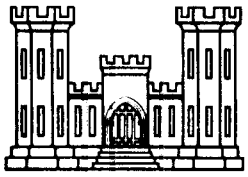

SUCCESS LAKE

Tule River, California

WATER CONTROL MANUAL

APPENDIX IV
To
Master Water Control Manual
Tulare Lake Basin, California
JANUARY 1982

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

SUCCESS LAKE
TULE RIVER, CALIFORNIA

WATER CONTROL MANUAL

JANUARY 1982
REVISED DECEMBER 1987

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


SUCCESS LAKE

PERSONNEL CONCERNED IN THE OPERATION OF SUCCESS RESERVOIR

UNIT		OFFICE PHONE	NAME	HOME PHONE
PROJECT OFFICE PORTERVILLE, CALIFORNIA	SUCCESS RESERVOIR	209-784-0215 (Porterville)	B. PROCTER PARK MANAGER	209-784-0575 (Porterville)
DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA	DISTRICT ENGINEER	916-440-2232*	COL. A. E. WILLIAMS DISTRICT ENGINEER	
	RESERVOIR CONTROL SECTION	916-440-3405* 916-440-3168* 916-440-3167*	R. A. NEAL CHIEF C. D. MATLOCK	916-791-0478 (Roseville) 916-487-2985
		916-440-2378*	M. E. VERKE	916-967-4994
	HYDROLOGIC FACILITIES	916-440-2112*	J. T. JOHNSON	916-687-7212
	OPERATIONS BRANCH	916-440-2327*	M. L. HELM CHIEF	916-961-1918
		916-440-2305*	A. E. SMITH, JR. CHIEF, OPERATIONS & MAINTENANCE SECTION	916-652-5280
IRRIGATION INTERESTS	TULE RIVER ASSOCIATION c/o LOWER TULE RIVER IRRIGATION DIST. P.O. BOX 511 WOODVILLE PORTERVILLE, CALIFORNIA	209-784-2598 (Porterville) 209-686-4716 (Tulare)	R. L. SCHAFER WATERMASTER	209-733-1329 (Visalia)
	TULARE LAKE BASIN WATER STORAGE DIST. 1109 WHITLEY AVE. CORCORAN, CALIFORNIA 93212	209-992-4127 (Corcoran)	B. GRAHAM MANAGER	209-582-7603 (Hanford)

FTS: SACRAMENTO 448-2000
NOTE: *BETWEEN 4:30 PM AND 7:45 AM, OR ON SATURDAY, SUNDAY OR HOLIDAYS USE 916-452-1535 (FLOOD SEASON ONLY)

SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA REV. 01-OCT-82

USACE Sacramento District Datum Documentation Report

Project: Success Lake and Dam

NGVD 29To NAVD 88 Datum Conversion Factor: add 2.61 ft.

Datum Conversion Procedure: The USACE Mapping Unit and A-E Contractor performed field measurements with known historical elevations. All documentation and raw data is filed with the USACE Sacramento District Mapping Unit. All survey and gage control is in US feet and is tied to NGS monument AC6136. For questions or comments contact the Sacramento District Datum Coordinator. The results of this survey produced an averaged difference between NGVD 29 and NAVD 88 of 2.61 feet for the USACE Success Lake and Dam civil works project.

Station ID	COE-NGVD29 record	NAVD 88	Difference
AC6136 (KT 200)	696.97	699.60	2.63
52	671.03	376.64	2.61
59	584.77	587.36	5.59
56	656.91	659.52	2.61
			Average = 2.61
Averaged Delta = 2.61ft conversion factor			

Accuracy Statement: The NAVD88 datum conversion accuracy is: =/- 0.25 feet to real work NAVD 88 elevations per EC- 1110-2-6065 Comprehensive Evaluation of Project Datums. The stated conversion factor is for planning, operations, water management and legacy conversion only. All future design work and survey work shall adhere to the NAVD 88 datum and follow EM 1110-1-1005 Control and Topographic Surveying. Contact the USACE Sacramento District's survey unit or the district's datum coordinator for current survey control.

SUCCESS LAKE
TULE RIVER, CALIFORNIA

PERTINENT DATA

GENERAL

Drainage areas	
Tule River below Success Dam	393.0 sq. mi.
S. Fork Tule River near Success	109.0 sq. mi.
Tule River near Springville	247.0 sq. mi.
N. Fork of M. Fork Tule River near Springville	39.3 sq. mi.
Flows at dam site	
Mean annual (1904-1980)	137,400 ac-ft
Mean daily (1904-1980)	190 cfs
Max. mean daily recorded inflow (6 Dec 66)	40,000 cfs
Max. instantaneous recorded inflow (6 Dec 66)	76,900 cfs
Standard project peak inflow	67,500 cfs
Standard project peak outflow	43,650 cfs
Spillway design peak inflow	200,000 cfs
Spillway design peak outflow	126,000 cfs

RESERVOIR

Elevation	
Inactive pool	559.0 feet
Flood control pool (bottom)	587.0 feet
Gross pool	652.5 feet
Taking line	658.0 feet
Spillway design flood pool	686.8 feet
Area	
Inactive pool	83 acres
Flood control pool (bottom)	379 acres
Gross pool	2,477 acres
Taking line	2,832 acres
Spillway design flood pool	4,441 acres
Storage capacity	
Inactive pool	557 ac-ft
Flood control pool (bottom)	6,540 ac-ft
Gross pool (nominal capacity)	82,300 ac-ft
Standard project flood pool	130,000 ac-ft
Spillway design flood pool	202,700 ac-ft
Reservoir length at gross pool elev.	3.5 miles

SPILLWAY (Uncontrolled Broad-Crested)

Location	In saddle near right abutment
Crest length	200 feet
Crest elevation	652.5 feet
Total excavation	
Head at gross pool	3.26 feet
Head at spillway design flood pool	34.3 feet
Max. capacity (SDF pool)	126,000 cfs

MAIN DAM (Earthfill)

Elevation, top of dam	691.5 feet
Freeboard, above spillway design flood pool	4.7 feet
Maximum height	142 feet
Length of crest	3,490 feet
Width of crest	22.5 feet
Width of roadway	16.0 feet
Upstream slope	1 on 3.75; 1 on 3.0; 1 on 2.5 at crest
Downstream slope	1 on 3.0; 1 on 2.5 at crest
Total excavation	490,000 cu. yds.
Total volume of embankment	4,900,000 cu. yds.

FRAZIER DIKE (Earthfill)

Elevation, top of dike	691.5 feet
Freeboard, above spillway design flood pool	4.7 feet
Length of crest	7,650 feet
Width of crest	20 feet
Width of roadway	16 feet
Maximum height	42 feet
Upstream slope	1 on 2.75
Downstream slope	1 on 2.75
Total excavation	67,000 cu. yds.
Total volume of embankment	660,000 cu. yds.

MAIN OUTLET

Conduit (concrete-lined tunnel)	
Diameter	12.0 feet
Intake structure elev., invert	559.0 feet
Outlet elev., invert	551.0 feet
Length	687.0 feet
Gates (number and size)	
Service gates (hydraulically operated slide)	2 - 5'8" x 10'0"
Emergency gates (hydraulically operated slide)	2 - 5'8" x 10'0"
Total capacity of outlets with water surface	
At elev. 587.0 (6,540 ac-ft)	3,200 cfs
At elev. 652.5 (82,300 ac-ft)	6,300 cfs

PIONEER IRRIGATION DITCH OUTLET

Steel pipe (concrete encased)	
Diameter	42 inches
Length	687.0 feet
Gross head	103.5 feet
Gates (number and size)	
Service gate (double disc type gate valve)	1 - 42" diameter
Emergency gate (double disc type gate valve)	1 - 42" diameter
Total discharge capacity (full valve opening)	
At elev. 560.0 (91 ac-ft)	75 cfs
At elev. 652.5 (82,300 ac-ft)	284 cfs

NOTICE TO USERS OF THIS MANUAL

Regulations specify that this Water Control Manual be published in looseleaf form, and only those sections, or parts thereof, requiring changes will be revised and printed. Therefore this copy should be preserved in good condition so that inserts can be made to keep the manual current.

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EXHIBIT

I - INTRODUCTION

1-01. Authorization. The Success Lake Water Control Manual, Tule River, California, is an Appendix to the Tulare Lake Basin Master Water Control Manual. It is prepared in accordance with instructions contained in EC 1110-2-208; EM 1110-2-3600, and ETL 1110-2-251.

1-02. Purpose and Scope. This manual provides a detailed plan for water control and management at the Success Lake project on the Tule River, California.

1-03. Related Manuals and Reports. This manual is Appendix IV to the Tulare Lake Basin Master Water Control Manual. Other related reports are as follow:

Title	Date
Master Water Control Manual	1 Dec 53
Tulare Lake Basin, California	
App I - Pine Flat Lake	Nov 53 (Rev. Sep 79)
App II - Isabella Lake	May 53 (Rev. Jan 78)
App III - Terminus Dam (Lake Kaweah)	Jun 62 (Rev. Nov 71) (Rev. Nov 81)
Maintenance Manual	Aug 63
Review of Spillway Adequacy	Nov 78
Definite Project Report	Dec 49
DM 1 - Spillway Design Flood	Nov 55
DM 2 - Dam & Appurtenances, 4 Volumes Report, App A and B & Plates	Jul 56
DM 3 - Real Estate	Apr 56
Supp 1 Real Estate	Jan 57
DM 5 - Reservoir Regulation	Dec 56
DM 6 - General Design	Jan 57 (Rev. 1 Dec 58)
DM 7 - Reservoir Clearing	Nov 57
DM 8 - Initial Public Use Facilities	Feb 61
DM 9 - Master Plan	Jun 61
DM 9B-C1 - Recreational Development at Areas 3, 4, and 10	Feb 64
DM 10 - Operators Quarters and Fallout Protection	Aug 62
Supp 1 Operators Quarters and Fallout Protection	Feb 67
DM 11 - Additional Recreation Development at Tule Recreation Area (Formerly Areas 3 and 4)	Nov 68
DM 12 - Master Plan	Dec 77

1-04. Project Owner. Success Lake is owned by the U.S. Government.

1-05. Operating Agency. The Sacramento District, U.S. Army Corps of Engineers operates Success Lake. Duties related to the control of outflows are performed by the Park Manager or by a designated Damoperator. The Park Manager has a normal tour of duty at the dam of eight hours per day, five days a week. At other times, the Park Manager may be contacted at his residence at the project. Project personnel will be on duty weekends and holidays and at other-than-normal working hours as necessary for effective

project operation. Operational responsibilities are explained in detail in Exhibit A. Business and home phone numbers of the individuals responsible for project operation are given at the beginning of this manual and at the beginning of Exhibit A.

1-06. Regulating Agencies. The operation plan for Success Lake for flood control was developed by the Corps of Engineers, Sacramento District, with the objective of gaining the greatest possible benefits from flood control, irrigation and recreation.

Releases for purposes other than flood control are directed by the Tule River Watermaster who represents the Pioneer Water Company, the Vandalia Irrigation District, Porterville Irrigation District, the Lower Tule River Irrigation District and the downstream Kaweah River and Tule River Associations. These organizations are known collectively as the Tule River Association. The Watermaster's work and home phone numbers are listed at the beginning of this manual and at the beginning of Exhibit A.

II - DESCRIPTION OF PROJECT

2-01. Location. Success Lake is located on the Tule River, California, about 6 miles east of Porterville, California. The project can be reached by driving east from Porterville on State Highway 190. Its location is shown on plate 1.

2-02. Purpose. Success Lake provides storage for flood control, conservation and other purposes.

2-03. Physical Components. The Success Project consists of a dam and reservoir on the Tule River. It intercepts the runoff from 391 square miles of mountainous area. Pertinent data for the project are tabulated at the front of this manual. A general site plan and recreation development are shown on plate 2. Success Dam is an earthfill structure with a maximum height of 142 feet and a length of 3,490 feet. The top of the dam at elevation 691.5, provides 4.7 feet of freeboard above the spillway design flood pool at elevation 686.8 feet. A plan and profile of the dam are shown on plate 3.

A rolled earthfill dike known as Frazier Dike, 42 feet high and 7,650 feet long extends across Frazier Valley about 3-1/2 miles northwest of the dam. A plan, profile and sections are shown on plate 4.

At normal full pool (elevation 652.5), the reservoir extends about 3.5 miles from the dam in an easterly direction. The capacity of Success Lake at normal full pool was originally 85,400 acre-feet, but sedimentation has reduced it to about 82,300 acre-feet. The area at normal full pool is about 2,477 acres. Area and capacity curves are presented on plate A-1, and a table of areas and capacities is presented on plate A-2.

The outlet works consist of one 12-foot circular conduit-type gated outlet with intake invert elevation at 559 feet and one 42-inch gated concrete-encased steel pipe under the main conduit, with invert elevation at 553 feet. The main outlet is controlled by two 5'8" x 10'0" hydraulically operated slide gates (with two 5'8" x 10'0" hydraulically operated emergency slide gates) and has a capacity of 3,200 c.f.s. at elevation 587 feet, at which the storage is 6,540 acre-feet. The rating curves for various gate openings for this outlet are shown on plate A-3. The smaller outlet takes off from the main outlet upstream from the slide gates. It is controlled by a 42" diameter double disc type valve service gate (with similar emergency gate) and has a capacity of 75 c.f.s. at pool elevation 560 feet, or 284 c.f.s. at gross pool elevation of 652.5 feet. This outlet serves Pioneer Irrigation Ditch which formerly diverted water from Tule River upstream from the damsite. A rating curve for Pioneer Ditch is shown on plate A-5. A plan, profile and sections of the control tower and outlet works are shown on plates 5 and 6.

The spillway is ungated and is excavated through overburden into the rock of a natural saddle about 900 feet from the right abutment of the main dam. It has a crest width of 200 feet and a safe discharge capacity of 126,000 cubic feet per second when the reservoir water surface is at spillway design flood pool (elevation 686.8 feet). A plan, profile, and sections of the spillway are shown on plate 7 and a rating curve is shown on plate A-4.

TABLE 2-01

RECREATION FACILITIES AT SUCCESS LAKE

Area	Camp Sites	Picnic Sites	Launch Lanes	Restroom Facilities: Flush	Vault	Portable 1/	Parking: Car	Car-Trailer
Observation					1		20	
Tule	104 2/	31 3/	6 4/	7		24	50	200
Gill						6	160 5/	
Wildlife						2		
Rocky Hill	223 5/		2	1		24	50	125
Bartlett Park		54 6/		4				

NOTES:
1/ Average. (More may be added if demand indicates).
2/ Includes 2 sites reserved for handicapped use.
3/ Includes 6 group sites (each group site will accommodate 20+ people).
4/ Six lanes available for high lake levels - 3 for low lake levels.
5/ Primitive.
6/ Includes 12 group sites. Group sites consist of 6 sites accommodating over 150 persons, and 6 sites accommodating 40-60 persons.
7/ Approximate figure. Parking is random along side of roads.

2-04. Related Control Facilities. The Success Project consists of the dam and reservoir and appurtenant facilities. No other improvements outside the reservoir area were made under the authority of this project. However, local interests have made channel improvements downstream.

2-05. Real Estate Acquisition. Project lands consist of approximately 4,116 acres acquired in fee, 57.8 acres under easement, and 0.2 acres under lease or permit. The minimum take line for this land is at elevation 658. The project land boundaries are shown on plate 2.

2-06. Public Facilities. Most recreation use of Success Lake presently occurs in and originates from the developed south and west shores of the lake and at Bartlett Park. Some use occurs at the undeveloped Gill area and in the partially developed wildlife management area. Success Lake has one of the best bass fisheries in the San Joaquin River Basin. Other recreation at Success Lake includes picnicing, camping, waterskiing, hunting, swimming, pleasure boating and sightseeing. In addition, opportunities for specialized activities such as hunting dog trials and horseback riding are also provided. Recreation facilities currently available at Lake Success are listed on Table 2-01 and the locations are shown on plate 2.

Accurate visitation records have been kept for Success Lake since 1964 when 603,200 recreation days were recorded. Annual visitation from 1964 through 1980 is as follows:

TABLE 2-02
ANNUAL VISITATION AT SUCCESS LAKE

1964	603,200
1965	568,050
1966	565,990
1967	400,960
1968	590,430
1969	533,300
1970	627,450
1971	549,890
1972	514,200
1973	691,340
1974	615,450
1975	775,280
1976	724,440
1977	696,750
1978	801,750
1979	569,840
1980	933,500
Mean	633,000

III - HISTORY OF PROJECT

3-01. Authorization. The investigation which led to the recommendation to construct Success Lake was authorized 22 June 1936. The project was authorized for construction by the 22 December 1944 Flood Control Act as follows:

> "The Plan for Terminus and Success Reservoirs on the Kaweah and Tule Rivers for Flood Control and other purposes in the San Joaquin Valley, California, in accordance with the recommendations of the Chief of Engineers in Flood Control Committee Document Number 1, Seventy-eighth Congress, Second Session, is approved, and there is hereby authorized $4,600,000 for initial and partial accomplishment of the plan."

3-02. Planning and Design. In Committee Document Number 1, 78th Congress, 2nd Session, dated 1944, the Chief of Engineers recommended a reservoir capacity of 50,000 acre-feet. However, subsequent studies made for the basic report indicated that, to provide adequate flood control, the storage capacity should be 115,000 acre-feet. The State of California and Tulare Lake interests questioned the economic feasibility of this increase. This is noted in the District Engineers report to the Chief of Engineers dated 1 June 1948. The report is in House Document 367, 81st Congress, 1st Session dated 1950.

Further investigations were made, and by letter of 6 July 1949, subject: "Preliminary Definite Project Report, Success Project, Tule River, California," the District Engineer transmitted a report recommending a capacity of 75,000 acre-feet, on the grounds that such capacity was necessary for flood control and that a larger capacity was not economically justified. The 75,000 acre-foot capacity was approved by the Chief of Engineers in 2nd endorsement dated 5 August 1949 to the basic letter of 6 July 1949. At a conference between representatives of OCE, SPD and the Sacramento District on 9 May 1956 it was decided to provide an additional 5,000 acre-feet of capacity for sedimentation reserve, which increased the planned total gross pool capacity to 80,000 acre-feet.

3-03. Construction. Construction funds were initially appropriated in fiscal year 1957 but relatively little was accomplished until fiscal year 1959 due to inadequacy of authorized funds. Construction on the main dam and appurtenances was begun during October 1958. Closure of the dam was initiated 4 April 1960 and was completed 20 January 1961. The project was certified complete and accepted by the Government for operation on 15 May 1961. State Highway 190 and the county road were relocated.

3-04. Related Projects. Success Lake is part of a system of reservoirs providing flood protection to Tulare Lakebed and adjacent areas. The other reservoirs are Pine Flat Lake, Lake Kaweah, and Isabella Lake. Kaweah River water may enter the Tule River via Elk Bayou.

The Friant Kern Canal crosses the Tule River approximately eleven miles downstream from Success Dam. It delivers irrigation water to the Tule River and has the potential to export flood waters if necessary.

Upstream and downstream control structures are discussed in paragraphs 4-10 and 4-11.

3-05. Modifications to Regulations. The flood control diagram in the original flood control manual dated June 1961 was based on a total reservoir capacity of 80,000 acre-feet: 75,000 acre-feet for flood control during the rain flood season and 5,000 acre-feet, below elevation 587, for silt and recreation purposes. However, after the project was constructed, it was found that the reservoir contained more than 80,000 acre-feet at gross pool (elevation 652.5). A November 1965 survey showed that the reservoir capacity at gross pool was actually 85,400 acre-feet and that 6,800 acre-feet of this capacity was below elevation 587. Since certain recreation facilities were installed based on that elevation it was decided to make the silt and recreation pool 6,800 acre-feet. The additional 3,600 acre-feet of space above elevation 587 was designated as winter flood control reservation when necessary to compensate for any decrease in irrigation and spreading demands. Additional surveys were made in 1978. The flood control diagram dated July 1981 in this manual is based on the 1978 survey. The current gross pool storage is 82,300 acre-feet and the storage below elevations 587 is 6,540 acre-feet.

The lines delineating the flood control space requirements during the rainflood season have been altered on the July 1981 diagram to more accurately portray the period of rainflood hazard.

The snowmelt operation requirements have been changed on the July 1981 diagram based on past operating experience and hypothetical routings of snowmelt floods (1906 to 1981). The objective of the snowmelt operation requirements is to minimize releases in excess of irrigation and spreading demand.

3-06. Principal Regulation Problems. Since completion of Success Lake, there have been no principal regulation problems. However, several large floods which included the largest rainflood of record (December 1966) and the second largest snowmelt flood of record (April-July 1969) have occurred. Operations during these floods demonstrated that Success Lake does not provide the degree of protection as presumed during the design stage. Discussions of these floods are covered in paragraphs 8.02c and d. Another potential regulatory problem is the high rate of sediment buildup in the reservoir. Sediments are accumulating at about twice the 1956 projected rate. Current projected deposition rates indicate that gross pool storage will be less than 75,000 acre-feet by the year 2020. Sediment deposition has a compound effect on the project by reducing available space for flood control, conservation, and recreation usage.

IV - WATERSHED CHARACTERISTICS

4-01. General Characteristics. The watershed above the dam is a fan-shaped mountainous area of about 391 square miles on the western slope of the southern Sierra Nevada. The Tule River is formed by three main forks flowing from the high eastern border of the basin in a southwesterly or westerly direction to their junction near the foothill line. The North, Middle, and South Forks are fed by numerous small streams with slopes ranging from 400 to about 1,000 feet per mile. The soil cover below 9,000 feet elevation ranges from moderate to deep. Vegetal cover is distributed approximately as follows:

TABLE 4-01

VEGETAL COVER ON TULE RIVER BASIN

Description	Elevation (ft. msl)	Percent of Basin Area
Grass lands (with scattered brush)	500- 3,000	9.3
Brush lands (chaparral, etc.)	2,500- 9,000	17.0
Deciduous forest (with brush, scattered conifers, and grass)	500- 7,000	48.9
Light coniferous	5,000-10,000	19.6
Heavy coniferous	6,000- 8,000	4.3
Sub-alpine forest	8,000-10,000	0.5
Bare rock	8,000-10,000	0.4
TOTAL		100.0

The area is sparsely settled and suitable for grazing, lumbering, mining, and recreation. More than half of the basin is within the Sequoia National Forest, and the southern portion of it comprises the Tule River Indian Reservation. The Tule River flows about 3 miles through low foothills below Success Dam and emerges on the valley floor near Porterville. There are no major tributaries between Success Dam and Porterville, the major potential damage area below the project. Porterville is located on the right bank of the Tule River.

Below Porterville the area becomes predominately agricultural along the river to Tulare Lakebed where the river terminates. Normally, diversions for agriculture cause the river to dry up before it gets to the lakebed.

4-02. Topography. The area above the dam is steep mountainous terrain. Below the dam there are foothills which transition into an alluvial fan and flatlands gently sloping to Tulare Lakebed. Elevations range from about 10,000 feet in the mountains to 550 feet at the dam, 450 feet at Porterville and down to 175 feet in Tulare Lakebed. The percent of area above various elevations is shown below:

TABLE 4-02

PERCENT OF AREA ABOVE GIVEN ELEVATIONS
IN TULE RIVER BASIN

Elevation (feet)	Percent of Area Above Elevation
550	100
2,000	75
4,000	45
5,000	33
6,000	22
8,000	5
10,050	0

A topographical map is shown on plate 8, an area elevation curve is shown on plate 9, and a stream profile is shown on plate 10.

4-03. Geology and Soils. The intrusion of the Sierra Nevada Batholith through metamorphased sediments has created a complicated rock structure in the Tule River Basin. Glacial and stream erosion have cut deeply leaving large areas of exposed granite and roof pendants of metamorphased rock. Alluvial deposits cover the narrow canyon floors and the wide alluvial fan where the Tule River emerges from the foothills onto the San Joaquin Valley floor. Lake deposits are found at the rivers terminus in Tulare Lakebed.

A number of minor faults are located within the basin area. Major faults nearby include the Garlock and San Andreas faults, within 90 miles, White Wolf fault within 75 miles and the Sierra Nevada and Pond-Poso faults within 50 miles.

4-04. Sediment. Storage space below elevation 587 feet has been reserved for sedimentation. A system of 27 sedimentation ranges was established by ground survey methods before reservoir operation was initiated. Two of these ranges cross the river below the dam, two above gross pool elevation on the river; and the remaining ranges are so spaced that no range represents more than 10 percent of the potential sediment accumulation in the reservoir. Each range is straight and is marked by a permanent monument above gross pool at each end. Each profile is recorded on a permanent drawing to a horizontal scale of 1 inch to 20 feet, with an attached table showing the coordinates of all survey points. The range locations are shown on plate 11. Reconnaissance surveys of the sedimentation ranges are made as deemed necessary; generally after major events. General surveys of the reservoir area have been made in 1960, 1965, 1967, 1968, 1973 and 1977. The surveys show that approximately 186 acre-feet of sediment per year has accumulated in Success Lake. In addition to surveys of the reservoir area, the sediment concentration of outflow from the reservoir is measured each month or at intermittent intervals from a one-gallon sample of outflow water taken immediately below the outlets of the dam. An estimate of sediment outflow of 4 acre-feet per year was computed from the 20 year record of outflow volume and the concentration of solid sediment indicated by sample measurements.

4-05. Climate. The valley area is characterized by hot, dry summers and moderate winters. At high elevations the summers are cool and the winters severe.

a. Temperature. Temperatures within the basin vary considerably. On the valley floor the summer highs go well over 100°F. while the winter lows may go below freezing. At the higher elevations, the summer highs are generally less than 100°F. while the winter lows may go below 0°F. The mean monthly and annual temperatures at three stations within or near the Tule River Basin are shown below:

TABLE 4-03

MEAN MONTHLY AND ANNUAL TEMPERATURES (°F)

Month	Success Dam (elev. 590)	Grant Grove (elev. 6600)	Three Rivers Edison PH #2 (elev. 950)
Oct	66.0	49.9	64.2
Nov	54.7	40.5	53.9
Dec	46.3	35.3	47.2
Jan	46.1	33.2	46.3
Feb	51.2	33.6	50.1
Mar	54.6	34.5	53.5
Apr	59.7	39.5	59.2
May	67.3	46.4	65.9
Jun	75.0	54.1	73.0
Jul	81.3	62.6	80.5
Aug	79.6	61.3	78.7
Sep	74.3	57.0	73.8
Mean	63.0	45.6	62.2

b. Precipitation. Normal annual precipitation (NAP) in the Tule River Basin varies from about 6-inches at the lowest elevation to about 50-inches at the headwaters. The NAP for the Basin above Success Reservoir is 31.0 inches. NAP isohyets for the area are shown on plate 12. Approximately 90 percent of the precipitation occurs in the period from November through April. It generally occurs as rain below 5,000 feet and as snow above that elevation. However, warm winter storms have produced rain up to 11,000 feet, which would cover the entire basin, and snow has occurred on the valley floor below the dam. The average monthly precipitation for representative stations is shown below:

TABLE 4-04

AVERAGE MONTHLY PRECIPITATION

Month	Success Dam Elev 590.0 in.	Success Dam Elev 590.0 % Ann	Eagle Creek Elev 6650 in.	Eagle Creek Elev 6650 % Ann	Rogers Camp Elev 6240 in.	Rogers Camp Elev 6240 % Ann	Mtn Home Elev 5360 in.	Mtn Home Elev 5360 % Ann	Hossack Elev 7100 in.	Hossack Elev 7100 % Ann
Oct	0.65	5.8	1.89	5.0	1.00	2.9	1.33	3.2	0.95	2.2
Nov	1.56	14.0	3.73	9.9	3.15	9.1	3.64	8.7	4.28	10.1
Dec	1.55	14.0	7.49	19.9	6.94	20.0	7.13	17.1	7.71	18.3
Jan	1.99	17.8	8.05	21.4	7.86	22.6	8.71	20.9	8.92	21.2
Feb	1.84	16.5	5.61	14.9	5.42	15.6	6.97	16.7	6.14	14.6
Mar	1.58	14.2	5.06	13.4	5.31	15.3	6.29	15.1	6.40	15.2
Apr	1.15	10.3	2.94	7.8	2.69	7.8	4.69	11.2	4.12	9.8
May	0.45	4.0	1.19	3.2	0.95	2.7	1.46	3.5	1.91	4.5
Jun	0.08	0.7	0.51	1.4	0.40	1.2	0.80	1.9	0.61	1.4
Jul	0.02	0.2	0.27	0.7	0.26	0.7	0.18	0.4	0.16	0.4
Aug	0.07	0.6	0.22	0.6	0.12	0.3	0.13	0.3	0.21	0.5
Sep	0.21	1.9	0.72	1.9	0.62	1.8	0.44	1.0	0.74	1.8
TOTAL	11.15	100.0	37.68	100.0	34.72	100.0	41.77	100.0	42.15	100.0

c. Snow. Snow cover below 5,000 feet is generally transient and may accumulate and melt a number of times during the winter season. Above 5,000 feet, the snow generally accumulates until March when the melt season begins. Snowpack data for 1969, 1975, and 1977 representing wet, normal, and dry years is shown below:

TABLE 4-05

1 APRIL SNOW PACK DATA FOR 1969, 1975 AND 1977

Index #	Snow Course:	Elev. in ft.:	Record Began	Depth in Inches 1969	Depth in Inches 1975	Depth in Inches 1977	Water Content in Inches Ave. 1/	Water Content in Inches 1969	Water Content in Inches 1975	Water Content in Inches 1977
247	Quaking Aspen	7,000	1937	97.5	48.5	1.3	13.9	44.7	17.7	0.5
248	Old Enterprise Mill	6600	1937	95.8	52.6	1.6	16.9	44.4	20.8	0.5
244	Hockett Mdw.	8500	1930	144.2	107.4	20.3	28.8	71.6	31.6	6.5
264	Quinn Ranger Station	8350	1930	128.1	68.2	4.6	20.4	59.6	22.3	2.0

1/ Average for 1931-1981 period.

d. Evaporation. Monthly evaporation rates are shown below:

TABLE 4-06
HISTORICAL MONTHLY EVAPORATION
SUCCESS LAKE

Month	Mean Evaporation (in.) 1/	Standard Deviation (in.)
January	1.1	.28
February	1.5	.29
March	2.7	.51
April	4.3	.91
May	6.6	.78
June	8.2	.80
July	10.4	.76
August	10.0	1.11
September	7.9	.94
October	5.6	.91
November	2.6	.68
December	1.2	.37
Total	62.1	

1/ Average for 1960-1981 period.

e. Wind. The average monthly wind movement at Success Lake is shown below:

TABLE 4-07

HISTORICAL MONTHLY WIND MOVEMENT
SUCCESS LAKE

Month	Mean Wind Movement (miles) 1/	Standard Deviation (miles)
January	961	236
February	963	264
March	1,095	291
April	1,082	267
May	1,154	259
June	1,186	253
July	1,207	224
August	1,148	269
September	1,052	266
October	1,010	313
November	917	244
December	949	263
Total	12,724	

1/ Average for 1964-1981 period.

4-06. Storms and Floods. Flood flows on Tule River are of two types, winter rain floods and spring snowmelt floods. The winter-type floods are characterized by sharp high peaks and small volumes and are usually of short duration, seldom lasting more than four days. These winter floods normally occur during the period November through March and are caused by intense rains sometimes augmented by snowmelt at the lower elevations. The largest rain flood of record on Tule River at Success Dam was that of December 1966. Flows during the 6 largest rain floods of record follow:

TABLE 4-08
MAXIMUM INFLOW TO SUCCESS LAKE

Date of Peak	Peak (Average Flow in c.f.s)	Peak 1-Day	Peak 3-Day	Peak 7-Day	Peak 15-Day	Peak 30-Day
6 Dec 1966	76,900	40,000	18,300	8,700	4,300	2,300
19 Nov 1950	28,000*	15,500*	8,100*	3,700*	2,100*	1,100*
23 Dec 1955	27,000	13,600	6,100	3,300	1,800	1,000
25 Jan 1969	24,000	12,900	7,400	4,600	3,300	2,100
9 Mar 1943	21,000*	14,200*	8,600*	4,400*	3,700*	2,700*
3 Jan 1980	17,000	8,700	7,200	4,100	2,300	1,600

*Determined by correlation with Tule River near Porterville.

Flows during the 5 largest snowmelt floods of record follow:

TABLE 4-09

MAXIMUM INFLOW TO SUCCESS LAKE DURING SNOWMELT SEASON

Water Year	1-Day	15-Day	30-Day	60-Day	90-Day	120-Day
	(Average Flow in c.f.s.)					
1906	3,560*	2,100*	1,920*	1,700*	1,690*	1,330*
1969	1,560	1,270	1,220	1,200	1,000	830
1938	1,650*	1,160*	1,140*	1,050*	1,040*	800*
1909	1,270*	1,180*	1,120*	1,020*	1,000*	780*
1967	1,740	1,250	1,080	980	840	690

*Determined by correlation with Tule River near Porterville.

4-07. Runoff Characteristics. Stream gage locations are shown on plate 8, a stream profile is shown on plate 10 and historical unimpaired flow below Success Dam is shown on plate 13. The flows on plate 13 from 1904 through 1953 have been estimated based on upstream gages. Runoff data at 3 of the upstream gages follows:

TABLE 4-10

RECORDED RUNOFF DATA

	Tule River near Porterville	Tule River near Springville	SF Tule River
Period of Record	1901-1960	1958-Present	1930-1954; 1956-Present
Drainage area sq. mi.	261	247	109
Instantaneous flow, c.f.s.			
Maximum	25,500 (Nov 1950)	49,600 (Dec 1966)	14,300 (Dec 1966)
Minimum	0 (More than 1 Year)	0 (More than 1 Year)	0 (More than 1 Year)
Mean daily flow, c.f.s.	138	292	42
Instantaneous flow, c.s.m.			
Maximum	97.7	202	131
Minimum	0	0	0
Mean daily flow, c.s.m.	0.53	1.18	0.39
Annual flow, acre-feet			
Maximum	340,000 (1905-06)	366,200 (1967-69)	122,000 (1968-69)
Minimum	13,900 (1930-31)	12,870 (1976-77)	2,330 (1976-77)
Mean	101,400	106,700	29,900
Annual flow, inches			
Maximum	24.4	27.80	21.0
Minimum	1.0	0.98	0.40
Mean	7.28	8.10	5.14
April-July flow, acre-feet			
Maximum	192,300 (1906)	169,100 (1969)	48,500 (1969)
Minimum	2,090 (1934)	4,060 (1977)	448 (1977)
Mean	50,000	49,000	14,000
April-July flow, inches			
Maximum	13.8	12.84	8.34
Minimum	0.15	0.31	0.08
Mean	3.59	3.72	2.41

The seasonal variation in runoff is illustrated by the following table:

TABLE 4-11

MEAN MONTHLY RUNOFF INTO SUCCESS LAKE

Month	Volume (1,000 acre-feet) 1/	Percent
Oct	1.3	.01
Nov	3.5	.03
Dec	9.1	.07
Jan	15.6	.11
Feb	18.2	.13
Mar	24.4	.18
Apr	25.3	.18
May	23.4	.17
Jun	11.4	.08
Jul	3.3	.02
Aug	1.1	.01
Sep	.8	.01
Total	137.4	100.0

1/ Average for 1904-1980 period.

4-08. Water Quality. The quality of Success Lake water, its inflow, and its outflow are checked bi-annually in April and August. A probe is used for on-site determination of temperature (T), dissolved oxygen (D.O.), pH, and electrical conductivity (EC). Nutrient, algae, salt, heavy metal, and pesticide levels are determined from samples in a laboratory. A sample measurement follows:

TABLE 4-12
WATER QUALITY OF TULE RIVER - APRIL 16, 1974

Location	Inflow	Lake	Outflow
Flow (c.f.s.)	289		303
TC (°F)	62	59	54.4
E.C. (p.p.m.)	142	120	166
D.O. (p.p.m.)	8.5	8.7	10.1
p^H	7.8	8.4	7.3

In general, the project water quality is good to excellent relative to its beneficial uses. They have been determined by the State of California to be:

TABLE 4-13

BENEFICIAL USES OF TULE RIVER WATER

Success Lake	Downstream
Recreation	Recreation
Warm freshwater habitat	Warm freshwater habitat
Wildlife habitat	Wildlife habitat
Freshwater replenishment	Groundwater recharge
	Municipal and domestic supply
	Agricultural supply
	Industrial service supply
	Industrial process supply

4-09. Channel and Floodway Characteristics. Channel capacities below Success Dam are shown on plate A-7. Immediately below the project the channel passes through relatively sparsely populated rolling hills for about 5 miles before reaching Porterville. This reach can pass about 10,000 c.f.s. to below Porterville before agricultural damages occur and about 16,000 c.f.s. before damage occurs to urban property. Porter Slough takes off from the Tule River just above Porterville and passes through the Porterville business district. Its capacity is about 180 c.f.s. and diversions to it are controlled by a concrete structure.

Below Porterville the Tule River flood plain is mainly agricultural and the channel capacity decreases in this area. About 22 miles downstream from Porterville, Elk Bayou enters the Tule River and may contribute Kaweah River water. Tule River flow essentially enters Tulare Lakebed at Turnbull Weir where any remaining flow must be diverted into Lakeland Canal or it will enter the lakebed.

Since the Tule River has no outlet to the ocean, any releases above irrigation and spreading capability may be damaging below Turnbull Weir. In the spring and summer months, irrigation and spreading demand may reach approximately 1,500 c.f.s.: 1,000 c.f.s. diverted and 500 c.f.s. spread within the channel. During the rainflood season, under optimum conditions, the diversion capability may reach 500 c.f.s. and in channel spreading capability another 500 c.f.s. for a total of 1,000 c.f.s. above Turnbull Weir. At Turnbull Weir, up to 300 c.f.s. can be diverted into the Lakeland Canal depending on canal inflow from Elk Bayou (Kaweah River distributary) and other sources and the conditions at the canal's terminus. Channel improvements are in progress to increase Lakeland Canal to 550 c.f.s. by 1984.

In the past, releases of 3,200 c.f.s. (the maximum project design release) have caused damage to agricultural areas. In December 1966 a combined spill and release of 9,050 c.f.s. caused considerable agricultural damage but very little damage to urban property.

4-10. Upstream Structures. There are two powerhouses above Success Lake: Tule Powerhouse owned by P.G.&E. on the North Fork of Middle Fork Tule River and Tule Powerhouse owned by S.C.E. on Middle Fork Tule River. Larson Dam wit 325 acre-feet of storage is located on a tributary to the South Fork Tule River and a diversion to South Tule Ditch is located on the South Fork Tule River. None of these projects affect the operation of Success Lake.

4-11. Downstream Structures. Except during large floods, most releases from Success Lake are used for irrigation. There are numerous diversion structures downstream for this purpose. Their locations are shown on plate A-7. The structure at the head of Porter Slough just above Porterville is of particular importance since it prevents excessive flow from going into Porter Slough and flooding Porterville.

4-12. Economic Data.

a. Population. Porterville is the only major population center along the Tule River. Its population is approximately 20,000. It is located in Tulare County which has a population of approximately 230,000.

b. Agriculture. Agriculture is the major activity along the Tule River. The crops grown include citrus, grapes, cotton and cattle field crops.

c. Industry. Manufacturing does take place in the vicinity of Porterville. The classes of goods manufactured include electronics, printing, synthetic yarns, womens sportswear, marine controls, disposable diapers, helicopters and machine components.

d. Flood Damages. Rainfloods on the Tule River produce high peak flows which damage improvements within the channel and adjacent areas while the volume exceeding irrigation and spreading capabilities goes on to Tulare Lake to pond on cropland. Prior to construction of Success Lake, rainfloods frequently caused extensive soil erosion, damaged farm equipment and structures, silted in irrigation canals, washed out diversion structures and washed out reaches of highways. The December 1950 flood, which reached a peak of approximately 28,000 c.f.s. at the Success Dam site, extensively damaged agricultural and industrial areas and caused relatively shallow flooding in a small portion of Porterville. The December 1955 flood, which peaked out at approximately 25,000 c.f.s. at the damsite, caused extensive damage but did not flood Porterville or its suburbs.

