NEW MELONES DAM AND LAKE
Stanislaus River, California

REPORT ON RESERVOIR REGULATION

FOR FLOOD CONTROL

APPENDIX V
To
Master Manual of Reservoir Regulation
San Joaquin River Basin, California

January 1980

DEPARTMENT OF THE ARMY

SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

[R]

NEW MELONES DAM AND LAKE
STANISLAUS RIVER, CALIFORNIA
PERTINENT DATA

GENERAL

Drainage Areas	
So Fk Stanislaus R nr Long Barn	67 sq mi
No Fk Stanislaus R nr Avery	163 sq mi
Mid Fk Stanislaus R bl Beardsley Dam	316 sq mi
Stanislaus R at New Melones Dam	904 sq mi
Stanislaus R bl Tulloch Dam, nr Knight's Ferry	980 sq mi
Stanislaus R at Orange Blossom Br	1,020 sq mi
Stanislaus R at Ripon	1,075 sq mi

Flows at New Melones Dam	
Mean Annual Runoff (1904-1978)	1,168,000 ac-ft
Max Mean Daily Recorded Inflow (23 Dec 55)	62,000 cfs
Max Instantaneous Recorded Inflow (23 Dec 55)	102,000 cfs
Standard Proj Snowmelt Flood Max Mean Daily Inflow	16,000 cfs
Standard Proj Rain Flood Max Instantaneous Inflow	148,000 cfs
Spillway Design Flood Max Instantaneous Inflow	355,000 cfs

NEW MELONES DAM AND LAKE

(elevations in feet above mean sea level, 1929 datum)

[redacted]

Flood Control and Irrigation Outlet

[redacted]

Gross pool, el. 1088.0 ft	8,300 cfs
Min oper pool, el. 808.0 ft	6,000 cfs

New Melones Lake

Elevations	
Min operating pool	808.0 ft
Flood control pool, btm	1,049.5 ft
Gross pool	1,088.0 ft
Spillway design flood pool	1,123.4 ft
Areas	
Min operating pool	3,440 acres
Flood control pool, btm	10,900 acres
Gross pool	12,500 acres
Spillway design flood pool	14,000 acres
Storage Capacities	
Min operating pool	300,000 ac-ft
Flood control pool, btm	1,970,000 ac-ft
Gross pool	2,420,000 ac-ft
Spillway design flood pool	2,871,000 ac-ft

New Melones Powerplant

[redacted]

Total Discharge Capacities	
Gross pool, el. 1088.0 ft	8,600 cfs
Min oper pool, el. 808.0 ft	6,400 cfs

TULLOCH DAM AND RESERVOIR

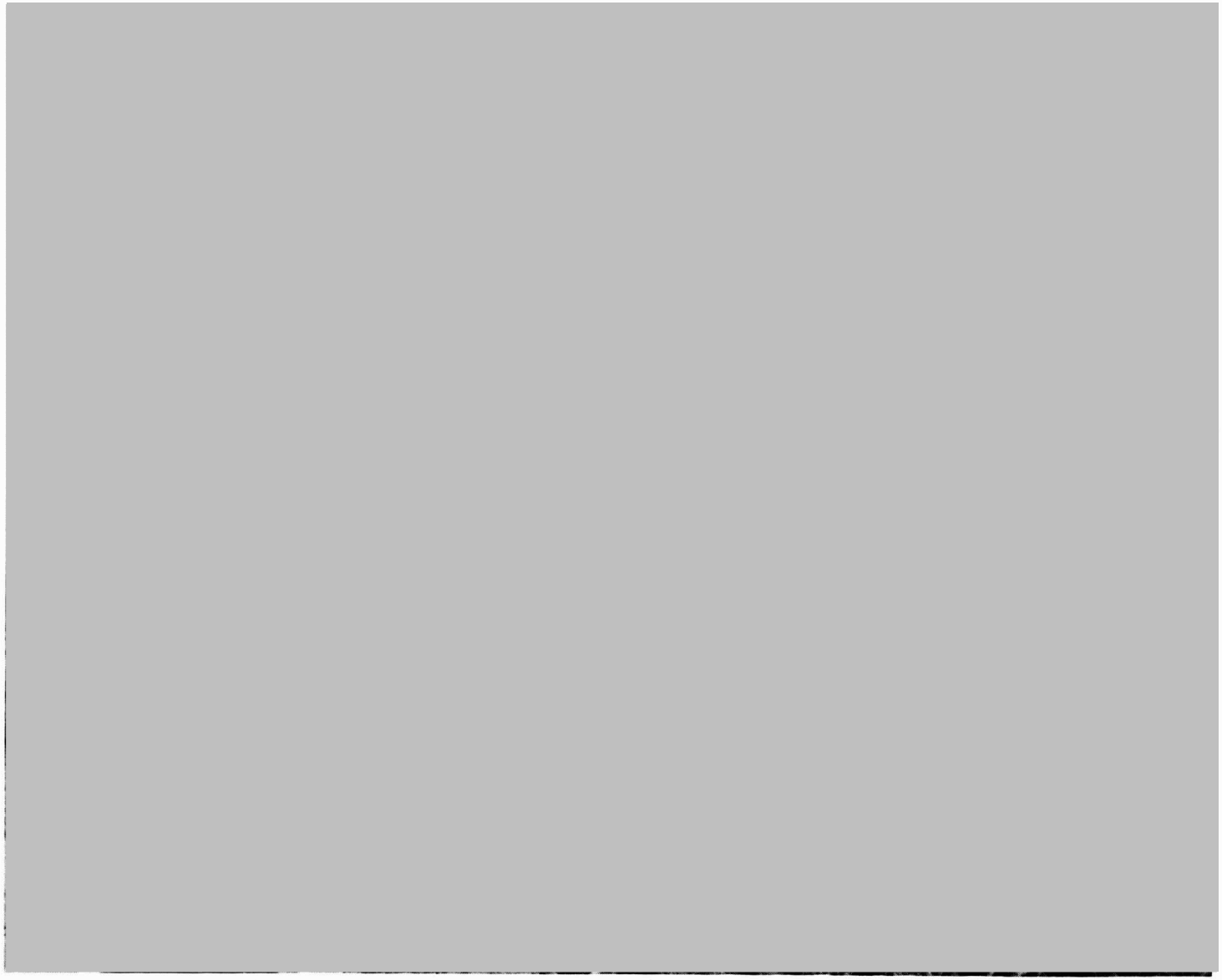
(elevations in feet refer to datum of 1.5 feet, 1929 msl)

[redacted]

Tulloch Reservoir

Elevations	
Min operating pool	431.0 ft
Flood control, pool, btm	501.5 ft
Max operating pool	510.0 ft
Areas	
Min operating pool	320 acres
Flood control pool, btm	1,100 acres
Max operating pool	1,450 acres
Storage Capacities	
Min operating pool	11,380 ac-ft
Flood control pool, btm	57,000 ac-ft
Max operating pool	67,000 ac-ft

[redacted]



NEW MELONES DAM AND LAKE

NEW MELONES DAM AND LAKE
STANISLAUS RIVER, CALIFORNIA

REPORT ON RESERVOIR REGULATION
FOR FLOOD CONTROL

JANUARY 1980

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

REPORT ON RESERVOIR REGULATION FOR FLOOD CONTROL NEW MELONES DAM AND LAKE STANISLAUS RIVER, CALIFORNIA

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REPORT ON RESERVOIR REGULATION FOR FLOOD CONTROL

NEW MELONES DAM AND LAKE STANISLAUS RIVER, CALIFORNIA

CHAPTER I - GENERAL INFORMATION

1. AUTHORITY AND SCOPE

This report on reservoir regulation for flood control for New Melones Dam and Lake, Stanislaus River, California, is an appendix to "Master Manual of Reservoir Regulation, San Joaquin River Basin, California." It was prepared in accordance with instructions in ER 1110-2-240, EM 1110-2-3600, and EC 1110-2-67, which pertain to requirements for reports on reservoir regulation for projects subject to provisions of Section 7 of the Flood Control Act of 1944 (58 Stat. 890). The pertinent portion of that act reads as follows:

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

This report contains descriptive information about New Melones Dam and Lake, outlines general operation of the project, and prescribes regulations for flood control operation. A description of the entire San Joaquin Basin and related flood control plans is presented in the Master Manual. Some of the material used in preparing the report was furnished by the U.S. Water and Power Resources Service (formerly the Bureau of Reclamation), Mid-Pacific Region, Sacaramento, California.

New Melones Dam is about 35 miles northeast of Modesto. [redacted], creating a lake with a capacity of 2.4 million acre-feet, with 450,000 acre-feet reserved for flood control. The dam is about three-fourths of a mile downstream from an existing dam--Melones Dam--which was built in 1926 for irrigation and power by the Oakdale and South San Joaquin Irrigation Districts. In addition to flood control, New Melones Dam and Lake will meet needs for power generation, irrigation supply, water quality control, fishery enchancement, and recreation. The project was built by the Corps of Engineers. On completion, it was transferred to the Water and Power Resources Service for operation and maintenance as a unit of the Central Valley Project. Chart 1 is a map of the lake area; location of the project is shown on Chart 2.

2. PROJECT AUTHORIZATION

A Federal project on the Stanislaus River was originally authorized by Congress in the Flood Control Act of 1944. At that time, the project plan comprised a concrete arch dam 355 feet high and 918 feet long at the crest. Storage capacity was to be 450,000 acre-feet with 340,000 acre-feet reserved for flood control. Future raising of the dam to provide 1,100,000 acre-feet of storage was contemplated.

[redacted]

The New Melones project, Stanislaus River, California, authorized by the Flood Control Act approved December 22, 1944 (58 Stat. 887), is hereby modified substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 453, Eighty-seventh Congress, at an estimated cost of $113,717,000: Provided, That upon completion of construction of the dam and powerplant by the Corps of Engineers, the project shall become an integral part of the Central Valley Project and be operated and maintained by the Secretary of the Interior pursuant to the Federal reclamation laws, except that the flood control operation of the project shall be in accordance with the rules and regulations prescribed by the Secretary of the Army: Provided further, That the Stanislaus River Channel, from Goodwin Dam to the San Joaquin River, shall be maintained by the Secretary of the Army to a capacity of at least eight thousand cubic feet per second subject to the condition that responsible local interests agree to maintain private levees and to prevent enchroachment on the existing channel and floodway between the levees: Provided further, That before initiating any diversions of water from the Stanislaus River Basin in connection with the operation of the Central Valley Project, the Secretary of the Interior shall determine the quantity of water required to satisfy all existing and anticipated future needs within that basin and the diversions shall at all times be subordinate to the quantities so determined: Provided further, That the Secretary of the Army adopt appropriate measures to insure

the preservation and propagation of fish and wildlife in the New Melones project and shall allocate to the preservation and propagation of fish and wildlife, as provided in the Act of August 14, 1946 (60 Stat. 1080), an appropriate share of the cost of constructing the Stanislaus River diversion and of operating and maintaining the same: Provided further, That the Secretary of the Army, in connection with the New Melones project, construct basic public recreation facilities, acquire land necessary for that purpose, the cost of constructing such facilities and acquiring such lands to be nonreimbursable and nonreturnable: Provided further, That contracts for the sale and delivery of the additional electric energy available from the Central Valley Project power system as a result of the construction of the plants herein authorized and their integration with that system shall be made in accordance with preferences expressed in the Federal reclamation laws except that a first preference, to the extent as needed and as fixed by the Secretary of the Interior, but not to exceed 25 per centum of such additional energy, shall be given, under reclamation law, to preference customers in Tuolumne and Calaveras Counties, California, for use in that county, who are ready, able, and willing, within twelve months after notice of availability by the Secretary of the Interior, to enter into contracts for the energy and that Tuolumne and Calaveras County preference customers may exercise their option in the same date in each successive fifth year providing written notice of their intention to use the energy is given to the Secretary not less than eighteen months prior to said dates: And provided further, That the Secretary of the Army give consideration during the preconstruction planning for the New Melones project to the advisability of including storage for the regulation of stream-flow for the purpose of downstream water quality control.

3. CHANGES TO AUTHORIZED PLAN

Further modifications in the project plan were made after 1962. The principal changes are summarized below. They were based primarily on additional geologic studies or on in-depth analysis of economic, social, and environmental values consistent with current priorities.

a. Main Dam. -

These modifications resulted from changes in freeboard allowance, dam alignment, and spillway and powerhouse locations. As a result of refinement in design, the embankment slopes and cross section of the dam were modified and the axis of the dam was arched upstream.

c. Outlet Works. - The size, alignment, and configuration of the multi-purpose tunnel were altered.

e. Water Quality Operation. - Provisions were made for the dam to be operated to improve water quality in the lower Stanislaus and San Joaquin Rivers.

f. Recreation, and Environmental Enhancement and Mitigation. - Features for recreation and environmental enhancement and mitigation were added downstream from New Melones Dam to optimize recreation potential and to preserve, and to mitigate loss of, fish and wildlife habitat.

4. CONSTRUCTION HISTORY

Project construction was started in 1966. Initial work consisted of building access and haul roads, administration buildings, and a visitor overlook area and parking lot; building the low-level intake structure; scaling canyon walls; and excavating and grouting the dam foundation. Construction of the diversion tunnel was started in 1966 and completed in December 1973. Total cost of the tunnel was $27 million.

A low bid of $83.2 million for construction of the main dam was received in October 1972; however, award of a contract was withheld pending outcome of a suit entered in the U.S. district court by the Environmental Defense Fund, the Sierra Club, 11 commercial rafting companies, and others. The plaintiffs contended that the Environmental Impact Statement (EIS) for the project was inadequate. A court-ordered supplement to the EIS (to include the impact of use of project's irrigation supply) was prepared by the Bureau of Reclamation; and, in March 1973, the district court ruled the statement adequate. The Ninth Circuit Court of Appeals upheld the ruling of the district court; and, in April 1974, the Supreme Court refused to hear further appeal. A statewide initiative opposing the project was rejected in the general election of 1974.

Escalating prices during the early delays resulted in withdrawal of the successful low bid for the main dam. Readvertisement in December 1973 resulted in a low bid of $107.7 million, an increase of $24.5 million over the original low bid. The contract for the main dam and appurtenances was awarded to Atkinson-Ball-Arundel, a joint-venture corporation. Construction was begun in March 1974, and the dam was "topped out" on 28 October 1978.

Other contracts awarded included: $5.3 million to Allis-Chalmers for two turbines, $6.2 million to General Electric for two generators, and $40 million to Atkinson-Ball-Arundel for the powerplant

and appurtenances. The powerplant was completed and the turbines and generators were installed in 1978. The turbines and generators were tested during May and June, 1979.

Major bridge reconstructions and road relocations comprised: State Highway 49 (Archie Stevenot) Bridge, completed in 1975 by California Department of Transportation, $14.9 million; Camp Nine Bridge, completed in 1978 by Roy E. Ladd, Inc., $2.8 million; and Parrotts Ferry Bridge, completed in 1979 by S. J. Groves and Sons Company, $10.2 million.

The project was transfered to the Water and Power Resources Service on 20 November 1979, although the Corps of Engineers retained responsibility for reservoir clearing and recreation development. The final, total cost of the project was $346 million.

5. DESCRIPTION OF PROJECT AREA

The Stanislaus River is a major east-side tributary to the San Joaquin River, the principal stream in the San Joaquin Valley portion of the Sacramento-San Joaquin basin (Central Valley basin) of California. It rises on the western slope of the Sierra Nevada and flows in a southwesterly direction through mountains and foothills and thence across the flat valley floor to its mouth. Together with its principal tributaries, the North, Middle, and South Forks, the Stanislaus River drains about 1,115 square miles. The basin is about 100 miles long and, on the average, about 8 miles wide. It is bordered on the north by the Calaveras River basin and on the south by the Tuolumne River basin. Chart 2 is a map of the tributary area; topographic features and locations of stream-gaging stations are shown on Chart 3. Chart 4 shows profiles of the main stem and its principal tributaries. For descriptive purposes, the project area has been divided into three parts: (1) the mountains above New Melones Dam, (2) the mountains and foothills below the dam, and (3) the valley floor.

6. MOUNTAINS ABOVE NEW MELONES DAM

Above New Melones Dam, the Stanislaus River drains 904 square miles of mountains and foothills. The North and Middle Forks join to form the main stem about 27 miles upstream from the dam, and the South Fork joins the reservoir area about 16 miles upstream from the dam. Throughout most of the area, the streams flow through well-incised, steep-walled canyons, and are fed by many short, steep-sided tributaries. Overall slope of the channels is about 100 feet per mile. Elevation ranges from 500 feet at the dam to 11,570 feet in the headwater region. As shown in the tabulation below, about half the area is above 6,000 feet.

ELEVATION RANGE (FEET)	PERCENTAGE OF AREA
10,000-11,570	1
9,000- 9,999	5
8,000- 8,999	12
7,000- 7,999	17
6,000- 6,999	14
5,000- 5,999	12
4,000- 4,999	12
3,000- 3,999	8
2,000- 2,999	8
1,000- 1,999	10
500- 999	1
TOTAL	100

The drainage area above New Melones Dam is characterized by rugged mountain peaks and ridges with outcroppings granite and andesite. In the intermediate elevations, the soil is a fine-textured metavolcanic residual type of moderate depth and good drainage. Small areas of sandy loam and loam residual soil are also present. In the lower portion of the area, silty clay and clay loam residual types predominate. Small areas of limestone and lava lie near the junction of the South Fork and the main stem. Vegetation consists of scattered conifers and subalpine species in upper elevations; a heavy cover of fir, cedar, and giant sequoia in intermediate elevations; and a light cover of deciduous trees, chaparral, and grasses in lower elevations. The vegetation pattern is summarized below. About 5 percent of the drainage area, between 9,500 and 11,570 feet, is bare rock.

VEGETATION	ELEVATION RANGE (FEET)	PERCENTAGE OF AREA
Grasses and scattered trees	500- 1,500	6
Deciduous forest (some grasses)	1,000- 2,500	11
Brush	1,500- 3,500	15
Conifers, light cover	5,000-10,000	31
Conifers, heavy cover	6,000- 8,000	18
Subalpine forest	8,000- 9,500	14

There are nine reservoirs and two diversion canals upstream from New Melones Lake. (See Chart 2.) The reservoirs are used for irrigation, power, and/or domestic water supply, and have only a minor effect on floodflows. The largest are Beardsley and Donnells Lakes (on the Middle Fork Stanislaus River), which have capacities of 97,800 and 64,300 acre-feet, respectively. The diversion canals supply water to powerhouses. Philadelphia Canal, capacity about 60 cubic feet per second (cfs), is used to divert water from the South Fork Stanislaus River through Pacific Gas and Electric Company's Spring Gap powerhouse and into the Middle Fork near the gaging station at Sand Bar Flats. Tuolumne Canal, capacity about 50 cfs, supplies water from the South Fork at Lyons Dam to Phoenix powerhouse, and out of the Stanislaus Basin. It also supplies water for domestic use to Sonora. Utica Ditch, capacity about 88 cfs, diverts from the North Fork Stanislaus River through the Utica powerhouse.

7. MOUNTAINS AND FOOTHILLS BELOW NEW MELONES DAM

Below New Melones Dam, the Stanislaus River flows through Tulloch Reservoir, through steep-sided canyons to the vicinity of Knights Ferry, and thence through rolling hills to Oakdale, at the eastern edge of the San Joaquin Valley. In this reach, the river drains 130 square miles. Principal tributaries are Black and Green Spring Run Creeks, which drain 44 square miles above Tulloch Reservoir, and Owl and Wildcat Creeks,

which drain 21 square miles below the reservoir. Tulloch Reservoir and Beardsley and Donnells Lakes (upstream from New Melones Lake) compose the Tri-Dam project, a power and irrigation development built by the Oakdale and South San Joaquin Irrigation Districts in 1955-58. Tulloch Reservoir has a capacity of 67,000 acre-feet. Elevation in this portion of the basin, which is used primarily for grazing, ranges from 200 to 1,500 feet.

Soils of the uplands are shallow to very shallow and marginally to moderately fertile. Low to high alluvial terraces border segments of the river. Soils on the low terraces range from shallow clay types to deep, well-drained fertile types. Soils on the high terraces are shallow to moderately deep, and on the terrace sides, soils are shallow clay types. Vegetation is characteristic foothill woodland community. Between Goodwin Diversion Dam (just downstream from Tulloch Reservoir) and Knights Ferry, narrow bands of sparse vegetation extend along the river, which is confined to a rocky-bottom canyon. The steep canyon sides support several foothill woodland species, including digger pine, oak, white alder, California buckeye, redbud, Pacific madrone, and manzanita. Downstream from Knights Ferry, the principle riparian vegetation comprises valley oaks, cottonwoods, and willows, and dense growths of shrubs, blackberries, and wild grapes.

8. VALLEY FLOOR

Below Oakdale, the Stanislaus River flows across 25 miles of gently sloping valley floor. It is deeply entrenched through most of the reach, and emerges onto the flat valley trough about 5 miles above its confluence with the San Joaquin River. Elevation ranges from 30 feet at the mouth of the river to 200 feet near Oakdale. Average slope of the channel is about 2 feet per mile.

The valley floor is traversed by an extensive network of irrigation canals originating at Goodwin Diversion Dam and extending into adjacent drainage basins. Some of the canals have spillways to the river for returning excess irrigation water or draining runoff from the valley floor. During rain floods, runoff from the Stanislaus basin is negligible, but runoff intercepted from adjacent basins can amount to as much as 1,200 cfs.

Soils are deep and moderately well drained to well-drained, and are favorable for agriculture. Orchards and vineyards are common, and large areas are devoted to row crops. Grasses and oak trees are interspersed with riparian vegetation, which is extensive along the lower reaches of the stream. Downstream from Riverbank, the Stanislaus River meanders and forms a wide flood plain. State Highways 99, 108, and 120; various county roads; and the main lines of the Southern Pacific, and Atchison, Topeka, and Santa Fe Railroads cross this area.

Backwater levees extend along the right bank of the Stanislaus River from the stream mouth upstream 9.3 miles, and along the left bank from the stream mouth upstream 12 miles. These levees were built by the Corps

of Engineers as part of the lower San Joaquin River Tributaries project and are maintained by the Reclamation Board of the State of California.

9. CLIMATE

Climate in the Stanislaus River basin is characterized by cool, wet winters and hot, dry summers. Normal annual precipitation is 47 inches, and ranges from 27 inches at New Melones Dam to 65 inches in the upper part of the basin. In very dry years, annual precipitation averages about 26 inches; in very wet years, it averages about 68 inches. Chart 5 shows isoheytals of normal annual precipitation over the basin.

Major storms occur from November through April. Winter storms, which account for about 80 percent of the annual precipitation in the basin, originate over the Pacific Ocean and are associated with frontal systems containing masses of moist air moving inland against mountain barriers. Below 4,000 feet, precipitation usually occurs as rain. Intensities are moderate, but rain generally continues for 3 or 4 days and is often followed by additional storm fronts. As much as half the normal annual precipitation may fall in a single storm period. Above 4,000 feet, precipitation usually occurs as snow, although warm winter storms have brought rain to as high as 11,000 feet. Above 5,000 feet, snow normally accumulates into a deep snowpack, and may fall as late as April or May.

Precipitation in summer is largely confined to mountain areas and occurs as occasional showers or thunderstorms. Rain may be intense for short periods, but is confined to relatively small areas. Precipitation data for three representative stations in the basin are tabulated below.

MONTH	AVERAGE MONTHLY PRECIPITATION					
	SONORA R.S. ELEVATION 1,745		CALAVERAS BIG TREES ELEVATION 4,696		PINECREST (STRAWBERRY) ELEVATION 5,620	
	AMOUNT (INCHES)	PERCENTAGE OF N.A.P.	AMOUNT (INCHES)	PERCENTAGE OF N.A.P.	AMOUNT (INCHES)	PERCENTAGE OF N.A.P.
January	5.56	17.3	10.53	19.7	6.87	15.6
February	4.66	14.5	7.23	13.5	5.60	12.7
March	4.61	14.4	7.72	14.4	6.20	14.1
April	3.20	10.0	5.27	9.9	4.64	10.5
May	0.75	2.3	1.30	2.4	1.64	3.7
June	0.32	1.0	0.79	1.5	1.24	2.8
July	0.09	0.3	0.39	0.7	0.21	0.5
August	0.11	0.3	0.30	0.6	0.73	1.7
September	0.28	0.9	0.47	0.9	0.51	1.2
October	1.91	5.9	3.14	5.9	1.96	4.4
November	4.93	15.3	7.18	13.4	7.39	16.7
December	5.71	17.8	9.16	17.1	7.13	16.1
TOTAL	32.13	100.0	53.48	100.0	44.12	100.0
LENGTH OF RECORD (YEARS)	88		45		16	

Winter temperature in the mountains averages around freezing and occasionally drops below zero, and summer temperature is moderate. Extremes of 14° and 113° have been recorded in the vicinity of New Melones Dam. Temperature at the dam may drop below freezing for a few hours of several consecutive days during winter, but no extended periods of subfreezing temperature have been recorded. Observed extremes for three representative stations in the basin are 8° and 113° at Sonora, -4° and 107° at Calaveras Big Trees, and -4° and 96° at Pinecrest. Temperature data for these stations are tabulated below.

AVERAGE MONTHLY TEMPERATURES (Degrees Fahrenheit)

MONTH	SONORA R.S. ELEVATION 1,745	CALAVERAS BIG TREES ELEVATION 4,696	PINECREST (STRAWBERRY) ELEVATION 5,620
January	43.2	33.6	37.3
February	46.3	38.1	38.8
March	48.7	39.0	37.9
April	52.6	42.7	42.1
May	61.4	51.6	49.4
June	68.6	59.7	56.4
July	75.9	66.9	65.1
August	75.2	66.3	64.8
September	69.3	60.9	61.3
October	59.8	52.0	54.3
November	49.3	42.6	43.3
December	42.5	36.1	36.6
AVERAGE	57.7	49.1	48.9
LENGTH OF RECORD (YEARS)	67	44	9

On 1 April of an average year, the snowpack at 6,000 and 9,000 feet has a water equivalent of 20 and 45 inches, respectively. When snowfall is abnormally heavy and little snowmelt occurs during the winter months, the water equivalent may be much as 150-200 percent of average. Representative data on average water equivalents during the late winter and early spring period follows:

STATION	ELEVATION	DRAINAGE	AVERAGE WATER EQUIVALENT (INCHES) 1 FEB	1 MAR	1 APR	1 MAY
Lake Alpine	7,550	N.F. Stanislaus R.	23.6	34.8	41.4	34.8
Herring Cr.	7,300	S.F. Stanislaus R.	16.8	23.9	28.9	21.3
Relief Dam	7,250	M.F. Stanislaus R.	10.9	16.4	20.2	10.7

10. RUNOFF CHARACTERISTICS

Most of the runoff from the Stanislaus River basin occurs from November through July. In general, runoff from November through March results from rains that may extend to an elevation of 10,000 feet, and runoff from April through July usually results from snowmelt. Most of the runoff from the basin originates in the area above New Melones Dam, and more than half of that amount results from snowmelt. The average annual runoff at the damsite for 74 years of record (1904-77) is 1,120,000 acre-feet. The maximum runoff was 2,779,000 acre-feet (248 percent of average) in water year 1907, and the minimum was 155,000 acre-feet (14 percent of average) in water year 1977. Chart 6 is a list of the unregulated monthly inflows to New Melones Lake for 1904-77. Corresponding historical (regulated) inflows are shown on Chart 7. Average monthly runoff data at four gaging stations in the Stanislaus Basin are tabulated below.

AVERAGE MONTHLY RUNOFF
(1,000 ACRE-FEET)

MONTH	M.F. STANISLAUS R. BELOW BEARDSLEY DAM: DA 316 SQ. MI.		S.F. STANISLAUS R. NEAR LONG BARN: DA 67 SQ. MI.		N.F. STANISLAUS R. NEAR AVERY: DA 163 SQ. MI.		STANISLAUS R. AT RIPON: DA 1,075 SQ. MI.	
	AMOUNT	PERCENT OF ANNUAL	AMOUNT	PERCENT OF ANNUAL	AMOUNT	PERCENT OF ANNUAL	AMOUNT	PERCENT OF ANNUAL
OCT	24	5.3	0	0	3	.9	19	2.9
NOV	25	5.6	0	0	6	1.9	20	3.0
DEC	25	5.6	1	1.8	15	4.7	51	7.7
JAN	24	5.3	2	3.6	19	5.9	87	13.0
FEB	23	5.1	1	1.8	19	5.9	78	11.7
MAR	23	5.1	2	3.6	30	9.3	76	11.4
APR	35	7.1	4	7.3	57	17.8	84	12.6
MAY	75	16.6	22	40	101	35.1	112	16.8
JUN	94	20.8	20	36.4	49	15.3	96	14.4
JUL	47	10.4	3	5.5	15	4.7	20	3.0
AUG	31	6.9	0	0	4	1.2	11	1.6
SEP	28	6.2	0	0	3	.9	13	1.9
TOTAL	451	100.0	55	100.0	321	100.0	667	100.0

PERIOD OF RECORD: 1957-75

During winter rain floods, there is a significant volume of runoff from in the foothills below New Melones Dam. Most of the runoff is carried in Black and Green Spring Run Creeks, which flow into Tulloch Reservoir, and in Owl and Wildcat Creeks, which join the Stanislaus River between Tulloch Reservoir and the stream-gaging station at Orange Blossom Bridge. The pattern of runoff in the Stanislaus River basin is altered by storage facilities and interbasin and intrabasin diversions. A tabulation of stream gaging stations and their locations, drainage areas, periods of record, and peak flows is presented on Chart 3.

CHAPTER III - FLOOD POTENTIAL

11. FLOOD CHARACTERISTICS

Rain floods from sustained intense rainfall over the Stanislaus River basin can occur anytime from November through March. Runoff is intensified when rain on snow in higher elevations adds snowmelt to rain flood runoff. Other important variables affecting runoff include soil moisture conditions, depth of snow at the beginning of the flood-producing storm, temperatures, and surface winds associated with the storm. Rain floods are characterized by sharp, high peak flows, short duration of floodflow, and comparatively small volume of runoff. Reservoirs upstream from New Melones Lake usually detain some of the runoff, but during large floods they fill and spill. If filling occurs early in the flood, the reservoirs have only a minor effect on the inflow to New Melones Lake.

The largest rain flood of record on the Stanislaus River was in December 1955. Unimpaired flows and volumes at New Melones Dam for the seven largest rain floods of record are tabulated below.

DATE	PEAK FLOW (CFS)	MAXIMUM MEAN DAILY FLOW (CFS)	7-DAY VOLUME (ACRE-FEET)
23 Dec 1955	102,000	62,000	289,800
18 Nov 1950	82,000	34,600	288,400
19 Mar 1907	77,000	52,000	319,000
1 Feb 1963	64,400	38,200	161,000
23 Dec 1964	62,800	43,100	285,600
31 Jan 1911	60,000	34,000	125,000
11 Dec 1937	53,000	26,500	130,760

Snowmelt floods can be expected anytime from April through July. They are characterized by low peak flows, long duration of floodflow, and large volume of runoff. The snowmelt flood potential varies according to the depth and areal extent of the snowpack and temperature; the highest rates of snowmelt runoff usually occur during years of an unusually deep snowpack. High flows are sustained during May and June when rising daily temperatures cause the snowpack to melt. Unimpaired flows and volumes at New Melones Dam for the largest snowmelt floods of record are tabulated below.

YEAR	MAXIMUM MEAN DAILY FLOW (CFS)	120-DAY VOLUME (ACRE-FEET)
1967	16,200	1,345,000
1906	14,300	1,618,000
1938	13,800	1,330,000
1969	12,000	1,356,000
1952	11,400	1,386,000

12. FLOODED AREAS

Historically, the Stanislaus River has flooded large areas between Oakdale and the San Joaquin River. From Oakdale to State Highway 99, the flood plain extends generally between the bluffs on either side of the river, and varies from 1/2 to 3 miles wide. Downstream from State Highway 99, the flood plain extends across a much wider area. Most of the flood plain, which comprises 35,000 acres, is devoted to intensive agricultural use. Low-density residential areas around Oakdale, Riverbank, and Ripon are in the flood plain, but the communities themselves have not been flooded. Several state highways and county roads, as well as main lines of the Southern Pacific, and Atchison, Topeka and Santa Fe Railroads cross the flood plain.

Stanislaus River flows have contributed to flooding of 55,000 acres of land along the lower San Joaquin River and 185,000 acres in the Delta of the Sacramento and San Joaquin Rivers. Much of this region is devoted to agricultural use. Development includes several military facilities, several small communities, scattered rural residences, and vital rail and highway facilities.

13. RAIN FLOOD POTENTIAL

Sustained intense rainfall over the Stanislaus River basin anytime from November through March usually results in flooding. Runoff is intensified when antecedent rain has resulted in saturated ground conditions or when rain on snow in higher elevations adds snowmelt to rain flood runoff. Because a snowpack may partially absorb rain and thus delay runoff, a shallow snowpack is more critical than a deep one. Conditions most favorable for producing floods in the basin comprise heavy precipitation in a warm storm (freezing level at a high elevation) or series of storms, saturated ground conditions, and a moderately deep snowpack in the upper part of the basin. The flood of December 1955, the largest rain flood of record on the Stanislaus River, was characterized by these conditions. Rain flood frequency curves for the Stanislaus River at New Melones Dam, at Goodwin Dam, and at Orange Blossom Bridge are shown on Charts 8, 9, and 10, respectively.

14. SEASONAL VARIATION OF RAIN FLOOD POTENTIAL

Major rainstorms over the Stanislaus River basin occur most frequently from November through March, and occur occasionally in September, October, April, or May. The seasonal variation of rain flood potential is dependent on the seasonal variation of storm potential, which is defined by criteria in an October 1959 office report entitled "Reservoir Operation Criteria for Flood Control."

15. SNOWMELT FLOOD POTENTIAL

Snowmelt runoff in the Stanislaus River basin usually begins in early April and continues into July. Snowmelt flood frequency curves for the Stanislaus River at New Melones Dam are shown on Chart 11.

16. STANDARD PROJECT FLOOD

General rain and snowmelt standard project floods were developed to test the operation of New Melones Dam under extreme conditions. A standard project flood (SPF) is one that can be expected from the most severe combination of meteorologic and hydrologic conditions characteristic of the geographical region, excluding extremely rare combinations. The adopted SPF's are described in detail in "Design Memorandum No. 1, Hydrology, New Melones Project, Stanislaus River, California," dated December 1957.

a. Rain Flood. - The standard project rain flood at New Melones Dam has a peak flow of 148,000 cfs and a 5-day volume of 377,000 acre-feet. It results from a standard project storm that lasts 96 hours and deposits 16.6 inches of rain on wet ground in the drainage area above New Melones Lake. The flood was computed on the basis of criteria in a April 1957 office report entitled "Standard Project Rain Flood Criteria, Sacramento-San Joaquin Valley, California." Because the outflow capacity of New Melones Dam is comparatively small, total volume of inflow to the reservoir is more critical than peak flow in terms of flood control. Accordingly, an SPF series (20-day) was developed. A routing of the series through New Melones Lake is shown on Chart 12. Maximum outflow is 8,000 cfs, and maximum storage is 2,400,000 acre-feet.

b. Snowmelt Flood. - For the standard project snowmelt flood, a water equivalent of 49 inches for the 1 April basin mean snowpack was adopted (133 percent of the 1 April 1906 value, the largest of record), and the snowline was assumed to be at 4,000 feet. The meteorological sequence adopted comprised a cold April and a series of storms which increased the snowpack at high elevations, rising temperatures in mid-May, and persistent high temperatures through June and July. Maximum inflow of the resultant SPF is 16,000 cfs, and the total volume is 1,755,000 acre-feet. A routing of the flood through New Melones Lake is shown on Chart 13. Maximum outflow is 9,100 cfs, including water to be diverted for irrigation at Goodwin Dam (flows downstream from Goodwin Dam not larger than 8,000 cfs), and maximum storage is 2,400,000 acre-feet.

17. RESERVOIR DESIGN FLOOD

a. Rain Flood. - Operation of the 450,000 acre-feet of flood control reservation in New Melones Lake in conjunction with operation of 10,000 acre-feet of dedicated reservation in Tulloch Reservoir will control a standard project rain flood series (a peak flow of 148,000 cfs and a 20-day volume of 655,000 acre-feet) to a downstream channel capacity of 8,000 cfs.

b. Snowmelt Flood. - Operation of the 450,000 acre-feet of flood control reservation in New Melones Lake will control the standard project snowmelt flood (a peak of 16,000 cfs and a 120-day volume of 1,755,000 acre-feet) to a downstream channel capacity of 8,000 cfs.

18. PROBABLE MAXIMUM FLOOD

Design of the spillway at New Melones Lake was based on the probable maximum flood presented in the Hydrology Design Memorandum. (See paragraph 16.) Precipitation amounts used in developing the flood were furnished by the Hydrometeorological Section of the U.S. Weather Bureau in June 1957. Based on an average of 23.4 inches of rain over the basin, the probable maximum flood would result in a peak inflow of 355,000 cfs and a 5-day volume of 780,000 acre-feet. Reservoir routings beginning with pool elevation at 1,088 feet indicate a maximum pool elevation of 1,123.4 feet, 11.6 feet of freeboard, and a maximum outflow of 112,600 cfs. Routings of this flood adjusted to reflect failure of Beardsley Dam indicate a maximum pool elevation of 1,126.4 feet and 8.6 feet of freeboard.

