANYON RESERVOIR, WEBER BASIN RESERVOIRS, UTAH

DATE OF FORECAST	PERIOD OF FORECAST	YEARS CORRE- LATED	SNOW COURSES USED	PRECIPIT- ATION STA. USED	EQUATIONS UNIT: 1,000 AC-FT	R	$\bar{s}$ 1,000 AC-FT
Jan 1	Jan 1- July 31	1936-59	None	Snake Crk. Coalville	$y = 2.527 + 1.504 x_1 + 2.037 x_2$ $x_1 = \text{Oct-Dec Precip}$ $x_2 = \text{Ave Jan precip}$	.58	10.18
Feb 1	Feb 1- July 31	1936-59	None	Snake Crk. Coalville	$y = 2.527 + 1.504 x_1 + 2.037 x_2$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan precip}$	.58	10.18
Mar 1	Mar 1- July 31	1936-62	11-J-15 11-J-16	Snake Crk. Coalville	$y = -13.479 + 0.924 x_1 + 0.088 x_2 + 1.644 x_3$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Feb precip}$ $x_3 = \text{March 1 water content of snow}$	.77	8.32
Apr 1	Apr 1- July 31	1936-62	11-J-15 11-J-16	Snake Crk. Coalville	$y = -33.775 + 1.085 x_1 + 1.184 x_2 + 1.659 x_3$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April 1 water content of snow}$	.92	5.34
May 1	May 1 July 31	1936-62	11-J-15	Snake Crk. Coalville	$y = -22.825 + 0.654 x_1 + 0.685 x_2 + 1.129 x_3 + 0.956 x_4$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April precip}$ $x_4 = \text{April 1 water content of snow}$	.88	3.86
June 1	May 1- July 31	1936-62	11-J-15	Snake Crk. Coalville	$y = -23.99 + 0.574 x_1 + 0.683 x_2 + 0.869 x_3 + 0.970 x_4$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{Apr-May precip}$ $x_4 = \text{Apr 1 water content of snow}$	.89	3.68

SUMMARY OF FORECAST EQUATIONS PINEVIEW RESERVOIR, WEBER BASIN RESERVOIRS, UTAH

DATE OF FORECAST	PERIOD OF FORECAST	YEARS CORRE- LATED	SNOW COURSES USED	PRECIPIT- ATION STA. USED	EQUATIONS UNIT: 10,000 AC-FT	R	$\bar{s}$ 10,000 AC-FT
Jan 1	Jan 1- July 31	1940-64	None	Pineview Dam Evanston Coalville Brigham City Ogden, P.H.	$y = 3.079 + .245 x_1 + 3.019 x_2$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Previous year run-off}$	.52	4.29
Feb 1	Feb 1- July 31	1940-64	11-H-13 11-H-14	Pineview Dam Evanston Coalville Brigham City Ogden P.H.	$y = 2.654 + .028 x_1 + .535 x_2$ $x_1 = \text{Oct-Jan precip}$ $x_2 = \text{Feb 1 water content of snow}$	.64	3.87
Mar 1	Mar 1- July 31	1940-64	11-H-12 11-H-13	Pineview Dam Evanston Coalville Brigham City Ogden P.H.	$y = -3.645 + .011 x_1 + .364 x_2 + 1.867 x_3$ $x_1 = \text{Oct-Feb precip}$ $x_2 = \text{March 1 water content of snow}$ $x_3 = \text{Previous season runoff}$	.73	3.30
Apr 1	Apr 1- July 31	1936-62	11-H-12 11-H-13 11-H-8	Pineview Dam Evanston Coalville Monte Cristo	$y = -8.976 + .102 x_1 + .250 x_2 + .391 x_3$ $x_1 = \text{Oct-Feb precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April 1 water content of snow}$	.78	3.20
May 1	May 1- July 31	1936-62	11-H-8 11-H-10 11-H-12 11-H-13 11-H-14	Brigham City Ogden P.H. Pineview Dam Monte Cristo	$y = -3.941 + .059 x_1 + .078 x_2 + .148 x_3 + .260 x_4$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{April precip}$ $x_4 = \text{May 1 water content of snow}$	.76	2.14
June 1	May 1- July 31	1936-62	11-H-8 11-H-10 11-H-12 11-H-13 11-H-14	Brigham City Ogden P.H. Pineview Dam Monte Cristo	$y = -4.710 + .050 x_1 + .089 x_2 + .149 x_3 + .248 x_4$ $x_1 = \text{Oct-Dec precip}$ $x_2 = \text{Jan-Mar precip}$ $x_3 = \text{Apr-May precip}$	.79	2.03

FORECAST VERIFICATION DATA
U.S. BUREAU OF RECLAMATION HISTORICAL FORECAST DATA
AND OBSERVED RUNOFF (Data from Month of Forecast to July 31)

Unit:
1,000 acre-feet

YEAR	1 JANUARY		1 FEBRUARY		1 MARCH		1 APRIL		1 MAY		1 JUNE	
	Forecast	Observed	Forecast	Observed	Forecast	Observed	Forecast	Observed	Forecast	Observed	Forecast	Observed
WEBER RIVER AT ROCKPORT RESERVOIR 1/												
1962	148	175	138	172	148	161	144	154	132	122	94	65
1963	90	117	93	114	71	107	69	102	130	91	60	49
1964	120	150	115	145	70	141	80	136	100	123	52	62
1965	185	212	165	204	185	200	155	193	134	174	91	89
1966	140	123	125	116	110	110	82	96	49	76	17	53
1967	140	193	162	187	130	182	115	170	110	159	82	74
1968	115	171	97	166	114	160	100	150	129	138	85	54
WEBER RIVER AT ECHO RESERVOIR 1/												
1962	208	221	194	216	212	199	207	187	170	142	134	50
1963	108	144	108	137	88	126	80	119	160	102	65	49
1964	155	208	148	203	90	197	95	190	120	168	53	69
1965	265	307	238	298	250	288	205	268	154	231	107	75
1966	200	155	183	141	145	133	100	114	72	83	18	33
1967	190	250	225	240	175	232	150	217	140	201	95	65
1968	145	233	146	219	160	203	130	189	160	170	100	109
OGDEN RIVER AT PINEVIEW RESERVOIR												
1962	154	166	144	162	157	142	169	126	100	64	52	50
1963	83	104	73	98	56	93	34	86	70	61	20	49
1964	117	125	107	122	70	115	100	108	100	80	38	69
1965	210	185	205	172	165	161	124	148	62	100	25	75
1966	140	113	140	106	135	101	72	79	38	39	10	33
1967	123	163	135	158	115	153	90	138	100	111	35	65
1968	127	126	105	120	100	112	90	94	75	73	29	48
EAST CANYON CREEK AT EAST CANYON RESERVOIR												
1962 2/	31	24	29	24	32	24	29	21	22	11	15	4
1963 2/	16	13	16	13	11	13	10	11	12	7	2	2
1964 2/	23	26	22	26	15	26	15	25	11	17	11	6
1965 2/	40	43	43	43	45	43	37	40	17	27	22	13
1966 2/	30	20	30	20	26	20	8	14	4	8	1	3
1967	-	33	30	32	27	30	17	27	14	22	4	12
1968	26	33	24	32	25	30	20	26	14	22	4	12
LOST CREEK AT LOST CREEK RESERVOIR												
1965 2/	-	30	30	30	30	30	20	28	-	21	-	6
1966 2/	17	14	14	14	20	14	10	12	5	6	-	2
1967	-	16	21	16	17	15	13	15	20	14	-	5
1968	18	14	13	13	12	13	11	11	9	9	-	4

NOTES:

1/ Total flow-not adjusted for Weber-Provo Canal Diversions.

2/ Forecast and observed flow shown for January and February are for the March - July period.

HISTORICAL FORECAST DATA
SOIL CONSERVATION SERVICE
FEDERAL-STATE-PRIVATE SNOW-SURVEY FORECASTS
WEBER RIVER NEAR OAKLEY, UTAH

April-September Runoff in Thousand Acre-Feet

		Date of Forecast							
Water:Observed:		1 February :		1 March :		1 April :		1 May	
Year :	Runoff	Forecast:	Error:	Forecast:	Error:	Forecast:	Error:	Forecast:	Error
1947	133					120	-13		
1948	118					110	- 8		
1949	137			130	- 7	162	25		
1950	175			150	-25	155	-20		
1951	147			155	8	145	- 2		
1952	192			170	-22	188	- 4		
1953	116			90	-26	92	-24		
1954	82			100	18	105	23		
1955	98			99	1	113	15	106	8
1956	145			151	6	136	- 9	132	-13
1957	153	138	-15	134	-19	131	-22	140	-13
1958	106	130	24	123	17	138	32	148	42
1959	91	104	13	111	20	119	28	112	11
1960	90	97	7	106	16	92	2	112	22
1961	51	90	39	65	14	80	29	70	19
1962	148	150	2	160	12	153	5	155	7
1963	102	105	3	85	-17	72	-30	121	19
1964	136	107	-29	82	-54	105	-31	117	-19
1965	188	173	-15	165	-23	154	-34	161	-27
1966	105	124	19	112	- 3	94	-11	90	-15
1967	167	132	-35	125	-42	120	-47	141	26

HISTORICAL FORECAST DATA
FEDERAL-STATE-PRIVATE SNOW-SURVEY FORECASTS
SOUTH FORK OGDEN RIVER NEAR HUNTSVILLE, UTAH

April-September Runoff in Thousand Acre-Feet

		Date of Forecast							
Water:Observed		1 February :		1 March :		1 April :		1 May	
Year : Runoff		Forecast:	Error:	Forecast:	Error:	Forecast:	Error:	Forecast:	Error:
1947	49					62	13		
1948	74					60	-14		
1949	77			80	3	75	- 2		
1950	97			75	-22	88	- 9		
1951	95			88	- 7	77	-18		
1952	112			95	-17	110	- 2		
1953	60			45	-15	45	-15		
1954	32			52	20	54	22		
1955	62			58	- 4	70	8	58	- 4
1956	63			95	32	80	17	72	9
1957	77	56	-21	57	-20	59	-18	70	- 7
1958	58	51	- 7	53	- 5	88	30	88	30
1959	29	43	14	49	20	49	20	49	20
1960	38	48	10	52	14	56	18	55	17
1961	16	35	19	32	16	33	17	22	6
1962	67	80	13	83	16	90	23	81	14
1963	48	55	7	30	18	29	-19	56	8
1964	67	55	-12	45	22	63	- 4	62	- 5
1965	90	88	- 2	78	12	70	-20	74	-16
1966	50	63	3	65	15	49	- 1	44	- 6
1967	67	60	- 7	58	9	48	-19	59	- 8

HISTORICAL FORECAST DATA
FEDERAL-STATE-PRIVATE SNOW-SURVEY FORECAST
ROCKPORT RESERVOIR INFLOW 1/

April-July Runoff in Thousand Acre-Feet									
Water:Observed Year : Runoff		Date of Forecast							
		1 February		1 March		1 April		1 May	
		Forecast:	Error:	Forecast:	Error:	Forecast:	Error:	Forecast:	Error:
1960	73					100	+27	96	+23
1961	36	72	+36	51	+15	63	+27	40	+ 4
1962	148	145	- 3	150	2	147	- 1	162	+14
1963	94	85	- 9	60	-34	53	-39	113	+19
1964	137	85	-52	64	-73	83	-54	107	-30
1965	193	175	-18	155	-38	145	-48	164	-29
1966	94	119	25	100	6	78	-16	83	-11
1967	159	129	-30	114	-45	105	-55	143	-16

1/ Published as Wanship Reservoir Inflow prior to 1966.

HISTORICAL FORECAST DATS
FEDERAL-STATE-PRIVATE SNOW-SURVEY FORECASTS
PINEVIEW RESERVOIR INFLOW

April-July Runoff in Thousand Acre-Feet

		Date of Forecast							
Water:Observed		1 February		1 March		1 April		1 May	
Year	Runoff	Forecast	Error	Forecast	Error	Forecast	Error	Forecast	Error
1962	142			165	23	195	53	190	28
1963	93	116	43	62	-11	57	-16	104	31
1964	115	115	0	91	-24	128	13	82	-33
1965	161	180	19	166	5	132	-29	86	-75
1966	83	126	43	130	47	88	5	48	-35
1967	132	120	-12	110	-22	79	-53	88	-44

HISTORICAL FORECAST DATA
U. S. WEATHER BUREAU FORECAST
WEBER RIVER NEAR OAKLEY, UTAH

October-September Runoff in Thousand Acre-Feet

		Date of Forecast							
Water:Observed		1 February		1 March		1 April		1 May	
Year	Runoff	Forecast	Error	Forecast	Error	Forecast	Error	Forecast	Error
1946	146			128	-18	126	-20	125	-21
1947	157	163	6	182	25	142	-15	148	- 9
1948	143	122	-21	115	-28	126	-17	130	-13
1949	158	158	0	152	- 6	153	- 6	137	-21
1950	199	167	-32	158	-41	175	-41	171	-28
1951	174	164	-10	153	-21	146	-28	150	-24
1952	217	205	-12	205	-12	265	48	255	38
1953	139	130	- 9	110	-29	110	-29	114	-25
1954	101	125	24	116	15	120	19	110	9
1955	114	125	11	122	8	125	11	120	6
1956	168	187	19	172	4	141	-27	137	-31
1957	171	145	-26	133	-38	146	-25	157	-14
1958	128	155	27	169	41	180	52	180	52
1959	109	121	12	130	21	117	8	117	8
1960	113	108	- 5	116	3	124	9	120	7
1961	67	100	33	90	23	92	25	87	20
1962	168	151	-17	174	6	174	6	186	18
1963	122	111	-11	108'	-14	100	-22	140	18
1964	153	131	-22	105	-48	110	-43	123	-30
1965	208	192	-16	175	-33	165	-43	172	-36
1966	134	150	16	140	6	123	-11	118	-16
1967	190	162	-28	148	-42	143	-47	164	-26

HISTORICAL FORECAST DATA
U. S. WEATHER BUREAU FORECAST
SOUTH FORK OGDEN RIVER NEAR HUNTSVILLE

October-September Runoff in Thousand Acre-Feet

Water:Observed Year : Runoff		Date of Forecast							
		1 February		1 March		1 April		1 May	
		Forecast	Error	Forecast	Error	Forecast	Error	Forecast	Error
1946	101			56	-45	62	-39	61	-40
1947	67	80	13	68	1	71	4	74	7
1948	90	52	-38	53	-37	58	-32	66	-24
1949	96	73	-23	66	-30	69	-27	61	-35
1950	120	88	-32	86	-34	96	-24	95	-25
1951	120	102	-18	97	-23	95	-25	99	-21
1952	131	106	-25	102	-29	132	1	125	- 6
1953	80	68	-12	60	-20	59	-21	61	-19
1954	53	65	12	60	7	65	12	53	0
1955	62	82	20	82	20	82	20	79	7
1956	90	126	36	115	25	89	- 1	85	- 5
1957	95	75	-20	71	-24	71	-24	83	-12
1958	76	82	6	92	16	103	27	105	31
1959	44	61	17	62	18	61	17	59	15
1960	54	58	4	67	13	72	18	66	12
1961	29	46	17	42	13	43	14	37	12
1962	84	72	-12	90	6	97	15	100	16
1963	63	50	-13	40	-23	38	-25	62	- 1
1964	80	60	-20	42	-38	46	-34	61	-19
1965	112	135	23	121	9	105	- 7	110	- 2
1966	65	98	33	92	27	74	9	69	4
1967	84	72	-12	64	-20	67	-17	80	- 4

HISTORICAL FORECAST DATA
U. S. WEATHER BUREAU FORECAST
ROCKPORT LAKE INFLOW 1/

October-September Inflow in Thousand Acre-Feet

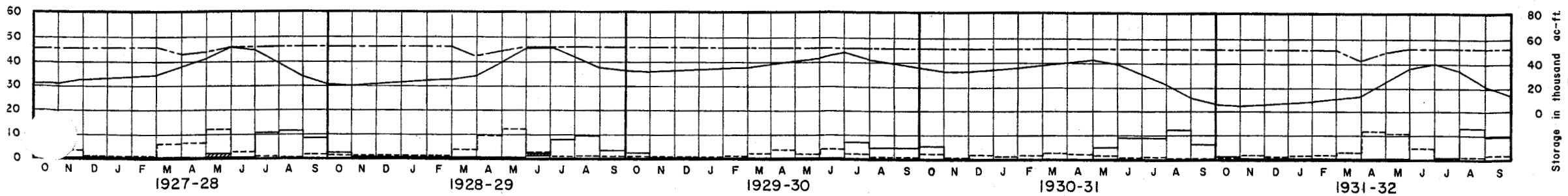
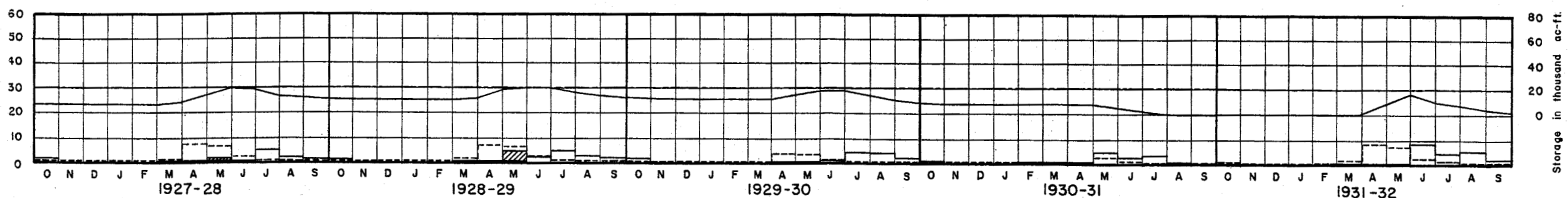
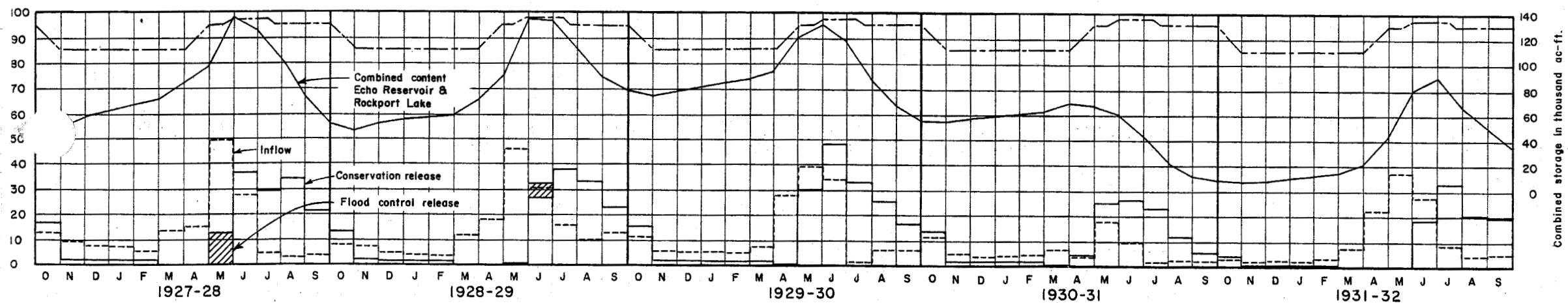
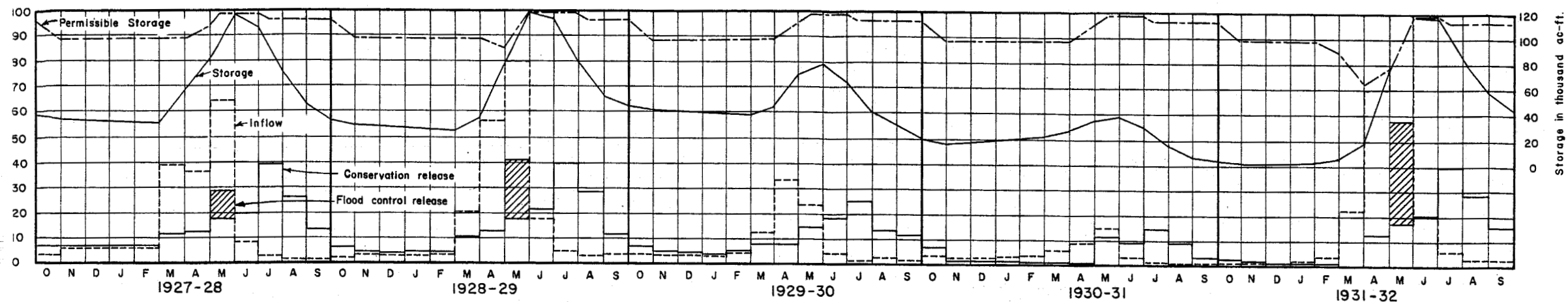
Water:Observed Year : Runoff		Date of Forecast							
		1 February	:	1 March	:	1 April	:	1 May	
		Forecast	Error	Forecast	Error	Forecast	Error	Forecast	Error
1957	174								
1958	161	175	14	197	36	205	44	205	44
1959	127	132	5	141	14	126	- 1	126	- 1
1960	128	117	-11	125	- 3	135	7	129	1
1961	69	106	37	92	23	94	25	87	18
1962	211	170	-41	205	- 6	205	- 6	225	14
1963	137	115	-22	110	-27	104	-33	154	17
1964	174	146	-28	112	-62	121	-53	136	-38
1965	262	244	-18	215	-47	200	-62	215	-47
1966	134	181	47	167	33	142	8	136	2
1967	221	197	-24	173	-48	171	-50	200	-21

1/ Prior to 1961 published as Wanship Reservoir Inflow

HISTORICAL FORECAST DATA
U. S. WEATHER BUREAU FORECAST
PINEVIEW RESERVOIR INFLOW

October-September Inflow in Thousand Acre-Feet

		Date of Forecast							
Water:Observed		1 February	:	1 March	:	1 April	:	1 May	
Year	: Runoff	Forecast	:Error	Forecast	:Error	Forecast	:Error	Forecast	:Error
	180								
	170								
1958	178	167	-11	190	12	215	37	220	42
1959	66	118	52	121	55	118	52	114	48
1960	114	112	- 2	132	18	143	29	135	21
1961	44	85	41	76	32	78	34	65	21
1962	178	143	-35	186	8	200	22	230	52
1963	119	93	-26	72	-47	68	-51	121	2
1964	159	116	-43	76	-83	85	-74	118	-41
1965	224	295	71	260	36	220	- 4	225	1
1966	142	200	58	190	48	148	6	137	- 5
1967	179	143	-36	130	-49	120	-59	153	-26



LEGEND

- Storage
- Permissible storage
- - - Inflow
- ▨ Flood control release
- Conservation release

Note:
Based on U.S.B.R. provisional reservoir
operation study for ultimate project conditions.