Snowmelt floods have much lower peak flows than rainfloods but larger volumes. Tule River snowmelt flood flows combined with runoff from adjacent basins flood large areas in Tulare Lakebed for long periods of time, more than a year in some cases.

A number of large floods have occurred since the project was built, the December 1966 flood with a peak inflow to Success Lake of 76,900 c.f.s. being the largest of record. Its combined spill and release reached 9,050 c.f.s. This flow damaged agricultural areas along the Tule River and in Tulare Lakebed but did relatively little damage to urban areas. The estimated damages prevented by Success Lake during 4 major floods follow:

TABLE 4-14
ESTIMATED DAMAGES PREVENTED BY SUCCESS LAKE

Water Year	Damages Prevented ($1,000)	
	During Rainfloods	During Snowmelt Floods
1967	10,400	1,280
1969	5,300	2,100
1978	5,490	380
1980	7,600	1,500

V - DATA COLLECTION AND COMMUNICATIONS NETWORKS

5-01. Hydrometeorological Stations. Hydrometeorological information at Success Lake and elsewhere within the Tule River basin is monitored through the Hydrologic Automatic Data Acquisition (HADA) system. The Success Lake project office subcentral station automatically stores precipitation reports from 4 gages, Hossack (Hossack also transmits temperature data), Eagle Creek, Rogers Camp and Mountain Home by radio. It also automatically stores project release data and reservoir stages. Temperature, wind, evaporation and precipitation data at the project is entered into the subcentral station memory manually with thumb wheels. This data is transmitted to the central station (HADA central) in the Sacramento District Reservoir Control Section office. Normally, the precipitation gages automatically report every 6 hours, however, the system is set to make interim reports when .3 inches or more of precipitation falls since the last report.

The facilities at the project include the following:

a. A float operated digital recording pool gage in the dam capable of recording pool levels up to the spillway design pool level, supplemented by a permanent staff gage in the reservoir.

b. Two float operated digital recording outflow stream gages with selsyn operated data transmission just below the dam. One of these gages is on Tule River and the other is on Pioneer Ditch. Both are supplemented with visual staff gages.

c. Recording inflow stations on Tule River near Springville and on South Fork Tule River near Success above the reservoir.

d. A weather station at the dam.

The weather station at the dam consists of:

a. Recording and non-recording precipitation gages.

b. A wind station recording both direction and velocity.

c. A weather bureau Class-A evaporation pan with anemometer.

d. A recording hygrothermograph with maximum and minimum thermometers.

Climatological station locations and descriptions are shown on plate 12 and stream gage locations and descriptions are shown on plate 8.

5-02. Water Quality Stations. Project water quality and the techniques used to monitor it are discussed in paragraph 4-08. The locations and descriptions of water quality stations are shown on plate 8.

5-03. Sediment Stations. The sedimentation range locations are shown on plate 11. Reservoir sedimentation is discussed in paragraph 4-04.

5-04. Recording Hydrologic Data. Records of storage, inflow, outflow and evaporation at Success Lake are kept at the Corps of Engineers District Office

in Sacramento. Outflows and storages for the project are published by the U.S. Geological Survey from the Corps record. Extensive hydrologic data pertinent to irrigation is published by the Tule River Association.

5-05. Communication Network. Voice communication between the Sacramento Office and the project office is either by radio or telephone and the radios in both offices have backup power from batteries and standby generators.

The central station of the Hydrologic Automatic Data Acquisition system (HADA) in Sacramento can interrogate the subcentral stations of the projects by radio or telephone. The central and subcentral stations have backup power from batteries and standby generators.

The precipitation and stream gaging stations above the project report to the subcentral station by radio only and the reservoir stage and outflow gages are hard wired to the HADA system.

5-06. Communication with Project. Communication requirements between the project office and the Reservoir Control Section are discussed in exhibit A.

5-07. Project Reporting Instructions. Reporting instructions are discussed in exhibit A.

5-08. Warnings. Warnings are discussed in exhibit A.

VI - HYDROLOGIC FORECASTS

6-01. General. Since reliable long-term rainflood forecasts are not available, the rainflood space must be kept available throughout the rainflood season in anticipation of a large unforecasted rainflood. Short-term precipitation forecasts are available and are mainly useful for anticipating release changes due to increased inflow or a change in downstream conditions.

Most of the central valley in California is relatively unique in that general rainfloods during the late spring and summer are extremely rare. Therefore, runoff into the reservoirs can be fairly accurately predicted during the spring and summer based on the snowpack in the mountains. This allows the space required for flood control to be varied during the snowmelt season based on the forecasted runoff. These snowmelt forecasts are important in optimizing reservoir operation for flood control and conservation.

a. Role of Corps. The Corps of Engineers has no responsibility for furnishing forecasts of flow into or out of Success Lake to the public. However, the Corps does furnish release predictions to the National Weather Service to facilitate their forecasting of river flows. Plate 14 provides data which can be used to forecast inflow due to rain based on precipitation or known inflow.

b. Role of Other Agencies. The National Weather Service provides precipitation and river flow forecast data and the State provides snowmelt forecasts.

6-02. Flood Condition Forecasts. The National Weather Service provides short-term local precipitation forecasts up to 24-hours in advance. The precipitation gages incorporated in the HADA system which report every 6 hours under normal conditions will make interim reports anytime .3 inches of rain has fallen since the last report.

Since the conditional space required for flood control is determined from snowmelt forecasts, they are of primary concern in the operation of Success Lake. The Tule River Watermaster and the Corps of Engineers use snowmelt forecasts made by the California Department of Water Resources. The Department prepares forecasts of April through July runoff into Success Lake as of 1 February, 1 March, 1 April, and 1 May each year. Weekly updates are provided when conditions change appreciably from the last forecast. The forecasts are published about 10 days after the date to which they apply. A summary of forecasted runoff compared to actual runoff is shown on plate 15.

6-03. Conservation Purpose Forecasts. Operation of Success Lake for conservation is generally as requested by the Tule River Watermaster. The total demand for conservation water in Success Lake is largely a function of the forecasted runoff during the snowmelt season. Normal irrigation demand is shown on plate A-8.

6-04. Long-range Forecasts. Other than snowmelt forecasts discussed above, no long-range forecasts are used by the Corps of Engineers for the Tule River basin.

VII - WATER CONTROL PLAN

7-01. General Objectives. Success Reservoir will be operated for flood control and conservation to achieve the following objectives:

a. To restrict flows in downstream channels of Tule River and its distributaries to nondamaging rates.

b. To minimize damaging flows from Tule River into the Tulare Lakebed area.

c. To provide the maximum practicable amount of storage space for conservation of irrigation water without impairment of the flood control functions.

7-02. Major Constraints. Releases greater than irrigation and spreading demand have the potential to pond on valuable cropland in Tulare Lakebed. Tulare Lakebed also receives flood water from a number of other sources. * Therefore, releases from Success Lake should be coordinated with flow from * other sources to the extent possible giving consideration to downstream * storage and diversion capabilities. *

Structures which impede the flow of water over the spillway will not * be permitted. *

7-03. Overall Plan for Water Control. The overall plan for water control is to coordinate releases for flood control with conservation demand to the greatest extent possible. During the rainflood season, when reliable inflow forecasts are not available, the required rainflood space is set for a given date, with minor variations based on downstream irrigation and spreading capability, and antecendent precipitation. During the snowmelt season, the required flood control space is varied based on forecasted inflow and irrigation and spreading demand to satisfy both flood control and conservation objectives. The snowmelt portion of the flood control diagram (plate A-8) is designed to fill the reservoir, if runoff and irrigation demand permit, but not to spill.

Downstream spreading and irrigation capability is essential to allow * non-damaging releases to be made. The design of Success Lake flood control * operation is based on maintaining a 500 c.f.s. irrigation and spreading * capability along the Tule River below the project. *

7-04. Standing Instructions to Dam Operator. The standing instructions to the dam operator are contained in exhibit A.

7-05. Flood Control. In 1986, the Tule River Association agreed on the * following to describe the distribution of water released from flood control * space: "Water stored in schedule 1, 2, or 3 flood control space will be * released in accordance with the schedule that applies to that space. These * criteria are established to ensure the timely release of water from flood * control space in the reservoir and, therefore, such releases shall not be * restricted by the storage and diversion rights under the Tule River * Association agreements. It is understood that, under the Tule River * Association agreements, each TRA unit has the right to supplement any * required flood control releases by additional releases of such unit's Tule *

River Water entitlement and/or water held in Success Lake storage for the account of such unit, as may be desired from time to time for beneficial use by such unit."* A detailed explanation of flood control operation, including emergencies, is contained in exhibit A and on plate A-8. An explanation of the allocation of reservoir space is contained in paragraph 3-05, "Modification to Regulations". Specific information concerning forecasts and channel and floodway characteristics is found under those headings.

7.06. Recreation. On 2 November 1965, the Tule River Association entered into an agreement with the County of Tulare (Tulare County Agreement No. 1915) for the purpose of providing a minimum pool for recreational use. This agreement was terminated on 16 October 1987 and the parties are presently negotiating a new agreement.

7.07. Water Quality. Success Lake is not operated for water quality. Water quality measurements and the quality of water within the Lake are discussed in paragraph 4-08, "Water Quality."

7-08. Fish and Wildlife. Success Lake supports one of the best bass fisheries in the San Joaquin Basin. In addition, approximately 1,400 acres on the northeast side of Success Lake have been set aside as a wildlife management area. About half of the acreage is above gross pool elevation. The area is characterized by alternating rows of bush, cereal grains, and fallow strips. The area is managed to increase the variety and numbers of upland game species as well as non-game animals. The area was developed with the assistance and cooperation of the California Department of Fish and Game, Southern Tulare Sportsmen's Association, Tulare County Audubon Society, California Department of Forestry, Tulare County Fine Commission, and Tulare County Parks and Recreation Department.

7.09. Water Supply. Space not required for flood control or retention of a minimum pool is operated for conservation. In 1986, the Tule River Association agreed on the following to describe the distribution of water stored in conservation space: "Water stored in conservation space may be released by Tule River water users in accordance with their respective entitlements under the agreements among such water users."

User contract No. 14-06-200-2110A between the United States and the downstream water users provides for the operation and maintenance of irrigation space.

7-10. Hydroelectric Power. There are no facilities for hydroelectric power generation at this time, however, the Lower Tule River Irrigation District representing the Tule River Association has an approved application from F.E.R.C. for generating power at the project.

7-11. Navigation. No portion of the Tule River is considered navigable.

7-12. Drought Contingency Plan. During droughts, flood control is not expected to be a principle factor in the operation of Success Lake. Conservation water and conservation space is managed by local interests in accordance with contacts between the various irrigation interests. As part of the drought contingency plan, Schedule 1 releases may be deferred temporarily in anticipation of a dry water year during the period 11 November through 27 March. The amount of encroachment at anytime is dependent on the basin

wetness parameter as discussed in paragraph 3f in exhibit A. During droughts, the Tule River Watermaster and the various groups he represents can be expected to conserve water to the best of their ability. Any information that the Corps of Engineers may have that would be beneficial to drought operation will be passed on to the Tule River Watermaster. In extreme cases, it may be desirable to pump water from the sediment pool below the outlet invert. It should be noted that project toilets, showers, and sink fixtures are low flow or microflow types.

7-13. Deviation from Normal Operation. Deviations from normal operation are discussed in exhibit A.

7-14. Rate of Release Change. Release changes should not be made without notifying the Tule River Watermaster or his representative. There are numerous irrigation structures downstream from the dam which may require adjustments prior to any release change. In addition, during periods of high releases, the Tule River channel must be patrolled for debris removal and to assure the proper functioning of flood control works. These downstream activities are coordinated through the Tule River Watermaster.

Generally, the rate at which flows will be changed will be based on prevailing downstream conditions. In the absence of any downstream constraints, releases from Success Lake should not be increased or decreased by more than 1,000 c.f.s. per hour.

VIII - EFFECT OF WATER CONTROL PLAN

8-01. General. Success Lake has decreased the frequency of flooding, increased the water available for irrigation during the irrigation season and increased the recreation opportunities within the Tule River basin. The historical operation of Success Lake is shown graphically on plate 16.

8-02. Flood Control.

a. Spillway Design Flood. The spillway design flood for Success Lake is based on a storm averaging 23.2 inches of precipitation and the equivalent of 4.7 inches of snowmelt over the entire basin resulting in a total runoff of 16.6 inches. The total volume of runoff in 4 days is 347,000 acre-feet. The peak inflow is 200,000 c.f.s. A routing of the spillway design flood is shown on plate 17.

b. Standard Project Rainflood. The standard project rainflood shown in this manual was developed in 1970. The total average precipitation over the basin (20.14 inches) is about the same as that in December 1966 but the freezing level, snowmelt, time distribution and infiltration rates are more severe. The excess (6.12 inches) combined with base flow gives a total main wave volume of 157,000 acre-feet, about 140 percent of the 5-day runoff from 4 through 8 December 1966. A routing of the standard project rainflood is shown on plate 17.

c. Reservoir Design Flood. The reservoir design flood shown in Design Memorandum No. 5 Reservoir Regulation, dated December 1956, was considered to be a 100-year flood and was controlled to 3,200 c.f.s. below Success Dam. It was concluded that the project provided 100-year protection to agricultural areas since at that time 3,200 c.f.s. was considered non-damaging. Its 4-day volume is about 95,000 acre-feet which is about a 50-year event on the current frequency curves for unregulated rainflows below Success Dam shown on plate 19. In addition, the design flood is a 4-day flood series whereas routings show that, due to limited release schedules at low pool elevations, a longer duration series is critical at Success Lake. Success Lake was considered to provide standard project flood protection to Porterville. However, the SPF shown in D.M. No. 5 was exceeded in December 1966 and a new one was developed in 1970. Routings using 30-day rainflood series based on the frequency curves for unregulated rainflows below Success Dam indicate that Success Lake will fill to the spillway or above an average of once every 30 years, spill 3,200 c.f.s. or more once every 40 years and exceed the channel capacity through Porterville about once every 100 years. These routings were made assuming that on the average 80 percent of the scheduled releases shown on plate A-8 would be achieved. Routings of the reservoir design flood and 100-year flood are shown on plate 17.

d. Snowmelt floods. Releases required to control snowmelt floods are not expected to exceed 3,200 c.f.s. except during exceptionally rare events. Releases exceeding 1,500 c.f.s. (total downstream diversion and spreading capability above Turnbull Weir) can be expected about once every 40 years. Tule River flows below Turnbull Weir may damage Tulare Lakebed depending on their diversion capability. Hypothetical routings of the 1906 and 1969 snowmelt floods using the criteria on plate A-8 are shown on plate 18.

8-03. Recreation. Success Lake supports a fishery and provides opportunities for many other types of recreation. A description of the recreation development is in paragraph 2-06.

8-04. Water Quality. Although the agricultural and recreational activities at the lake and the warming of the ponded water may have some detrimental affect on quality, Success Lake provides water for recreation and irrigation at times when there would otherwise be none and the quality of the water is good to excellent relative to its beneficial uses. The beneficial uses are listed in table 4-12.

8-05. Fish and Wildlife. Success Lake supports an excellent warmwater fishery within the lake. This is a considerable enhancement since natural flow in the Tule River often falls to zero.

8-06. Water Supply. Success Lake provides approximately 25,000 acre-feet of new and redistributed water.

8-07. Hydroelectric Power. There is presently no generation of hydroelectric power at the project. However, there is some potential and the feasibility for power generation is presently being investigated by the Tule River Association.

8-08. Navigation. Success Lake augments Tule River flows, however, very little if any navigation occurs below the dam.

8-09. Frequencies.

a. Peak Flow Probability. The potential for rainfloods below the dam comes from project spills. There is little local flow between the dam and Porterville. Rainflow frequency curves for unregulated and regulated flows at the dam are shown on plate 19. Snowmelt flow frequency curves for unregulated and regulated conditions are shown on plate 20.

The unregulated rainflow frequency curves were based on a two station comparison between the Tule River gage below Success Dam and the Tule River near Porterville gage. The curves were then adjusted on the assumption that the 1 through 15 day flows during the December 1966 flood were the largest in the last 100 years. The curves were also adjusted for expected probability. The plotting positions for the flows below Success Dam were determined by correlation with the flows near Porterville. The period of record for the Tule River near Porterville gage is from 1901 through 1960.

The regulated rainflow frequency curve was drawn graphically. The project releases were plotted based on a period of nineteen years except for the December 1966 peak release which was plotted at the frequency of the 30-day flow for that flood. Hypothetical routings assuming 80 percent channel capacity were used to locate the uncontrolled portion of the curve. A 30-day flood series was used, the frequency of which was determined from the unregulated 30-day frequency curve.

The snowmelt flow means at the Tule River below Success Dam and the Tule River near Porterville gages were close and the correlation coefficients for the flows of various durations at these stations were .99+. So, it was felt that little error would result from estimating the snowmelt flows at Success

through a correlation with the near Porterville gage flows. The snowmelt flow frequency curves were developed by treating the estimated and actual flows below Success Dam as a continuous record. The actual flows below Success Dam were plotted as indicated by the correlation with the gage near Porterville.

The regulated snowmelt flow frequency curve was drawn graphically. The project releases were plotted based on a period of nineteen years except for the 1969 flood which was plotted as the second largest in 78 years. Hypothetical routings were used to locate the upper portion of the curve. The routings were based on the April through July 1969 flow pattern with the volume determined by the 120-day unregulated snowmelt curve. The flood control diagram and irrigation demands shown on plate A-8 were used for the routings.

b. Stage-Duration and Frequency. Stage-duration curves, a stage-frequency curve and seasonal variation of reservoir storage frequency curves are shown on plates 21, 22 and 23.

8-10. Other Studies. The Tule River association is presently investigating the feasibility of generating power with Succes Lake releases.

IX - WATER CONTROL MANAGEMENT

9-01. Responsibilities and Organization.

a. Corps of Engineers. The District Engineer, Sacramento is responsible for:

(1) Prescribing the use of flood control space in Success Lake.

(2) Operation and Maintenance of Success Lake.

(3) Advising local interests and the Division Engineer of any substantial deviation from the flood control regulations.

(4) Preparing monthly operation and other reports required by the Division Engineer.

(5) Estimating the water users share of maintenance and operation costs.

Corps personnel under supervision of Construction-Operations Division, Sacramento District, operate Success Lake with instructions on all matters pertaining to flood control operation received directly from the Reservoir Control Section. The duties of the reservoir operators and the Reservoir Control Section are discussed in detail in Exhibit A.

b. Bureau of Reclamation. The Bureau acts as the agent for the United States in the execution of the repayment contract (14-06-200-2110A).

c. California Department of Fish and Game. They enforce fish and game laws on the lake and within the wildlife areas. They also plant fish in the lake.

d. California Division of Forestry. They are responsible for fire fighting on project lands.

e. County of Tulare. They provide normal law enforcement at the project and, through an agreement with the State, patrol the lake by boat. During periods of peak visitation, they provide additional law enforcement under contract with the Corps. They also supervise and maintain Bartlett Park which is on project land below the dam.

f. Tule River Watermaster. He is appointed by the Tule River Association to act on behalf of downstream water users. He directs the use of space not required for flood control in Success Lake.

9-02. Interagency Coordination.

a. Local Press. Either the Corps of Engineers Public Affairs Office or the Tule River Association are responsible for making local press releases concerning the operation of Success Lake. The Federal-State River Forecast Center furnishes the press with downstream river flow forecasts.

b. National Weather Service. The California Department of Water Resources cooperates with the National Weather Service to develop streamflow forecasts. The Corps of Engineers provides them with forecasts of Success Lake operation.

c. U.S. Geological Survey. The Corps of Engineers makes payments to the U.S.G.S. to maintain 5 gages on the Tule River: Tule River near Springville; South Fork Tule River near Success, California; Success Lake near Success, California; Tule River below Success Dam and Pioneer Ditch below Success Dam. The U.S.G.S. publishes the flows and water quality data (when applicable) at these gages.

d. California Department of Water Resources. The Corps of Engineers furnishes the DWR with precipitation and temperature data from climatological stations it maintains on the Tule River: Hossack, Eagle Creek, Mountain Home, Rogers Camp and Success Dam. The DWR publishes most of this data.

e. Bureau of Reclamation. The Friant Kern Canal which is operated by the Bureau of Reclamation carries diverted water from Millerton Lake on the San Joaquin River to Tulare Lake Basin. The canal diverts San Joaquin River water to the Tule River irrigation network. The operation of the Friant Kern Canal and Success Lake must be coordinated. The coordination of conservation releases is normally the responsibility of the Tule River Watermaster. However, during floods, Corps personnel and Bureau personnel should be aware of how the operation of Success Lake and the Friant Kern Canal will impact the Tule River.

f. Tule River. All releases from Success Lake must be coordinated with Tule River Watermaster since he has first hand knowledge of downstream conditions and may have to operate various structures to accommodate a release change.

g. Other Local Agencies. Releases from Success Lake, which are not used for irrigation or spreading may flow to Tulare Lakebed and flood cropland. Therefore, whenever such releases are anticipated, Tulare Lake interests should be notified.

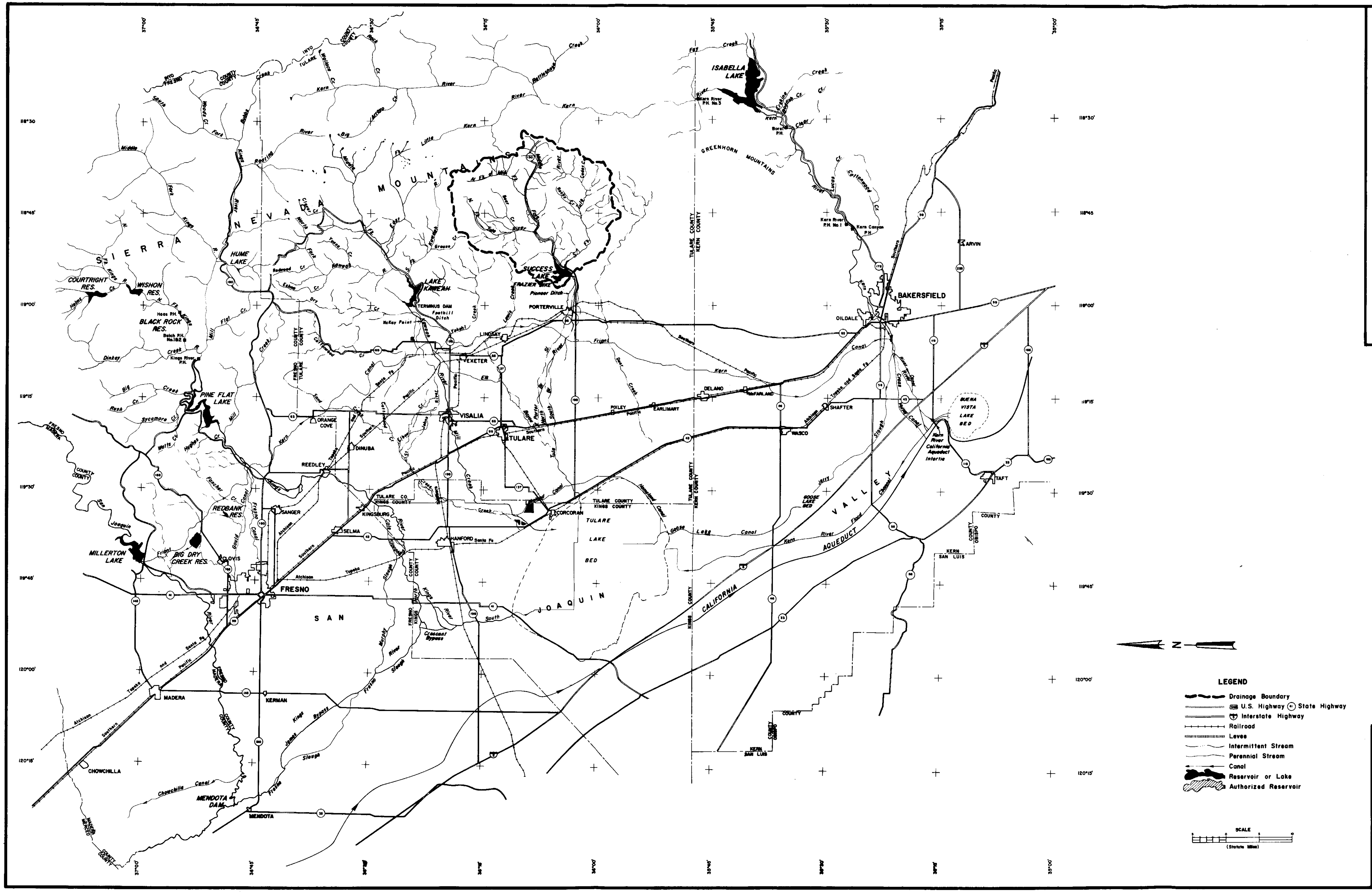
9-03. Coordination with Other Projects Operated by the Corps of Engineers. Pine Flat Lake, Lake Kaweah, and Isabella Lake are all operated by the Corps of Engineers and have the potential to release floodwater to Tulare Lakebed. The flood control operation of these projects must be coordinated with that of Success Lake to take advantage of any opportunity to minimize flood damages.

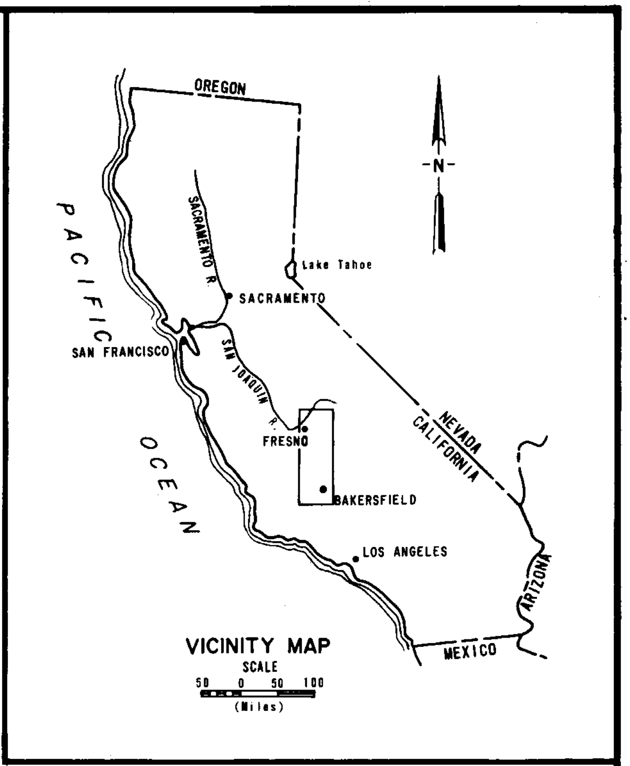
9-04. Interagency Agreements. The division of responsibilities in the Central Valley Basin of California between the Corps of Engineers and the Bureau of Reclamation in respect to water resource project planning, construction and operation activities is spelled out in the Memorandum of Agreement between the Department of The Army and The Department of the Interior on division of responsibilities in the Central Valley Basin, California dated 29 December 1958.

The provisions for payment of project first costs and O&M costs by local interests are set forth in Bureau of Reclamation contract number 14-06-200-2110A.

9-05. Commissions, River Authorities, Compacts and Committees. None.

9-06. Reports. The Tule River Association publishes an annual report listing precipitation, discharge, unit entitlement, storage, and diversion. Other reports required for the operation of Success Lake are discussed in exhibit A.





SUCCESS LAKE
TULE RIVER, CALIFORNIA

GENERAL MAP

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

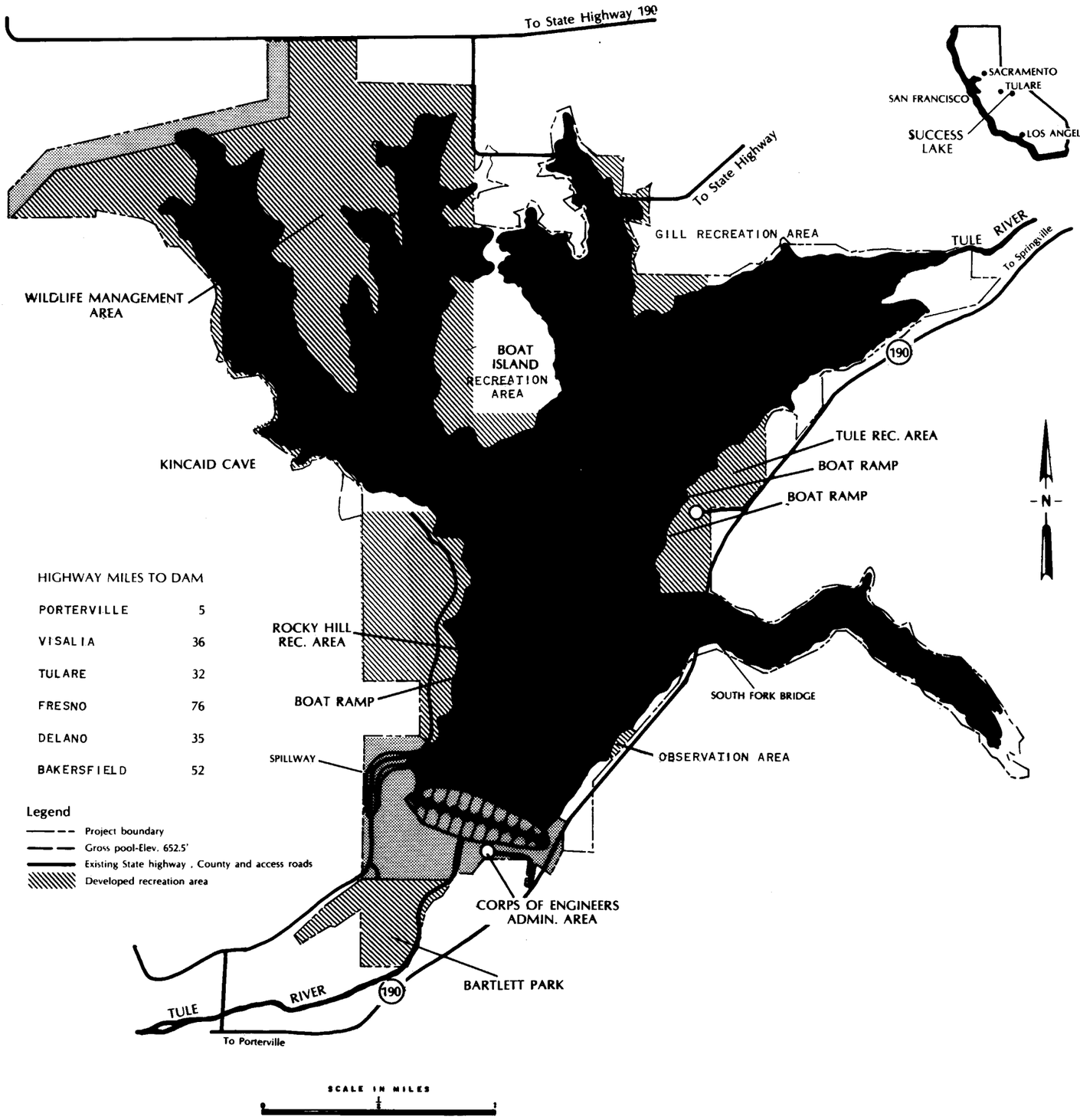
Prepared: L.H.C.
Drawn: L.H.C.

Date: SEPTEMBER 1981

PLATE I

GENERAL SITE PLAN AND RECREATIONAL DEVELOPMENT

NEAR PORTERVILLE IN TULARE COUNTY, CALIFORNIA



HIGHWAY MILES TO DAM	
PORTERVILLE	5
VISALIA	36
TULARE	32
FRESNO	76
DELANO	35
BAKERSFIELD	52

Legend

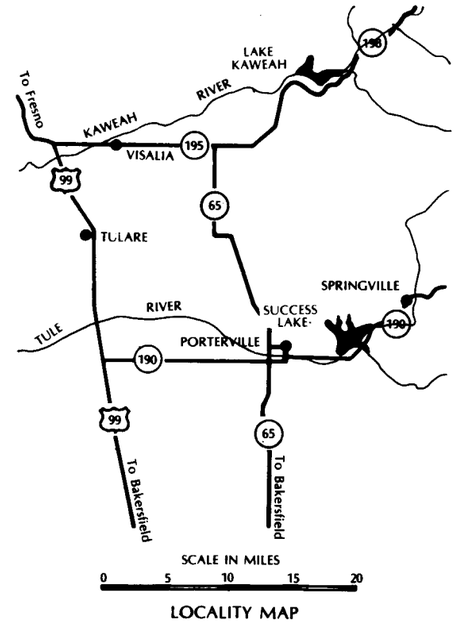
- Project boundary
- Gross pool-Elev. 652.5'
- Existing State highway , County and access roads
- Developed recreation area

SUCCESS LAKE

CAMPING

BOATING & SKIING

GENERAL



LOCALITY MAP

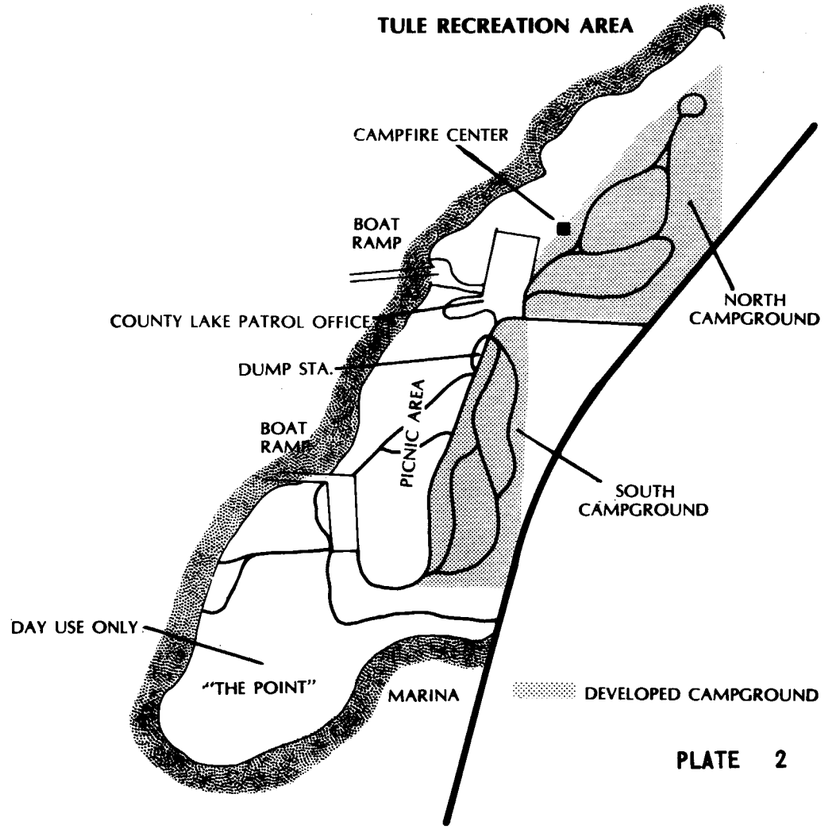
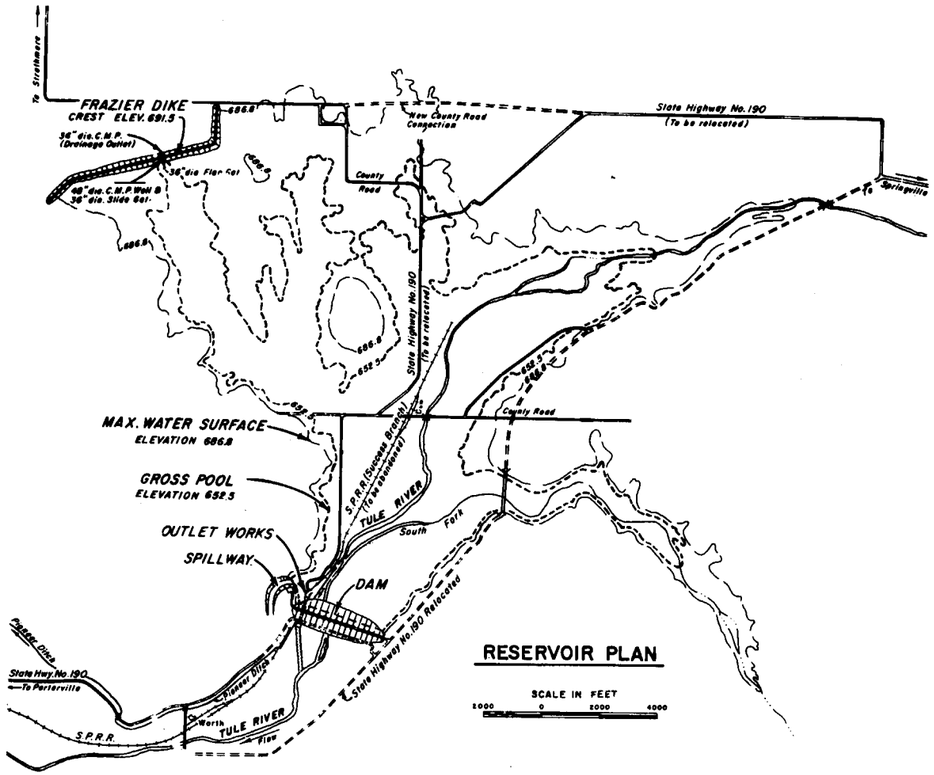