The probable maximum flood was revised on the basis of criteria in the Weather Bureau's "Hydrometeorological Report No. 36, Interim Report, Probable Maximum Precipitation in California," revised October 1969. Based on an average of 31.7 inches of rain over the basin, the revised flood results in a peak inflow of 327,000 cfs and a 5-day volume of 940,000 acre-feet. Hydrographs from reservoir routings of this flood (Chart 14) indicate a maximum pool elevation of 1,130.3 feet, 4.7 feet of freeboard, and a maximum outflow of 150,000 cfs. Routings adjusted to reflect failure of Beardsley Dam indicate a maximum pool elevation of 1,134.0 feet and 1.0 foot of freeboard.

19. FLOOD MAGNITUDES

Values for the standard project rain flood, major historical rain floods, and the probable maximum flood are tabulated below. All values reflect unimpaired flow.

FLOOD	PEAK INFLOW (CFS)	RATIO TO SPF	7-DAY VOLUME (ACRE-FEET)	RATIO TO SPF
Standard Project	148,000	1.00	458,290	1.00
December 1955	102,000	0.68	289,800	0.63
November 1950	82,000	0.61	288,400	0.63
March 1907	77,000	0.52	319,000	0.70
February 1963	64,400	0.44	161,000	0.35
December 1964	62,800	0.42	285,600	0.62
January 1911	60,000	0.41	125,000	0.27
December 1937	53,000	0.36	130,760	0.29
Probable Maximum	327,000	2.40	940,000 1/	----

1/5-day volume

Hypothetical routings of the December 1955 and December 1964 floods and a routing of the standard project flood are shown on Chart 12.

Values for the standard project snowmelt flood and major historical snowmelt floods are shown below. Values reflect unimpaired flow.

FLOOD	MAXIMUM MEAN DAILY INFLOW (CFS)	RATIO TO SPF	120-DAY VOLUME (ACRE-FEET)	RATIO TO SPF
Standard Project	16,000	1.00	1,755,000	1.00
1967	16,200	1.01	1,345,000	0.77
1906	14,300	0.89	1,618,000	0.93
1938	13,800	0.86	1,330,000	0.76
1969	12,000	0.75	1,356,000	0.77
1952	11,400	0.71	1,386,000	0.79

Hypothetical routings of the 1906, 1967, 1969, and standard project snowmelt floods are shown on Chart 13.

CHAPTER IV - PROJECT FEATURES

20. DESCRIPTION OF PROJECT

New Melones Dam and Lake are on the Stanislaus River near Sonora, about 35 miles northeast of Modesto. The project is operated and maintained by the Water and Power Resources Service as a unit of the Central Valley Project (CVP), one of the most extensive manmade water transport systems in the world. The CVP comprises a comprehensive system of storage reservoirs, power generation and transmission facilities, and conveyance facilities, and extends from the Cascade Range on the north to the semiarid plains along the Kern River 500 miles to the south. The primary purpose of the CVP is irrigation, including transfer of water from the Sacramento River basin to water-deficient areas in the southern part of the San Joaquin Valley. Other purposes include flood control, water supply, power generation, fishery enhancement and wildlife conservation, recreation, improvement of navigation on the Sacramento River, and protection of the Sacramento-San Joaquin Delta from saltwater intrusion. The New Melones Lake project will be operated for flood control, power generation, irrigation supply, water quality control, fishery enhancement, and recreation.

New Melones Dam is about three-fourths of a mile downstream from Melones Dam, a 186-foot-high concrete arch structure built in 1926. Melones Dam will be submerged by New Melones Lake. The drum gates and irrigation valves have been removed from Melones Dam, and the power tunnel has been plugged.

At gross pool, the water-surface area of the lake is 12,500 acres and the shoreline totals about 100 miles. Area-capacity curves for the lake are shown on Chart A-1 in the Appendix; Chart A-3 is an area-capacity table. Water-surface elevations of New Melones Lake at selected storage levels are:

STORAGE LEVEL	ELEVATION (FEET)
Minimum power pool (300,000 acre-feet)	808.0
Gross pool (2,420,000 acre-feet)	1,088.0
Probable maximum flood pool (2,970,000 acre-feet)	1,130.3

21. TULLOCH DAM AND RESERVOIR

Tulloch Reservoir, which extends about 7 miles downstream from New Melones Dam, serves as the afterbay for the New Melones Lake project. It is one unit of a three-unit power and irrigation development built on the Middle Fork and main stem Stanislaus River by the Oakdale and South San Joaquin Irrigation District in 1955-58. It creates a lake with a storage capacity of 67,000 acre-feet, 10,000 acre-feet of which are reserved for flood control. Spillway releases are controlled by seven tainter gates capable of discharging 150,000 cfs when the reservoir is at a maximum pool elevation of 510.0 feet. The Tulloch powerplant has an installed capacity of 17,000 kilowatts provided by two 8,500-kilowatt generators. Details of Tulloch Dam and powerplant are shown on Chart 19.

22. POWER DEVELOPMENT

The CVP power system serves primarily as a peaking system; only Keswick, Nimbus, and Lewiston afterbay powerplants are operated as baseload plants. The New Melones powerplant increases the dependable capacity of the CVP system by about 209,000 kilowatts annually and provides an average of about 429 million kilowatt-hours of energy annually.

To permit the most desirable operation of the New Melones powerplant for peaking purposes without causing large fluctuations in downstream flows, afterbay storage is provided in Tulloch Reservoir in accordance with an agreement between the Water and Power Resources Service and the Oakdale and South San Joaquin Irrigation Districts.

The Pacific Gas and Electric Company (PG&E) owns and operates a system of reservoirs and powerplants upstream from New Melones Lake. The powerplants have an aggregate installed capacity of 91,700 kilowatts. Stanislaus powerplant (at the upstream end of New Melones Lake) is the largest, with a capacity of 82,000 kilowatts.

The Tri-Dam project, a joint venture of the Oakdale and South San Joaquin Irrigation Districts, consists of Beardsley and Donnells Reservoirs, upstream from New Melones Lake, and Tulloch Reservoir, downstream. The total installed capacity of the project is 81,000 kilowatts.

23. IRRIGATION AND WATER QUALITY

Integration of the New Melones Lake project into the CVP will provide new water to be used in one or more of the following ways: (1)

to serve irrigation districts along the Stanislaus River; (2) to serve adjacent areas north or south of the Stanislaus River basin; (3) to serve other San Joaquin Valley areas via the Delta-Mendota Canal, the California Aqueduct, or other conveyance facilities; (4) to serve the San Felipe Service Area in Santa Clara, San Benito, Santa Cruz, and Monterey Counties; (5) to furnish supplemental water to the Montezuma Hills-Suisun Marsh area; and (6) to satisfy water quality requirements for the Sacramento-San Joaquin Delta.

Summer flows in the lower San Joaquin River are mainly irrigation return flows, which contain a high concentration of total dissolved solids (TDS). During periods of low flow, the TDS concentration has reached as high as 1,220 parts per million (ppm). Under present conditions, flow from the Stanislaus River constitutes about 25 percent of the mean annual flow in the San Joaquin River at Vernalis during normal or wet years, and about 1 to 15 percent during low flow periods. Water will be released from New Melones Lake during low flow to reduce high levels of dissolved solids in the lower San Joaquin River. In addition, releases will be necessary in about year 2000 to maintain an adequate concentration of dissolved oxygen (DO) in the lower reaches of the Stanislaus River.

24. RECREATION

The New Melones Lake project, located only a short distance from several large population centers, is expected to attract many visitors. Recreation use in the lake area is estimated to be 850,000 recreation days initially and to increase to 1,044,000 recreation days in about 10 years. Recreational activities available include picnicking, camping, hiking, boating, fishing, and swimming. In addition to a visitor center, dam-viewing areas, and interpretative trails, six recreation areas have been developed. Two of the recreation areas will be enlarged and six new areas developed to accommodate future demand. The recreation areas, described in "Lake Area Master Plan, New Melones Lake, Stanislaus River, California," dated August 1976, are shown on Chart 20. Facilities available are summarized below.

NEW MELONES LAKE - RECREATION DEVELOPMENT

RECREATION AREA	CAMPSITES	PICNIC SITES	BOAT LAUNCH	LODGING	MARINA
Initial Development					
Tuttletown	327	155	Drive-in	-	140-slip
Glory Hole	441	170	Drive-in	-	130-slip
Mark Twain	-	30	Walk-in	-	-
Parrotts Ferry	-	10	Walk-in	-	-
Coyote Creek	-	25	-	-	-
Camp Nine	25	45	Walk-in	-	-

NEW MELONES LAKE - RECREATION DEVELOPMENT					
RECREATION AREA	CAMPSITES	PICNIC SITES	BOAT LAUNCH	LODGING	MARINA
Future Development					
Tuttletown	-	-	-	105-unit	120-slip
Glory Hole	51	10	-	-	130-slip
Melones	-	15	Walk-in	-	-
Skunk Gulch	55	5	-	-	-
Grapevine Gulch	15	-	-	-	-
Rawhide	182	100	Drive-in	-	-
Bear Creek	105	40	Drive-in	-	-
Chaparral	230	90	Drive-in	110-unit	300-slip

Initially, two marina concessions are planned for the lake. A 6,800-acre area reserved for wildlife management provides for incidental recreational uses such as hiking, nature photography, and bird watching. More than 70 limestone caves are known to exist in or near the reservoir area, and an acquisition and management program covering them was developed as part of the recreation function of the project. The caves, which contain fragile ecosystems, are considered to be an important national resource, and they are protected accordingly. Because many of the caves have vertical shafts as deep as 160 feet, measures have been implemented to insure the safety of cave visitors. The Water and Power Resources Service is responsible for administration and management of the program.

Recreation development is a companion feature of the environmental enhancement and mitigation program for the lower Stanislaus River. Two existing parks were incorporated into the recreation plan, and 11 public access areas for day use and camping were developed to support the increased boating that will result from higher river flows during summer months. Recreation use is estimated to be 185,000 recreation days initially and 235,000 recreation days in 10 years. Public access areas along the lower Stanislaus River are described in "Lower Stanislaus River Master Plan, New Melones Lake, Stanislaus River, California," dated April 1977, and are shown on Chart 20. Recreation facilities to be made available are summarized below.

LOWER STANISLAUS RIVER - RECREATION DEVELOPMENT			
PUBLIC ACCESS AREA	BOAT LAUNCH	CAMPSITES	PICNIC SITES
Goodwin Dam	Walk-in	-	10
Two-Mile Bar	Walk-in	-	10
Knights Ferry	Walk-in	-	75
Six-Mile Bar	-	-	10
Horseshoe Road	Walk-in	1 group (10-party)	20
Orange Blossom	Walk-in	-	20

LOWER STANISLAUS RIVER - RECREATION DEVELOPMENT			
PUBLIC ACCESS AREA	BOAT LAUNCH	CAMPSITES	PICNIC SITES
Oakdale	1/	-	-
Jacob Meyers	Drive-in	2 group (22-party)	-
McHenry Avenue	Walk-in	1 group (20-party)	15
Ripon	Walk-in	2 group (20-party)	30
San Joaquin	Walk-in	-	0

1/Fishing access trail.

A 4-mile course for kayaks is proposed for the canyon upstream from Knights Ferry. This will partially compensate for loss of whitewater reaches when the lake is filled to its 2,400,000 acre-foot capacity. Studies are being made to determine if additional whitewater mitigation is feasible.

CHAPTER V - FLOOD CONTROL REQUIREMENTS

25. HYDROLOGIC BASIS FOR DESIGN

Selection of the flood control space requirement for New Melones Lake was based primarily on the following objectives:

a. To protect areas around Oakdale, Riverbank, and Ripon against all reasonably probable rain floods.

b. To protect agricultural areas along the Stanislaus River downstream from Goodwin Dam against damaging flows during all but very large floods, and to minimize and delay damaging flows during large floods.

c. To control flows in the Stanislaus River downstream from New Melones Dam to existing channel capacities, insofar as practicable; and, in conjunction with operation of other projects in the lower San Joaquin River basin, to reduce flooding along the lower San Joaquin River and in the Sacramento-San Joaquin Delta.

The flood control reservation in New Melones Lake (450,000 acre-feet) is based on controlling the standard project rain flood 20-day series without exceeding a flow of 8,000 cfs at Orange Blossom Bridge. The flood control reservation in Tulloch Reservoir (10,000 acre-feet dedicated) is based on controlling the 3-day 100-year inflow below New Melones Dam without exceeding 8,000 cfs at Orange Blossom Bridge, with no releases from New Melones Lake.

26. FLOOD CONTROL SPACE REQUIREMENTS

The flood control space required at any particular time is determined from the Flood Control Diagram. The diagram requires:

a. 450,000 acre-feet of storage from 1 November to 20 March, and

b. As much as 450,000 acre-feet of conditional flood control space from 20 March to 1 June, and decreasing to zero on 1 August. Storage in conditional space is dependent on forecasts of runoff and irrigation demand, giving consideration to the channel capacity of 8,000 cfs at Orange Blossom Bridge.

27. MULTIPLE USE OF RESERVOIR SPACE

As defined in approved regulations, the allocation of a portion of project costs to flood control is based on optimum use of reservoir space with priority given to storage for flood control. Careful analysis of the seasonal fluctuation of rain flood potential in the Stanislaus River basin and the storage needed for flood control provides for optimum use of reservoir space not required for flood control.

Rain flood potential in the Stanislaus River basin decreases after 20 March and is negligible from about 1 June through 15 September; snowmelt flood potential is relatively predictable after about 1 April and is negligible after 1 August. Accordingly, space not required for flood control is available for conservation storage beginning 20 March. From 20 March through 31 July, the space available is dependent upon the projected snowmelt runoff. After 1 August, no flood control reservation is required in New Melones Lake.

Storage for control of snowmelt floods is not required at Tulloch Reservoir; therefore, storage for other purposes is allowed from 20 March through 15 September.

28. FLOOD CONTROL DIAGRAM

The Flood Control Diagrams for New Melones Lake and Tulloch Reservoir (Charts A-12 and A-13 in the appendix) are the basic project documents regarding operation for flood control. They are the result of careful analysis of flood frequency, seasonal flood potential, and downstream channel capacities consistent with project objectives, and of consideration of operational experience at other reservoirs. Maximum allowable storages in New Melones Lake on selected dates are:

DATE	MAXIMUM ALLOWABLE STORAGE (ACRE-FEET)
15 September	2,400,000
31 October	1,950,000
20 March	1,950,000
31 May	2,400,000

CHAPTER VI - GENERAL PROJECT OPERATION

29. OBJECTIVES

The New Melones Lake project is operated for flood control, irrigation supply, power generation, fishery enhancement, water quality control, and recreation on the basis of the following objectives:

a. To restrict flows in the Stanislaus River downstream from New Melones Dam to a controlling rate of 8,000 cfs at the stream gage at Orange Blossom Bridge, insofar as possible.

b. To provide the maximum conservation storage practicable without impairing the flood control function of the reservoir.

c. To provide the maximum amount of power practicable without impairing the flood control and conservation functions of the reservoir.

d. To provide releases to enhance an anadromous fishery on the lower Stanislaus River.

e. To provide releases to meet established water quality objectives for the Stanislaus River and the San Joaquin River at Vernalis.

f. To maintain a minimum pool of at least 300,000 acre-feet for power and recreation.

30. RESPONSIBILITY FOR OPERATION

New Melones Dam is operated by the Water and Power Resources Service, U.S. Department of the Interior, and is under the jurisdiction of the Regional Director, Mid-Pacific Region, Sacramento, California. Details concerning responsibility for flood control operation are discussed in the appendix to this report. Operation for flood control will be in accordance with the rules and regulations outlined in the Code of Federal Regulations, Title 33, Part 208.11, and reflected in the Field Working Agreement and Flood Control Diagram in the appendix.

In accordance with the project authorization, the Corps of Engineers is required to maintain the lower Stanislaus River channel (from Goodwin Dam downstream to the San Joaquin River) to accommodate a maximum project design release of 8,000 cfs, subject to the condition that responsible local interests agree to maintain private levees along the channel and to prevent encroachment on the channel and floodway between the levees. Easements for flood control were acquired on about 5,100 acres within the 8,000-cfs-capacity area; easements for protection of vegetation and spawning gravels were obtained on about 3,700 of the 5,100 acres.

31. PRESENT REGULATION

Water resources development in the Stanislaus River basin consists of facilities for hydroelectric power generation, irrigation, municipal

and industrial water supply, and recreation. The principal reservoirs in the basin are tabulated on Chart 21; the largest are shown on Chart 2.

PG&E operates several facilities upstream from New Melones Lake in conjunction with its power operations in the basin. Spicer Meadows, Union, Utica, and Alpine Lakes, on the North Fork Stanislaus River or tributaries, provide about 13,000 acre-feet of storage for irrigation, power generation, and domestic use. Relief Reservoir, capacity 15,600 acre-feet, provides water to a network of powerplants extending from Donnells Lake (owned by Oakdale and South San Joaquin Irrigation Districts) downstream to PG&E's Stanislaus powerplant. Relief Reservoir is on Summit Creek, a tributary to the Middle Fork Stanislaus River. Pinecrest (Strawberry) and Lyons Lakes are on the South Fork Stanislaus River. Water from Pinecrest Lake, capacity 18,300 acre-feet, is diverted via Philadelphia Canal (capacity 60 cfs) to Spring Gap powerplant on the Middle Fork Stanislaus River, thence to Stanislaus powerplant on the main stem. Water from Lyons Lake, capacity 5,500 acre-feet, is diverted to Phoenix powerplant via Tuolumne Canal; from Phoenix powerplant, water is rediverted for irrigation and domestic use.

The Oakdale and South San Joaquin Irrigation Districts operate the Tri-Dam project, a three-unit power and irrigation development on the Middle Fork and main stem Stanislaus River. Storage and power capacities of the project are tabulated below.

RESERVOIR	GROSS STORAGE CAPACITY (ACRE-FEET)	POWER INSTALLATION (KILOWATTS)
Donnells Lake	64,500	54,000
Beardsley Lake	97,500	10,000
Tulloch Reservoir	67,000	17,000

Donnells and Beardsley Lakes, on the Middle Fork Stanislaus River, are operated primarily for power. They provide minor, wholly incidental flood control as a result of operation for power and irrigation.

Releases through Tulloch powerplant are discharged into the Stanislaus River; diversions for irrigation are made about 1 mile downstream at Goodwin Dam. The principle diversion canals have a combined capacity of about 1,800 cfs. Because diversions for irrigation are made upstream from the Stanislaus River areas subject to flooding, they serve to reduce prolonged snowmelt flood flows. Winter diversions are small and have practically no effect on large rain floods.

32. MINIMUM RELEASE REQUIREMENTS

Releases from New Melones Lake are required for fishery enhancement in the lower Stanislaus River. The schedule of required minimum flows below Goodwin Dam, given below, is based on a 1962 report by the U.S. Fish and Wildlife Service.

PERIOD	REQUIRED MINIMUM FLOW (CFS)	
	NORMAL YEAR	DRY YEAR 1/
1 Oct - 31 Dec	200	150
1 Jan - 31 May	125	100
1 Jun - 30 Sep	100	50
Annual Release	98,000 acre-feet	69,000 acre-feet

1/One in which the natural inflow to Shasta, Trinity, Folsom, and Friant Reservoirs is less than 5,000,000 acre-feet, and the combined water storage in Shasta, Trinity, Whiskeytown, Folsom, Auburn, and New Melones Reservoirs is less than 5,000,000 acre-feet (based on the prediction for a particular water year).

33. DOWNSTREAM CHANNEL CAPACITIES

Below New Melones Dam, the Stanislaus River flows into Tulloch Reservoir, from Tulloch Reservoir into Goodwin Reservoir, and thence through 59 miles of natural channel. The farthest downstream control point used in the flood control operation of New Melones Dam is the gaging station at Orange Blossom Bridge, which is about 11 miles downstream from Goodwin Dam. As shown below, the channel capacity of the lower Stanislaus River ranges from 8,000 to 12,000 cfs.

REACH	INDEX STATION	STAGE (FEET)	CHANNEL CAPACITY (CFS)
Goodwin Dam to Orange Blossom Bridge	Orange Blossom	119.7	8,000
Orange Blossom Bridge to Riverbank	Orange Blossom	119.7	8,000
Riverbank to Ripon	Ripon	56.3	8,000
Ripon to San Joaquin River	Ripon	56.3-58.3	8,000-12,000

The channel capacities shown above serve as criteria for the flood control operation of New Melones Dam as outlined in the appendix to this report. Approximate travel times of flood waves in the lower Stanislaus River are as follows:

REACH	DISTANCE (RIVER MILES)	TRAVEL TIME (HOURS)
Goodwin Dam to Orange Blossom Bridge	11.6	4
Orange Blossom Bridge to Riverbank	13.2	4
Riverbank to Ripon	17.1	4
Ripon to San Joaquin River	17.1	6

Rating curves for Stanislaus River stations pertinent to flood control operation of New Melones Dam are shown on Chart A-10 (in appendix).

Lower Stanislaus River areas subject to flooding under project conditions are shown on Chart 22. These areas lie within private or project levees or are covered by flowage easements on lands within the 8,000-cfs-capacity channel.

34. FLOOD DAMAGE

Flood damage along the Stanislaus River below New Melones Dam is caused by both general rain and snowmelt floods. Rain floods, characterized by high peaks, small volume, and short duration, are damaging to rural-residential and agricultural areas, whereas snowmelt floods, characterized by low peaks, large volume, and long duration, are damaging to low-lying agricultural areas only. In addition, Stanislaus River floodflows contribute to flooding along the lower San Joaquin River and in the Delta.

Flood control operation of New Melones Dam in conjunction with operation of Tulloch Reservoir and maintenance of the channel downstream from Goodwin Dam will significantly reduce flood damage along the lower Stanislaus River. The prescribed operation would control all Stanislaus River floods of record to objective project flows, and control the standard project general rain and snowmelt floods to a maximum flow of 8,000 cfs at Orange Blossom Bridge.

Damages for selected floods along the Stanislaus River below New Melones Dam are summarized below. For comparison, these amounts have been adjusted to reflect the damage preventable under 1978 conditions with the New Melones Lake project in full operation.

FLOOD	DAMAGE: AT TIME OF FLOOD	DAMAGE: PREVENTABLE UNDER 1978 CONDITIONS WITH PROJECT IN FULL OPERATION
January 1969	$2,140,000	$3,552,000
May 1967	743,000	1,384,000
December 1964	1,623,000	3,187,000
December 1955-January 1956	1,928,000	5,080,000
May 1952	250,000	701,000
November 1950	1,060,000	3,583,000
March 1940	90,000	718,000
February 1938	40,000	391,000
March 1928	150,000	2,469,000
January 1911	130,000	4,388,000
March 1907	140,000	5,247,000

The New Melones Lake project will provide protection along the lower San Joaquin River and in the Delta equal to about 150 percent of damage preventable on the Stanislaus River. The combined operation of New Melones and projects on the San Joaquin, Mokelumne, Calaveras, Tuolumne, and Merced Rivers will prevent most of the remaining flood damage along the lower San Joaquin River and in the Delta.

35. CONSERVATION AND WATER QUALITY OPERATION

For the purpose of irrigation, New Melones Dam will be operated as a unit of the CVP in accordance with criteria developed by the Water and Power Resources Service. Operation for irrigation provides that:

a. All inflow in excess of demands for irrigation, water quality control, fishery enhancement, and power generation will be stored to the extent that conservation space is available.

b. Release of water stored for irrigation will be in accordance with the request of water users and in conformance with their mutual agreements and stipulations. In addition to satisfying an existing irrigation demand of up to 654,000 acre-feet of water to the local service areas of the Oakdale and South San Joaquin Irrigation Districts, New Melones Lake will provide a new irrigation supply of about 210,000 acre-feet. If any of this new water is surplus to local needs, it will be available to serve other water-deficient areas in the San Joaquin Valley. The most efficient use of surplus water from New Melones Lake will be made through coordinated operation with other units of the CVP.

Regulation of flow for water quality enhancement will require releases in addition to those made for other purposes. The objective of operation for water quality is to maintain a mean monthly TDS concentration of 500 ppm or less in the San Joaquin River at Vernalis, and to maintain a minimum dissolved oxygen DO concentration of at least 5 ppm in

the lower Stanislaus River. Under the authorizing legislation, releases from the reservoir specifically for water quality control will not exceed 70,000 acre-feet a year. The Water and Power Resources Service is responsible for monitoring TDS and DO concentrations and for incorporating necessary water quality releases into the reservoir release schedule.

36. POWER OPERATION

The New Melones powerplant, , serves as a unit of the CVP power system. The demand for power generation at the New Melones plant varies according to local grid area requirements as integrated into the Pacific Gas and Electric power grid, consequently no schedule of power requirements is possible. To permit the most desirable operation of the New Melones powerplant for peaking purposes without causing large fluctuations in downstream flows, afterbay storage is provided in Tulloch Reservoir. Operation of New Melones Dam enables the Tulloch powerplant t to increase its power generation. Pacific Gas and Electric Company and the Oakdale and South San Joaquin Irrigation Districts are making a joint study to determine the feasibility of adding another power unit at Tulloch Dam.

37. SEDIMENTATION AND WATER QUALITY MEASUREMENT

In July 1947, the U.S. Soil Conservation Service published a report entitled "Reservoir Sedimentation in the Sacramento-San Joaquin Drainage Basin, California," which indicated that about 6,150 acre-feet of sediment would be deposited in the New Melones Lake site over a 50-year period. Subsequent to that report, Donnells and Beardsley Dams were built upstream from the New Melones site. It is estimated that Donnells and Beardsley Lakes will trap a total of about 1,150 acre-feet of sediment in 50 years. Accordingly, sediment deposition in New Melones Lake is estimated to be 5,000 acre-feet over 50 years, or 10,000 acre-feet over 100 years (project life). The Water and Power Resources Service requires installation of sediment ranges if the estimated 100-year sediment deposition in a reservoir is greater than 5 percent of gross pool. Estimated sediment deposition in New Melones Lake is less than one-half of 1 percent of gross pool; therefore, sediment ranges were not established. Space for storage of sediment in New Melones Lake is included in the minimum operating pool of 300,000 acre-feet.

Samples from New Melones Lake, the inflow, and the outflow are analyzed periodically for water quality. In addition, temperature of the inflow and outflow at New Melones Lake and at Tulloch and Goodwin Reservoirs is monitored continuously. Water quality in the lower Stanislaus River is monitored by telemetry by the Water and Power Resources Service stream-gaging station at Ripon. Concentration of TDS in the lower San Joaquin River near Vernalis, below the mouth of the Stanislaus River, is also monitored by telemetry by the Water and Power Resources Service.

38. RELATION TO OTHER PROJECTS

Operation of the New Melones Lake project for the purpose of flood control will be coordinated with the flood control operation of Tulloch Dam. For purposes other than flood control, the project will be operated as a unit of the CVP.

CHAPTER VII - OPERATIONAL CONTROLS

39. HYDROLOGIC FACILITIES

Current hydrologic data for use in operating New Melones Dam are available from the following stations:

[redacted]

All stations are operated by the Water and Power Resources Service

[redacted]

Outflow from New Melones Lake is computed by adding together the flows through the powerhouse, through the flood control-irrigation outlet, and over the spillway. Flows are calculated from rating curves (Charts A-5, A-7, and A-8). Outflow from Tulloch Reservoir is computed by adding together the flows through the powerhouse, through the irrigation conduits, and over the spillway.

Inflow to New Melones Lake is computed from records of reservoir storage, outflow, and evaporation; computed quantities are supplemented by records for stream-gaging stations on the South Fork Stanislaus River and on the main stem.

d. Data for record and planning purposes are available from storage and outflow records available from operators of reservoirs upstream from New Melones Lake, and from the following nonreporting stations:

a. Several Geological Survey stream gages on tributaries upstream from New Melones Lake, and several Geological Survey or California Department of Water Resources gages downstream.

b. Numerous National Weather Service precipitation gages upstream from New Melones Dam.

c. Numerous snow courses in the mountain area upstream from New Melones Dam. The courses are operated by various agencies, and the data from them are published by the California Cooperative Snow Surveys (California Department of Water Resources).

40. FORECASTS OF FLOOD RUNOFF

The April through July forecast of snowmelt runoff in the Stanislaus River basin is of primary concern for operation of New Melones Dam. Seasonal forecasts pertinent to operation are made by the Water and Power Resources Service. A forecast of runoff for the Stanislaus River at New Melones Dam is made for February through July, and periodically adjusted to account for observed runoff and additional precipitation.

Operation of New Melones Dam for control of rain floods, which may occur anytime from October through April, requires frequent forcasts of inflow to New Melones Lake and local inflows downstream.

41. COORDINATION WITH OTHER AGENCIES

To insure that the flood control operation of New Melones Dam will be as effective as possible, it is essential that the operating agency be continually advised of possible flood hazards, weather conditions, inflows to New Melones Lake and Tulloch Reservoir, and flows in the Stanislaus River below Goodwin Dam and in the San Joaquin River. This requires close liaison between the Water and Power Resources Service and the National Weather Service, Geological Survey, Corps of Engineers, California Department of Water Resources, Oakdale and South San Joaquin Irrigation Districts, the Tri-Dam Project, and downstream interests.

42. WATER RIGHTS FOR IRRIGATION UPSTREAM FROM NEW MELONES DAM

Under existing California water law, counties of origin cannot be deprived of any water required to satisfy needs. Most of the water in the Stanislaus River originates in Calaveras and Tuolumne Counties. Public Law 87-874, 87th Congress, Second Session, provides further that:

> . . . before initiating any diversions of water from the Stanislaus River Basin in connection with the operation of the Central Valley Project, the Secretary of the Interior shall determine the quantity of water required to satisfy all existing and anticipated future needs within that basin and the diversions shall at all times be subordinate to the quantities so determined . . . .

Rights to the basic natural flow in the Stanislaus River, a maximum of about 1,900 cfs plus existing storage, are determined by court adjudication or specific water rights. Applications for water rights to substantially all of the unappropriated water in the Stanislaus River basin have been filed by the State of California, Tuolumne County Water District No. 2, Calaveras County, and Calaveras County Water District. Under agreements between the Water and Power Resources Service and (1) Tuolumne County Water District No. 2 (contract No. 14-06-200-7116A dated 29 November 1972); (2) Calaveras County (contract No. 12-06-200-7011A dated 24 July 1972); and (3) Calaveras County Water District (contract No. 14-06-200-7001A), the United States agrees that the local agencies may divert and/or impound water from the Stanislaus River or any of its tributaries, and that the right to do so, whenever initiated, shall be prior and superior to any rights of the United States to divert or impound any of the waters of the Stanislaus River. In addition, the United States agrees that should the local agencies desire to purchase water impounded by the United States in New Melones Lake for release as replacement water in order to satisfy other prior rights downstream from New Melones Dam, prices shall not exceed those charged other customers of the new water provided by the New Melones Lake project.

43. WATER RIGHTS FOR IRRIGATION DOWNSTREAM FROM NEW MELONES DAM

Users downstream from New Melones Dam who have established rights to water in the Stanislaus River may be grouped as follows:

a. Oakdale and South San Joaquin Irrigation Districts.

b. Reclamation Districts 2064 and 2075.

c. Individual water users adjacent to the Stanislaus River.

By an agreement dated 24 October 1972 between the United States and the Oakdale and South San Joaquin Irrigation Districts, the Water and Power Resources Service, in recognition of the water rights of the Districts, each year will deliver to the Districts the following quantities of water for diversion at Goodwin Dam:

a. 200,000 acre-feet from storage in New Melones Lake.

b. 36,000 acre-feet for storage in Woodward Reservoir, and

c. That portion of the inflow to New Melones Lake required to meet the Districts' direct diversion requirements but not to exceed 1,816.6 cfs, subject to the following limitation: the maximum quantity of water delivered each year is limited to 654,000 acre-feet or the total quantity of inflow to New Melones Lake during the water year, whichever is smaller.

Reclamation District 2064 is entitled to divert 72.29 cfs of water from the Stanislaus and San Joaquin Rivers at four points of diversion on each stream. Under its rights, the district has diverted more than 17,000 acre-feet of Stanislaus River water annually. Reclamation District 2078 holds two applications to appropriate 75.4 cfs of water from the Stanislaus River. The district has diverted as much as 19,230 acre-feet of water annually.

Individual water users adjacent to the Stanislaus River between Goodwin Dam and the San Joaquin River control about 8,300 acres of irrigable lands. The estimated ultimate water requirements of these lands and classification of water rights as determined from studies by the Water and Power Resources Service are:

WATER RIGHT CLASSIFICATION	IRRIGABLE AREA (ACRES)	ULTIMATE WATER REQUIRMENT (ACRE-FEET)
Assumed riparian rights	5,430	24,500
Adjudicated rights	80	300
Appropriative rights	1,270	5,700
Other rights	1,520	6,800
TOTAL	8,300	37,300

Of the 5,430 acres of land covered by assumed riparian rights, about 2,500 acres are supplied water by sources such as wells or diversions from sloughs and drains rather than by direct diversions from the Stanislaus River.

44. WATER RIGHTS FOR POWER

To be completed when agreements between the United States and Oakdale and South San Joaquin Irrigation Districts have been finalized.

45. RESPONSIBILITY FOR SATISFYING DOWNSTREAM WATER RIGHTS

To be completed when agreements between the United States and Oakdale and South San Joaquin Irrigation Districts have been finalized.

CHAPTER IX
PROJECT ACCOMPLISHMENTS

46. EXAMPLES OF OPERATION

Routings of two large historical rain floods (1955 and 1964) through New Melones Lake and Tulloch Reservoir are shown on Chart 13. At the outset of each routing, it was assumed that there were 382,500 acre-feet of available space in New Melones Lake and that inflows to the reservoir were impaired by the incidental regulation of upstream reservoirs. Routings of large historical snowmelt floods (1906, 1967, and 1969) are shown on Chart 13. At the outset of each routing, it was assumed that all upstream reservoirs were full and that there was 450,000 acre-feet of space available in New Melones Lake. Routings of the standard project rain flood and the standard project snowmelt flood are shown on Charts 12 and 13, respectively; routing of the probable maximum flood is shown on Chart 14. Rain flood frequency curves (unregulated and project conditions) are shown on Charts 8, 9, and 10, and snowmelt flood frequency curves (unregulated and project conditions) are shown on Chart 11. A stage-frequency curve is shown on Chart 23, and stage-duration curves are shown on Chart 24. The seasonal variation of reservoir storage frequency is shown on Chart 25.

47. OPERATION RECORD

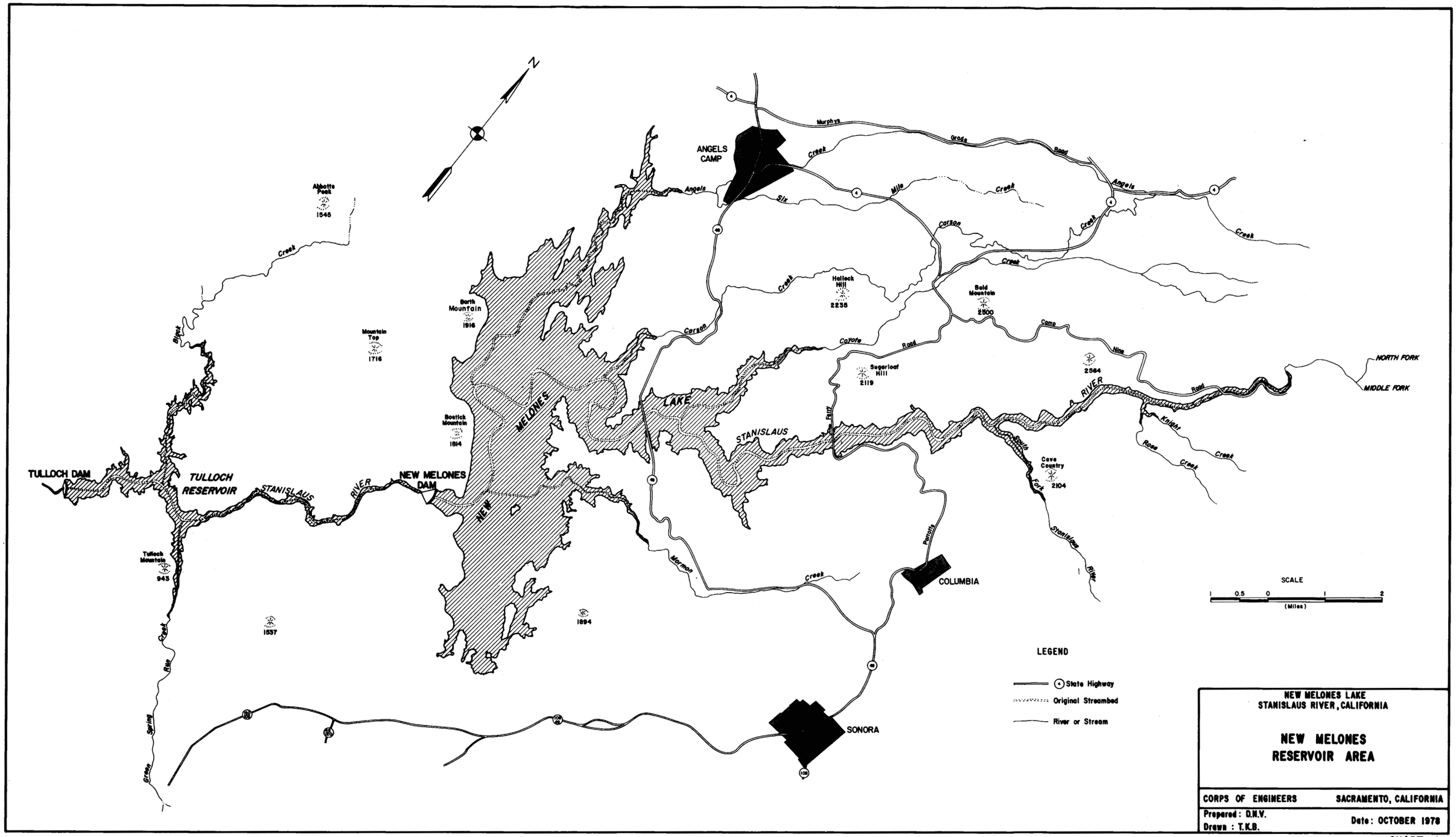
The official operating record of New Melones Dam is published in Water Supply Papers of the Geological Survey.