WEBER BASIN RESERVOIRS, UTAH

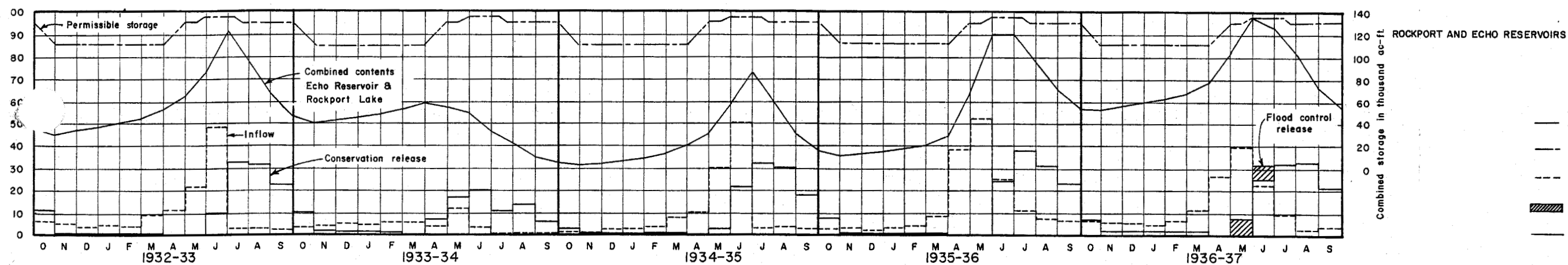
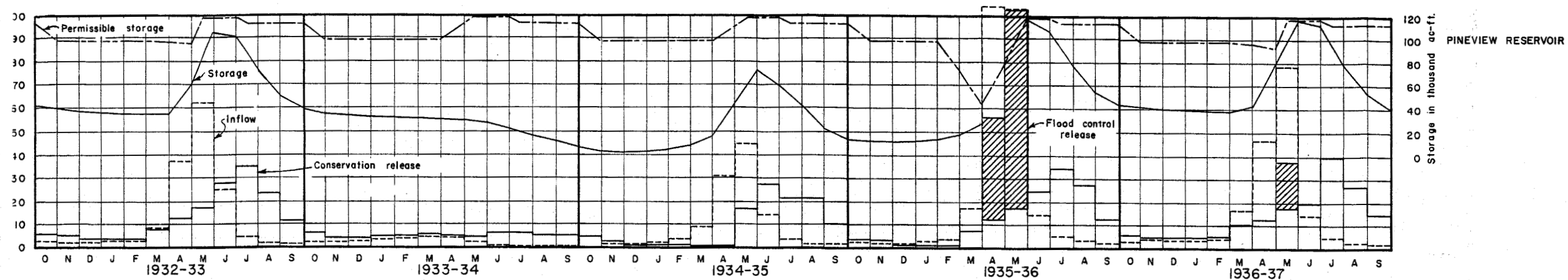
HYPOTHETICAL OPERATION

(1927-1947)

U.S. Army Engineer District Sacramento, California

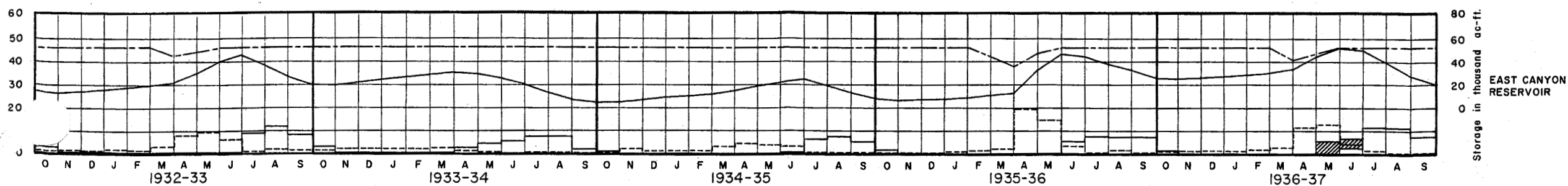
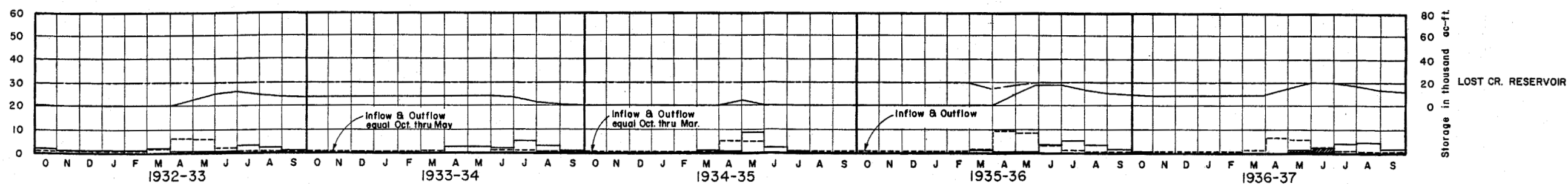
LJM

July 1970



- LEGEND**
- Storage
 - - - Permissible storage
 - - - Inflow
 - ▨ Flood control release
 - Conservation release

Note:
Based on U.S.B.R. provisional reservoir
operation study for ultimate project conditions.



WEBER BASIN RESERVOIRS, UTAH

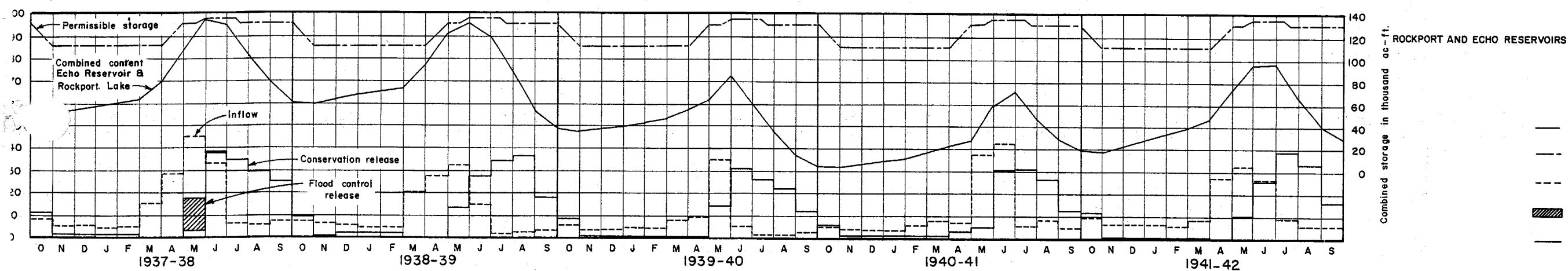
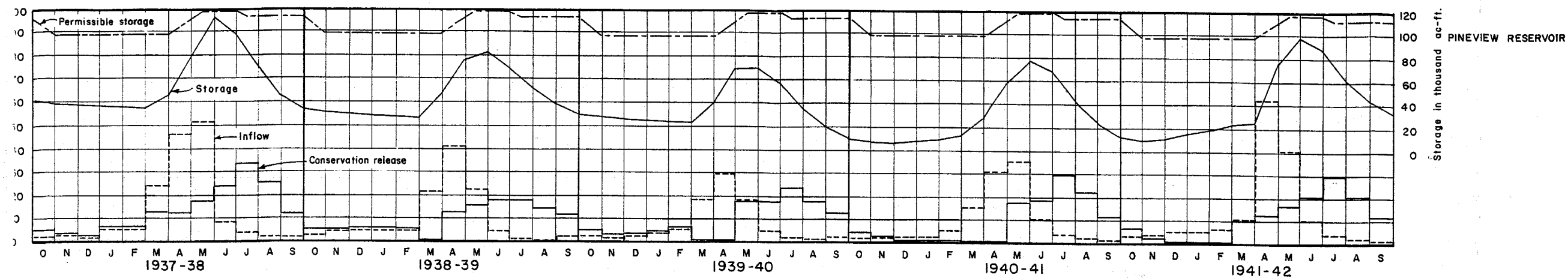
HYPOTHETICAL OPERATION

(1927-1947)

US Army Engineer District Sacramento, California

LJM

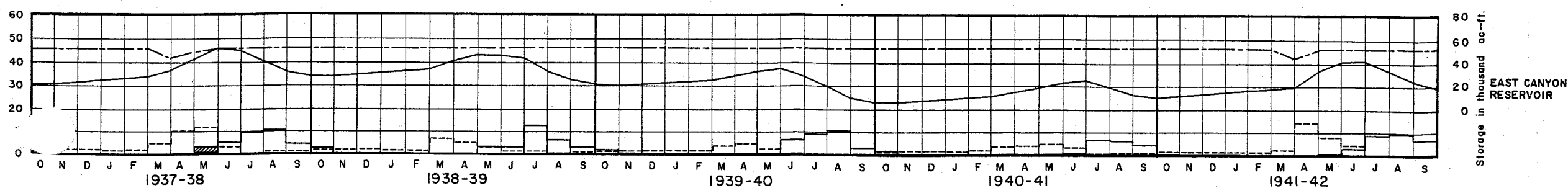
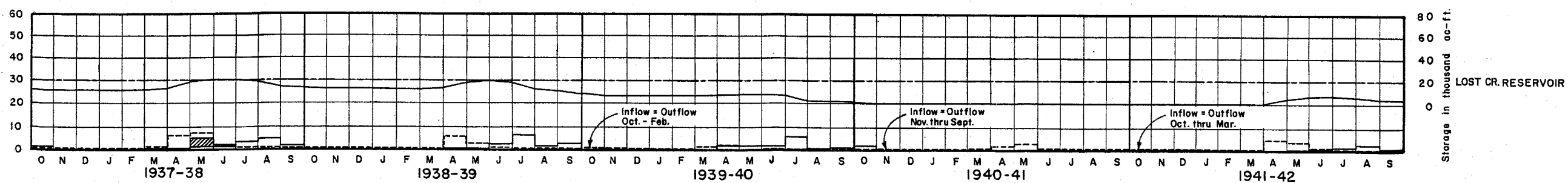
July 1970



LEGEND

- Storage
- - - Permissible storage
- - - Inflow
- ▨ Flood control release
- Conservation release

Note:
Based on U.S.B.R. provisional reservoir
operation study for ultimate project conditions.



WEBER BASIN RESERVOIRS, UTAH

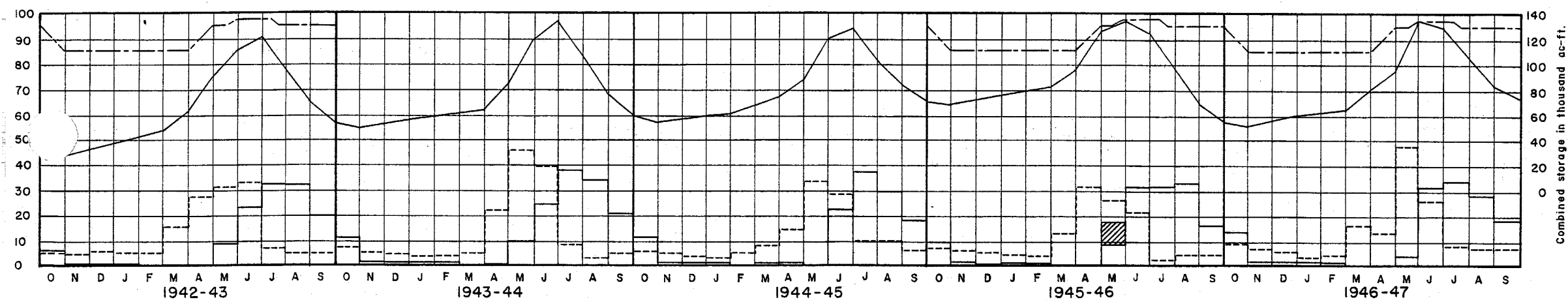
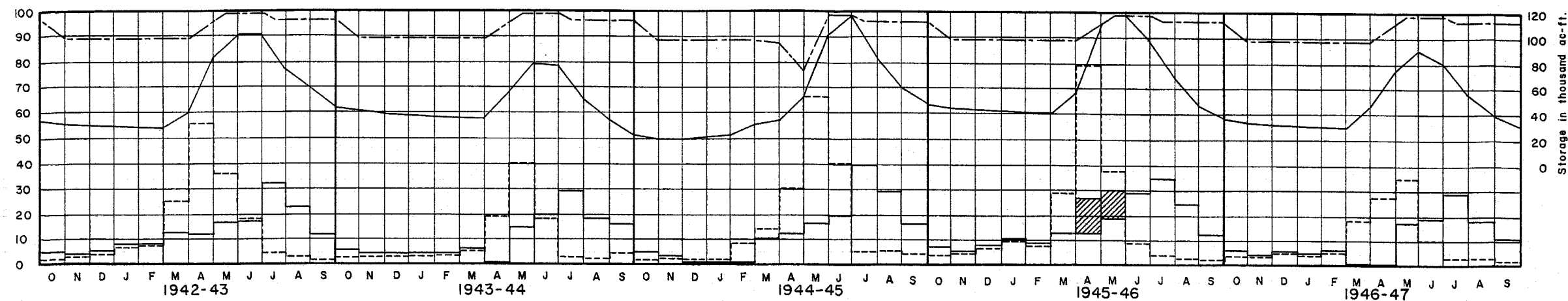
HYPOTHETICAL OPERATION

(1927-1947)

U.S. Army Engineer District Sacramento, California

LJM

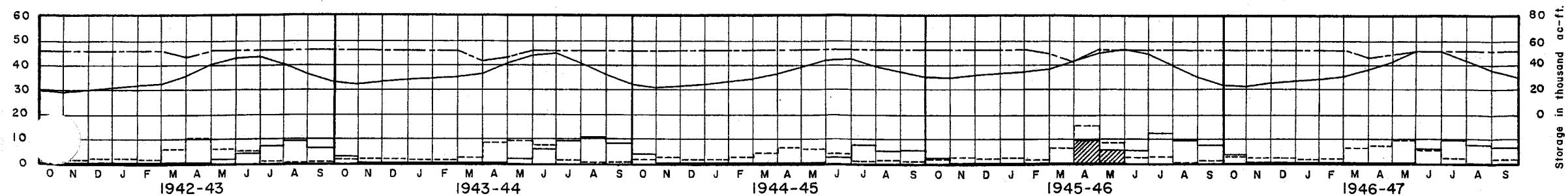
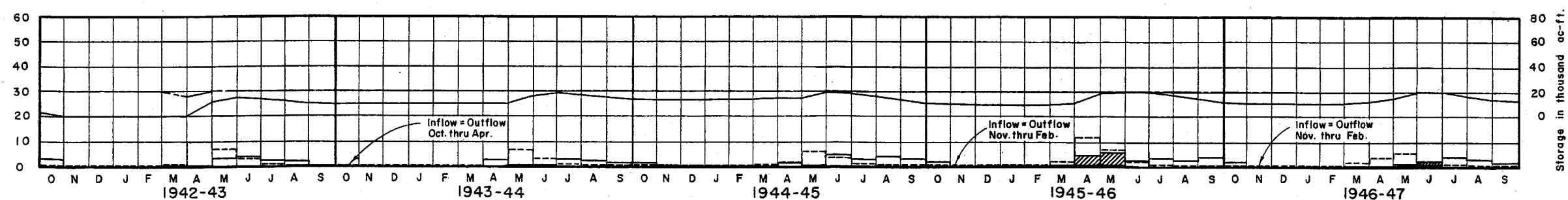
July 1970



LEGEND

- Storage
- Permissible storage
- - - Inflow
- ▨ Flood control release
- Conservation release

Note:
Based on U.S.B.R. provisional reservoir
operation study for ultimate project conditions



WEBER BASIN RESERVOIRS, UTAH

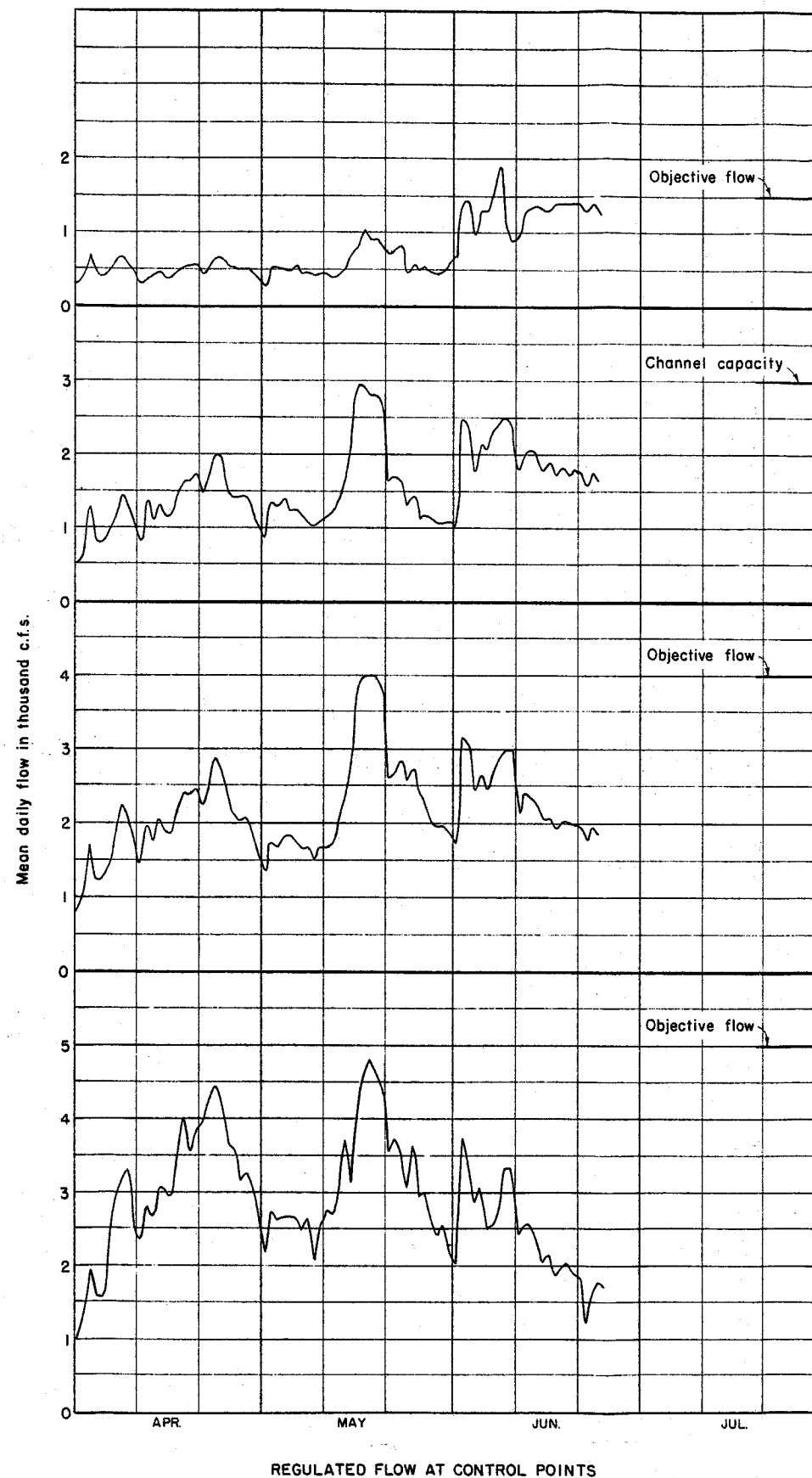
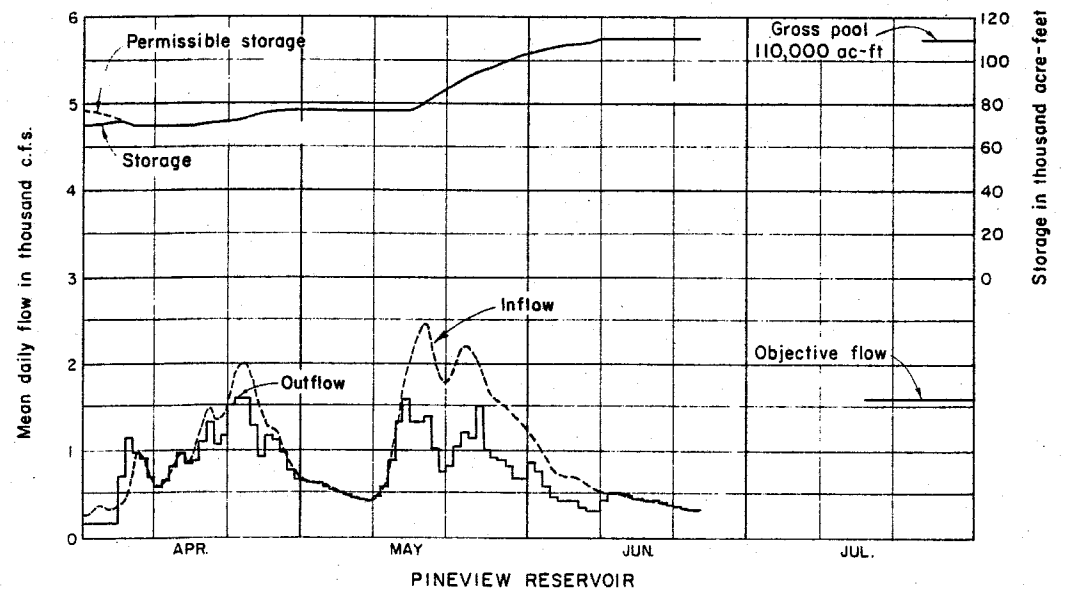
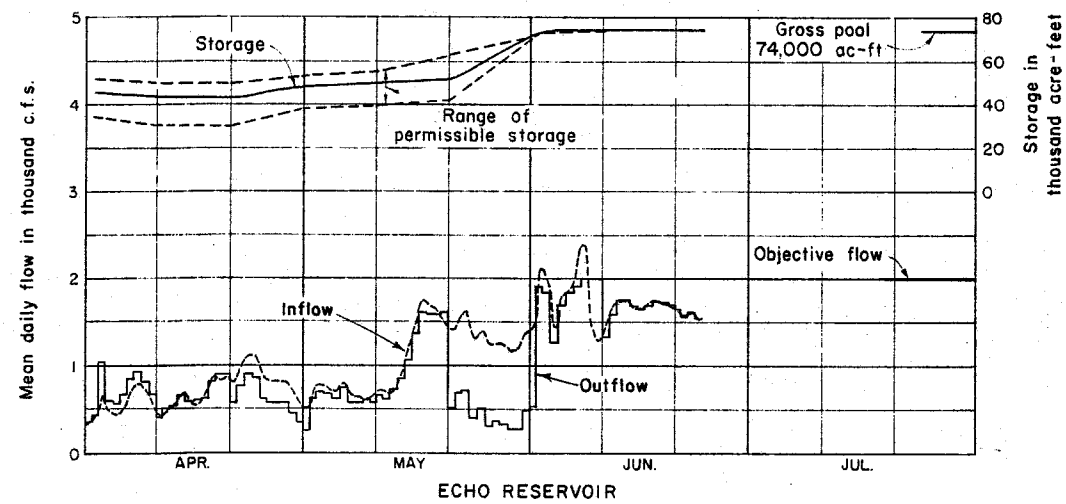
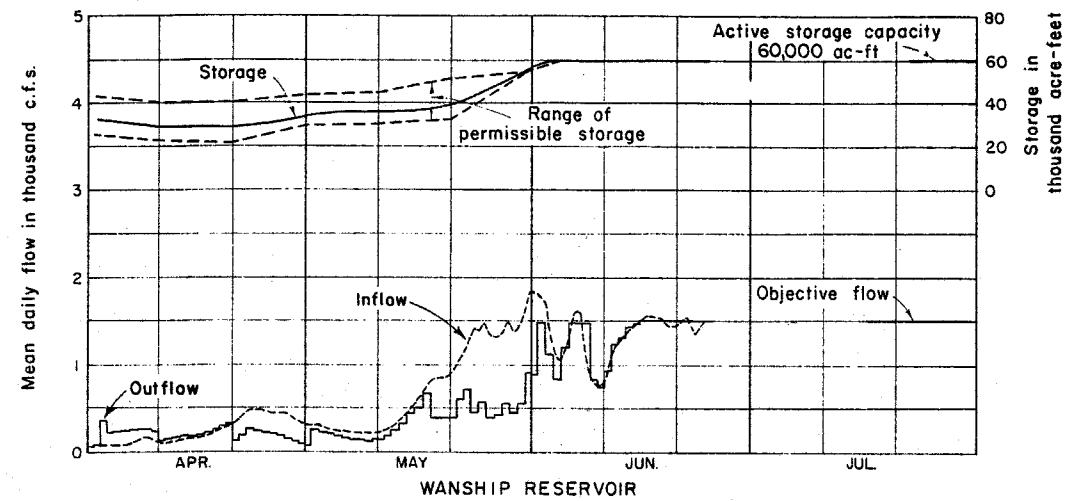
HYPOTHETICAL OPERATION

(1927-1947)

U.S. Army Engineer District Sacramento, California

LJM

July 1970



NOTE:
 Routings based on historical
 forecast and proposed regulations
 for initial operation.