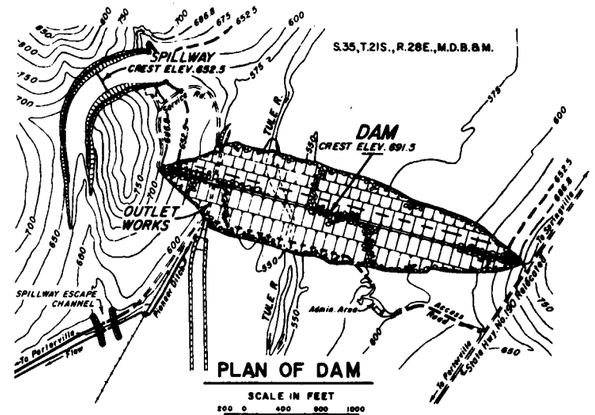
PLATE 2



RESERVOIR PLAN

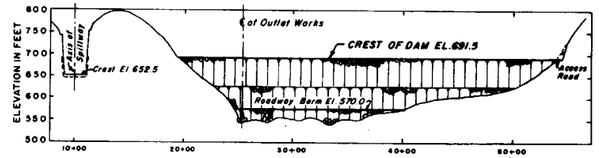
SCALE IN FEET
2000 0 2000 4000

N

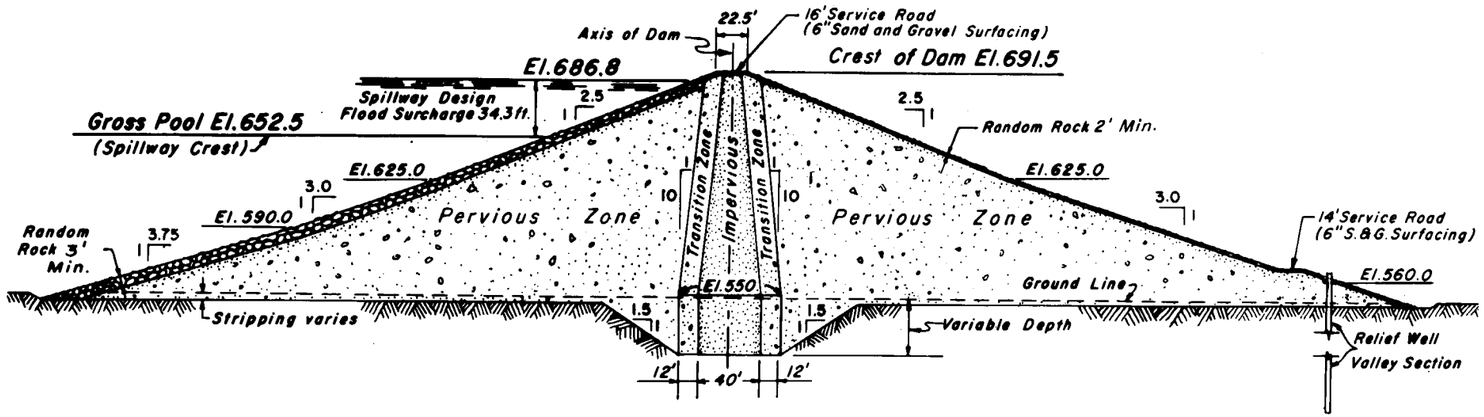


PLAN OF DAM

SCALE IN FEET
200 0 400 800 1000



DEVELOPED DOWNSTREAM ELEVATION



TYPICAL EMBANKMENT SECTION OF DAM

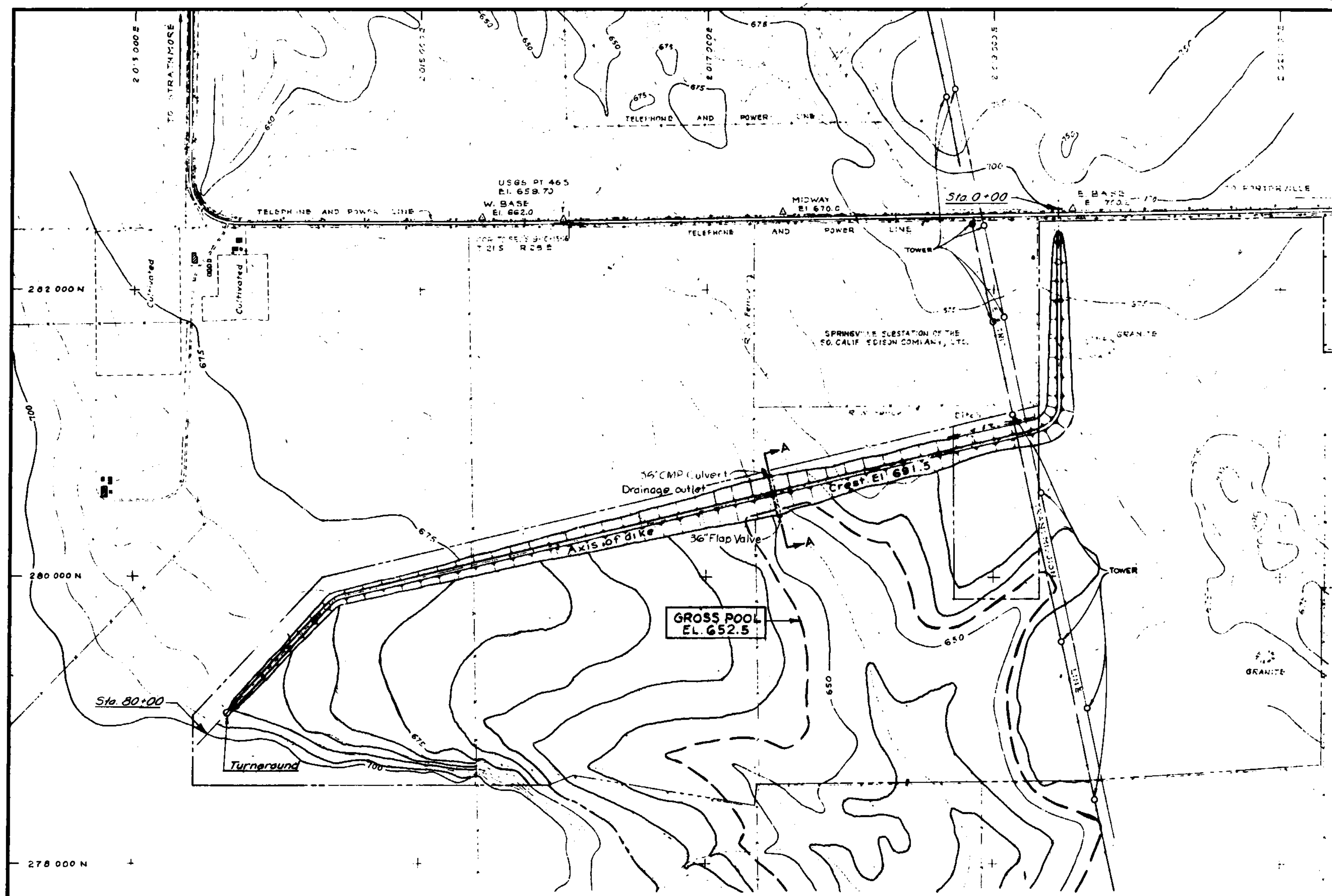
SCALE IN FEET
60 30 0 60 120

SUCCESS LAKE
TULE RIVER, CALIFORNIA

SUCCESS DAM
GENERAL PLAN AND PROFILE

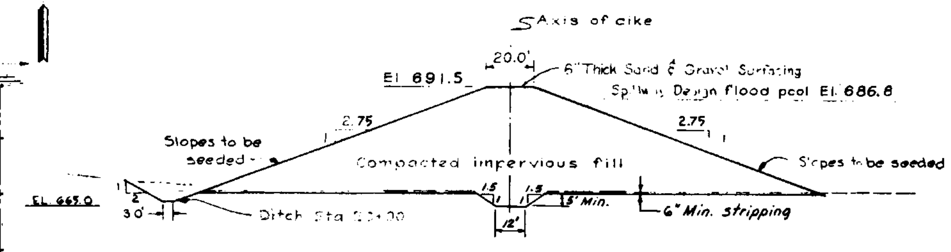
U.S. Army Engineer District Sacramento, California

R.P.L. August 1966



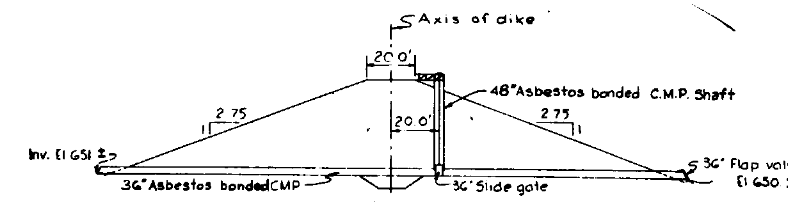
PLAN

SCALE: 1 IN = 400 FT



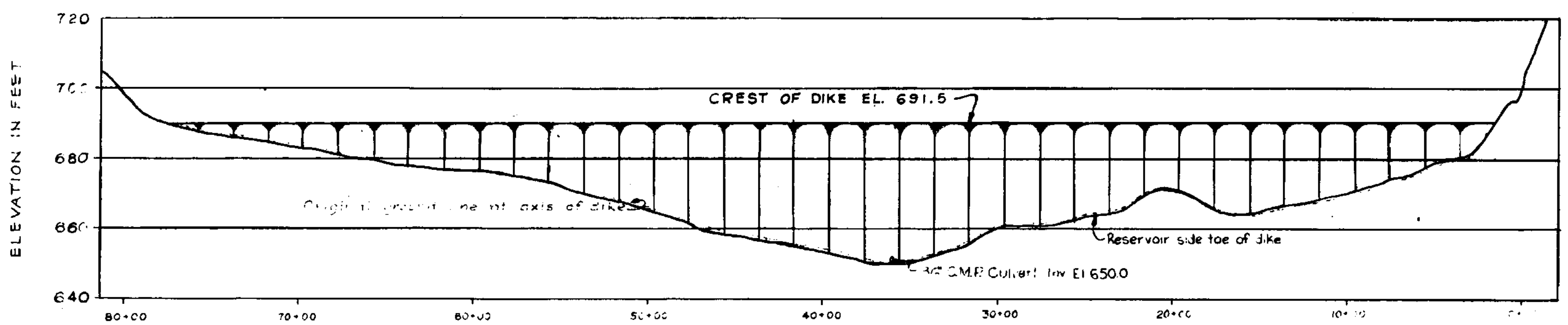
TYPICAL SECTION OF DIKE

SCALE: 1 IN = 30 FT



SECTION A-A

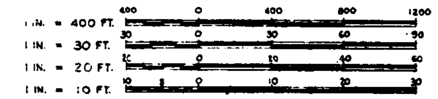
SCALE: 1 IN = 30 FT



DEVELOPED RESERVOIR SIDE ELEVATION

SCALES: VERT. 1 IN = 20 FT
HORIZ. 1 IN = 400 FT

GRAPHIC SCALES



NOTES:

Datum is mean sea level (1929 adj)
Contour interval 5 ft.
California State Coordinate System, Zone 4

LEGEND

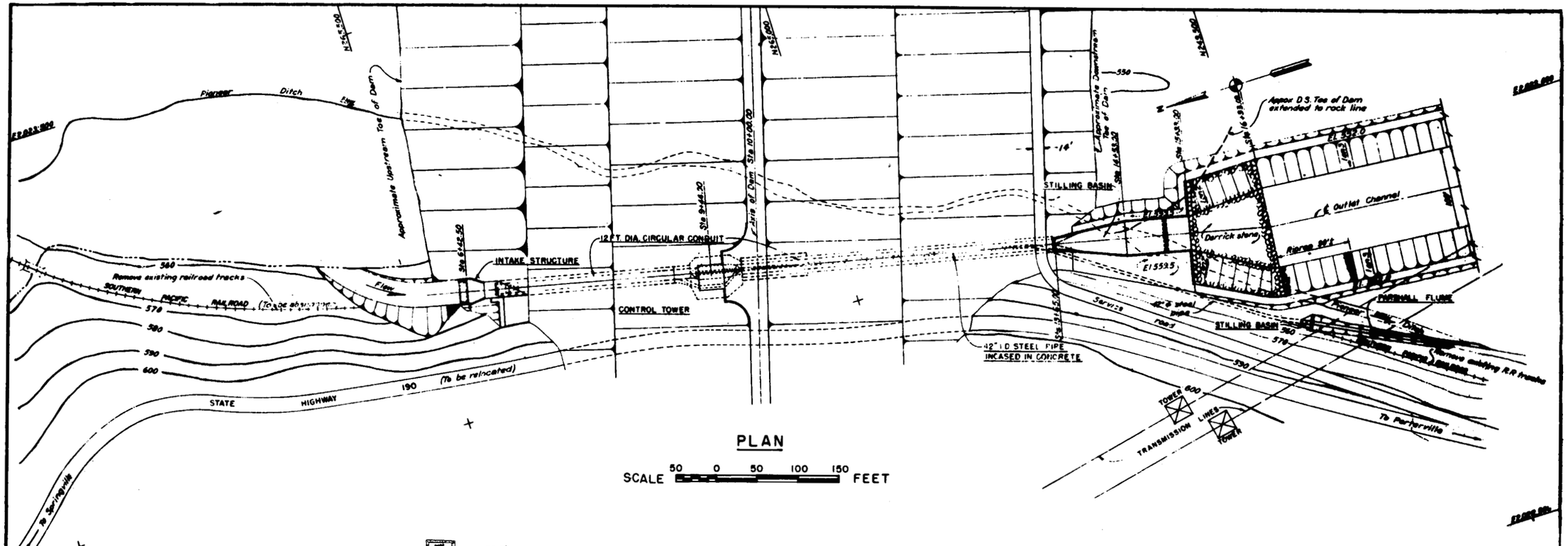
——·——·—— Real Estate Acquisition Line
——·——·—— Property Line

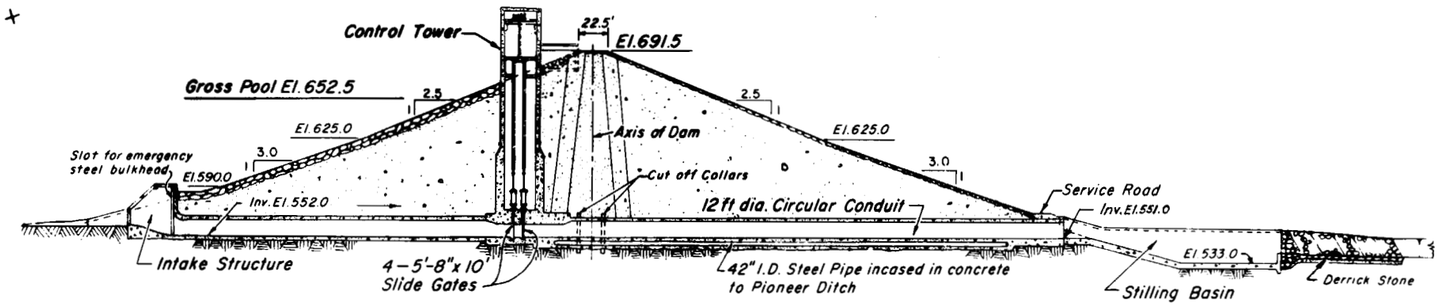
SUCCESS LAKE
TULE RIVER, CALIFORNIA

FRAZIER DIKE
GENERAL PLAN, PROFILE AND SECTION

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

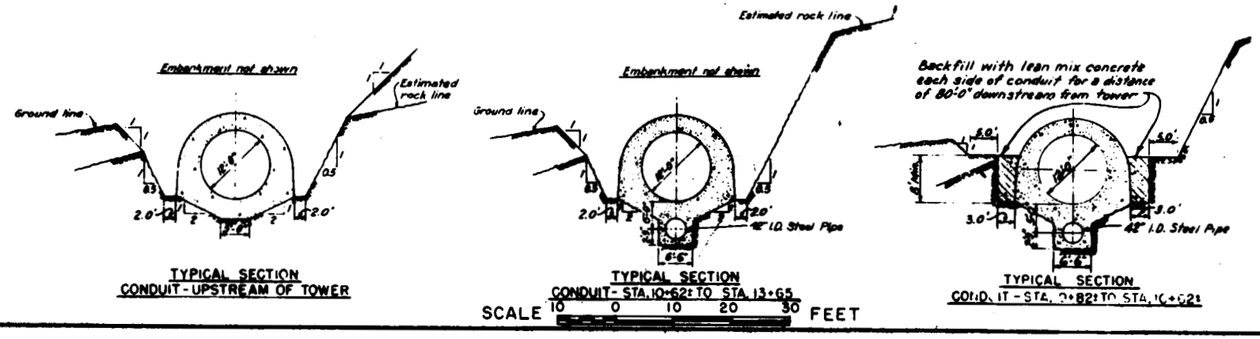
Prepared: Date: JULY 1956





PROFILE ALONG ℄ OF OUTLET WORKS

SCALE IN FEET 50 0 50 100 150



GENERAL NOTES

1. Datum is Mean Sea Level, 1929 Adjustment. California State Coordinate System, Zone 4.

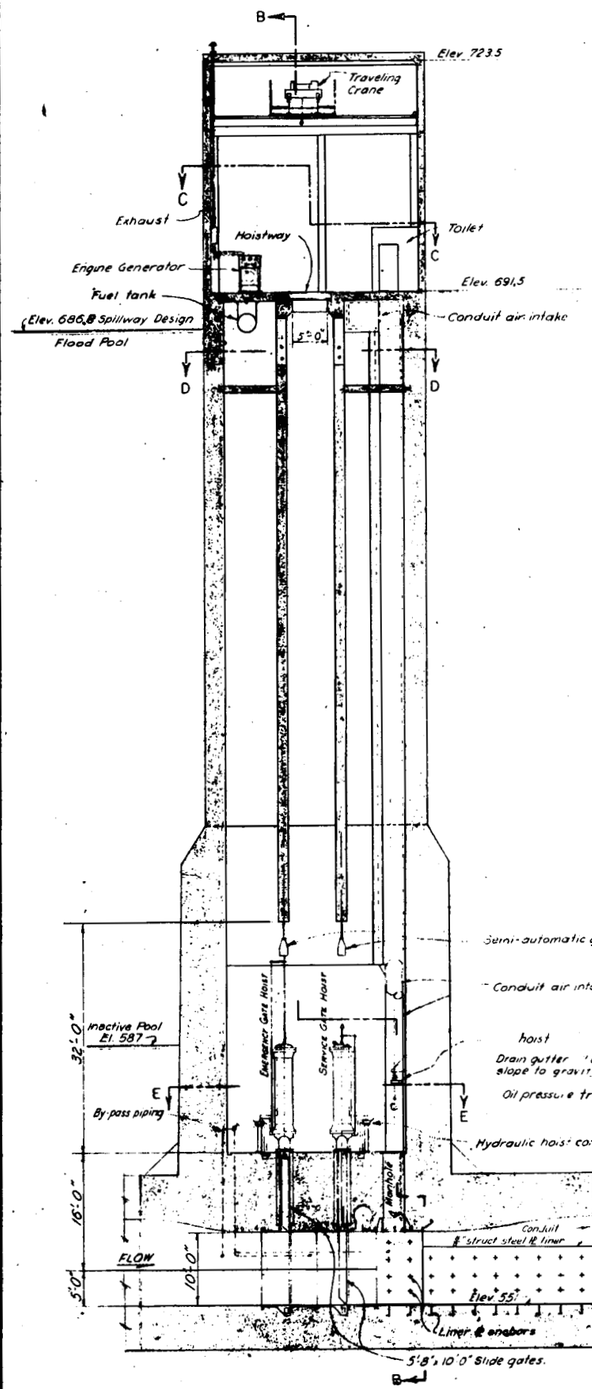
SUCCESS LAKE
TULE RIVER, CALIFORNIA

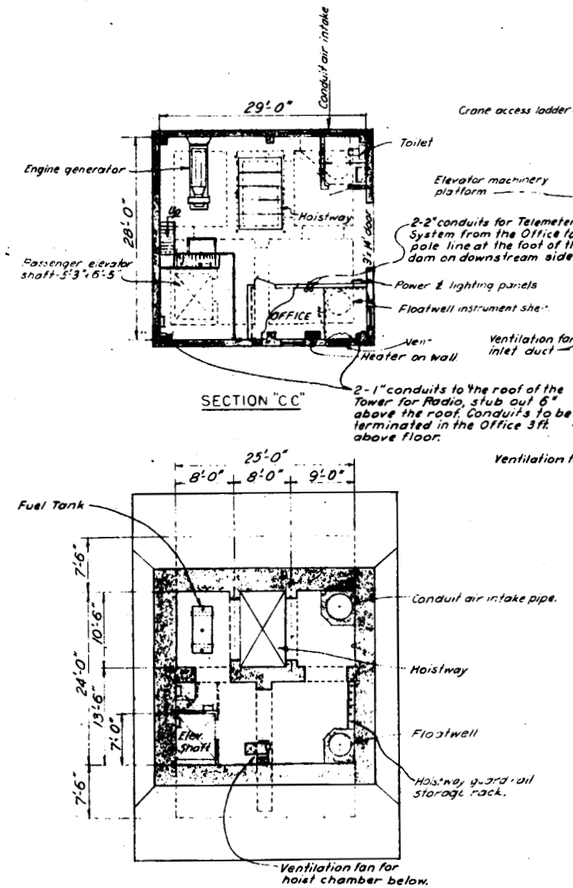
SUCCESS DAM
OUTLET WORKS
PLAN, PROFILE AND SECTIONS

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

R.P.L. May 1961

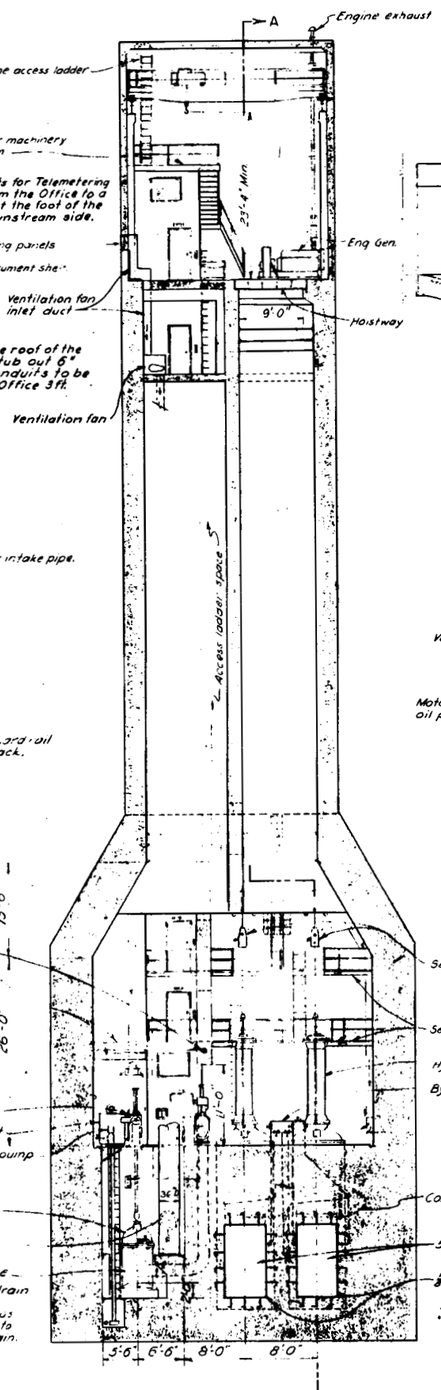
PLATE 5

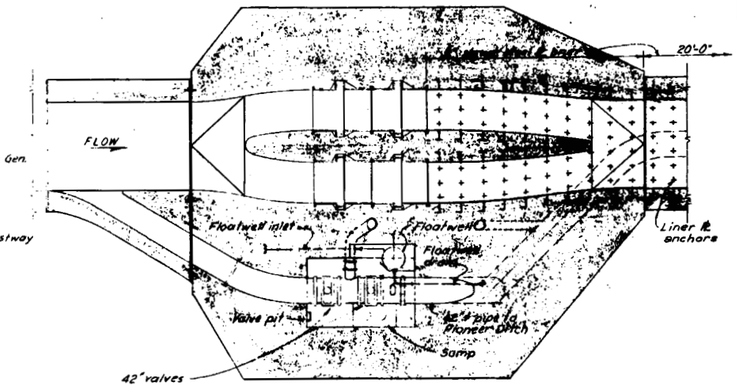




SECTION "C C"

SECTION "D D"





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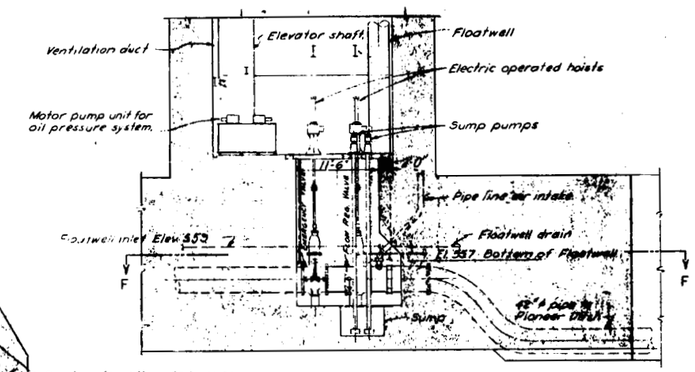
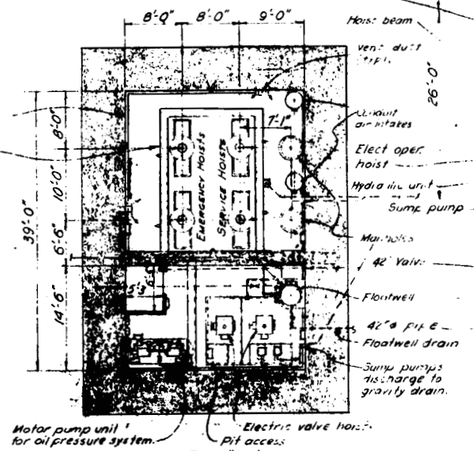


SECTION THRU VALVE PIT

SECTION "A A"



SECTION "E E"

SECTION "B B"

GRAPHIC SCALES

0 5' 10' 15' 20' 25' 30' 35' 40' 45'

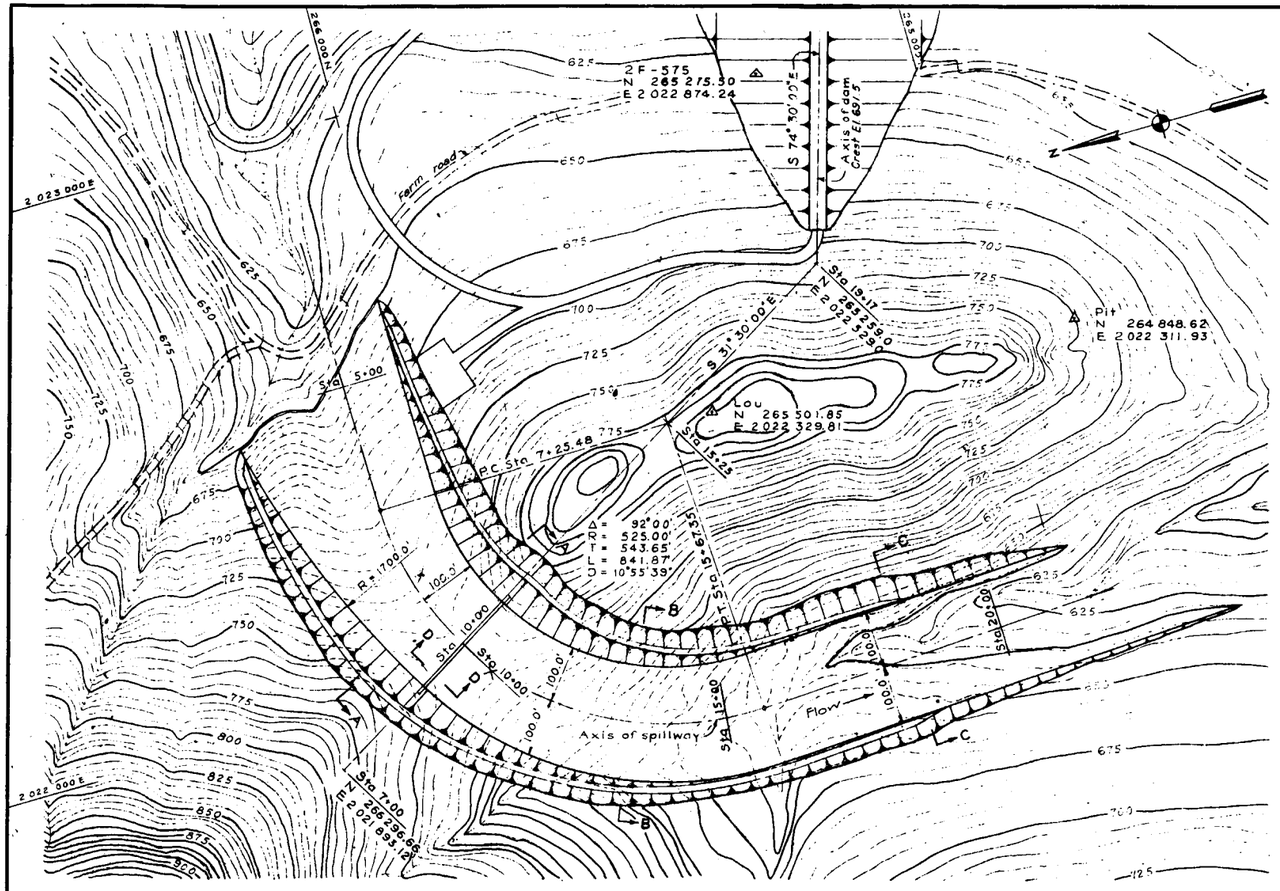
SUCCESS LAKE
TULE RIVER, CALIFORNIA

SUCCESS DAM
OUTLET WORKS AND CONTROL TOWER

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

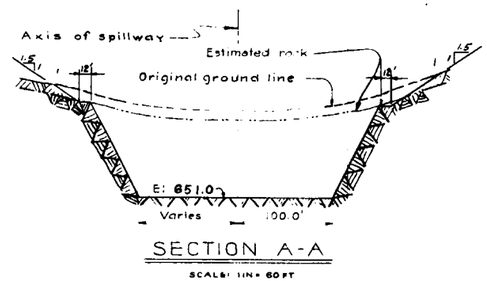
Prepared: C.R.J. Date: JULY 1956

PLATE 6



PLAN

SCALE: 1 IN = 100 FT



SECTION A-A

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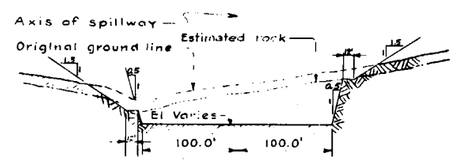

SECTION B-B

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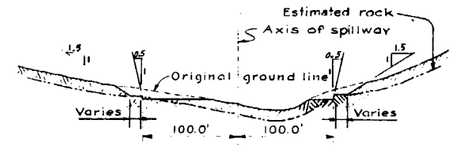

SECTION C-C

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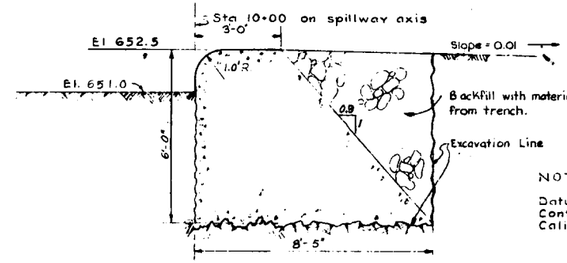
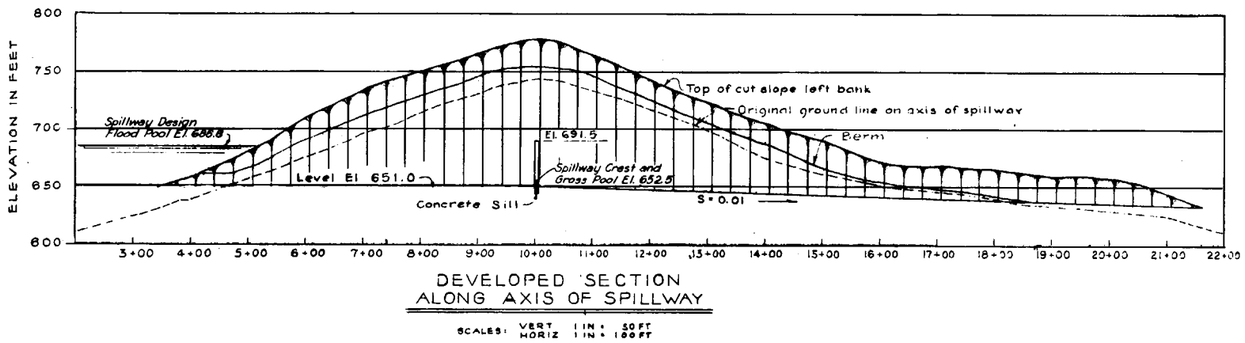


SECTION D-D

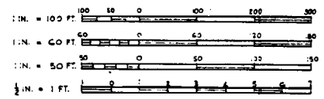
SCALE: ½ IN = 1 FT



DEVELOPED SECTION
ALONG AXIS OF SPILLWAY

SCALES: VERT 1 IN = 50 FT
HORIZ 1 IN = 100 FT

GRAPHIC SCALES



NOTES:

Datum is mean sea level (1929 adj)
Contour interval 5 ft.
California State Coordinate System, Zone 4

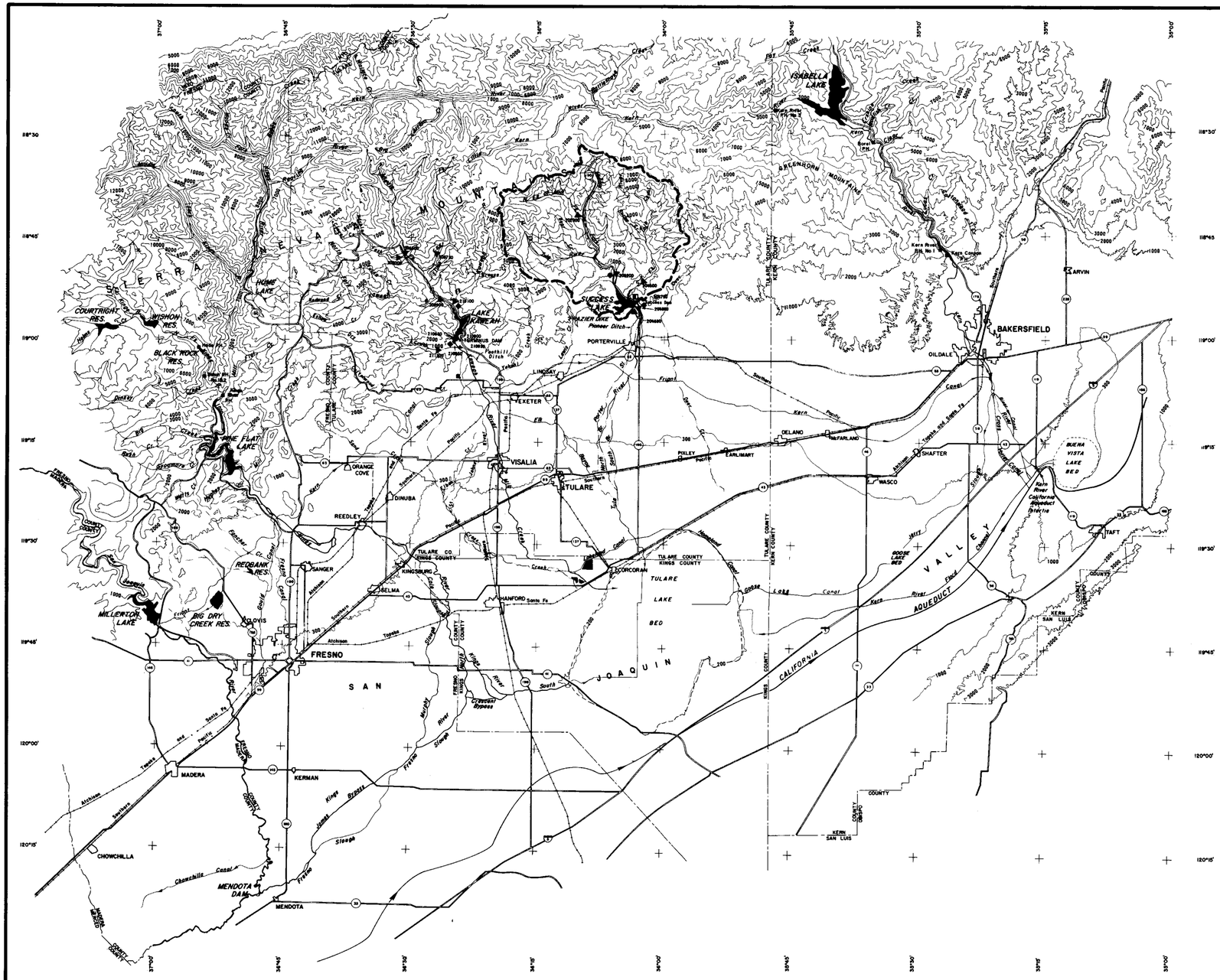
SUCCESS LAKE
TULE RIVER, CALIFORNIA

SUCCESS DAM
SPILLWAY PLAN, PROFILE AND SECTIONS

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: Date:

PLATE 7



STREAM GAGING STATIONS

CALIF INDEX NUMBER	GAGING STATION	TYPE OF GAGE	LOCATION LATITUDE DEG	LOCATION LATITUDE MIN	LOCATION LONGITUDE DEG	LOCATION LONGITUDE MIN	ELEVATION FEET	ELEVATION DATUM	DRAINAGE AREA (SQ MI)	RECORDS BEGAN IN	RECORDS AGENCY IN CHARGE	MAXIMUM FLOW DATE	MAXIMUM FLOW CFS
202900	SOUTH FORK OF MIDDLE FORK TULE RIVER NEAR SPRINGVILLE, CA.		36	10	118	42	2920	TOPO	39.3	1949	PGAC	6 DEC 66	16 000
203200	TULE RIVER NEAR SPRINGVILLE, CA. 1/		36	06	118	52	680	TOPO	267	1957	USGS	6 DEC 66	49 600
204500	SOUTH FORK TULE RIVER NEAR SUCCESS, CA.		36	03	118	51	770	TOPO	109	1930	USGS	6 DEC 66	16 500
204580	PIONEER DITCH BELOW SUCCESS DAM 2/		36	04	118	55	549	MSL	--	1959	C OF E	--	--
204700	SUCCESS LAKE NEAR SUCCESS, CA.		36	04	118	55		MSL	201	1961	C OF E	--	--
204900	TULE RIVER BELOW SUCCESS DAM 3/		36	03	118	56	535	MSL	203	1960	C OF E	23 DEC 65	27,000
206500	MIDDLE FORK KAWEAH RIVER NEAR POTWISHA CAMP, CA.		36	31	118	47	2100	TOPO	102	1949	USGS, SCE	23 DEC 55	46,800
206900	MARBLE FORK KAWEAH RIVER AT POTWISHA CAMP, CA.		36	31	118	48	2150	TOPO	51.4	1950	USGS, SCE	23 DEC 55	12,500
208700	EAST FORK KAWEAH RIVER NEAR THREE RIVERS, CA.		36	27	118	47	2500	TOPO	85.6	1957	SCE	6 DEC 66	19,000
209000	KAWEAH RIVER AT THREE RIVERS, CA. 3/		36	27	118	54	810	MS	418	1956	USGS	5 DEC 66	72,000
210100	SOUTH FORK KAWEAH RIVER AT 3/		36	25	118	55	887	MS	86.7	1958	USGS	6 DEC 66	11,600
210850	LEMONCOVE DITCH BELOW TERMINUS DAM, CA.		36	25	119	00	540.0	MS	--	1962	C OF E	--	--
210860	LAKE KAWEAH NEAR LEMONCOVE, CA.		36	25	119	00	684	MSL	560	1962	C OF E	--	--
210930	FOOTHILL DITCH BELOW TERMINUS DAM, CA.		36	25	119	01	483.0	MS	--	1961	C OF E	--	--
210950	KAWEAH RIVER BELOW TERMINUS DAM, CA.		36	25	119	01	485.9	MS	561	1961	C OF E	3 JAN 63	5,610
211300	DRY CREEK NEAR LEMONCOVE, CA. 3/		36	27	119	02	670	TOPO	78.4	1958	USGS	6 DEC 66	14,500

TYPE OF GAGE

- ▲ WATER STAGE RECORDER
- WATER STAGE RECORDER WITH RADIO TELEMARK
- WATER STAGE RECORDER WITH TELEPHONE TELEMARK
- RECORDING RESERVOIR BANK, STAGE ONLY
- ◆ WATER QUALITY STATION

1/ RECORDS SINCE 20 MAR 1968 INCLUDE FLOW DIVERTED TO TULE RIVER DIVERSION DITCH. PRIOR TO 20 MAR 1968 AT SITE 1.9 MI. (3.1 KM) UPSTREAM AT DIFFERENT DATUM.

2/ PRIOR TO 26 JUNE 1951 AT SITE 0.9 MI. (0.6 KM) DOWNSTREAM AT DIFFERENT DATUM.

3/ PRIOR TO 1 FEB 1961 AT SITE 6.5 MI. (0.8 KM) DOWNSTREAM AT DIFFERENT DATUM.

4/ PRIOR TO OCTOBER 1960 PUBLISHED AS " AT WORTH BRIDGE," NEAR PORTERVILLE.

5/ PRIOR TO OCTOBER 1956 RECORDS FOR RIVER AND CONDUIT PUBLISHED SEPARATELY; COMBINED FLOW ONLY, OCTOBER 1956 TO SEPTEMBER 1960.

6/ PRIOR TO OCTOBER 1962 COMBINED ONLY.

7/ FLOOD OF 23 DEC 1955 REACHED A STAGE OF 17.9 FT. (5.46 M) FROM FLOODMARKS.