Operation of New Melones Dam began in November 1978 and is shown on Chart 26. A record of flood control requirements and storage and flows pertinent to flood control operation is contained in monthly reports submitted to the Chief of Engineers by the District Engineer, Sacramento District, Corps of Engineers, Sacramento, California.

CHAPTER X - STUDIES IN PROGRESS OR PLANNED

48. CURRENT STUDIES

The Corps of Engineers does not have in progress, or planned for the immediate future, any studies in the Stanislaus River basin; however, it is anticipated that the master manual of reservoir regulation for the San Joaquin River basin, dated 5 September 1953, will be revised and updated soon. A plan for coordinating flood control operation of all facilities in the basin, including storage projects on tributary streams, bypass and diversion facilities, coordinated reporting and dissemination of hydrologic and operating data, and necessary interagency operating agreements, is under study and will be discussed in the master manual. Local interests, including Calaveras County Water District, Tuolumne County Water District No. 2, Oakdale Irrigation District, and South San Joaquin Irrigation District, are currently studying further development of the North and South Forks of the Stanislaus River for irrigation, water supply, and hydropower. Additionally, the Oakdale and South San Joaquin Irrigation Districts and PG&E are studying the feasibility of adding another power unit at Tulloch Dam.

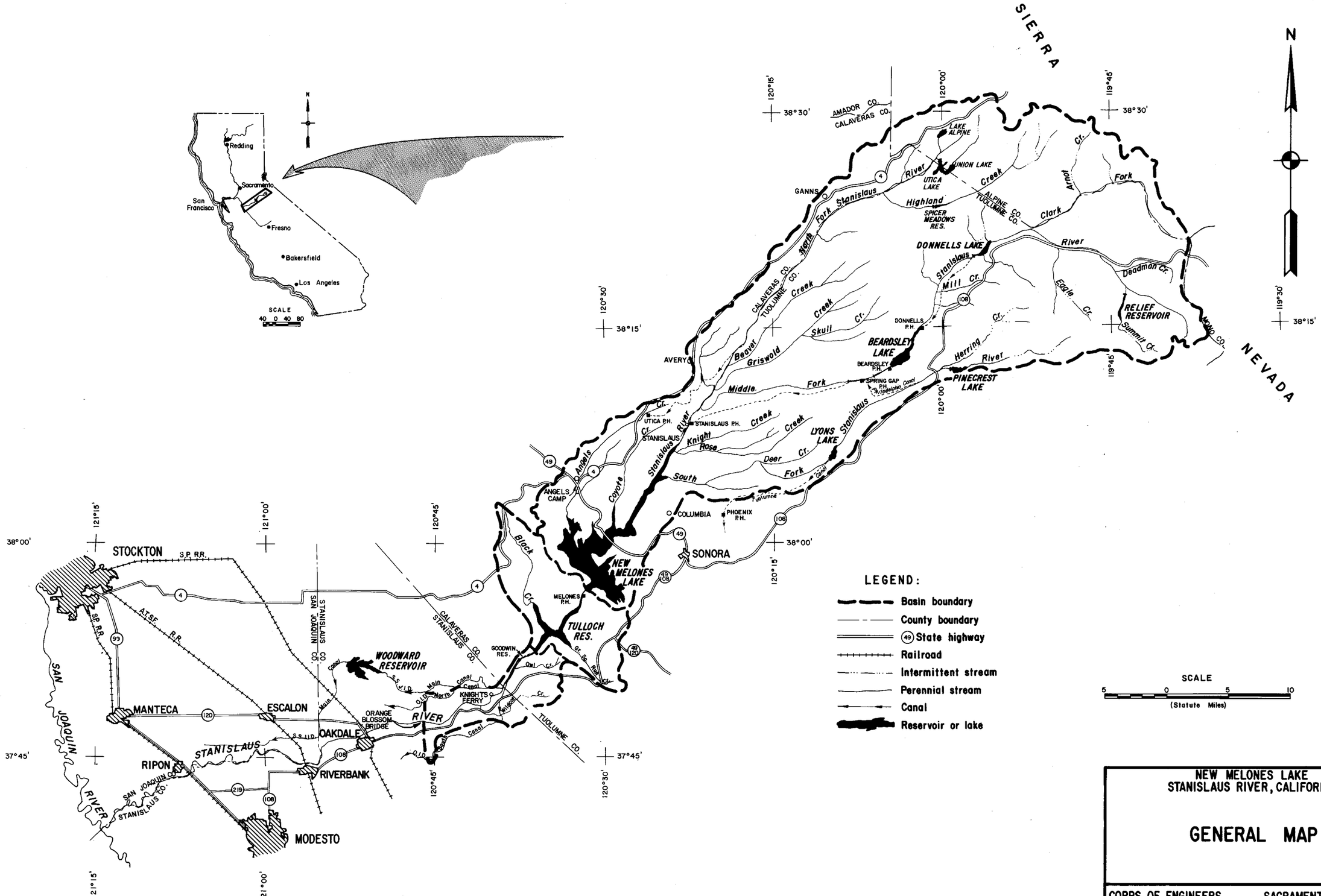


NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

NEW MELONES RESERVOIR AREA

CORPS OF ENGINEERS	SACRAMENTO, CALIFORNIA
Prepared: D.N.V. Drawn : T.K.B.	Date: OCTOBER 1978

CHART 1



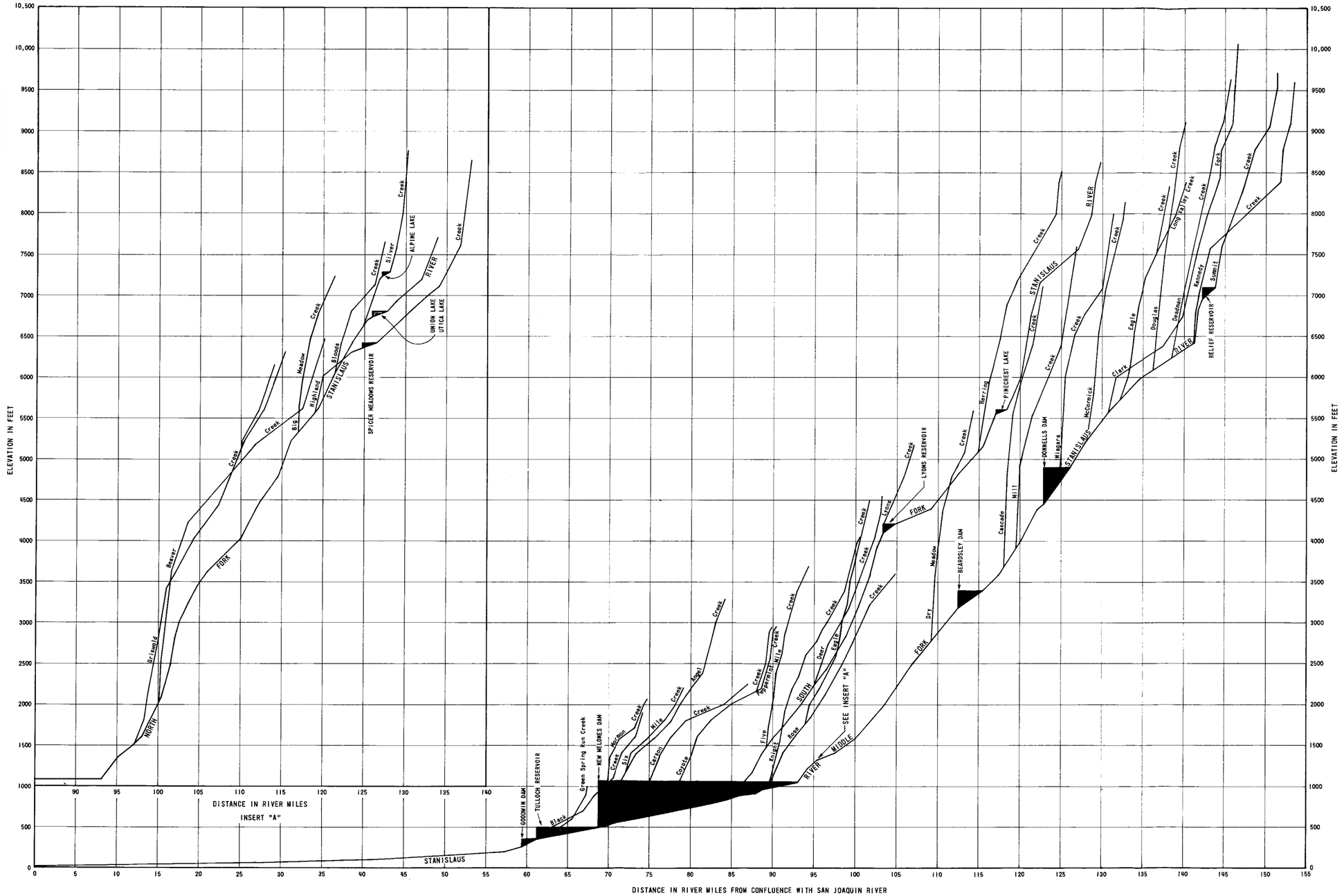
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

GENERAL MAP

CORPS OF ENGINEERS	SACRAMENTO, CALIFORNIA
Prepared: D.N.V. Drawn: T.K.B.	Date: OCTOBER 1979

CHART 2

CHART 3



NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

STREAM PROFILES

CORPS OF ENGINEERS — SACRAMENTO, CALIFORNIA

Prepared : D.N.V.
Drawn : T.K.B.

Date : OCTOBER 1979

CHART 4

CHART 5

UNIMPAIRED MONTHLY INFLOWS TO NEW MELONES LAKE

(1,000 acre-feet)

WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1895	10.0	8.0	236.0	193.0	141.0	126.0	224.0	470.1	353.1	152.2	34.2	23.1	1,970.7
1896	7.0	9.0	11.0	118.0	42.0	105.0	133.0	199.1	433.1	159.2	22.2	21.1	1,259.7
1897	6.0	47.0	43.0	45.0	174.0	142.0	290.0	489.1	202.1	77.2	11.2	4.1	1,530.7
1898	8.0	25.0	35.0	17.0	27.0	39.0	121.0	144.1	65.1	10.2	3.2	1.1	495.7
1899	1.0	1.0	46.0	20.0	26.0	146.0	195.0	178.1	228.1	39.2	8.2	2.1	890.7
1900	20.0	95.0	121.0	95.0	36.0	96.0	97.0	274.1	204.1	31.2	4.2	2.1	1,075.7
1901	27.9	74.2	56.7	129.7	308.6	159.0	166.0	333.1	297.1	102.7	24.8	7.3	1,687.1
1902	9.2	16.6	52.3	14.0	50.9	85.0	225.5	256.1	194.1	38.5	13.3	5.0	960.5
1903	7.1	18.7	30.8	85.0	64.7	140.0	286.0	224.8	217.5	41.1	8.2	0.5	1,124.4
1904	1.7	39.9	17.6	13.0	274.0	385.2	324.0	596.5	274.9	82.4	23.4	15.0	2,047.6
1905	73.5	25.4	28.5	41.3	76.5	150.7	177.0	204.8	146.1	39.1	8.7	4.8	976.4
1906	5.1	5.4	9.0	155.2	117.9	335.7	320.4	506.5	559.7	323.8	59.1	17.4	2,415.2
1907	10.7	10.0	79.7	103.9	200.9	647.7	486.4	483.3	449.7	272.8	68.7	21.3	2,835.1
1908	15.8	11.8	22.6	34.1	31.6	74.7	153.6	141.5	85.0	32.3	12.0	5.7	620.7
1909	6.9	8.1	10.4	359.6	227.9	171.7	294.4	391.6	336.7	91.8	20.1	7.4	1,926.6
1910	9.2	61.7	143.2	143.2	92.3	241.7	329.3	243.7	96.7	27.8	9.3	8.4	1,406.5
1911	8.0	12.0	21.5	257.5	170.2	341.4	376.4	418.7	501.0	201.3	35.8	13.8	2,357.6
1912	11.8	13.3	12.5	20.3	14.9	32.0	57.9	224.6	168.6	29.1	8.0	7.4	600.4
1913	5.4	15.0	10.7	21.5	19.5	30.0	139.8	209.5	101.6	24.9	11.5	5.3	594.7
1914	7.3	9.6	19.8	266.2	163.9	198.4	262.4	430.5	275.4	105.4	23.5	7.7	1,770.1
1915	9.6	9.2	16.5	42.4	130.9	89.5	204.4	355.8	320.4	95.7	18.2	9.0	1,301.6
1916	7.5	8.2	22.5	142.7	136.4	290.7	358.1	349.0	248.9	74.3	20.5	10.4	1,669.2
1917	20.4	16.0	40.0	28.2	143.7	85.3	202.2	352.6	382.6	83.7	14.7	8.2	1,377.6
1918	3.2	6.5	10.8	8.9	31.9	159.7	205.2	213.9	153.4	21.1	5.8	7.8	828.2
1919	12.7	15.8	17.0	12.6	49.7	64.9	205.7	317.4	58.6	11.0	2.8	0.5	768.7
1920	3.6	4.9	14.0	11.7	14.7	96.7	149.5	288.9	124.3	26.6	5.5	2.9	743.3
1921	12.5	27.5	50.3	116.8	96.0	157.0	189.1	308.8	239.1	52.9	9.1	3.8	1,262.9
1922	19.9	6.6	23.1	32.2	85.4	94.1	163.0	481.9	377.4	86.3	19.1	7.7	1,396.7
1923	9.8	16.7	65.8	71.0	49.8	73.9	201.8	343.7	159.3	73.3	15.2	13.3	1,093.6
1924	14.3	10.4	10.2	11.7	23.0	19.2	67.2	80.6	12.2	2.9	2.2	2.1	256.0
1925	8.0	26.4	30.7	29.8	135.6	117.1	251.4	345.6	170.3	52.7	13.9	7.7	1,189.2
1926	10.3	10.9	13.7	13.1	66.4	77.8	205.3	136.8	40.8	8.7	4.6	3.7	592.1
1927	25.6	32.2	29.9	49.4	144.1	128.0	259.0	321.1	244.7	67.0	15.6	7.0	1,323.6
1928	10.5	35.3	25.7	30.1	53.7	233.9	199.3	236.3	70.6	11.5	7.4	5.7	920.0
1929	3.2	8.0	11.0	12.1	19.4	44.1	88.1	194.3	97.0	22.3	2.9	3.4	505.8
1930	1.9	5.5	19.7	28.4	43.5	101.1	172.4	164.1	133.1	30.1	4.0	7.8	711.6
1931	6.9	11.3	7.8	13.3	18.5	36.3	84.5	93.6	26.8	9.8	1.0	1.8	311.6
1932	4.5	7.6	40.8	34.7	112.9	107.0	187.1	371.3	282.2	79.8	17.9	9.1	1,254.9
1933	6.3	4.8	8.1	11.8	14.7	36.4	96.2	174.1	206.4	28.7	6.3	4.7	598.5
1934	3.7	7.8	20.6	28.6	43.1	94.2	98.9	68.5	41.6	9.7	2.1	3.0	421.8
1935	6.2	17.6	19.7	42.7	47.2	68.8	307.3	373.7	248.8	53.7	14.4	6.3	1,206.4
1936	7.3	9.2	9.2	55.2	205.4	153.5	284.8	328.7	200.3	48.1	18.1	7.6	1,327.4
1937	7.4	7.5	12.7	18.0	114.3	125.3	188.9	409.7	163.5	40.9	10.7	6.1	1,105.0
1938	7.5	10.6	179.4	49.9	176.4	240.2	303.9	544.6	397.9	113.0	28.2	13.6	2,065.2
1939	18.8	21.4	17.4	21.8	26.3	74.3	173.1	105.2	42.8	14.7	3.8	7.7	527.3
1940	16.8	11.1	10.9	128.2	169.4	258.0	257.4	344.9	153.9	30.6	9.8	5.3	1,396.3
1941	8.0	8.7	45.7	55.2	108.0	158.2	180.2	432.5	232.4	80.9	18.5	5.1	1,333.4
1942	11.0	14.0	74.2	117.1	102.6	104.6	247.9	353.9	320.3	101.7	18.1	6.9	1,472.3
1943	6.8	40.4	62.7	161.5	119.1	302.5	305.1	276.7	186.2	62.3	16.0	3.6	1,542.9
1944	7.5	9.8	11.2	20.1	31.3	67.4	98.9	258.6	119.4	36.9	8.2	4.5	673.8
1945	7.3	47.9	41.9	35.5	181.9	101.3	209.7	328.6	225.0	69.0	15.5	8.4	1,272.0
1946	20.0	50.3	122.7	84.0	47.2	112.0	234.5	315.3	132.5	35.2	10.2	6.5	1,170.4
1947	11.5	31.1	29.3	21.5	45.5	92.7	134.1	179.3	60.0	14.7	8.1	4.3	632.1
1948	13.1	11.8	11.3	26.4	17.4	38.2	148.4	312.2	246.7	50.4	11.5	5.4	892.8
1949	6.6	8.8	11.1	11.0	18.8	65.0	197.6	277.4	112.6	20.0	8.4	3.9	741.2
1950	4.8	8.1	7.5	41.9	75.2	95.6	248.8	333.3	189.1	42.6	9.9	7.3	1,064.1
1951	14.0	356.9	411.4	124.1	107.0	126.2	174.2	210.3	111.7	35.4	11.8	7.5	1,690.5
1952	10.3	16.8	59.7	105.1	106.2	142.1	337.9	578.5	360.8	142.3	35.3	13.5	1,908.5
1953	8.8	12.5	25.4	77.4	41.2	72.6	199.6	187.2	229.5	88.3	18.9	7.0	968.4
1954	9.1	10.0	13.5	22.1	43.1	135.1	262.8	260.1	88.5	27.4	9.6	6.8	888.1
1955	7.1	11.3	25.1	36.9	35.0	54.0	93.7	226.6	146.9	29.1	10.9	4.5	681.1
1956	5.2	7.5	364.9	263.8	102.2	120.7	203.6	393.7	281.6	93.1	22.2	12.7	1,871.2
1957	13.9	18.1	16.0	18.3	60.3	110.4	135.0	262.4	193.6	39.7	14.0	8.3	890.0
1958	14.2	12.2	22.9	34.8	117.8	157.6	292.6	553.7	324.5	100.8	28.9	9.8	1,669.8
1959	10.5	11.1	7.6	37.6	65.3	80.5	135.3	119.3	68.9	16.5	5.4	15.5	573.5
1960	6.3	4.5	5.3	13.7	61.3	99.4	151.9	154.8	70.6	11.9	2.5	3.1	585.3
1961	5.8	11.7	11.6	9.6	24.0	38.9	102.4	120.1	56.2	6.9	6.9	6.4	400.5
1962	3.5	6.0	10.5	11.2	97.1	76.5	265.6	240.2	204.9	55.5	10.5	4.8	986.3
1963	15.7	8.2	14.6	31.4	241.7	69.3	152.9	418.5	217.9	63.5	15.0	8.9	1,257.6
1964	11.7	47.4	31.5	32.9	30.5	44.8	113.7	182.3	105.8	21.9	6.7	6.6	635.8
1965	6.9	19.6	365.9	204.0	101.9	99.8	237.2	302.3	245.4	97.3	39.7	16.1	1,736.1
1966	5.2	48.3	38.0	33.0	39.2	100.1	202.5	167.9	40.3	12.3	4.6	3.9	695.3
1967	3.4	23.5	109.0	67.7	80.6	188.9	152.5	483.9	489.0	210.9	37.8	17.5	1,864.7
1968	62.9	10.4	14.4	21.7	87.5	83.4	134.3	160.0	70.7	12.8	6.4	6.5	671.0
1969	8.7	36.0	37.6	356.1	159.0	138.9	314.3	613.7	334.5	116.1	26.6	11.9	2,153.4
1970	18.2	21.4	75.0	330.9	105.2	127.7	120.0	251.2	160.4	43.4	11.6	5.2	1,270.2
1971	6.0	37.3	64.6	70.7	68.4	104.3	163.6	235.1	207.1	63.2	13.2	3.3	1,036.8
MEAN	11.0	23.6	50.3	73.4	90.0	129.6	204.0	297.5	202.8	62.7	14.8	7.5	1,167.9

NOTE:

This data was furnished by the U.S. Water and Power Resources Service.

ANNUAL MAXIMUM RAIN FLOOD FLOWS
STANISLAUS RIVER AT NEW MELONES DAMSITE
UNREGULATED CONDITION

(Flows in cfs)

WATER YEAR	DATE	PEAK	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
			DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1932			6 Feb	6,490	6 Feb	5,900	5 Feb	4,100	31 Jan	2,770	31 Jan	1,810
1933			17 Mar	960	16 Mar	790	16 Mar	710	11 Mar	620	2 Mar	530
1934			1 Jan	1,810	1 Jan	1,380	20 Feb	1,130	14 Feb	890	30 Jan	700
1935			8 Apr	9,120	15 Apr	6,800	3 Apr	5,180	2 Apr	4,780	18 May	2,960
1936			22 Feb	13,200	22 Feb	10,100	21 Feb	6,490	12 Feb	5,440	12 Feb	3,960
1937			6 Feb	7,050	5 Feb	5,330	4 Feb	3,050	4 Feb	2,740	2 Mar	2,010
1938	11 Dec 37	53,000	11 Dec	26,500	10 Dec	17,100	10 Dec	9,340	10 Dec	4,990	1 Mar	3,990
1939			26 Mar	2,620	25 Mar	2,450	23 Mar	2,140	17 Mar	1,790	2 Mar	1,180
1940			31 Mar	16,600	30 Mar	12,800	26 Mar	10,600	17 Mar	5,880	2 Mar	4,040
1941			2 Mar	5,690	1 Mar	5,160	28 Feb	3,770	28 Feb	2,930	10 Feb	2,670
1942			27 Jan	8,520	26 Jan	7,000	24 Jan	4,860	25 Jan	3,880	24 Jan	2,770
1943	21 Jan 43	30,000	10 Mar	17,600	9 Mar	12,700	6 Mar	8,750	5 Mar	6,630	2 Mar	4,930
1944			4 Mar	2,650	3 Mar	1,800	28 Feb	1,560	28 Feb	1,170	28 Feb	1,040
1945			2 Feb	17,300	1 Feb	12,700	1 Feb	7,740	1 Feb	4,760	1 Feb	3,070
1946			22 Dec	6,600	21 Dec	5,690	21 Dec	4,790	21 Dec	3,740	21 Dec	2,640
1947			23 Nov	2,300	23 Nov	1,700	19 Nov	1,290	19 Nov	840	19 Nov	700
1948			10 Apr	2,290	9 Apr	1,850	5 Apr	1,630	20 Mar	940	2 Mar	600
1949			3 Mar	2,550	3 Mar	1,790	3 Mar	1,090	11 Mar	1,030	2 Mar	940
1950			6 Feb	3,550	4 Feb	3,410	4 Feb	2,410	4 Feb	1,640	4 Feb	1,400
1951	18 Nov 50	82,000	21 Nov	34,600	19 Nov	31,700	18 Nov	20,600	3 Dec	11,500	18 Nov	11,200
1952			15 Jan	4,480	14 Jan	3,550	12 Jan	2,610	24 Jan	2,470	12 Jan	2,210
1953			28 Apr	8,750	26 Apr	7,460	14 Jan	1,710	9 Jan	1,600	7 Jan	1,280
1954			9 Mar	8,010	9 Mar	6,490	9 Mar	3,900	9 Mar	2,690	2 Mar	2,030
1955			1 Jan	1,890	1 Jan	1,440	25 Mar	1,220	17 Mar	920	2 Mar	810
1956	23 Dec 55	102,000	23 Dec	62,000	22 Dec	36,200	22 Dec	20,700	22 Dec	11,300	22 Dec	7,660
1957			25 Feb	3,270	24 Feb	2,900	23 Feb	2,240	23 Feb	2,150	21 Feb	1,620
1958	3 Apr 58	16,900	3 Apr	11,100	1 Apr	8,360	31 Mar	6,500	22 Feb	4,830	8 Feb	3,800
1959			17 Feb	5,200	17 Feb	3,700	6 Feb	2,500	6 Feb	1,690	6 Feb	1,490
1960			9 Feb	5,330	8 Feb	4,610	7 Feb	2,630	1 Feb	1,580	24 Jan	1,030
1961			2 Dec	920	1 Dec	740	30 Nov	500	7 Feb	400	30 Jan	360
1962			10 Feb	6,020	9 Feb	4,910	9 Feb	3,800	8 Feb	2,630	9 Feb	1,900
1963	1 Feb 63	64,400	1 Feb	38,200	31 Jan	24,700	28 Jan	11,500	20 Jan	5,450	5 Jan	2,790
1964			22 Jan	2,300	21 Jan	1,770	21 Jan	1,300	20 Jan	990	19 Jan	700
1965	23 Dec 64	62,800	24 Dec	43,100	23 Dec	33,300	22 Dec	20,400	22 Dec	11,600	22 Dec	7,670
1966			18 Nov	2,960	23 Nov	2,070	18 Nov	1,700	15 Nov	1,280	15 Nov	940
1967			17 Mar	13,400	16 Mar	10,900	16 Mar	7,060	16 Mar	4,930	2 Mar	3,190

COMPUTED STATISTICS BASED ON CORRELATION WITH FLOWS IN THE VICINITY OF GOODWIN DAM

Log Mean		3.820	3.701	3.548	3.401	3.266
Std Dev		.468	.446	.417	.389	.364
Skew		.182	.134	.017	.011	-.044
Equiv Yrs		71.3	71.9	70.9	71.4	71.2

ADOPTED STATISTICS

Log Mean	4.009	3.819	3.704	3.534	3.396	3.268
Std Dev	.485	.464	.441	.407	.380	.354
Adopted Skew	0	0	-.014	-.049	-.077	-.103

ANNUAL MAXIMUM SNOWMELT FLOWS
STANISLAUS RIVER AT NEW MELONES DAMSITE
UNREGULATED CONDITION

(Flows in cfs)

WATER YEAR	1-DAY		3-DAY		15-DAY		30-DAY		60-DAY		90-DAY	
	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1904	23 May	11500	23 May	11200	11 May	9748	6 May	8280	2 Apr	7030	1 Apr	5780
1905	17 May	6020	17 May	5023	15 May	3720	27 Apr	3390	2 Apr	3080	1 Apr	2770
1906	12 Jun	14300	11 Jun	13466	11 Jun	11380	9 Jun	9960	11 Apr	8910	17 Apr	7860
1907	2 Jun	12000	2 Jun	11233	25 Jun	9368	9 May	8620	15 Apr	8175	8 Apr	7730
1908	20 Apr	3820	19 Apr	3610	18 Apr	2882	10 Apr	2790	10 Apr	2425	1 Apr	2060
1909	4 Jun	9550	2 Jun	9490	31 May	6944	23 Apr	6420	26 Apr	6010	4 Apr	5600
1910	28 Apr	7730	26 Apr	6880	15 Apr	5943	2 Apr	5230	2 Apr	4395	1 Apr	3560
1911	12 Jun	11400	12 Jun	10800	5 Jun	10179	23 May	8790	24 Apr	7925	1 Apr	7060
1912	4 Jun	5980	2 Jun	5800	26 May	5049	11 May	4320	1 May	3320	3 Apr	2320
1913	18 May	4770	17 May	4260	15 May	3440	5 May	3440	21 May	2900	1 Apr	2360
1914	10 Apr	8643	7 May	8174	6 May	7498	5 May	7221	6 Apr	6207	2 Apr	5192
1915	13 May	9910	31 May	9040	27 May	7883	12 May	7210	10 May	6105	8 Apr	4999
1916	5 May	9410	4 May	8830	5 May	7358	10 Apr	6540	3 May	5810	1 Apr	5080
1917	10 Jun	9410	8 Jun	8830	3 Jun	7118	27 May	6230	25 Apr	5615	5 Apr	5000
1918	5 May	4840	4 May	4570	23 Apr	4189	18 Apr	3680	10 Apr	3290	1 Apr	2900
1919	1 May	7740	1 May	7550	29 Apr	5944	22 Apr	4970	21 Apr	3960	1 Apr	2950
1920	20 May	6800	19 May	6720	15 May	4935	6 May	4230	17 Apr	3425	1 Apr	2620
1921	7 Jun	7160	14 May	6880	2 Jun	5277	14 May	4860	22 Apr	4340	1 Apr	3820
1922	18 May	10500	16 May	10000	14 May	8300	14 May	8120	24 Apr	6825	2 Apr	5530
1923	17 May	7400	8 May	7120	7 May	6165	2 May	5320	6 Apr	4495	5 Apr	3670
1924	3 May	1700	2 May	1630	29 Apr	1316	11 Apr	1230	2 Apr	980	1 Apr	730
1925	5 May	8820	4 May	8450	2 May	5774	1 May	5560	4 Apr	4865	1 Apr	4170
1926	8 Apr	4750	6 Apr	4050	6 Apr	3267	6 Apr	3280	5 Apr	2625	1 Apr	1970
1927	17 May	8460	15 May	7960	5 May	5930	22 Apr	5790	1 Apr	5130	1 Apr	4470
1928	8 May	5720	11 May	5130	30 Apr	4504	28 Apr	3940	1 Apr	3340	1 Apr	2740
1929	19 May	4240	3 May	3660	11 May	3011	27 Apr	2720	16 Apr	2215	3 Apr	1710
1930	22 May	4940	22 Apr	4005	19 May	3033	19 May	2900	8 Apr	2640	1 Apr	2380
1931	13 May	2580	6 May	1780	2 May	1521	19 Apr	1420	6 Apr	1178	1 Apr	935
1932	17 May	8817	16 May	8545	11 May	7320	9 May	6146	2 May	5194	2 Apr	4470
1933	30 May	6754	29 May	6497	27 May	4987	21 May	4336	24 Apr	2984	3 Apr	2430
1934	30 Mar	2408	29 Mar	2219	19 Mar	1632	18 Mar	1485	15 Feb	1375	19 Feb	1010
1935	27 May	8304	25 May	7967	22 May	6805	8 May	6325	15 Apr	5746	1 Apr	4010
1936	14 May	8021	13 May	7485	4 May	6282	17 Apr	5966	11 Apr	5119	1 Apr	4370
1937	14 May	9297	14 May	8748	4 May	6957	2 May	6308	12 Apr	4961	21 May	4040
1938	15 May	13813	14 May	13485	24 May	10712	11 May	10421	18 Apr	8269	4 Apr	6660
1939	7 Apr	3261	7 Apr	3239	1 Apr	2768	2 Apr	2511	20 Mar	2161	16 Mar	1610
1940	11 May	7815	11 May	6819	10 May	6320	-	5541E	11 Apr	4789E	22 Mar	4040
1941	12 May	10251	11 May	9503	10 May	7633	2 May	6889	24 Apr	5583	27 Mar	4550
1942	23 May	11237	23 May	10556	20 May	7150	19 May	6884	21 Apr	5636	3 Apr	5060
1943	1 Jun	11931	31 May	10201	23 Apr	6431	14 Apr	5685	9 Mar	5273	5 Mar	4260
1944	10 May	5319	8 May	4950	2 May	4360	2 May	3951	19 Apr	3013	2 Apr	2470
1945	8 May	9607	7 May	9275	29 Apr	7945	19 Apr	6362	18 Apr	4973	26 Mar	4130
1946	6 May	7461	5 May	7166	24 Apr	6400	22 Apr	5749	12 Apr	4627	20 Mar	3670
1947	4 May	4688	4 May	4514	20 Apr	3189	28 Apr	2800	30 Mar	2394	10 Mar	1940
1948	26 May	8250	25 May	7814	14 May	5782	14 May	5505	21 Apr	4572	5 Apr	3800
1949	14 May	7480	13 May	6523	4 May	4846	20 Apr	4803	14 Apr	4012	28 Mar	3200
1950	22 May	7402	21 May	7148	19 May	6905	10 May	5843	8 Apr	4919	29 Mar	4180
1951	27 May	5043	26 May	4734	17 May	3804	3 May	3328	5 Apr	3053	20 Mar	2630
1952	28 May	11416	26 May	11137	19 May	10491	11 May	9954	18 Apr	8259	29 Mar	6960
1953	19 Jun	6146	18 Jun	5827	6 Jun	4389	30 May	3810	23 Apr	3685	16 Apr	3280
1954	22 Apr	6270	21 Apr	6032	15 Apr	5515	16 Apr	5137	3 Apr	4190	9 Mar	3260
1955	24 May	4998	6 Jun	4746	28 May	3928	12 May	3719	22 Apr	2974	28 Mar	2430
1956	23 May	10736	22 May	10261	21 May	8033	16 May	6753	21 Apr	5769	5 Apr	4880
1957	19 May	7994	18 May	6193	27 May	3889	18 May	3652	1 May	2852	3 Apr	2370
1958	24 May	11483	24 May	10578	16 May	9578	3 May	8636	27 Apr	7802	25 Apr	6360
1959	13 May	2872	12 May	2704	3 Apr	2109	3 Apr	2043	30 Mar	1899	17 Mar	1680
1960	12 May	4086	11 May	3809	7 May	2879	7 May	2432	24 Mar	2395	13 Mar	1940
1961	29 Apr	2325	23 May	2167	15 May	1843	28 Apr	1733	2 Apr	1596	23 Mar	1380
1962	6 May	6745	6 May	6388	27 Apr	5269	12 Apr	4995	9 Apr	4181	31 Mar	3780
1963	9 May	11960	20 May	9164	18 May	7839	5 May	6794	25 Apr	5256	5 Apr	4380
1964	20 May	3872	19 May	3823	12 May	3448	10 May	2908	14 Apr	2440	30 Mar	2100
1965	30 Apr	7897	29 Apr	7643	20 Apr	6169	22 Apr	5526	20 Apr	5158	9 Apr	4410
1966	5 Apr	3794	5 Apr	3738	29 Mar	3493	30 Mar	3055	26 Mar	2959	10 Mar	2150
1967	24 May	16161	22 May	15186	17 May	11738	20 May	9470	8 May	8502	18 Apr	6730
1968	21 May	3195	3 May	2948	29 Apr	2573	1 May	2459	8 Apr	2278	8 Mar	1890
1969	23 May	12030	23 May	11578	17 May	10851	8 May	10542	12 Apr	8169	29 Mar	6930
1970	18 May	6374	17 May	5951	15 May	4817	12 May	4221	1 May	3365	31 Mar	2880
1971	16 May	6370	15 May	6006	18 May	4807	11 May	4170	30 Apr	3710	1 Apr	3250
1972	15 May	4170	14 May	4010	9 May	3440	2 May	3170	21 Apr	2730	1 Apr	2310
1973	19 May	9820	18 May	9430	18 May	7910	8 May	6630	12 Apr	5264	20 Mar	5290
1974	1 Apr	9080	8 May	8010	9 May	6750	1 May	5930	15 Apr	5040	22 Mar	4430
1975	1 Jun	11000	2 Jun	10300	4 Jun	8780	25 May	7960	1 May	6245	1 Apr	4530

COMPUTED STATISTICS (ADOPTED)

Equiv Yrs	72.0	72.0	71.9	71.9	72.0	72.0
Log Mean	3.838	3.806	3.719	3.675	3.600	3.524
Std Dev	.211	.212	.214	.215	.217	.219
Computed Skew	-.763	-.751	-.718	-.701	-.671	-.643

E - Estimated Value

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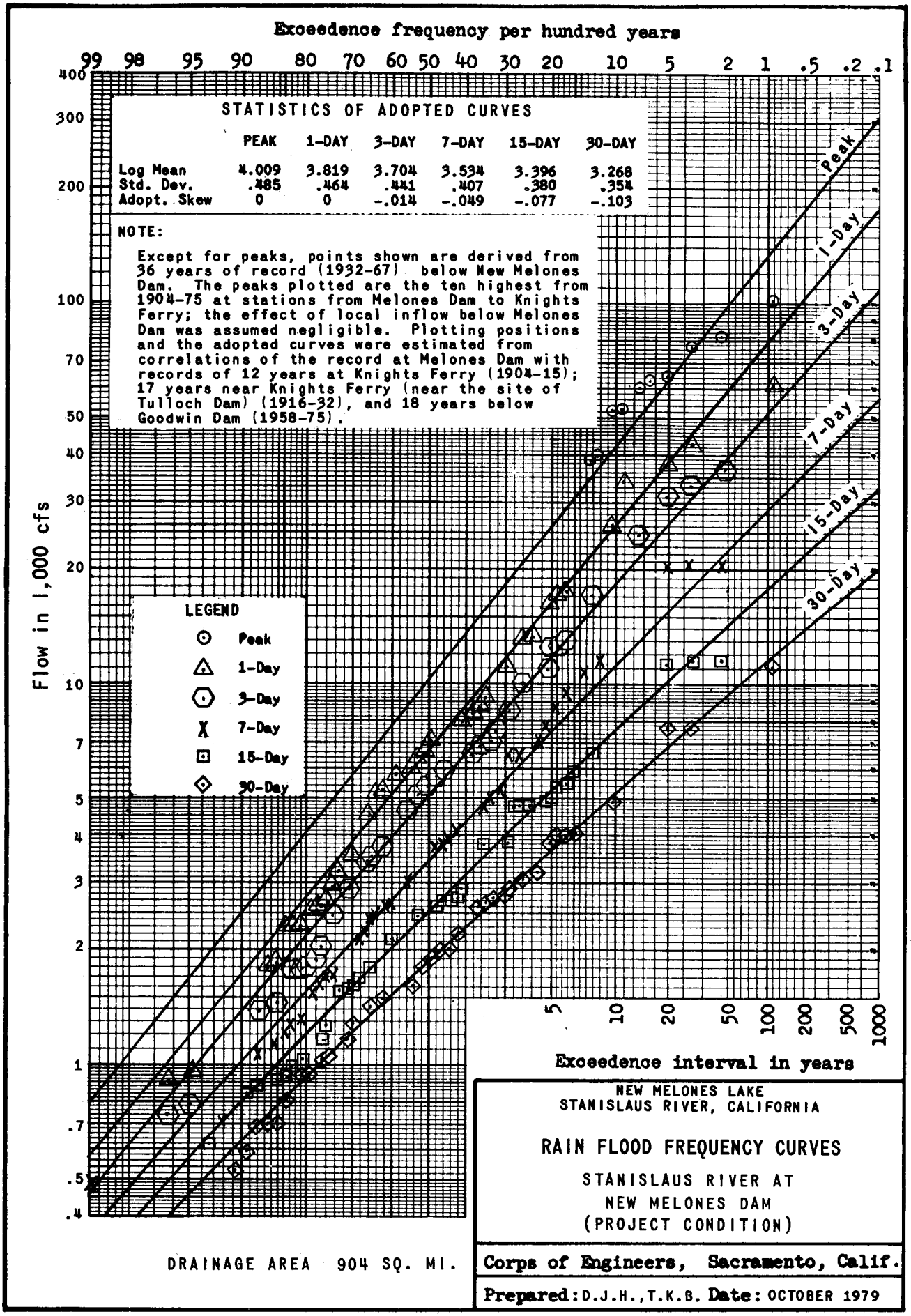
HISTORICAL MONTHLY INFLOWS TO NEW MELONES LAKE