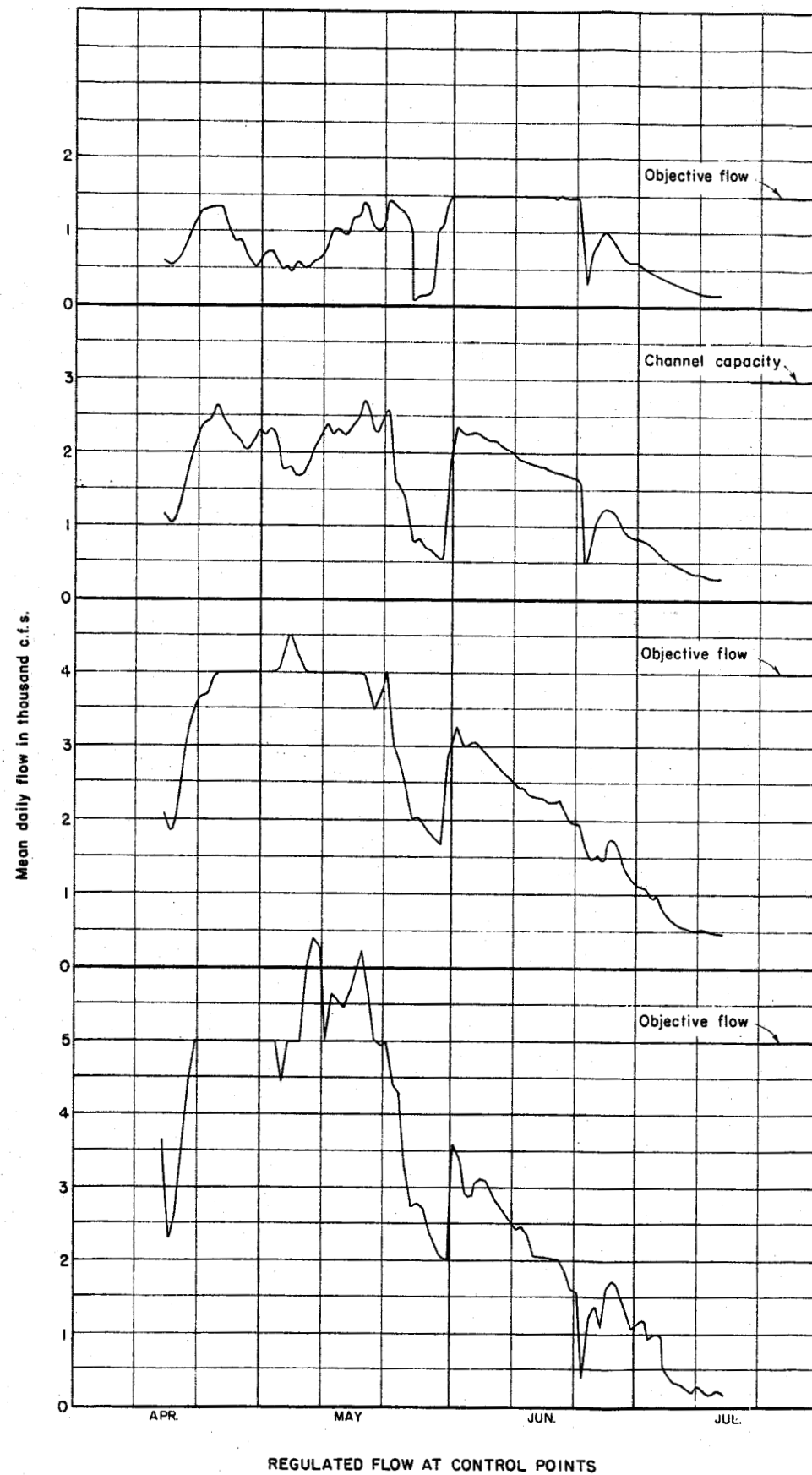
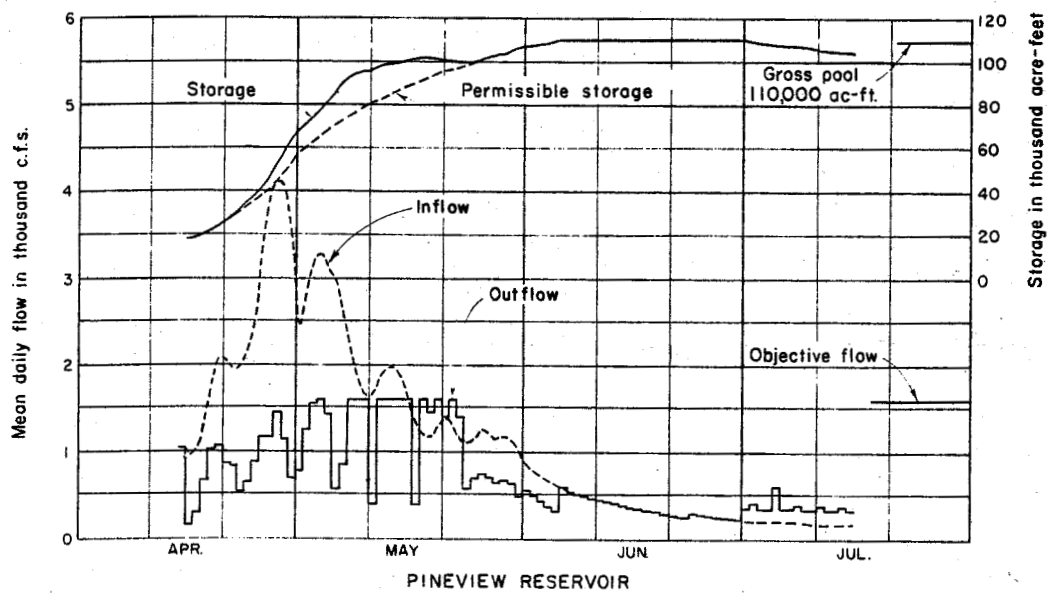
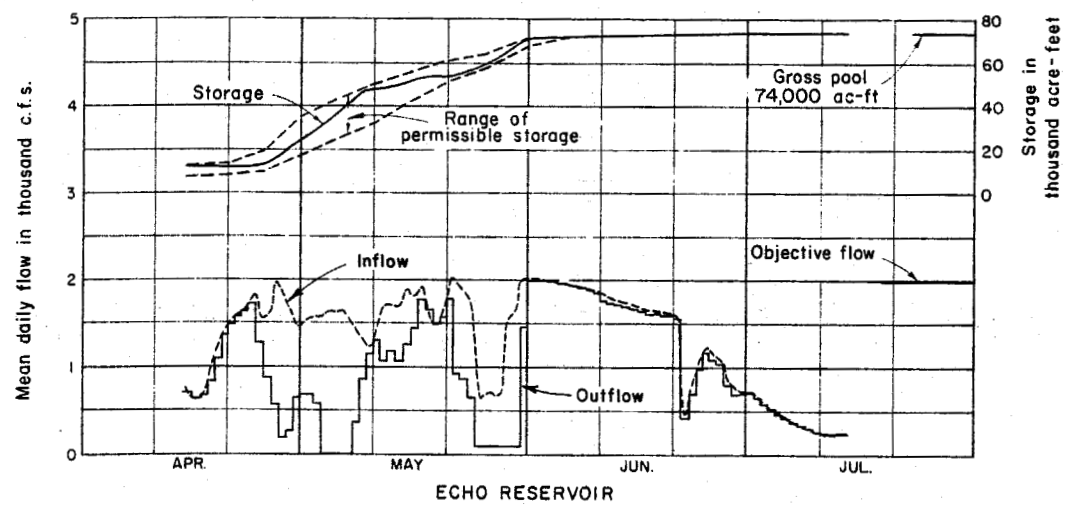
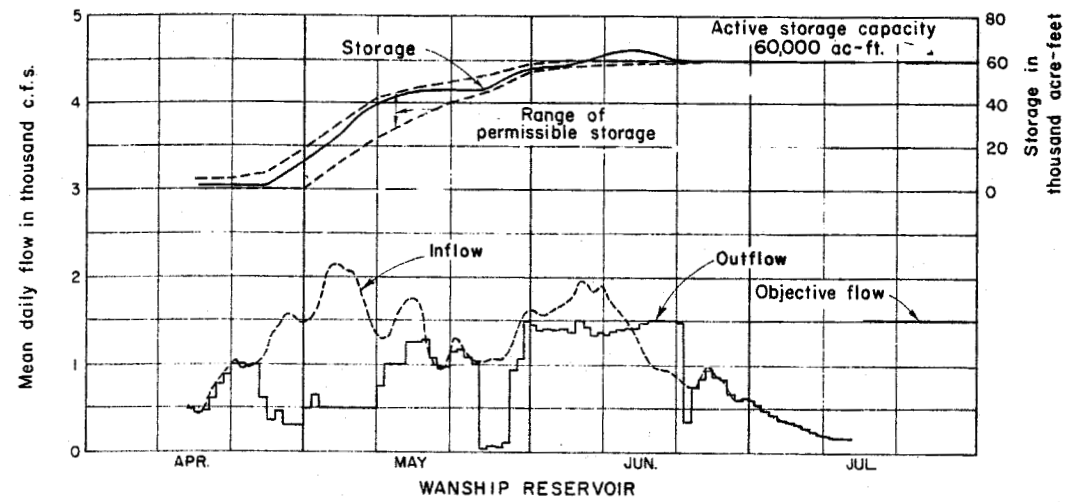
1950 SNOWMELT FLOOD

WEBER BASIN RESERVOIRS, UTAH

**HYPOTHETICAL FLOOD ROUTINGS
WEBER BASIN RESERVOIRS**

U. S. Army Engineer District Sacramento, California

R.W.S.-R.P.L. Dec 1959



Weber River near Coalville

Weber River at Devils Slide

Weber River at Gateway

Weber River below Ogden River

NOTE:
Routings based on historical
forecast and proposed regulations
for initial operation.

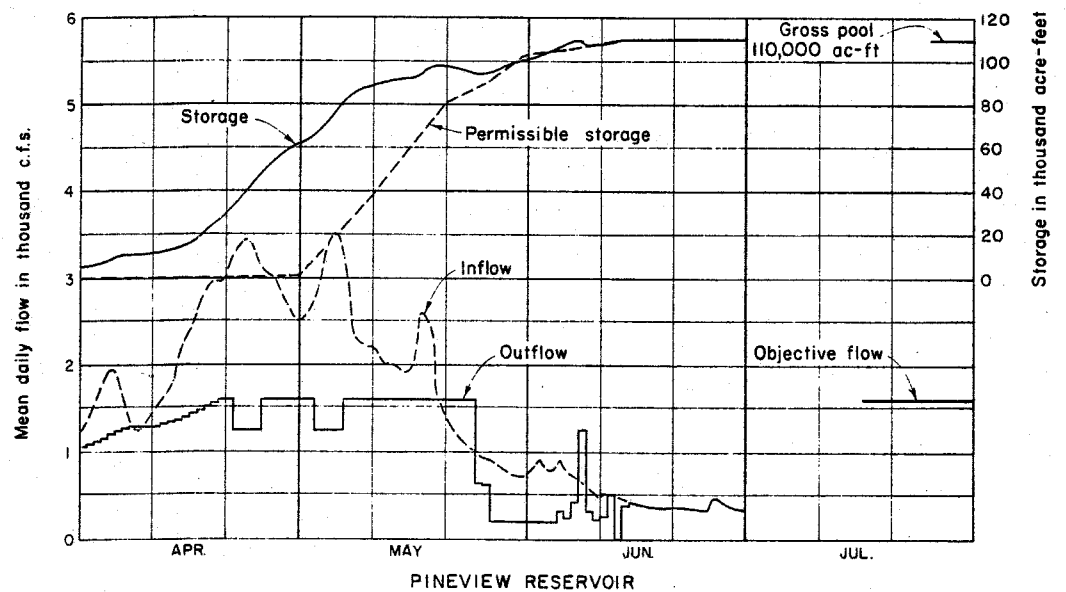
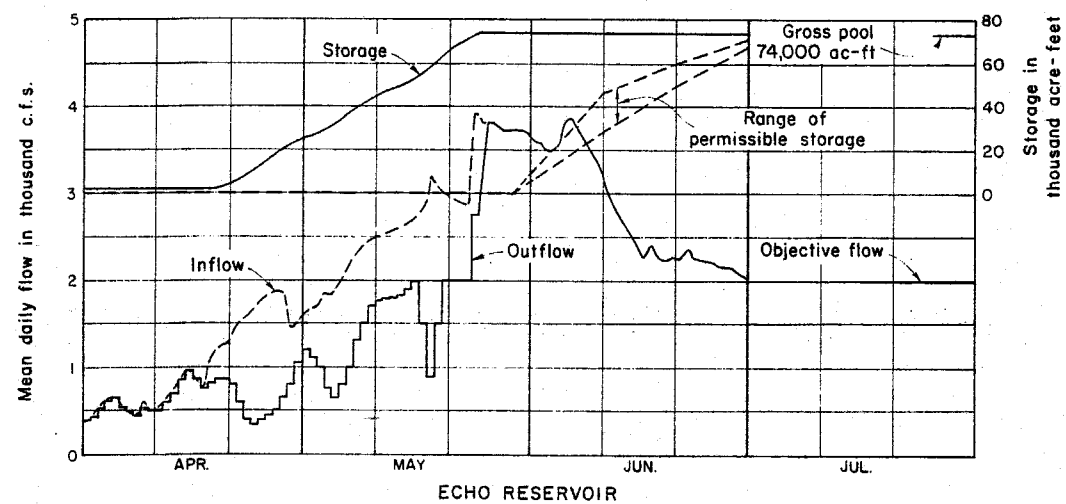
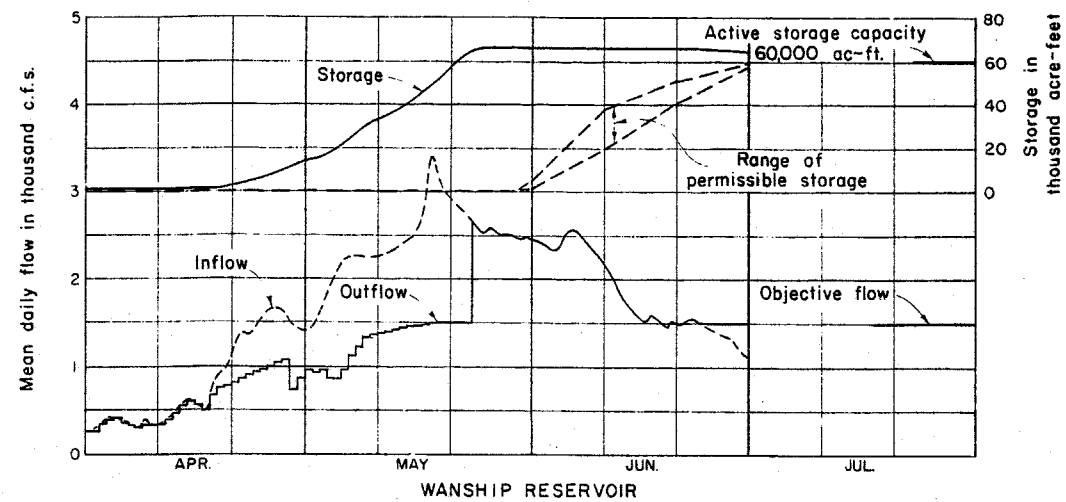
1952 SNOWMELT FLOOD

WEBER BASIN RESEVOIRS, UTAH

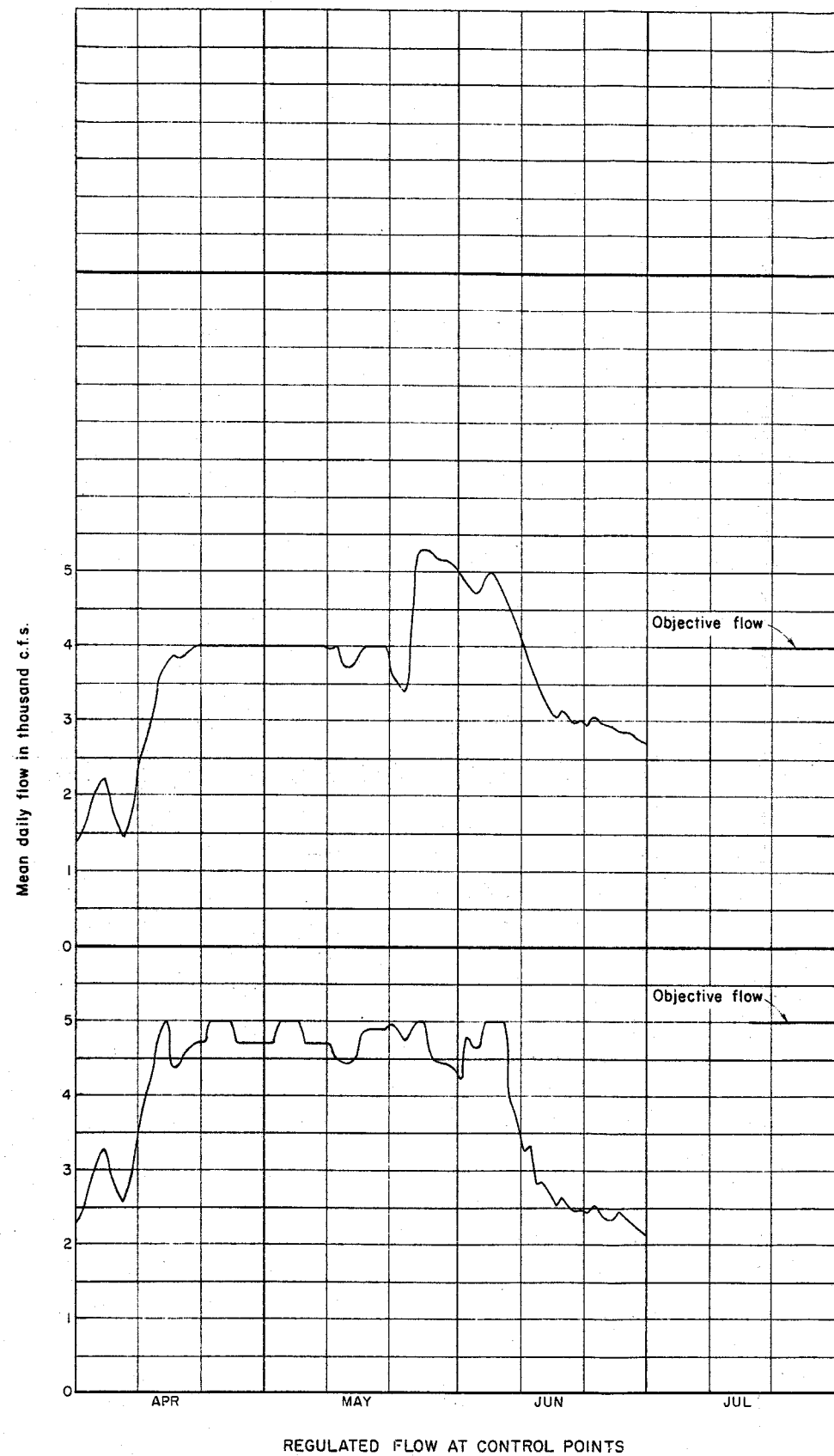
**HYPOTHETICAL FLOOD ROUTINGS
WEBER BASIN RESERVOIRS**

U. S. Army Engineer District Sacramento, California

R.W.S.-R.P.L. Dec 1959



STANDARD PROJECT FLOOD



Weber River at Gateway

NOTE:
Routings based on proposed
regulations for initial operation.

Weber River below Ogden River

WEBER BASIN RESERVOIRS, UTAH

HYPOTHETICAL FLOOD ROUTINGS
WEBER BASIN RESERVOIRS

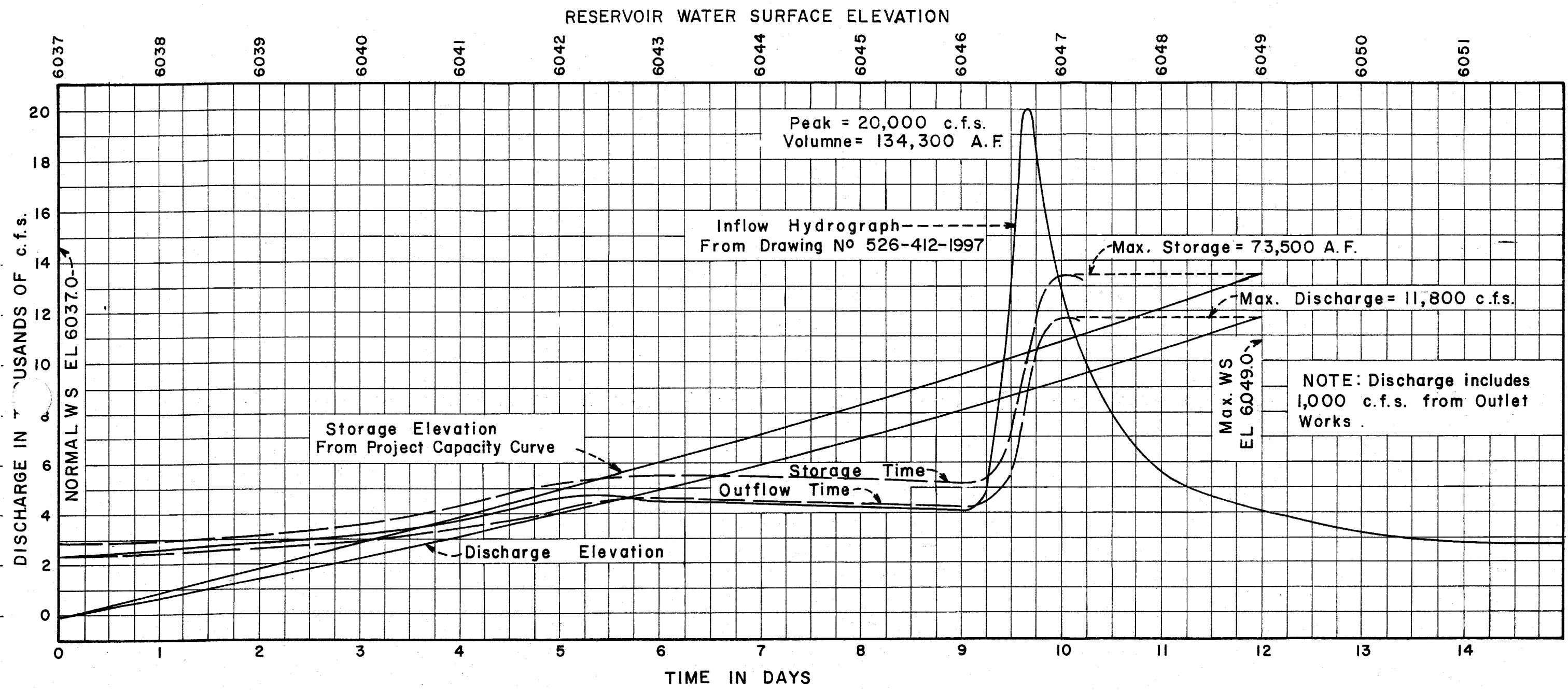
U. S. Army Engineer District

Sacramento, California

R.P.L.

Dec. 1959

SHEET 3 CHART 52



RESULTS OF FLOOD ROUTING

DESCRIPTION	MAX. WSEL	MAX. DISCH.	MAX. STOR.	SURCHARGE
75 FT. OPEN CREST	6049.0	11,800 c.f.s.	73,500 A.F.	13,500 A.F.