8/ FLOOD OF 23 DEC 1955 REACHED A STAGE OF 9.5 FT. (2.90 M) FROM FLOODMARKS, DISCHARGE, 10,000 FT³/SEC (283 M³/SEC).

9/ PRIOR TO 8 MARCH 1960 1.6 MI. (2.6 KM) DOWNSTREAM AT DIFFERENT DATUM.

WATER QUALITY STATIONS

NUMBER	STATION NAME	TYPE OF STATION	LOCATION LATITUDE DEG	LOCATION LATITUDE MIN	LOCATION LONGITUDE DEG	LOCATION LONGITUDE MIN	AGENCY
203200	TULE RIVER NEAR SPRINGVILLE	◆	36	09	118	52	USGS
204600	TULE RIVER BELOW MONTEREY DAM	◆	36	08	118	55	DWR
209000	KAWEAH RIVER AT THREE RIVERS	◆	36	27	118	54	USGS
210950	KAWEAH RIVER BELOW TERMINUS DAM	◆	36	25	119	01	DWR

USGS - U.S. GEOLOGICAL SURVEY
DWR - STATE OF CALIFORNIA, DEPARTMENT OF WATER RESOURCES

N

LEGEND

- Drainage Boundary
- U.S. Highway (91) State Highway
- Interstate Highway
- Railroad
- Levee
- Intermittent Stream
- Perennial Stream
- Canal
- Reservoir or Lake
- Authorized Reservoir
- 2000 Contour

SCALE (Statute Miles)

SUCCESS LAKE
TULE RIVER, CALIFORNIA

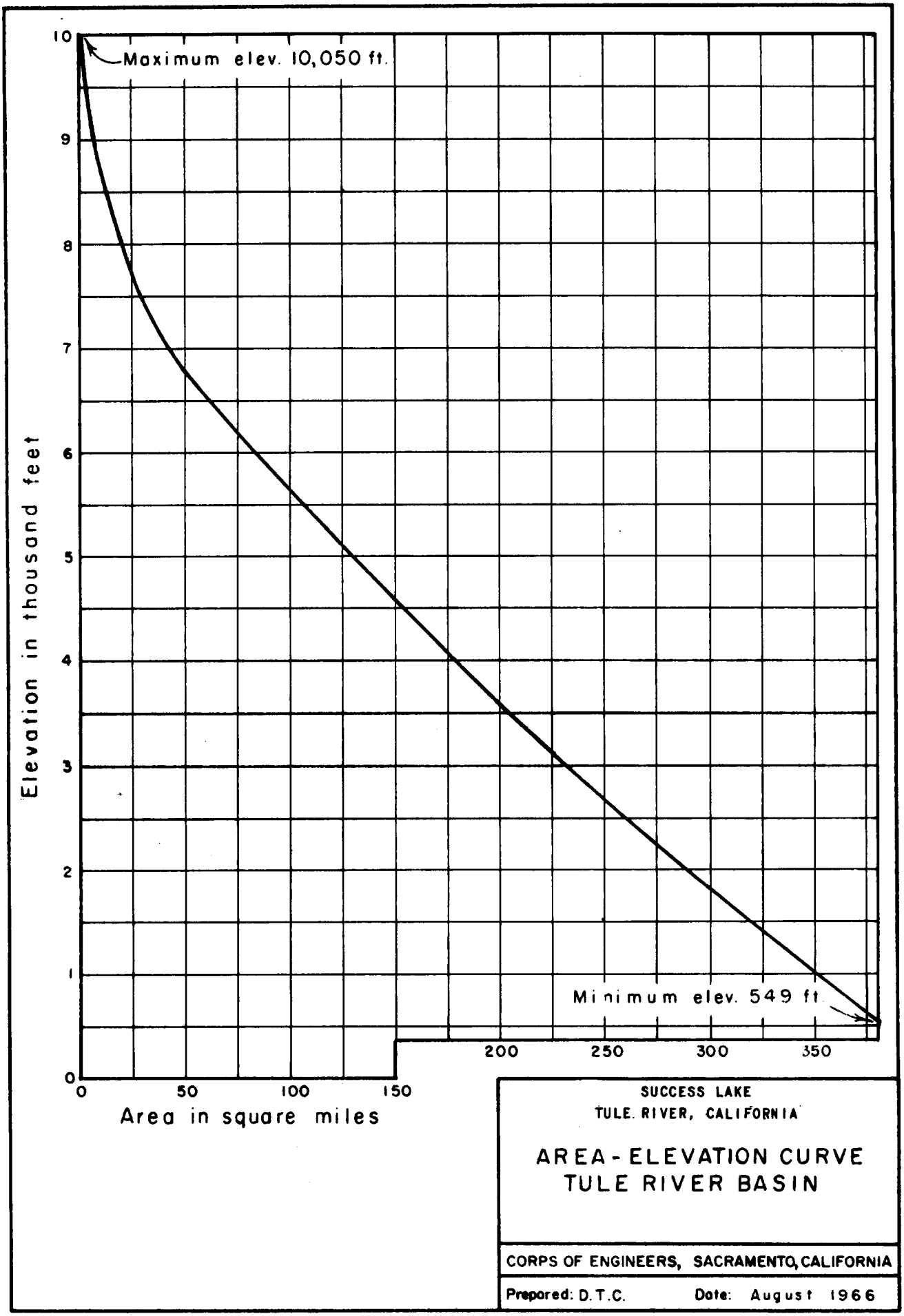
TOPOGRAPHY AND STREAM GAGING STATIONS

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C.

Date: SEPTEMBER 1981

PLATE 8



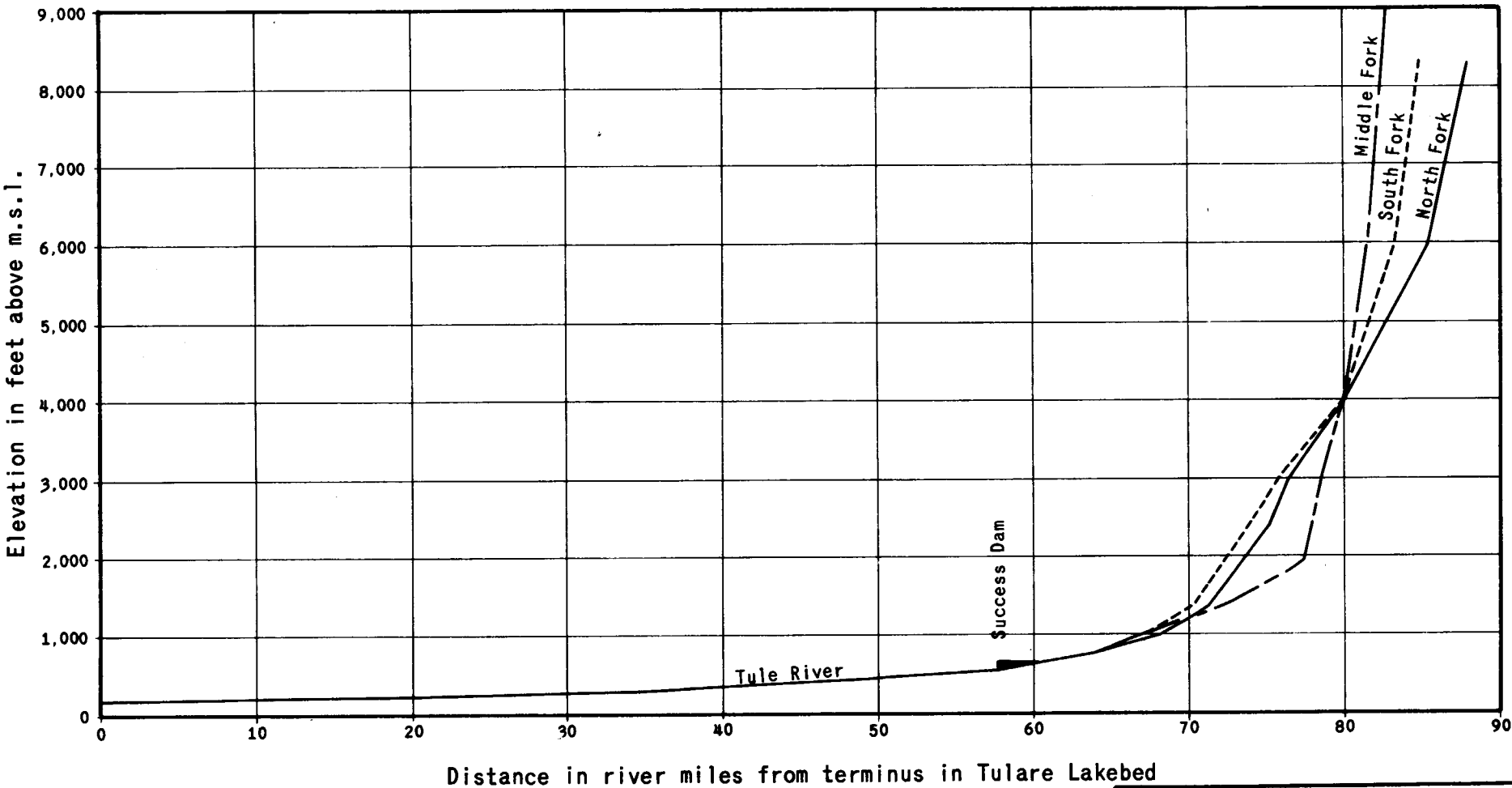
SUCCESS LAKE
TULE. RIVER, CALIFORNIA

AREA - ELEVATION CURVE
TULE RIVER BASIN

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.T.C. Date: August 1966

PLATE 9



SUCCESS LAKE
TULE RIVER, CALIFORNIA

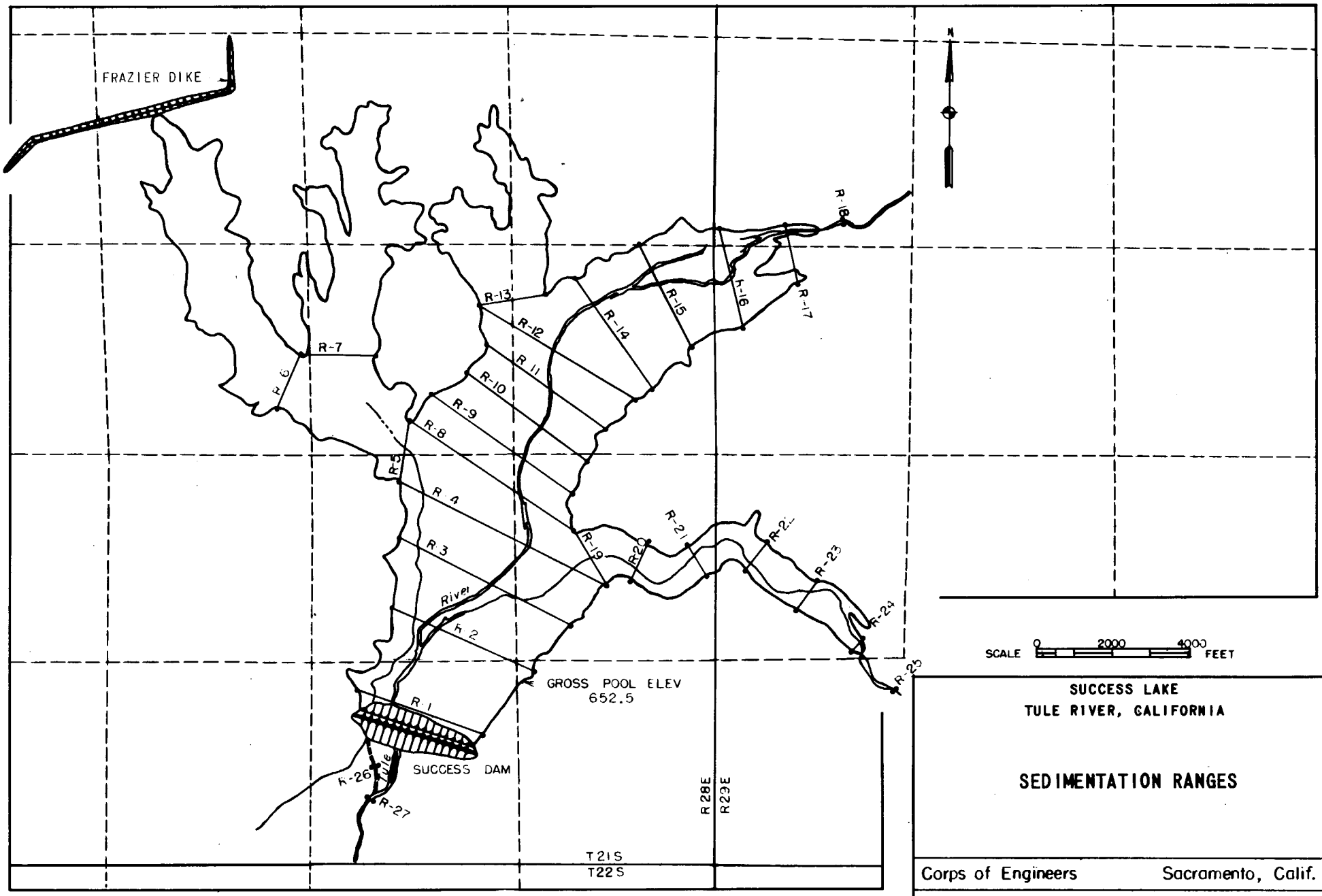
TULE RIVER
STREAM PROFILE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C.

Date: APRIL 1981

PLATE 10



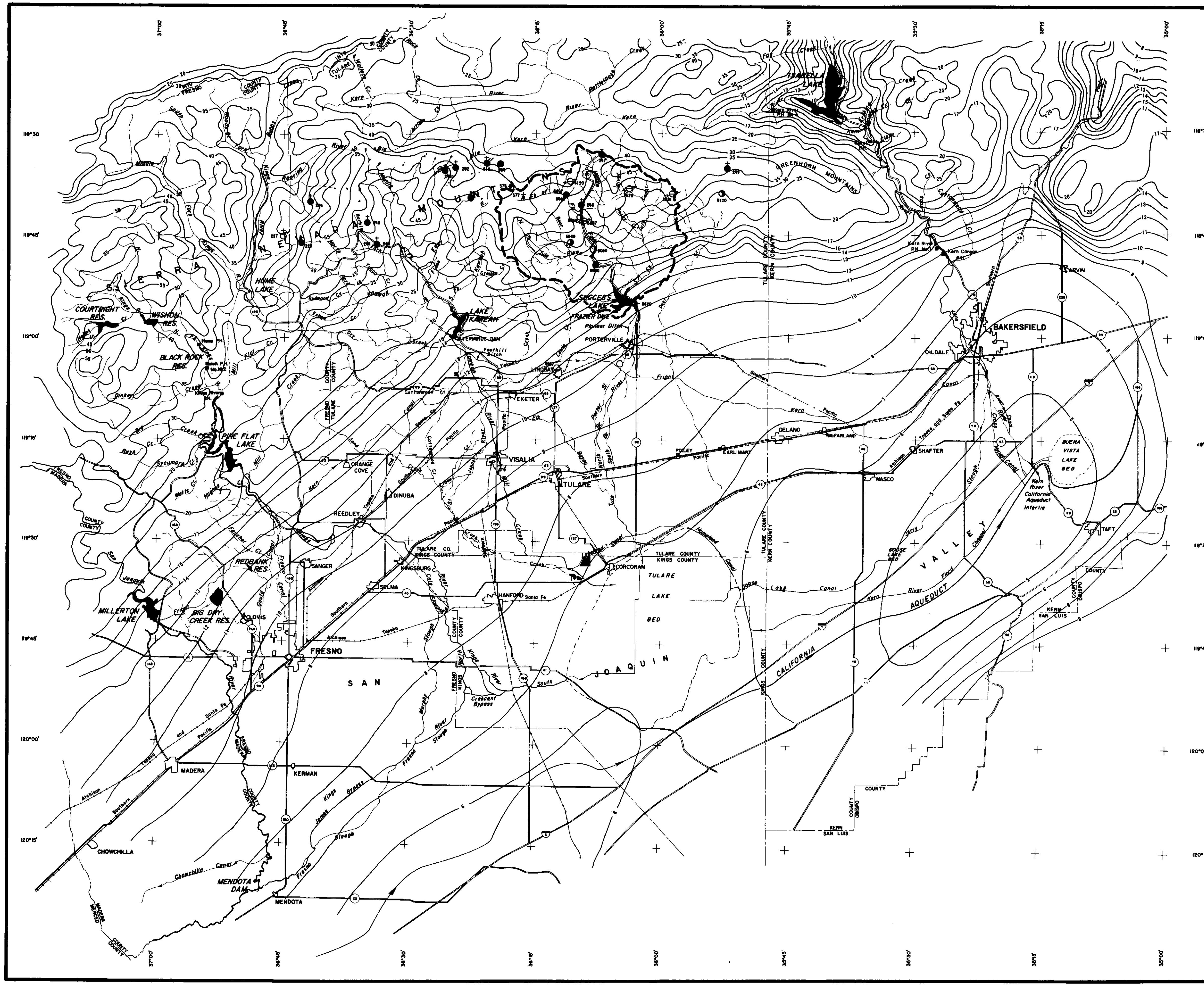
SUCCESS LAKE
TULE RIVER, CALIFORNIA

SEDIMENTATION RANGES

Corps of Engineers Sacramento, Calif.

G.H.C. 13 AUG 1956 File: KT-1-26-176

PLATE 11



SNOW COURSE AND AERIAL SNOW DEPTH MARKERS											
CALIF INDEX NUMBER	STATION	TYPE OF GAGE	ELEV (FEET)	LOCATION				RECORD BEGAN	MEASUREMENT DATES 1/	MEASURED BY	AVG 1 APRIL WATER CONTENT 2/ (INCHES)
				LATITUDE		LONGITUDE					
				DEG	MIN	DEG	MIN				
517	SHOTGUN PASS	†●	10,900	36	25	118	30	1950	2,3,4,5	C. OF E.	27.4
518	CHAGOOPA PLATEAU	†	10,300	36	30	118	27	1953	2,3,4,5	C. OF E.	21.8
511	MITCHELL MEADOWS	†●	9,900	36	44	118	43	1956	2,3,4,5	C. OF E.	30.6
387	SCENIC MEADOWS	● †● †○~	9,650	36	41	118	36	1953	3, 5	C. OF E. 6/	26.9
292	FAREWELL GAP	†●	9,500	36	25	118	35	1952	2,3,4,5	S. &K.C.N.P.	36.2
570W	SUMMIT LAKE	†	9,000	36	08	118	38	1974	2,3,4,5	D.W.R. 7/	28.0
	WET MEADOW	†●~	8,950	36	21	118	34	1957	2,3,4,5	S. &K.C.N.P.	23.9
224	ROWELL MEADOWS	†●	8,850	36	43	118	42	1930	2,3,4,5	K.R.W.A. 1/	27.2
243	PANTHER MEADOW	†●	8,600	36	35	118	43	1925	2,3,4,5,	S. &K.C.N.P. 2/	37.0
294	HOCKETT MEADOWS	†●	8,500	36	23	118	39	1930	3,4,5	S. &K.C.N.P.	28.6
204	QUINN RANGER STATION	●	8,350	36	20	118	34	1930	3,4,5	S. &K.C.N.P.	30.4
295	MINERAL KING	†●	8,000	36	26	118	35	1948	2,3,4,5	S. &K.C.N.P.	21.8
236	BIG MEADOWS	†●	7,600	36	43	118	51	1930	2,3,4,5	K.R.W.A.	25.9
237	HORSE CORRAL MEADOW	†○~	7,600	36	43	118	46	1930	2,3,4	K.R.W.A.	17.2
577W	LONG MEADOW	†●	7,400	36	17	118	40	1974	2,3,4,5	D.W.R.	27.0
290	DEAD HORSE MEADOW	†●	7,300	35	52	118	35	1937	2,3,4,5	H.S.R.D. 5/	13.0
297	QUAKING ASPEN	†●	7,000	36	07	118	33	1937	2,3,4,5	T.R.R.D. 3/	13.9
246	OLD ENTERPRISE MILL	†●	6,600	36	15	118	41	1937	3,4,5	C.D.F. 4/	16.0
248	GIANT FOREST	●	6,400	36	34	118	46	1930	2,3,4,5	S. &K.C.N.P.	17.2

1/ NUMBERS INDICATE DATES OF SCHEDULED OBSERVATIONS: 1-ON OR ABOUT 1 JANUARY, 2-ON OR ABOUT 1 FEBRUARY, 3-ON OR ABOUT 1 MARCH, ETC.

2/ THE AVERAGE 1 APRIL WATER CONTENT OF A SNOW COURSE, COMPUTED FOR THE 45-YEAR PERIOD 1931-1975. AVERAGES FOR SNOW COURSES WITH LESS THAN 45 YEARS OF RECORD HAVE BEEN DETERMINED BY COMPARISON WITH COURSES WITH COMPLETE RECORDS.

1/ K.R.W.A. - KINGS RIVER WATER ASSOCIATION - FRESNO.
2/ S. &K.C.N.P. - SEQUOIA AND KINGS CANYON NATIONAL PARKS - THREE RIVERS.
3/ T.R.R.D. - TULE RIVER RANGER DISTRICT - SPRINGVILLE.
4/ C.D.F. - CALIFORNIA DEPARTMENT OF FORESTRY - MOUNTAIN HOME STATE FOREST - SPRINGVILLE.
5/ H.S.R.D. - HOT SPRINGS RANGER DISTRICT - PORTERVILLE.
6/ C. OF E. - CORPS OF ENGINEERS.
7/ D.W.R. - CALIFORNIA DEPARTMENT OF WATER RESOURCES.

LEGEND:

- ● SNOW COURSE
- † AERIAL SNOW DEPTH MARKER
- †● SNOW COURSE WITH AERIAL SNOW DEPTH MARKER
- ○~ RADIO REPORTING SNOW PILLOW
- †○~ RADIO REPORTING SNOW PILLOW WITH AERIAL SNOW DEPTH MARKER

CLIMATOLOGICAL STATIONS									
INDEX NUMBER	STATION	ELEV IN FEET	TYPE OF GAGE	LOCATION				RECORDS	
				LATITUDE		LONGITUDE		BEGAN IN	PUBLISHED IN
				DEG	MIN	DEG	MIN		
8620	SUCCESS DAM	590		36	03	118	55	1959	COE
7077	PORTERVILLE	393		36	04	119	01	1889	NOAA
4957	LINDSAY	395		36	11	119	04	1913	NOAA
7079	PORTERVILLE 3 W	412	○	36	05	119	04	1960	DWR
2325-10	DEER CREEK RCH	960	○	35	57	118	51	1966	DWR
8490	SPRINGVILLE RS	1050	●	36	08	118	49	1924	NOAA
9069	TULE RIVER PH	1240	○	36	08	118	47	1910	SCE
9060	TULE RIVER INTAKE	2950	○	36	10	118	42	1910	SCE
5569	MILO 5 NE	3400	◑	36	17	118	46	1957	NOAA
9120	[illegible] RS	3680	◑	35	53	118	39	1965	NOAA
8442	SPRINGVILLE TULE HDW	4070	●	36	12	118	39	1907	NOAA
1425	CAMP NELSON	4500	○	36	08	118	36	1959	DWR
5887	MOUNTAIN HOME	5340		36	15	118	43	1963	COE
7529	ROGERS CAMP	6240		36	04	118	38	1964	COE
2591	EAGLE CREEK	6650		35	59	118	39	1964	COE
4120	HOSSACK (RADIO)	7100		36	11	118	37	1959	COE

1/ RECORDS NOT PUBLISHED

COE - CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY
DWR - DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA
NOAA - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

LEGEND FOR CLIMATOLOGICAL STATIONS

RECORDING / RECORDING AND NON-RECORDING / NON-RECORDING

- PRECIPITATION STATION
- PRECIPITATION STORAGE
- PRECIPITATION AND TEMPERATURE
- PRECIPITATION, TEMPERATURE AND EVAPORATION
- COMPLETE METEOROLOGICAL STATION
- USED IN COMBINATION WITH OTHER SYMBOLS AS TO INDICATE RADIO EQUIPPED GAGE

N

LEGEND

- Drainage Boundary
- U.S. Highway (41) State Highway
- Interstate Highway
- Railroad
- Levee
- Intermittent Stream
- Perennial Stream
- Canal
- Reservoir or Lake
- Authorized Reservoir
- 3 Isohyets

SCALE
5 0 5 10
(Statute Miles)

SUCCESS LAKE
TULE RIVER, CALIFORNIA

NORMAL ANNUAL PRECIPITATION, CLIMATOLOGICAL STATIONS AND SNOW COURSES

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C.

Date: SEPTEMBER 1981

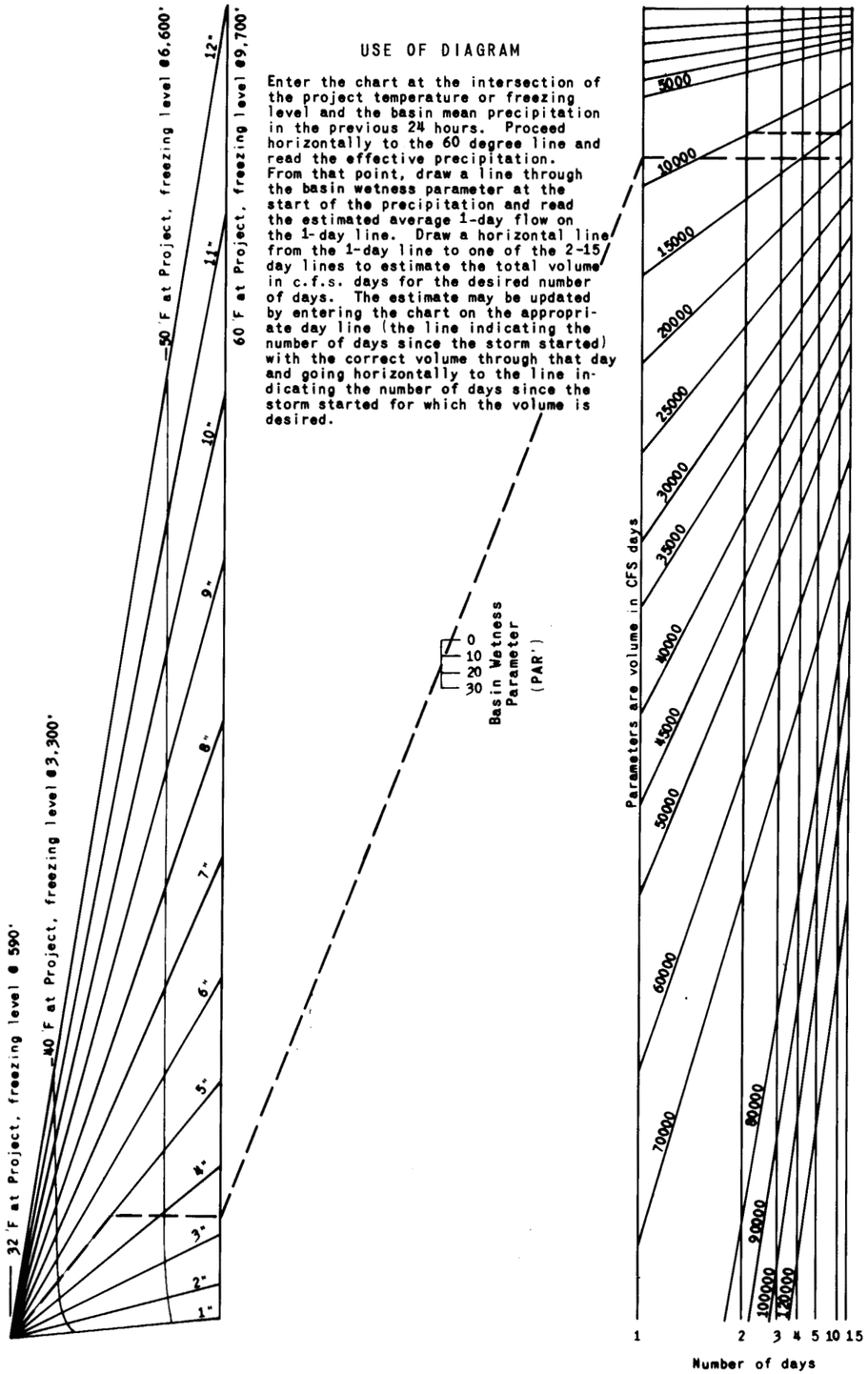
PLATE 12

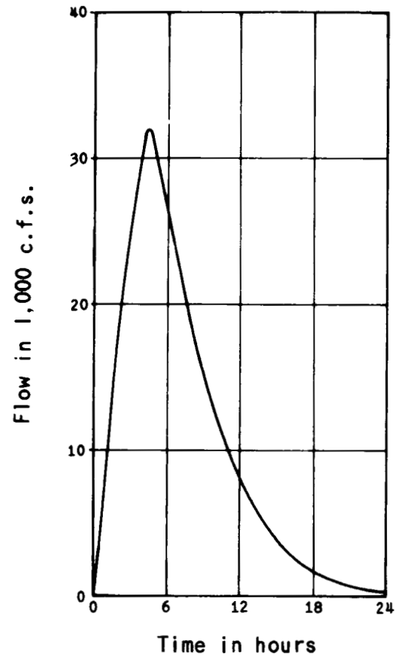
HISTORICAL UNIMPAIRED FLOW
BELOW SUCCESS DAM

(Runoff in 1,000 acre-feet)

WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANNUAL TOTAL
1904	1.2	1.8	2.3	2.7	9.7	24.5	22.1	20.8	6.0	1.5	0.9	1.7	95.2
1905	4.5	2.3	3.0	5.1	7.2	21.0	17.7	26.7	12.7	3.1	0.8	0.7	104.8
1906	1.0	3.9	9.3	44.6	16.5	122.2	64.7	90.4	75.5	29.2	7.6	4.4	469.3
1907	3.8	4.5	8.9	19.7	21.7	29.5	60.1	26.9	20.3	6.9	3.0	2.3	207.6
1908	3.7	4.4	9.3	10.2	20.6	24.2	14.3	13.4	6.4	1.5	0.8	1.4	110.2
1909	2.5	2.7	3.7	77.5	70.2	45.4	61.6	59.2	45.3	13.3	4.3	3.0	388.7
1910	3.5	7.0	49.3	28.2	13.2	17.3	17.4	12.1	4.1	1.4	0.5	0.8	154.8
1911	1.6	2.6	4.0	22.2	19.0	35.2	26.2	20.2	12.1	3.7	1.3	1.0	149.1
1912	1.9	3.2	3.8	4.9	4.2	7.4	14.3	16.1	8.4	1.2	0.2	0.3	65.9
1913	0.6	1.4	2.0	2.8	2.7	7.1	10.2	7.2	3.5	0.6	0.1	0.3	38.5
1914	0.2	2.8	5.5	62.7	19.8	19.0	21.5	20.5	11.0	2.9	0.6	0.4	166.9
1915	1.1	1.6	3.5	6.2	13.2	14.5	20.1	52.8	20.2	4.7	1.0	0.7	139.6
1916	0.7	2.4	6.1	85.0	48.7	74.2	52.8	43.1	23.0	7.9	2.9	1.5	348.3
1917	7.5	5.1	17.9	12.8	26.4	22.2	30.5	31.6	21.0	4.8	1.6	0.7	182.1
1918	1.2	2.3	2.9	3.2	4.6	16.7	11.1	7.6	2.6	0.2	0.1	0.2	52.7
1919	0.9	2.2	4.0	3.4	8.7	18.8	20.7	15.1	3.5	0.3	0.0	0.0	77.6
1920	0.7	1.3	5.6	2.6	3.2	25.7	36.3	24.7	11.1	2.0	0.3	0.5	114.6
1921	1.2	2.6	4.8	7.1	11.9	19.9	13.3	18.7	10.9	1.5	0.2	0.1	92.2
1922	0.5	1.1	7.7	10.8	19.6	19.7	24.8	38.6	16.6	3.0	0.5	0.2	143.1
1923	0.8	2.9	10.9	7.1	8.1	8.0	37.9	18.7	7.3	1.7	0.4	0.5	104.3
1924	1.1	1.6	2.2	2.6	2.7	3.7	8.2	2.5	0.1	0.0	0.0	0.0	24.7
1925	0.2	4.1	8.0	6.7	13.0	13.2	20.0	15.6	5.9	1.1	0.1	0.1	88.0
1926	1.2	2.1	2.8	2.3	6.2	7.5	18.0	8.7	1.2	0.1	0.0	0.0	50.1
1927	0.0	9.2	5.2	5.2	35.9	23.7	23.6	21.7	9.2	1.3	0.1	0.2	135.3
1928	0.7	5.9	3.5	3.9	4.3	15.6	10.2	4.3	0.5	0.0	0.0	0.0	48.9
1929	0.0	1.2	3.4	3.0	4.8	10.8	14.3	13.0	4.8	0.3	0.0	0.0	55.6
1930	0.0	0.2	0.7	2.3	4.9	12.0	9.7	12.8	4.1	0.2	0.0	0.0	46.9
1931	0.1	1.5	2.0	3.8	3.5	3.4	3.0	2.4	0.3	0.0	0.0	0.0	20.0
1932	0.0	0.2	12.9	9.3	26.5	19.7	20.2	29.3	13.6	2.3	0.3	0.0	134.3
1933	0.3	0.7	2.1	9.0	6.9	14.4	14.6	16.9	14.4	2.0	0.1	0.0	81.4
1934	0.1	0.8	4.2	5.3	3.8	5.1	2.0	0.4	0.3	0.0	0.0	0.0	22.0
1935	0.0	1.6	2.9	4.5	6.9	11.9	32.4	20.7	8.6	1.1	0.1	0.0	90.7
1936	0.4	1.1	2.1	4.1	46.6	23.5	43.9	27.7	11.0	2.4	0.4	0.2	163.4
1937	0.9	1.9	5.7	8.8	73.9	56.1	59.5	51.6	20.4	5.6	1.3	0.7	286.4
1938	1.1	2.1	24.5	10.7	29.9	92.0	63.1	68.0	31.5	8.9	3.0	1.8	336.6
1939	3.0	4.3	5.4	6.9	10.3	19.4	21.2	9.3	2.5	0.4	0.0	0.1	82.8
1940	1.1	1.1	2.1	37.2	49.6	35.0	37.0	24.2	7.4	1.3	0.3	0.3	196.6
1941	1.4	2.7	13.4	16.5	40.5	34.3	41.5	45.4	22.5	6.1	1.9	1.2	227.4
1942	2.1	3.3	9.8	17.1	13.0	19.1	27.4	25.2	14.6	2.9	0.7	0.4	135.6
1943	0.8	3.1	7.1	40.3	25.5	144.4	56.0	36.2	15.3	5.2	1.9	1.1	336.9
1944	1.9	3.3	5.0	7.8	11.5	19.2	16.1	24.5	11.0	2.6	0.9	0.7	104.5
1945	0.6	7.7	5.8	4.8	50.2	38.3	43.2	36.1	19.5	4.6	1.3	0.7	212.8
1946	2.2	4.7	13.0	13.4	9.5	15.3	20.1	14.2	5.1	0.6	0.0	0.0	98.1
1947	0.9	7.4	10.4	6.0	5.9	9.0	7.5	5.5	1.4	0.0	0.0	0.0	54.0
1948	0.1	1.3	2.0	1.7	2.6	6.1	24.3	20.9	7.4	0.8	0.0	0.0	67.2
1949	0.0	0.9	1.7	3.5	4.0	9.5	15.7	11.0	2.5	0.3	0.0	0.0	49.1
1950	0.0	1.4	2.2	6.6	18.2	8.9	15.5	8.9	2.9	0.1	0.0	0.0	64.7
1951	1.5	42.3	29.4	13.8	11.4	16.9	11.4	12.7	3.6	0.5	0.0	0.0	143.5
1952	2.0	13.2	18.8	40.4	26.0	60.7	58.9	58.5	28.2	8.4	3.1	1.7	319.9
1953	1.5	4.0	6.3	24.1	8.7	9.6	15.8	15.6	10.3	2.3	0.5	0.0	98.7
1954	0.5	2.1	3.5	7.5	9.9	16.3	24.9	15.3	4.0	0.3	0.0	0.0	84.3
1955	0.2	1.6	3.8	8.0	12.7	9.3	7.2	11.7	3.5	0.2	0.0	0.0	58.2
1956	0.0	1.1	56.4	45.3	21.0	15.4	22.1	30.9	10.7	1.2	0.3	0.2	204.6
1957	1.4	1.2	1.6	3.6	6.0	8.5	6.8	22.8	7.1	0.4	0.0	0.0	59.4
1958	1.0	2.4	5.6	8.3	17.0	45.5	62.9	46.5	21.8	5.6	1.1	0.7	218.4
1959	0.6	1.9	2.0	3.4	6.7	6.8	3.7	1.9	0.2	0.0	0.0	0.0	27.2
1960	0.0	0.2	0.5	1.5	10.8	10.1	8.5	9.1	1.1	0.1	0.0	0.0	41.9
1961	0.0	1.7	2.7	2.1	2.2	3.7	4.1	2.5	0.6	0.0	0.0	0.0	19.6
1962	0.0	0.3	1.6	2.7	23.5	13.6	23.8	13.3	6.3	0.9	0.2	0.2	86.4
1963	0.8	1.1	1.2	10.0	29.0	10.1	26.3	25.3	9.7	3.8	1.9	1.3	120.5
1964	2.1	5.2	3.9	3.9	3.4	7.5	14.6	13.3	5.2	0.7	0.2	0.4	60.4
1965	0.7	4.6	17.2	23.6	12.0	10.9	29.2	20.7	12.3	3.4	2.0	1.2	137.8
1966	0.8	4.3	6.0	6.9	6.5	8.5	8.1	4.3	1.2	0.5	0.0	0.1	47.2
1967	0.3	2.1	138.5	16.9	16.8	24.9	50.7	65.6	34.2	14.7	5.3	4.0	374.0
1968	2.7	4.5	6.9	7.5	10.7	12.5	10.8	7.6	2.9	0.9	0.0	0.2	67.2
1969	1.6	4.1	5.5	99.5	86.5	71.0	83.1	73.7	46.9	20.0	7.9	4.1	503.9
1970	4.5	4.8	7.5	34.1	13.3	24.1	12.0	2.9	5.9	2.0	0.8	0.3	112.2
1971	0.8	5.1	7.9	11.7	9.5	10.6	11.2	15.1	8.3	2.8	0.8	0.2	84.0
1972	1.0	2.6	6.3	5.3	5.8	5.8	3.9	2.8	0.8	0.1	0.0	0.3	34.7
1973	0.9	3.7	6.4	27.2	26.7	40.7	36.4	47.4	21.0	7.3	4.4	3.1	225.2
1974	2.8	5.3	9.1	23.9	9.6	26.9	35.6	22.2	11.2	5.4	3.6	1.1	156.7
1975	2.2	3.6	5.1	5.5	12.5	19.8	17.2	31.2	15.5	4.9	2.8	2.1	122.4
1976	3.6	3.6	4.6	3.3	4.6	8.2	6.5	4.4	1.2	0.5	0.1	0.9	41.6
1977	1.4	1.3	1.6	2.5	2.0	2.2	1.6	2.5	0.5	0.0	0.1	0.0	15.8
1978	0.1	0.5	8.1	16.3	48.4	62.7	46.6	41.5	29.6	10.3	3.7	4.8	272.6
1979	2.6	3.4	5.7	7.1	12.5	22.7	20.6	22.8	8.3	4.0	2.7	1.7	114.1
1980	2.1	3.2	3.5	73.0	73.1	53.2	37.0	35.9	26.6	12.2	6.3	2.8	328.9
MEAN	1.3	3.5	9.1	15.6	18.2	24.4	25.3	23.4	11.4	3.3	1.1	0.8	137.4

PLATE 13





2-Hour Unit Hydrograph

UNIT HYDROGRAPH	
TIME IN HOURS	FLOW IN CFS
2	10,195
4	25,752
6	30,586
8	21,208
10	14,775
12	9,952
14	5,835
16	3,744
18	2,119
20	1,217
22	690
24	461
2	178

Drainage Area - 393 sq. mi.