(Inflows in 1,000 acre-feet)

WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1904	6.0	39.5	17.7	18.9	213.0	328.0	303.0	491.0	261.0	78.0	23.6	15.5	1795.2
1905	70.5	25.0	27.0	39.1	73.3	143.0	161.0	196.0	138.0	36.5	10.3	6.5	926.2
1906	6.2	6.2	9.3	125.0	83.5	294.0	279.0	472.0	559.0	335.0	55.5	18.4	2243.1
1907	12.1	11.0	79.1	101.0	197.0	631.0	478.0	470.0	441.0	268.0	68.2	23.0	2779.4
1908	17.0	12.2	22.2	33.1	30.8	74.2	145.0	140.0	84.0	31.3	13.1	7.4	610.3
1909	8.0	7.3	9.5	357.0	225.0	164.0	291.0	379.0	333.0	85.5	21.2	9.5	1893.0
1910	11.0	60.1	140.0	140.0	89.4	234.0	310.0	232.0	93.4	26.9	11.9	11.7	1360.4
1911	13.0	14.3	21.9	255.0	163.0	338.0	373.0	406.0	491.0	191.0	34.7	18.0	2318.9
1912	17.0	18.9	17.2	19.6	13.9	31.0	50.9	203.0	162.0	28.8	12.1	12.6	587.0
1913	13.4	13.6	8.0	19.5	17.7	29.4	119.0	194.0	98.0	24.4	13.8	13.0	563.8
1914	13.2	12.4	20.3	266.0	164.0	199.0	271.0	418.0	261.0	99.9	23.6	13.7	1762.1
1915	15.4	14.3	15.9	39.2	12.8	83.0	201.0	340.0	308.0	91.0	21.2	17.9	1274.9
1916	12.1	10.1	22.8	140.0	136.0	278.0	325.0	330.0	237.0	71.3	18.8	12.1	1593.2
1917	22.6	18.6	38.9	33.9	143.0	87.3	207.0	330.0	355.0	86.1	20.7	17.8	1360.9
1918	13.6	12.9	12.4	8.8	30.6	154.0	181.0	189.0	149.0	21.6	16.7	14.5	804.1
1919	16.1	18.1	18.0	15.0	47.9	61.5	189.0	286.0	52.5	17.0	15.6	11.9	748.6
1920	7.9	4.7	12.9	10.5	13.3	92.2	135.0	257.0	120.0	26.4	16.9	15.9	712.7
1921	13.9	26.8	49.8	116.0	93.9	157.0	18.0	272.0	234.0	50.5	17.7	17.2	1228.8
1922	12.3	8.6	25.0	34.2	105.0	99.0	164.0	461.0	368.0	81.8	22.0	18.0	1398.9
1923	17.5	18.7	76.2	75.6	53.7	72.6	194.0	322.0	157.0	70.7	20.5	20.5	1099.0
1924	18.9	14.9	12.4	12.1	22.8	19.0	58.3	60.1	11.9	5.8	6.1	7.5	249.8
1925	9.0	28.0	32.8	30.6	148.0	113.0	242.0	338.0	168.0	51.6	18.6	15.6	1195.2
1926	16.4	14.4	15.4	13.9	72.2	73.8	181.0	132.0	39.8	14.6	11.8	10.9	596.2
1927	--	--	--	--	--	--	--	--	--	--	--	--	--
1928	13.9	30.5	26.5	30.9	56.5	237.9	194.3	233.2	67.7	15.3	19.2	8.7	934.6
1929	6.0	10.5	10.7	12.9	20.5	43.7	81.9	165.2	94.2	22.0	9.6	11.7	488.9
1930	4.9	6.1	19.1	30.9	43.5	105.0	155.3	146.5	125.9	30.2	11.1	16.3	694.8
1931	12.9	13.4	9.6	13.8	19.2	34.1	70.1	71.6	25.0	12.0	4.5	12.9	299.1
1932	13.7	9.9	39.3	33.0	107.2	102.0	176.4	360.2	263.2	73.4	19.9	14.5	1216.6
1933	10.3	13.4	10.6	13.8	15.5	31.4	83.3	154.8	207.6	27.5	15.2	15.6	599.0
1934	6.7	9.8	20.8	28.8	39.6	83.2	79.6	61.2	39.6	11.1	4.4	10.1	394.8
1935	14.3	21.3	21.4	42.0	43.6	65.1	291.4	357.7	243.7	51.5	19.1	15.6	1186.7
1936	14.9	11.3	11.3	53.1	201.4	145.9	266.6	319.4	196.3	51.2	19.8	16.6	1307.7
1937	14.5	10.3	14.4	18.6	107.4	122.8	180.8	383.5	158.8	40.2	19.0	16.5	1091.7
1938	12.8	11.6	161.3	52.7	177.3	241.3	293.1	531.8	392.3	108.1	30.1	20.0	2047.4
1939	22.5	29.5	18.9	23.2	26.1	68.7	150.4	96.3	41.2	15.5	7.5	10.4	524.3
1940	20.0	20.2	13.7	121.0	166.7	251.9	249.2	345.9	147.1	30.8	13.3	19.6	1399.5
1941	14.4	10.9	43.7	52.9	104.1	155.8	171.3	417.1	223.5	77.0	22.9	14.1	1305.7
1942	16.0	14.7	69.1	112.3	102.7	99.5	248.6	342.5	312.8	98.7	21.5	15.5	1453.8
1943	9.8	36.8	59.0	161.4	115.6	295.8	297.6	269.0	182.1	59.9	17.8	8.5	1513.3
1944	15.3	14.5	18.1	20.4	30.9	63.5	86.3	239.8	113.3	36.2	18.7	11.0	668.0
1945	8.2	45.7	41.2	35.9	176.8	94.4	197.1	323.2	216.9	67.8	22.7	19.0	1248.8
1946	21.7	43.9	120.0	83.8	47.7	110.5	224.6	299.9	126.9	37.2	15.8	25.9	1157.9
1947	14.5	28.5	30.8	23.1	43.9	85.4	117.1	165.4	58.0	18.4	15.8	9.3	610.1
1948	14.1	14.1	13.4	26.1	18.2	35.5	133.4	294.9	240.1	48.6	14.3	8.9	861.6
1949	11.9	13.0	16.3	14.7	17.9	55.6	179.7	266.9	107.1	18.8	11.1	6.1	719.1
1950	9.7	15.8	10.6	40.4	71.1	89.8	235.7	321.3	183.7	41.0	13.6	12.8	1045.5
1951	19.3	338.2	433.2	126.9	88.5	124.2	163.2	198.8	108.8	35.5	17.9	15.6	1670.0
1952	19.4	17.1	57.2	103.4	104.2	139.6	322.4	564.0	354.3	136.6	35.8	19.7	1873.6
1953	22.5	16.8	26.9	72.5	40.8	66.1	180.6	176.6	222.9	84.2	23.6	19.2	925.7
1954	16.4	11.9	13.7	21.7	39.6	121.4	245.6	252.9	84.5	27.3	16.6	17.8	869.4
1955	10.5	11.4	24.1	36.1	33.6	51.2	85.6	200.7	142.0	29.9	18.1	15.3	658.4
1956	8.4	8.0	338.3	262.1	100.2	117.6	199.2	389.0	275.7	89.6	24.0	20.5	1832.6
1957	26.5	20.6	16.1	15.0	50.5	83.5	84.1	170.6	168.7	50.3	41.5	38.0	765.2
1958	47.9	16.0	21.6	34.0	105.0	149.4	253.7	493.4	319.3	116.0	38.9	32.6	1627.8
1959	39.5	33.8	26.0	37.3	72.7	69.0	84.6	76.6	55.2	68.4	50.2	35.8	649.1
1960	9.5	5.5	4.7	22.2	62.2	77.1	95.8	86.6	65.2	27.9	25.8	25.5	508.0
1961	8.8	31.8	31.2	20.9	19.2	31.4	69.5	73.0	36.8	27.9	37.5	20.6	408.7
1962	7.2	14.3	23.8	24.3	85.8	72.9	165.0	191.2	197.0	56.2	27.2	27.4	892.2
1963	32.5	26.8	32.8	44.2	180.3	50.7	130.1	394.5	214.5	61.7	35.0	34.3	1237.4
1964	37.6	60.0	48.9	52.8	23.8	30.2	77.8	117.8	86.2	36.9	35.0	34.8	641.7
1965	20.4	43.1	276.8	218.5	114.7	114.0	218.1	243.7	237.4	92.5	47.6	43.2	1670.1
1966	21.7	69.4	61.3	52.1	45.9	83.3	125.5	91.4	43.9	34.2	32.7	31.3	692.7
1967	24.2	44.2	104.9	92.2	76.9	163.4	182.2	393.9	418.2	183.2	43.5	44.2	1771.1
1968	48.3	39.7	39.4	43.7	73.8	65.8	80.4	97.7	62.8	32.7	31.7	33.3	651.2
1969	27.7	46.8	57.9	320.0	190.6	153.4	271.4	552.7	325.8	109.7	41.8	42.8	2140.6
1970	49.9	53.9	84.3	290.4	130.0	136.3	106.0	175.1	155.9	50.8	36.0	32.4	1301.0
1971	24.8	59.8	91.5	83.4	71.1	99.5	128.5	161.2	173.4	65.7	41.5	34.5	1034.7
1972	37.8	41.9	64.3	44.7	53.9	102.0	95.8	127.8	82.6	36.3	30.7	32.4	750.1
1973	36.8	19.3	62.0	126.2	136.1	127.0	143.5	306.3	161.9	40.3	32.0	32.1	1223.5
1974	29.5	79.2	114.3	153.9	78.0	192.7	204.7	304.3	201.6	64.2	43.4	32.3	1498.0
1975	37.1	36.6	34.1	43.4	85.7	140.6	104.3	261.2	308.3	78.9	40.4	34.9	1205.5
1976	44.5	37.2	43.7	42.9	39.6	45.5	49.1	52.1	24.2	31.3	35.0	25.2	470.4
1977	4.3	3.6	2.6	3.9	4.3	8.5	19.1	39.7	29.9	5.5	3.1	4.8	129.3

CHART 7



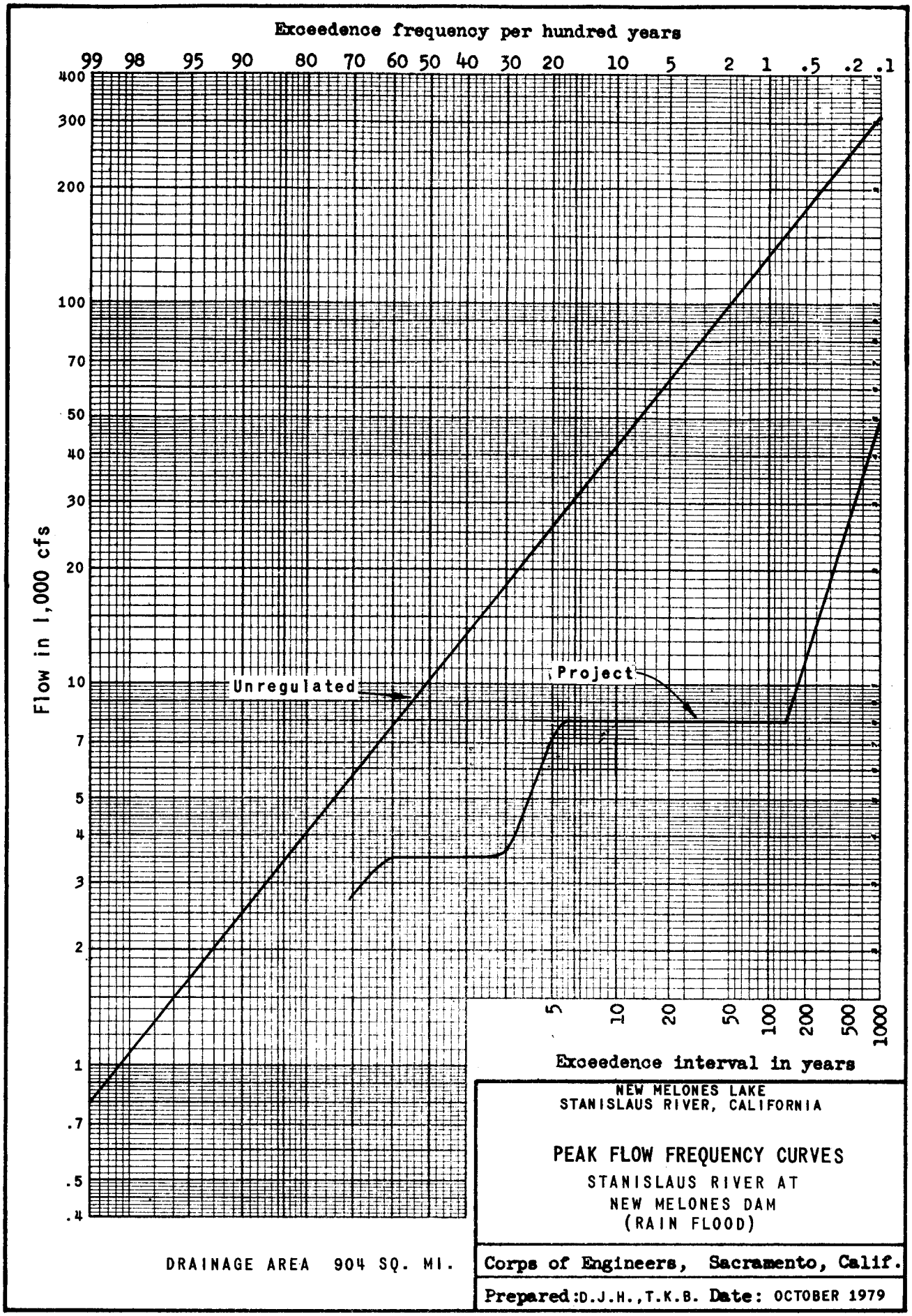
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES

STANISLAUS RIVER AT
NEW MELONES DAM
(PROJECT CONDITION)

Corps of Engineers, Sacramento, Calif.

Prepared: D.J.H., T.K.B. Date: OCTOBER 1979



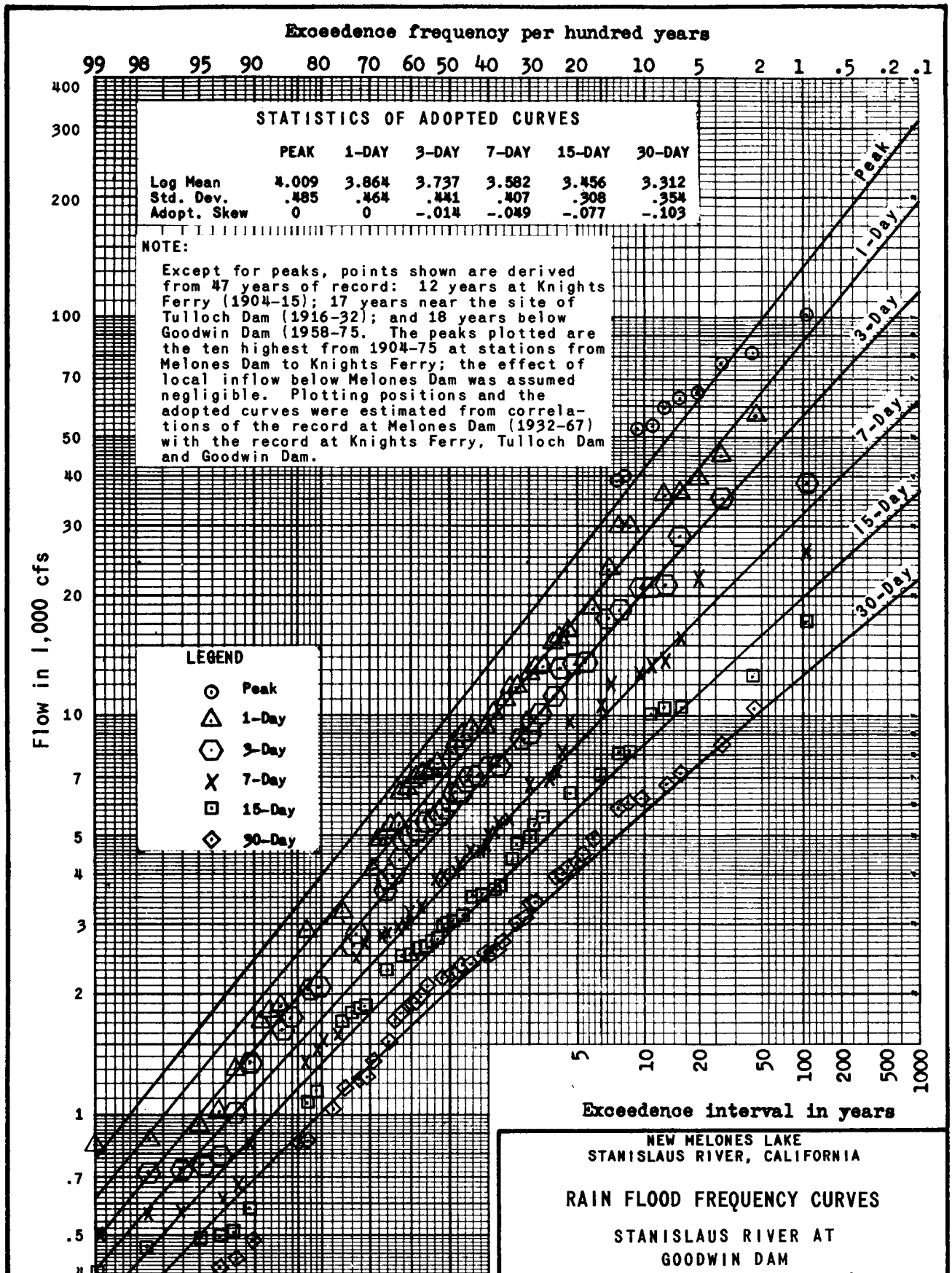
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

PEAK FLOW FREQUENCY CURVES
STANISLAUS RIVER AT
NEW MELONES DAM
(RAIN FLOOD)

DRAINAGE AREA 904 SQ. MI.

Corps of Engineers, Sacramento, Calif.

Prepared: D.J.H., T.K.B. Date: OCTOBER 1979



DRAINAGE AREA 986 SQ. MI.

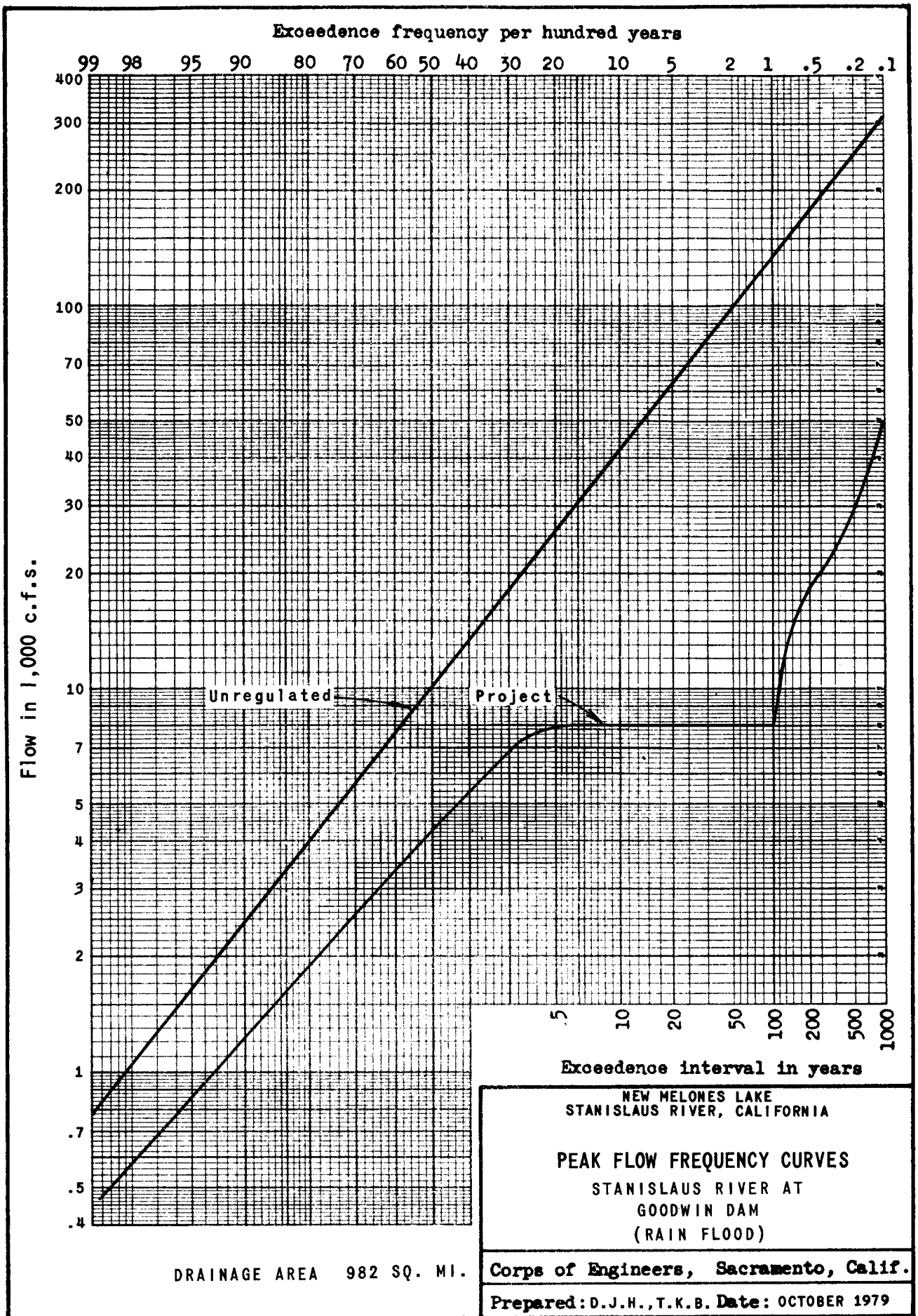
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES

STANISLAUS RIVER AT
GOODWIN DAM
(UNREGULATED CONDITION)

Corps of Engineers, Sacramento, Calif.

Prepared: D.J.H., T.K.B. Date: OCTOBER 1979



NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

PEAK FLOW FREQUENCY CURVES
STANISLAUS RIVER AT
GOODWIN DAM
(RAIN FLOOD)

DRAINAGE AREA 982 SQ. MI.

Corps of Engineers, Sacramento, Calif.

Prepared: D.J.H., T.K.B. Date: OCTOBER 1979

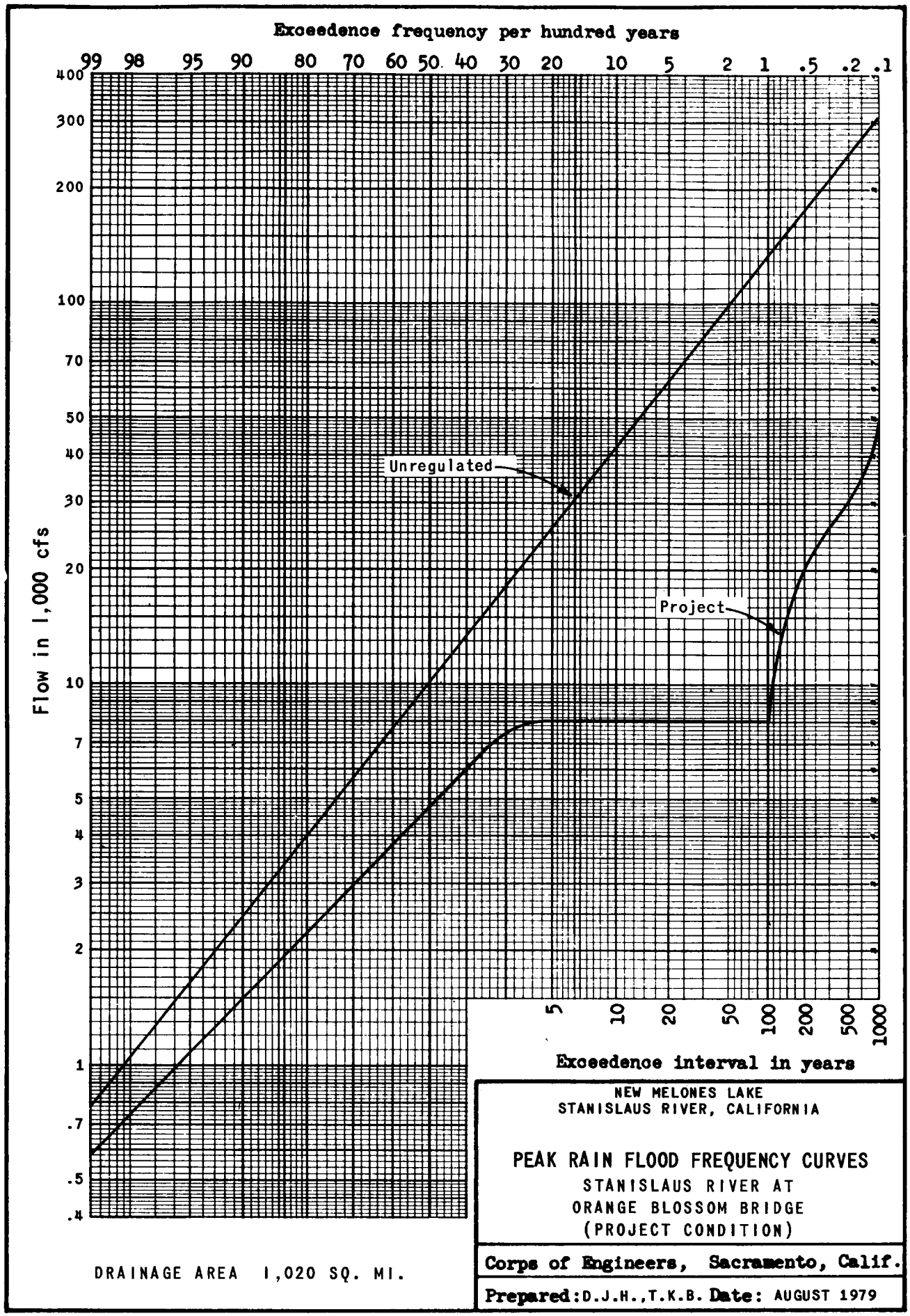
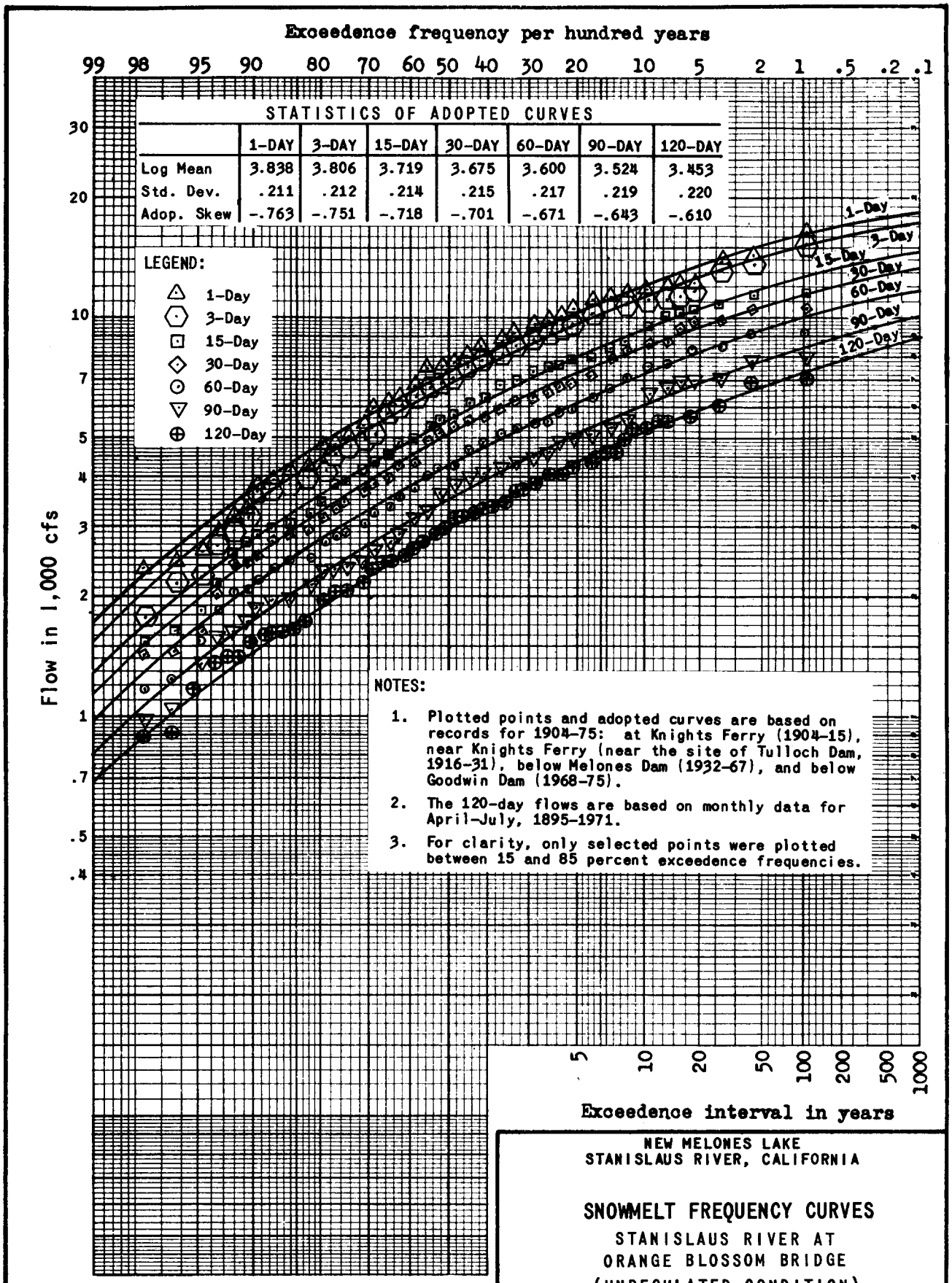

Exceedence frequency per hundred years
99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 .5 .2 .1
400
300
200
100
70
50
40
30
20
10
7
5
4
3
2
1
.7
.5
.4
Flow in 1,000 cfs
Unregulated
Project
5 10 20 50 100 200 500 1000
Exceedence interval in years
DRAINAGE AREA 1,020 SQ. MI.
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA
PEAK RAIN FLOOD FREQUENCY CURVES
STANISLAUS RIVER AT
ORANGE BLOSSOM BRIDGE
(PROJECT CONDITION)
Corps of Engineers, Sacramento, Calif.
Prepared: D.J.H., T.K.B. Date: AUGUST 1979

CHART 10



DRAINAGE AREA 1,020 SQ. MI.

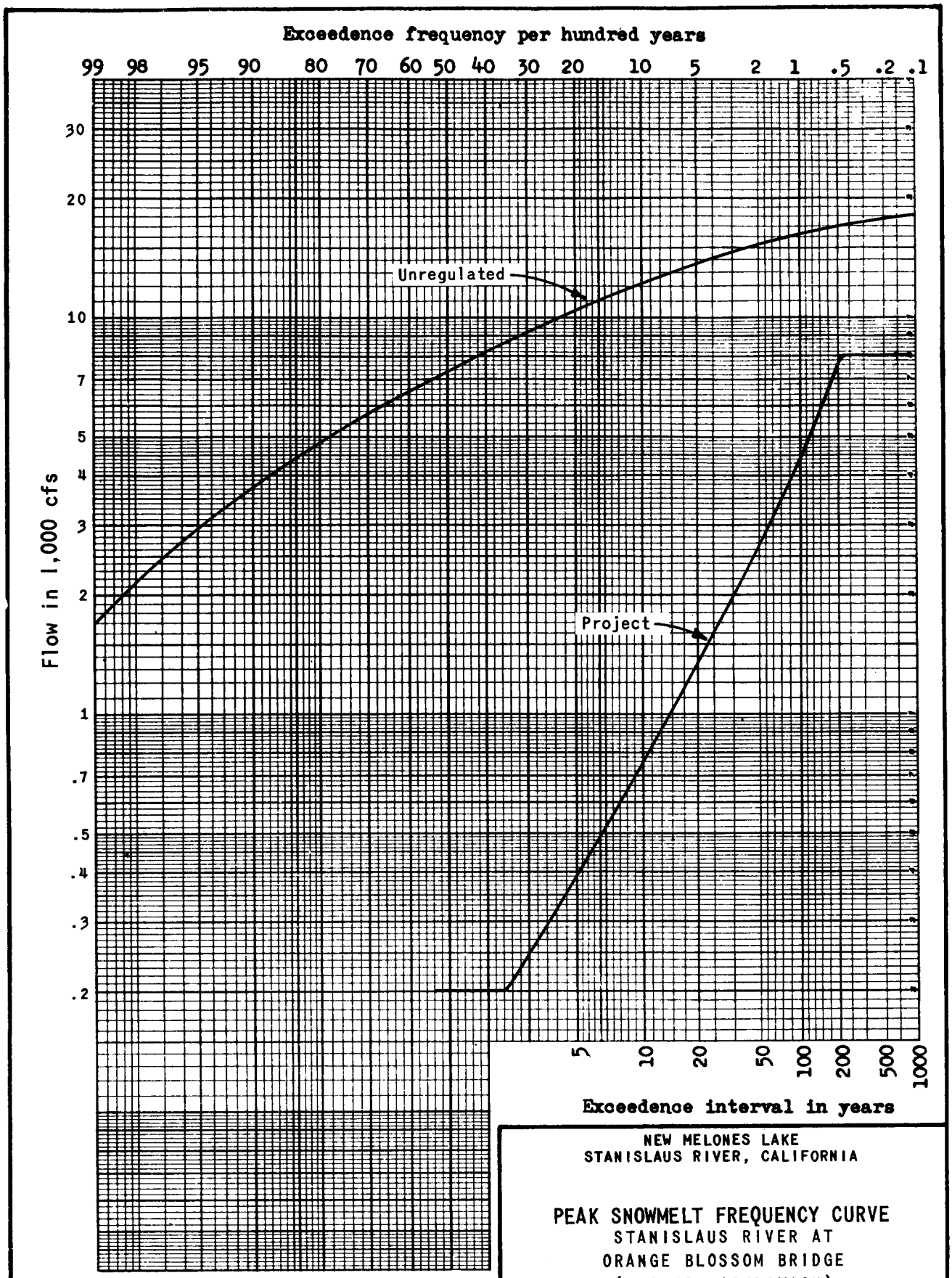
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

SNOWMELT FREQUENCY CURVES

STANISLAUS RIVER AT
ORANGE BLOSSOM BRIDGE
(UNREGULATED CONDITION)

Corps of Engineers, Sacramento, Calif.