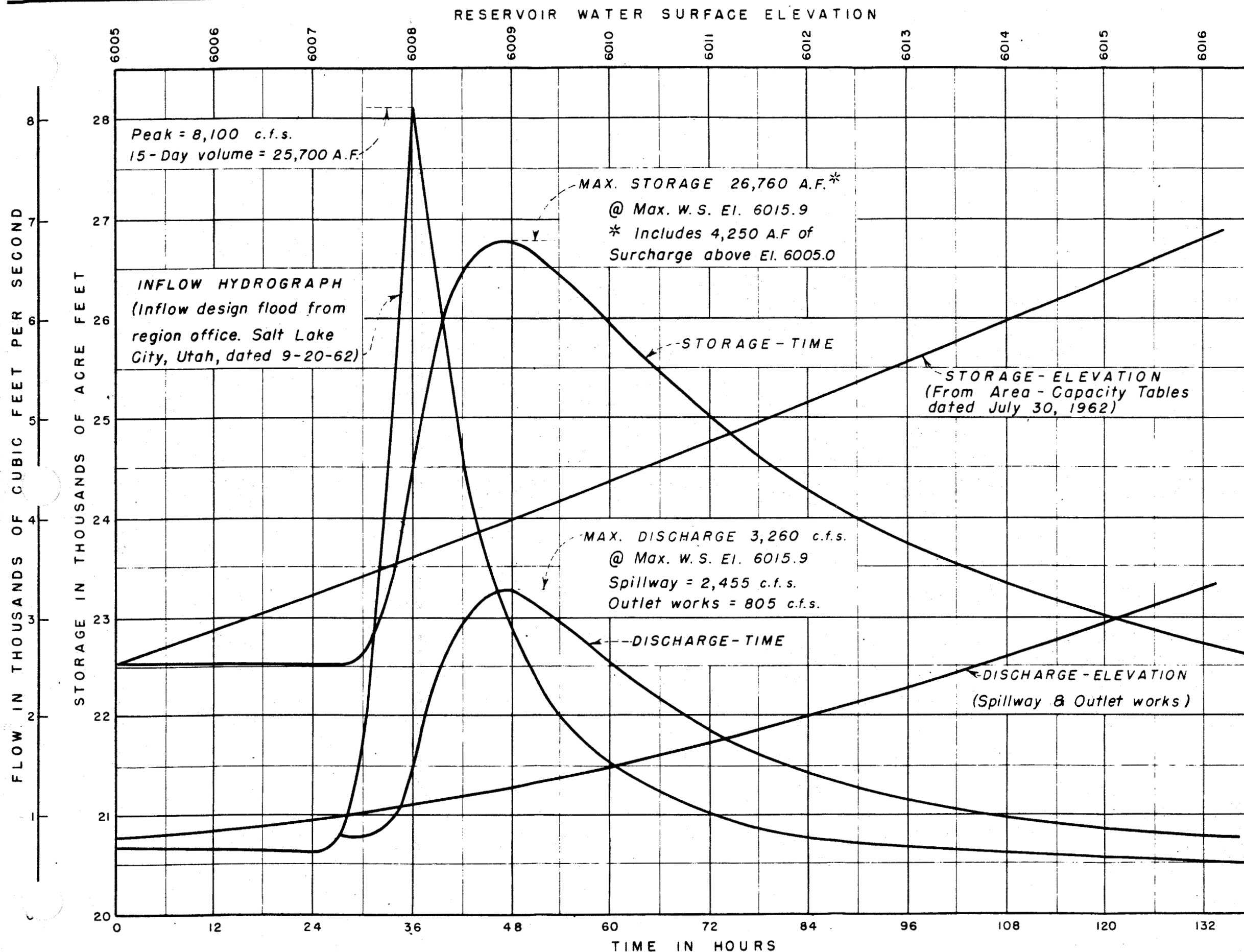
Chart redrawn from drawing 526-D-1166
furnished by U.S. Bureau of
Reclamation.

WEBER BASIN RESERVOIRS, UTAH

**WANSHIP DAM
SPILLWAY FLOOD ROUTING
CURVES**

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: _____ Date: JULY 1971
Drawn: R.E.Y.



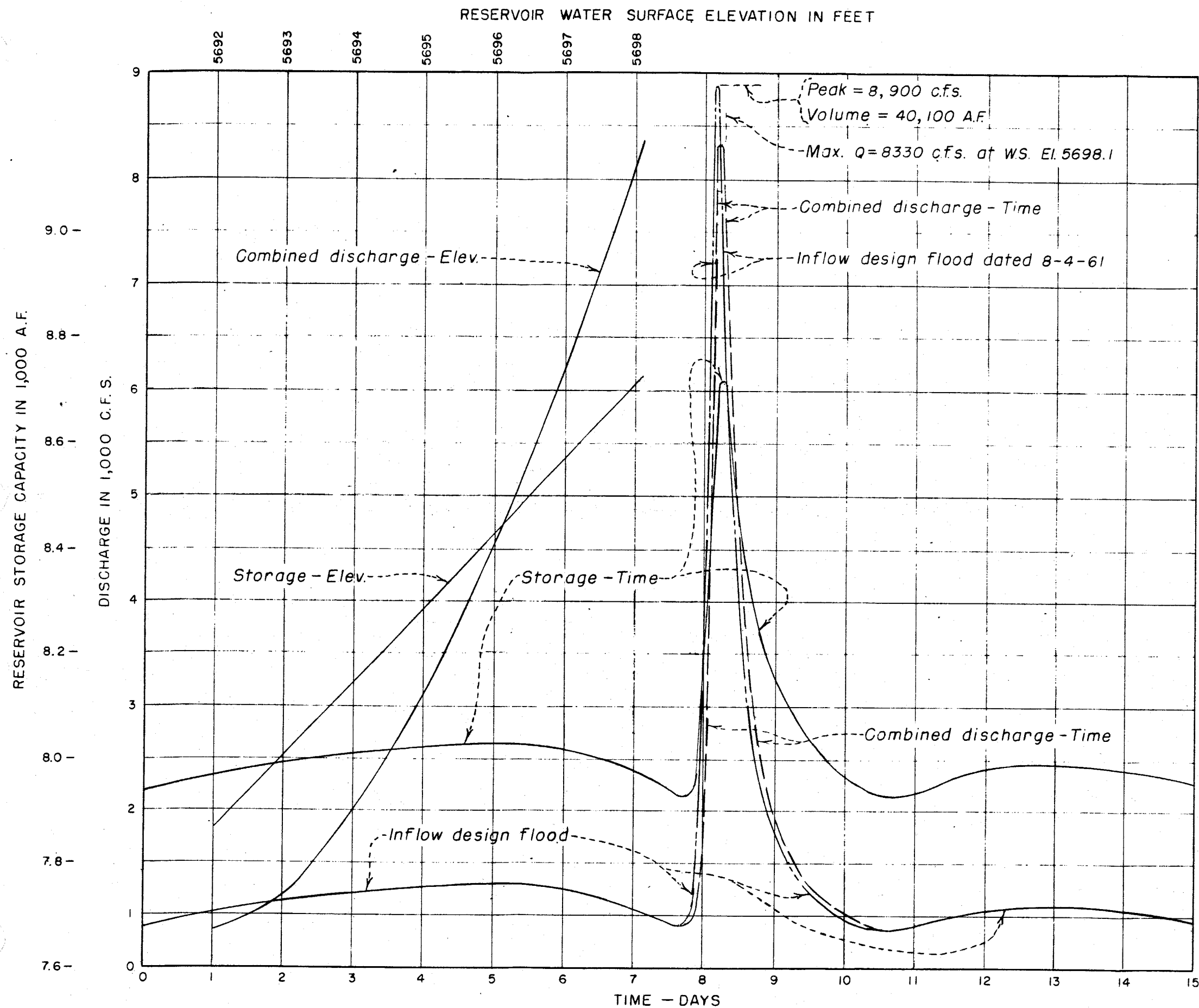
FLOOD ROUTING CRITERIA

The reservoir water surface is at El. 6005.0 (spillway crest) at the beginning of the design flood. The flood is then released thru both the spillway and outlet works. Outflow not to exceed inflow.

NOTE

This routing is for the spillway and outlet works shown on
Dwg. 526-D-2702.

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION WEBER BASIN PROJECT-UTAH LOST CREEK DAM FLOOD ROUTING CURVES			
DRAWN E.C.R.	SUBMITTED	<i>J. C. Roman</i>	
TRACED A.J.A.	RECOMMENDED	<i>R. W. Minner</i>	
CHECKED <i>J. C. Roman</i>	APPROVED	<i>O. J. Larsen</i> CHIEF, DAMS BRANCH	
DENVER, COLORADO, MAY 4, 1967		526-D-2720	



NOTES

Max. WS. El. 5698.1 with a surcharge of 860 A.F.
 Combined discharge includes discharge from spillway and outlet works.
 Max. discharge from spillway equals 7570 c.f.s.
 Max. discharge from outlet works equals 780 c.f.s.
 Flood routing starts with reservoir storage corresponding to leading flow.

 ALWAYS THINK **SAFETY**

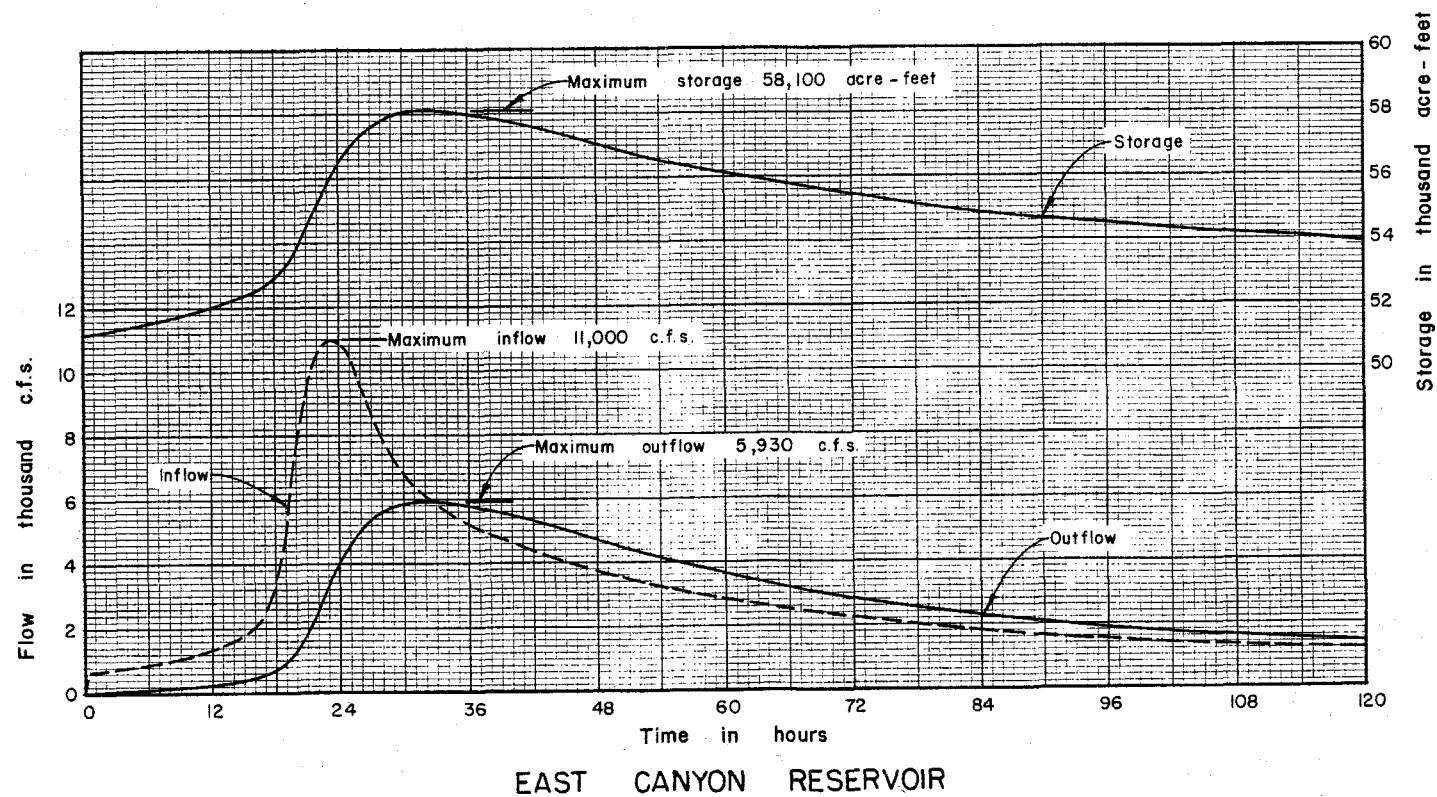
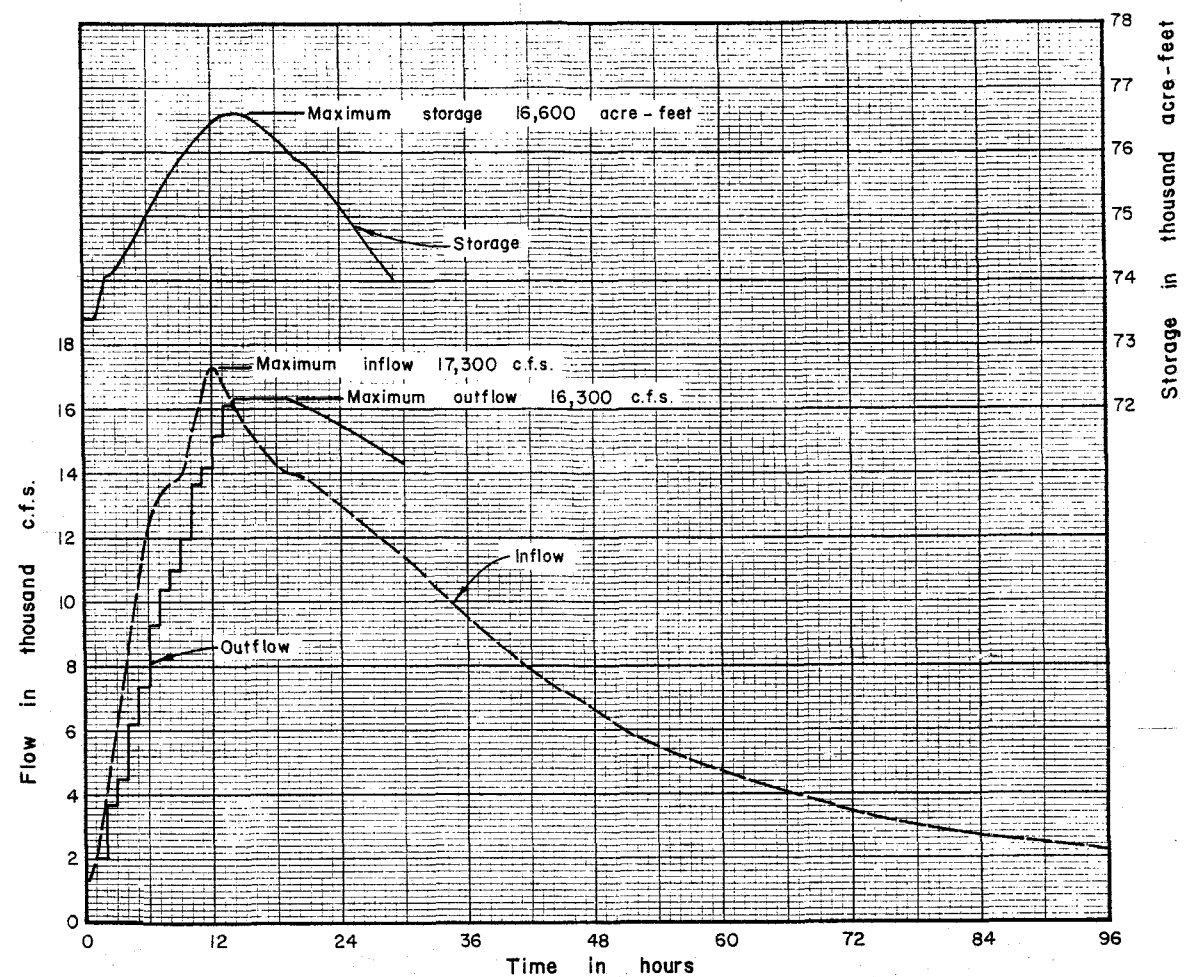
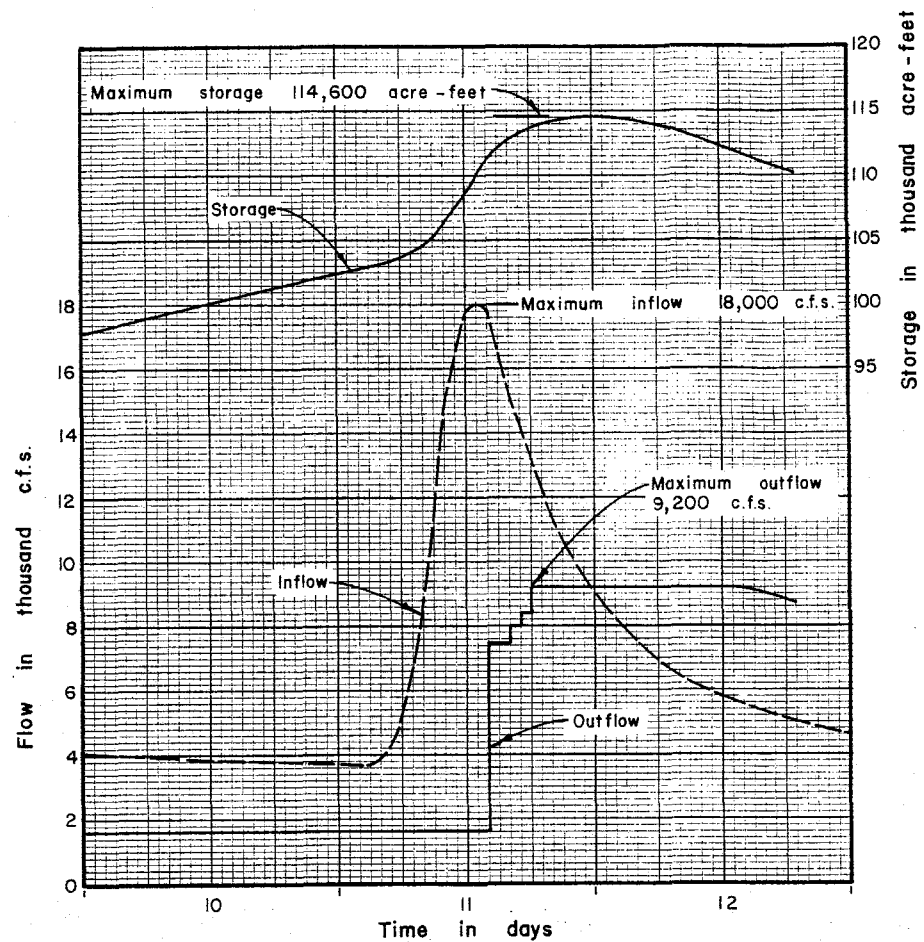
UNITED STATES
 DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
 WEBER BASIN PROJECT-UTAH

CAUSEY DAM
FLOOD ROUTING-DESIGN FLOOD

DRAWN: W.T.C. SUBMITTED: *[Signature]*
 TRACED: A.T.B. RECOMMENDED: *[Signature]*
 CHECKED: *[Signature]* APPROVED: *[Signature]*
 CHIEF DAMS BRANCH

DENVER, COLO., FEB. 6, 1963

526-D-2730



NOTE:
Data furnished by U.S. Bureau
of Reclamation.

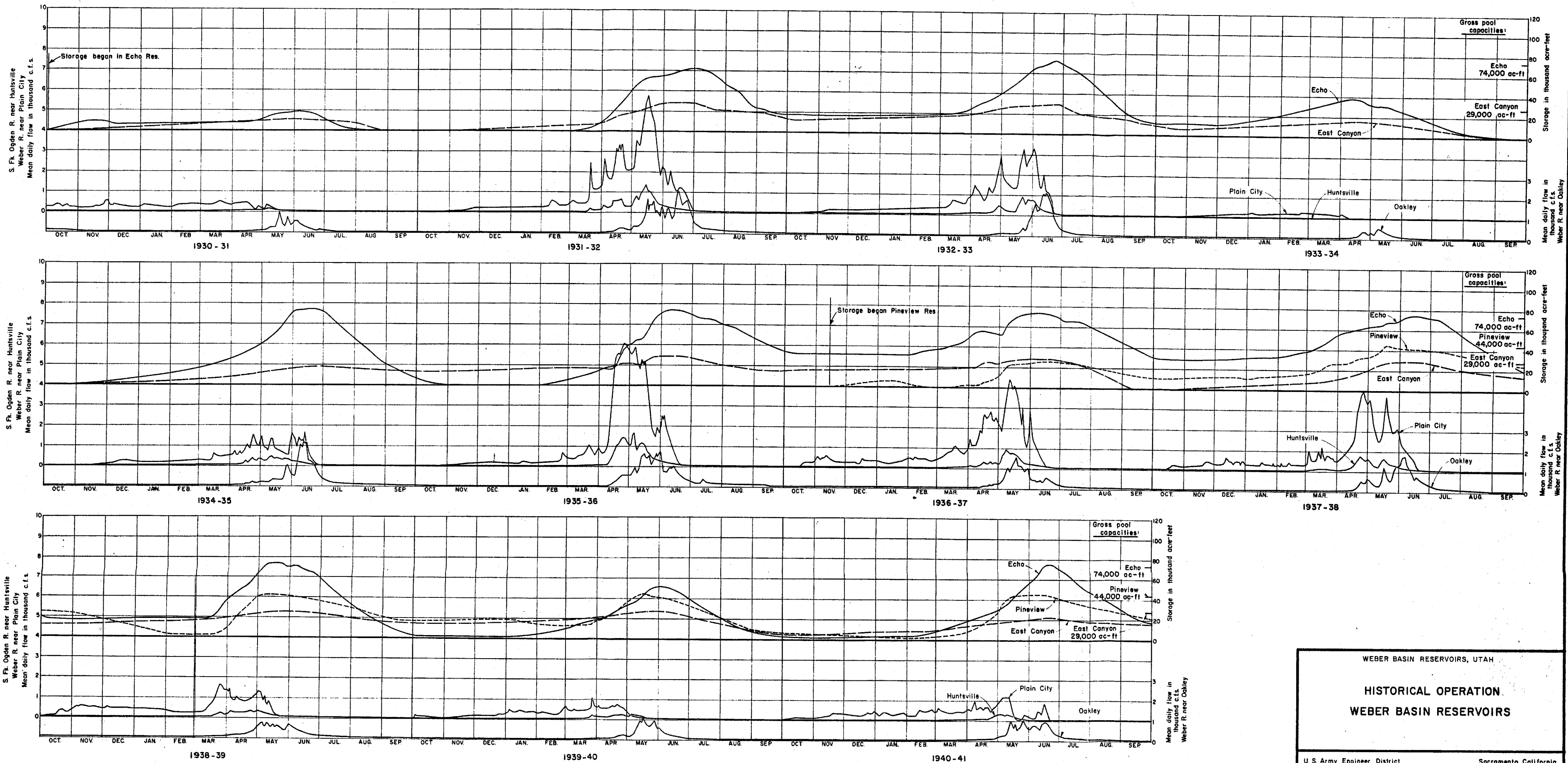
WEBER BASIN RESERVOIR
UTAH

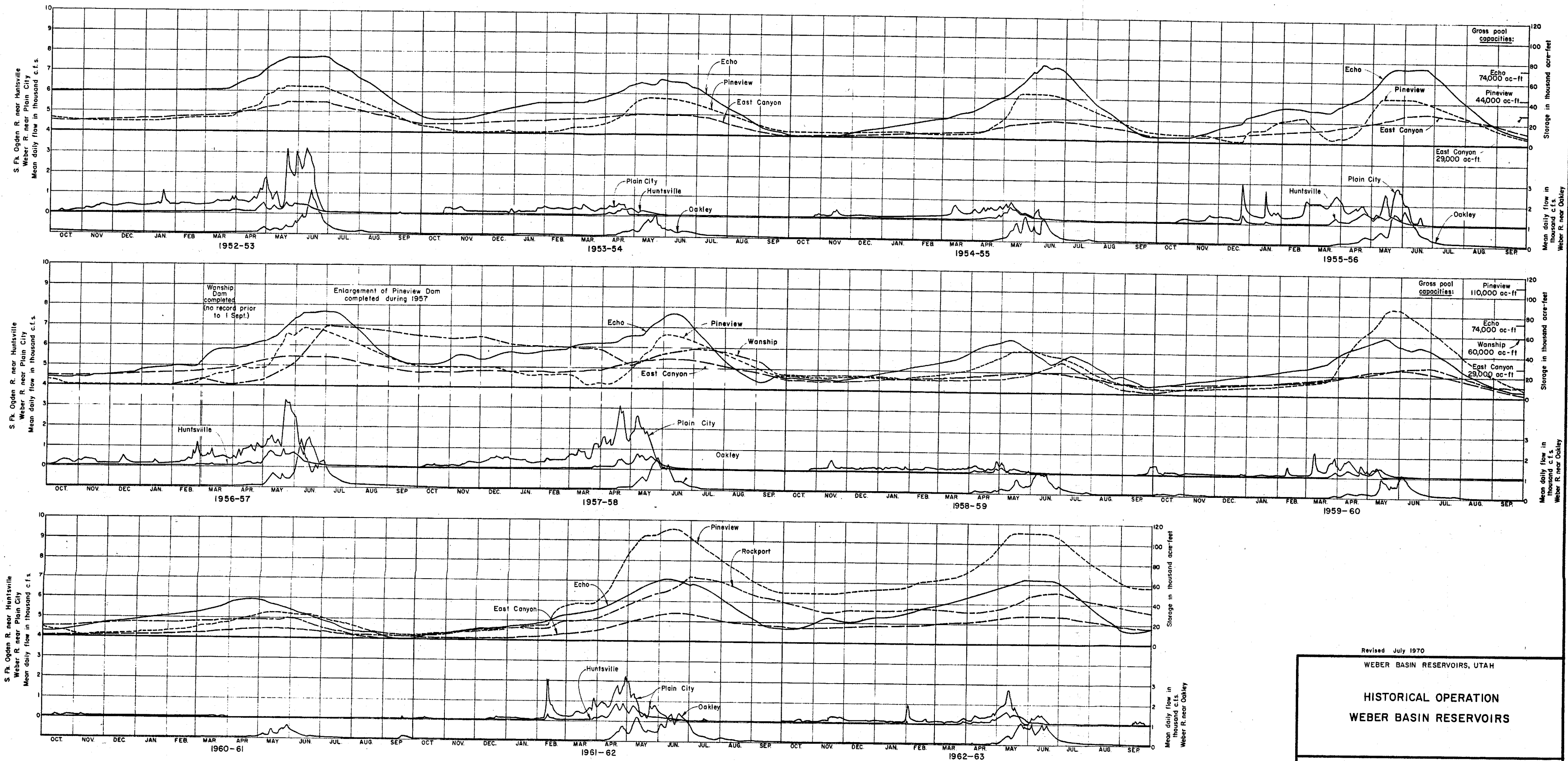
INFLOW DESIGN FLOOD
ROUTINGS

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: R.F.C.
Drawn: R.E.Y., T.G.K.