EXAMPLE 1

FIND:

Estimated average flow on 15 January.
Estimated 10-day volume from 15 January through 24 January.

GIVEN:

Basin mean precipitation (BMP) on 14 January = 5 inches.
Average temperature at Lake Success on 14 January = 45°F.
Basin wetness parameter (PAR') for 13 January = 15 inches.

FROM CHART:

15 January flow estimate = 8,100 c.f.s.
10-day volume (15-24 Jan) = 18,100 c.f.s. days.

EXAMPLE 2

FIND:

Update 15 January through 24 January volume estimate on 17 January.

GIVEN:

Average daily flows on 15 and 16 January are 7,000 c.f.s. and 2,800 c.f.s.
BMP on 15 and 16 January equals zero.

FROM CHART:

Use 2-day volume = 9,800 c.f.s.; therefore, the updated 15-24 January volume (10 days) estimate is 15,500 c.f.s. day.

NOTE:

Computations of PAR' and BMP are found in paragraph A-3f.

LOSS IN INCHES DURING 2-HOUR PERIOD AS A FUNCTION OF PRECIPITATION AND ACCUMULATED LOSS

Precipitation in Inches During 2-Hour Period

Accumulated Loss in Inches	1	2	3	4	5
0	1.0	2.0	3.0	4.0	5.0
2	.9	1.5	2.2	2.8	3.4
4	.8	1.5	2.1	2.6	3.2
6	.8	1.4	2.0	2.5	3.0
8	.7	1.3	1.9	2.4	2.9
10	.7	1.2	1.8	2.2	2.7
12	.7	1.2	1.7	2.1	2.6
14	.6	1.1	1.6	2.0	2.4
16	.6	1.1	1.5	1.9	2.3
18	.6	1.0	1.4	1.8	2.2
20	.5	1.0	1.4	1.7	2.1

SUCCESS LAKE
TULE RIVER, CALIFORNIA

RAINFLOOD FORECAST CRITERIA

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: H.T.M.
Drawn: L.M.C.
Date: MAY 1981

PLATE 14

SUMMARY OF FORECASTED AND ACTUAL SNOWMELT RUNOFF INTO SUCCESS LAKE

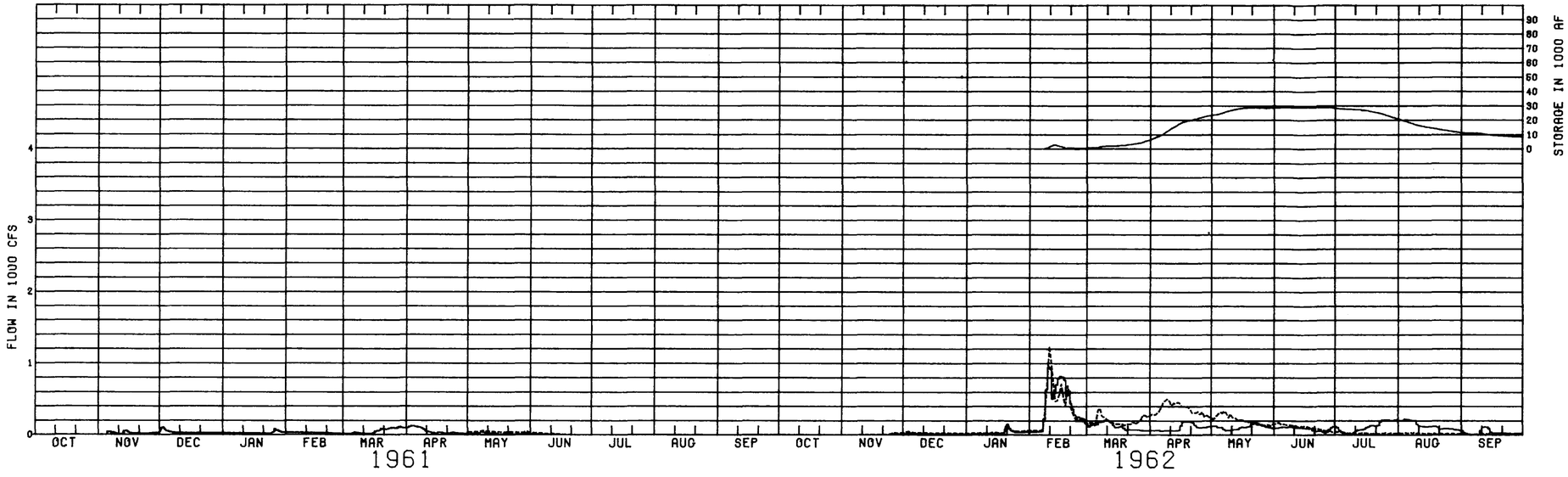
(Flow in 1,000 acre-feet)

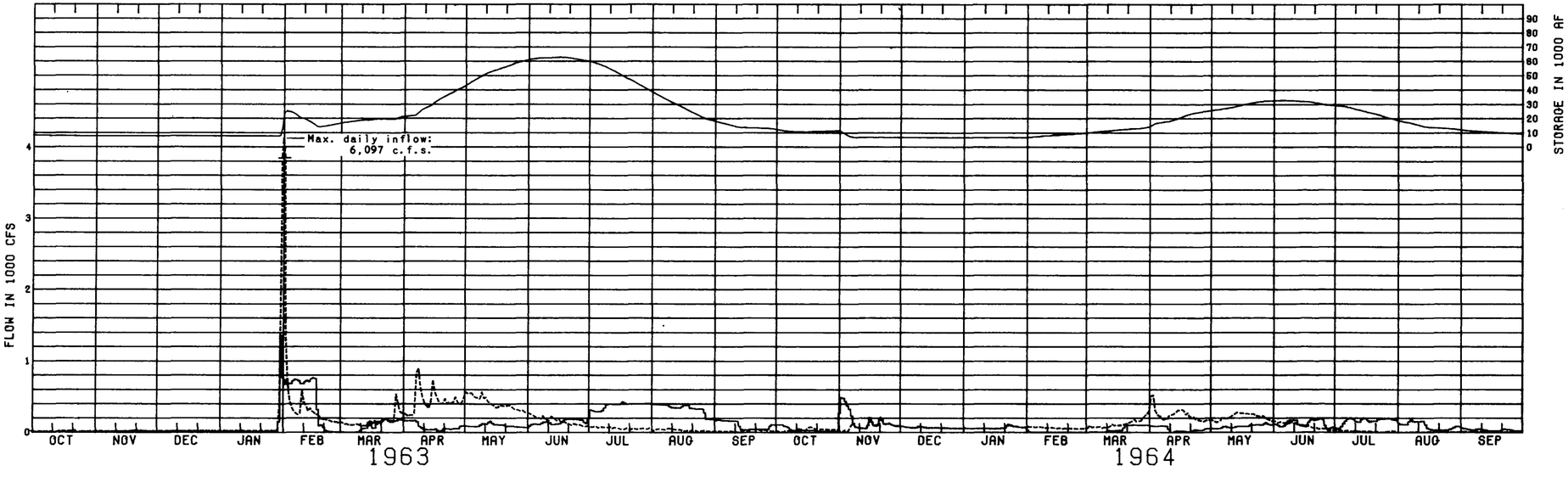
WATER YEAR	ACTUAL	1 APRIL THROUGH 31 JULY								
		1 FEBRUARY			1 MARCH			1 APRIL		
		FORECAST	ERROR	% ERROR	FORECAST	ERROR	% ERROR	FORECAST	ERROR	% ERROR
1953	44	NR	NR	NR	NR	NR	NR	27	- 17	- 63
1954	45	NR	NR	NR	35	- 10	- 29	35	- 10	- 29
1955	23	NR	NR	NR	43	+ 20	+ 47	25	+ 2	+ 8
1956	65	55	- 10	- 18	55	- 10	- 18	30	- 35	- 117
1957	37	NR	NR	NR	NR	NR	NR	16	- 21	- 131
1958	137	NR	NR	NR	47	- 90	- 191	110	- 27	- 25
1959	6	22	+ 16	+ 73	28	+ 22	+ 79	11	+ 5	+ 45
1960	19	20	+ 1	+ 5	30	+ 11	+ 37	12	- 7	- 58
1961	7	22	+ 15	+ 68	7	0	0	10	+ 3	+ 30
1962	44	23	- 21	- 91	65	+ 21	+ 32	22	- 22	- 100
1963	65	20	- 45	- 225	15	- 50	- 333	58	- 7	- 12
1964	34	33	- 1	- 3	22	- 12	- 55	28	- 6	- 21
1965	66	75	+ 9	+ 12	45	- 21	- 47	56	- 10	- 18
1966	14	50	+ 36	+ 72	30	- 36	- 120	25	- 41	- 164
1967	165	75	- 90	- 120	60	- 105	- 175	80	- 85	- 106
1968	22	45	+ 23	+ 51	30	+ 8	+ 27	32	+ 10	+ 31
1969	224	95	- 129	- 136	200	- 24	- 12	220	- 4	- 2
1970	23	45	+ 22	+ 49	40	+ 17	+ 43	40	+ 17	+ 43
1971	37	50	+ 13	+ 26	35	- 2	- 6	30	- 7	- 23
1972	8	30	+ 22	+ 73	20	+ 12	+ 60	12	+ 4	+ 33
1973	112	80	- 32	- 40	90	- 22	- 24	150	+ 38	+ 25
1974	74	60	- 14	- 23	45	- 29	- 64	55	- 19	- 35
1975	69	23	- 46	- 200	32	- 37	- 116	55	- 14	- 25
1976	13	16	+ 3	+ 19	12	- 1	- 8	12	- 1	- 8
1977	5	14	+ 9	+ 64	5	0	0	4	- 1	- 25
1978	128	75	- 53	- 71	95	- 33	- 35	120	- 8	- 7
1979	56	40	- 16	- 40	50	- 6	- 12	65	+ 9	+ 14
1980	112	70	- 42	- 60	115	+ 3	+ 3	125	+ 13	+ 10
Mean (+)	59	45	+ 15	+ 47	48	+ 14	+ 41	53	+ 11	+ 27
Mean (-)	--	--	- 42	- 86	--	- 31	- 78	--	- 18	- 51
Extreme (+)	224	95	+ 36	+ 73	200	+ 22	+ 79	220	+ 38	+ 45
Extreme (-)	--	--	- 129	- 225	--	- 105	- 333	--	- 85	- 164

GIVEN DATE THROUGH 31 JULY							
1 MAY				1 JUNE			
ACTUAL	FORECAST	ERROR	% ERROR	ACTUAL	FORECAST	ERROR	% ERROR
28	9	- 19	- 211	13	NR	NR	NR
20	25	+ 5	+ 20	4	NR	NR	NR
15	19	+ 4	+ 21	4	NR	NR	NR
43	20	- 23	- 115	12	NR	NR	NR
30	10	- 20	- 200	7	8	+ 1	+ 13
74	NR	NR	NR	27	20	- 7	- 35
2	NR	NR	NR	0	NR	NR	NR
10	5	- 5	- 100	1	NR	NR	NR
3	NR	NR	NR	1	NR	NR	NR
20	39	+ 19	+ 49	7	NR	NR	NR
39	19	- 20	- 105	14	NR	NR	NR
19	13	- 6	- 46	6	NR	NR	NR
35	26	- 9	- 35	16	NR	NR	NR
6	5	- 1	- 20	2	NR	NR	NR
115	100	- 15	- 15	49	NR	NR	NR
11	16	+ 5	+ 31	4	NR	NR	NR
141	137	- 4	- 3	67	60	- 7	- 12
11	20	+ 9	+ 45	8	NR	NR	NR
26	14	- 12	- 86	11	NR	NR	NR
4	3	- 1	- 33	1	NR	NR	NR
76	95	+ 19	+ 20	28	NR	NR	NR
39	30	- 9	- 30	17	NR	NR	NR
52	45	- 7	- 16	20	NR	NR	NR
6	5	- 1	- 20	2	NR	NR	NR
3	1	- 2	- 200	1	NR	NR	NR
81	90	- 9	- 10	40	NR	NR	NR
35	30	- 5	- 17	12	NR	NR	NR
75	75	0	0	39	NR	NR	NR
36	34	+ 12	+ 31	15	NR	NR	NR
--	--	- 9	- 70	--	NR	NR	NR
141	137	+ 20	+ 49	67	NR	NR	NR
--	--	- 23	- 211	--	NR	NR	NR

NOTES:

1. NR = No Record.
2. Forecasts prepared and published by State of California.
3. Forecasts and actual flow from 1953-1960 are from Tule River near Porterville.
4. Computed error based on past performance is not necessarily indicative of the accuracy that may be achieved in the future.





LEGEND:

Outflow

Inflow

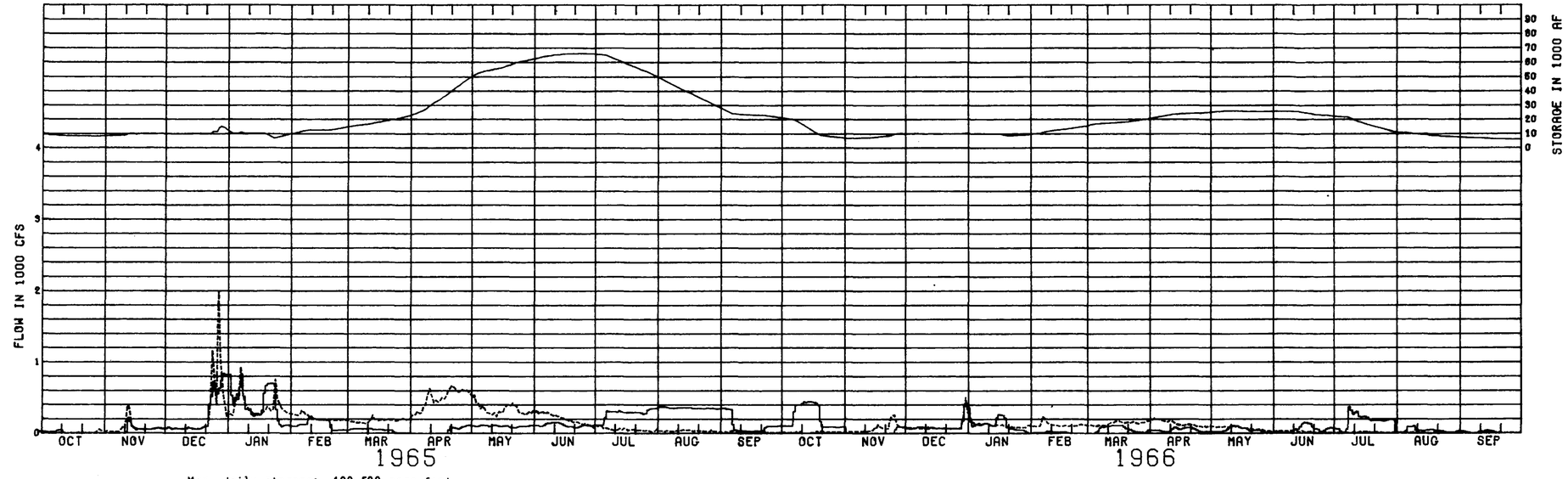
Storage

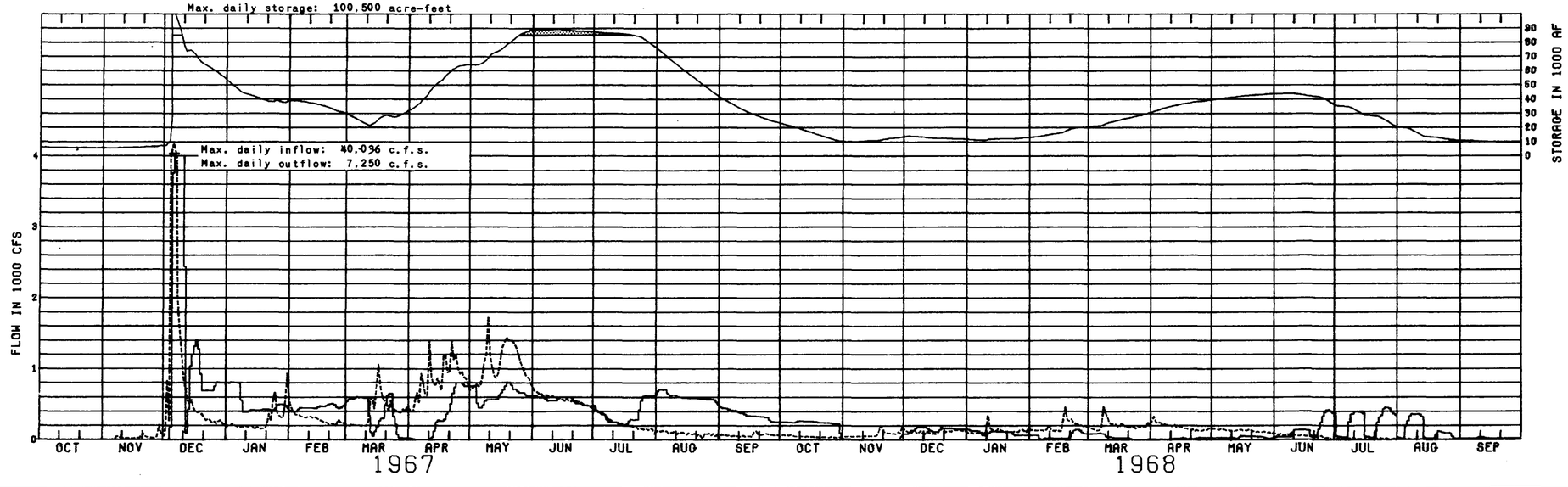
SUCCESS LAKE
TULE RIVER, CALIFORNIA

HISTORICAL OPERATION
SUCCESS LAKE

CORPS OF ENGINEERS, SACRAMENTO, CA.

PREPARED L.H.C.
DRAWN CAL-COMP
DATE AUGUST 1980





LEGEND

Outflow

Inflow

Storage

Surcharge operation

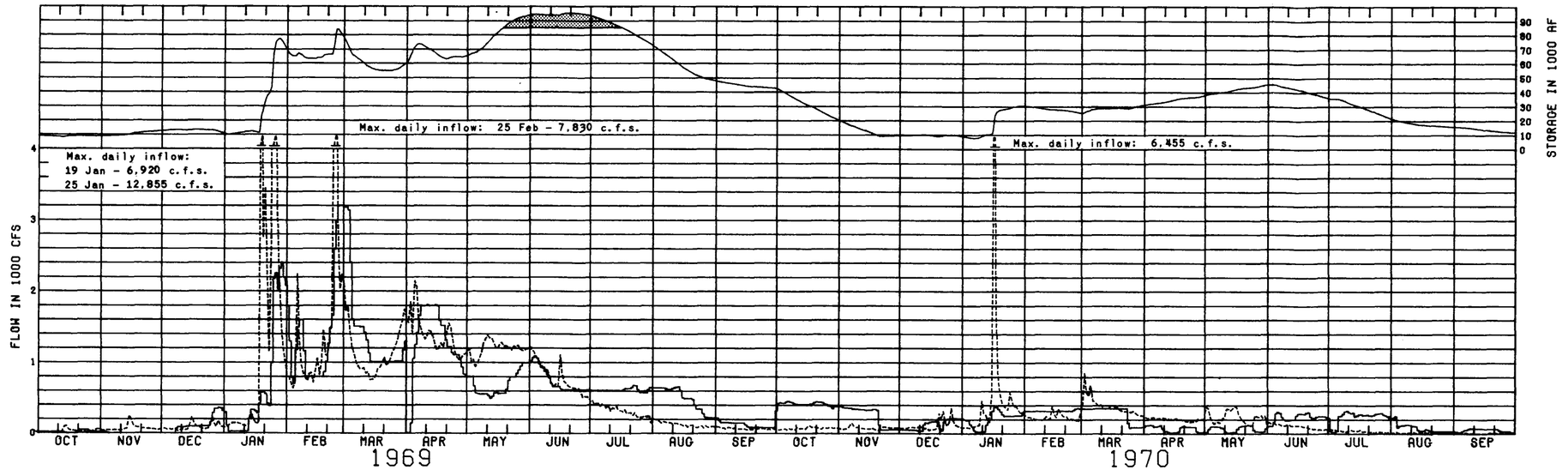
SUCCESS LAKE
TULE RIVER, CALIFORNIA

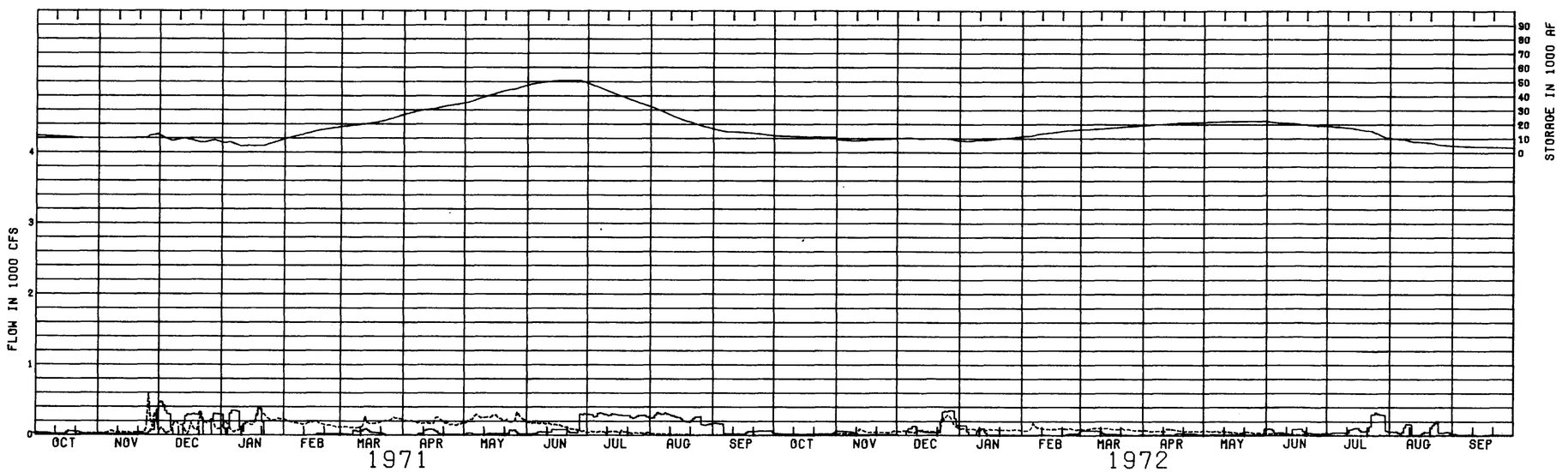
HISTORICAL OPERATION SUCCESS LAKE

CORPS OF ENGINEERS, SACRAMENTO, CA.

PREPARED L.H.C.
DRAWN CAL-COMP
DATE AUGUST 1980

SHEET 2 OF 6 PLATE 16





LEGEND

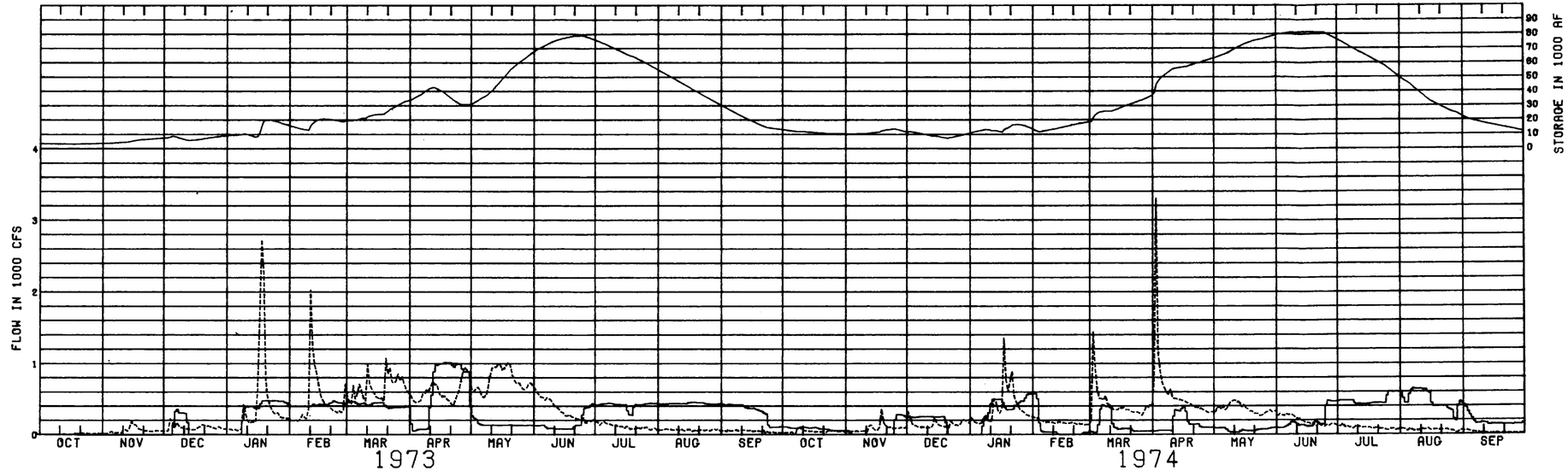
- Outflow
- Inflow
- Storage
- Surcharge operation

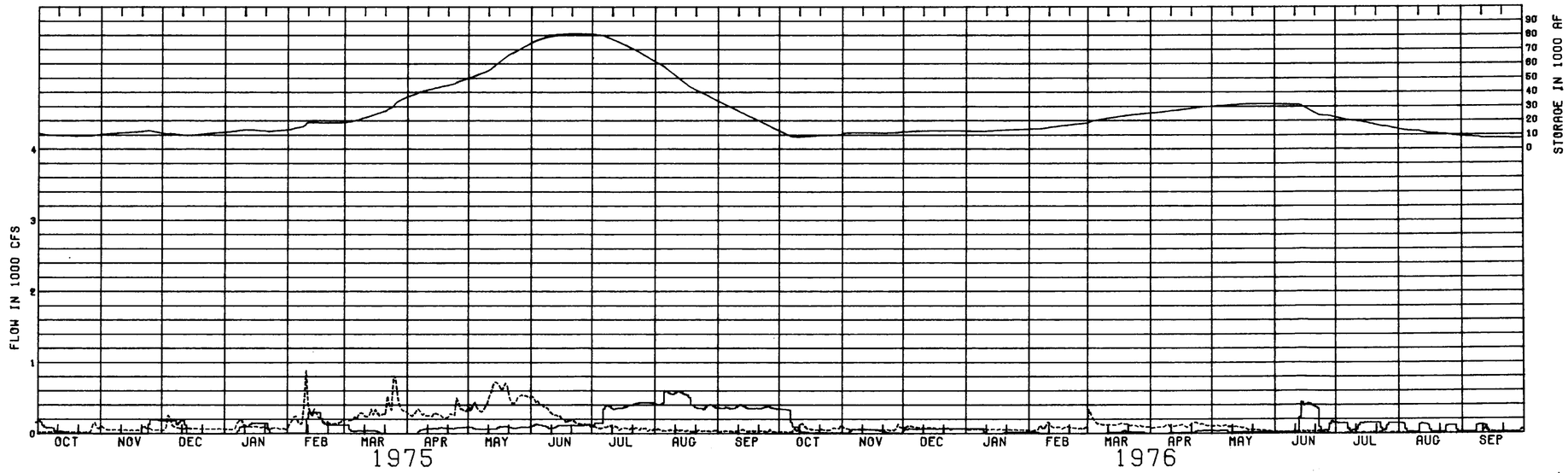
SUCCESS LAKE
TULE RIVER, CALIFORNIA

HISTORICAL OPERATION SUCCESS LAKE

CORPS OF ENGINEERS, SACRAMENTO, CA.
PREPARED L.H.C.
DRAWN CAL-COMP
DATE AUGUST 1980

SHEET 3 OF 6 PLATE 16





LEGEND

Outflow

Inflow

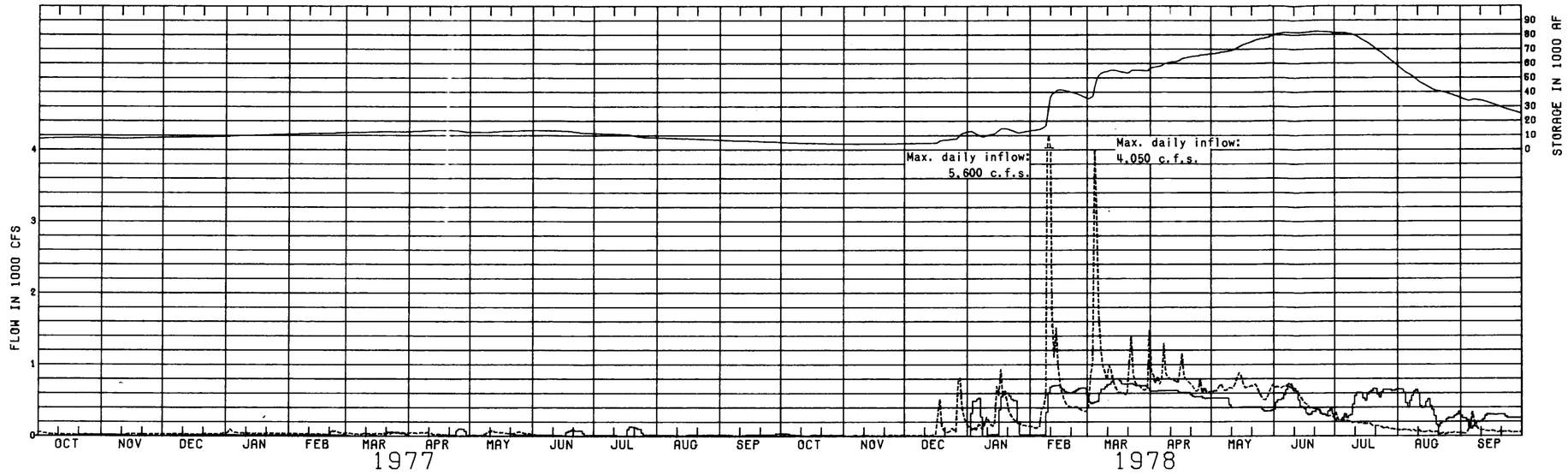
Storage

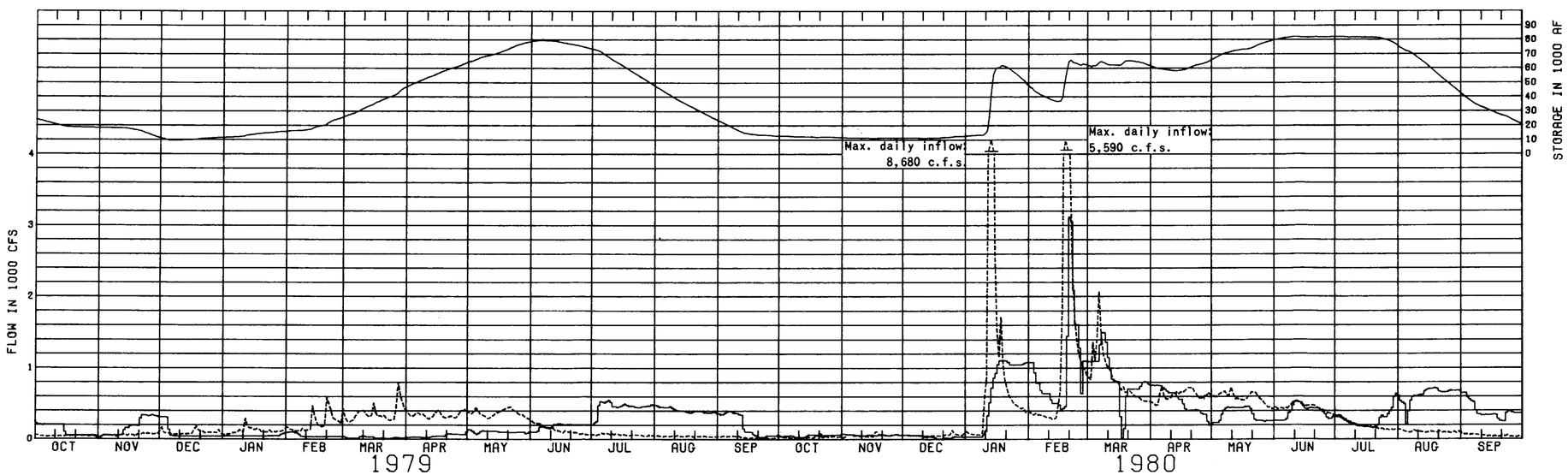
SUCCESS LAKE
TULE RIVER, CALIFORNIA

HISTORICAL OPERATION SUCCESS LAKE

CORPS OF ENGINEERS, SACRAMENTO, CA.

PREPARED L.H.C. DATE AUGUST 1980
DRAWN CAL-COMP





LEGEND:

Outflow

Inflow

Storage

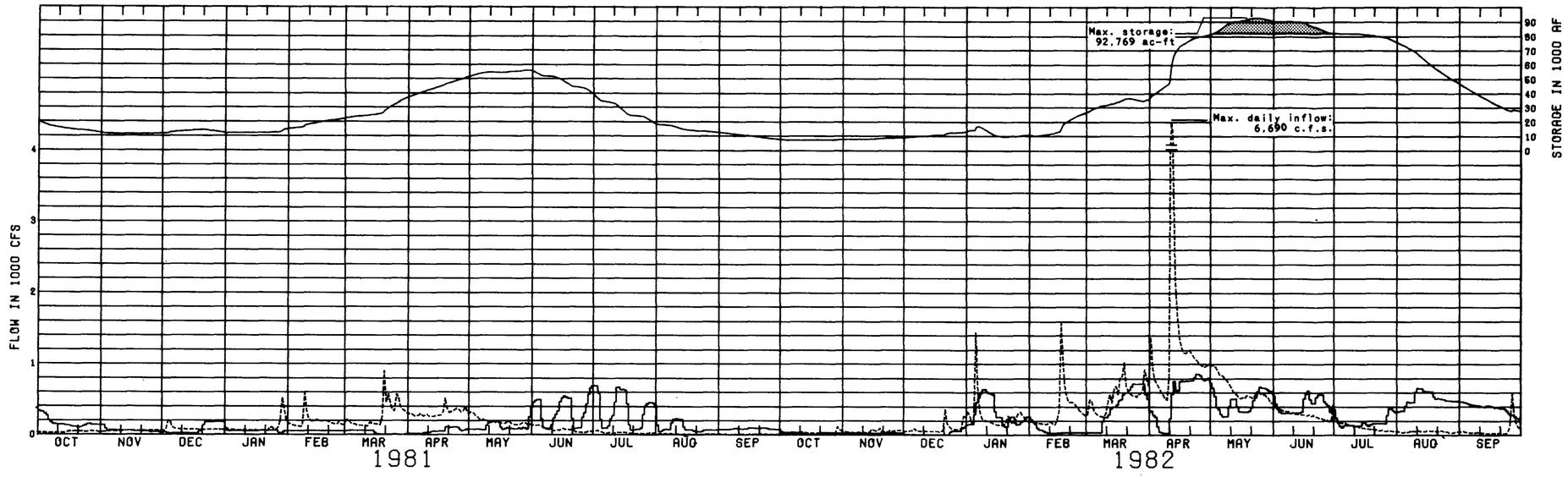
SUCCESS LAKE
TULE RIVER, CALIFORNIA

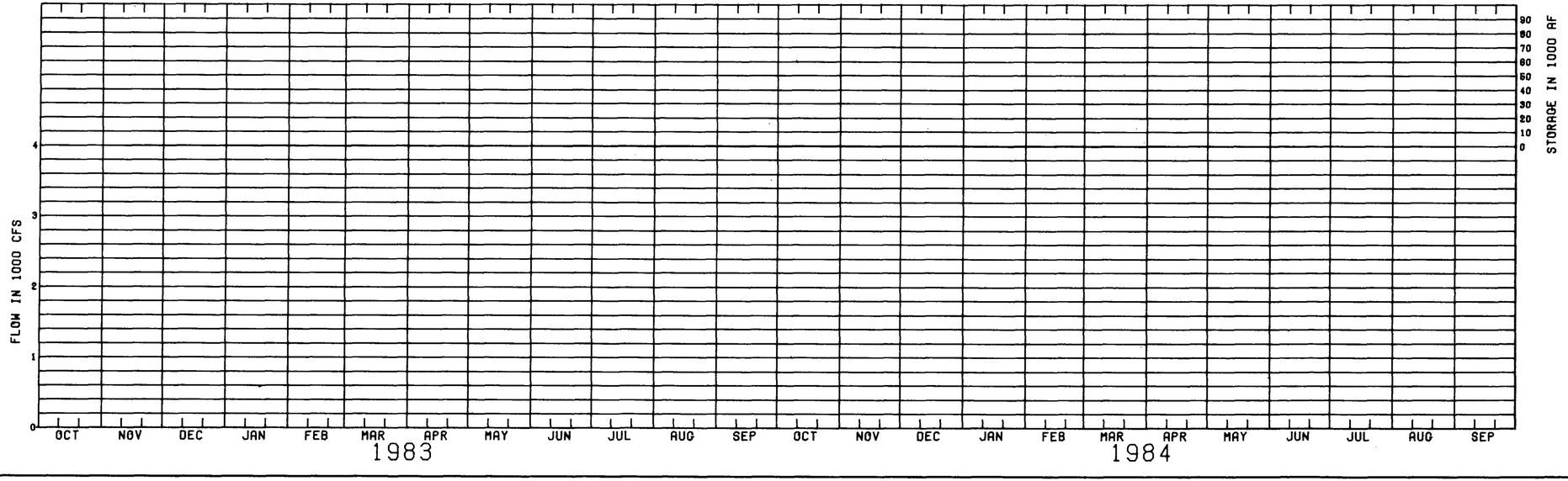
HISTORICAL OPERATION
SUCCESS LAKE

CORPS OF ENGINEERS, SACRAMENTO, CA.

PREPARED L.H.C. DATE OCTOBER 1980
DRAWN CAL-COMP

SHEET 5 OF 6 PLATE 16





LEGEND:

- Outflow
- Inflow
- Storage
- Surcharge operation

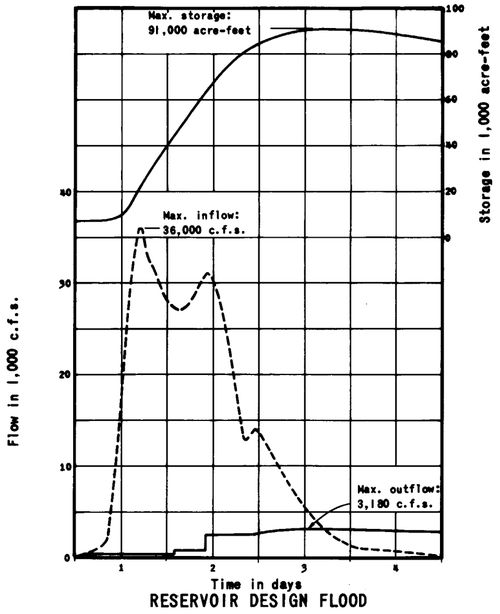
SUCCESS LAKE
TULE RIVER, CALIFORNIA

HISTORICAL OPERATION
SUCCESS LAKE

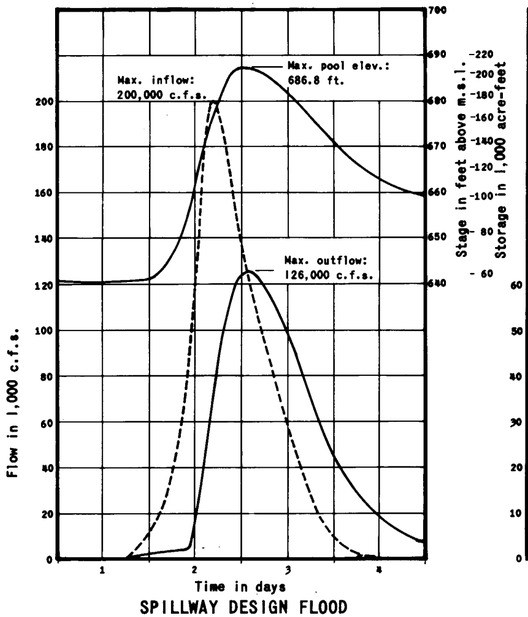
CORPS OF ENGINEERS, SACRAMENTO, CA.