Prepared: D.N.V., T.G.K. Date: NOVEMBER 1979



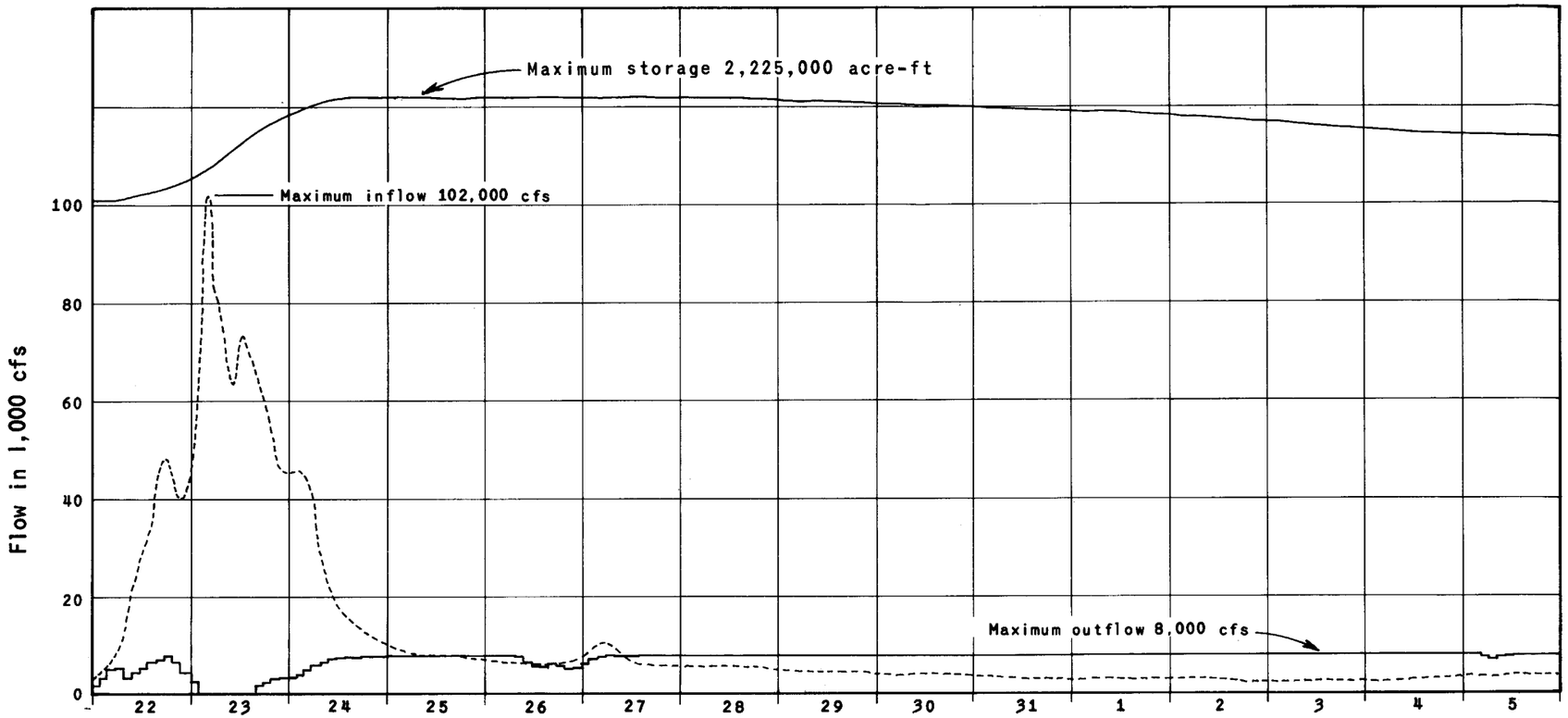
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

PEAK SNOWMELT FREQUENCY CURVE
STANISLAUS RIVER AT
ORANGE BLOSSOM BRIDGE
(PROJECT CONDITION)

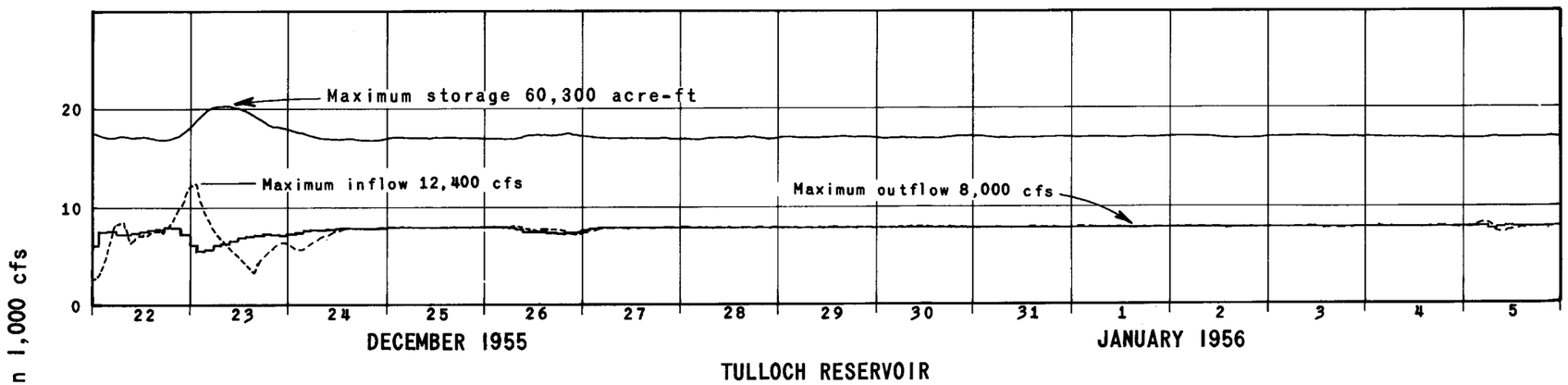
DRAINAGE AREA 1,020 SQ. MI.

Corps of Engineers, Sacramento, Calif.

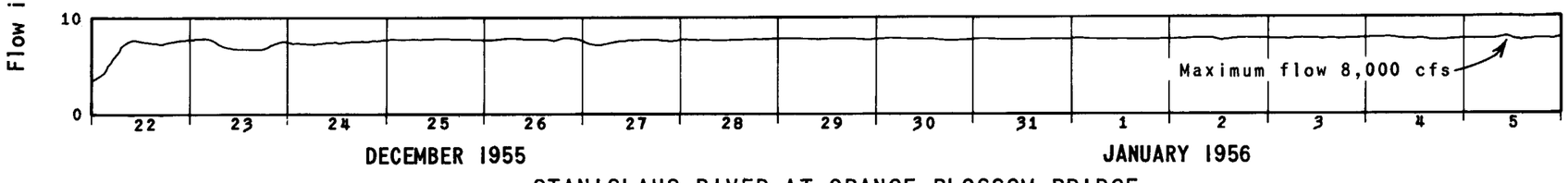
Prepared: D.J.H., T.K.B. Date: AUGUST 1979



NEW MELONES LAKE



TULLOCH RESERVOIR



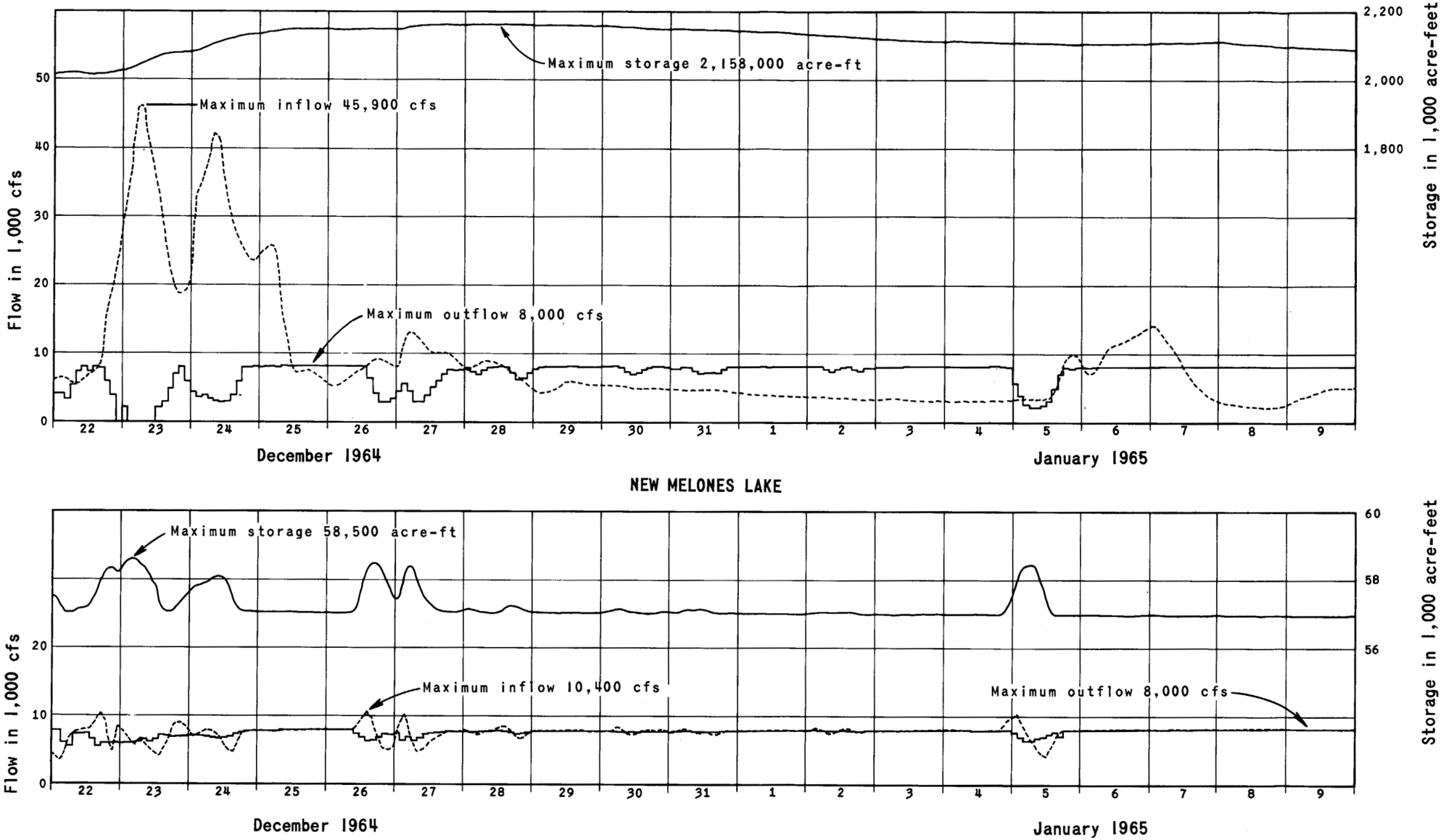
STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

HYPOTHETICAL ROUTING
OF
1955-56 RAIN FLOOD

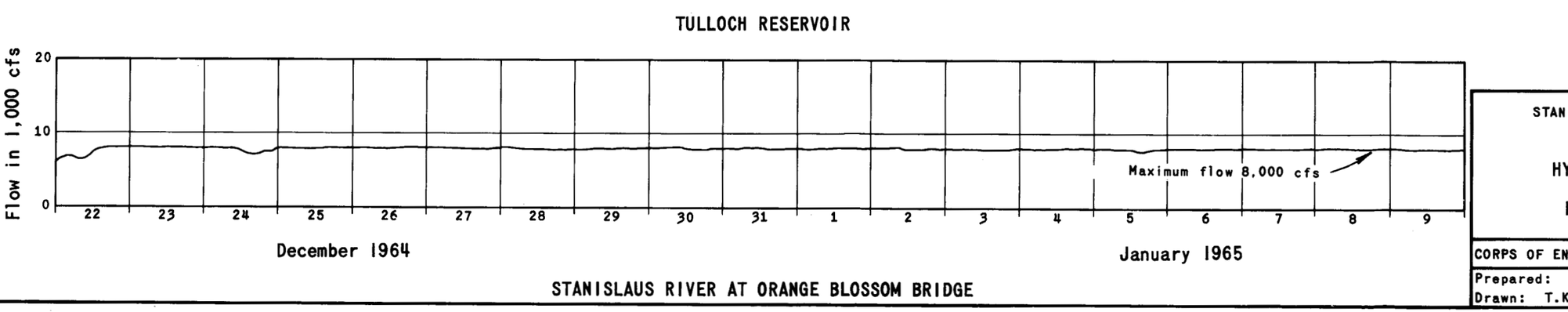
CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: D.J.H.
Drawn: T.K.B.
Date: OCTOBER 1979



NEW MELONES LAKE

TULLOCH RESERVOIR



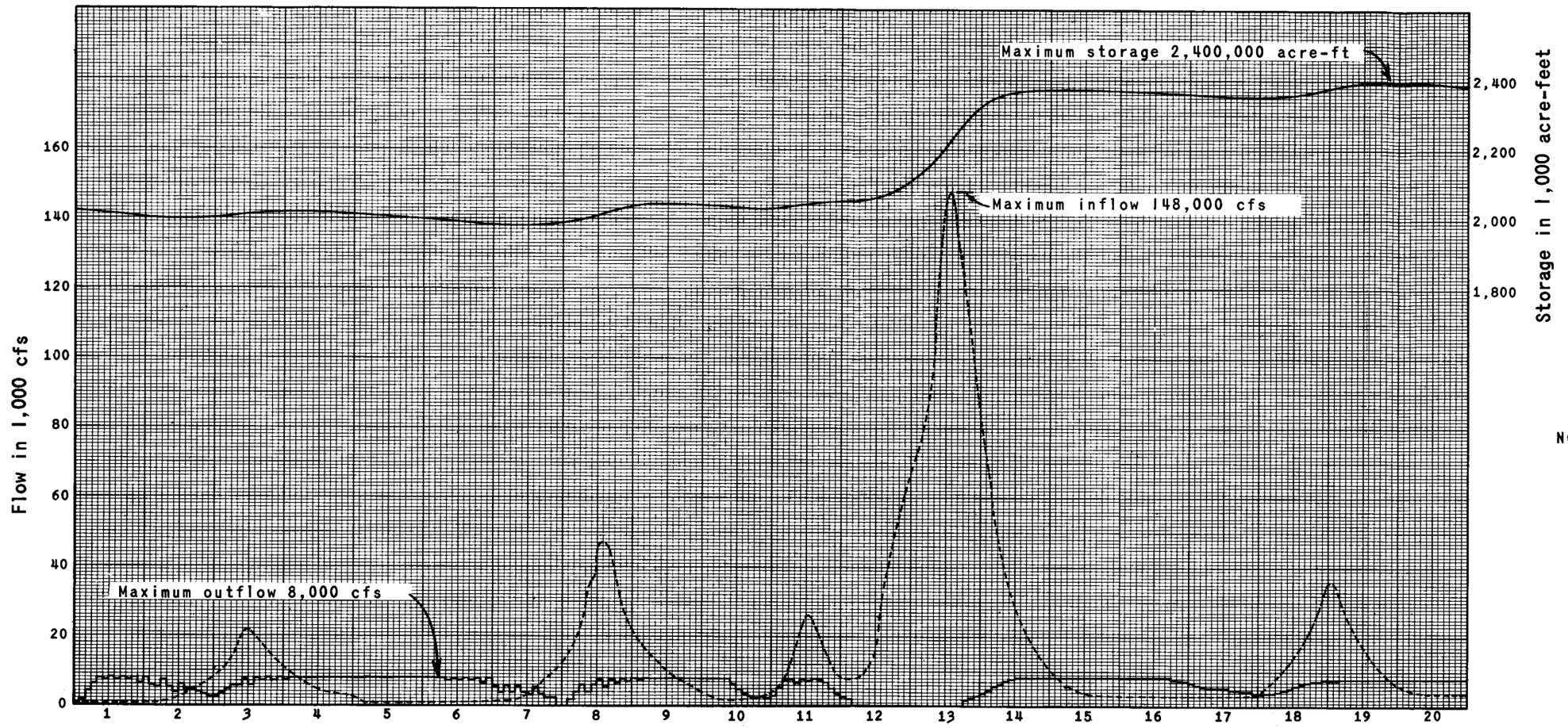
STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

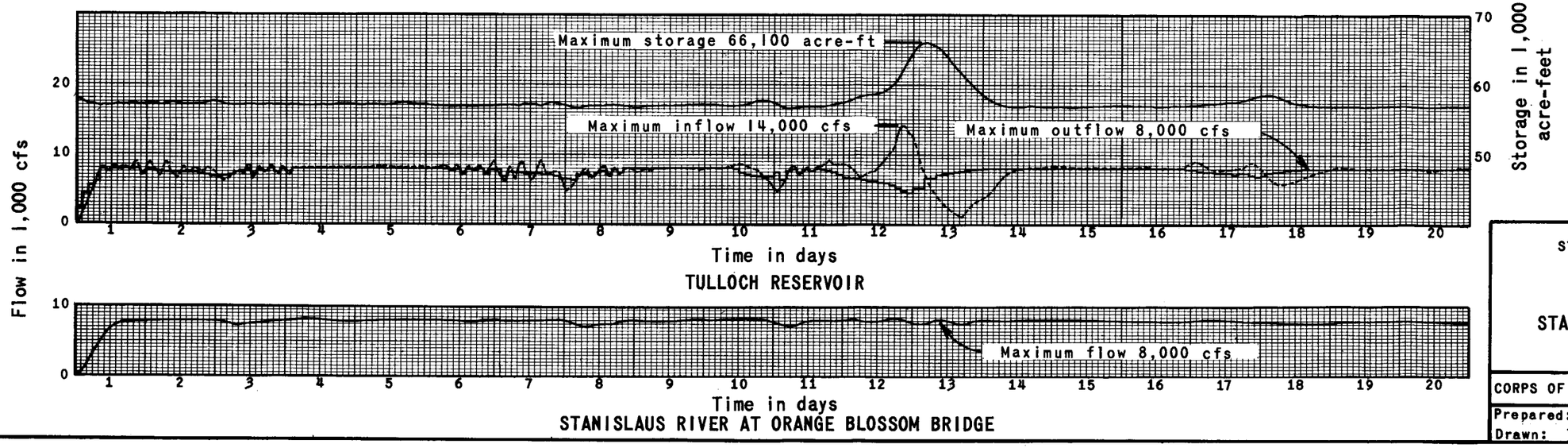
HYPOTHETICAL ROUTING
OF
1964-65 RAIN FLOOD

CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: D.N.V.
Drawn: T.K.B.
Date: OCTOBER 1979



NEW MELONES LAKE



TULLOCH RESERVOIR

STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE

NOTE:

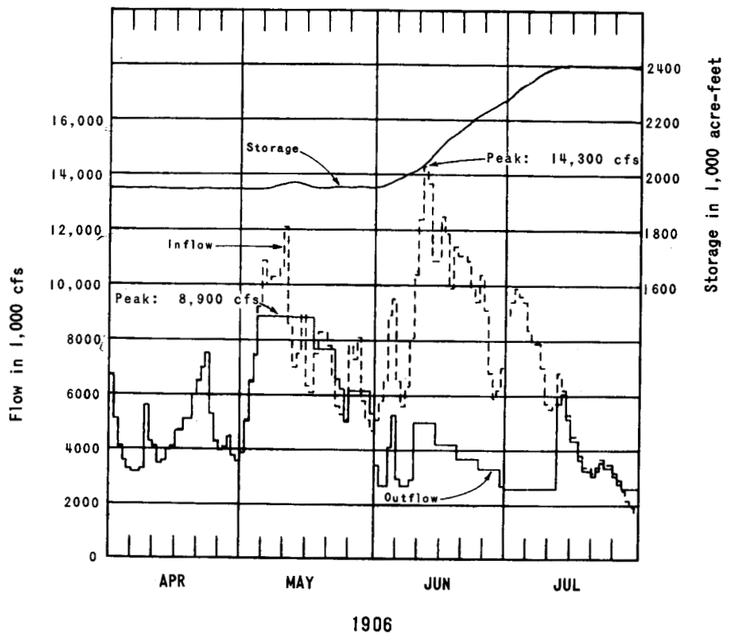
Standard Project Flood centered over Upper Stanislaus Basin.

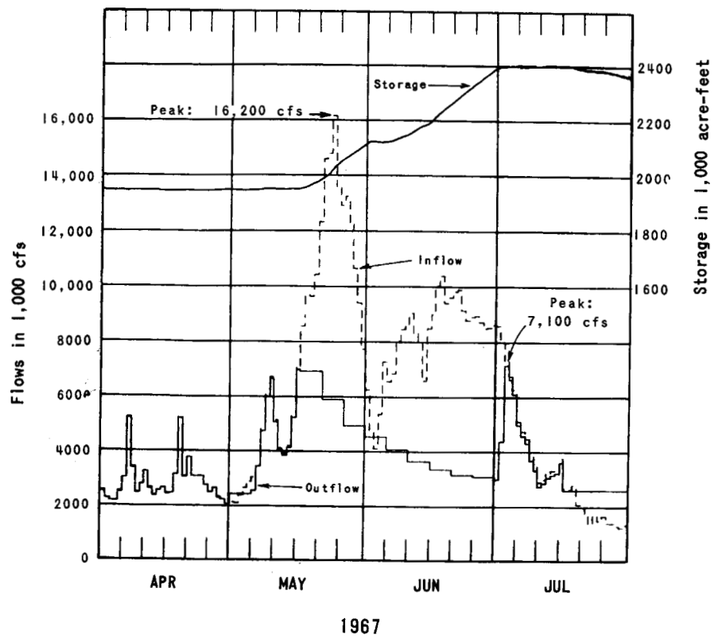
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

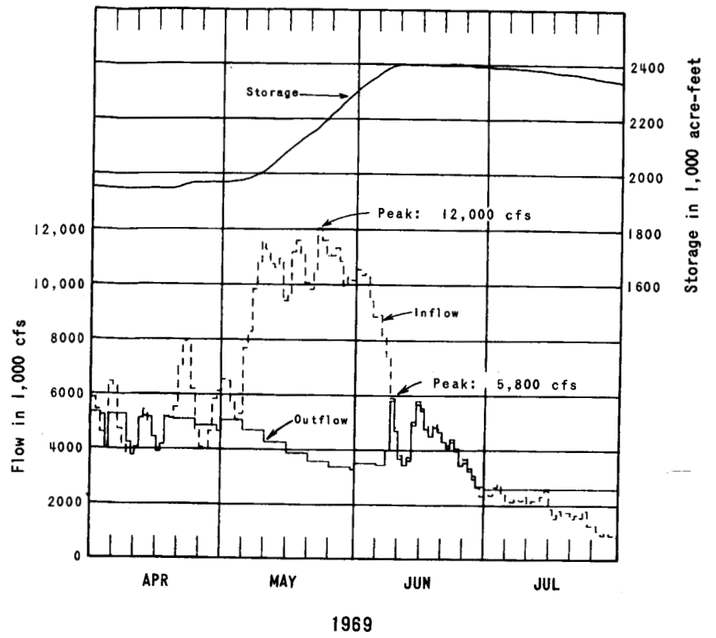
ROUTING OF
STANDARD PROJECT RAIN FLOOD

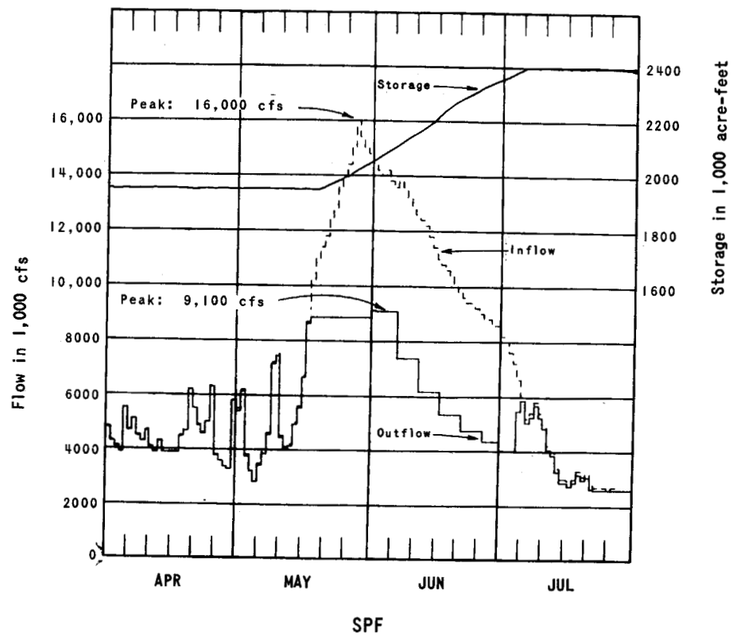
CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: D.N.V.
Drawn: T.K.B.
Date: OCTOBER 1979









NOTES:

1. Routings are hypothetical and represent one of several possible operations.
2. The effects of upstream regulation were ignored.

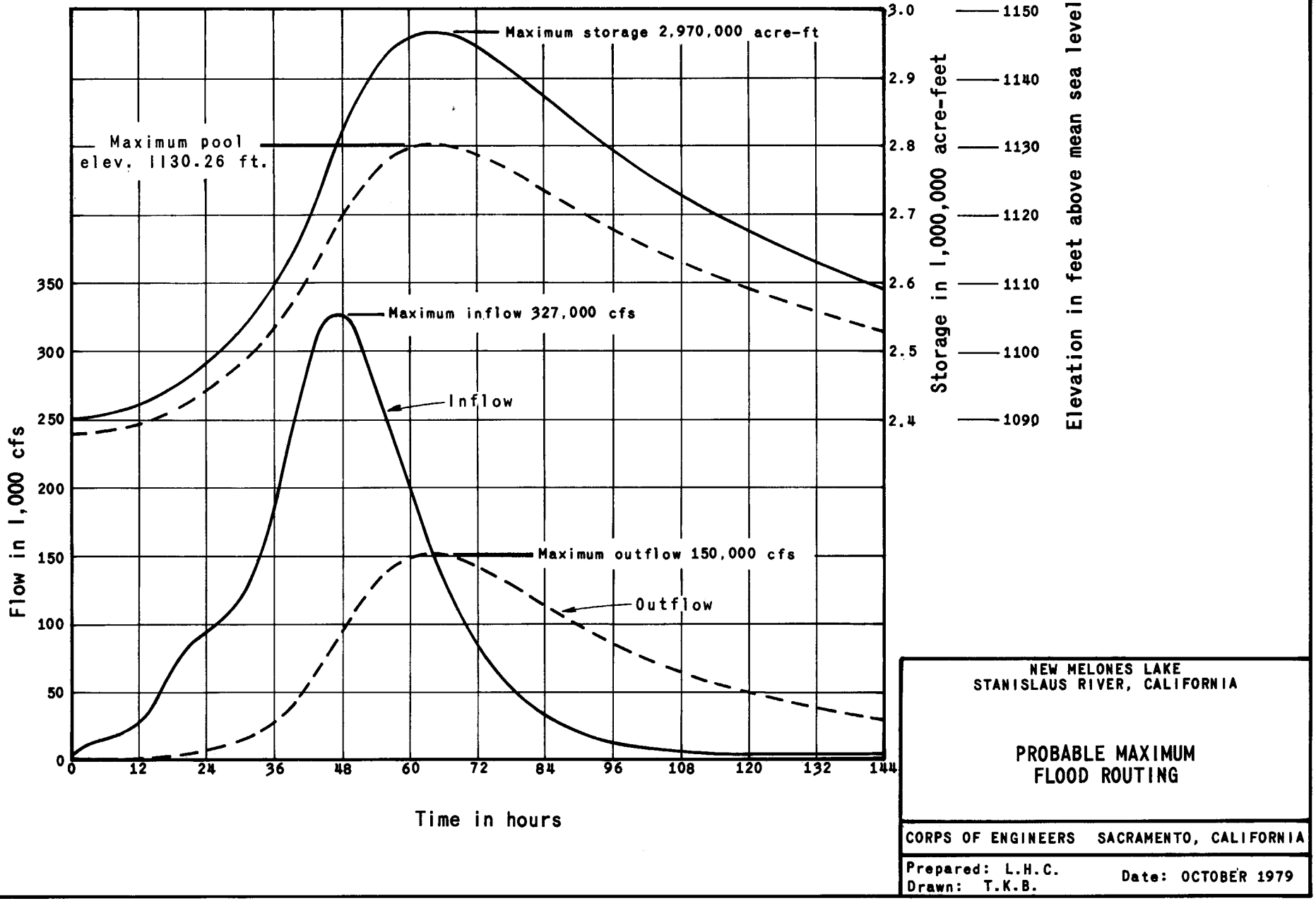
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

HYPOTHETICAL ROUTINGS OF HISTORICAL AND STANDARD PROJECT SNOWMELT FLOODS

CORPS OF ENGINEERS — SACRAMENTO, CALIFORNIA

Prepared: D.J.H.
Drawn: T.K.B.
Date: OCTOBER 1979

CHART 13



NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

PROBABLE MAXIMUM
FLOOD ROUTING

CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: L.H.C.
Drawn: T.K.B.

Date: OCTOBER 1979

CHART 14

CHART 15

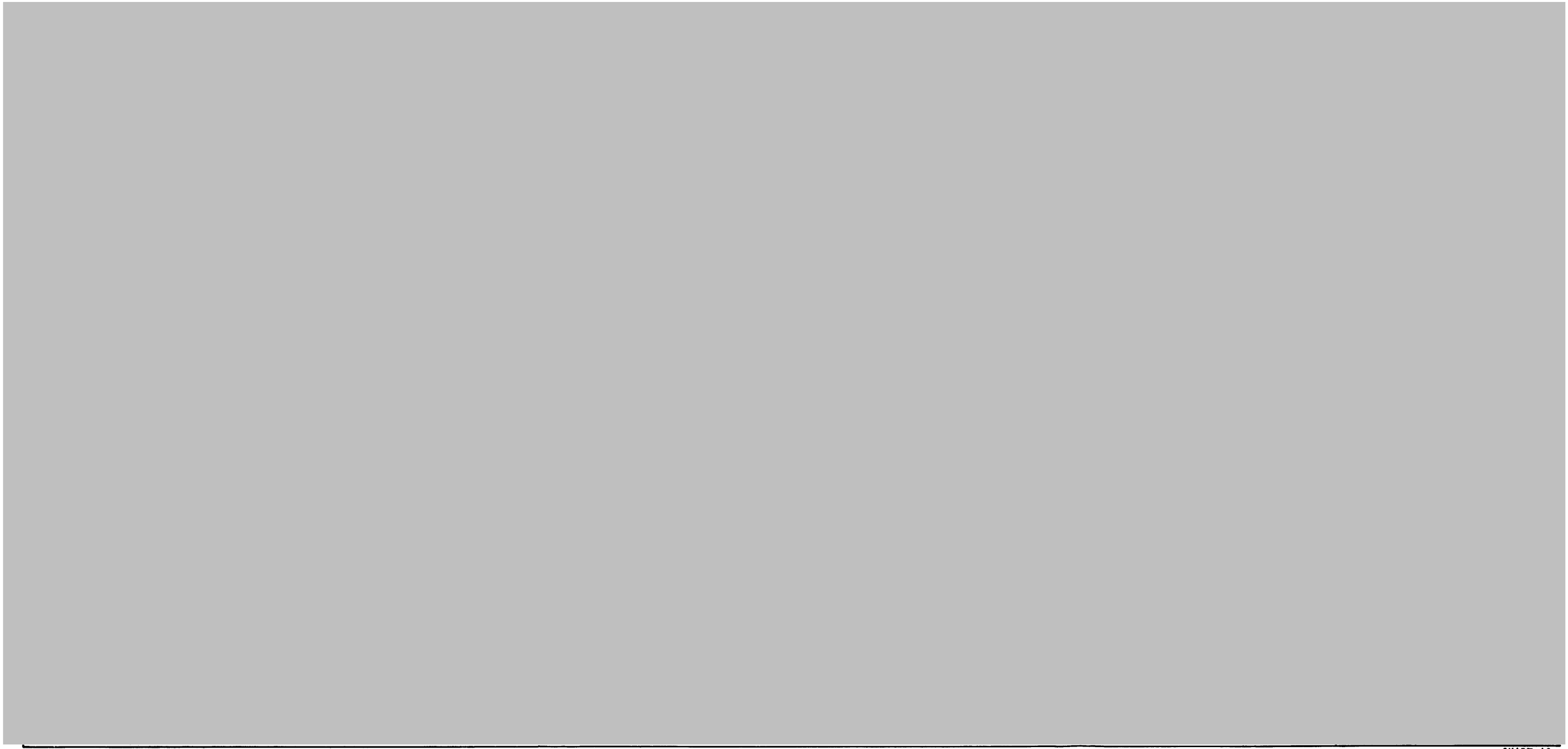
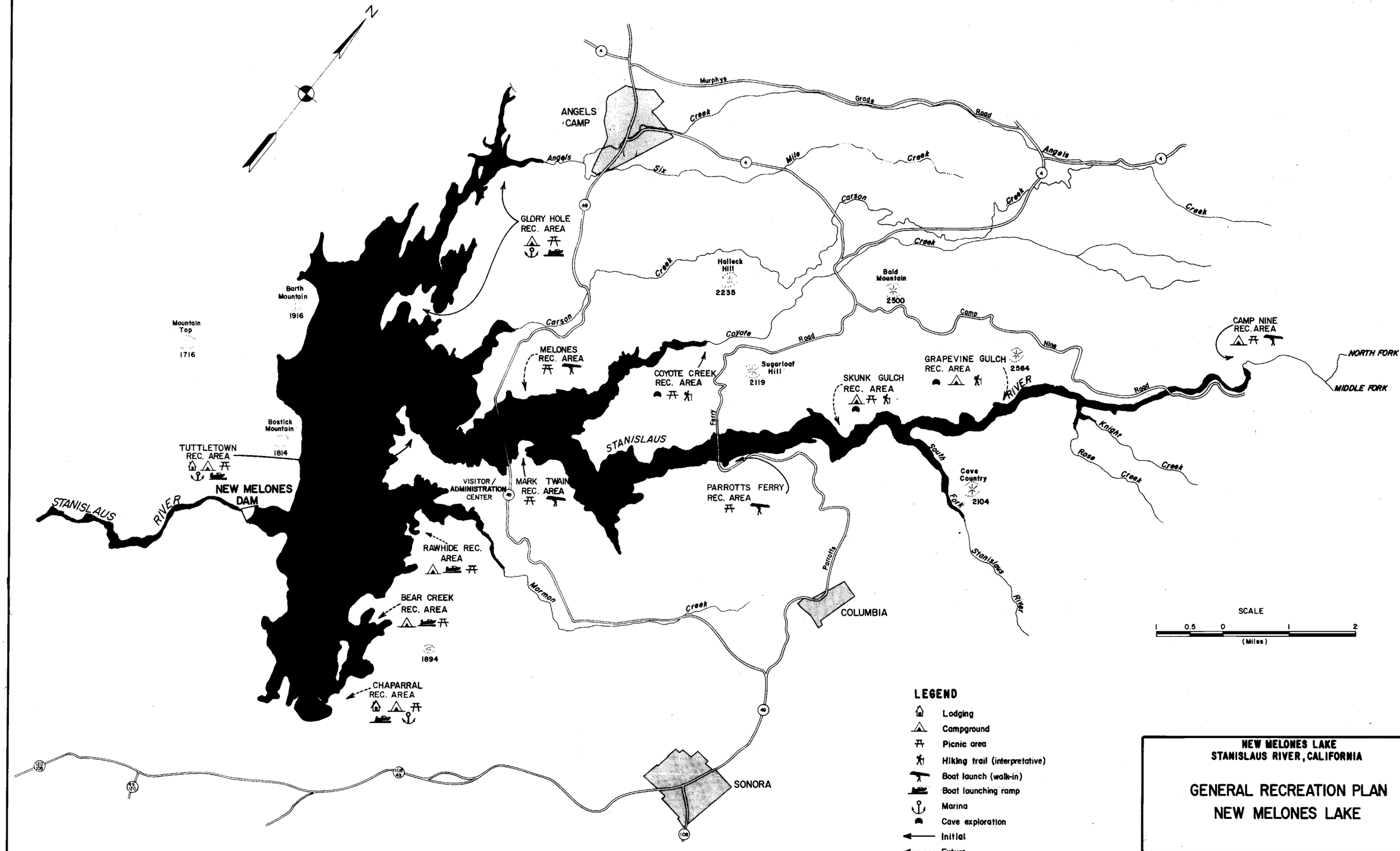


CHART 16

CHART 17

CHART 18

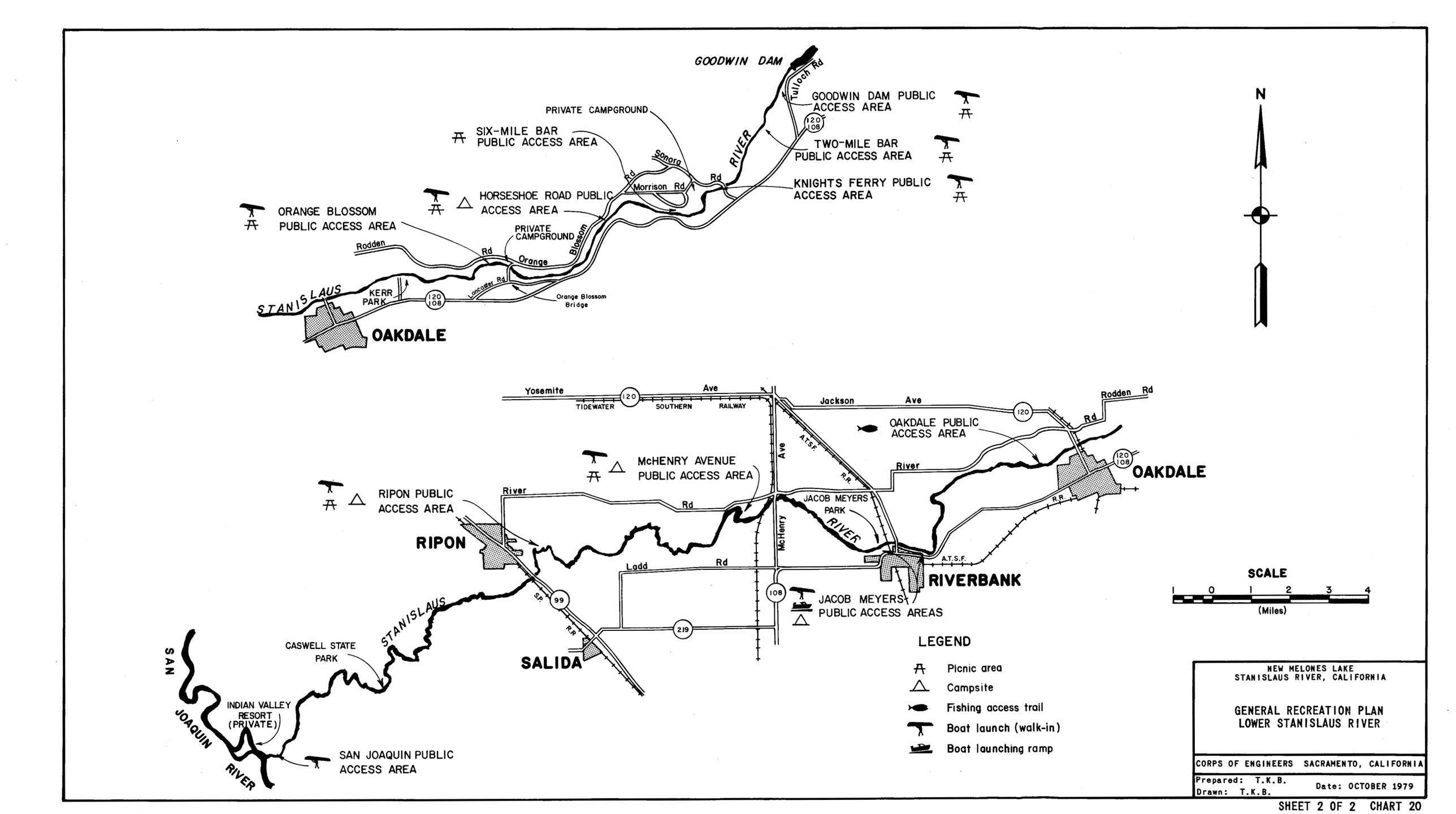
CHART 19



NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

GENERAL RECREATION PLAN
NEW MELONES LAKE

CORPS OF ENGINEERS	**SACRAMENTO, CALIFORNIA**
Prepared: T.K.B.	**Date**: October 1979
Drawn: T.K.B.	



NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

GENERAL RECREATION PLAN
LOWER STANISLAUS RIVER

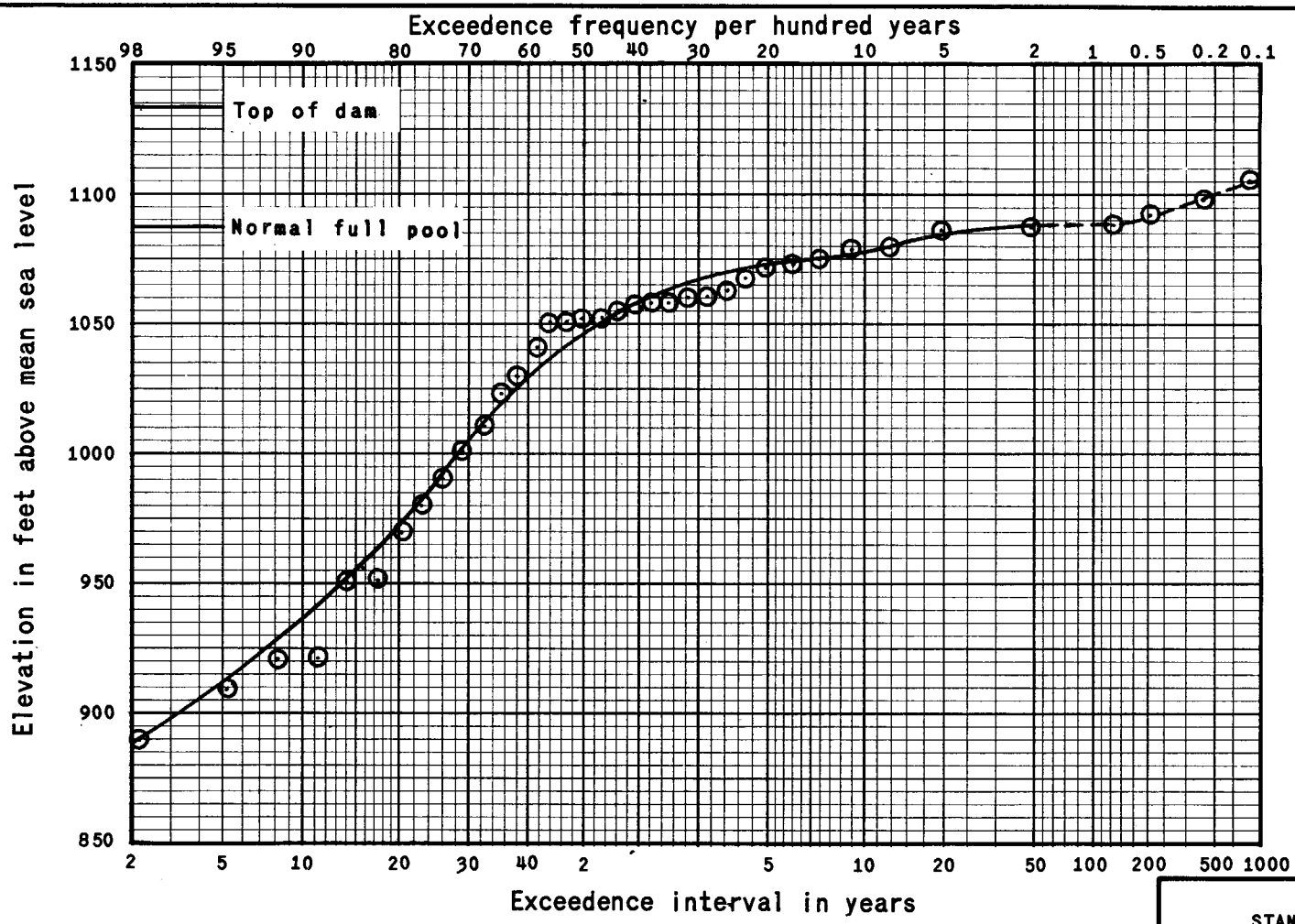
CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: T.K.B.
Drawn: T.K.B.
Date: OCTOBER 1979

PRINCIPAL EXISTING RESERVOIRS
STANISLAUS RIVER BASIN, CALIFORNIA

GENERAL FEATURES										DAM				SPILLWAY							OUTLET WORKS					POWER PLANT		
NO.	COUNTY	NAME OF DAM OR RESERVOIR	STREAM	TRIB AREA (sq mi)	PURPOSE*	OPERATING AGENCY	COMPL DATE (year)	STORAGE CAPACITY (ac-ft)	FC STOR ALLOW (ac-ft)	TYPE	CREST LENGTH (feet)	MAXIMUM HEIGHT (feet)	TOP ELEVATION (ft MSL)	TYPE	LOCATION	CREST ELEVATION (ft MSL)	TOTAL LENGTH (feet)	VERT DIST DAM CR TO PERM SPWY	DESIGN CAP (cfs)	CONTROL GATES	TYPE	SIZE	GATES OR VALVES	DESIGN CAP (cfs)	LOWEST INVERT ELEV (ft MSL)	STATIC HEAD (feet)	INSTALL CAP (KW)	NO.
1	ALPINE	UNION	N FK STANISLAUS	15	D,I,P	PG&E CO	1902	2,000	-	ROCK				OVERPOUR	DAM			2	5,900	NONE					-	-	-	1
2	ALPINE	ALPINE	SILVER CR	5	D,I,P	PG&E CO	1906	4,600	-	ROCK				OVERPOUR	DAM			2	930	NONE					-	-	-	2
3	ALPINE	UTICA	N FK STANISLAUS	15	D,I,P	PG&E CO	1908	2,400	-	GRAV				OVERPOUR	DAM			-	NO LIMIT	NONE					-	-	-	3
4	TUOLUMNE	RELIEF	RELIEF CR	28	P	PG&E CO	1910	15,122	-	ROCK				DETACHED	LEFT ABUT			12	3,800	10					-	-	-	4
5	TUOLUMNE	PINECREST	S FK STANISLAUS	27	P	PG&E CO	1916	18,600	-	ROCK				SIDE CHANNEL	LEFT ABUT			8	6,000	17					-	-	-	5
6	STANISLAUS	WOODWARD	SIMMONS CR	12	I	SOUTH SAN JOAQUIN IRRIGATION DISTRICT	1918	35,000	-	HYDF				-	-			-	-	-					-	-	-	6
7	TUOLUMNE	SPICER MEADOW	HIGHLAND CR	44	D,I,P	PG&E CO	1929	4,062	-	GRAV				OVERPOUR	DAM			-	NO LIMIT	NONE					-	-	-	7
8	TUOLUMNE	LYONS	S FK STANISLAUS	68	I,P	PG&E CO	1932	5,508	-	VARA				OVERPOUR	DAM			3	18,000	4					4,135	-	-	8
9	TUOLUMNE	BEARDSLEY	MD FK STANISLAUS	310	I,P	TRI DAM PROJECT	1957	97,500	-	EARTH				DETACHED	RIGHT ABUT			29	98,000	4					-	-	9,990	9
10	TUOLUMNE	DONNELLS	MD FK STANISLAUS	224	I,P	TRI DAM PROJECT	1958	64,500	-	VARA				DETACHED	LEFT ABUT			5	56,400	5					3,397	-	54,000	10
11	CALAVERAS	TULLOCH	STANISLAUS R	971	I,P	TRI DAM PROJECT	1958	68,400	-	GRAV				DETACHED	LEFT ABUT			12	151,000	7					431	-	17,100	11

*SYMBOLS USED IN PURPOSE COLUMN ARE AS FOLLOWS:
D - DOMESTIC USE
I - IRRIGATION
P - POWER



NOTES:

1. Portion of the curve for 2% to 98% exceedence frequencies is based on monthly routings by the U.S. Water and Power Resources Service for October 1922 through September 1954 which reflect projected development.
2. Dashed portion of curve is based on hypothetical standard project and spillway design floods.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

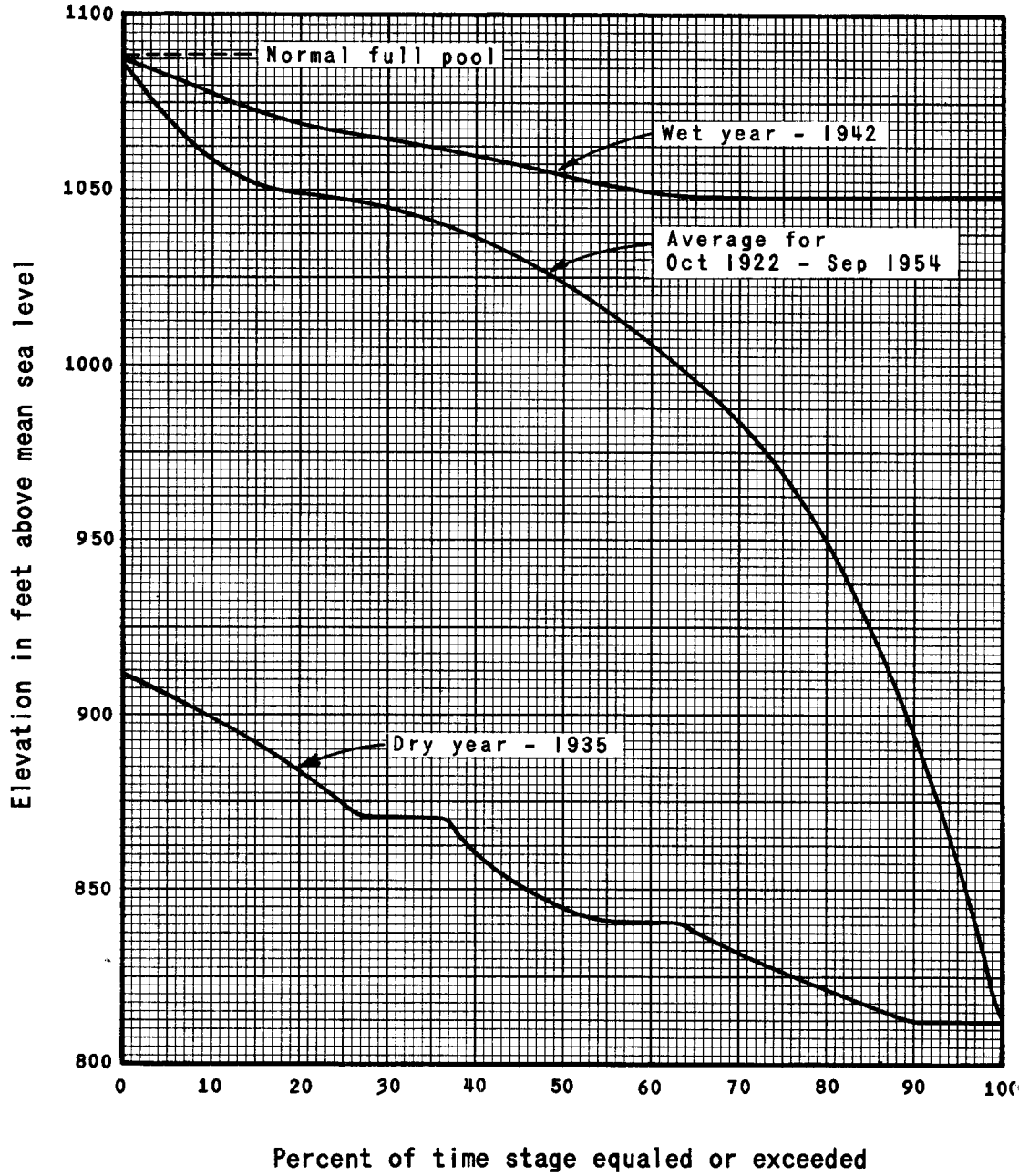
STAGE-FREQUENCY CURVE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.N.V.
Drawn: T.K.B.

Date: OCTOBER 1979

CHART 23



NOTE:

Curves are based on monthly routing by the U.S. Water and Power Resources Service for October 1922 through September 1954 which reflect projected development.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

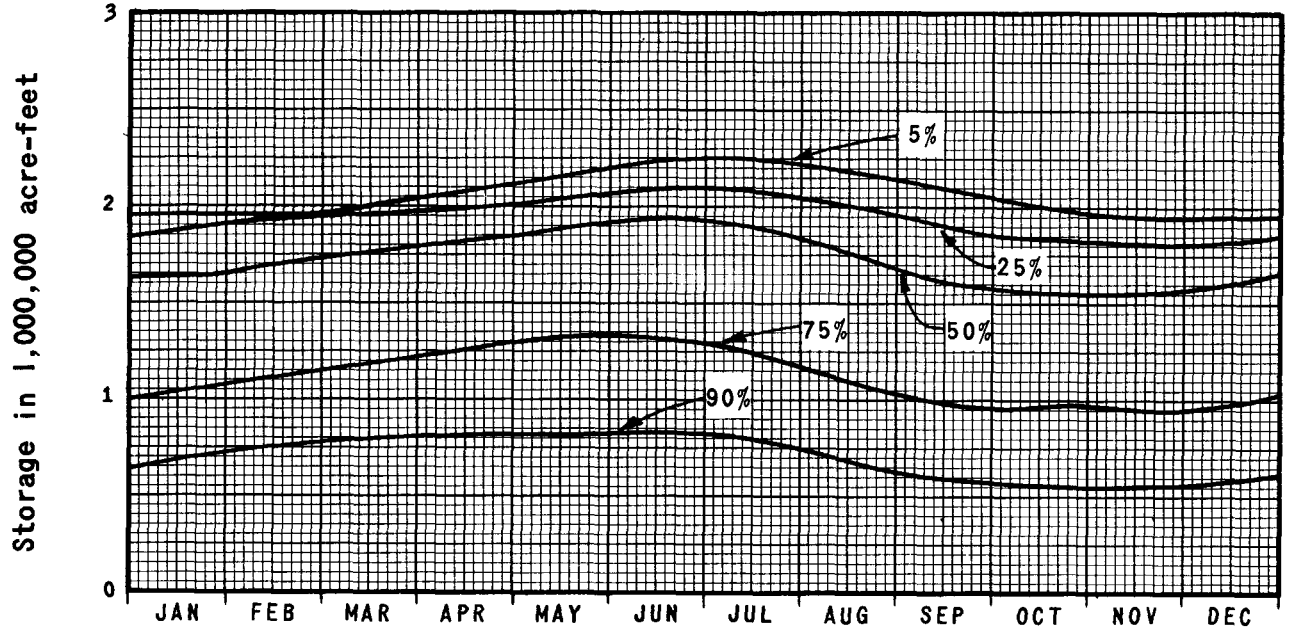
STAGE-DURATION CURVES

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.J.H.
Drawn: T.K.B.

Date: OCTOBER 1979

CHART 24



NOTES:

1. Values indicate incidence of storage exceeded on a given date on the basis of total end-of-month storage for October 1922 through September 1954.
2. Curves are based on monthly routings by the U.S. Water and Power Resources Service which reflect projected development.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

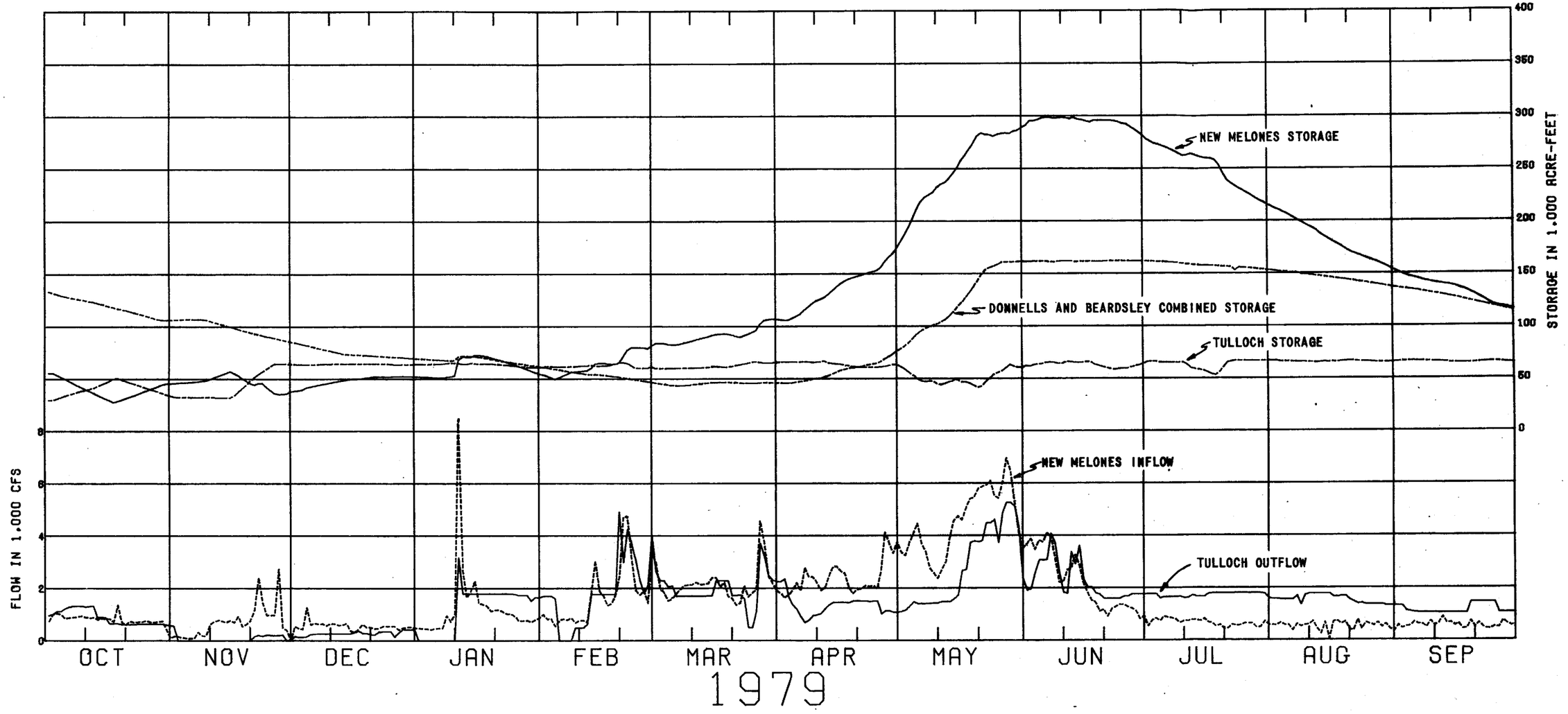
SEASONAL VARIATION OF RESERVOIR STORAGE FREQUENCY

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.N.V.
Drawn: T.K.B.

Date: OCTOBER 1979

CHART 25



NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

HISTORICAL OPERATION

CORPS OF ENGINEERS, SACRAMENTO, CA.

PREPARED: DJH,TOK
DRAWN: TOK
DATE: DECEMBER 1979

CHART 26

NEW MELONES DAM AND LAKE
STANISLAUS RIVER, CALIFORNIA

REPORT ON RESERVOIR REGULATION
FOR FLOOD CONTROL

JANUARY 1980

APPENDIX

STANDING INSTRUCTIONS TO DAMTENDERS
AND
FLOOD CONTROL REGULATIONS
FOR
NEW MELONES DAM AND LAKE

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

NEW MELONES DAM AND LAKE
STANISLAUS RIVER, CALIFORNIA

REPORT ON RESERVOIR REGULATION
FOR FLOOD CONTROL

JANUARY 1980

APPENDIX
PART I
STANDING INSTRUCTIONS TO DAMTENDERS

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

APPENDIX

STANDING OPERATING INSTRUCTIONS AND FLOOD CONTROL REGULATIONS FOR NEW MELONES DAM AND LAKE STANISLAUS RIVER, CALIFORNIA

PART I
STANDING INSTRUCTIONS TO DAMTENDERS

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FOR FLOOD CONTROL
NEW MELONES DAM AND LAKE
STANISLAUS RIVER, CALIFORNIA

PART I

STANDING INSTRUCTIONS TO DAMTENDERS

1. GENERAL

This appendix to "Report on Reservoir Regulation for Flood Control, New Melones Dam and Lake, Stanislaus River, California" was prepared in accordance with instructions in EM 1110-2-3600, paragraph 4-07 (Standing Instructions to Damtenders), and pertains to duties and responsibilities of the damtender in operating New Melones Dam and reporting required hydrologic data.

Operational instructions to the damtender are briefly outlined with specific emphasis on the damtender's duties and responsibilities during flood emergencies when communication between him and the operating office may have been disrupted. It is designed to be used independently as an emergency guide or, as published, in conjunction with the report on reservoir regulation for flood control. To facilitate independent use of this appendix, charts required for emergency flood control operation of New Melones Dam are included.

2. FLOOD CONTROL OPERATION REQUIREMENTS

New Melones Dam will be operated for flood control according to regulations prescribed by the Code of Federal Regulations, Title 33, Part 208.11, and the Field Working Agreement for Central Valley Project dams and reservoirs, copies of which are included herein. Accompanying these regulations is the Flood Control Diagram, which defines the requirements for flood control operation of New Melones Dam. Flood control objectives are:

a. To minimize flood damage downstream from the dam and, insofar as practicable, to avoid causing damage that would not have occurred without the project.

b. To permit use of the maximum practical amount of storage space for conservation, power, and other purposes without impairing the flood control function.

Storage space in New Melones Lake shall be reserved on the basis of the Flood Control Diagram, Chart A-12. Whenever encroachment into the flood control storage reservation occurs, water should be released as rapidly as possible without causing flows in the Stanislaus River at the gage at Orange Blossom Bridge to exceed the controlling rates shown on the Flood Control Diagram and outlined in paragraph 4.

Required flood control storage reservation is determined from Chart A-12, which indicates the storage reservation required at any time from 15 September to 1 August. The diagram requires:

a. Flood control space reservation increases from zero on 15 September to a maximum of 450,000 acre-feet from 1 November to 20 March.

b. A conditional flood control space reservation to a maximum of 450,00 acre-feet is required from 20 March to 1 August. Space not required for flood control may be filled for conservation purposes to allow more efficient operation of the project.

3. LIMITATIONS ON STORAGE

Operational limitations on storage in New Melones Lake are specified on the Flood Control Diagram. Physical limitations on storage are as follows:

STORAGE (ACRE-FEET)	WATER SURFACE ELEVATION (FEET)	FLOW OVER SPILLWAY (CFS)	REMARKS
160,500	760.0	0	Invert of Multi-Purpose Tunnel Intake
300,000	808.0	0	Inactive and minimum power pool
2,420,000	1,088.0	0	Gross pool
2,546,000	1,098.0	14,000	Water level at taking line

By contract no._____ with the Oakdale and South San Joaquin Irrigation Districts, the Water and Power Resources Service has reserved as much as 14,000 acre-feet of storage in Tulloch Reservoir for the combined purpose of flood control storage of local inflow between New Melones and Tulloch Dams, and reregulation of powerplant releases from New Melones Lake. Of the total space, 10,000 acre-feet is dedicated to flood control from 1 November through 20 March, and the remaining space normally is used for power reregulation.

4. LIMITATIONS ON RELEASES

Except during spillway operations described below, releases from New Melones Lake will be limited, insofar as possible, to those that will not cause flows in the Stanislaus River at the gage at Orange Blossom Bridge to exceed 8,000 cfs when water is stored in either the Flood Control Space or the Conditional Flood Control Space and 3,500 cfs when water is stored below the maximum flood control storage limitations. Releases from Tulloch Reservoir shall not fluctuate more than 1,000 cfs per hour. While most of the flow in the Stanislaus River at Orange Blossom Bridge

normally results from releases from Tulloch Reservoir (releases from New Melones Lake plus local inflow), releases will have to be modified occasionally to account for local inflow from Owl and Wildcat Creeks during rain flood periods. A stage-discharge curve for the Stanislaus River at Orange Blossom Bridge is shown on chart A-11.

Flood control releases from New Melones Lake are normally made through the powerplant. If the powerplant does not have the capability to make the required release, it will be made through the flood control and irrigation outlet. If the reservoir level rises above the spillway crest elevation of 1,088 feet, the powerplant and/or flood control and irrigation outlets will be closed progressively to maintain the total outflow, including water passing over the spillway, equal to the desired outflow, for as long as possible. When the water level recedes, the outlets will be opended progressively to maintain the desired outflow.

5. STANDING INSTRUCTIONS DURING FLOOD EMERGENCY

Operation of New Melones Dam is under the direction of the Regional Director, Mid-Pacific Region, Water and Power Resources Service; instructions to agency personnel are the responsibility of the Regional Director. During flood periods, close contact will be maintained between the Regional Office and the damtender (or operating personnel). The following are suggested instructions for emergency operation of New Melones Dam.

If communication between operating personnel and the Regional Office is broken during a flood emergency, the following procedure is recommended:

a. Continue releases in accordance with the last instructions from the Regional Office, and make every attempt to reestablish communication.

b. If communication cannot be reestablished, make releases made in accordance with the Flood Control Diagram (Chart A-12).

6. OPERATIONAL RESPONSIBILITIES

Responsibilities for flood control operation of New Melones Dam are summarized below. A list of personnel involved in the operation is at the front of this appendix.

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

a. Approving or disapproving deviations from the prescribed flood control criteria on Chart A-12.

b. Advising operating agencies and the Chief of Engineers of any departure from flood control regulations.

c. Preparing monthly reservoir operation reports and other special reports required by the Chief of Engineers.

d. Preparing revisions to the flood control criteria contained herein.

The Regional Director, Mid-Pacific Region, Water and Power Resources Service, is responsible for:

a. Operating the reservoir and associated facilities in accordance with official regulations.

b. Advising the District Engineer, Sacramento District, Corps of Engineers, of any deviation from prescribed requirements.

c. Reporting to the District Engineer, Sacramento District, Corps of Engineers, any unusual condition in the reservoir or along downstream channels that might interfere with the planned flood control operation of the reservoir.

d. Advising downstream interests of flood control releases which might affect them.

e. Reporting to the Reservoir Control Section, Sacramento District, Corps of Engineers, and to the California Department of Water Resources, data outlined in paragraph 7 and other data that may be required.

f. Keeping informed of the rules and regulations in the reservoir regulation manual and bringing to the attention of the District Engineer, Sacramento District, Corps of Engineers, any feature of the manual that may require clarification or revision.

g. Advising the District Engineer, Sacramento District, Corps of Engineers, of any inaccuracies in the manual or that may develop as a result of changing conditions.

h. Transmitting to the Reservoir Control Section, Sacramento District, Corps of Engineers, data outlined in paragraph 7.

7. OPERATION REPORTS

Between 8 and 9 a.m. each workday, and at other times upon request, the dam operator or operating agency will report to the Reservoir Control Section, Sacramento District, Corps of Engineers, and to the California Department of Water Resources, the following information:

a. Amount of flood control space used in New Melones Lake.

b. Inflow, outflow, water surface elevation, and storage at New Melones Lake.

c. Forecasted inflow and projected outflow changes at New Melones Lake.

d. Precipitation at the dam and at reporting stations in or adjacent to the drainage basin.

Data obtained on nonworkdays will be furnished on the following workday.

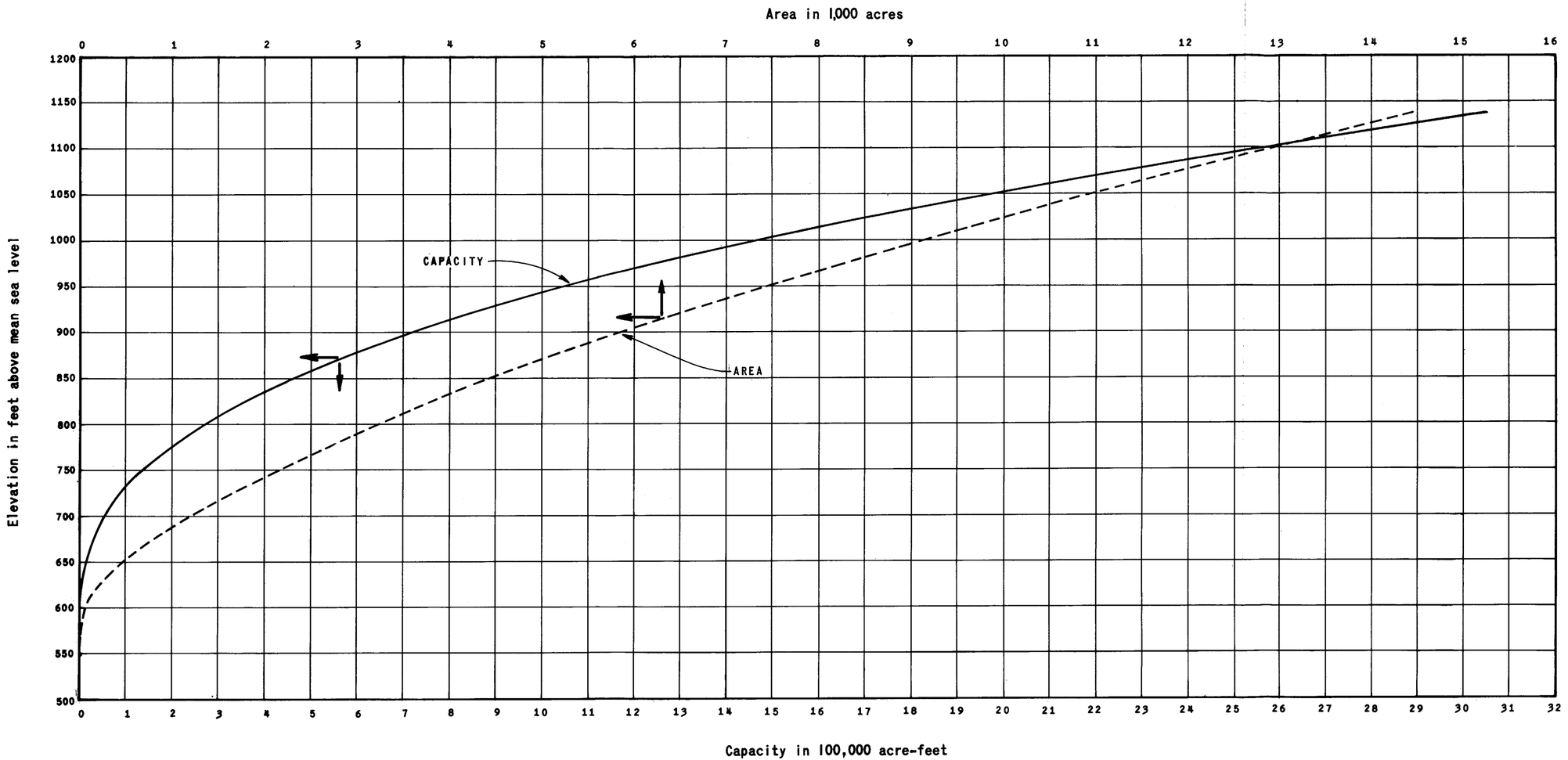
Immediately after the end of each month, the operating agency will dispatch to the Reservoir Control Section, Sacramento District, Corps of Engineers, a summary of the following operation data:

a. Daily inflow, outflow, water surface elevation, and storage at New Melones Lake and at Tulloch Reservoir.

b. Precipitation at New Melones Lake.

8. MODIFICATION OF REGULATIONS

During flood emergencies, the official flood control regulations are subject to temporary modification by the District Engineer, Sacramento District, Corps of Engineers. As necessary, the flood control criteria will be revised by the Corps of Engineers to reflect changed conditions relevant to flood control operation of the dam. Permanent revisions of the flood control criteria are subject to prior approval of the Chief of Engineers or his duly authorized representative.



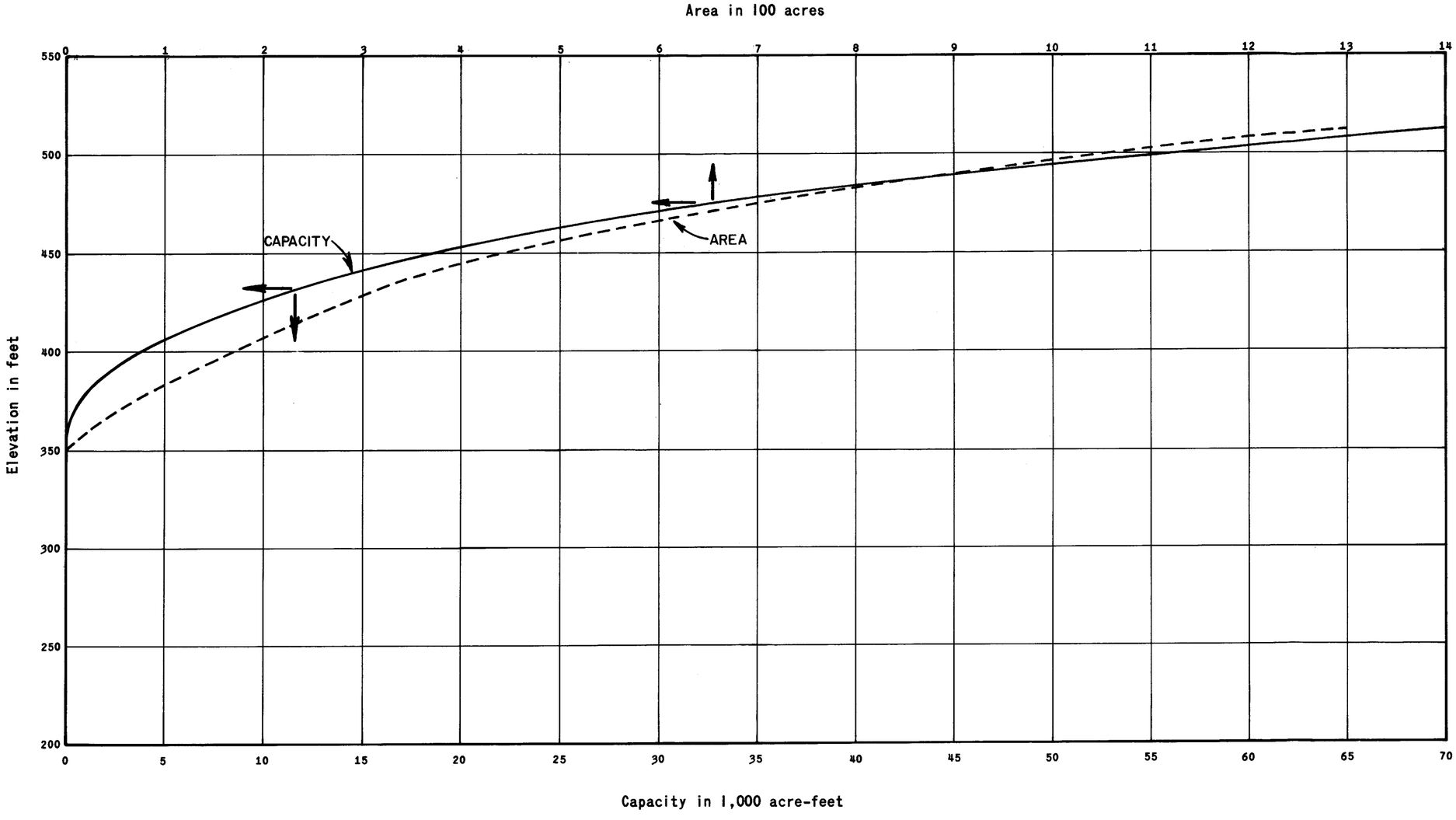
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

AREA AND CAPACITY CURVES
NEW MELONES LAKE

CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: D.N.V.
Drawn: T.K.B.
Date: OCTOBER 1978

CHART A-1



NOTES:

1. Data furnished by Oakdale Irrigation District.
2. Elevations correspond to the Oakdale Irrigation District Stage - Storage Gage with a datum of 1.5 feet above the 1929 mean sea level.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

AREA AND CAPACITY CURVES
TULLOCH RESERVOIR

CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: D.M.V.
Drawn: T.K.B.