Date: JULY 1971





Revised July 1970

WEBER BASIN RESERVOIRS, UTAH

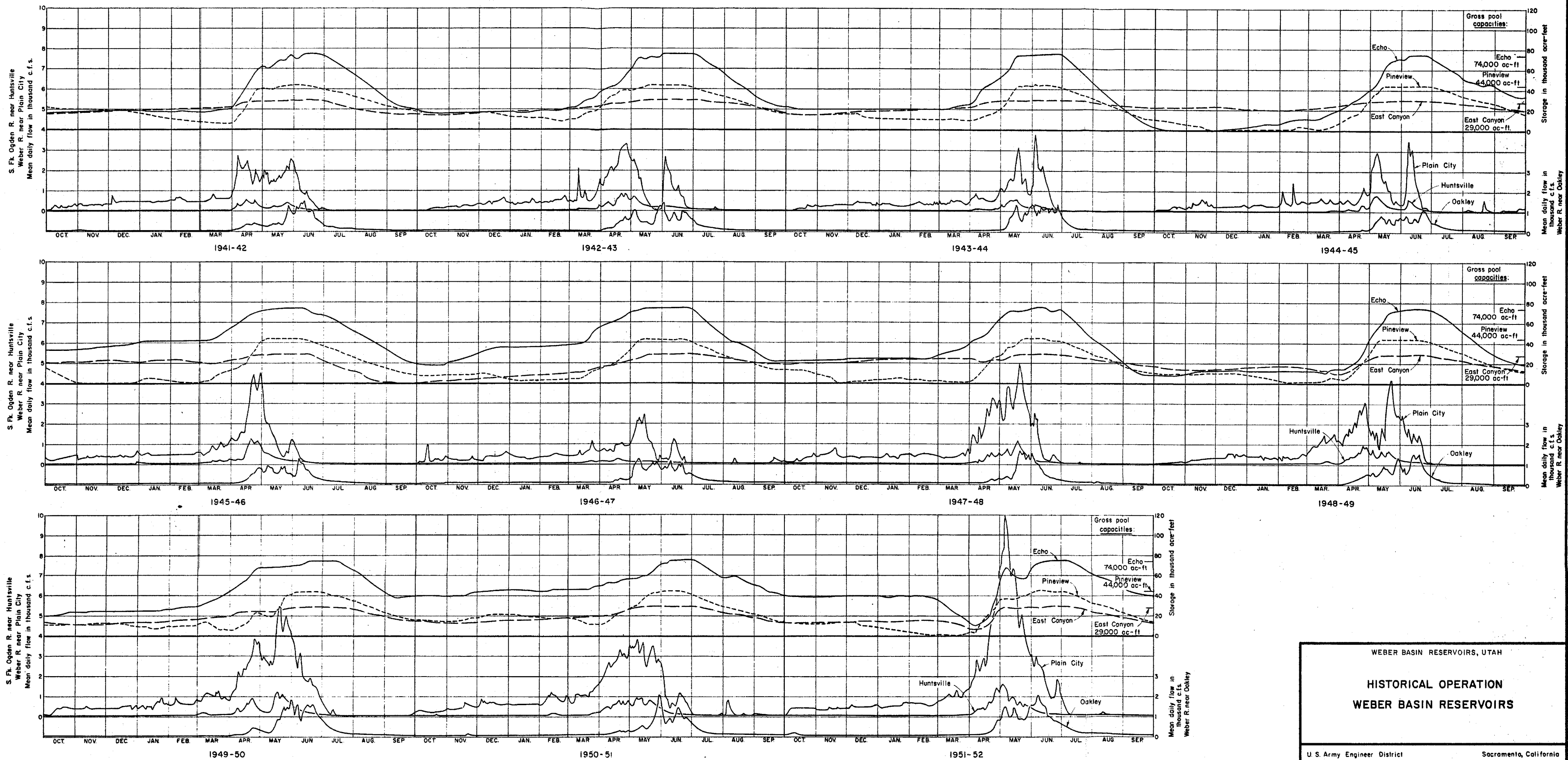
HISTORICAL OPERATION WEBER BASIN RESERVOIRS

U. S. Army Engineer District

Sacramento, California

R. W. S.

Dec. 1959



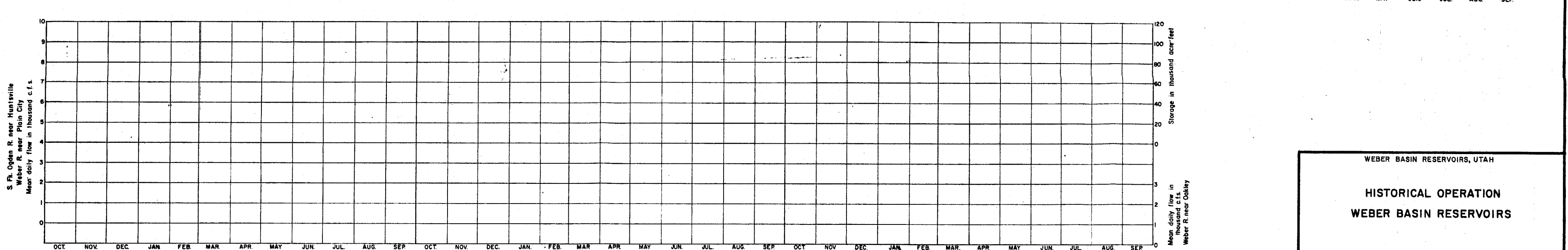
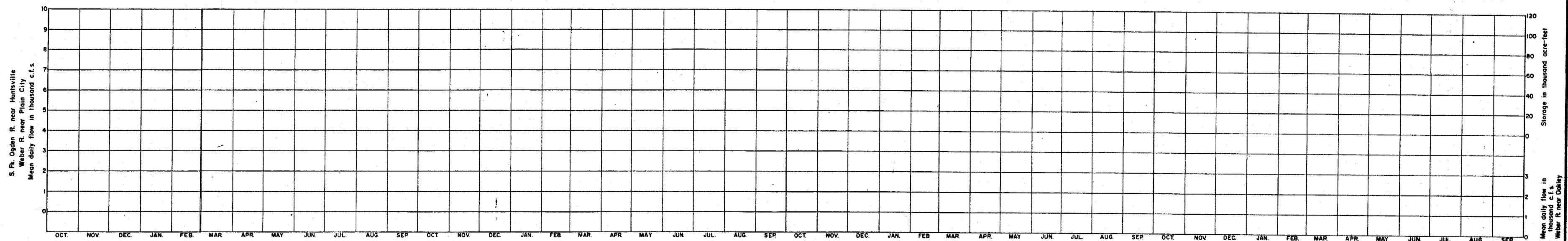
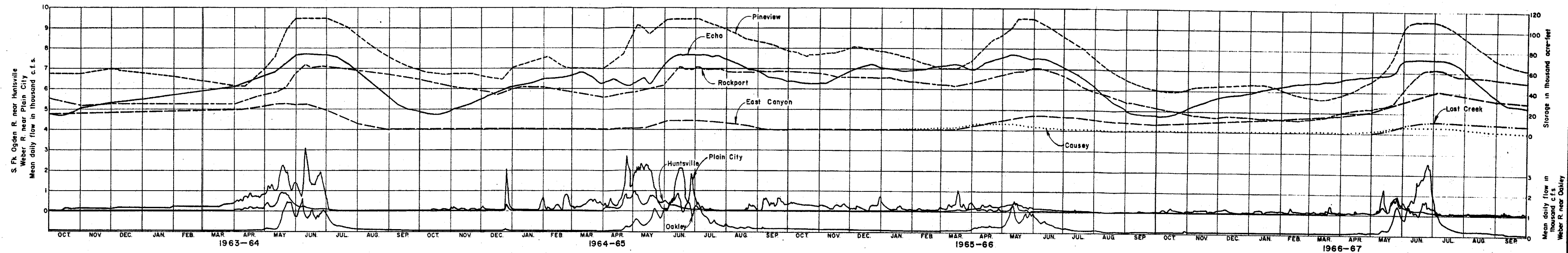
WEBER BASIN RESERVOIRS, UTAH

HISTORICAL OPERATION

WEBER BASIN RESERVOIRS

U. S. Army Engineer District Sacramento, California

R. W. S. Dec. 1959

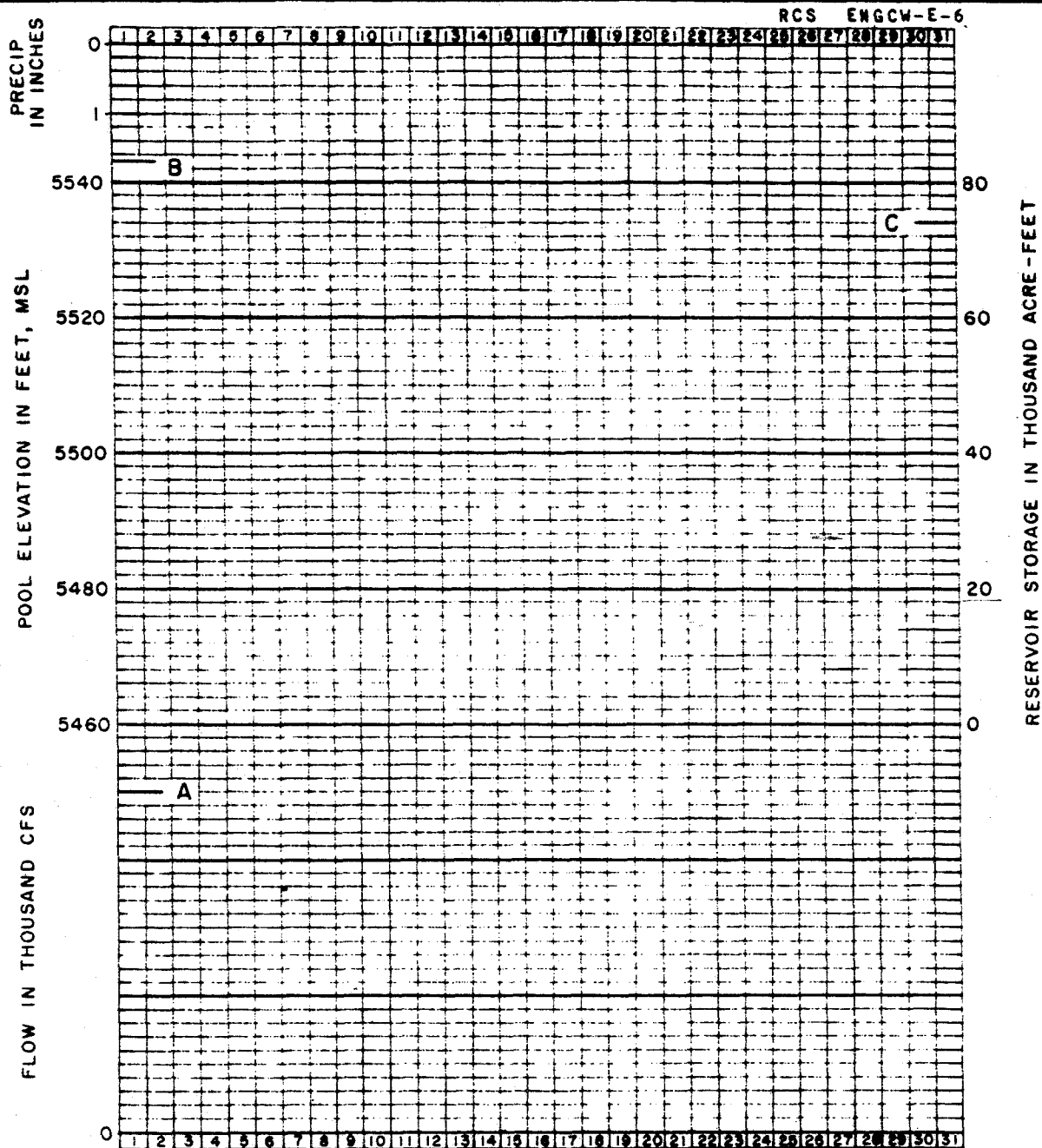


WEBER BASIN RESERVOIRS, UTAH

HISTORICAL OPERATION WEBER BASIN RESERVOIRS

U. S. Army Engineer District Sacramento, California

L. J. M. Date July 1970



- A. Invert elev. 14' horseshoe outlet conduit: 5450 ft.
- B. Spillway crest elev.: 5543 ft.
- C. Gross pool elev: 5560 ft.
Capacity: 74,000 ac-ft.
(top of 4-18'x17' radial gates)

MONTHLY RESERVOIR OPERATION

ECHO RESERVOIR

(OPERATED BY WEBER R. WATER USERS ASSN.)

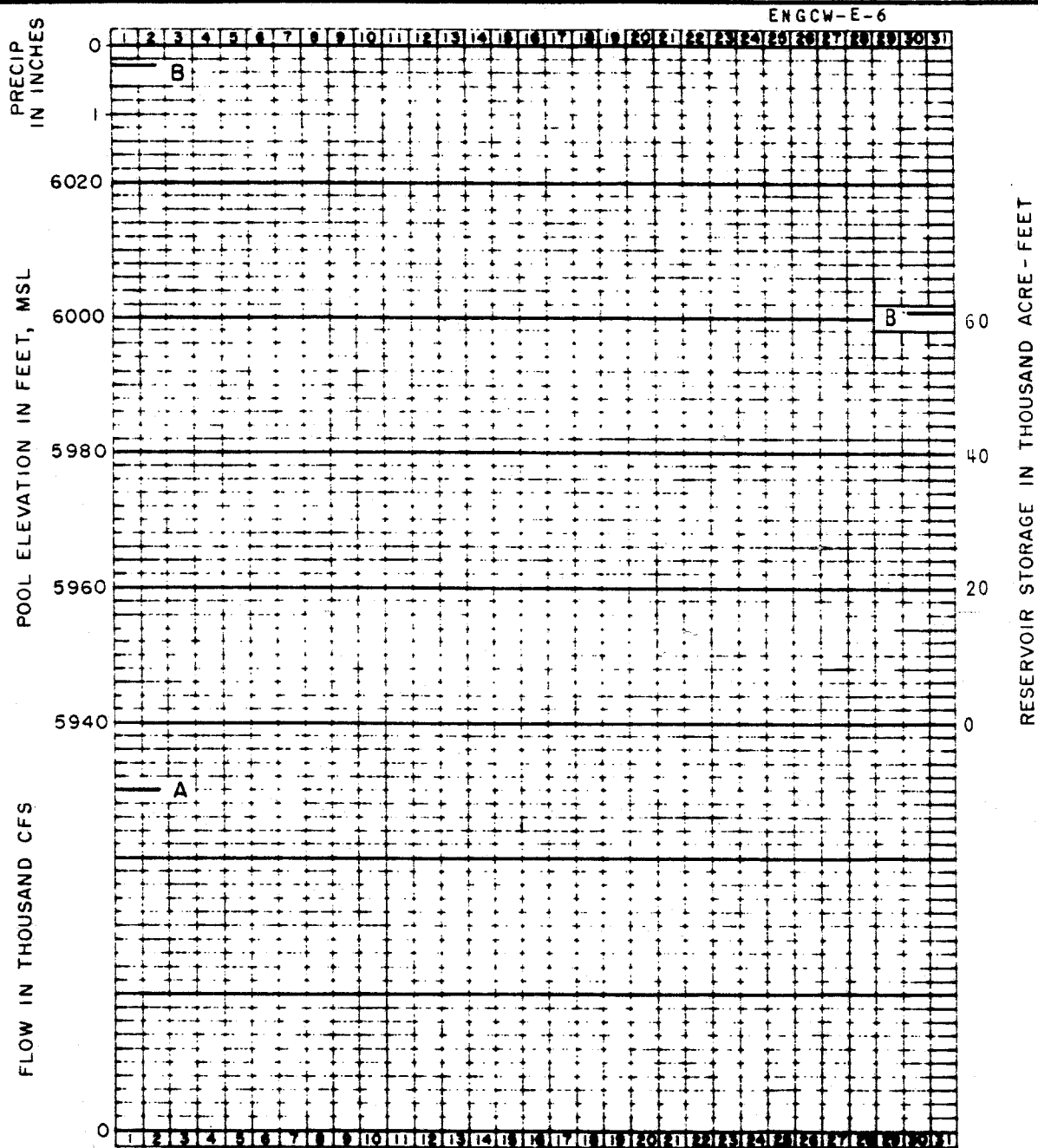
WEBER RIVER, UTAH

DRAINAGE AREA: 732 SQ MILES

Release capacity:

- 1800 c.f.s. at pool elev. 5543 ft.
- 2000 c.f.s. at pool elev. 5560 ft.

SOUTH PACIFIC DIVISION
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA



- A. Invert elev. of outlet: 5930 ft.
- B. Gross pool elev.: 6037 ft.
Capacity: 60,900 ac-ft.
(crest, uncontrolled spillway)

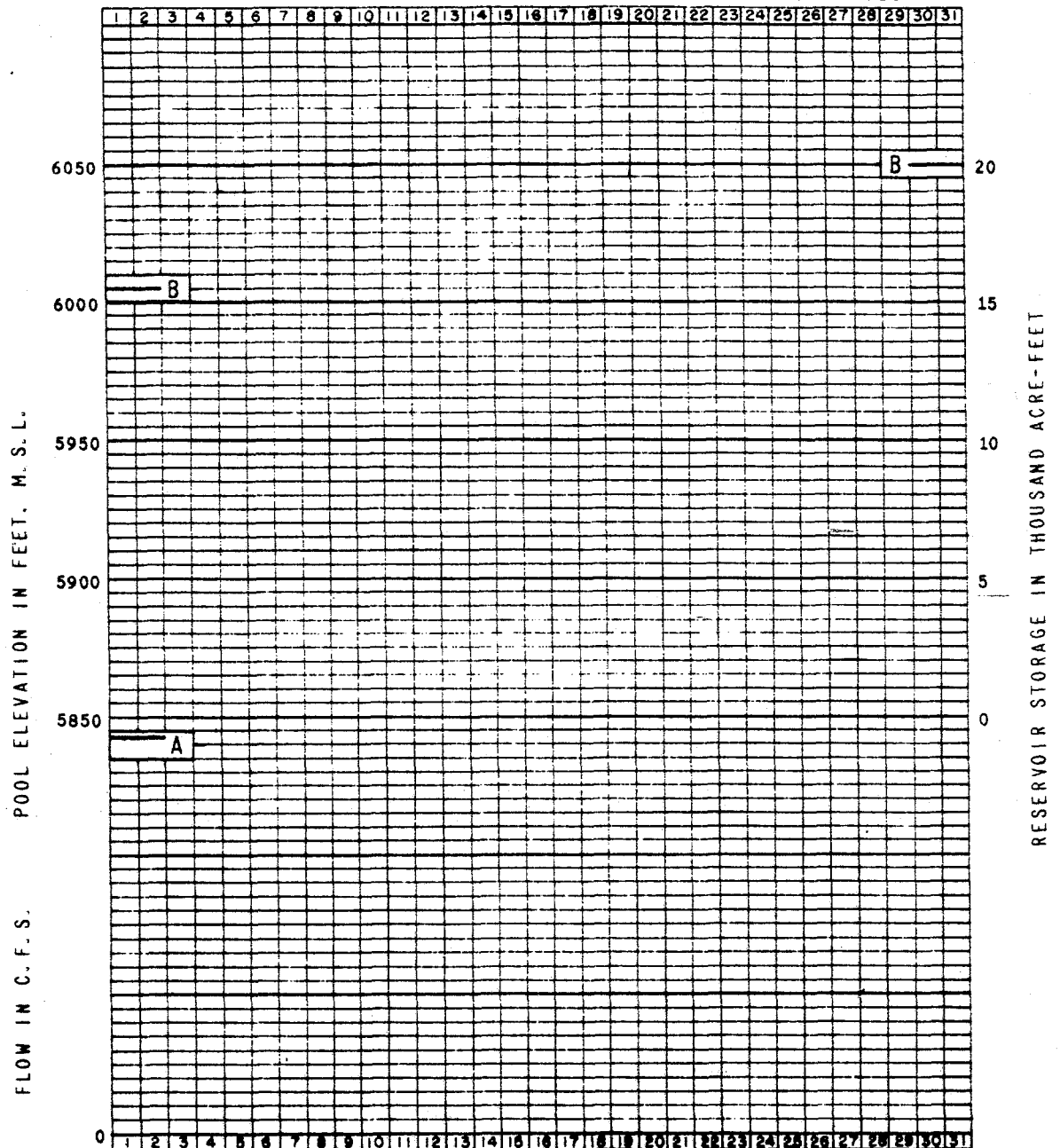
Release capacity:
1600 c.f.s. at pool elev. 6037 ft.

MONTHLY RESERVOIR OPERATION

WANSHIP RESERVOIR
(OPERATED BY U.S.B.R.)
WEBER RIVER, UTAH

DRAINAGE AREA 320 SQ MILES

SOUTH PACIFIC DIVISION
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA



A. Invert elev. of outlet: 5842 ft.

B. Gross pool elev.: 6005 ft.

Capacity: 20,000 ac-ft.
(crest, ungated spillway)

Release capacity:

775 c.f.s. at pool elev. 6005 ft.