PREPARED: L.H.C.
DRAWN: CAL-COMP
DATE: OCTOBER 1982

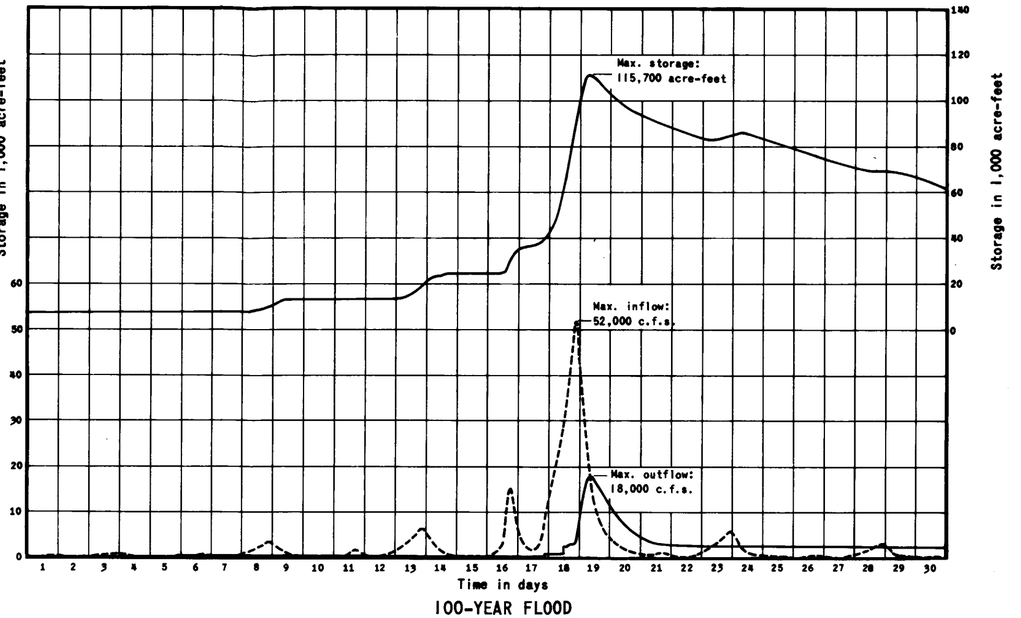
SHEET 6 OF 6 CHART 16



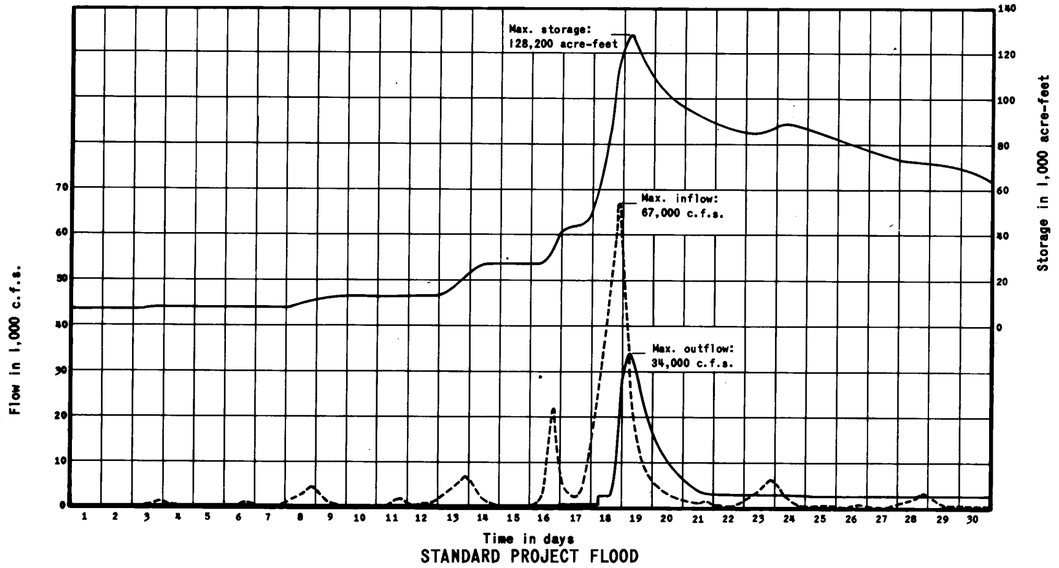
RESERVOIR DESIGN FLOOD



SPILLWAY DESIGN FLOOD



100-YEAR FLOOD



STANDARD PROJECT FLOOD

NOTE:

Routings were made allowing for operating contingencies by assuming 80% of the downstream channel capacities would be achieved by project releases.

SUCCESS LAKE
TULE RIVER, CALIFORNIA

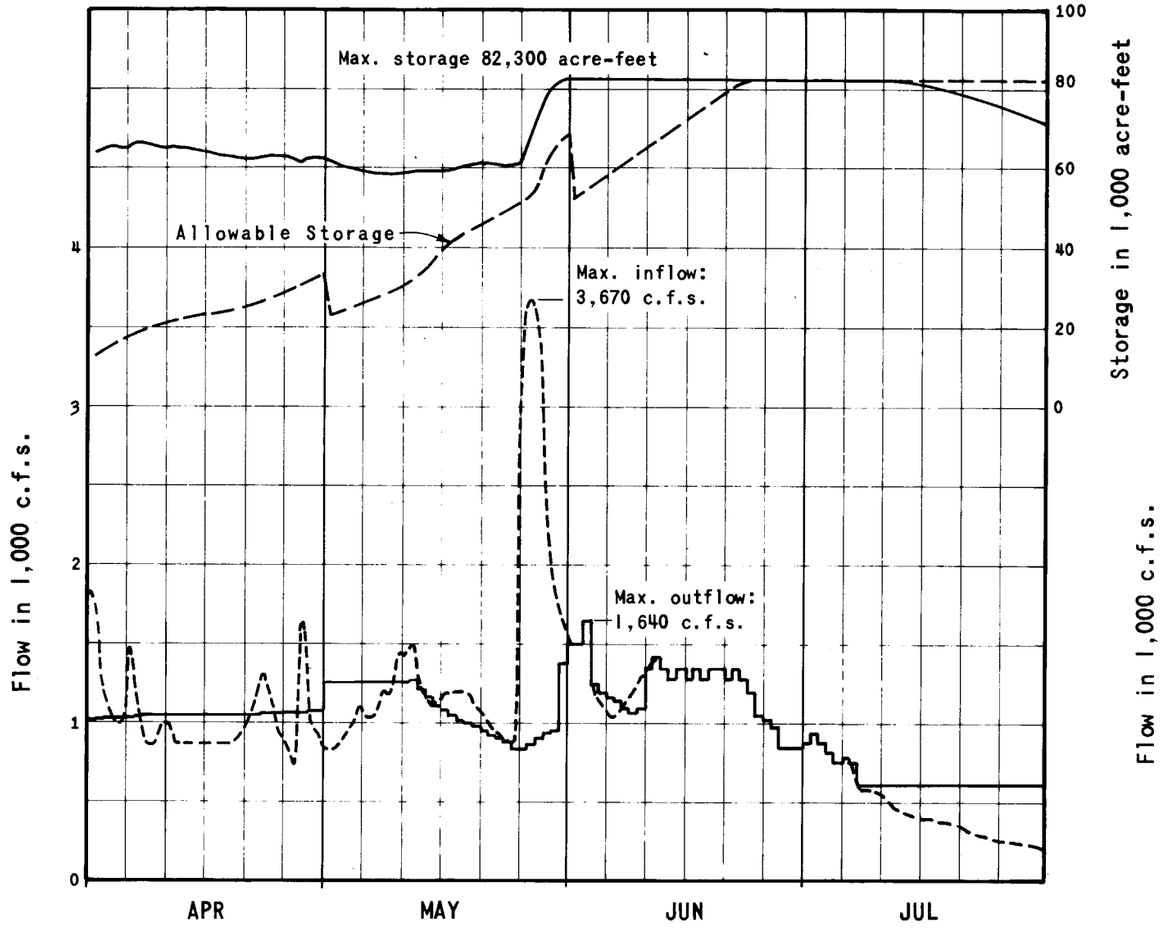
RAIN FLOOD ROUTINGS

CORPS OF ENGINEERS, SACRAMENTO, CA.

Prepared: H.T.M.
Drawn: L.H.C.

Date: OCTOBER 1981

PLATE 17



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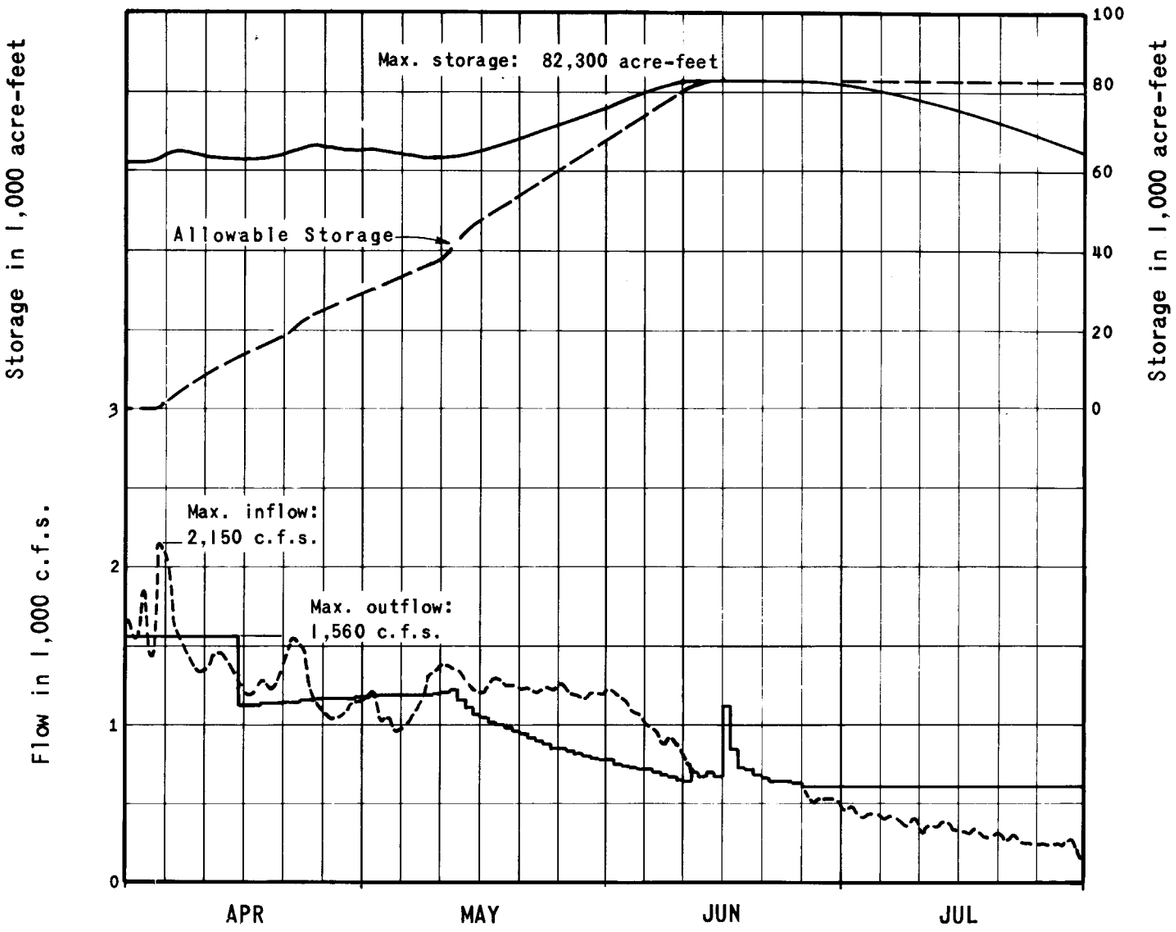


1969

NOTE:

The routings conform to the flood control diagram (Plate A-8). Accurate forecasts were used and were updated monthly.

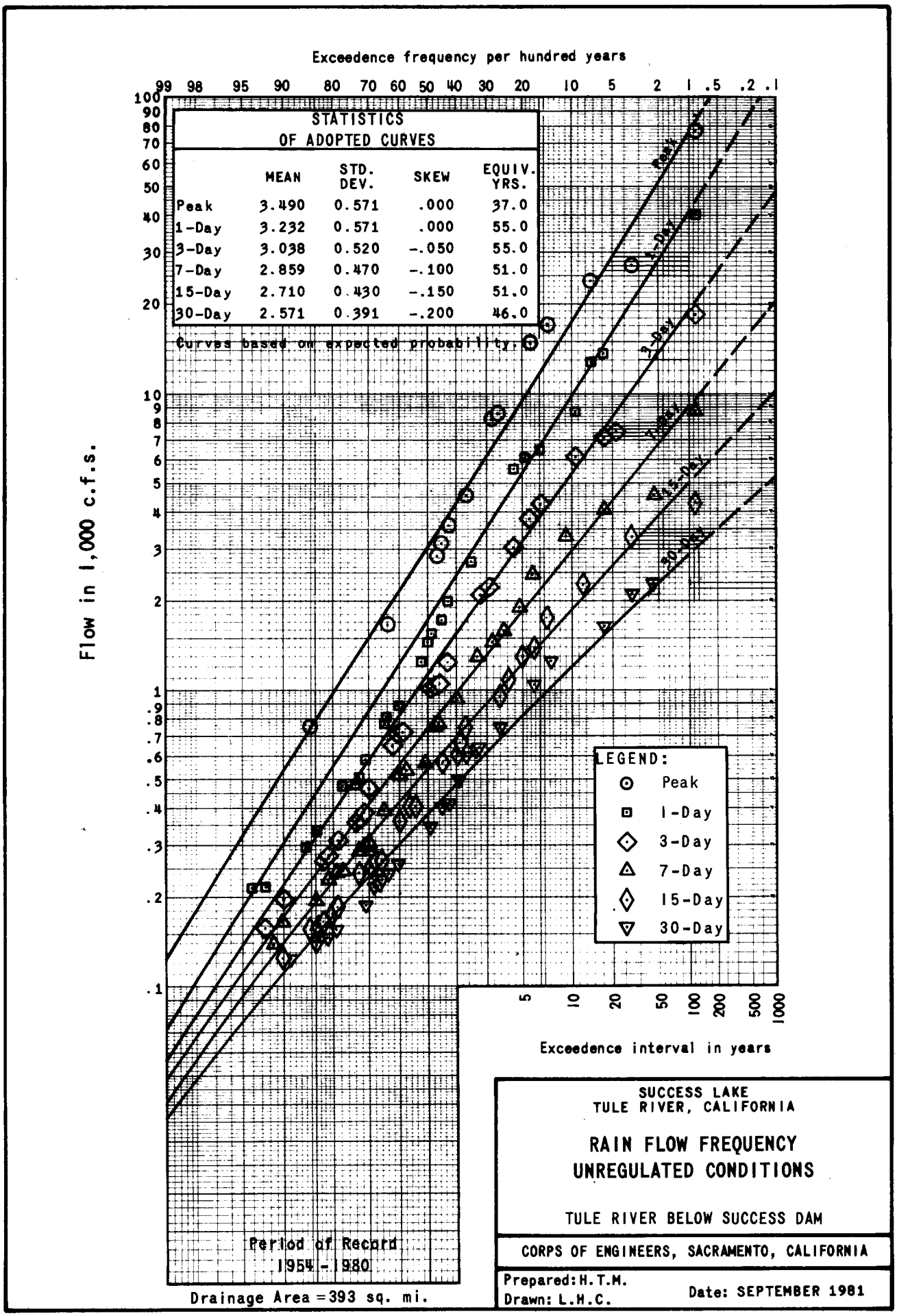
SUCCESS LAKE
TULE RIVER, CALIFORNIA

HYPOTHETICAL ROUTINGS
OF HISTORICAL SNOWMELT FLOODS

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: H.T.M.
Drawn: L.H.C.
Date: NOVEMBER 1981

PLATE 18



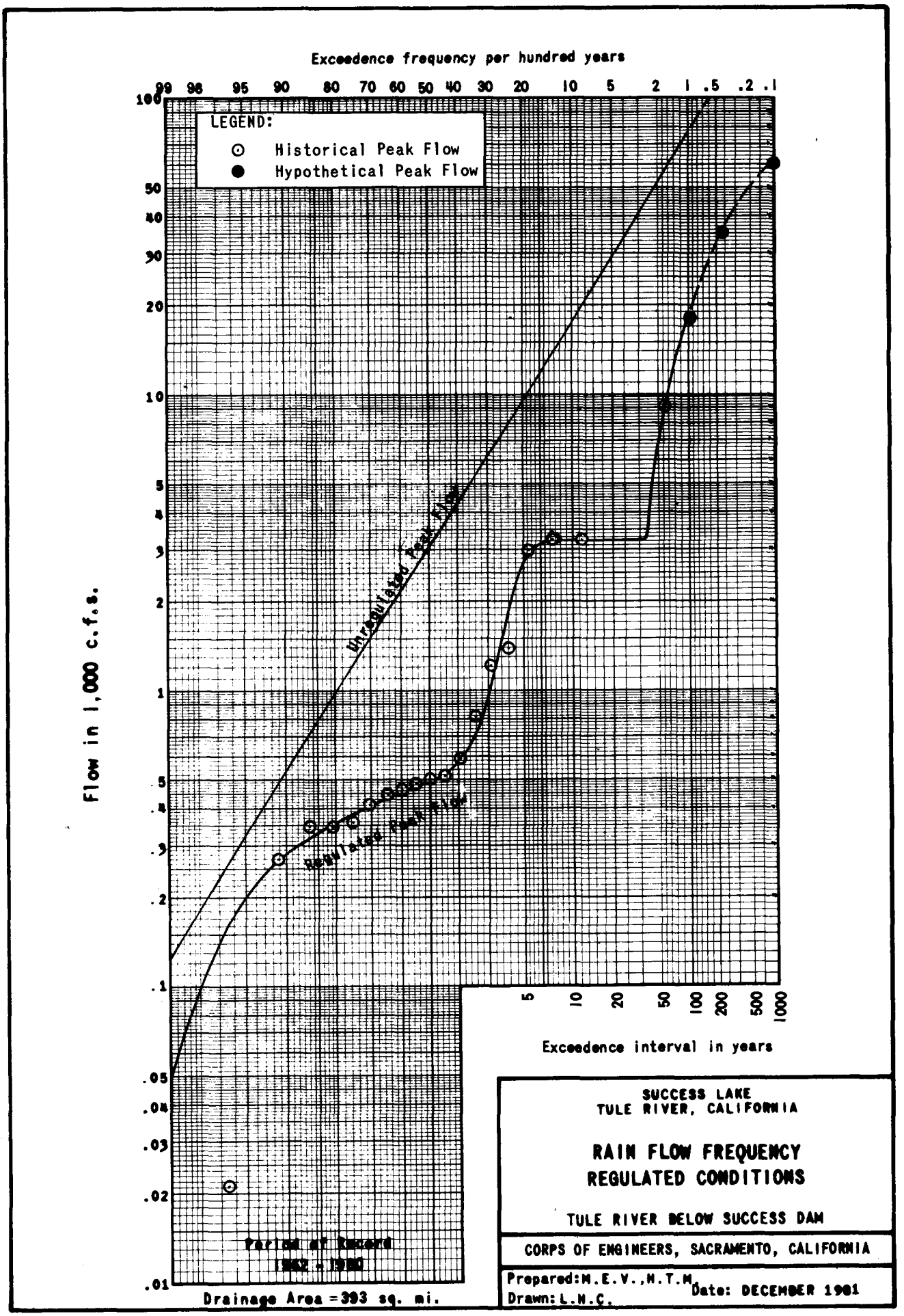
SUCCESS LAKE
TULE RIVER, CALIFORNIA

RAIN FLOW FREQUENCY UNREGULATED CONDITIONS

TULE RIVER BELOW SUCCESS DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: H.T.M.
Drawn: L.H.C.
Date: SEPTEMBER 1981



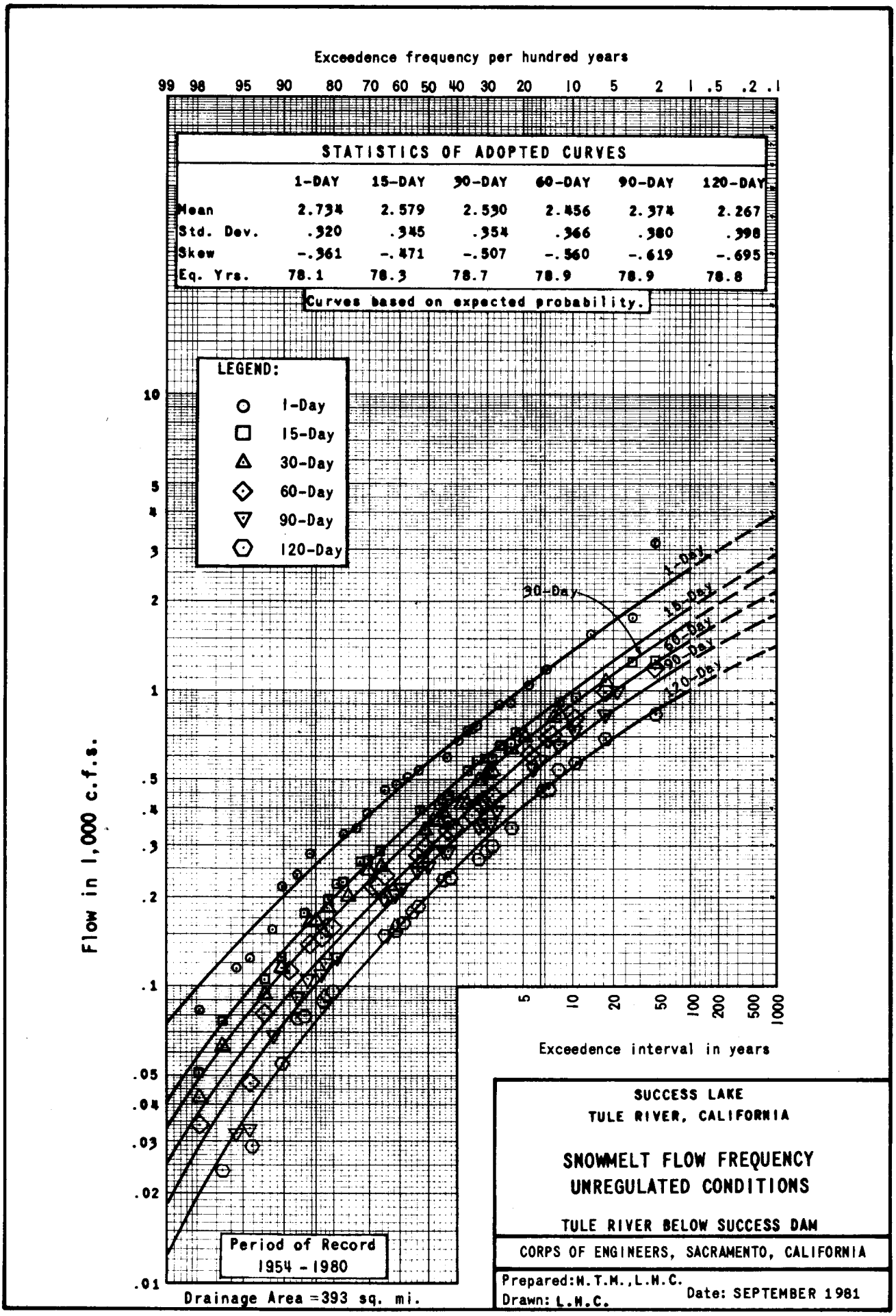
SUCCESS LAKE
TULE RIVER, CALIFORNIA

RAIN FLOW FREQUENCY
REGULATED CONDITIONS

TULE RIVER BELOW SUCCESS DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: M.E.V., H.T.M. Date: DECEMBER 1981
Drawn: L.N.C.



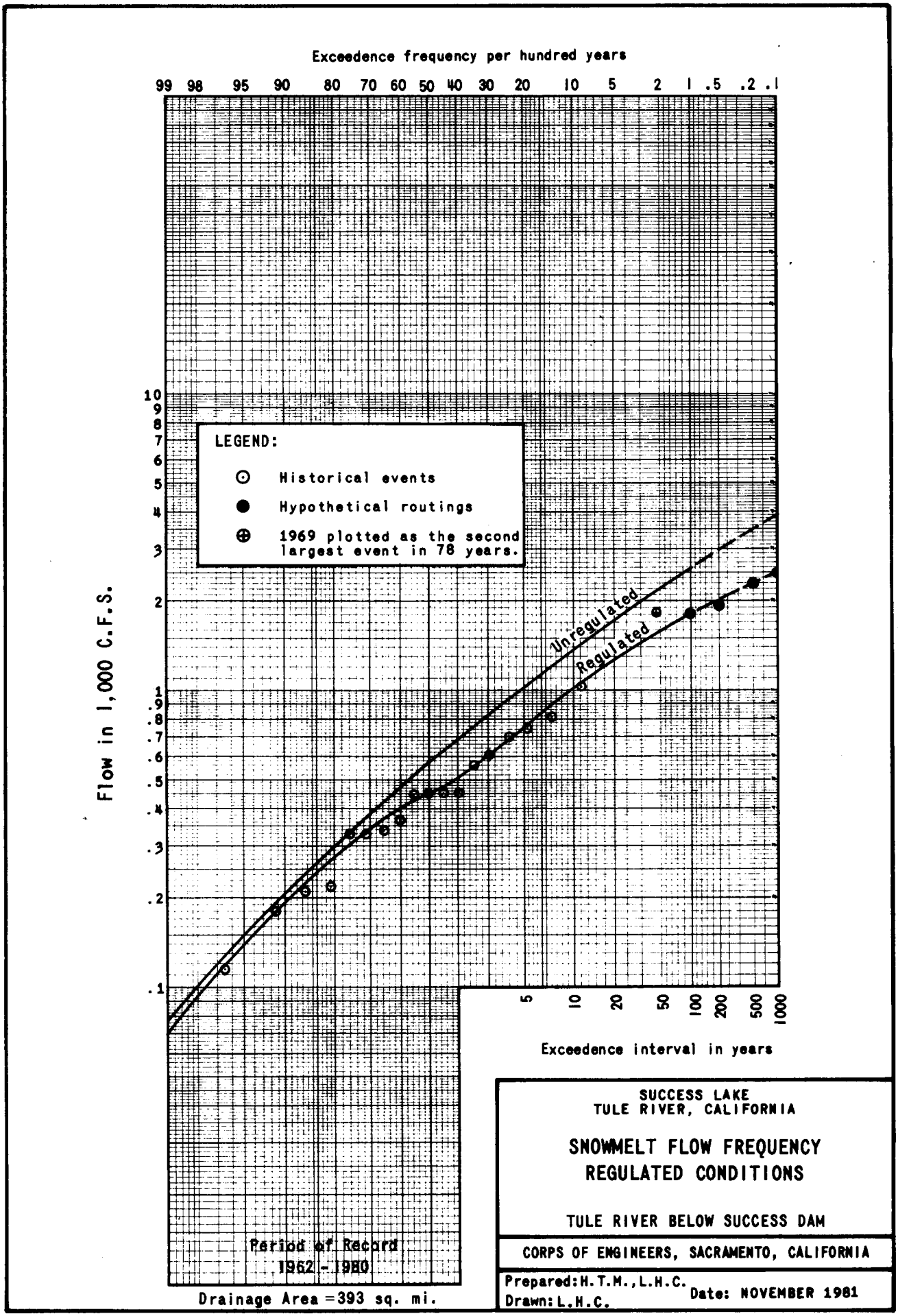
SUCCESS LAKE
TULE RIVER, CALIFORNIA

SNOWMELT FLOW FREQUENCY
UNREGULATED CONDITIONS

TULE RIVER BELOW SUCCESS DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: N.T.M., L.H.C.
Drawn: L.H.C.
Date: SEPTEMBER 1981



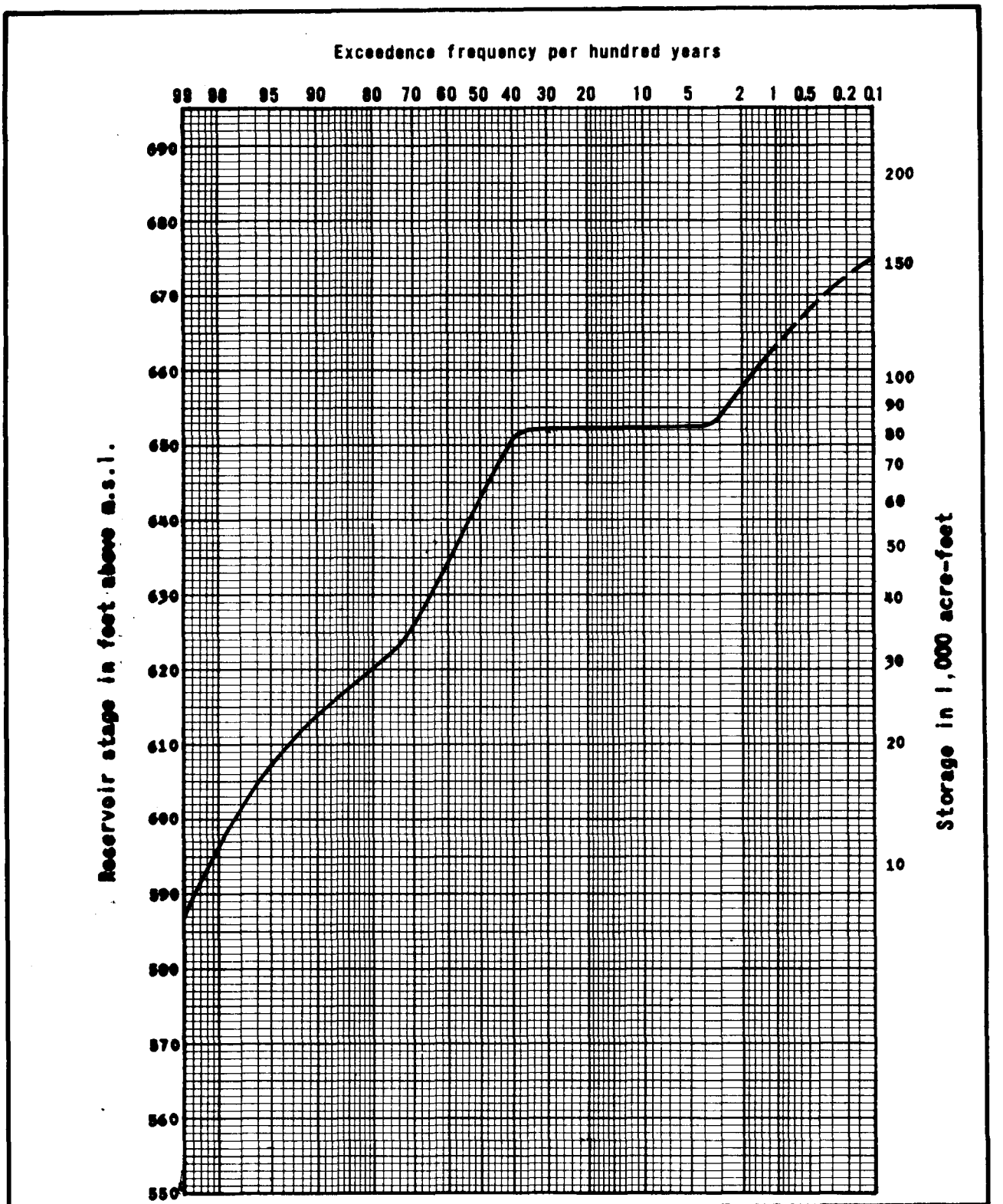
SUCCESS LAKE
TULE RIVER, CALIFORNIA

SNOWMELT FLOW FREQUENCY
REGULATED CONDITIONS

TULE RIVER BELOW SUCCESS DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: H.T.M., L.H.C.
Drawn: L.H.C.
Date: NOVEMBER 1981



SUCCESS LAKE
TULE RIVER, CALIFORNIA

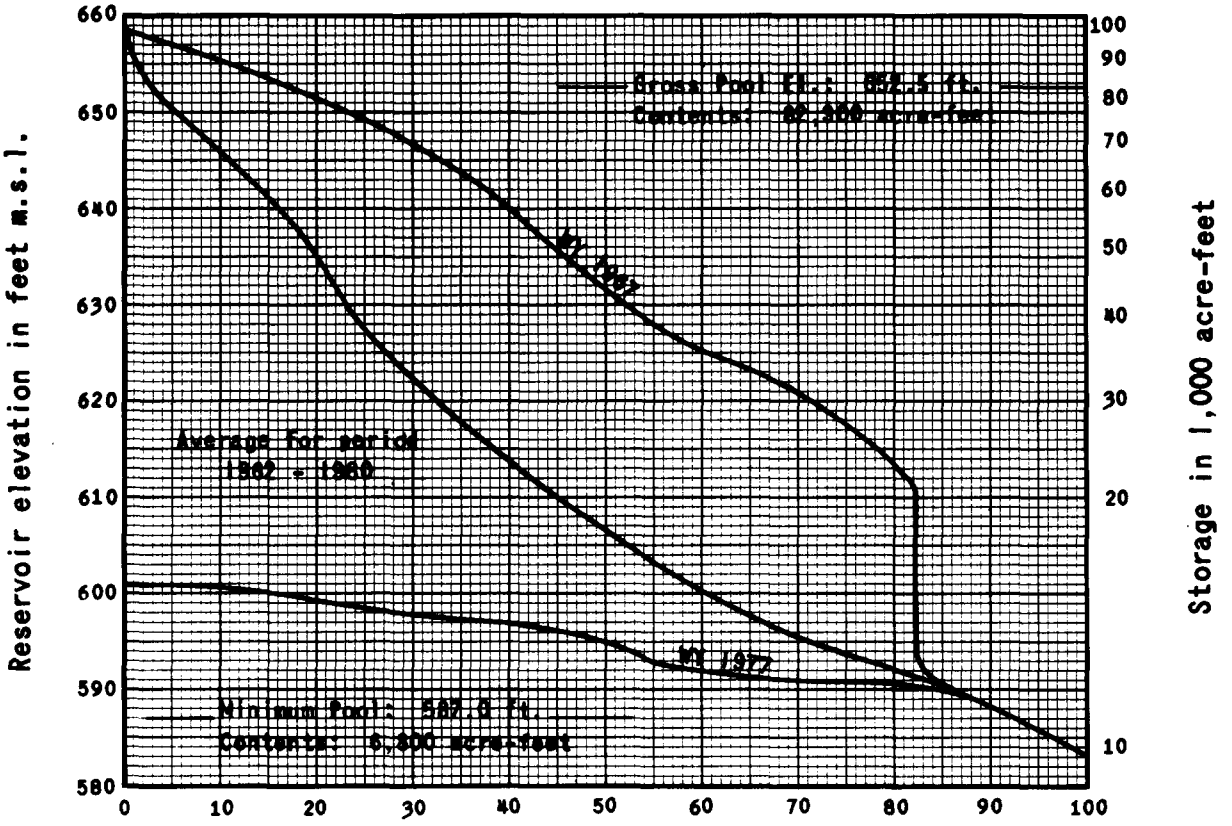
STAGE-FREQUENCY CURVE

Period of Record
1962 - 1980

CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: L.M.C., H.T.M. Date: SEP 1981
Drawn: L.M.C.

PLATE 21



SUCCESS LAKE
TULE RIVER, CALIFORNIA

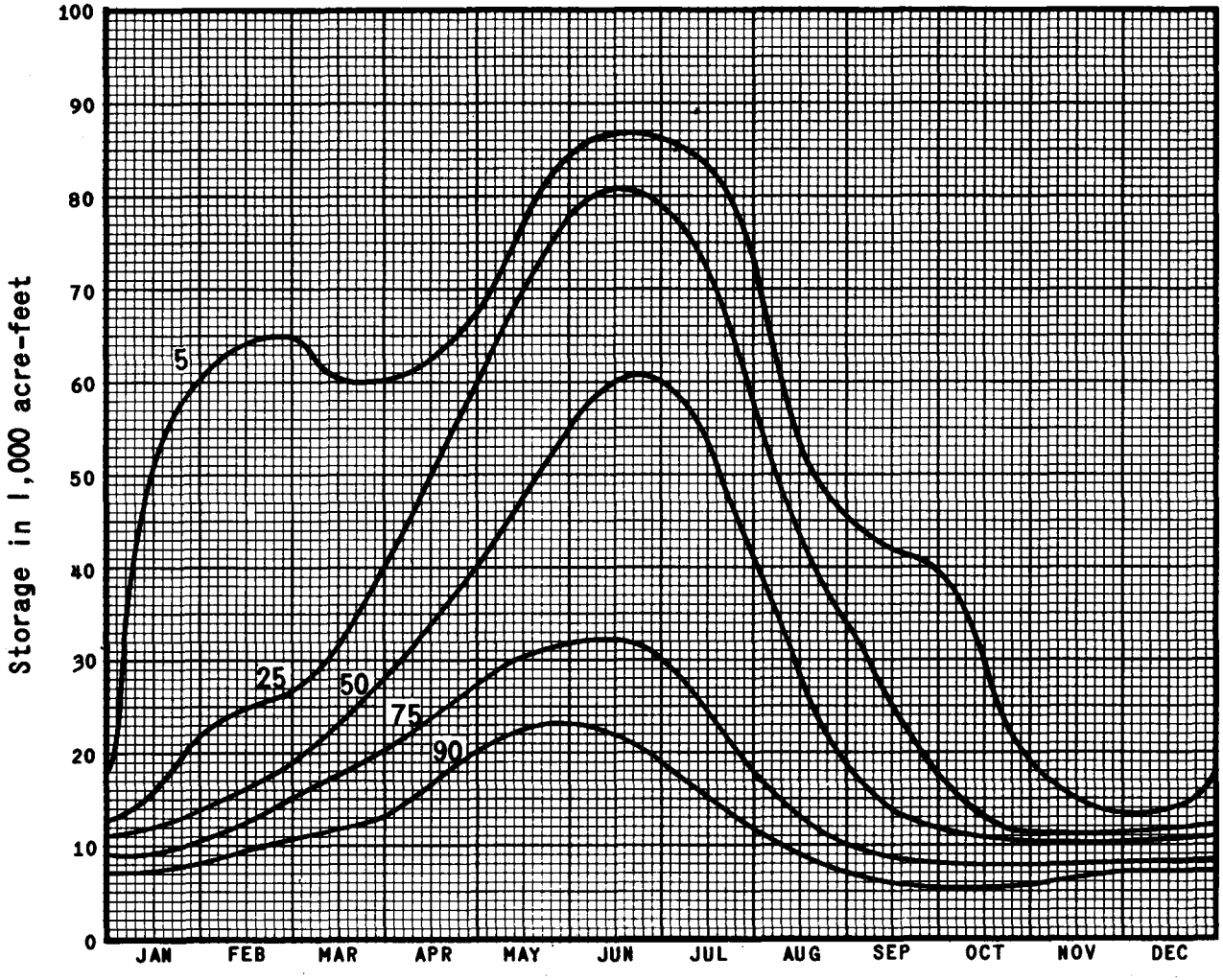
STAGE-DURATION CURVES

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C

Date: OCTOBER 1980

PLATE 22



NOTE:

Indicated value is percentage of year that the storage is exceeded on a given date based on monthly storage frequency curves for the years 1963-1980. Data was extracted from Corps of Engineers Monthly Report Computations.