Date: OCTOBER 1978

CHART A-2

CAPACITIES OF NEW MELONES LAKE - STANISLAUS RIVER, CALIFORNIA

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFFERENCE
					ACRE-FEET						
600.0	975	981	987	994	1,000	1,006	1,013	1,019	1,025	1,032	63
601.0	1,038	1,045	1,052	1,058	1,065	1,072	1,079	1,086	1,092	1,099	68
602.0	1,106	1,113	1,121	1,128	1,135	1,142	1,149	1,157	1,164	1,171	73
603.0	1,179	1,186	1,194	1,202	1,209	1,217	1,225	1,233	1,241	1,248	77
604.0	1,256	1,264	1,272	1,281	1,289	1,297	1,305	1,314	1,322	1,330	83
605.0	1,339	1,347	1,356	1,365	1,373	1,382	1,391	1,400	1,408	1,417	87
606.0	1,426	1,435	1,445	1,454	1,463	1,472	1,481	1,491	1,500	1,510	93
607.0	1,519	1,529	1,538	1,548	1,558	1,568	1,578	1,587	1,597	1,607	99
608.0	1,618	1,628	1,638	1,648	1,658	1,669	1,679	1,690	1,700	1,711	104
609.0	1,722	1,732	1,743	1,754	1,765	1,776	1,787	1,798	1,809	1,820	109
610.0	1,831	1,843	1,854	1,865	1,877	1,888	1,900	1,912	1,923	1,935	116
611.0	1,947	1,959	1,971	1,983	1,995	2,007	2,019	2,031	2,044	2,056	122
612.0	2,069	2,081	2,094	2,106	2,119	2,132	2,145	2,158	2,171	2,184	128
613.0	2,197	2,210	2,223	2,236	2,250	2,263	2,277	2,290	2,304	2,317	134
614.0	2,331	2,345	2,359	2,373	2,387	2,401	2,415	2,429	2,443	2,458	141
615.0	2,472	2,487	2,501	2,516	2,530	2,545	2,560	2,575	2,590	2,605	148
616.0	2,620	2,635	2,650	2,665	2,681	2,696	2,712	2,727	2,743	2,759	154
617.0	2,774	2,790	2,806	2,822	2,838	2,854	2,871	2,887	2,903	2,920	162
618.0	2,936	2,953	2,969	2,986	3,003	3,020	3,036	3,053	3,071	3,088	169
619.0	3,105	3,122	3,140	3,157	3,174	3,192	3,210	3,227	3,245	3,263	176
620.0	3,281	3,299	3,317	3,335	3,354	3,372	3,390	3,409	3,427	3,446	184
621.0	3,465	3,484	3,503	3,521	3,541	3,560	3,579	3,598	3,617	3,637	191
622.0	3,656	3,676	3,696	3,715	3,735	3,755	3,775	3,795	3,815	3,835	200
623.0	3,856	3,876	3,896	3,917	3,937	3,958	3,979	4,000	4,021	4,042	207
624.0	4,063	4,084	4,105	4,127	4,148	4,169	4,191	4,213	4,234	4,256	215
625.0	4,278	4,300	4,322	4,344	4,367	4,389	4,411	4,434	4,456	4,479	224
626.0	4,502	4,525	4,548	4,571	4,594	4,617	4,640	4,664	4,687	4,710	232
627.0	4,734	4,758	4,782	4,805	4,829	4,853	4,877	4,902	4,926	4,950	241
628.0	4,975	4,999	5,024	5,049	5,074	5,099	5,123	5,149	5,174	5,199	249
629.0	5,224	5,250	5,275	5,301	5,327	5,352	5,378	5,404	5,430	5,457	259
630.0	5,483	5,509	5,536	5,562	5,589	5,615	5,642	5,669	5,696	5,723	267
631.0	5,750	5,778	5,805	5,832	5,860	5,888	5,915	5,943	5,971	5,999	277
632.0	6,027	6,055	6,084	6,112	6,140	6,169	6,198	6,226	6,255	6,284	286
633.0	6,313	6,342	6,372	6,401	6,430	6,460	6,489	6,519	6,549	6,579	296
634.0	6,609	6,639	6,669	6,699	6,730	6,760	6,791	6,822	6,852	6,883	305
635.0	6,914	6,945	6,976	7,008	7,039	7,071	7,102	7,134	7,165	7,197	315
636.0	7,229	7,261	7,294	7,326	7,358	7,391	7,423	7,456	7,489	7,521	325
637.0	7,554	7,587	7,621	7,654	7,687	7,721	7,754	7,788	7,822	7,856	336
638.0	7,890	7,924	7,958	7,992	8,027	8,061	8,096	8,130	8,165	8,200	345
639.0	8,235	8,270	8,306	8,341	8,376	8,412	8,447	8,483	8,519	8,555	356
640.0	8,591	8,627	8,664	8,700	8,736	8,773	8,810	8,846	8,883	8,920	367
641.0	8,958	8,995	9,032	9,070	9,107	9,145	9,183	9,220	9,258	9,296	377
642.0	9,335	9,373	9,411	9,450	9,489	9,527	9,566	9,605	9,644	9,683	388
643.0	9,723	9,762	9,802	9,841	9,881	9,921	9,961	10,001	10,041	10,081	399
644.0	10,122	10,162	10,203	10,244	10,284	10,325	10,366	10,408	10,449	10,490	410
645.0	10,532	10,573	10,615	10,657	10,699	10,741	10,783	10,826	10,868	10,911	421
646.0	10,953	10,996	11,039	11,082	11,125	11,168	11,211	11,255	11,298	11,342	433
647.0	11,386	11,430	11,474	11,518	11,562	11,607	11,651	11,696	11,740	11,785	444
648.0	11,830	11,875	11,921	11,966	12,011	12,057	12,102	12,148	12,194	12,240	456
649.0	12,286	12,333	12,379	12,425	12,472	12,519	12,566	12,613	12,660	12,707	468
650.0	12,754	12,802	12,849	12,897	12,945	12,993	13,041	13,089	13,137	13,185	480
651.0	13,234	13,283	13,331	13,380	13,429	13,478	13,528	13,577	13,626	13,676	492
652.0	13,726	13,776	13,826	13,876	13,926	13,976	14,027	14,077	14,128	14,179	504
653.0	14,230	14,281	14,332	14,383	14,435	14,487	14,538	14,590	14,642	14,694	516
654.0	14,746	14,799	14,851	14,904	14,956	15,009	15,062	15,115	15,168	15,222	529
655.0	15,275	15,329	15,383	15,436	15,490	15,545	15,599	15,653	15,707	15,762	542
656.0	15,817	15,872	15,927	15,982	16,037	16,092	16,148	16,203	16,259	16,315	554
657.0	16,371	16,427	16,484	16,540	16,596	16,653	16,710	16,767	16,824	16,881	567
658.0	16,938	16,996	17,053	17,111	17,169	17,227	17,285	17,343	17,401	17,460	580
659.0	17,518	17,577	17,636	17,695	17,754	17,813	17,873	17,932	17,992	18,052	594
660.0	18,112	18,172	18,232	18,292	18,353	18,413	18,474	18,535	18,596	18,657	606
661.0	18,718	18,780	18,841	18,903	18,965	19,026	19,088	19,151	19,213	19,275	620
662.0	19,338	19,401	19,464	19,527	19,590	19,653	19,716	19,780	19,844	19,907	633
663.0	19,971	20,035	20,100	20,164	20,229	20,293	20,358	20,423	20,488	20,553	647
664.0	20,618	20,684	20,749	20,815	20,881	20,947	21,013	21,079	21,146	21,212	661
665.0	21,279	21,346	21,413	21,480	21,547	21,615	21,682	21,750	21,818	21,886	675
666.0	21,954	22,022	22,090	22,159	22,227	22,296	22,365	22,434	22,503	22,573	688
667.0	22,642	22,712	22,782	22,851	22,922	22,992	23,062	23,133	23,203	23,274	703
668.0	23,345	23,416	23,487	23,558	23,630	23,702	23,773	23,845	23,917	23,989	717
669.0	24,062	24,134	24,207	24,279	24,352	24,425	24,499	24,572	24,645	24,719	731
670.0	24,793	24,867	24,941	25,015	25,089	25,164	25,238	25,313	25,388	25,463	745

CAPACITIES OF NEW MELONES LAKE - STANISLAUS RIVER, CALIFORNIA
(CONTINUED)

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFFERENCE
					ACRE-FEET						
671.0	25,538	25,614	25,689	25,765	25,841	25,917	25,993	26,069	26,145	26,222	760
672.0	26,298	26,375	26,452	26,529	26,607	26,684	26,761	26,839	26,917	26,995	775
673.0	27,073	27,151	27,230	27,308	27,387	27,466	27,545	27,624	27,704	27,783	790
674.0	27,863	27,942	28,022	28,102	28,183	28,263	28,343	28,424	28,505	28,586	804
675.0	28,667	28,748	28,830	28,911	28,993	29,075	29,157	29,239	29,321	29,404	819
676.0	29,486	29,569	29,652	29,735	29,818	29,902	29,985	30,069	30,153	30,237	835
677.0	30,321	30,405	30,490	30,574	30,659	30,744	30,829	30,914	30,999	31,085	850
678.0	31,171	31,256	31,342	31,428	31,515	31,601	31,688	31,774	31,861	31,948	864
679.0	32,035	32,123	32,210	32,298	32,386	32,474	32,562	32,650	32,738	32,827	881
680.0	32,916	33,005	33,094	33,183	33,272	33,362	33,451	33,541	33,631	33,721	896
681.0	33,812	33,902	33,993	34,083	34,174	34,265	34,356	34,448	34,539	34,631	911
682.0	34,723	34,815	34,907	34,999	35,092	35,185	35,277	35,370	35,463	35,557	927
683.0	35,650	35,744	35,837	35,931	36,025	36,120	36,214	36,308	36,403	36,498	943
684.0	36,593	36,688	36,783	36,879	36,974	37,070	37,166	37,262	37,359	37,455	959
685.0	37,552	37,648	37,745	37,842	37,940	38,037	38,135	38,232	38,330	38,428	975
686.0	38,527	38,625	38,723	38,822	38,921	39,020	39,119	39,218	39,318	39,417	990
687.0	39,517	39,617	39,717	39,818	39,918	40,019	40,119	40,221	40,322	40,423	1,007
688.0	40,524	40,626	40,728	40,289	40,932	41,034	41,136	41,239	41,342	41,445	1,024
689.0	41,548	41,651	41,754	41,858	41,962	42,065	42,169	42,274	42,378	42,483	1,039
690.0	42,587	42,692	42,797	42,902	43,008	43,113	43,219	43,325	43,431	43,537	1,057
691.0	43,644	43,750	43,857	43,963	44,070	44,178	44,285	44,393	44,500	44,608	1,072
692.0	44,716	44,824	44,933	45,041	45,150	45,259	45,368	45,477	45,586	45,696	1,089
693.0	45,805	45,915	46,025	46,135	46,246	46,356	46,467	46,578	46,689	46,800	1,107
694.0	46,912	47,023	47,135	47,246	47,359	47,471	47,583	47,696	47,808	47,921	1,122
695.0	48,034	48,147	48,261	48,374	48,488	48,602	48,716	48,830	48,945	49,059	1,140
696.0	49,174	49,289	49,404	49,519	49,635	49,750	49,866	49,982	50,098	50,214	1,157
697.0	50,331	50,447	50,564	50,681	50,798	50,916	51,033	51,151	51,268	51,386	1,174
698.0	51,505	51,623	51,741	51,860	51,979	52,098	52,217	52,336	52,456	52,575	1,190
699.0	52,695	52,815	52,936	53,056	53,177	53,297	53,418	53,539	53,660	53,782	1,209
700.0	53,904	54,025	54,147	54,269	54,392	54,514	54,637	54,760	54,882	55,006	1,025
701.0	55,129	55,252	55,376	55,500	55,624	55,748	55,872	55,997	56,122	56,247	1,243
702.0	56,372	56,497	56,623	56,748	56,874	57,000	57,126	57,252	57,379	57,505	1,260
703.0	57,632	57,759	57,886	58,013	58,141	58,269	58,397	58,525	58,653	58,781	1,278
704.0	58,910	59,039	59,168	59,297	59,426	59,556	59,685	59,815	59,945	60,075	1,296
705.0	60,206	60,336	60,467	60,597	60,729	60,860	60,991	61,123	61,254	61,387	1,313
706.0	61,519	61,651	61,783	61,916	62,049	62,182	62,315	62,448	62,582	62,716	1,331
707.0	62,850	62,984	63,118	63,252	63,387	63,522	63,657	63,792	63,927	64,063	1,349
708.0	64,199	64,334	64,470	64,606	64,743	64,880	65,016	65,153	65,290	65,428	1,366
709.0	65,565	65,703	65,841	65,979	66,117	66,255	66,394	66,533	66,671	66,811	1,385
710.0	66,950	67,089	67,229	67,369	67,509	67,649	67,789	67,930	68,071	68,212	1,403
711.0	68,353	68,494	68,635	68,777	68,919	69,061	69,203	69,346	69,488	69,631	1,421
712.0	69,774	69,917	70,060	70,203	70,347	70,491	70,635	70,779	70,923	71,068	1,439
713.0	71,213	71,358	71,503	71,648	71,794	71,939	72,085	72,231	72,377	72,524	1,457
714.0	72,670	72,817	72,964	73,111	73,258	73,406	73,553	73,701	73,849	73,998	1,476
715.0	74,146	74,295	74,443	74,592	74,742	74,891	75,040	75,190	75,340	75,490	1,494
716.0	75,640	75,791	75,941	76,092	76,243	76,394	76,546	76,697	76,849	77,001	1,513
717.0	77,153	77,305	77,458	77,610	77,763	77,916	78,069	78,223	78,376	78,530	1,531
718.0	78,684	78,838	78,993	79,147	79,302	79,457	79,612	79,767	79,923	80,078	1,550
719.0	80,234	80,390	80,546	80,703	80,859	81,016	81,173	81,330	81,487	81,645	1,569
720.0	81,803	81,960	82,119	82,277	82,435	82,594	82,753	82,912	83,071	83,230	1,587
721.0	83,390	83,550	83,710	83,870	84,030	84,191	84,351	84,512	84,673	84,835	1,606
722.0	84,996	85,158	85,320	85,482	85,644	85,806	85,969	86,132	86,294	86,458	1,625
723.0	86,621	86,785	86,949	87,112	87,276	87,441	87,605	87,770	87,935	88,100	1,644
724.0	88,265	88,430	88,596	88,762	88,928	89,094	89,261	89,427	89,594	89,761	1,663
725.0	89,928	90,095	90,263	90,431	90,599	90,767	90,935	91,104	91,272	91,441	1,682
726.0	91,610	91,779	91,949	92,118	92,288	92,458	92,628	92,799	92,969	93,140	1,701
727.0	93,311	93,482	93,654	93,825	93,997	94,169	94,341	94,514	94,686	94,859	1,721
728.0	95,032	95,205	95,378	95,551	95,725	95,899	96,073	96,247	96,422	96,596	1,739
729.0	96,771	96,946	97,121	97,297	97,472	97,648	97,824	98,000	98,177	98,353	1,759
730.0	98,530	98,707	98,884	99,061	99,239	99,417	99,595	99,773	99,951	100,130	1,778
731.0	100,308	100,487	100,666	100,845	101,025	101,205	101,384	101,565	101,745	101,925	1,998
732.0	102,106	102,287	102,468	102,649	102,830	103,012	103,194	103,376	103,558	103,740	1,817
733.0	103,923	104,106	104,289	104,472	104,655	104,839	105,023	105,207	105,391	105,575	1,837
734.0	105,760	105,944	106,130	106,314	106,500	106,686	106,871	107,057	107,243	107,430	1,856
735.0	107,616	107,803	107,990	108,177	108,364	108,552	108,739	108,927	109,115	109,303	1,876
736.0	109,492	109,681	109,870	110,058	110,248	110,437	110,627	110,817	111,007	111,197	1,896
737.0	111,388	111,578	111,769	111,960	112,151	112,343	112,534	112,726	112,918	113,111	1,915
738.0	113,303	113,495	113,688	113,881	114,075	114,268	114,462	114,656	114,849	115,044	1,935
739.0	115,238	115,433	115,628	115,822	116,018	116,213	116,409	116,605	116,800	116,997	1,955
740.0	117,193	117,390	117,587	117,783	117,981	118,178	118,376	118,574	118,771	118,970	1,975

CAPACITIES OF NEW MELONES LAKE - STANISLAUS RIVER, CALIFORNIA
(CONTINUED)

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFFERENCE
					ACRE-FEET						
741.0	119,168	119,367	119,566	119,764	119,964	120,163	120,363	120,563	120,762	120,963	1,995
742.0	121,163	121,364	121,565	121,765	121,967	122,168	122,370	122,572	122,773	122,976	2,015
743.0	123,178	123,381	123,584	123,786	123,990	124,193	124,397	124,601	124,804	125,009	2,035
744.0	125,213	125,418	125,623	125,827	126,033	126,238	126,444	126,650	126,856	127,062	2,056
745.0	127,269	127,475	127,682	127,889	128,096	128,304	128,511	128,719	128,927	129,135	2,075
746.0	129,344	129,552	129,761	129,970	130,180	130,389	130,599	130,809	131,018	131,229	2,096
747.0	131,440	131,650	131,861	132,072	132,283	132,495	132,706	132,919	133,130	133,343	2,116
748.0	133,556	133,768	133,981	134,194	134,407	134,621	134,835	135,049	135,263	135,477	2,136
749.0	135,692	135,906	136,121	136,336	136,552	136,768	136,983	137,199	137,415	137,632	2,156
750.0	137,848	138,065	138,282	138,499	138,717	138,934	139,152	139,370	139,588	139,807	2,178
751.0	140,026	140,244	140,463	140,682	140,902	141,122	141,341	141,562	141,782	142,002	2,197
752.0	142,223	142,444	142,665	142,886	143,108	143,330	143,551	143,774	143,996	144,218	2,218
753.0	144,441	144,664	144,887	145,110	145,334	145,558	145,782	146,006	146,230	146,455	2,239
754.0	146,680	146,905	147,130	147,355	147,581	147,807	148,033	148,259	148,485	148,712	2,259
755.0	148,939	149,166	149,394	149,621	149,849	150,077	150,305	150,533	150,761	150,990	2,280
756.0	151,219	151,448	151,678	151,907	152,137	152,367	152,597	152,828	153,058	153,289	2,301
757.0	153,520	153,751	153,983	154,214	154,446	154,678	154,910	155,143	155,375	155,608	2,322
758.0	155,842	156,075	156,309	156,542	156,776	157,010	157,244	157,479	157,714	157,949	2,342
759.0	158,184	158,419	158,655	158,891	159,127	159,363	159,599	159,836	160,073	160,310	2,364
760.0	160,548	160,785	161,023	161,260	161,499	161,737	161,975	162,214	162,453	162,692	2,384
761.0	162,932	163,171	163,411	163,651	163,891	164,132	164,372	164,613	164,854	165,095	2,405
762.0	165,337	165,578	165,821	166,062	166,305	166,548	166,790	167,033	167,276	167,520	2,426
763.0	167,763	168,007	168,251	168,495	168,740	168,984	169,229	169,474	169,719	169,965	2,448
764.0	170,211	170,456	170,703	170,949	171,195	171,442	171,689	171,936	172,183	172,431	2,468
765.0	172,679	172,927	173,175	173,423	173,672	173,921	174,170	174,420	174,669	174,919	2,490
766.0	175,169	175,419	175,669	175,920	176,171	176,422	176,673	176,924	177,175	177,428	2,511
767.0	177,680	177,932	178,184	178,437	178,690	178,943	179,196	179,450	179,703	179,958	2,532
768.0	180,212	180,466	180,721	180,975	181,231	181,486	181,741	181,997	182,253	182,509	2,554
769.0	182,766	183,022	183,279	183,535	183,793	184,050	184,308	184,566	184,823	185,082	2,575
770.0	185,341	185,599	185,858	186,117	186,376	186,636	186,895	187,156	187,415	187,676	2,596
771.0	187,937	188,197	188,459	188,719	188,981	189,243	189,505	189,767	190,029	190,292	2,618
772.0	190,555	190,817	191,081	191,344	191,608	191,872	192,135	192,400	192,664	192,929	2,639
773.0	193,194	193,459	193,724	193,989	194,256	194,522	194,788	195,054	195,320	195,588	2,661
774.0	195,855	196,122	196,390	196,657	196,925	197,193	197,461	197,730	197,999	198,268	2,682
775.0	198,537	198,806	199,076	199,346	199,616	199,887	200,157	200,428	200,699	200,970	2,705
776.0	201,242	201,513	201,785	202,057	202,329	202,602	202,874	203,147	203,420	203,694	2,726
777.0	203,968	204,241	204,515	204,789	205,064	205,339	205,613	205,888	206,163	206,439	2,747
778.0	206,715	206,991	207,267	207,543	207,820	208,097	208,374	208,651	208,929	209,207	2,770
779.0	209,485	209,762	210,041	210,319	210,598	210,878	211,156	211,436	211,716	211,996	2,791
780.0	212,276	212,556	212,837	213,117	213,398	213,680	213,961	214,243	214,524	214,807	2,813
781.0	215,089	215,371	215,655	215,937	216,221	216,504	216,787	217,072	217,355	217,640	2,836
782.0	217,925	218,209	218,494	218,779	219,065	219,350	219,636	219,922	220,208	220,495	2,857
783.0	220,782	221,068	221,356	221,643	221,931	222,219	222,506	222,795	223,083	223,372	2,879
784.0	223,661	223,950	224,240	224,529	224,819	225,109	225,399	255,690	225,980	226,271	2,902
785.0	226,563	226,854	227,145	227,437	227,729	228,022	228,314	228,607	228,899	229,193	2,923
786.0	229,486	229,779	230,073	230,367	230,662	230,956	231,251	231,546	231,841	232,136	2,946
787.0	232,432	232,727	233,024	233,320	233,616	233,913	234,210	234,507	234,804	235,102	2,968
788.0	235,400	235,698	235,996	236,294	236,593	236,893	237,191	237,491	237,790	238,090	2,990
789.0	238,390	238,690	238,991	239,291	239,593	239,894	240,195	240,497	240,798	241,101	3,013
790.0	241,403	241,705	242,008	242,311	242,614	242,918	243,221	243,525	243,829	244,134	3,035
791.0	244,438	244,743	245,048	245,353	245,659	245,964	246,270	246,576	246,882	247,189	3,058
792.0	247,496	247,803	248,110	248,417	248,725	249,033	249,341	249,650	249,958	250,267	3,080
793.0	250,576	250,885	251,195	251,504	251,814	252,125	252,435	252,746	253,056	253,367	3,103
794.0	253,679	253,990	254,302	254,614	254,926	255,239	255,551	255,864	256,177	256,491	3,125
795.0	256,804	257,118	257,432	257,746	258,061	258,376	258,690	259,005	259,320	259,636	3,148
796.0	259,952	260,268	260,585	260,901	261,218	261,535	261,852	262,169	262,487	262,805	3,171
797.0	263,123	263,441	263,760	264,078	264,398	264,717	265,036	265,356	265,676	265,996	3,194
798.0	266,317	266,637	266,958	267,279	267,600	267,922	268,243	268,566	268,887	269,210	3,216
799.0	269,533	269,856	270,179	270,502	270,826	271,150	271,473	271,798	272,122	272,447	3,239
800.0	272,772	273,097	273,423	273,748	274,074	274,401	274,727	275,053	275,380	275,707	3,263
801.0	276,035	276,362	276,690	277,017	277,346	277,674	278,003	278,332	278,660	278,990	3,285
802.0	279,320	279,649	279,980	280,309	280,640	280,971	281,302	281,633	281,964	282,296	3,308
803.0	282,628	282,960	283,292	283,624	283,958	284,291	284,624	284,958	285,291	285,625	3,332
804.0	285,960	286,293	286,628	286,963	287,298	287,634	287,969	288,305	288,641	288,977	3,354
805.0	289,314	289,650	289,988	290,324	290,662	291,000	291,337	291,676	292,014	292,353	3,378
806.0	292,692	293,030	293,370	293,709	294,049	294,389	294,729	295,070	295,410	295,751	3,401
807.0	296,093	296,434	296,776	297,117	297,459	297,802	298,144	298,487	298,830	299,173	3,424
808.0	299,517	299,860	300,205	300,548	300,893	301,238	301,583	301,928	302,273	302,619	3,448
809.0	302,965	303,311	303,657	304,003	304,350	304,698	305,044	305,392	305,739	306,088	3,471
810.0	306,436	306,784	307,133	307,481	307,831	308,181	308,530	308,880	309,229	309,580	3,495

CAPACITIES OF NEW MELONES LAKE - STANISLAUS RIVER, CALIFORNIA
(CONTINUED)

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFFERENCE
						ACRE-FEET					
811.0	309,931	310,281	310,632	310,983	311,335	311,687	312,038	312,391	312,743	313,096	3,518
812.0	313,449	313,802	314,155	314,509	314,863	315,217	315,571	315,926	316,280	316,635	3,542
813.0	316,991	317,346	317,702	318,057	318,414	318,771	319,127	319,484	319,841	320,199	3,566
814.0	320,557	320,914	321,272	321,630	321,989	322,348	322,707	323,066	323,425	323,785	3,589
815.0	324,146	324,505	324,866	325,226	325,588	325,949	326,310	326,672	327,034	327,396	3,613
816.0	327,759	328,121	328,484	328,847	329,210	329,574	329,938	330,302	330,666	331,031	3,637
817.0	331,396	331,760	332,126	332,491	332,857	333,223	333,589	333,956	334,322	334,689	3,661
818.0	335,057	335,423	335,791	336,159	336,527	336,896	337,264	337,633	338,002	338,371	3,684
819.0	338,741	339,111	339,481	339,851	340,222	340,593	340,963	341,335	341,706	342,078	3,709
820.0	342,450	342,822	343,195	343,567	343,940	344,314	344,686	345,060	345,434	345,808	3,733
821.0	346,183	346,557	346,932	347,307	347,683	348,059	348,434	348,810	349,186	349,563	3,757
822.0	349,940	350,317	350,694	351,071	351,449	351,828	352,205	352,584	352,962	353,342	3,781
823.0	353,721	354,100	354,480	354,860	355,240	355,621	356,001	356,383	356,763	357,145	3,806
824.0	357,527	357,908	358,291	358,673	359,056	359,439	359,821	360,205	360,588	360,972	3,830
825.0	361,357	361,741	362,125	362,510	362,895	363,281	363,666	364,052	364,437	364,824	3,854
826.0	365,211	365,597	365,985	366,371	366,759	367,147	367,535	367,923	368,311	368,700	3,879
827.0	369,090	369,478	369,868	370,257	370,648	371,038	371,428	371,819	372,210	372,601	3,903
828.0	372,993	373,384	373,776	374,168	374,561	374,954	375,346	375,740	376,133	376,527	3,928
829.0	376,921	377,314	377,709	378,103	378,499	378,894	379,289	379,685	380,080	380,477	3,952
830.0	380,873	381,269	381,667	382,063	382,461	382,859	383,256	383,655	384,052	384,451	3,978
831.0	384,851	385,249	385,649	386,048	386,448	386,849	387,248	387,649	388,049	388,451	4,002
832.0	388,853	389,254	389,656	390,057	390,460	390,863	391,265	391,669	392,071	392,475	4,026
833.0	392,879	393,283	393,688	394,092	394,497	394,902	395,307	395,713	396,118	396,525	4,052
834.0	396,931	397,337	397,744	398,151	398,559	398,967	399,374	399,782	400,190	400,599	4,077
835.0	401,008	401,416	401,826	402,235	402,645	403,056	403,465	403,876	404,287	404,698	4,102
836.0	405,110	405,521	405,933	406,344	406,757	407,170	407,582	407,996	408,409	408,822	4,127
837.0	409,237	409,650	410,065	410,479	410,894	411,310	411,724	412,140	412,556	412,972	4,152
838.0	413,389	413,805	414,222	414,639	415,056	415,474	415,892	416,310	416,728	417,147	4,177
839.0	417,566	417,985	418,404	418,823	419,244	419,664	420,084	420,505	420,925	421,347	4,203
840.0	421,769	422,190	422,612	423,034	423,457	423,880	424,302	424,726	425,148	425,572	4,228
841.0	425,997	426,420	426,845	427,269	427,695	428,120	428,545	428,971	429,397	429,823	4,253
842.0	430,250	430,676	431,104	431,530	431,958	432,387	432,814	433,243	433,671	434,100	4,279
843.0	434,529	434,958	435,388	435,817	436,248	436,678	437,108	437,540	437,970	438,402	4,305
844.0	438,834	439,265	439,698	440,129	440,563	440,996	441,428	441,862	442,295	442,730	4,330
845.0	443,164	443,598	444,033	444,467	444,903	445,339	445,774	446,210	446,646	447,083	4,356
846.0	447,520	447,957	448,394	448,831	449,269	449,708	450,145	450,584	451,023	451,462	4,382
847.0	451,902	452,341	452,781	453,221	453,661	454,103	454,543	454,984	455,425	455,867	4,408
848.0	456,310	456,751	457,194	457,636	458,080	458,523	458,966	459,410	459,854	460,298	4,433
849.0	460,743	461,187	461,633	462,078	462,524	462,970	463,415	463,862	464,308	464,755	4,460
850.0	465,203	465,650	466,098	466,545	466,994	467,442	467,890	468,340	468,788	469,238	4,486
851.0	469,689	470,138	470,589	471,038	471,490	471,941	472,392	472,844	473,295	473,748	4,511
852.0	474,200	474,652	475,106	475,558	476,012	476,466	476,919	477,374	477,828	478,283	4,539
853.0	478,739	479,193	479,649	480,104	480,561	481,017	481,473	481,931	482,387	482,845	4,564
854.0	483,303	483,760	484,219	484,676	485,136	485,595	486,054	486,513	486,973	487,433	4,591
855.0	487,894	488,354	488,815	489,275	489,737	490,199	490,660	491,123	491,584	492,048	4,617
856.0	492,511	492,973	493,437	493,900	494,365	494,829	495,293	495,759	496,223	496,689	4,644
857.0	497,155	497,620	498,086	498,552	499,019	499,487	499,953	500,421	500,888	501,356	4,670
858.0	501,825	502,293	502,762	503,230	503,700	504,170	504,639	505,110	505,580	506,051	4,697
859.0	506,522	506,993	507,464	507,935	508,408	508,881	509,352	509,826	510,298	510,772	4,724
860.0	511,246	511,719	512,194	512,667	513,142	513,618	514,092	514,568	515,043	515,520	4,750
861.0	515,996	516,472	516,949	517,426	517,904	518,382	518,859	519,338	519,815	520,294	4,778
862.0	520,774	521,252	521,732	522,211	522,692	523,173	523,653	524,134	524,614	525,096	4,804
863.0	525,578	526,060	526,542	527,024	527,507	527,991	528,473	528,957	529,440	529,925	4,832
864.0	530,410	530,894	531,379	531,864	532,350	532,836	533,321	533,808	534,294	534,781	4,858
865.0	535,268	535,755	536,243	536,730	537,219	537,708	538,196	538,685	539,174	539,664	4,886
866.0	540,154	540,644	541,134	541,624	542,116	542,607	543,098	543,590	544,082	544,574	4,913
867.0	545,067	545,559	546,053	546,546	547,040	547,534	548,028	548,522	549,016	549,512	4,941
868.0	550,008	550,503	550,999	551,494	551,991	552,488	552,984	553,482	553,979	554,477	4,968
869.0	554,976	555,473	555,972	556,470	556,970	557,470	557,969	558,469	558,969	559,470	4,995
870.0	559,971	560,471	560,973	561,474	561,976	562,479	562,981	563,484	563,986	564,490	5,023
871.0	564,994	565,497	566,002	566,505	567,010	567,516	568,020	568,526	569,031	569,538	5,050
872.0	570,044	570,550	571,058	571,564	572,072	572,580	573,087	573,596	574,104	574,613	5,079
873.0	575,123	575,631	576,142	576,651	577,161	577,672	578,182	578,694	579,205	579,717	5,106
874.0	580,229	580,740	581,253	581,765	582,279	582,792	583,305	583,820	584,333	584,848	5,134
875.0	585,363	585,877	586,393	586,908	587,424	587,940	588,456	588,973	589,489	590,007	5,162
876.0	590,525	591,042	591,560	592,078	592,597	593,116	593,635	594,155	594,674	595,194	5,190
877.0	595,715	596,235	596,756	597,276	597,798	598,321	598,842	599,365	599,886	600,410	5,218
878.0	600,933	601,456	601,980	602,503	603,028	603,553	604,077	604,602	605,127	605,653	5,247
879.0	606,180	606,705	607,232	607,758	608,285	608,813	609,340	609,869	610,396	610,925	5,274
880.0	611,454	611,982	612,512	613,041	613,571	614,102	614,632	615,163	615,693	616,225	5,303

CAPACITIES OF NEW MELONES LAKE - STANISLAUS RIVER, CALIFORNIA
(CONTINUED)

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFFERENCE
						ACRE-FEET					
881.0	616,757	617,288	617,821	618,353	618,886	619,419	619,952	620,486	621,019	621,554	5,332
882.0	622,089	622,623	623,158	623,693	624,229	624,765	625,300	625,837	626,373	626,911	5,360
883.0	627,449	627,985	628,524	629,061	629,600	630,139	630,677	631,217	631,756	632,296	5,386
884.0	632,837	633,377	633,918	634,458	635,000	635,542	636,083	636,626	637,167	637,711	5,417
885.0	638,254	638,797	639,341	639,884	640,429	640,974	641,518	642,063	642,608	643,154	5,446
886.0	643,700	644,246	644,793	645,339	645,886	646,434	646,981	647,529	648,077	648,626	5,475
887.0	649,175	649,723	650,273	650,822	651,372	641,923	652,473	653,024	653,575	654,126	5,504
888.0	654,679	655,230	655,783	656,334	656,888	657,441	657,994	658,548	659,101	659,656	5,532
889.0	660,211	660,765	661,321	661,876	662,432	662,989	663,544	664,101	664,657	665,215	5,562
890.0	665,773	666,330	666,889	667,446	668,005	668,565	669,123	669,683	670,242	670,803	5,591
891.0	671,364	671,924	672,485	673,046	673,608	674,170	674,732	675,295	675,857	676,420	5,620
892.0	676,984	677,547	678,111	678,675	679,240	679,805	680,269	680,935	681,500	682,067	5,649
893.0	682,633	683,199	683,766	684,333	684,901	685,469	686,036	686,605	687,173	687,742	5,679
894.0	688,312	688,881	689,451	690,020	690,591	691,163	691,733	692,304	692,875	693,448	5,708
895.0	694,020	694,592	695,165	695,737	696,311	696,885	697,459	698,033	698,607	699,182	5,738
896.0	699,758	700,333	700,909	701,484	702,061	702,638	703,214	703,792	704,368	704,947	5,767
897.0	705,525	706,103	706,682	707,260	707,840	708,420	708,999	709,580	710,160	710,741	5,797
898.0	711,322	711,903	712,485	713,066	713,649	714,232	714,814	715,398	715,980	716,565	5,827
899.0	717,149	717,733	718,318	718,902	719,488	720,074	720,659	721,245	721,831	722,418	5,857
900.0	723,006	723,592	724,181	724,768	725,356	725,945	726,533	727,123	727,712	728,302	5,886
901.0	728,892	729,482	730,073	730,663	731,255	731,847	732,438	733,031	733,622	734,215	5,917
902.0	734,809	735,401	735,996	736,589	737,183	737,779	738,373	738,968	739,563	740,159	5,947
903.0	740,756	741,351	741,948	742,544	743,142	783,740	744,337	744,936	745,534	746,133	5,976
904.0	746,732	747,331	747,931	748,530	749,131	749,732	750,332	750,934	751,534	752,137	6,007
905.0	752,739	753,341	753,944	754,546	755,150	755,754	756,357	756,962	757,566	758,171	6,038
906.0	758,777	759,381	759,988	760,593	761,200	761,807	762,413	763,021	763,627	764,236	6,068
907.0	764,845	765,452	766,061	766,670	767,280	767,890	768,499	769,110	769,719	770,331	6,098
908.0	770,943	771,553	772,166	772,777	773,390	774,003	774,615	775,229	775,842	776,457	6,128
909.0	777,071	777,685	778,301	778,915	779,531	780,147	780,762	781,379	781,995	782,613	6,160
910.0	783,231	783,847	784,466	785,083	785,702	786,322	786,940	787,560	788,179	788,800	6,190
911.0	789,421	790,041	790,662	791,283	791,905	792,527	793,149	793,772	794,394	795,017	6,221
912.0	795,642	796,264	796,889	797,513	798,138	798,763	799,388	800,014	800,639	801,266	6,251
913.0	801,893	802,519	803,147	803,773	804,402	805,031	805,658	806,287	806,915	807,545	6,283
914.0	808,176	808,805	809,436	810,065	810,697	811,329	811,959	812,592	813,223	813,856	6,313
915.0	814,489	815,121	815,755	816,388	817,023	817,658	818,291	818,927	819,561	820,197	6,345
916.0	820,834	821,469	822,106	822,742	823,380	824,018	824,654	825,293	825,931	826,570	6,375
917.0	827,209	827,848	828,488	829,127	829,768	830,409	831,049	831,691	832,331	832,974	6,407
918.0	833,616	834,258	834,901	835,543	836,187	836,832	837,475	838,120	838,763	839,409	6,439
919.0	840,055	840,699	841,346	841,991	842,638	843,285	843,932	844,580	845,226	845,875	6,469
920.0	846,524	847,172	847,821	848,470	849,120	849,771	850,420	851,071	851,721	852,373	6,501
921.0	853,025	853,676	854,329	854,980	855,634	856,287	856,940	857,594	858,247	858,902	6,533
922.0	859,558	860,212	860,868	861,522	862,179	862,836	863,491	864,149	864,805	865,463	6,564
923.0	866,122	866,779	867,438	868,096	868,755	869,416	870,074	870,835	871,394	872,056	6,595
924.0	872,717	873,378	874,040	874,701	875,364	876,027	876,689	877,353	878,015	878,680	6,628
925.0	879,345	880,008	880,674	881,338	882,004	882,670	883,335	884,003	884,668	885,336	6,659
926.0	886,004	886,671	887,339	888,007	888,676	889,345	890,014	890,684	891,353	892,024	6,691
927.0	892,695	893,365	894,037	894,707	895,380	896,052	896,724	897,397	898,069	898,744	6,723
928.0	899,418	900,091	900,766	901,440	902,115	902,791	903,466	904,143	904,818	905,495	6,755
929.0	906,173	906,849	907,527	908,204	908,883	909,562	910,240	910,920	911,599	912,279	6,787
930.0	912,960	913,639	914,321	915,001	915,683	916,366	917,047	917,730	918,411	919,095	6,819
931.0	919,779	920,462	921,146	921,830	922,515	923,201	923,885	924,571	925,256	925,943	6,851
932.0	926,630	927,316	928,004	928,691	929,379	930,068	930,756	931,445	932,133	932,824	6,884
933.0	933,514	934,203	934,894	935,584	936,276	936,968	937,659	938,351	939,043	939,736	6,916
934.0	940,430	941,122	941,817	942,510	943,205	943,900	944,594	945,290	945,985	946,681	6,948
935.0	947,378	948,074	948,772	949,468	950,166	950,865	951,562	952,261	952,959	953,659	6,981
936.0	954,359	955,058	955,759	956,458	957,160	957,862	958,562	959,265	959,966	960,669	7,013
937.0	961,372	962,075	962,779	963,481	964,186	964,891	965,595	966,301	967,005	967,712	7,046
938.0	968,418	969,124	969,831	970,537	971,245	971,954	972,661	973,370	974,077	974,787	7,079
939.0	975,497	976,206	976,916	977,625	978,337	979,048	979,759	980,471	981,182	981,895	7,111
940.0	982,608	983,320	984,034	984,747	985,461	986,176	986,890	987,605	988,319	989,036	7,144
941.0	989,752	990,467	991,185	991,901	992,618	993,337	994,053	994,772	995,490	996,209	7,177
942.0	996,929	997,648	998,368	999,087	999,808	1,000,530	1,001,250	1,001,972	1,002,693	1,003,416	7,210
943.0	1,004,139	1,004,861	1,005,585	1,006,307	1,007,031	1,007,756	1,008,480	1,009,205	1,009,929	1,010,655	7,243
944.0	1,011,382	1,012,107	1,012,834	1,013,560	1,014,287	1,015,016	1,015,742	1,016,471	1,017,198	1,017,928	7,276
945.0	1,018,658	1,019,386	1,020,116	1,020,845	1,021,576	1,022,308	1,023,038	1,023,770	1,024,501	1,025,233	7,308
946.0	1,025,966	1,026,698	1,027,432	1,028,164	1,028,899	1,029,633	1,030,367	1,031,102	1,031,836	1,032,572	7,343
947.0	1,033,309	1,034,043	1,034,781	1,035,516	1,036,254	1,036,992	1,037,729	1,038,467	1,039,205	1,039,944	7,375
948.0	1,040,684	1,041,422	1,042,162	1,042,901	1,043,642	1,044,384	1,045,124	1,045,866	1,046,606	1,047,349	7,408
949.0	1,048,092	1,048,834	1,049,578	1,050,320	1,051,064	1,051,809	1,052,552	1,053,298	1,054,042	1,054,788	7,442
950.0	1,055,534	1,056,279	1,057,026	1,057,772	1,058,519	1,059,267	1,060,014	1,060,763	1,061,510	1,062,260	7,475