MONTHLY RESERVOIR OPERATION

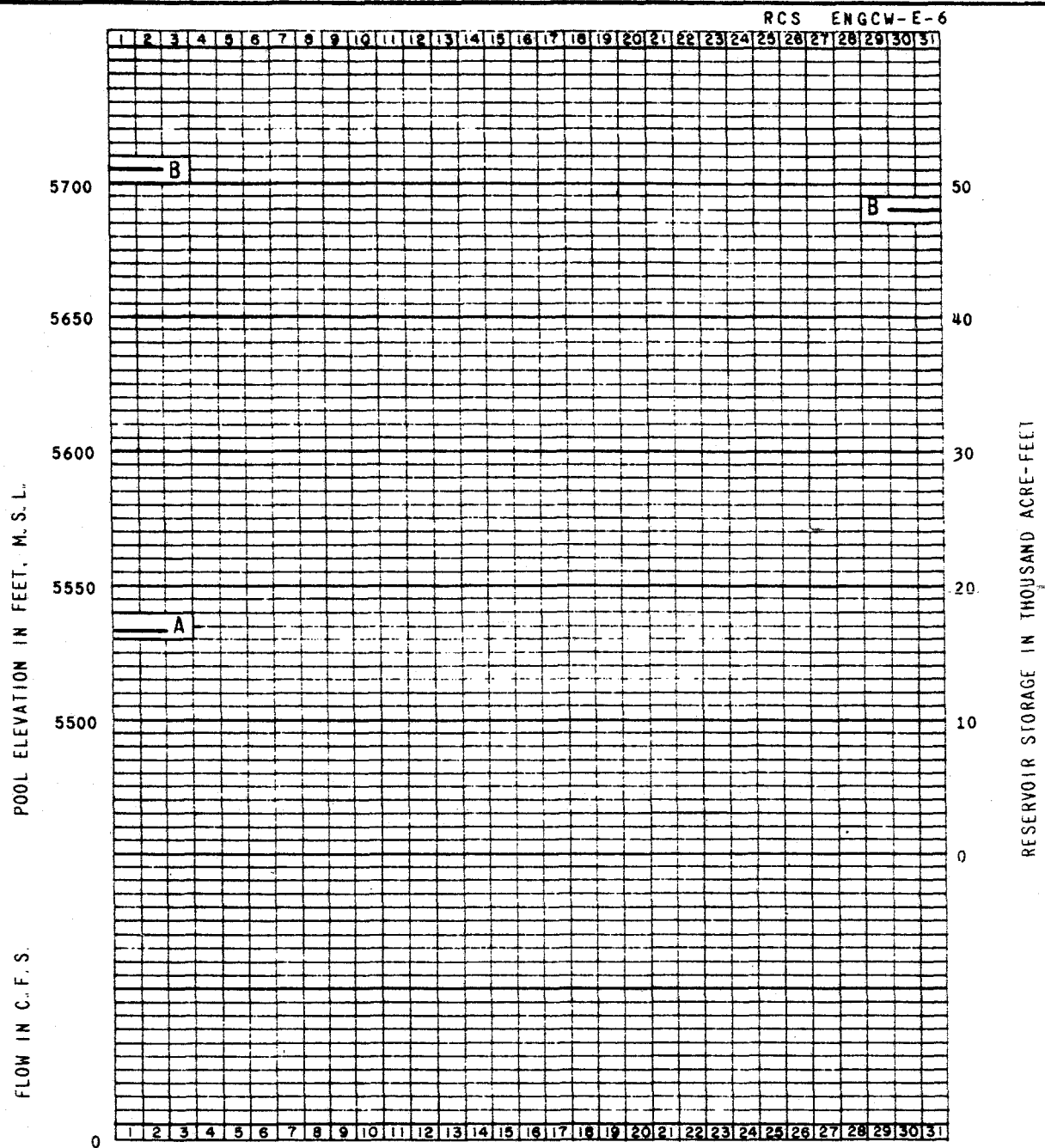
LOST CREEK RESERVOIR

(OPERATED BY U.S.B.R.)

LOST CREEK, UTAH

DRAINAGE AREA: 133 SQ. MILES

SOUTH PACIFIC DIVISION
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA



A. Invert elev. of outlet: 5533.6 ft.

B. Gross pool elev.: 5705 ft.

Capacity: 48,000 ac-ft.

(crest, ungated ogee spillway)

Release capacity:

650 c.f.s. at pool elev. 5705 ft.

MONTHLY RESERVOIR OPERATION

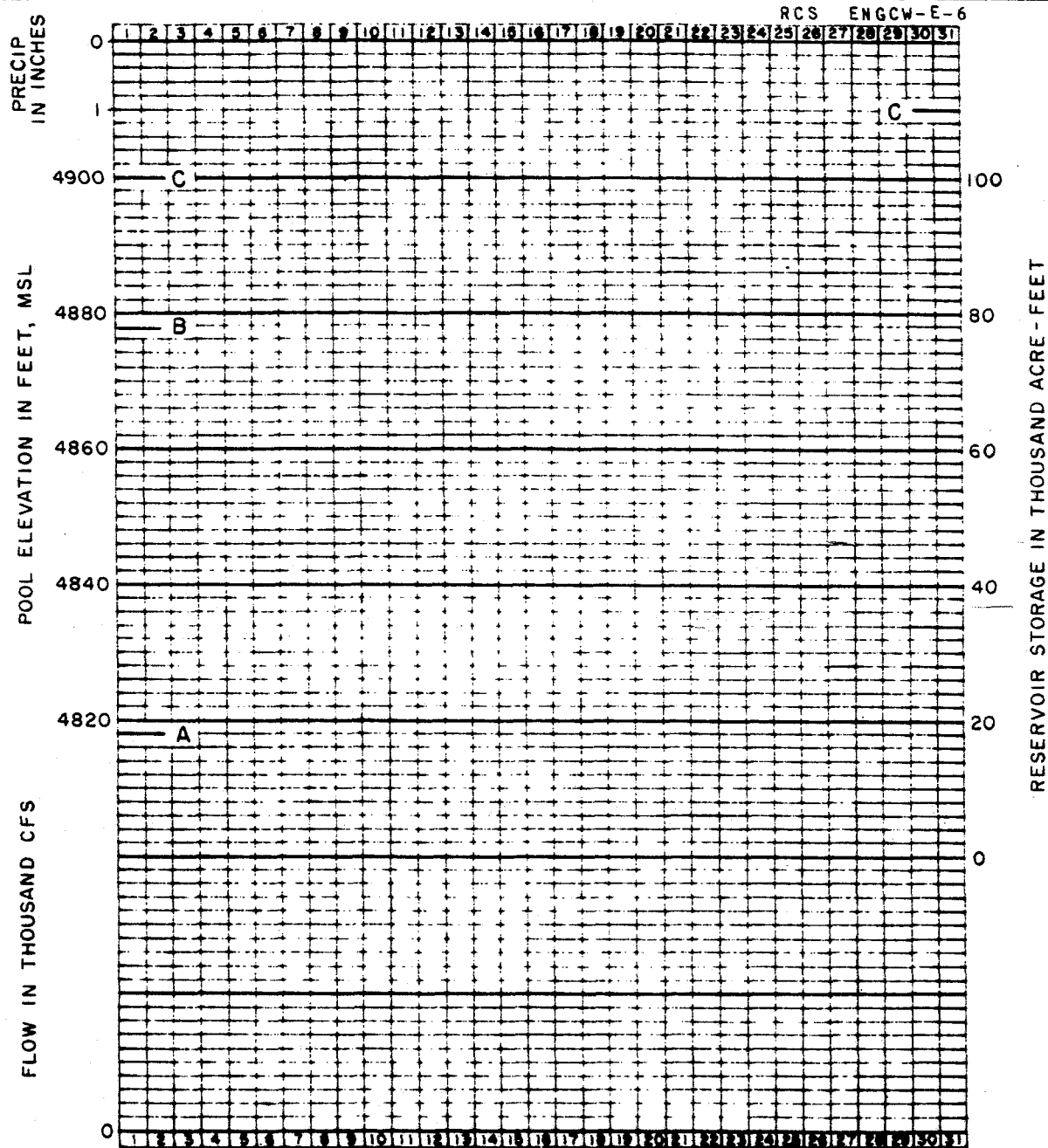
EAST CANYON RESERVOIR

(OPERATED BY U. S. B. R.)

EAST CANYON CREEK, UTAH

DRAINAGE AREA: 155 SQ. MILES

SOUTH PACIFIC DIVISION
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA



- A. Invert elev. of outlet 4818.0 ft.
- B. Spillway crest elev. 4878.0 ft.
- C. Gross pool elev. 4900.0 ft.
Capacity: 110,000 ac-ft.
(top of 2-12'x22' radial gates)

MONTHLY RESERVOIR OPERATION

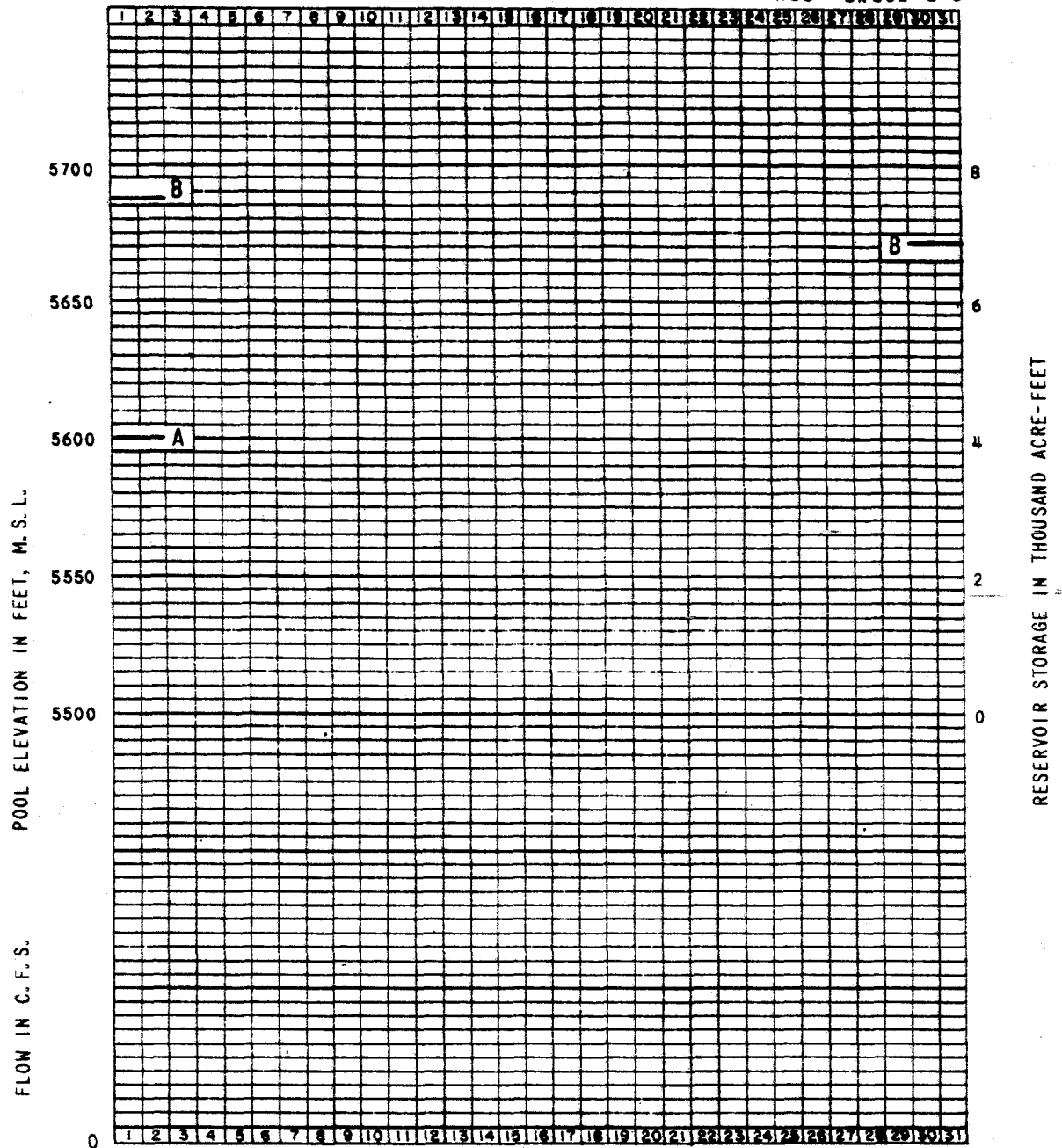
PINEVIEW RESERVOIR
(OPERATED BY U.S.B.R.)
OGDEN RIVER, UTAH

Release capacity:

- 1900 c.f.s. at pool elev. 4878 ft.
- 2300 c.f.s. at pool elev. 4900 ft.

DRAINAGE AREA: 310 SQ MILES

SOUTH PACIFIC DIVISION
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA



A. Invert elev. of outlet: 5601 ft.

B. Gross pool elev: 5692 ft.

Capacity: 6.870 ac-ft.

(crest. ungated spillway)

Release capacity:

770 c.f.s. at pool elev. 5692 ft.

MONTHLY RESERVOIR OPERATION

CAUSEY RESERVOIR

(OPERATED BY U.S.B.R.)

OGDEN RIVER, UTAH

DRAINAGE AREA: 81 SQ. MILES

SOUTH PACIFIC DIVISION
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

**WEBER BASIN RESERVOIRS
WEBER RIVER AND TRIBUTARIES, UTAH**

**REPORT ON RESERVOIR REGULATION
FOR FLOOD CONTROL**

**APPENDIX A
FLOOD CONTROL REGULATIONS**

DRAFT

JULY 1971

**Department of the Army
Sacramento District, Corps of Engineers
Sacramento, California**

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

CODE OF FEDERAL REGULATIONS

TITLE 33 -- NAVIGATION AND NAVIGABLE WATERS

Chapter II -- Corps of Eng'neers
Department of the Army

PART 208 -- FLOOD CONTROL REGULATIONS

ECHO AND WANSHIP DAMS AND RESERVOIRS
WEBER RIVER, UTAH

Pursuant to the provisions of Section 7 of the Act of Congress approved December 22, 1944 (58 Stat. 890; 33 U.S.C. 709), and of the Act of Congress approved August 29, 1949 (63 Stat. 677), the following Part 208.76 regulations are hereby prescribed to govern the operation of Echo Dam and Reservoir and Wanship Dam and Reservoir (Rockport Lake) on Weber River, Utah, in the interest of flood control:

PART 208.76 ECHO DAM AND RESERVOIR AND WANSHIP DAM AND RESERVOIR (ROCKPORT LAKE), WEBER RIVER, UTAH. The Bureau of Reclamation, Department of the Interior, represented by the Regional Director in charge of the locality, hereinafter referred to as the Regional Director, shall operate or otherwise effect the operation Rockport Lake and Echo Reservoir in the interest of flood control in accordance with instructions furnished by the Department of the Army, represented by the District Engineer in charge of the locality, hereinafter referred to as the District Engineer, as follows:

a. Storage space in Echo and Wanship Reservoirs of 73,942 acre-feet (below elevation 5560) and 60,860 acre-feet (below elevation 6037), respectively, shall be kept available for flood control purposes on a seasonal basis in accordance with the integrated Flood Control Diagram currently in force for the two reservoirs. The Flood Control Diagram in force as of the promulgation of this section is that dated _____, File No. WE-26-34.

b. Except when greater releases are required as prescribed in paragraph (c) of this section; releases from Rockport Lake and Echo Reservoir shall be restricted insofar as possible to quantities specified on the Flood Control Diagram currently in force and; any water temporarily stored in the flood control space indicated by the Flood Control Diagram shall be released as rapidly as can be safely accomplished without causing downstream flows to exceed the rates of flow shown thereon.

c. In the event the reservoir level at Echo Reservoir approaches or exceeds the top of flood control pool elevation 5560, subsequent operation shall be in accordance with the Emergency Spillway Release Diagram currently in force, or the Flood Control Diagram currently in force, whichever requires the greater release. The Emergency Spillway Release Diagram in force as of the promulgation of this section is that dated _____, File No. WE-26-35.

d. Except as necessary in order to comply with the provisions of the Emergency Spillway Release Diagram under paragraph (c) above, the regulations of this section shall not be construed to require dangerously

rapid changes in magnitudes of releases, or that releases be made in a manner that will be inconsistent with requirements for protecting the dams and reservoirs from major damage.

e. The Regional Director shall procure such current basic hydrologic data and make such current determinations of required flood control space and releases at each reservoir as are required to accomplish the flood control objectives prescribed in this section.

f. The Regional Director shall keep the District Engineer/ currently advised of reservoir releases, reservoir storage and such other operating data as the District Engineer may request.

g. The flood control regulations of this section are subject to temporary modification by the District Engineer if found necessary in time of emergency. Requests for and action on such modifications may be made by any available means of communication, and the action taken by the District Engineer shall be confirmed in writing under date of same day to the office of the Regional Director.

h. The Regional Director may temporarily suspend application of the flood control regulations of this section in the event it is deemed necessary for emergency reasons to protect the safety of the dams, or to avoid other serious hazards. Such action shall be immediately reported by any available means of communication, and confirmed in writing under date of same day to the District Engineer.

i. Revision of the Flood Control or Emergency Spillway Release Diagrams requires approval of the Chief of Engineers, or his duly authorized representative, and the Commissioner of Reclamation. Each

such revision shall be effective upon the date specified in the approval, and from that date until replaced shall be the diagram in force for the purpose of this section. The Flood Control and Emergency Spillway Release Diagrams are on file in the Office, Chief of Engineers, Department of the Army, Washington, D.C. and the office of the Commissioner of Reclamation, Washington, D.C. Copies of the diagrams currently in force shall be kept on file in and may be obtained from the offices of the District Engineer, Corps of Engineers, Sacramento, California, and the Regional Director, Bureau of Reclamation, Salt Lake City, Utah.

DRAFT

CODE OF FEDERAL REGULATIONS

TITLE 33 -- NAVIGATION AND NAVIGABLE WATERS

Chapter II -- Corps of Engineers
Department of the Army

PART 208 -- FLOOD CONTROL REGULATIONS

LOST CREEK DAM AND RESERVOIR
LOST CREEK, UTAH

Pursuant to the provisions of Section 7 of the Act of Congress approved December 22, 1944 (58 Stat. 890; 33 U.S.C. 709), and of the Act of Congress approved August 29, 1949 (63 Stat. 677), the following Part 208. -- regulations are hereby prescribed to govern the operation of Lost Creek Dam and Reservoir on Lost Creek, Utah, in the interest of flood control:

PART 208. -- LOST CREEK DAM AND RESERVOIR, UTAH. The Bureau of Reclamation, Department of the Interior, represented by the Regional Director in charge of the locality, hereinafter referred to as the Regional Director, shall operate or otherwise effect the operation of Lost Creek Dam and Reservoir in the interest of flood control in accordance with instructions furnished by the Department of the Army, represented by the District Engineer in charge of the locality, hereinafter referred to as the District Engineer, as follows:

a. Storage space in Lost Creek Reservoir of 20,000 acre-feet below elevation 6005 feet, shall be kept available for flood control purposes on a seasonal basis in accordance with the Flood Control Diagram currently in force. The Flood Control Diagram in force as of the promulgation of this section is that dated _____, File No. WE-13-98.

b. Releases from Lost Creek Reservoir shall be restricted insofar as possible to quantities which will not cause flows in Lost Creek below Lost Creek Dam to exceed the controlling flow rates specified on the Flood Control Diagram currently in force. Any water temporarily stored in the flood control space indicated by the Flood Control Diagram shall be released as rapidly as can be safely accomplished without causing downstream flows to exceed the rates of flow shown thereon.

c. Nothing in the regulations of this section shall be construed to require dangerously rapid changes in magnitudes of releases, or that releases be made in a manner that will be inconsistent with requirements for protecting the dam and reservoir from major damages.

d. The Regional Director shall procure such current basic hydrologic data and make such current determinations of required flood control space and releases at the reservoir as are required to accomplish the flood control objectives prescribed in this Section.

e. The Regional Director shall keep the District Engineer currently advised of reservoir storage and such other operating data as the

District Engineer may request.

f. The flood control regulations of this section are subject to temporary modification by the District Engineer if found necessary in time of emergency. Requests for and action on such modifications may be made by any available means of communication, and the action taken by the District Engineer shall be confirmed in writing under date of same day to the office of the Regional Director.

g. The Regional Director may temporarily suspend application of the flood control regulations of this section in the event it is deemed necessary for emergency reasons to protect the safety of the dam, or to avoid other serious hazards. Such action shall be immediately reported by any available means of communication, and confirmed in writing under date of same day to the District Engineer.

h. Revision of the Flood Control Diagram requires approval of the Chief of Engineers, or his duly authorized representative, and the Commissioner of Reclamation. Each such revision shall be effective upon the date specified in the approval, and from that date until replaced shall be the diagram in force for the purpose of this section. The Flood Control Diagram is on file in the Office, Chief of Engineers, Department of the Army, Washington, D.C., and the Office of the Commissioner of Reclamation, Washington, D.C. Copies of the diagram currently in force shall be kept on file in and may be obtained from the offices of the District Engineer, Corps of Engineers, Sacramento, California, and the Regional Director, Bureau of Reclamation, Salt Lake City, Utah.

DRAFT

CODE OF FEDERAL REGULATIONS

TITLE 33 -- NAVIGATION AND NAVIGABLE WATERS

Chapter II -- Corps of Engineers
Department of the Army

PART 208 -- FLOOD CONTROL REGULATIONS

EAST CANYON DAM AND RESERVOIR
EAST CANYON CREEK, UTAH

Pursuant to the provisions of Section 7 of the Act of Congress approved December 22, 1944 (58 Stat. 890; 33 U.S.C. 709), and of the Act of Congress approved August 29, 1949 (63 Stat. 677), the following Part 208. -- regulations are hereby prescribed to govern the operation of East Canyon Dam and Reservoir on East Canyon Creek, Utah, in the interest of flood control:

PART 208. -- EAST CANYON DAM AND RESERVOIR, UTAH. The Bureau of Reclamation, Department of the Interior, represented by the Regional Director in charge of the locality, hereinafter referred to as the Regional Director, shall operate or otherwise effect the operation of East Canyon Creek Dam and Reservoir in the interest of flood control in accordance with instructions furnished by the Department of the Army, represented by the District Engineer in charge of the locality, hereinafter referred to as the District Engineer, as follows:

a. Storage space in East Canyon Reservoir of 48,000 acre-feet below elevation 5705 feet, shall be kept available for flood control purposes on a seasonal basis in accordance with the Flood Control Diagram currently in force. The Flood Control Diagram in force as of the promulgation of this section is that dated _____, File No. WE-13-98.

b. Releases from East Canyon Reservoir shall be restricted insofar as possible to quantities which will not cause flows in East Canyon Creek below East Canyon Dam to exceed the controlling flow rates specified on the Flood Control Diagram currently in force. Any water temporarily stored in the flood control space indicated by the Flood Control Diagram shall be released as rapidly as can be safely accomplished without causing downstream flows to exceed the rates of flow shown thereon.

c. Nothing in the regulations of this section shall be construed to require dangerously rapid changes in magnitudes of releases, or that releases be made in a manner that will be inconsistent with requirements for protecting the dam and reservoir from major damages.

d. The Regional Director shall procure such current basic hydrologic data and make such current determinations of required flood control space and releases at the reservoir as are required to accomplish the flood control objectives prescribed in this Section.

e. The Regional Director shall keep the District Engineer currently advised of reservoir storage and such other operating data as the

District Engineer may request.

f. The flood control regulations of this section are subject to temporary modification by the District Engineer if found necessary in time of emergency. Requests for and action on such modifications may be made by any available means of communication, and the action taken by the District Engineer shall be confirmed in writing under date of same day to the office of the Regional Director.

g. The Regional Director may temporarily suspend application of the flood control regulations of this section in the event it is deemed necessary for emergency reasons to protect the safety of the dam, or to avoid other serious hazards. Such action shall be immediately reported by any available means of communication, and confirmed in writing under date of same day to the District Engineer.

h. Revision of the Flood Control Diagram requires approval of the Chief of Engineers, or his duly authorized representative, and the Commissioner of Reclamation. Each such revision shall be effective upon the date specified in the approval, and from that date until replaced shall be the diagram in force for the purpose of this section. The Flood Control Diagram is on file in the Office, Chief of Engineers, Department of the Army, Washington, D.C., and the office of the Commissioner of Reclamation, Washington, D.C. Copies of the diagram currently in force shall be kept on file in and may be obtained from

the offices of the District Engineer, Corps of Engineers, Sacramento, California, and the Regional Director, Bureau of Reclamation, Salt Lake City, Utah.