SUCCESS LAKE
TULE RIVER, CALIFORNIA

SEASONAL VARIATION
OF RESERVOIR STORAGE FREQUENCY

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C.
Date: DECEMBER 1980

PLATE 23

SUCCESS LAKE
TULE RIVER, CALIFORNIA

WATER CONTROL MANUAL

JANUARY 1982

EXHIBIT A

STANDING INSTRUCTIONS TO DAMOPERATOR

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

PERSONNEL CONCERNED IN THE OPERATION OF SUCCESS RESERVOIR

	UNIT	OFFICE PHONE	NAME	HOME PHONE
PROJECT OFFICE PORTERVILLE, CALIFORNIA	SUCCESS RESERVOIR	209-784-0215 (Porterville)	B. PROCTER PARK MANAGER	209-784-0575 (Porterville)
DEPARTMENT OF THE ARMY SACRAMENTO DISTRICT CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA	DISTRICT ENGINEER	916-440-2232‡	COL. A. E. WILLIAMS DISTRICT ENGINEER	
	RESERVOIR CONTROL SECTION	916-440-3405‡	R. A. NEAL CHIEF	916-791-0478 (Roseville)
		916-440-3168‡ 916-440-3167‡	C. D. MATLOCK	916-487-2985
		916-440-2378‡	M. E. VERKE	916-967-4994
	HYDROLOGIC FACILITIES	916-440-2112‡	J. T. JOHNSON	916-687-7212
	OPERATIONS BRANCH	916-440-2327‡	M. L. HELM CHIEF	916-961-1918
		916-440-2305‡	A. E. SMITH, JR. CHIEF, OPERATIONS & MAINTENANCE SECTION	916-652-5280
IRRIGATION INTERESTS	TULE RIVER ASSOCIATION c/o LOWER TULE RIVER IRRIGATION DIST. P.O. BOX 511 WOODVILLE PORTERVILLE, CALIFORNIA	209-784-2598 (Porterville) 209-686-4716 (Tulare)	R. L. SCHAFER WATERMASTER	209-733-1329 (Visalia)
	TULARE LAKE BASIN WATER STORAGE DIST. 1109 WHITLEY AVE. CORCORAN, CALIFORNIA 93212	209-992-4127 (Corcoran)	B. GRAHAM MANAGER	209-582-7603 (Hanford)

FTS: SACRAMENTO 448-2000
NOTE: ‡BETWEEN 4:30 PM AND 7:45 AM, OR ON SATURDAY, SUNDAY OR HOLIDAYS USE 916-452-1535 (FLOOD SEASON ONLY)

SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA REV. 01-OCT-82

STANDING INSTRUCTIONS TO DAMOPERATOR

TABLE OF CONTENTS

LIST OF PLATES

EXHIBIT A

STANDING INSTRUCTIONS TO DAMOPERATOR

A-1. General. This exhibit is prepared in accordance with instructions contained in EM 1110-2-3600, paragraph 4-07, (Standing Instructions to Damoperators) and ETL 1110-2-251 and pertains to duties and responsibilities of the damoperators in connection with the operation of Success Lake, and the reporting of required hydrologic data.

Operational instructions to the damoperator, relating to flood control, are outlined with specific emphasis on flood emergencies when communication facilities between him and the Reservoir Control Section have been disrupted. It is designed to be used independently as a flood control guide, or as published, in conjunction with the water control manual. To facilitate independent use of this appendix, plates required for flood control operation (A-1 through A-8) are included herein.

A-2. Operational Responsibilities. The primary responsibilities for operating Success Lake are delegated to units of the Engineering Division and Construction-Operations Division of the Sacramento District, U.S. Army Corps of Engineers, as outlined below. Names and telephone numbers for the individuals whose responsibilities are outlined are given at the front of this exhibit and at the front of the manual.

a. The Hydrology Section (Engineering Division).

(1) Obtaining current hydrometeorological data and weather forecasts for the region.

(2) Maintaining hydrologic equipment and supervising its operation.

(3) Supervising a program of water quality and sediment measurement.

b. The Reservoir Control Section (Engineering Division).

(1) Analyzing current reservoir and hydrologic data, determining a schedule under which the reservoir shall be operated, and issuing appropriate operating instructions (except for routine day-to-day operations for conservation only) to the reservoir operator.

(2) Preparing monthly operation and other special reports relative to the operation of the reservoir.

(3) Advising the District Engineer through the Chief of Engineering Division whenever there has been an unavoidable departure from these operating rules, or when there is a need for making temporary modification of these operating rules.

(4) Keeping advised at all times of channel and seepage conditions in downstream channels and spreading areas. This will require periodic inspections during years of high runoff.

(5) Maintain a record of nonscheduled operation changes requested by the watermaster and other agencies.

(6) Making necessary revisions to this Water Control Manual and distributing them.

c. The Park Manager (Construction-Operations Division).

(1) Keeping well informed of the operating rules contained in this Water Control Manual and bringing to the attention of the Reservoir Control Section any feature of the manual that may require clarification or revision.

(2) Keeping familiar with the operation of all recording and communication equipment.

(3) Accomplishing the physical operation of the reservoir in accordance with instructions contained in the Water Control Manual or issued by the Reservoir Control Section.

(4) Calculating and maintaining a record of inflows, outflows, storage, weather data, and other data specified by the Reservoir Control Section.

(5) Reporting, by radio or telephone to the Reservoir Control Section, data outlined in this exhibit.

(6) Obtaining necessary information on scheduled downstream irrigation and spreading activities and keeping local interests continuously advised of the routine operation of the reservoir.

(7) Reporting to the Reservoir Control Section any unusual conditions which might interfere with the planned operation of the reservoir.

(8) Maintaining a log of outlet gate operation containing any change in gate position, date, time, and water surface elevation when such changes were made, and initials of the individual accomplishing the change.

(9) Making and recording weekly checks on reservoir and outflow gage readings to assure proper operation of all recording equipment.

(10) Obtaining samples for water quality and sedimentation analysis as required.

(11) Immediately after the end of each month, transmitting to the Reservoir Control Section data specified under reports in paragraph A-6.

(12) Making emergency operation changes when contact with the Reservoir Control Section is broken and a clearly defined change occurs that warrants immediate action.

(13) Maintaining a record of instructions received from the Reservoir Control Section, and requests received from the Tule River Watermaster.

A-3. Computation of Hydrologic Data. During normal operation the following computations are made daily by the indicated personnel.

Reservoir Control Section	Reservoir Operator
Basin Mean Precipitation	Releases from the Reservoir
Basin Wetness Parameter	Inflow to the Reservoir
Evaporation from the Reservoir	Evaporation from the Reservoir
Inflow to the Reservoir	

During emergencies, these computations may be made more frequently as directed by the Reservoir Control Section. The basin mean precipitation, the basin wetness parameter and the reservoir inflow are computed on the HADA computer. Forms are available from the Reservoir Control Section to facilitate manual computations.

a. Mean Daily Releases from the Reservoir.

(1) Check punch tape for errors in gage height and for time. Time is corrected to the current 15 minutes; gage height to the nearest .01 foot.

(2) Tabulate correct gage height readings at odd hours, starting with 0100 hours. Punch tape correction, if any, should be noted.

(3) Enter current rating table, using shifts as applicable, determine and list flow at each odd hour, using the procedure indicated for mean daily flow in (6) below.

(4) Total the 12 flow readings so obtained and divide by 12. This is the mean daily flow.

(5) Mean daily flow will be listed to nearest 0.1 c.f.s. for flows up to 10 c.f.s., and to the nearest 1 c.f.s. for flows above 10 c.f.s. Such values will later be rounded to 3 significant figures by the USGS prior to publication.

(6) When calculating discharge from gage height with a (-) shift correction, enter rating table below the actual height, i.e., if observed gage height is 4.86 and shift is -.02, enter rating table at 4.84 to obtain discharge. For (+) shift, enter rating table above observed gage height.

(7) In order to calculate the gage height for a desired flow under a (-) shift condition, add amount of (-) shift to gage height obtained from table for desired discharge, i.e., if shift is -.03, desired discharge is 5,000 c.f.s., and the rating table shows a gage height of 10.20 = 5,000 c.f.s., the required gage height for 5,000 c.f.s. is 10.20 + .03 = 10.23. For (+) shift, subtract amount of shift from gage height obtained from table for desired discharge.

b. Evaporation from the Reservoir. Lake evaporation in inches is equal to the pan evaporation in inches multiplied by the evaporation coefficient shown on plate A-6. For this computation, pan evaporation measured at 7:00 a.m. is used to compute lake evaporation for the previous day:

Pan evaporation (inches)

x Gross Evaporation Coefficient
12
x Average Lake Area (acres) = acre-feet
(Round to nearest acre-foot for next computation)
acre-feet x 0.50417* = s.f.d. = mean c.f.s. for 24-hours.

*Coefficient shown is for 24-hour day. When changing to daylight savings time or from daylight savings time the coefficients are as follows: for 23-hour day (change to D.S.T.) use 0.52609; for 25-hour day (change from D.S.T.) use 0.48400.

Lake area used when computing evaporation will be the average area for the day; obtained by averaging the midnight areas at the beginning and ending of the period being computed.

c. Inflow to the Reservoir. Computed mean inflow to the lake will be taken as the algebraic sum of the mean outflow, change in lake storage, and evaporation for the lake water surface and will represent mean inflow to the lake from all sources including rainfall on the lake surface.

Mean Daily Outflow (c.f.s.) +
Change in Lake Storage (s.f.d.)+
Evaporation (s.f.d.) =
Mean Inflow (c.f.s.)

d. Basin Mean Precipitation. The approximate basin mean precipitation (BMP) is computed by multiplying the sum of the precipitation at representative rain gages by the conversion factor for the basin and gages. The conversion factor is computed by dividing the basin normal annual precipitation (BNAP) by the sum of the station normal annual precipitation (SNAP)). The computation of the conversion factor (C) for the Tule River Basin and the rain gages normally observed is shown below:

Gage	SNAP
Hossack	42"
Eagle Creek	36"
Rogers Camp	36"
Mountain Home	38"
Success Dam	11"
Sum SNAP	163"

BNAP = 31"

Basin Conversion Factor (C) = 31"/163" = 0.19

e. Basin Wetness Parameter. The basin wetness parameter (PAR) for a given day is the basin mean precipitation (BMP) for that day plus 97 percent

of the previous day's wetness parameter (PAR') and is represented by the equation PAR = BMP + .97 PAR'. A sample computation of PAR is shown in paragraph A-3f.

f. Encroachment. As part of Success Lake's drought contingency plan, Schedule 1 releases may be deferred temporarily during the period 10 November to 1 April to allow storage of 3,200 acre-feet in Schedule 1 space above elevation 588.9 feet subject to the following: The amount of encroachment (E) above elevation 588.9 feet will be dependent on the basin wetness parameter (PAR) and will vary proportionately from 3,200 acre-feet when PAR is 2 inches or less to 0 acre-feet when the PAR Is 6 inches or more. Values of E and PAR are shown in tabular form below along with an example computation.

EXAMPLE

Given:
Station precipitation for 14 January

Success Dam	1.69 in.
Mountain Home	5.00 in.
Rogers Camp	4.40 in.
Eagle Creek	8.80 in.
Hossack	6.40 in.

Data for BMP, PAR and E for the period 8 Jan through 13 Jan.

Date	BMP (in.)	.97 PAR' (in.)	PAR (in.)	E (ac-ft)
8 Jan	0.20	1.56	1.76	3,200
9 Jan	2.00	1.71	3.71	1,832
10 Jan	2.22	3.60	5.82	144
11 Jan	0.50	5.65	6.15	0
12 Jan	1.00	5.97	6.97	0
13 Jan	8.24	6.76	15.00	0
14 Jan	(5.00)	(14.55)	(19.55)	(0)

Basin conversion factor (C) = BNAP/SNAP = 31"/163" = 0.19

Find:

BMP, PAR and E for 14 January.
BMP = C (13.29) = 0.19 (13.29) = 5.00 in.

PAR = BMP + .97 (PAR') = 5.00 + .97 (15.00) = 19.55 in.
(PAR' = previous day's PAR)

E = [6-PAR)/4] 3,200 acre-feet = 0 acre-feet
(E = 0 acre-feet when PAR = 6 in.)

A-4. Outlet Gate Operation. Desired releases through each outlet will be obtained by manipulating the gates until the appropriate stages are obtained as indicated by the current rating curve for Pioneer Ditch (plate A-5) and the current rating curve for the Tule River (plate A-5). The partial gate opening curves on plate A-3 will be used as a guide in estimating gate openings for river outlet releases. Releases to Pioneer Ditch will be regulated by the 42" double disc type gate valve. Other irrigation releases and flood releases below the spillway level will be regulated by the two 5'8" x 10'0" hydraulically operated slide gates. There are no hydraulic limitations on the sequence or arrangement of openings for these two slide gates. However, for larger releases, it is desirable to maintain approximately equal gate openings at the two gates whenever feasible in order to obtain smooth flow through the conduit. Operation of outlets when spillway flows are occurring is described in paragraph A-8.

A-5. Normal Flood Control Operation. Plate A-8 depicts flood control space and flood control release requirements.

a. All inflow in excess of the releases requested by the Tule River irrigation interests will be stored to the extent that conservation space is available.

b. Release of water stored for irrigation will be in accordance with the requests of the Tule River Watermaster, conforming with mutual agreements and stipulations of the water users, unless prior release is required for flood control.

A-6. Reports. The damoperator shall report the following data by radio or telephone to the Reservoir Control Section each work day between 7:30 a.m. and 9:00 a.m.:

a. Reservoir stage as of midnight.

b. Pan evaporation as of 7:00 a.m.

c. Mean daily flows (ending at midnight) of:

(1) Tule River below Success Dam.

(2) Pioneer Ditch below Success Dam

d. Daily precipitation at the dam as measured at 7:00 a.m.

e. Climatological gage readings for precipitation at Eagle Creek, Rogers Camp, Hossack and Mountain Home.

When conditions do not warrant weekend or holiday reports, complete reports for each day shall be made on the first day following the non-reporting period. More frequent reports of the above information and reports of other Tule River data will be made in the same manner when requested by the Reservoir Control Section. Forms furnished to the operators are to be used in computing the above information.

Immediately after the end of each month, the reservoir operator will dispatch to the Reservoir Control Section all original forms used for observations and computations as specified above. The charts and punch tapes for that month from the following instruments will be included.

a. Recording precipitation gage of Success Lake.

b. Recording Hygrothermograph at Success Lake.

c. Reservoir level recorder punch tape.

d. Stream gages below dam on the Tule River and on Pioneer Ditch.

A-7. Special Weather and Flood Reports. During the rain flood season from 1 October to 1 May the damoperator shall call the Reservoir Control Section whenever any of the following occurs:

a. One inch or more of rainfall at the project or at any of the radio-reporting precipitation stations during any 6-hour period or 1.5 inches or more of rainfall during any 24-hour period.

b. An increase in flow at the main Tule River inflow station of 1,000 c.f.s. or more during any 6-hour period.

Any special report based on one of the foregoing criteria should include the latest available data concerning the other item. On nonworking days or at night, these special reports should be telephoned directly to the Chief of the Reservoir Control Section or his designated representative.

A-8. Standing Instructions During Flood Emergency. Flood control operation shall be in accordance with instructions from the Reservoir Control Section. During flood periods, close contact will be maintained between project and District personnel on a 24-day per day basis or as otherwise required.

If communication is broken between the operating personnel and the Sacramento District Office during a flood emergency, continue releases in accordance with the last instructions received from the Sacramento District unless a clearly defined change occurs that warrants immediate action. Every attempt should be made to reestablish communications.

The maximum design release of 3,200 c.f.s. will not be intentionally exceeded. If flow over the spillway occurs, gate releases will be curtailed so as to maintain a flow of 3,200 c.f.s. or less for as long as possible.

A-9. Emergency Notification. For serious emergencies when large spillway releases or dam failure are eminent, an emergency notification plan is maintained at the Success Lake Project Office. The park manager is responsible for implementing the emergency notification plan; however, such notification should be coordinated with the Reservoir Control Section, if possible.

A-10. Modification of Regulations. The reservoir operator may make emergency departures from the regulations in this manual as required by operating equipment failures, accidents such as drownings or other emergencies that require immediate action. The Reservoir Control Section of the Army Corps of Engineers, Sacramento District should be notified of such departures as soon as possible. The District Engineer, Sacramento District, U.S. Army Corps of Engineers may make temporary modifications to these regulations. Permanent changes are subject to approval by the Division Engineer, South Pacific Division, U.S. Army Corps of Engineers.

Area in acres

0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800 4000 4200 4400 4600

Top of Dam El. 691.5 ft.

Spillway Design Flood Pool El. 686.8 ft.

Gross Pool El. 652.5 ft.

Normal Minimum Pool El. 587.0 ft.

CAPACITY

AREA

Elevation in feet above m.s.l.

700 690 680 670 660 650 640 630 620 610 600 590 580 570 560 550

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230

Capacity in 1,000 acre-feet

Note:

From Area-Capacity tables dated September 1978

SUCCESS LAKE
TULE RIVER, CALIFORNIA

AREA-CAPACITY CURVES

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.M.C.
Drawn: L.M.C.

Date: OCTOBER 1980

PLATE A-I

SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA - AREA AND CAPACITY TABLE (SEPT 78)

ELEV FEET	CAP AREA .0	CAP AREA .1	CAP AREA .2	CAP AREA .3	CAP AREA .4	CAP AREA .5	CAP AREA .6	CAP AREA .7	CAP AREA .8	CAP AREA .9
550.0	98	100	103	105	108	111	113	116	119	122
	24	25	25	26	26	27	27	28	28	29
551.0	125	128	131	134	137	140	143	146	150	153
	29	30	30	31	31	32	32	33	33	34
552.0	156	160	163	167	171	174	178	182	186	190
	34	35	36	36	37	37	38	38	39	40
553.0	194	198	202	206	210	215	219	223	228	232
	40	41	41	42	43	43	44	45	45	46
554.0	237	242	246	251	256	261	266	271	276	282
	47	47	48	48	49	50	50	51	52	52
555.0	287	292	298	303	309	314	320	326	332	337
	53	54	55	55	56	57	57	58	59	59
556.0	343	349	356	362	368	374	381	387	394	400
	60	61	62	62	63	64	64	65	66	67
557.0	407	414	421	428	435	442	449	456	463	471
	67	68	69	70	70	71	72	73	73	74
558.0	478	486	493	501	509	517	525	533	541	549
	75	76	76	77	78	79	80	80	81	82
559.0	557	565	574	582	591	599	608	617	626	635
	83	83	84	85	86	87	87	88	89	90
560.0	644	653	662	671	681	690	700	709	719	729
	91	91	92	93	94	95	95	96	97	98
561.0	738	748	758	768	779	789	799	810	820	831
	99	100	100	101	102	103	104	105	105	106
562.0	841	852	863	874	885	896	907	918	930	941
	107	108	109	109	110	111	112	113	114	114
563.0	952	964	976	987	999	1011	1023	1035	1047	1060
	115	116	117	118	119	120	120	121	122	123
564.0	1072	1084	1097	1110	1122	1135	1148	1161	1174	1187
	124	125	125	126	127	128	129	130	131	131
565.0	1200	1213	1227	1240	1254	1267	1281	1295	1309	1323
	132	133	134	135	136	137	138	138	139	140
566.0	1337	1351	1365	1379	1394	1408	1423	1438	1452	1467
	141	142	143	144	144	145	146	147	148	149
567.0	1482	1497	1512	1527	1543	1558	1574	1589	1605	1620
	150	151	152	152	153	154	155	156	157	158
568.0	1636	1652	1668	1684	1700	1717	1733	1750	1766	1783
	159	160	160	161	162	163	164	165	166	167
569.0	1799	1816	1833	1850	1867	1884	1902	1919	1936	1954
	168	169	169	170	171	172	173	174	175	176

PLATE A-2

SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA - AREA AND CAPACITY TABLE (SEPT 78)

ELEV FEET	CAP AREA .0	CAP AREA .1	CAP AREA .2	CAP AREA .3	CAP AREA .4	CAP AREA .5	CAP AREA .6	CAP AREA .7	CAP AREA .8	CAP AREA .9
570.0	1972	1989	2007	2025	2043	2061	2079	2098	2116	2134
	177	178	179	180	181	181	182	183	184	185
571.0	2153	2172	2190	2209	2228	2247	2266	2286	2305	2324
	186	187	188	189	190	191	192	193	194	195
572.0	2344	2364	2383	2403	2423	2443	2463	2483	2504	2524
	196	197	198	199	200	200	201	202	203	204
573.0	2544	2565	2586	2606	2627	2648	2669	2691	2712	2733
	205	206	207	208	209	210	211	212	213	214
574.0	2755	2776	2798	2820	2842	2864	2886	2908	2930	2953
	215	216	217	218	219	221	222	223	224	225
575.0	2975	2998	3021	3043	3066	3089	3113	3136	3159	3183
	226	227	228	229	230	231	232	233	234	235
576.0	3206	3230	3254	3278	3302	3326	3350	3374	3399	3423
	236	237	238	239	241	242	243	244	245	246
577.0	3448	3473	3498	3523	3548	3573	3598	3624	3649	3675
	247	248	249	250	252	253	254	255	256	257
578.0	3701	3727	3753	3779	3805	3831	3858	3884	3911	3938
	258	260	261	262	263	264	265	267	268	269
579.0	3965	3992	4019	4046	4074	4101	4129	4157	4185	4213
	270	271	272	274	275	276	277	278	280	281
580.0	4241	4269	4298	4326	4355	4384	4412	4441	4471	4500
	282	283	285	286	287	288	290	291	292	293
581.0	4529	4559	4588	4618	4648	4678	4708	4739	4769	4799
	295	296	297	298	300	301	302	304	305	306
582.0	4830	4861	4892	4923	4954	4986	5017	5049	5080	5112
	307	309	310	311	313	314	315	317	318	319
583.0	5144	5176	5209	5241	5274	5306	5339	5372	5405	5438
	321	322	323	325	326	328	329	330	332	333
584.0	5472	5505	5539	5573	5607	5641	5675	5709	5744	5779
	335	336	337	339	340	342	343	344	346	347
585.0	5813	5848	5883	5919	5954	5990	6025	6061	6097	6133
	349	350	352	353	355	356	358	359	360	362
586.0	6170	6206	6242	6279	6316	6353	6390	6428	6465	6503
	363	365	366	368	369	371	372	374	375	377
587.0	6540	6578	6616	6655	6693	6732	6770	6809	6848	6887
	379	380	382	383	385	386	388	389	391	393
588.0	6927	6966	7006	7046	7086	7126	7166	7207	7247	7288
	394	396	397	399	400	402	404	405	407	409
589.0	7329	7370	7411	7453	7494	7536	7578	7620	7662	7705
	410	412	413	415	417	418	420	422	423	425

PLATE A-2

SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA - AREA AND CAPACITY TABLE (SEPT 78)

ELEV FEET	CAP AREA .0	CAP AREA .1	CAP AREA .2	CAP AREA .3	CAP AREA .4	CAP AREA .5	CAP AREA .6	CAP AREA .7	CAP AREA .8	CAP AREA .9
590.0	7747	7790	7833	7876	7919	7963	8006	8050	8094	8138
	427	428	430	432	433	435	437	438	440	442
591.0	8182	8226	8271	8316	8361	8406	8451	8497	8542	8588
	443	445	447	448	450	452	454	455	457	459
592.0	8634	8680	8726	8773	8820	8867	8913	8961	9008	9056
	461	462	464	466	468	469	471	473	475	476
593.0	9103	9151	9199	9248	9296	9345	9393	9442	9492	9541
	478	480	482	483	485	487	489	491	492	494
594.0	9590	9640	9690	9740	9790	9841	9891	9942	9993	10044
	496	498	500	501	503	505	507	509	511	512
595.0	10096	10147	10199	10251	10303	10355	10407	10460	10513	10566
	514	516	518	520	522	524	525	527	529	531
596.0	10619	10672	10726	10780	10834	10888	10942	10997	11051	11106
	533	535	537	538	540	542	544	546	548	550
597.0	11161	11217	11272	11328	11383	11440	11496	11552	11609	11665
	552	553	555	557	559	561	563	565	567	569
598.0	11722	11779	11837	11894	11952	12010	12068	12127	12185	12244
	571	573	574	576	578	580	582	584	586	588
599.0	12303	12362	12421	12480	12540	12600	12660	12720	12781	12841
	590	592	594	596	598	600	601	603	605	607
600.0	12902	12963	13024	13086	13147	13209	13271	13333	13396	13458
	609	611	613	615	617	619	621	623	625	627
601.0	13521	13584	13647	13711	13774	13838	13902	13966	14031	14095
	629	631	633	635	637	639	641	643	645	647
602.0	14160	14225	14290	14355	14421	14487	14553	14619	14685	14752
	649	651	653	655	657	659	661	663	665	667
603.0	14819	14885	14953	15020	15088	15155	15223	15291	15360	15428
	669	671	673	675	677	679	681	683	685	687
604.0	15497	15566	15635	15704	15774	15844	15914	15984	16054	16125
	689	691	693	695	697	699	701	703	705	707
605.0	16196	16267	16338	16409	16481	16553	16624	16697	16769	16842
	709	711	713	715	717	719	721	723	725	727
606.0	16914	16987	17061	17134	17208	17281	17355	17430	17504	17579
	729	731	733	735	737	739	741	743	745	747
607.0	17654	17728	17804	17879	17955	18031	18107	18183	18259	18336
	749	751	753	755	757	759	761	764	766	768
608.0	18413	18490	18567	18645	18722	18800	18878	18957	19035	19114
	770	772	774	776	778	780	782	784	786	788
609.0	19193	19272	19351	19431	19511	19591	19671	19751	19832	19912
	790	792	794	796	799	801	803	805	807	809

PLATE A-2

SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA - AREA AND CAPACITY TABLE (SEPT 78)

ELEV FEET	CAP AREA .0	CAP AREA .1	CAP AREA .2	CAP AREA .3	CAP AREA .4	CAP AREA .5	CAP AREA .6	CAP AREA .7	CAP AREA .8	CAP AREA .9
610.0	19994	20075	20156	20238	20320	20402	20484	20566	20649	20732
	811	813	815	817	819	821	823	826	828	830
611.0	20815	20898	20982	21065	21149	21233	21318	21402	21487	21572
	832	834	836	838	840	842	844	847	849	851
612.0	21657	21743	21828	21914	22000	22086	22173	22259	22346	22433
	853	855	857	859	861	863	866	868	870	872
613.0	22521	22608	22696	22784	22872	22961	23049	23138	23227	23316
	874	876	878	881	883	885	887	889	891	894
614.0	23406	23495	23585	23675	23766	23856	23947	24038	24129	24221
	896	898	900	902	904	907	909	911	913	915
615.0	24312	24404	24496	24588	24681	24774	24867	24960	25053	25147
	917	920	922	924	926	929	931	933	935	937
616.0	25241	25335	25429	25524	25618	25713	25809	25904	26000	26096
	940	942	944	946	949	951	953	955	958	960
617.0	26192	26288	26385	26481	26578	26676	26773	26871	26969	27067
	962	964	967	969	971	974	976	978	981	983
618.0	27165	27264	27363	27462	27561	27661	27761	27861	27961	28062
	985	988	990	992	995	997	999	1002	1004	1006
619.0	28162	28263	28365	28466	28568	28670	28772	28874	28977	29080
	1009	1011	1014	1016	1018	1021	1023	1026	1028	1030
620.0	29183	29286	29390	29494	29598	29703	29807	29912	30017	30123
	1033	1035	1038	1040	1043	1045	1048	1050	1053	1055
621.0	30228	30334	30440	30547	30653	30760	30867	30975	31082	31190
	1058	1060	1063	1065	1068	1070	1073	1075	1078	1081
622.0	31299	31407	31516	31625	31734	31844	31953	32063	32173	32284
	1083	1086	1088	1091	1094	1096	1099	1101	1104	1107
623.0	32395	32506	32617	32729	32841	32953	33065	33178	33291	33404
	1109	1112	1115	1118	1120	1123	1126	1128	1131	1134
624.0	33518	33632	33746	33860	33975	34090	34205	34320	34436	34552
	1137	1139	1142	1145	1148	1151	1153	1156	1159	1162
625.0	34669	34785	34902	35019	35137	35255	35372	35491	35609	35728
	1165	1168	1171	1173	1176	1179	1182	1185	1188	1191
626.0	35848	35967	36087	36207	36328	36449	36569	36691	36812	36934
	1194	1197	1200	1203	1206	1209	1212	1215	1218	1221
627.0	37057	37179	37302	37425	37549	37673	37797	37921	38046	38171
	1224	1227	1230	1234	1237	1240	1243	1246	1249	1252
628.0	38297	38422	38548	38675	38801	38929	39056	39184	39311	39440
	1256	1259	1262	1265	1269	1272	1275	1278	1282	1285
629.0	39569	39697	39827	39956	40087	40217	40348	40479	40610	40742
	1288	1292	1295	1298	1302	1305	1309	1312	1316	1319

SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA - AREA AND CAPACITY TABLE (SEPT 78)

ELEV FEET	CAP AREA .0	CAP AREA .1	CAP AREA .2	CAP AREA .3	CAP AREA .4	CAP AREA .5	CAP AREA .6	CAP AREA .7	CAP AREA .8	CAP AREA .9
630.0	40874	41006	41139	41272	41406	41540	41674	41808	41943	42078
	1322	1326	1329	1333	1336	1340	1344	1347	1351	1354
631.0	42214	42350	42486	42623	42760	42897	43035	43173	43312	43451
	1358	1361	1365	1369	1372	1376	1380	1383	1387	1391
632.0	43590	43730	43870	44010	44151	44292	44434	44576	44718	44861
	1395	1398	1402	1406	1410	1414	1418	1421	1425	1429
633.0	45004	45147	45291	45435	45580	45725	45871	46017	46163	46309
	1433	1437	1441	1445	1449	1453	1457	1461	1465	1469
634.0	46457	46604	46752	46900	47049	47198	47348	47498	47648	47799
	1473	1477	1481	1485	1489	1493	1498	1502	1506	1510
635.0	47950	48102	48254	48406	48559	48713	48866	49021	49175	49330
	1514	1519	1523	1527	1531	1536	1540	1544	1549	1553
636.0	49486	49642	49798	49955	50112	50270	50428	50587	50746	50905
	1557	1562	1566	1571	1575	1580	1584	1588	1593	1598
637.0	51066	51226	51387	51548	51710	51872	52035	52198	52362	52526
	1602	1607	1611	1616	1620	1625	1630	1634	1639	1644
638.0	52691	52855	53021	53187	53354	53521	53688	53856	54024	54193
	1648	1653	1658	1663	1667	1672	1677	1682	1687	1691
639.0	54363	54532	54703	54873	55045	55217	55389	55562	55735	55909
	1696	1701	1706	1711	1716	1721	1726	1731	1736	1741
640.0	56084	56258	56434	56609	56786	56963	57140	57318	57496	57675
	1746	1751	1756	1761	1766	1771	1776	1781	1786	1792
641.0	57855	58034	58215	58396	58578	58760	58942	59125	59309	59493
	1797	1802	1807	1812	1818	1823	1828	1834	1839	1844
642.0	59678	59863	60049	60235	60422	60609	60797	60986	61174	61364
	1849	1855	1860	1866	1871	1876	1882	1887	1893	1898
643.0	61554	61745	61936	62127	62320	62513	62706	62900	63094	63290
	1904	1909	1915	1920	1926	1931	1937	1942	1948	1954
644.0	63486	63681	63878	64075	64273	64472	64671	64871	65071	65272
	1959	1965	1970	1976	1982	1987	1993	1999	2005	2010
645.0	65473	65675	65877	66080	66284	66488	66693	66898	67104	67311
	2016	2022	2028	2033	2039	2045	2051	2057	2063	2068
646.0	67518	67726	67934	68143	68352	68563	68773	68985	69196	69409
	2074	2080	2086	2092	2098	2104	2110	2116	2122	2128
647.0	69622	69836	70050	70265	70480	70697	70913	71130	71348	71567
	2134	2140	2146	2152	2158	2164	2170	2176	2182	2188
648.0	71786	72005	72226	72447	72668	72891	73113	73337	73561	73786
	2194	2200	2207	2213	2219	2225	2231	2237	2243	2250
649.0	74011	74237	74463	74690	74918	75147	75375	75605	75835	76066
	2256	2262	2268	2274	2281	2287	2293	2299	2306	2312

PLATE A-2

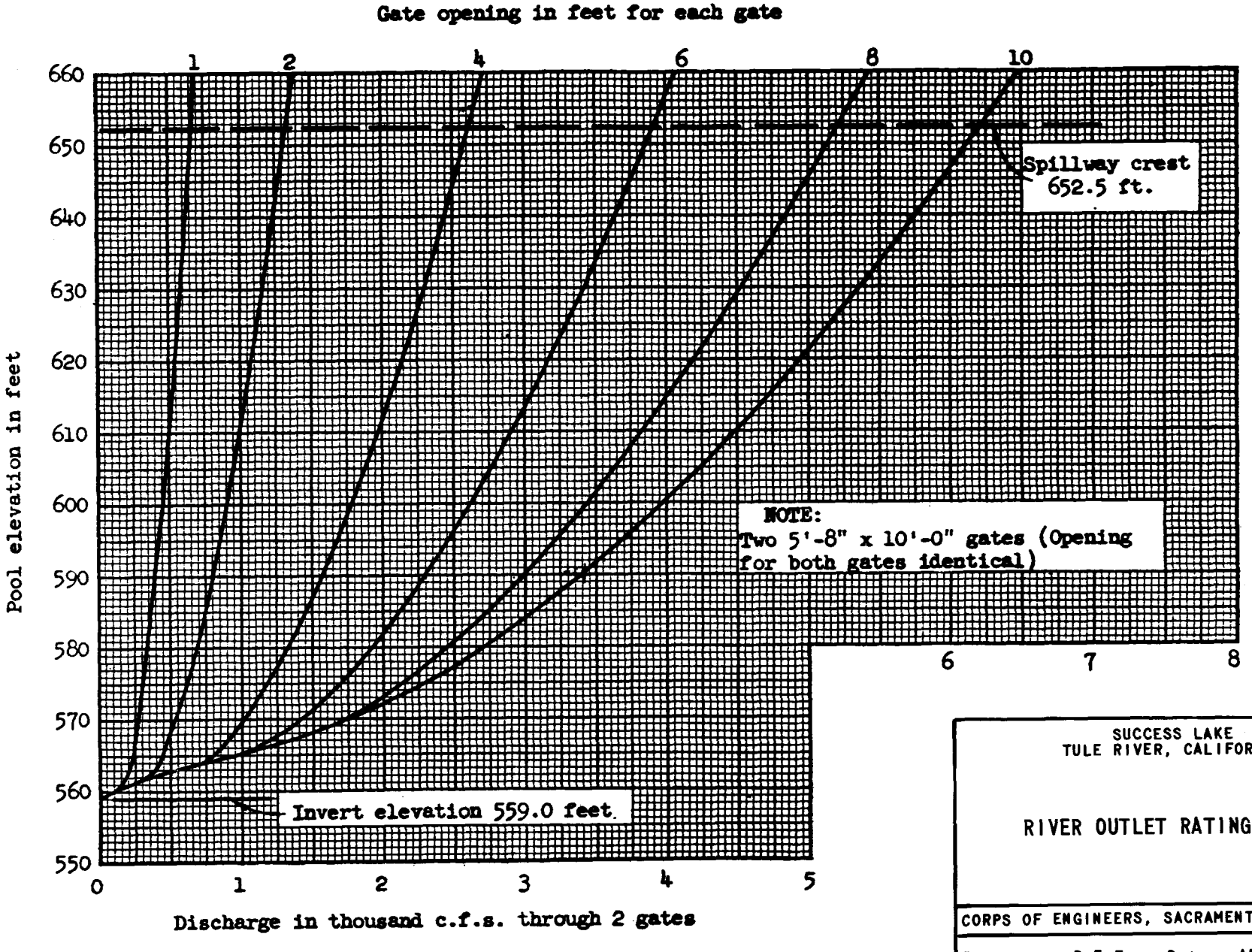
SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA - AREA AND CAPACITY TABLE (SEPT 78)

ELEV FEET	CAP AREA .0	CAP AREA .1	CAP AREA .2	CAP AREA .3	CAP AREA .4	CAP AREA .5	CAP AREA .6	CAP AREA .7	CAP AREA .8	CAP AREA .9
650.0	76298	76530	76763	76996	77230	77465	77700	77936	78172	78410
	2318	2324	2331	2337	2343	2350	2356	2362	2369	2375
651.0	78648	78886	79125	79364	79605	79846	80087	80330	80572	80816
	2381	2388	2394	2400	2407	2413	2419	2426	2432	2439
652.0	81061	81305	81551	81797	82043	82291	82539	82788	83037	83287
	2445	2451	2458	2464	2471	2477	2483	2490	2496	2503
653.0	83538	83788	84041	84293	84546	84800	85054	85310	85565	85822
	2509	2516	2522	2528	2535	2541	2548	2554	2561	2567
654.0	86079	86336	86595	86853	87113	87374	87634	87896	88158	88421
	2574	2580	2587	2593	2599	2606	2612	2619	2625	2632
655.0	88685	88949	89214	89479	89745	90012	90279	90548	90816	91085
	2638	2645	2651	2658	2664	2671	2677	2684	2690	2697
656.0	91356	91626	91897	92169	92442	92715	92989	93264	93538	93814
	2703	2710	2716	2723	2729	2735	2742	2748	2755	2761
657.0	94091	94368	94646	94924	95203	95483	95763	96044	96325	96608
	2768	2774	2781	2787	2794	2800	2806	2813	2819	2826
658.0	96891	97174	97459	97743	98029	98315	98602	98889	99177	99466
	2832	2839	2845	2852	2858	2864	2871	2877	2884	2890
659.0	99756	100045	100336	100627	100919	101212	101504	101798	102092	102388
	2896	2903	2909	2916	2922	2928	2935	2941	2947	2954
660.0	102684	102980	103277	103574	103873	104172	104471	104771	105072	105373
	2960	2966	2973	2979	2985	2992	2998	3004	3011	3017
661.0	105676	105978	106281	106585	106890	107195	107500	107807	108114	108422
	3023	3030	3036	3042	3048	3055	3061	3067	3073	3080
662.0	108730	109039	109348	109658	109969	110281	110592	110905	111218	111532
	3086	3092	3098	3104	3111	3117	3123	3129	3135	3141
663.0	111847	112161	112477	112793	113110	113428	113746	114065	114384	114704
	3148	3154	3160	3166	3172	3178	3184	3190	3196	3203
664.0	115025	115346	115668	115990	116313	116637	116961	117286	117611	117937
	3209	3215	3221	3227	3233	3239	3245	3251	3257	3263
665.0	118264	118590	118919	119246	119576	119906	120235	120566	120897	121229
	3269	3275	3281	3287	3293	3299	3305	3310	3316	3322
666.0	121562	121895	122229	122563	122898	123234	123569	123906	124243	124581
	3328	3334	3340	3346	3352	3358	3363	3369	3375	3381
667.0	124920	125258	125598	125938	126279	126620	126962	127305	127647	127991
	3387	3392	3398	3404	3410	3416	3421	3427	3433	3439
668.0	128335	128680	129025	129371	129717	130065	130412	130760	131109	131458
	3444	3450	3456	3462	3467	3473	3479	3484	3490	3496
669.0	131808	132158	132510	132861	133213	133566	133919	134273	134627	134982
	3501	3507	3513	3518	3524	3529	3535	3541	3546	3552

SUCCESS RESERVOIR, TULE RIVER, CALIFORNIA - AREA AND CAPACITY TABLE (SEPT 78)