DRAFT

CODE OF FEDERAL REGULATIONS

TITLE 33 -- NAVIGATION AND NAVIGABLE WATERS

Chapter II -- Corps of Engineers
Department of the Army

PART 208 -- FLOOD CONTROL REGULATIONS

CAUSEY DAM AND RESERVOIR
OGDEN RIVER, UTAH

Pursuant to the provisions of Section 7 of the Act of Congress approved December 22, 1944 (58 Stat. 890; 33 U.S.C. 709), and of the Act of Congress approved August 29, 1949 (63 Stat. 677), the following Part 208.72 regulations are hereby prescribed to govern the operation of Causey Dam and Reservoir on Ogden River, Utah, in the interest of flood control:

PART 208.72 CAUSEY DAM AND RESERVOIR, UTAH. The Bureau of Reclamation, Department of the Interior, represented by the Regional Director in charge of the locality, hereinafter referred to as the Regional Director, shall operate or otherwise effect the operation of Causey Dam and Reservoir in the interest of flood control in accordance with instructions furnished by the Department of the Army, represented by the District Engineer in charge of the locality, hereinafter referred to as the District Engineer, as follows:

a. Storage space in Causey Reservoir of 6,900 acre-feet below elevation 5692, shall be kept available for flood control purposes on a seasonal basis in accordance with the Flood Control Diagram currently in force. The Flood Control Diagram in force as of the promulgation of this section is that dated _____, File No. WE-13-99.

b. Releases from Causey Reservoir shall be restricted insofar as possible to quantities which will not cause flows in the South Fork Ogden River below Causey Dam to exceed the controlling flow rates specified on the Flood Control Diagram currently in force. Any water temporarily stored in the flood control space indicated by the Flood Control Diagram shall be released as rapidly as can be safely accomplished without causing downstream flows to exceed the rates of flow shown thereon.

c. Nothing in the regulations of this section shall be construed to require dangerously rapid changes in magnitudes of releases, or that releases be made in a manner that will be inconsistent with requirements for protecting the dam and reservoir from major damages.

d. The Regional Director shall procure such current basic hydrologic data and make such current determinations of required flood control space and releases at the reservoir as are required to accomplish the flood control objectives prescribed in this section.

e. The Regional Director shall keep the District Engineer/ currently advised of reservoir storage and such other operating data as the District Engineer may request.

f. The flood control regulations of this section are subject to temporary modification by the District Engineer/ if found necessary in

time of emergency. Requests for and action on such modifications may be made by any available means of communication, and the action taken by the District Engineer shall be confirmed in writing under date of same day to the office of the Regional Director.

g. The Regional Director may temporarily suspend application of the flood control regulations of this section in the event it is deemed necessary for emergency reasons to protect the safety of the dam, or to avoid other serious hazards. Such action shall be immediately reported by any available means of communication, and confirmed in writing under date of same day to the District Engineer.

h. Revision of the Flood Control Diagram requires approval of the Chief of Engineers, or his duly authorized representative, and the Commissioner of Reclamation. Each such revision shall be effective upon the date specified in the approval, and from that date until replaced shall be the diagram in force for the purpose of this section. The Flood Control Diagram is on file in the Office, Chief of Engineers, Department of the Army, Washington, D.C., and the office of the Commissioner of Reclamation, Washington, D.C. Copies of the diagram currently in force shall be kept on file in and may be obtained from the offices of the District Engineer, Corps of Engineers, Sacramento, California, and the Regional Director, Bureau of Reclamation, Salt Lake City, Utah.

DRAFT

CODE OF FEDERAL REGULATIONS
TITLE 33 -- NAVIGATION AND NAVIGABLE WATERS
Chapter II -- Corps of Engineers
Department of the Army
PART 208 -- FLOOD CONTROL REGULATIONS
PINEVIEW DAM AND RESERVOIR
OGDEN RIVER, UTAH

Pursuant to the provisions of Section 7 of the Act of Congress approved December 22, 1944 (58 Stat. 890; 33 U.S.C. 709), and of the Act of Congress approved August 29, 1949 (63 Stat. 677), the following Part 208.71 regulations are hereby prescribed to govern the operation of Pineview Dam and Reservoir on Ogden River, Utah, in the interest of flood control:

PART 208.71 PINEVIEW DAM AND RESERVOIR, UTAH. The Bureau of Reclamation, Department of the Interior, represented by the Regional Director in charge of the locality, hereinafter referred to as the Regional Director, shall operate or otherwise effect the operation of Pineview Dam and Reservoir in the interest of flood control in accordance with instructions furnished by the Department of the Army, represented by the District Engineer in charge of the locality, hereinafter referred to as the District Engineer, as follows:

a. Storage space in Pineview Reservoir of 110,000 acre-feet below elevation 4900, shall be kept available for flood control purposes on a seasonal basis in accordance with the Flood Control Diagram currently in force. The Flood Control Diagram in force as of the promulgation of this section is that dated _____, File No. WE-26-36.

b. Except when greater releases are required as prescribed in paragraph (c) of this section; releases from Pineview Reservoir shall be restricted insofar as possible to quantities which will not cause flows in the Ogden or Weber Rivers below Pineview Dam to exceed the controlling flow rates specified on the Flood Control Diagram currently in force and; any water temporarily stored in the flood control space indicated by the Flood Control Diagram shall be released as rapidly as can be safely accomplished without causing downstream flows to exceed the rates of flow shown thereon.

c. In the event the reservoir level at Pineview Reservoir approaches or exceeds the top of flood control pool elevation 4900, subsequent operation shall be in accordance with the Emergency Spillway Release Diagram currently in force, or the Flood Control Diagram currently in force, whichever requires the greater release. The Emergency Spillway Release Diagram in force as of the promulgation of this section is that dated _____, File No. WE-26-37.

d. Except as necessary in order to comply with the provisions of the Emergency Spillway Release Diagram under paragraph (c) above, the regulations of this section shall not be construed to require dangerously

rapid changes in magnitudes of releases or that releases be made in a manner that will be inconsistent with requirements for protecting the dam and reservoir from major damages.

e. The Regional Director shall procure such current basic hydrologic data and make such current determinations of required flood control space and releases at the reservoir as are required to accomplish the flood control objectives prescribed in this section.

f. The Regional Director shall keep the District Engineer currently advised of reservoir storage and such other operating data as the District Engineer may request.

g. The flood control regulations of this section are subject to temporary modification by the District Engineer if found necessary in time of emergency. Requests for and action on such modifications may be made by any available means of communication, and the action taken by the District Engineer shall be confirmed in writing under date of same day to the office of the Regional Director.

h. The Regional Director may temporarily suspend application of the flood control regulations of this section in the event it is deemed necessary for emergency reasons to protect the safety of the dam, or to avoid other serious hazards. Such action shall be immediately reported by any available means of communication, and confirmed in writing under date of same day to the office of the District Engineer.

i. Revision of the Flood Control or Emergency Spillway Release Diagrams requires approval of the Chief of Engineers, or his duly authorized representative, and the Commissioner of Reclamation. Each

such revision shall be effective upon the date specified in the approval, and from that date until replaced shall be the diagram in force for the purpose of this section. The Flood Control and Emergency Spillway Release Diagrams are on file in the Office, Chief of Engineers, Department of the Army, Washington, D.C., and the office of the Commissioner of Reclamation, Washington, D.C. Copies of the diagrams currently in force shall be kept on file in and may be obtained from the offices of the District Engineer, Corps of Engineers, Sacramento, California, and the Regional Director, Bureau of Reclamation, Salt Lake City, Utah.

FIELD WORKING AGREEMENT
BETWEEN
DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION
AND
DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS
FOR
FLOOD CONTROL OPERATION
OF
WEBER BASIN DAMS AND RESERVOIRS
IN
UTAH

THIS agreement, made and entered into this 23 RD day of March
1978, between the Bureau of Reclamation and the Corps of Engineers,

WITNESSETH THAT:

WHEREAS, the Department of the Interior, acting through the Bureau of Reclamation, represented by its appropriate Regional Director, has constructed dams and reservoirs on the Ogden and Weber Rivers and their tributaries, and is responsible for normal operation and structural safety of the projects, and

WHEREAS, the Department of the Army, acting through the Corps of Engineers, represented by its appropriate District and Division Engineers, is responsible for the flood control operation plans of said dams and reservoirs in accordance with Section 7 of the 1944 Flood Control Act (33 U.S.C. 709) and as promulgated in Code of Federal Regulations, Title 33, Part 208.11, 15 May 1976, and

WHEREAS, there is a need for a working agreement to insure a clear understanding of the flood control regulations and information exchange required for the projects operation.

NOW, THEREFORE, it is mutually understood and agreed by and between the parties hereto that the Weber Basin Projects will be operated in accordance with the following criteria:

(a) Conservation operations shall be in accordance with Bureau of Reclamation criteria as determined by the Regional Director or his designated representative.

(b) Storage space in the Weber Basin Projects shall be made available on a seasonal basis and operated for flood control in accordance with the Flood Control Diagrams currently in force.

(c) Emergency operation shall be in accordance with the procedure set forth on the Emergency Spillway Release Diagrams or procedures currently in force.



(d) The Regional Director is responsible for the safety of the dam and appurtenant facilities and for regulation of the Weber Basin Projects during surcharge storage utilization. Emphasis upon the safety of the dam is especially important in the event surcharge storage is utilized, which results when the total storage space reserved for flood control is exceeded. Any assistance provided by the Corps of Engineers concerning surcharge regulation is to be utilized at the discretion of the Regional Director, and does not relieve the Regional Director of the responsibility for safety of the Weber Basin Projects.

(e) Revisions of the Flood Control or Emergency Spillway Release Diagrams and procedures may be developed as necessary by parties of this agreement. Each such revision shall be effective on the date specified.

(f) Except as necessary in order to comply with Emergency Operation procedures, the flood control regulations shall not be construed to require dangerously rapid changes in magnitude of releases. Releases will be made in a manner consistent with requirements for protecting the dam, reservoir and appurtenances from major damages.

(g) Any water impounded in the flood control space defined by the Flood Control Diagrams shall be evacuated as rapidly as can be safely accomplished without causing downstream flows to exceed the controlling rates; i.e., releases from the reservoir shall be restricted insofar as practicable to quantities which, in conjunction with uncontrolled runoff downstream of the dams, will not cause water levels to exceed the controlling stages currently in force. Although conflicts may arise with other purposes, such as hydropower, the plan or regulation may require releases to be completely curtailed in the interest of flood control or safety of the projects.

(h) The Regional Director shall procure such current basic hydrologic data and make such current determinations of required flood control space and releases at the reservoir as are required to accomplish the flood control objectives.

(i) The Regional Director shall keep the District Engineer advised of such reservoir operating data as the District Engineer may request. The minimum data required is reservoir storage, inflow, releases and streamflow at control points designated by the Flood Control Diagram on a daily basis.

(j) The flood control regulations are subject to temporary modification by the Corps of Engineers if found necessary in time of emergency. Requests for and action on such modifications may be made by the fastest means of communication available. The action taken shall be confirmed in writing the same day to the office of the Regional Director and shall include justification for the action.

(k) The Regional Director may temporarily deviate from the flood control regulations in the event an immediate short-term departure is deemed necessary for emergency reasons to protect the safety of the dams, or to avoid other serious hazards. Such actions shall be immediately reported by the fastest means of communication available. Actions shall be confirmed in writing the same day to the Corps of Engineers and shall include justification for the action. Continuation of the deviation will require the express approval of the Division Engineer.

IN WITNESS WHEREOF, the parties hereto have caused this memorandum of agreement to be executed as the day and date first above written.

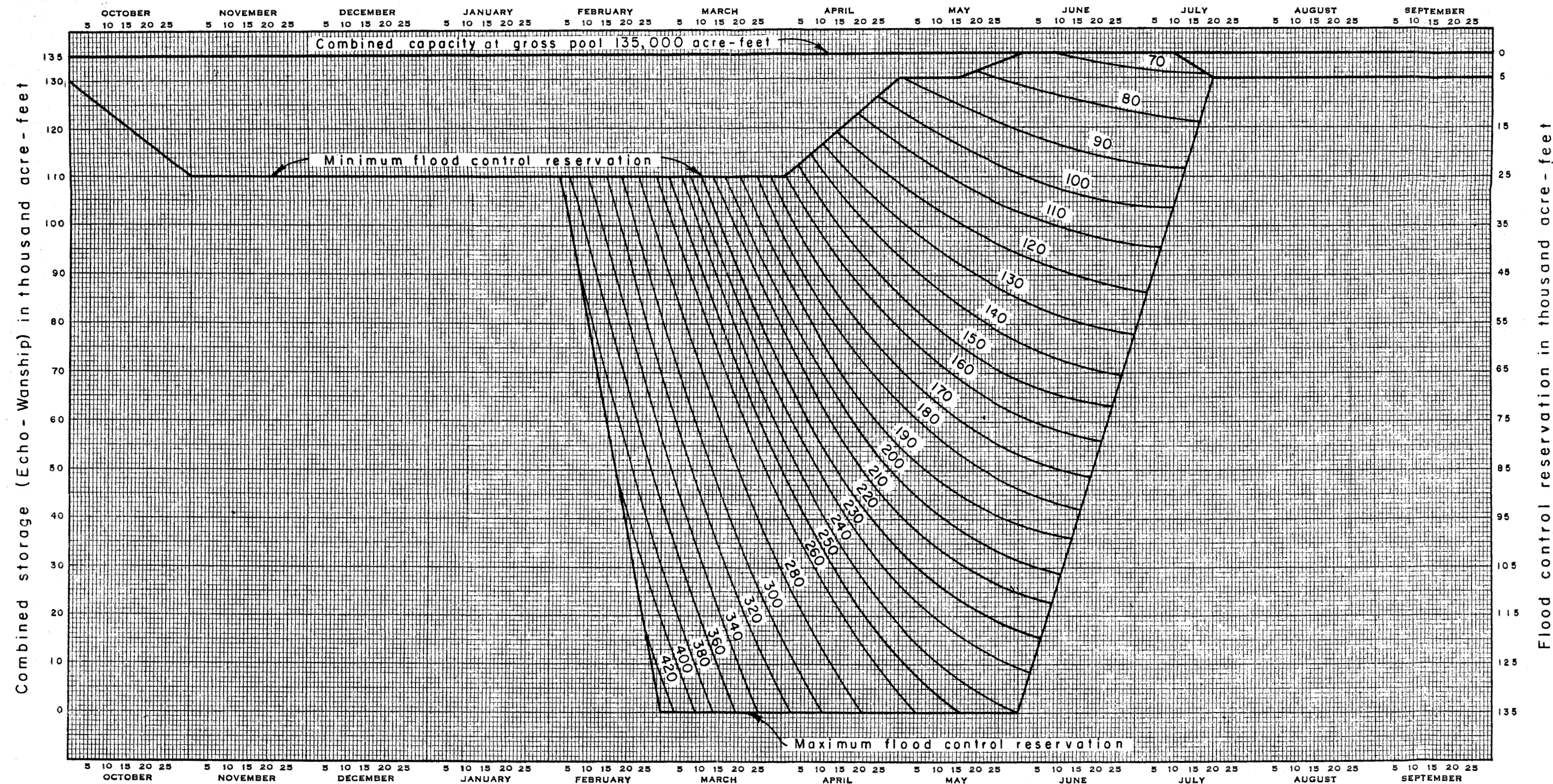
CORPS OF ENGINEERS

BUREAU OF RECLAMATION

By: William C. Vandenberg
Division Engineer
South Pacific Division

By: Grandall
Regional Director
Upper Colorado Region





NOTES

1. Wanship (Rockport Lake) and Echo Reservoirs will be operated for flood control in accordance with this flood control diagram and the accompanying emergency spillway release diagram, File No. WE-26-35.
2. Parameter values are predicted natural inflow to Echo Reservoir in thousand acre-feet between the given date and 31 July, less adjustment for predicted diversions to Provo River. This adjustment is the forecasted diversion through Kamas Canal into Provo River between the given date and 30 June reduced by one-quarter percent for each day between the given date and 30 June.

USE OF DIAGRAM

1. Whenever the combined empty space in Echo Reservoir and Rockport Lake is less than that required by the diagram or whenever the empty space in Echo Reservoir is less than 40 percent of the combined space required by the diagram, water will be released from Echo Reservoir as rapidly as possible without causing flows in Weber River to exceed 2,000 c.f.s. below Echo Reservoir or 4,000 c.f.s. at Gateway, unless greater releases are necessary as indicated by the emergency spillway release diagram currently in force.
2. Whenever empty space in Rockport Lake is less than 30 percent of the combined space required by the diagram plus 30 percent of the combined space required in excess of 60,860 acre-feet, water in Rockport Lake will be released as rapidly as possible without causing flows in Weber River at Coalville to exceed 1,700 c.f.s., except when reduced releases are required under item 3 below.
3. Whenever empty space in Rockport Lake exceeds that in Echo Reservoir and empty space in Echo Reservoir is less than 40 percent of the combined space required by the diagram, releases from Rockport Lake will be restricted to minimum power and fish requirements as necessary in order to provide additional empty space in Echo Reservoir.
4. After 30 May when it has been determined from criteria developed by the Regional Director, USBR, and concurred in by the District Engineer, Corps of Engineers, that the natural snowmelt inflow to Echo Reservoir during the remainder of the snowmelt season will no longer exceed 1,500 c.f.s., the combined flood control space requirement may be decreased by 10,000 acre-feet.

COMBINED WANSHIP (ROCKPORT LAKE) AND ECHO
RESERVOIRS
Weber River Basin, Utah
FLOOD CONTROL DIAGRAM
Prepared Pursuant to Flood-Control Regulations
for Weber Basin Reservoirs

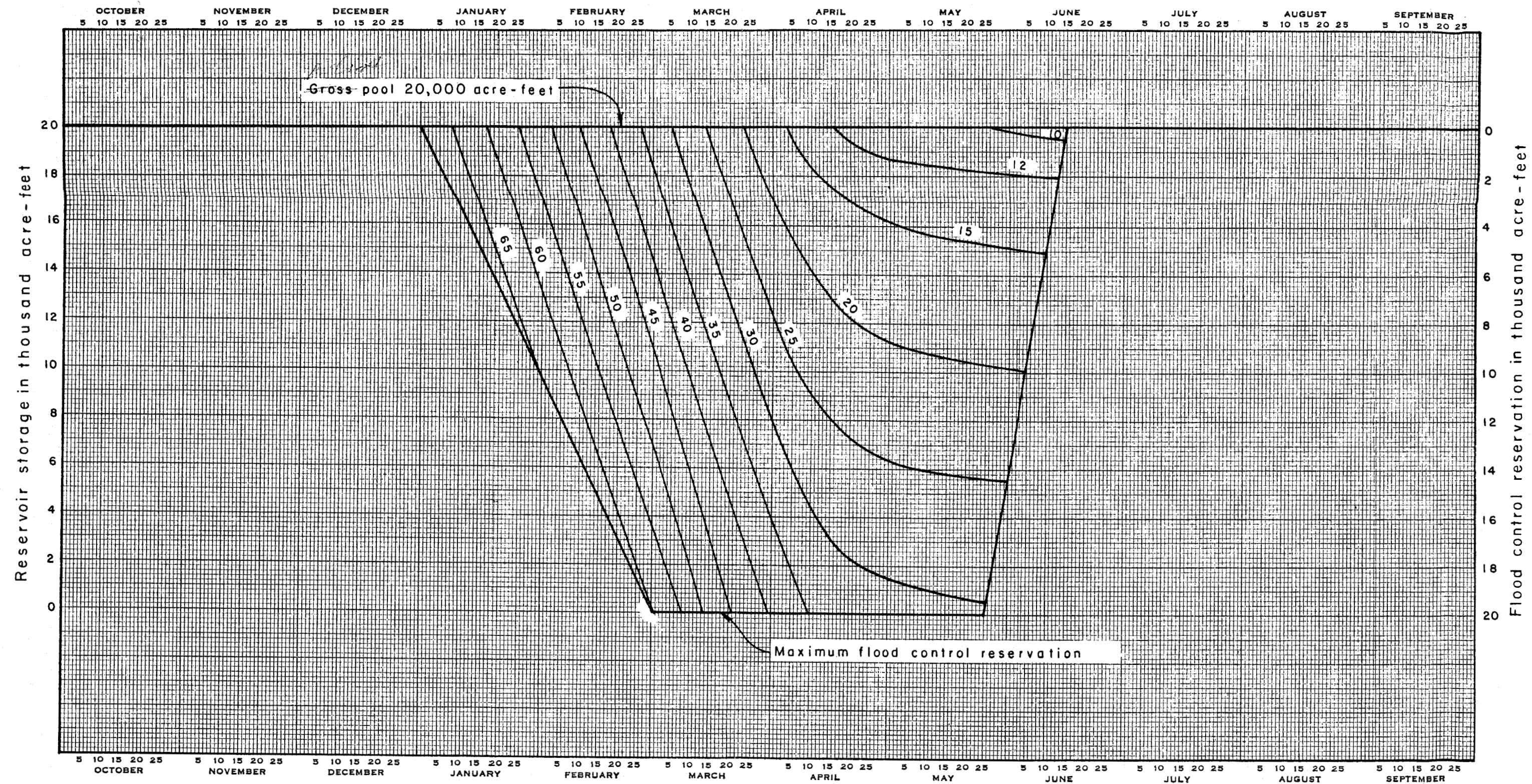
APPROVED: _____

Commissioner of Reclamation

APPROVED: _____

Lieutenant General, Chief of Engineers

Effective Date: 28 JAN 1972 File No. WE-26-34



NOTES:

1. Parameters represent predicted runoff of Lost Creek into Lost Creek Reservoir for remainder of snowmelt season prior to 31 July in thousand acre-feet.
2. Whenever empty space in Lost Creek Reservoir is less than that required by the diagram, water will be released as rapidly as possible without causing flood to exceed 250 c.f.s. in Lost Creek below Lost Creek Dam or 350 c.f.s. in Lost Creek at its mouth.

LOST CREEK RESERVOIR
Weber River Basin, Utah

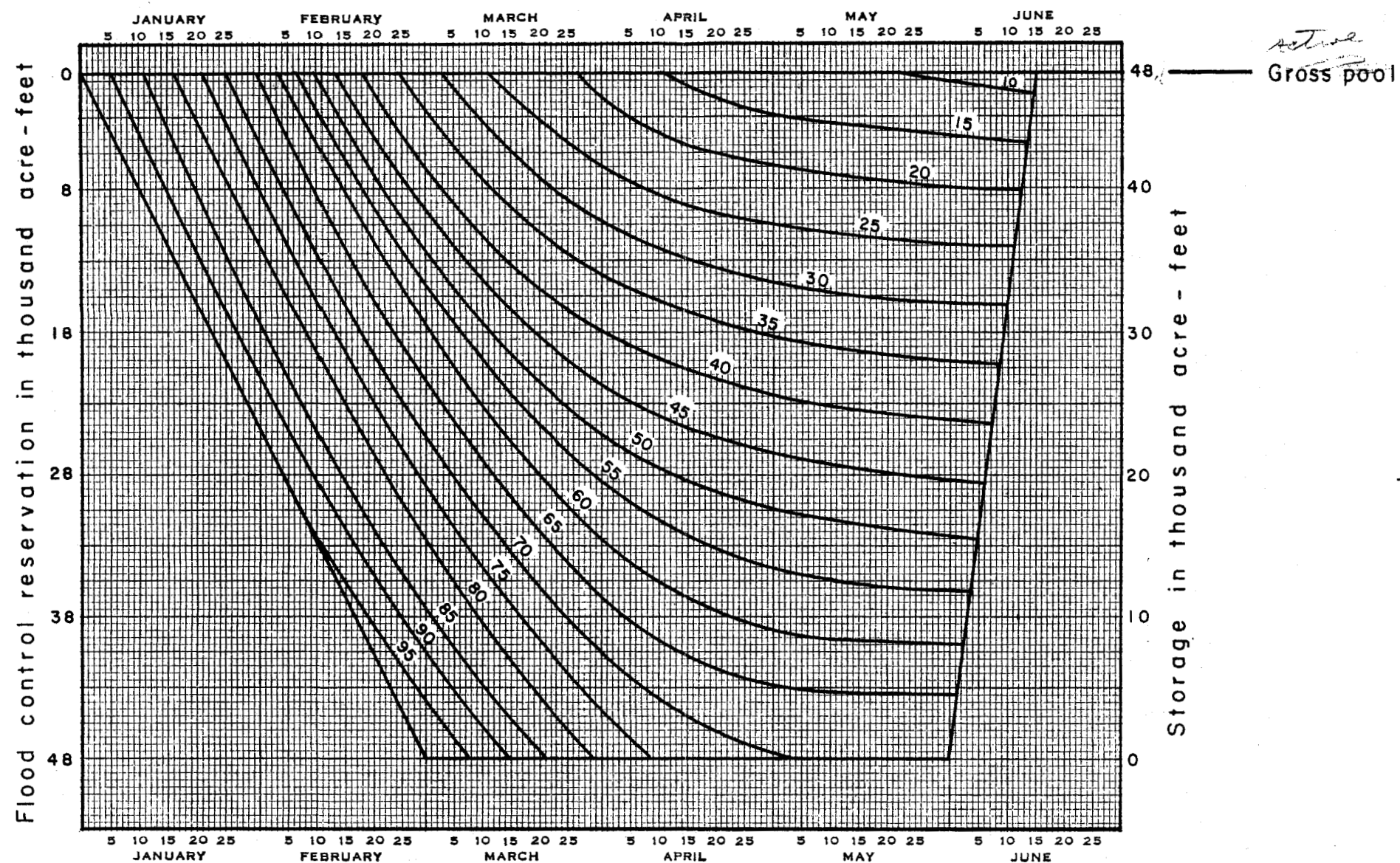
FLOOD CONTROL DIAGRAM

Prepared Pursuant to Flood-Control Regulations
for Weber Basin Reservoirs

APPROVED: *[Signature]*
Commissioner of Reclamation

APPROVED: *[Signature]*
Lieutenant General, Chief of Engineers

Effective Date: 28 JAN 1972 File No. WE -13-100



NOTES:

- Parameters represent predicted run-off of East Canyon Creek into East Canyon Reservoir for remainder of snow-melt season prior to 31 July in 1,000 acre-feet.
- Whenever empty space in East Canyon Reservoir is less than that required by the diagram, water shall be released as rapidly as possible without causing flows to exceed ~~250~~ ²⁵⁰ c.f.s. in East Canyon Creek below East Canyon Dam or 450 ~~450~~ ⁴⁵⁰ c.f.s. in East Canyon Creek at its mouth.

EAST CANYON RESERVOIR
Weber River Basin, Utah

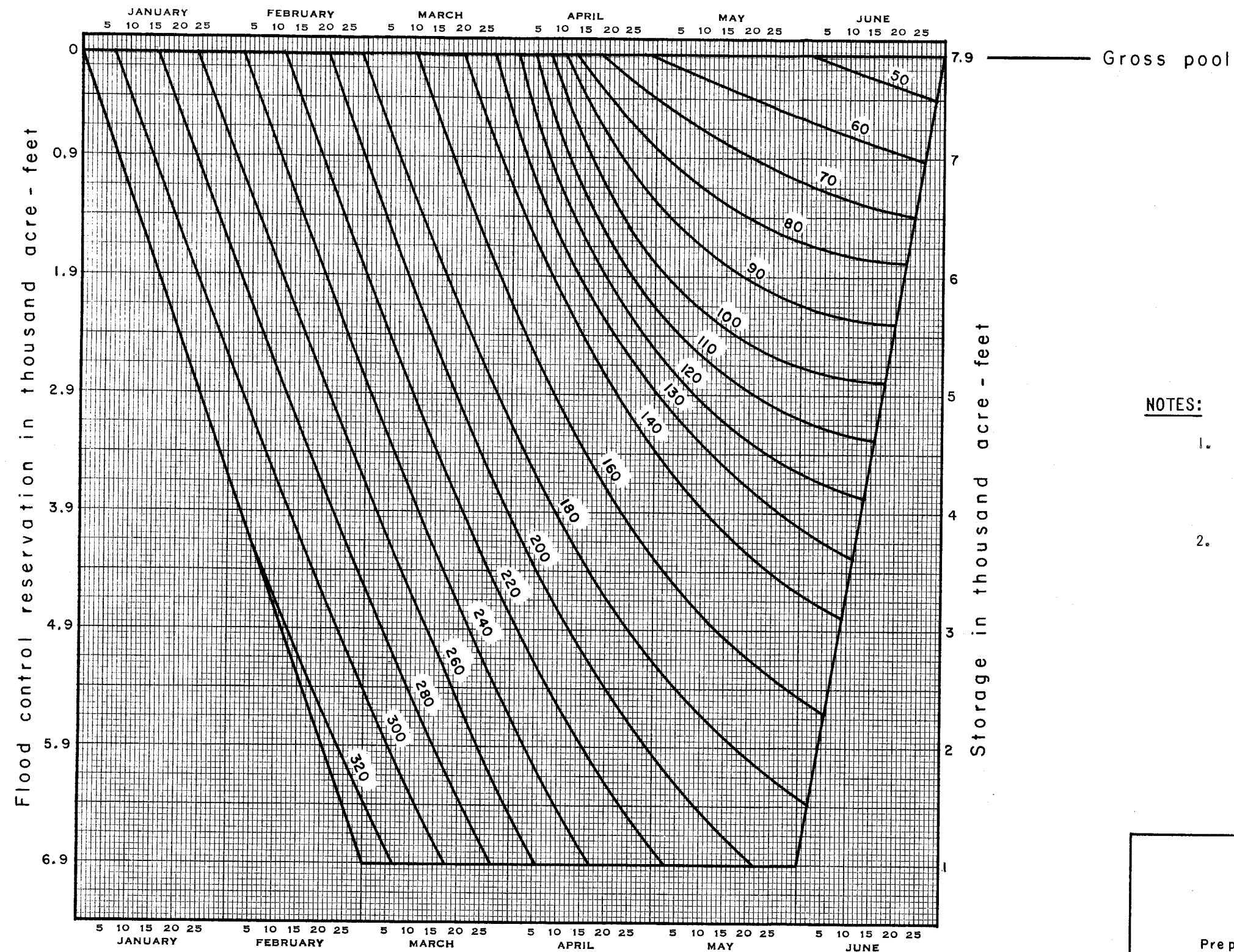
FLOOD CONTROL DIAGRAM

Prepared Pursuant to Flood Control Regulations
for Weber Basin Reservoirs

APPROVED: *[Signature]*
Commissioner of Reclamation

APPROVED: *[Signature]*
Lieutenant General, Chief of Engineers

Effective Date: 28 JAN 1972 File No: WE-13-98



NOTES:

1. Parameters represent predicted inflow into Pineview Reservoir for remainder of snow-melt season prior to 31 July in 1,000 acre-feet.
2. Whenever empty space in Causey Reservoir is less than that required by the diagram, water shall be released as rapidly as possible without causing flows to exceed 800 c.f.s. in South Fork of Ogden River below Causey Dam or 1,000 c.f.s. in South Fork of Ogden River above Pineview Reservoir.

CAUSEY RESERVOIR
Weber River Basin, Utah

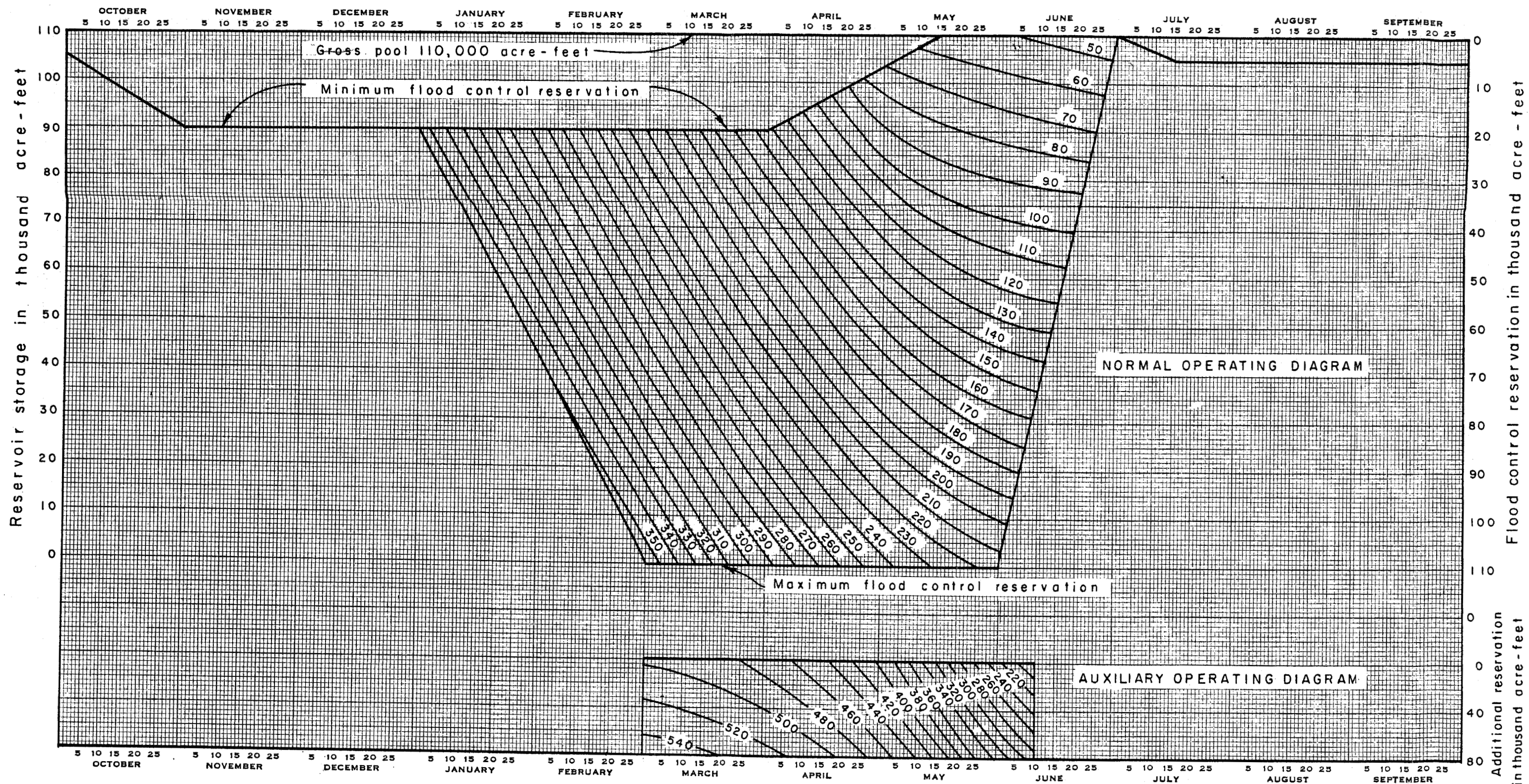
FLOOD CONTROL DIAGRAM

Prepared Pursuant to Flood Control Regulations
for Weber Basin Reservoirs

APPROVED: _____

APPROVED: _____

Effective Date: _____ File No: WE-13-99



NOTES:

1. Operation of Pineview Dam for flood control will be in accordance with this flood control diagram and the accompanying emergency spillway release diagram, File No. WE-26-37.
2. When operation of Pineview Reservoir is governed by this flood control diagram only, the primary objective will be to control flows in Ogden River below Pineview Dam to a maximum of 1,600 c.f.s. Space requirements to meet this objective are defined by the normal operating diagram shown hereon. Parameter values for the normal operating diagram are predicted natural inflow to Pineview Reservoir in thousand acre-feet between the given date and 31 July.
3. A secondary objective in operation of Pineview Dam for flood control is to assist in control of flows in Weber River below Ogden River to a maximum of 5,000 c.f.s., or in Weber River below Willard Canal to a maximum of 4,400 c.f.s. Additional space required for this objective is defined by the auxiliary operating diagram. Parameters for the auxiliary operating diagram are predicted natural inflow to Echo Reservoir on Weber River in thousand acre-feet between the given date and 31 July.

USE OF DIAGRAMS:

1. Whenever empty space in Pineview Reservoir is less than the total space required by the normal and auxiliary operating diagrams, water shall be released from Pineview Reservoir as rapidly as possible in accordance with the following criteria:
 - a. Whenever empty space in Pineview Reservoir is less than 50 percent of that required by the normal operating diagram, operation will be based on control of flows in Ogden River only, and water shall be released as rapidly as possible without causing flows in Ogden River below Pineview Dam to exceed 1,600 c.f.s., unless greater releases are required by the emergency spillway release diagram.
 - b. Whenever empty space in Pineview Reservoir is greater than 50 percent of that required by the normal operating diagram, operation will be modified to assist in control of Weber River flows, and water shall be released as rapidly as possible without causing flows to exceed 1,600 c.f.s. in Ogden River below Pineview Dam, 5,000 c.f.s. in Weber River below Ogden, or 4,400 c.f.s. in Weber River below Willard Canal.
2. After 15 May when it has been determined from criteria developed by the Regional Director, USBR, and concurred in by the District Engineer, Corps of Engineers, that the snowmelt inflows during the remainder of the snowmelt season will no longer exceed 1,600 c.f.s., the flood control space requirements may be decreased by 10,000 acre-feet.

PINEVIEW RESERVOIR Weber River Basin, Utah

FLOOD CONTROL DIAGRAM

Prepared Pursuant to Flood-Control Regulations
for Weber Basin Reservoirs

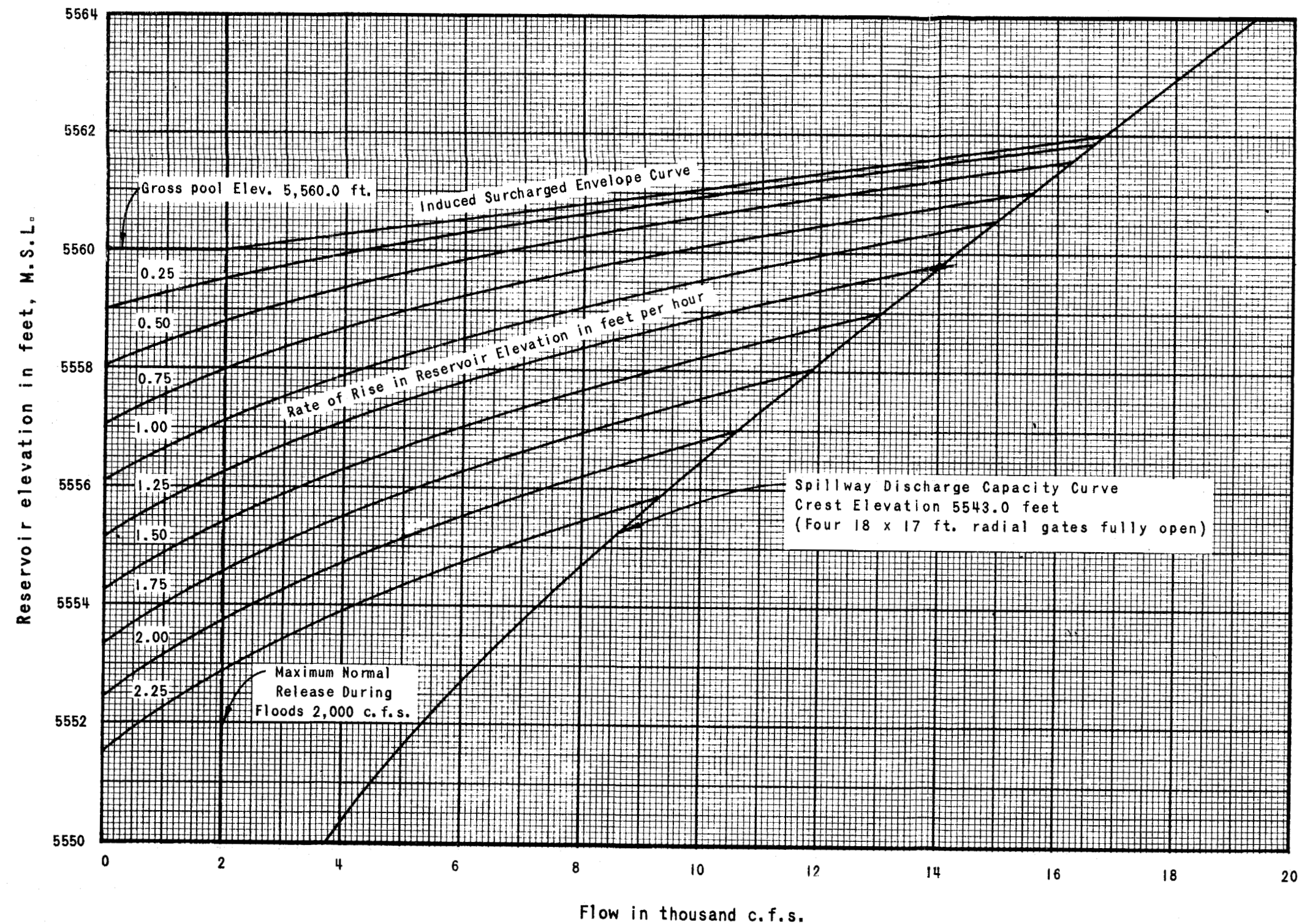
APPROVED: *[Signature]*

Commissioner of Reclamation

APPROVED: *[Signature]*

Lieutenant General, Chief of Engineers

Effective Date: 28 JAN 1972 File No. WE- 26- 36



OPERATING INSTRUCTIONS

1. Follow regular flood control regulation schedule until larger releases are required by this diagram.
2. Adjust the spillway outflow each hour on the basis of the rate of rise in reservoir elevation in feet during the preceding hour and the current reservoir elevation as indicated by the curves.
3. When outflows as determined from this diagram are once initiated, gate openings shall not be reduced until the reservoir water surface has receded to gross pool elevation, 5560.0 feet. Below gross pool elevation, follow regular flood control regulation schedule.
4. Once operation in accordance with the emergency spillway release diagram is initiated, gate changes shall be made only in accordance with the above criteria.

ECHO RESERVOIR
Weber River Basin, Utah

EMERGENCY SPILLWAY RELEASE DIAGRAM

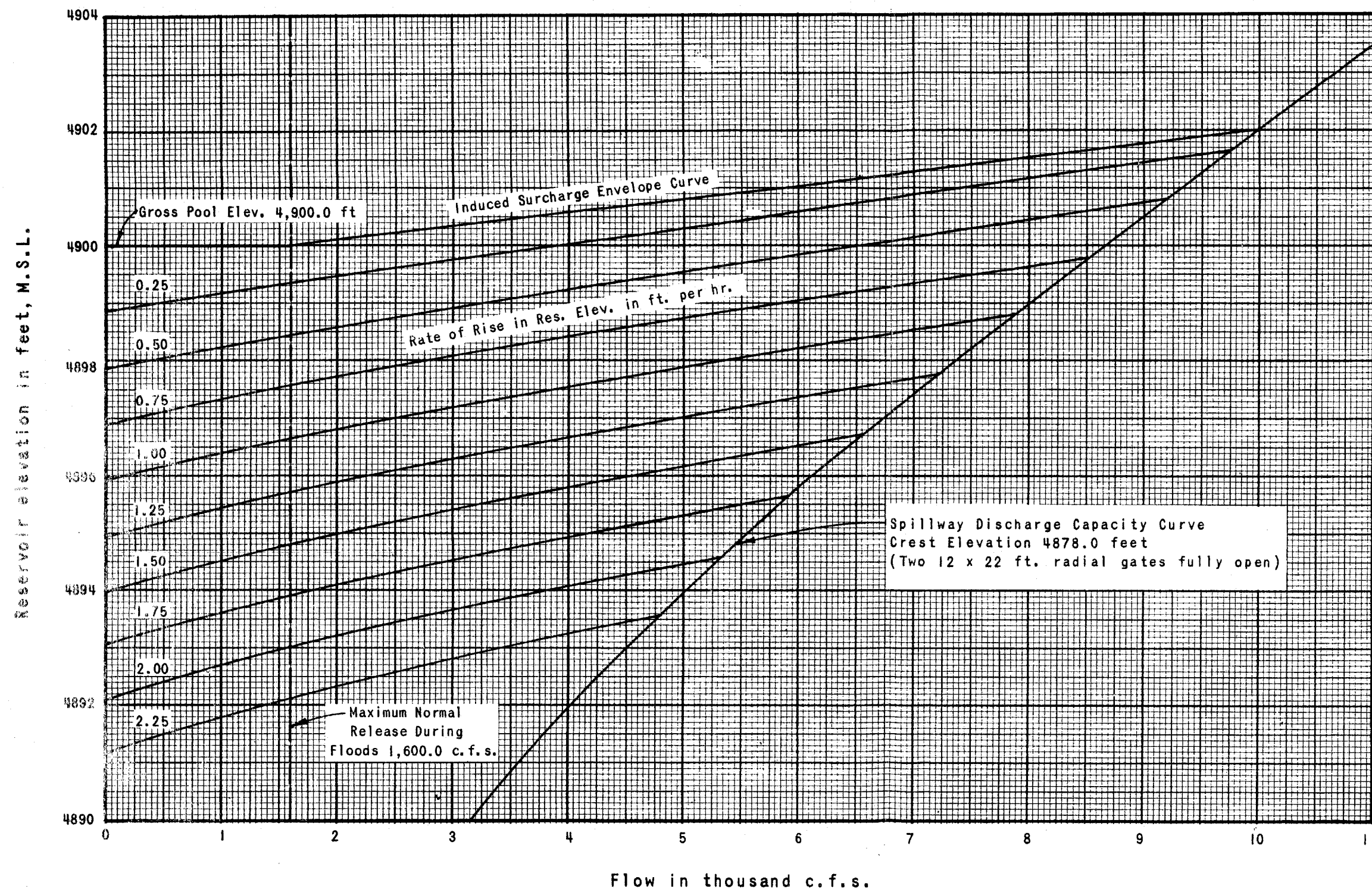
Prepared Pursuant to Flood-Control Regulations
for Weber Basin Reservoirs

APPROVED: *[Signature]*

APPROVED: *[Signature]*

Commissioner of Reclamation
Lieutenant General, Chief of Engineers

Effective Date: 28 JAN 1972 File No. WE-26-35



OPERATING INSTRUCTIONS

1. Follow regular flood control regulation schedule until larger releases are required by this diagram.
2. Adjust the spillway outflow each hour on the basis of the rate of rise in reservoir elevation in feet during the preceding hour and the current reservoir elevation as indicated by the curves.
3. When outflows as determined from this diagram are once initiated, gate openings shall not be reduced until the reservoir water surface has receded to gross pool elevation, 4900.0 feet. Below gross pool elevation, follow regular flood control regulation schedule.
4. Once operation in accordance with the emergency spillway release diagram is initiated, gate changes shall be made only in accordance with the above criteria.

PINEVIEW RESERVOIR
Weber River Basin, Utah

EMERGENCY SPILLWAY RELEASE DIAGRAM

Prepared Pursuant to Flood-Control Regulations
for Weber Basin Reservoirs

APPROVED: *[Signature]*
Commissioner of Reclamation

APPROVED: *[Signature]*
Lieutenant General, Chief of Engineers

Effective Date: 28 JAN 1972 File No. WE-26-37