ELEV FEET	CAP AREA .0	CAP AREA .1	CAP AREA .2	CAP AREA .3	CAP AREA .4	CAP AREA .5	CAP AREA .6	CAP AREA .7	CAP AREA .8	CAP AREA .9
670.0	135338	135693	136050	136407	136765	137124	137482	137842	138201	138562
	3557	3563	3569	3574	3580	3585	3591	3596	3602	3607
671.0	138923	139284	139647	140009	140372	140736	141100	141466	141830	142197
	3613	3619	3624	3630	3635	3641	3646	3652	3657	3662
672.0	142564	142930	143298	143666	144035	144404	144774	145144	145515	145886
	3668	3673	3679	3684	3690	3695	3701	3706	3712	3717
673.0	146259	146631	147004	147377	147752	148127	148501	148878	149253	149631
	3722	3728	3733	3739	3744	3749	3755	3760	3766	3771
674.0	150008	150386	150765	151143	151523	151903	152283	152665	153046	153429
	3777	3782	3787	3793	3798	3803	3809	3814	3820	3825
675.0	153812	154194	154579	154963	155348	155734	156119	156506	156892	157280
	3830	3836	3841	3846	3852	3857	3863	3868	3873	3879
676.0	157669	158057	158447	158836	159226	159618	160008	160401	160792	161186
	3884	3889	3895	3900	3905	3911	3916	3922	3927	3932
677.0	161580	161973	162368	162763	163159	163555	163951	164349	164746	165145
	3938	3943	3948	3954	3959	3964	3970	3975	3980	3986
678.0	165544	165943	166343	166743	167144	167546	167948	168351	168753	169157
	3991	3996	4002	4007	4013	4018	4023	4029	4034	4039
679.0	169562	169966	170372	170777	171184	171591	171998	172406	172814	173223
	4045	4050	4055	4061	4066	4071	4077	4082	4088	4093
680.0	173633	174043	174454	174865	175277	175689	176101	176515	176928	177343
	4098	4104	4109	4114	4120	4125	4130	4136	4141	4146
681.0	177758	178173	178590	179005	179423	179841	180258	180677	181096	181516
	4152	4157	4162	4168	4173	4178	4184	4189	4194	4199
682.0	181937	182357	182778	183200	183622	184046	184468	184893	185316	185742
	4205	4210	4215	4221	4226	4231	4236	4242	4247	4252
683.0	186168	186593	187020	187446	187874	188303	188731	189160	189589	190020
	4257	4262	4268	4273	4278	4283	4288	4293	4298	4303
684.0	190451	190881	191313	191745	192178	192611	193044	193479	193913	194348
	4309	4314	4319	4324	4329	4334	4339	4344	4348	4353
685.0	194784	195220	195656	196093	196531	196969	197407	197846	198285	198725
	4358	4363	4368	4373	4377	4382	4387	4392	4396	4401
686.0	199166	199606	200048	200489	200932	201375	201817	202261	202704	203149
	4405	4410	4414	4419	4423	4428	4432	4436	4441	4445
687.0	203594	204038	204484	204929	205376	205823	206270	206718	207165	207614
	4449	4453	4457	4461	4465	4469	4473	4477	4481	4484
688.0	208063	208511	208961	209410	209860	210311	210761	211212	211663	212115
	4488	4491	4495	4498	4502	4505	4508	4511	4514	4517
689.0	212567	213019	213472	213924	214377	214831	215284	215738	216191	216646
	4520	4523	4526	4528	4531	4533	4536	4538	4540	4542

PLATE A-2



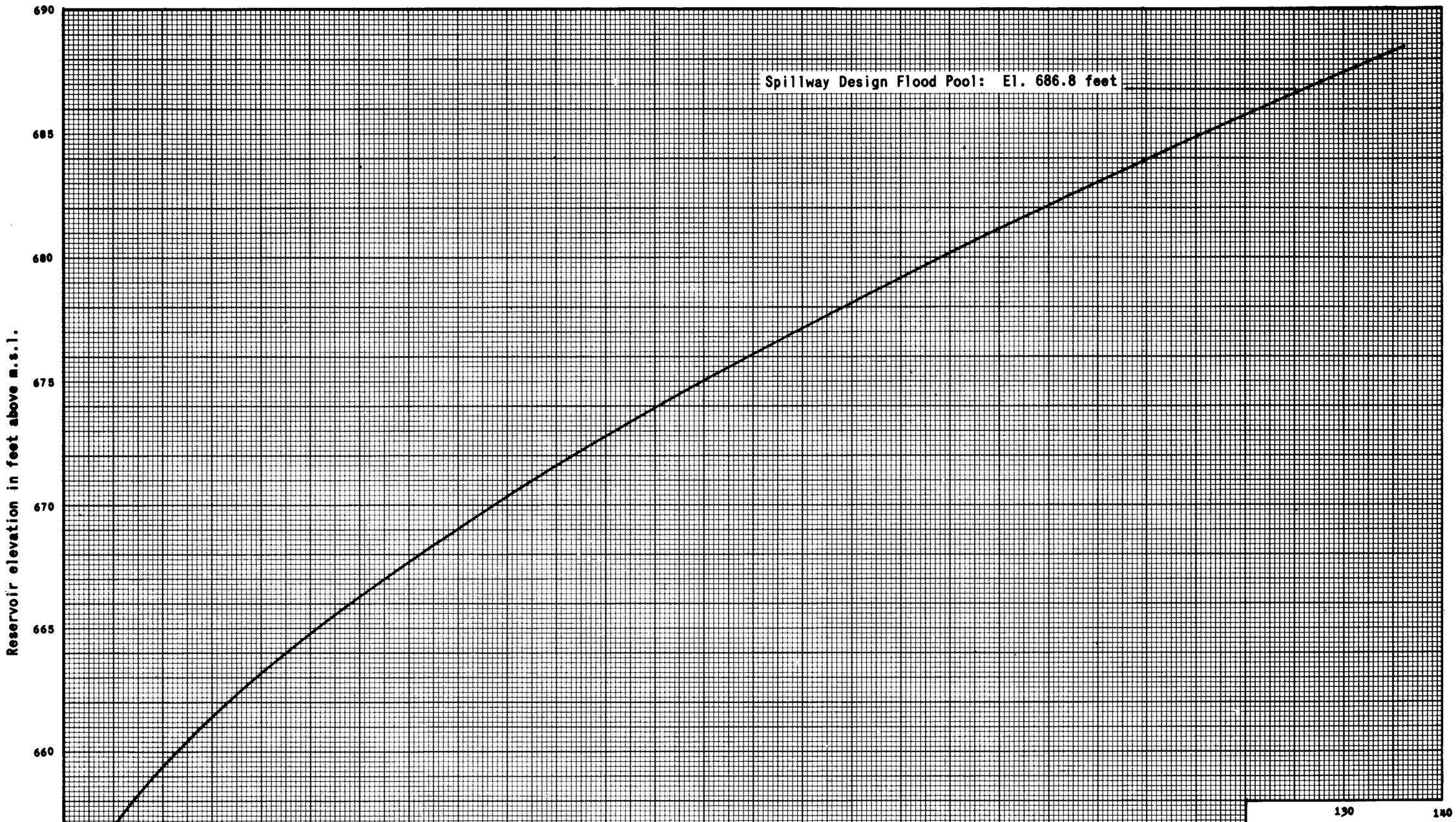
SUCCESS LAKE
TULE RIVER, CALIFORNIA

RIVER OUTLET RATING CURVE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: R.E.F. Date: APRIL 1961

PLATE A-3



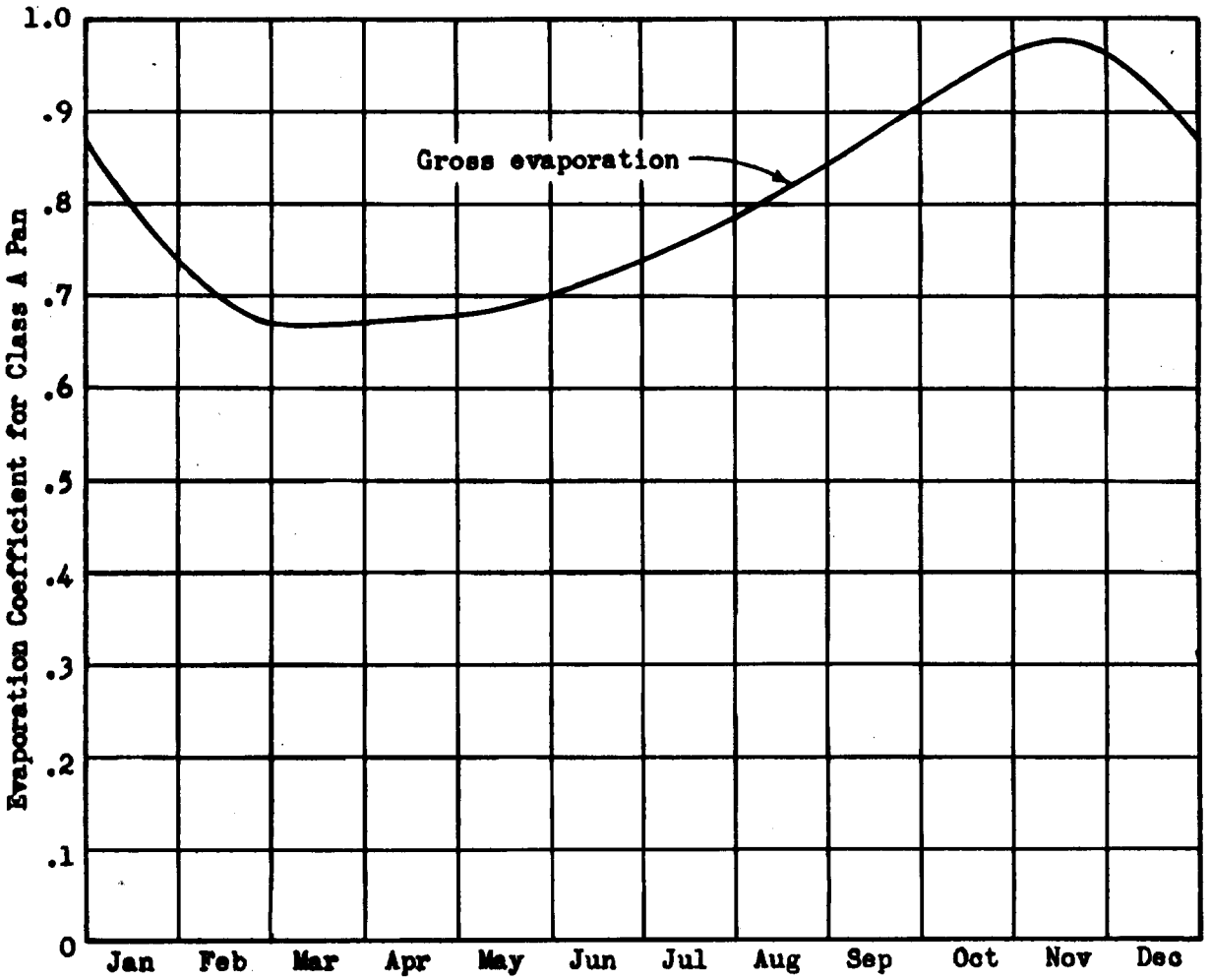
SUCCESS LAKE
TULE RIVER, CALIFORNIA

SPILLWAY RATING CURVE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.D.D.
Drawn:
Date: JULY 1956

PLATE A-4



AVERAGE MONTHLY
EVAPORATION COEFFICIENTS

Jan	0.804	Jul	0.768
Feb	0.696	Aug	0.816
Mar	0.672	Sep	0.876
Apr	0.672	Oct	0.936
May	0.684	Nov	0.960
Jun	0.720	Dec	0.924

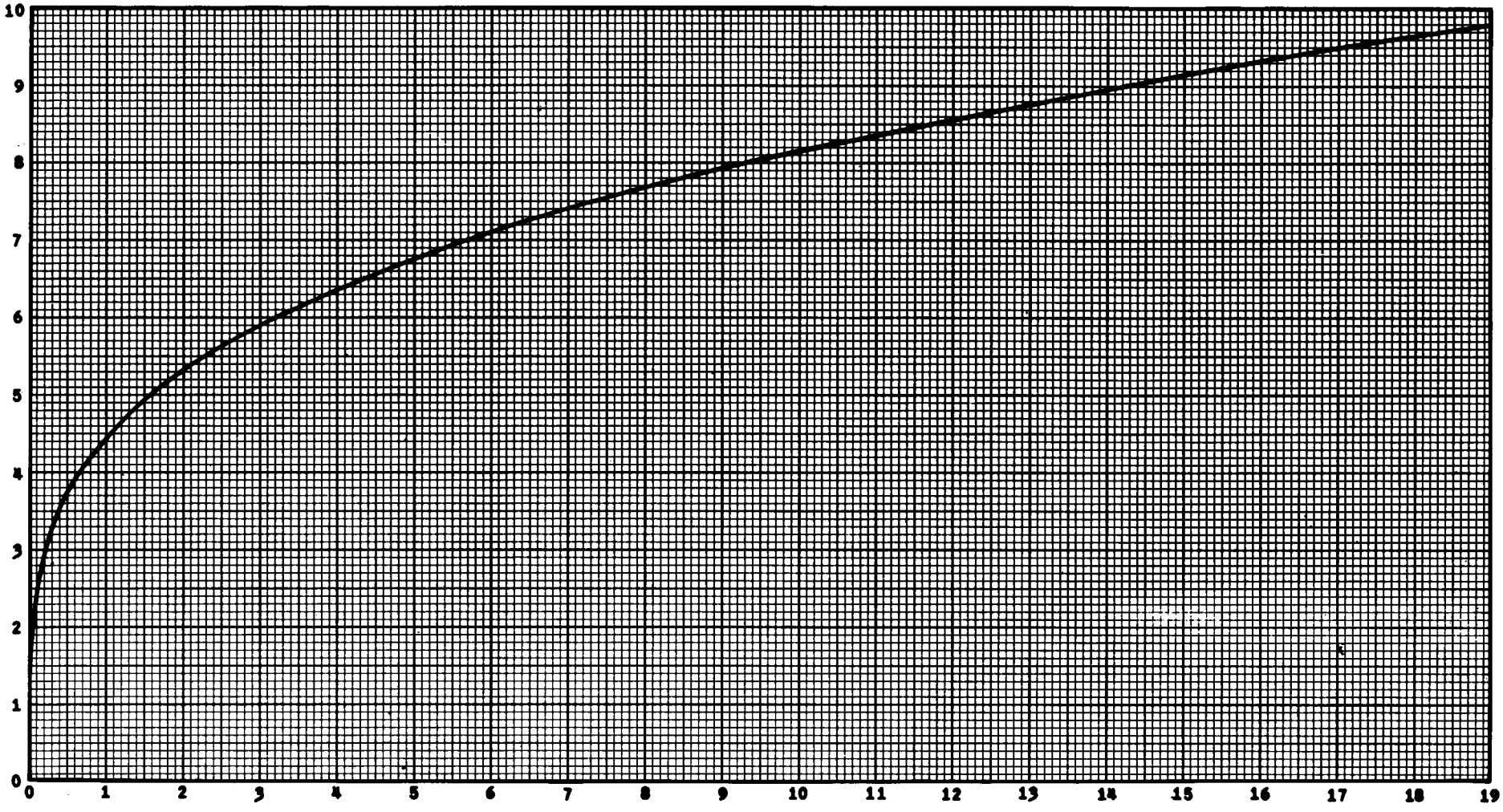
SUCCESS LAKE
TULE RIVER, CALIFORNIA

EVAPORATION COEFFICIENTS

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.R.B. Date: SEPTEMBER 1955

PLATE A-5



SUCCESS LAKE
TULE RIVER, CALIFORNIA

DISCHARGE RATING CURVE

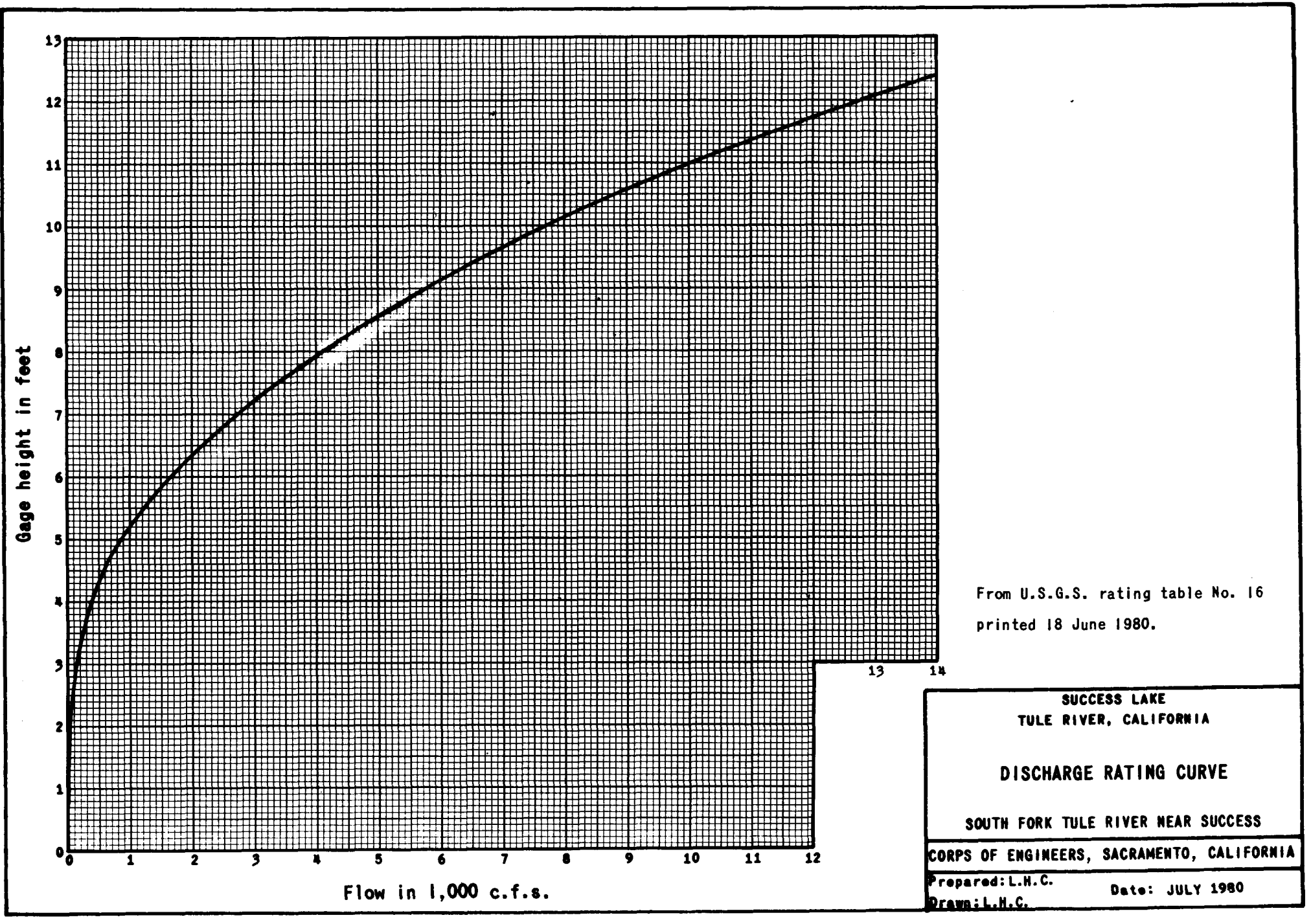
TULE RIVER NEAR SPRINGVILLE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C.
Date: JULY 1980

From U.S.G.S. rating tables No. 12 and 13 printed 22 February 1980 and 18 June 1980 respectively.

SHEET 1 OF 4 PLATE A-6



From U.S.G.S. rating table No. 16
printed 18 June 1980.

SUCCESS LAKE
TULE RIVER, CALIFORNIA

DISCHARGE RATING CURVE

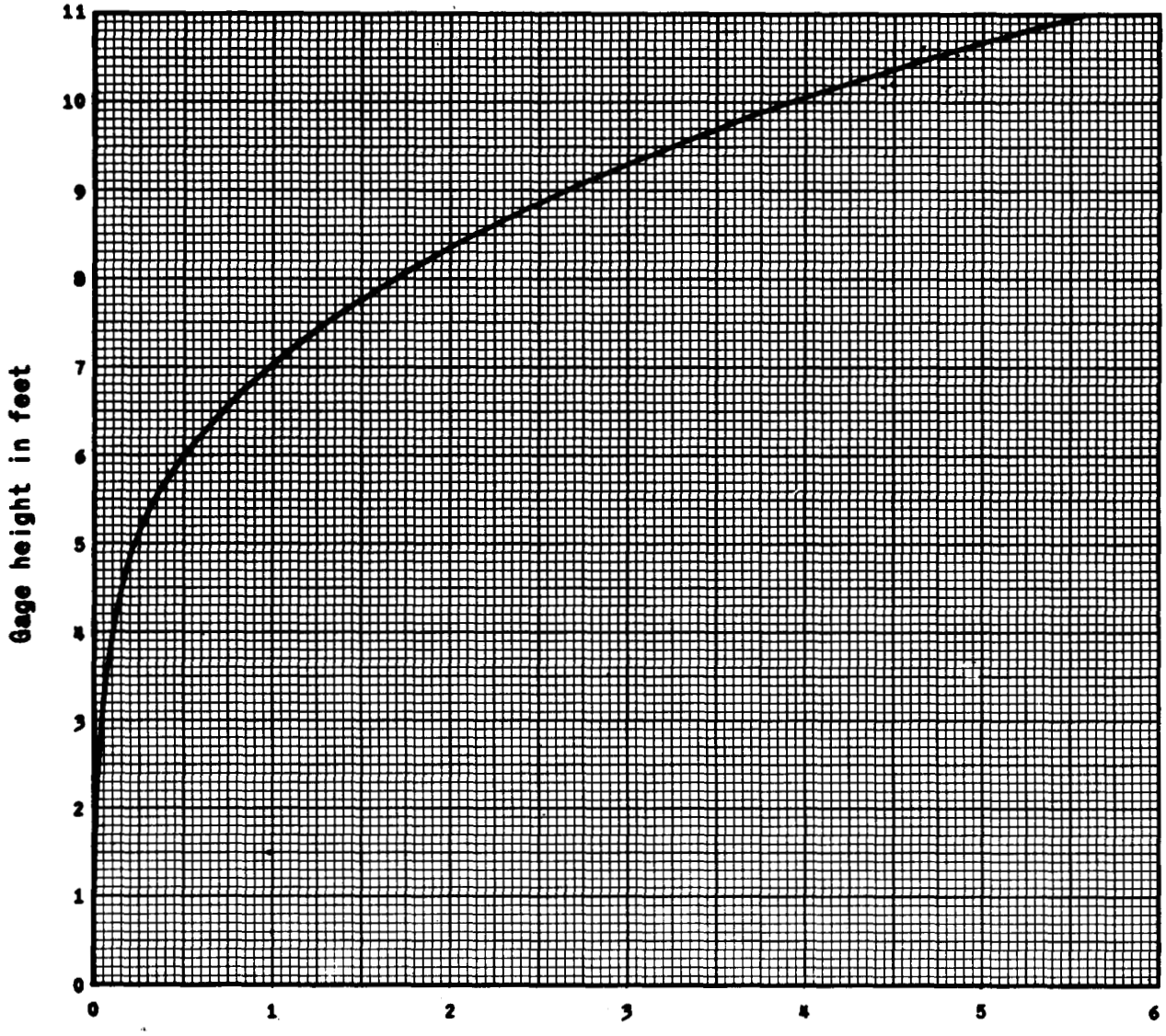
SOUTH FORK TULE RIVER NEAR SUCCESS

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C.

Date: JULY 1980

SHEET 2 OF 4 PLATE A-6



From U.S.G.S. rating table No. 8
printed 18 June 1980.

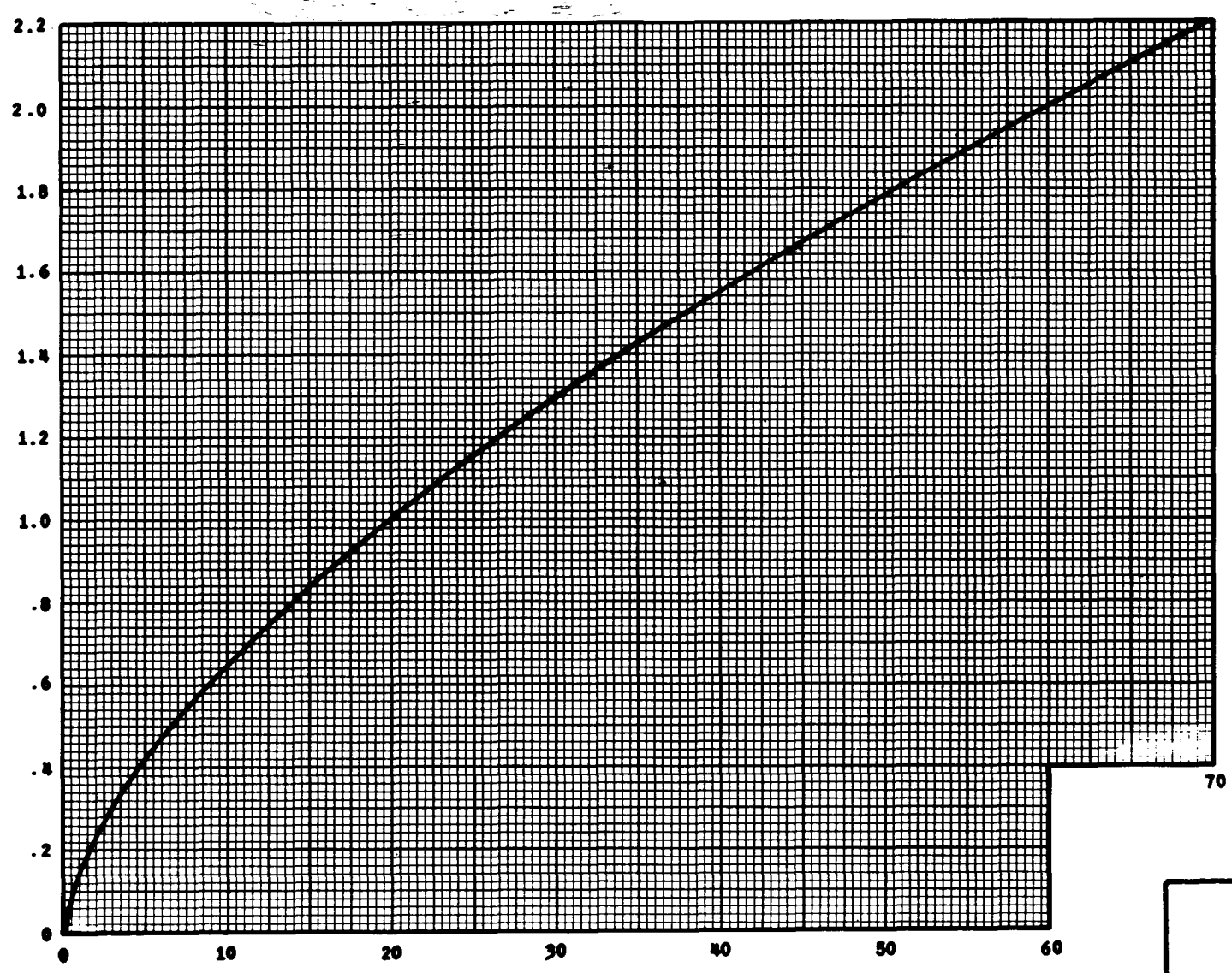
SUCCESS LAKE
TULE RIVER, CALIFORNIA

DISCHARGE RATING CURVE

TULE RIVER BELOW SUCCESS DAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C.
Date: JULY 1980



From U.S.G.S. rating table No.2 printed 18 June 1980.

SUCCESS LAKE
TULE RIVER, CALIFORNIA

DISCHARGE RATING CURVE

PIONEER DITCH

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: L.H.C.
Date: APRIL 1980

SHEET 4 OF 4 PLATE A-6

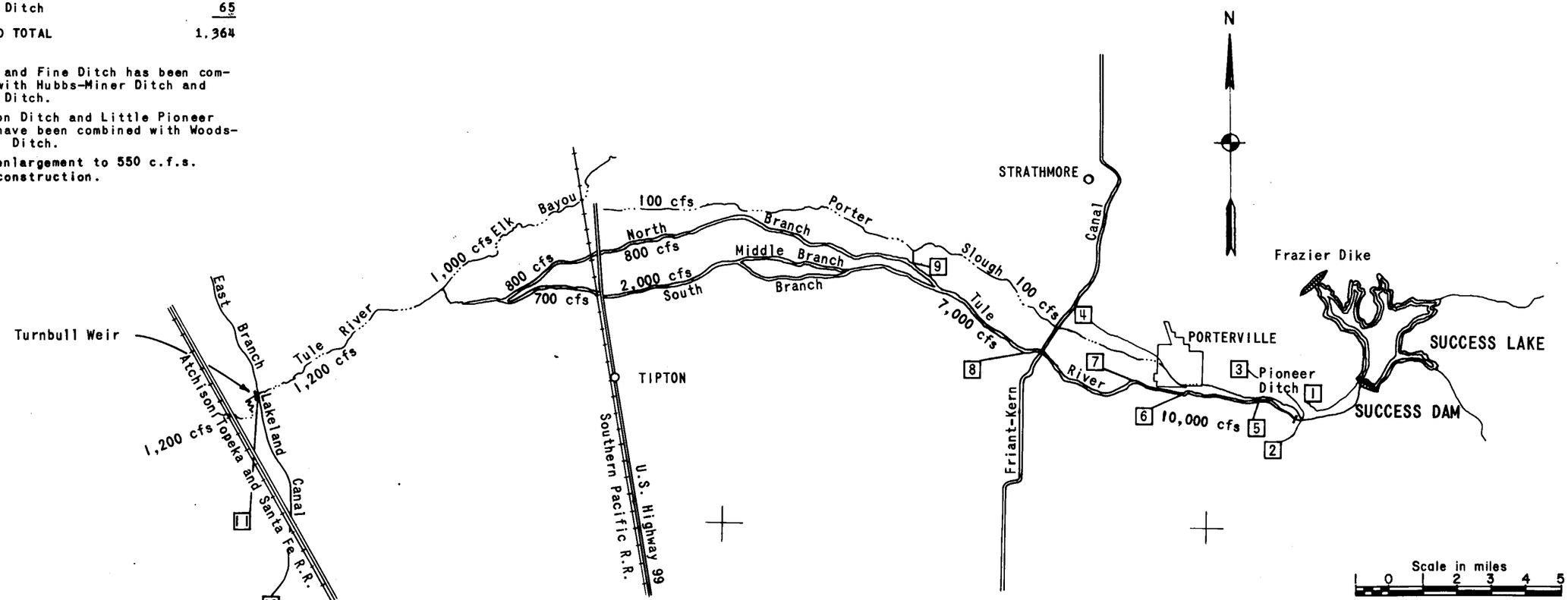
DIVERSIONS AND CAPACITIES

	CANAL OR DITCH	CAPACITY (c.f.s.)
1	Pioneer Ditch	35
2	Campbell-Moreland	30
3	Porter Slough	180
4	Porter Slough Ditch	20
5	Vandalia Ditch	9
6	Poplar Ditch	150
7	Hubbs-Miner Ditch Rhodes and Fine Ditch	25 a/
8	Woods-Central Ditch (Woods-Central Canal) Stockton Ditch Little Pioneer Ditch	250 b/ b/
9	North Canal	300
	SUBTOTAL	999
10	East Branch Lakeland Canal	c/ 300
11	Taylor Ditch	65
	GRAND TOTAL	1,364

a/ Rhodes and Fine Ditch has been combined with Hubbs-Miner Ditch and Poplar Ditch.

b/ Stockton Ditch and Little Pioneer Ditch have been combined with Woods-Central Ditch.

c/ Canal enlargement to 550 c.f.s. under construction.



SUCCESS LAKE
TULE RIVER, CALIFORNIA

DOWNSTREAM CHANNEL CAPACITIES

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: L.H.C. Date: MAY 1981

PLATE A-7

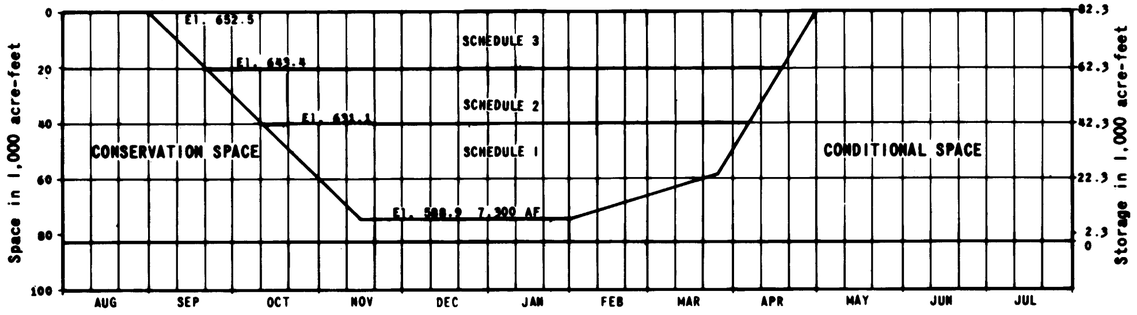


FIGURE 1

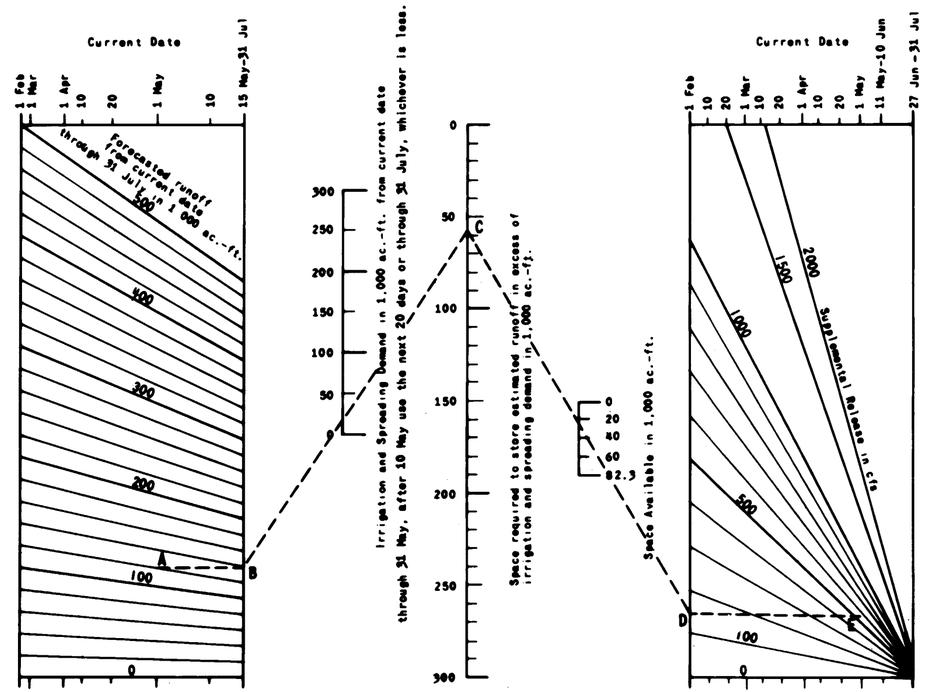


FIGURE 2

USE OF DIAGRAM

1. Water stored in conservation space will be released as requested by the Tule River watermaster.

2. Water stored in Schedule 1, 2 or 3 space will be released in accordance with the schedule that applies to that space.

3. Schedule 1 releases may be deferred temporarily during the rainflood period 11 November through 27 March to allow storage of 3,200 acre-feet in schedule 1 space, subject to the following. The limit on storage (S) in schedule 1 space will be dependent on the basin wetness parameter (Par) and will vary incrementally from 3,200 acre-feet when Par is 2 inches or less, to 0 acre-feet when Par is 6 inches or more. Values of Par and S are shown in tabular form below. The computation of Par is discussed in Exhibit A paragraph 3f.

Basin Wetness Parameter (Par) (inches)	Storage (S) (acre-feet)
Less than 2.00	3,200
2.01 to 3.00	2,800
3.01 to 4.00	2,000
4.01 to 5.00	1,000
5.01 to 6.00	400
More than 6.00	0

Calculation of Par will begin with Par = 0 at midnight on 31 August of each year.

4. Water stored in conditional space that is required for flood control must be released as a supplemental release in addition to releases for irrigation and spreading. The conditional space required for flood control is equal to the space required to store estimated runoff in excess of demand for irrigation and spreading. The space and supplemental release can be determined from figure 2.

5. Estimates of future inflow, for release computations, will be made by the Corps of Engineers.

6. The Corps of Engineers may direct that flood control space and releases be increased or decreased from those required by this diagram based on conditions prevailing at the time.

SCHEDULE 1

Water stored in schedule 1 space will be released at the lesser of A,B,C or D below.

SCHEDULE 2

Water stored in schedule 2 space will be released at the lesser of C or D below.

SCHEDULE 3

Water stored in schedule 3 space will be released in accordance with D below or at a lesser rate determined by the Corps of Engineers.

A. The estimated release which will evacuate the encroachment plus inflow within the next 5 days. The estimated release shall be maintained for five days unless the desired stage is achieved in less time or inflow is greater than anticipated and a greater release is required.

B. The release required to provide a quantity of water arriving at Turnbull Weir no greater than the quantity of water requested by the Tulare Lake interests for irrigation , spreading and flood control.

C. The "base release" from figure 3 plus the estimated average inflow for the next 5 days. The computed release shall be maintained for 5 days unless the desired stage is achieved in less time or inflow is greater than anticipated and a greater release is required.

D. The "maximum release" specified in figure 3.

SAMPLE CONDITIONAL SPACE COMPUTATION

Given Data:

Date.....1 May
Forecasted runoff from 1 May through 31 July.....120,000 acre-feet
Forecasted irrigation and spreading demand from 1 May through 31 May.....18,450 acre-feet
Irrigation and spreading demand on 1 May.....250 c.f.s.
Space available in Success Lake.....25,000 acre-feet

Computation of Space Required to Store Runoff Exceeding Irrigation and Spreading Demand:

Enter Figure 2 at "A" with current date (1 May) and forecasted runoff from current date through 31 July (120,000 acre-feet) and move horizontally to "B".

From "B" extend a line through the irrigation and spreading demand (18,450 acre-feet) to "C" and read the space required to store the runoff exceeding irrigation and spreading demand (57,600 acre-feet).

Computation of Supplemental Release:

Extend a line from "C" through the space available (25,000 acre-feet) to "D".

From "D" move horizontally to "E" below the current date (1 May) and read the supplemental release (550 c.f.s.).

Computation of Total Release:

Add the supplemental release (550 c.f.s.) to the irrigation and spreading release (250 c.f.s.) to get a total release of 800 c.f.s..

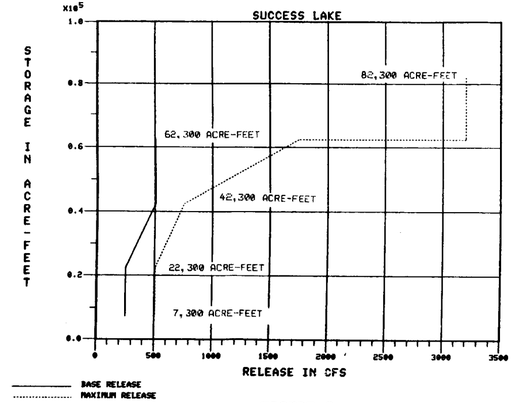


FIGURE 3

* REVISED DECEMBER 1987

SUCCESS LAKE
TULE RIVER, CALIFORNIA

FLOOD CONTROL DIAGRAM

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA
Prepared: N.T.M., M.E.V. Date: JULY 1981
Drawn: L.M.C.

PLATE A-8