CAPACITIES OF NEW MELONES LAKE - STANISLAUS RIVER, CALIFORNIA
(CONTINUED)

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFFERENCE
					ACRE-FEET						
951.0	1,063,009	1,063,758	1,064,508	1,065,257	1,066,008	1,066,749	1,067,509	1,068,261	1,069,012	1,069,765	7,509
952.0	1,070,518	1,071,269	1,072,023	1,072,776	1,073,530	1,074,285	1,075,038	1,075,793	1,076,547	1,077,304	7,542
953.0	1,078,060	1,078,815	1,079,572	1,080,328	1,081,085	1,081,844	1,082,600	1,083,359	1,084,116	1,084,876	7,576
954.0	1,085,636	1,086,394	1,087,154	1,087,913	1,088,675	1,089,436	1,090,196	1,090,958	1,091,719	1,092,482	7,609
955.0	1,093,245	1,094,007	1,094,770	1,095,533	1,096,297	1,097,062	1,097,825	1,098,591	1,099,355	1,100,121	7,643
956.0	1,100,888	1,101,653	1,102,420	1,103,186	1,103,954	1,104,722	1,105,489	1,106,257	1,107,025	1,107,794	7,675
957.0	1,108,564	1,109,333	1,110,103	1,110,872	1,111,644	1,112,415	1,113,185	1,113,958	1,114,728	1,115,501	7,711
958.0	1,116,275	1,117,046	1,117,820	1,118,593	1,119,368	1,120,143	1,120,916	1,121,692	1,122,466	1,123,242	7,744
959.0	1,124,019	1,124,794	1,125,571	1,126,347	1,127,125	1,127,904	1,128,680	1,129,459	1,130,237	1,131,017	7,778
960.0	1,131,797	1,132,575	1,133,356	1,134,135	1,134,917	1,135,699	1,136,479	1,137,261	1,138,042	1,138,825	7,812
961.0	1,139,609	1,140,391	1,141,175	1,141,957	1,142,742	1,143,527	1,144,311	1,145,097	1,145,881	1,146,668	7,846
962.0	1,147,455	1,148,240	1,149,027	1,149,813	1,150,602	1,151,390	1,152,177	1,152,966	1,153,754	1,154,544	7,879
963.0	1,155,334	1,156,123	1,156,914	1,157,703	1,158,495	1,159,287	1,160,077	1,160,870	1,161,661	1,162,455	7,914
964.0	1,163,248	1,164,040	1,164,835	1,165,628	1,166,423	1,167,218	1,168,012	1,168,808	1,169,602	1,170,399	7,948
965.0	1,171,196	1,171,992	1,172,790	1,173,586	1,174,384	1,175,183	1,175,980	1,176,780	1,177,578	1,178,378	7,982
966.0	1,179,178	1,179,977	1,180,779	1,181,578	1,182,380	1,183,182	1,183,983	1,184,786	1,185,587	1,186,391	8,017
967.0	1,187,195	1,187,997	1,188,802	1,189,605	1,190,410	1,191,216	1,192,020	1,192,826	1,193,631	1,194,438	8,050
968.0	1,195,245	1,196,051	1,196,859	1,197,665	1,198,474	1,199,283	1,200,091	1,200,901	1,201,709	1,202,519	8,805
969.0	1,203,330	1,204,128	1,204,951	1,205,761	1,206,573	1,207,385	1,208,196	1,209,009	1,209,821	1,210,635	8,119
970.0	1,211,449	1,212,262	1,213,077	1,213,890	1,214,706	1,215,522	1,216,336	1,217,153	1,217,968	1,218,785	8,154
971.0	1,219,603	1,220,419	1,221,237	1,222,054	1,222,873	1,223,692	1,224,510	1,225,330	1,226,149	1,226,969	8,188
972.0	1,227,791	1,228,610	1,229,432	1,230,252	1,231,075	1,231,897	1,232,719	1,233,542	1,234,364	1,235,188	8,222
973.0	1,236,013	1,236,836	1,237,661	1,238,485	1,239,311	1,240,137	1,240,962	1,241,789	1,242,614	1,243,442	8,257
974.0	1,244,270	1,245,096	1,245,925	1,246,752	1,247,581	1,248,411	1,249,239	1,250,070	1,250,898	1,251,730	8,291
975.0	1,252,561	1,253,391	1,254,223	1,255,054	1,255,886	1,256,720	1,257,551	1,258,385	1,259,217	1,260,052	8,326
976.0	1,260,887	1,261,720	1,262,556	1,263,390	1,264,226	1,265,063	1,265,898	1,266,735	1,267,571	1,268,409	8,360
977.0	1,269,247	1,270,084	1,270,923	1,271,761	1,272,601	1,273,441	1,274,279	1,275,120	1,275,959	1,276,801	8,396
978.0	1,277,643	1,278,483	1,279,325	1,280,166	1,281,010	1,281,853	1,282,695	1,283,539	1,284,382	1,285,227	8,429
979.0	1,286,072	1,286,916	1,287,762	1,288,606	1,289,453	1,290,300	1,291,146	1,291,994	1,292,840	1,293,688	8,465
980.0	1,294,537	1,295,384	1,296,234	1,297,081	1,297,932	1,298,782	1,299,631	1,300,482	1,301,332	1,302,184	8,499
981.0	1,303,036	1,303,887	1,304,740	1,305,591	1,306,445	1,307,299	1,308,151	1,309,006	1,309,859	1,310,714	8,534
982.0	1,311,570	1,312,424	1,313,281	1,314,136	1,314,993	1,315,850	1,316,706	1,317,564	1,318,421	1,319,280	8,569
983.0	1,320,139	1,320,997	1,321,857	1,322,715	1,323,576	1,324,437	1,325,296	1,326,158	1,327,018	1,327,880	8,604
984.0	1,328,743	1,329,604	1,330,467	1,331,329	1,332,193	1,333,058	1,333,921	1,334,786	1,335,649	1,336,515	8,639
985.0	1,337,382	1,338,246	1,339,113	1,339,978	1,340,846	1,341,714	1,342,580	1,343,449	1,344,316	1,345,185	8,673
986.0	1,346,055	1,346,923	1,347,794	1,348,662	1,349,533	1,350,405	1,351,275	1,352,147	1,353,017	1,353,890	8,709
987.0	1,354,764	1,355,635	1,356,509	1,357,381	1,358,256	1,359,131	1,360,004	1,360,880	1,361,754	1,362,630	8,743
988.0	1,363,507	1,364,382	1,365,259	1,366,135	1,367,013	1,367,892	1,368,769	1,369,648	1,370,525	1,371,405	8,779
989.0	1,372,286	1,373,164	1,374,045	1,374,924	1,375,806	1,376,688	1,377,568	1,378,451	1,379,332	1,380,215	8,813
990.0	1,381,099	1,381,981	1,382,866	1,383,748	1,384,633	1,385,519	1,386,403	1,387,289	1,388,173	1,389,060	8,849
991.0	1,389,948	1,390,833	1,391,721	1,392,607	1,393,496	1,394,385	1,395,272	1,396,162	1,397,050	1,397,940	8,883
992.0	1,398,831	1,399,720	1,400,612	1,401,502	1,402,394	1,403,286	1,404,177	1,405,070	1,405,962	1,406,856	8,919
993.0	1,407,750	1,408,643	1,409,538	1,410,431	1,411,327	1,412,223	1,413,117	1,414,014	1,414,909	1,415,806	8,954
994.0	1,416,704	1,417,600	1,418,499	1,419,395	1,420,295	1,421,194	1,422,092	1,422,992	1,423,891	1,424,792	8,989
995.0	1,425,693	1,426,593	1,427,495	1,428,395	1,429,298	1,430,201	1,431,102	1,432,006	1,432,908	1,433,813	9,025
996.0	1,434,718	1,435,621	1,436,526	1,437,430	1,438,336	1,439,243	1,440,148	1,441,055	1,441,961	1,442,869	9,059
997.0	1,443,777	1,444,684	1,445,593	1,446,500	1,447,410	1,448,320	1,449,229	1,450,140	1,451,049	1,451,960	9,095
998.0	1,452,872	1,453,782	1,454,695	1,455,606	1,456,519	1,457,433	1,458,345	1,459,259	1,460,172	1,461,087	9,130
999.0	1,462,002	1,462,916	2,463,832	1,464,746	1,465,663	1,466,581	1,467,496	1,468,414	1,469,330	1,470,249	9,166
1000.0	1,471,168	1,472,085	1,473,005	1,473,923	1,474,843	1,475,764	1,476,683	1,477,604	1,478,524	1,479,446	9,201
1001.0	1,480,369	1,481,289	1,482,213	1,483,134	1,484,058	1,484,982	1,485,905	1,486,830	1,487,753	1,488,679	9,263
1002.0	1,489,605	1,490,529	1,491,456	1,492,381	1,493,308	1,494,236	1,495,162	1,496,091	1,497,017	1,497,947	9,271
1003.0	1,498,876	1,499,804	1,500,735	1,501,663	1,502,594	1,503,525	1,504,455	1,505,387	1,506,317	1,507,250	9,307
1004.0	1,508,183	1,509,115	1,510,049	1,510,981	1,511,915	1,512,850	1,513,783	1,514,719	1,515,653	1,516,589	9,343
1005.0	1,517,526	1,518,461	1,519,398	1,520,334	1,521,272	1,522,210	1,523,147	1,524,086	1,525,023	1,525,963	9,378
1006.0	1,526,904	1,527,842	1,528,783	1,529,722	1,530,664	1,531,606	1,532,546	1,533,489	1,534,430	1,535,373	9,413
1007.0	1,536,317	1,537,259	1,538,204	1,539,146	1,540,091	1,541,037	1,541,981	1,542,927	1,543,827	1,544,819	9,449
1008.0	1,545,766	1,546,711	1,547,660	1,548,606	1,549,555	1,550,504	1,551,451	1,552,401	1,553,349	1,554,299	9,484
1009.0	1,555,250	1,556,199	1,557,151	1,558,101	1,559,053	1,560,006	1,560,957	1,561,910	1,562,862	1,563,816	9,520
1010.0	1,564,770	1,565,723	1,566,678	1,567,631	1,568,587	1,569,544	1,570,498	1,571,455	1,572,410	1,573,368	9,556
1011.0	1,574,326	1,575,282	1,576,241	1,577,198	1,578,157	1,579,117	1,580,075	1,581,035	1,581,994	1,582,955	9,591
1012.0	1,583,917	1,584,877	1,585,839	1,586,799	1,587,762	1,588,726	1,589,687	1,590,651	1,591,614	1,592,578	9,627
1013.0	1,593,544	1,594,507	1,595,473	1,596,437	1,597,403	1,598,370	1,599,335	1,600,303	1,601,269	1,602,237	9,662
1014.0	1,603,206	1,604,173	1,605,142	1,606,110	1,607,080	1,608,051	1,609,019	1,609,990	1,610,960	1,611,932	9,698
1015.0	1,612,904	1,613,874	1,614,848	1,615,819	1,616,792	1,617,766	1,618,739	1,619,713	1,620,686	1,621,662	9,734
1016.0	1,622,638	1,623,612	1,624,588	1,625,563	1,626,540	1,627,518	1,628,494	1,629,472	1,630,449	1,631,428	9,769
1017.0	1,632,407	1,633,385	1,634,365	1,635,343	1,636,324	1,637,305	1,638,285	1,639,267	1,640,247	1,641,229	9,805
1018.0	1,642,212	1,643,193	1,644,177	1,645,159	1,646,143	1,647,128	1,648,111	1,649,097	1,650,080	1,651,067	9,841
1019.0	1,652,053	1,653,038	1,654,025	1,655,011	1,655,999	1,656,987	1,657,974	1,658,963	1,659,950	1,660,940	9,877
1020.0	1,661,930	1,662,918	1,663,909	1,664,898	1,665,890	1,666,882	1,667,872	1,668,864	1,669,855	1,670,849	9,912

CAPACITIES OF NEW MELONES LAKE - STANISLAUS RIVER, CALIFORNIA
(CONTINUED)

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFFERENCE
						ACRE-FEET					
1021.0	1,671,842	1,672,834	1,673,829	1,674,821	1,675,816	1,676,812	1,677,806	1,678,802	1,679,796	1,680,793	9,949
1022.0	1,681,791	1,682,786	1,683,784	1,684,780	1,685,779	1,686,778	1,687,775	1,688,775	1,689,773	1,690,774	9,984
1023.0	1,691,775	1,692,774	1,693,775	1,694,775	1,695,777	1,696,780	1,697,781	1,698,784	1,699,786	1,700,790	10,020
1024.0	1,701,795	1,702,797	1,703,802	1,704,806	1,705,812	1,706,818	1,707,822	1,708,830	1,709,835	1,710,842	10,056
1025.0	1,711,851	1,712,857	1,713,866	1,714,872	1,715,882	1,716,892	1,717,900	1,718,910	1,719,919	1,720,931	10,091
1026.0	1,721,942	1,722,952	1,723,964	1,724,975	1,725,988	1,727,002	1,728,013	1,729,027	1,730,040	1,731,055	10,128
1027.0	1,732,070	1,733,083	1,734,099	1,735,113	1,736,130	1,737,147	1,738,162	1,739,180	1,740,196	1,741,215	10,164
1028.0	1,742,234	1,743,250	1,744,270	1,745,288	1,746,308	1,747,329	1,748,348	1,749,369	1,750,388	1,751,411	10,199
1029.0	1,752,433	1,753,454	1,754,477	1,755,498	1,756,522	1,757,547	1,758,569	1,759,594	1,760,617	1,761,643	10,236
1030.0	1,762,669	1,763,693	1,764,720	1,765,745	1,766,772	1,767,800	1,768,826	1,769,855	1,770,881	1,771,911	10,272
1031.0	1,772,941	1,773,968	1,774,999	1,776,027	1,777,058	1,778,090	1,779,119	1,780,152	1,781,182	1,782,215	10,307
1032.0	1,783,248	1,784,279	1,785,314	1,786,346	1,787,380	1,788,416	1,789,449	1,790,485	1,791,518	1,792,555	10,344
1033.0	1,793,592	1,794,627	1,795,665	1,796,700	1,797,739	1,798,778	1,799,814	1,800,854	1,801,891	1,802,931	10,380
1034.0	1,803,972	1,805,010	1,806,052	1,807,091	1,808,133	1,809,176	1,810,216	1,811,259	1,812,300	1,813,344	10,416
1035.0	1,814,388	1,815,430	1,816,475	1,817,518	1,818,564	1,819,610	1,820,654	1,821,700	1,822,745	1,823,792	10,452
1036.0	1,824,840	1,825,886	1,826,935	1,827,981	1,829,030	1,830,080	1,831,128	1,832,178	1,833,226	1,834,277	10,489
1037.0	1,835,329	1,836,378	1,837,430	1,838,480	1,839,533	1,840,587	1,841,638	1,842,692	1,843,744	1,844,798	10,525
1038.0	1,845,854	1,846,906	1,847,962	1,849,016	1,850,073	1,851,129	1,852,184	1,853,242	1,854,297	1,855,356	10,561
1039.0	1,856,415	1,857,471	1,858,531	1,859,588	1,860,648	1,861,709	1,862,767	1,863,828	1,864,887	1,865,949	10,597
1040.0	1,867,012	1,868,072	1,869,135	1,870,196	1,871,260	1,872,324	1,873,386	1,874,451	1,875,514	1,876,579	10,633
1041.0	1,877,645	1,878,709	1,879,776	1,880,841	1,881,908	1,882,976	1,884,042	1,885,110	1,886,176	1,887,246	10,670
1042.0	1,888,315	1,889,383	1,890,453	1,891,522	1,892,593	1,893,664	1,894,733	1,895,806	1,896,876	1,897,949	10,707
1043.0	1,899,022	1,900,093	1,901,167	1,902,239	1,903,314	1,904,389	1,905,462	1,906,538	1,907,611	1,908,688	10,743
1044.0	1,909,765	1,910,840	1,911,917	1,912,993	1,914,071	1,915,150	1,916,227	1,917,306	1,918,383	1,919,464	10,779
1045.0	1,920,544	1,921,623	1,922,704	1,923,783	1,924,865	1,925,948	1,927,028	1,928,111	1,929,192	1,930,276	10,816
1046.0	1,931,360	1,932,442	1,933,527	1,934,610	1,935,696	1,936,782	1,937,866	1,938,953	1,940,037	1,941,125	10,853
1047.0	1,942,213	1,943,298	1,944,387	1,945,474	1,946,563	1,947,653	1,948,740	1,949,831	1,950,919	1,952,010	10,889
1048.0	1,953,102	1,954,191	1,955,284	1,956,374	1,957,467	1,958,560	1,959,651	1,960,746	1,961,838	1,962,932	10,926
1049.0	1,964,038	1,965,121	1,966,217	1,967,311	1,968,407	1,969,504	1,970,599	1,971,697	1,972,793	1,973,891	10,962
1050.0	1,974,990	1,976,087	1,977,187	1,978,284	1,979,385	1,980,485	1,981,584	1,982,685	1,983,785	1,984,887	11,000
1051.0	1,985,990	1,987,090	1,988,193	1,989,295	1,990,399	1,991,503	1,992,605	1,993,711	1,994,814	1,995,920	11,036
1052.0	1,997,026	1,998,130	1,999,237	2,000,342	2,001,450	2,002,558	2,003,664	2,004,773	2,005,879	2,006,989	11,073
1053.0	2,008,099	2,009,207	2,010,317	2,011,426	2,012,537	2,013,649	2,014,759	2,015,872	2,016,982	2,018,095	11,110
1054.0	2,019,209	2,020,320	2,021,435	2,022,547	2,023,662	2,024,778	2,025,891	2,027,007	2,028,121	2,029,239	11,147
1055.0	2,030,356	2,031,471	2,032,589	2,033,705	2,034,824	2,035,943	2,037,060	2,038,180	2,039,298	2,040,419	11,184
1056.0	2,041,540	2,042,659	2,043,781	2,044,900	2,046,023	2,047,146	2,048,267	2,049,391	2,050,512	2,051,636	11,221
1057.0	2,052,761	2,053,884	2,055,010	2,056,133	2,057,259	2,058,386	2,059,510	2,060,638	2,061,783	2,062,891	11,259
1058.0	2,064,020	2,065,146	2,066,275	2,067,402	2,068,532	2,069,663	2,070,791	2,071,922	2,073,051	2,074,183	11,295
1059.0	2,075,315	2,076,445	2,077,579	2,078,709	2,079,843	2,080,977	2,082,109	2,083,244	2,084,377	2,085,512	11,334
1060.0	2,086,649	2,087,782	2,088,919	2,090,054	2,091,191	2,092,329	2,093,465	2,094,603	2,095,740	2,096,879	11,370
1061.0	2,098,019	2,099,156	2,100,297	2,101,435	2,102,577	2,103,718	2,104,858	2,106,000	2,107,140	2,108,283	11,408
1062.0	2,109,427	2,110,568	2,111,712	2,112,854	2,113,999	2,115,145	2,116,288	2,117,434	2,118,578	2,119,725	11,445
1063.0	2,120,872	2,122,017	2,123,165	2,124,311	2,125,460	2,126,609	2,127,756	2,128,906	2,130,054	2,131,204	11,484
1064.0	2,132,256	2,133,504	2,134,656	2,135,806	2,136,958	2,138,111	2,139,262	2,140,416	2,141,567	2,142,722	11,520
1065.0	2,143,876	2,145,029	2,146,185	2,147,338	2,148,494	2,149,651	2,150,805	2,151,963	2,153,118	2,154,276	11,559
1066.0	2,155,435	2,156,591	2,157,751	2,158,908	2,160,068	2,161,229	2,162,387	2,163,548	2,164,707	2,165,869	11,597
1067.0	2,167,032	2,168,192	2,169,355	2,170,516	2,171,680	2,172,844	2,174,006	2,175,171	2,176,334	2,177,500	11,634
1068.0	2,178,666	2,179,830	2,180,997	2,182,162	2,183,330	2,184,498	2,185,664	2,186,833	2,187,999	2,189,169	11,673
1069.0	2,190,339	2,191,507	2,192,678	2,193,846	2,195,018	2,196,190	2,197,359	2,198,532	2,199,703	2,200,876	11,711
1070.0	2,202,050	2,203,222	2,204,396	2,205,569	2,206,744	2,207,920	2,209,093	2,210,270	2,211,444	2,212,622	11,749
1071.0	2,213,799	2,214,975	2,216,153	2,217,329	2,218,509	2,219,688	2,220,866	2,222,046	2,223,224	2,224,405	11,788
1072.0	2,225,587	2,226,766	2,227,949	2,229,129	2,230,312	2,231,495	2,232,677	2,233,861	2,235,043	2,236,228	11,826
1073.0	2,237,413	2,238,596	2,239,783	2,240,966	2,242,154	2,243,341	2,244,526	2,245,714	2,246,900	2,248,089	11,865
1074.0	2,249,278	2,250,465	2,251,655	2,252,843	2,254,034	2,255,225	2,256,414	2,257,606	2,258,796	2,259,989	11,904
1075.0	2,261,182	2,262,373	2,263,567	2,264,758	2,265,953	2,267,148	2,268,341	2,269,537	2,270,731	2,271,927	11,943
1076.0	2,273,125	2,274,319	2,275,517	2,276,713	2,277,911	2,279,111	2,280,307	2,281,507	2,282,704	2,283,905	11,981
1077.0	2,285,106	2,286,305	2,287,507	2,288,706	2,289,909	2,291,112	2,292,312	2,293,516	2,294,717	2,295,922	12,021
1078.0	2,297,127	2,298,330	2,299,535	2,300,739	2,301,945	2,303,152	2,304,357	2,305,564	2,306,770	2,307,978	12,060
1079.0	2,309,187	2,310,394	2,311,603	2,312,811	2,314,021	2,315,232	2,316,441	2,317,652	2,318,861	2,320,074	12,100
1080.0	2,321,287	2,322,497	2,323,711	2,324,922	2,326,137	2,327,352	2,328,564	2,329,780	2,330,993	2,332,209	12,139
1081.0	2,333,426	2,334,640	2,335,858	2,337,073	2,338,292	2,339,511	2,340,727	2,341,947	2,343,164	2,344,384	12,179
1082.0	2,345,605	2,346,823	2,348,045	2,349,264	2,350,487	2,351,710	2,352,930	2,354,154	2,355,375	2,356,599	12,219
1083.0	2,357,824	2,359,046	2,360,272	2,361,495	2,362,722	2,363,948	2,365,173	2,366,400	2,367,626	2,368,854	12,259
1084.0	2,370,083	2,371,309	2,372,539	2,373,766	2,374,997	2,376,228	2,377,456	2,378,688	2,379,917	2,381,149	12,299
1085.0	2,382,382	2,383,613	2,384,846	2,386,077	2,387,312	2,388,547	2,398,779	2,391,015	2,392,248	2,393,485	12,340
1086.0	2,394,722	2,395,956	2,397,194	2,398,429	2,399,668	2,400,907	2,402,143	2,403,383	2,404,620	2,405,861	12,380
1087.0	2,407,102	2,408,341	2,409,583	2,410,822	2,412,065	2,413,308	2,414,548	2,415,972	2,417,033	2,418,278	12,421
1088.0	2,419,523	2,420,766	2,422,012	2,423,255	2,424,502	2,425,749	2,426,994	2,428,242	2,429,487	2,430,736	12,462
1089.0	2,431,985	2,433,232	2,434,482	2,435,730	2,436,981	2,438,232	2,439,481	2,440,733	2,441,982	2,443,235	12,504
1090.0	2,444,489	2,445,739	2,446,994	2,448,245	2,449,500	2,450,756	2,452,009	2,453,265	2,454,519	2,455,776	12,544

CAPACITIES OF NEW MELONES LAKE - STANISLAUS RIVER, CALIFORNIA
(CONTINUED)

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFFERENCE
					ACRE-FEET						
1091.0	2,457,033	2,458,288	2,459,547	2,460,802	2,462,062	2,463,321	2,464,578	2,465,839	2,467,097	2,468,358	12,587
1092.0	2,469,620	2,470,879	2,472,141	2,473,401	2,474,665	2,475,928	2,477,190	2,478,454	2,479,716	2,480,982	12,628
1093.0	2,482,248	2,483,511	2,484,778	2,486,042	2,487,309	2,488,578	2,489,843	2,491,112	2,492,378	2,493,648	12,670
1094.0	2,494,918	2,496,185	2,497,456	2,498,725	2,499,997	2,501,269	2,502,538	2,503,811	2,505,082	2,506,356	12,712
1095.0	2,507,630	2,508,902	2,510,177	2,511,450	2,512,726	2,514,002	2,515,276	2,516,554	2,517,828	2,519,107	12,755
1096.0	2,520,385	2,521,661	2,522,941	2,524,218	2,525,498	2,526,779	2,528,057	2,529,339	2,530,617	2,531,900	12,798
1097.0	2,533,183	2,534,463	2,535,747	2,537,028	2,538,313	2,539,598	2,540,880	2,542,166	2,543,450	2,544,736	12,841
1098.0	2,546,024	2,547,308	2,548,596	2,549,882	2,551,171	2,552,460	2,553,747	2,555,037	2,556,325	2,557,616	12,884
1099.0	2,558,908	2,560,197	2,561,489	2,562,779	2,564,072	2,565,366	2,566,657	2,567,952	2,569,244	2,570,539	12,927
1100.0	2,571,835	2,573,129	2,574,425	2,575,720	2,577,017	2,578,315	2,579,611	2,580,910	2,582,206	2,583,506	12,972
1101.0	2,584,807	2,586,104	2,587,406	2,588,704	2,590,006	2,591,309	2,592,609	2,593,912	2,595,213	2,596,517	13,015
1102.0	2,597,822	2,599,124	2,600,430	2,601,733	2,603,039	2,604,346	2,605,651	2,606,959	2,608,264	2,609,573	13,060
1103.0	2,610,882	2,612,188	2,613,499	2,614,806	2,616,117	2,617,429	2,618,737	2,620,050	2,621,359	2,622,673	13,105
1104.0	2,623,987	2,625,298	2,626,612	2,627,924	2,629,240	2,630,556	2,631,869	2,633,186	2,634,500	2,635,818	13,149
1105.0	2,637,136	2,638,452	2,639,771	2,641,087	2,642,407	2,643,728	2,645,046	2,646,367	2,647,686	2,649,008	13,159
1106.0	2,650,331	2,651,651	2,652,975	2,654,296	2,655,620	2,656,945	2,658,268	2,659,594	2,660,917	2,662,244	13,240
1107.0	2,663,571	2,664,896	2,666,224	2,667,550	2,668,879	2,670,209	2,671,536	2,672,866	2,674,194	2,675,526	13,287
1108.0	2,676,858	2,678,187	2,679,520	2,680,850	2,682,184	2,683,518	2,684,850	2,686,185	2,687,518	2,688,854	13,333
1109.0	2,690,191	2,691,525	2,692,862	2,694,197	2,695,536	2,696,875	2,698,211	2,699,551	2,700,888	2,702,229	13,379
1110.0	2,703,570	2,704,909	2,706,251	2,707,591	2,708,934	2,710,278	2,711,618	2,712,963	2,714,305	2,705,651	13,427
1111.0	2,716,997	2,718,340	2,719,687	2,721,031	2,722,379	2,723,728	2,725,073	2,726,423	2,727,769	2,729,120	13,474
1112.0	2,730,471	2,731,819	2,733,170	2,734,519	2,735,872	2,737,225	2,738,576	2,739,930	2,741,281	2,742,637	13,521
1113.0	2,743,992	2,745,345	2,746,702	2,748,056	2,749,413	2,750,771	2,752,126	2,753,485	2,754,842	2,756,202	13,570
1114.0	2,757,562	2,758,920	2,760,281	2,761,640	2,763,002	2,764,365	2,765,725	2,767,089	2,768,450	2,769,815	13,619
1115.0	2,771,181	2,772,543	2,773,909	2,775,273	2,776,640	2,778,008	2,779,373	2,780,742	2,782,108	2,783,478	13,667
1116.0	2,784,848	2,786,216	2,787,587	2,788,955	2,790,328	2,791,700	2,793,070	2,794,444	2,795,815	2,979,190	13,717
1117.0	2,798,565	2,799,937	2,801,314	2,802,687	2,804,064	2,805,442	2,806,817	2,808,196	2,809,572	2,810,951	13,767
1118.0	2,812,332	2,813,709	2,815,090	2,816,469	2,817,851	2,819,234	2,820,614	2,821,998	2,823,379	2,824,763	13,817
1119.0	2,826,149	2,827,531	2,828,917	2,830,301	2,831,688	2,833,076	2,834,461	2,835,850	2,837,236	2,838,626	13,868

NOTES:

1. Capacities based on topographic maps of reservoir area. (File Numbers ST-1-13-25, ST-1-13-53, and ST-1-13-307)
2. Inactive pool elevation 808.0 feet.
3. Gross pool elevation 1088.0 feet.
4. Top of dam elevation 1135.0 feet.

CAPACITIES OF TULLOCH RESERVOIR, STANISLAUS RIVER, CALIFORNIA

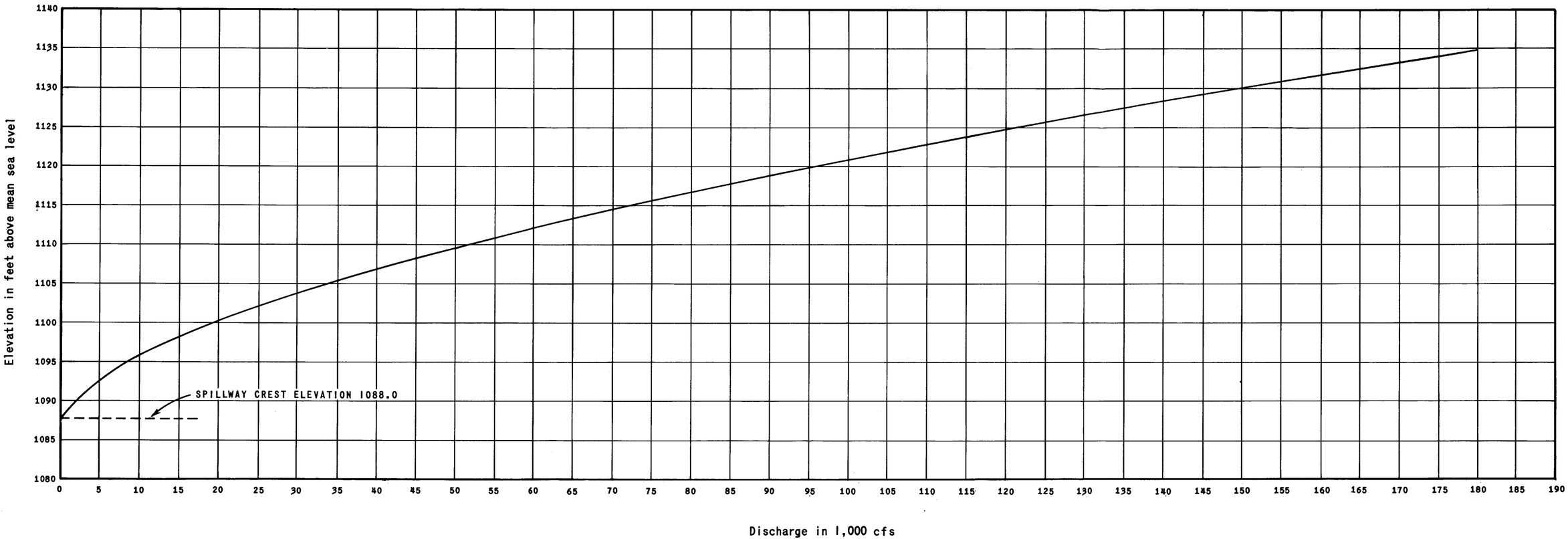
ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFF.
	ACRE-FEET										
431	11,376	11,408	11,440	11,472	11,504	11,536	11,567	11,599	11,631	11,663	319
432	11,695	11,728	11,760	11,792	11,825	11,858	11,890	11,922	11,955	11,988	325
433	12,020	12,053	12,086	12,119	12,152	12,186	12,219	12,252	12,285	12,318	331
434	12,351	12,385	12,418	12,452	12,486	12,520	12,553	12,587	12,621	12,654	337
435	12,688	12,722	12,757	12,791	12,825	12,860	12,894	12,928	12,962	12,997	343
436	13,031	13,066	13,101	13,136	13,171	13,206	13,240	13,275	13,310	13,345	349
437	13,380	13,415	13,451	13,486	13,522	13,557	13,592	13,628	13,663	13,699	354
438	13,734	13,770	13,806	13,842	13,878	13,914	13,949	13,985	14,021	14,057	359
439	14,093	14,130	14,166	14,202	14,239	14,276	14,312	14,348	14,385	14,422	365
440	14,458	14,495	14,532	14,569	14,606	14,644	14,681	14,718	14,754	14,792	371
441	14,829	14,867	14,905	14,943	14,981	15,019	15,057	15,095	15,133	15,171	380
442	15,209	15,247	15,285	15,323	15,361	15,399	15,437	15,475	15,513	15,551	389
443	15,598	15,638	15,677	15,717	15,756	15,796	15,836	15,875	15,915	15,954	396
444	15,994	16,035	16,075	16,116	16,156	16,157	16,238	16,278	16,319	16,359	406
445	16,400	16,441	16,483	16,524	16,565	16,606	16,648	16,689	16,730	16,772	413
446	16,813	16,855	16,897	16,939	16,981	17,024	17,066	17,108	17,150	17,192	421
447	17,234	17,277	17,320	17,363	17,406	17,448	17,491	17,534	17,577	17,620	429
448	17,663	17,707	17,751	17,794	17,838	17,882	17,926	17,970	18,013	18,057	438
449	18,101	18,146	18,190	18,235	18,280	18,324	18,369	18,414	18,459	18,503	447
450	18,548	18,594	18,639	18,684	18,730	18,776	18,821	18,866	18,912	18,958	455
451	19,003	19,050	19,096	19,142	19,189	19,236	19,282	19,328	19,375	19,422	465
452	19,468	19,516	19,563	19,610	19,658	19,706	19,754	19,801	19,849	19,896	476
453	19,944	19,993	20,041	20,090	20,138	20,187	20,236	20,284	20,333	20,381	486
454	20,430	20,480	20,529	20,579	20,628	20,678	20,728	20,777	20,827	20,876	496
455	20,926	20,977	21,027	21,078	21,128	21,179	21,230	21,280	21,331	21,381	506
456	21,432	21,484	21,535	21,587	21,638	21,690	21,742	21,793	21,845	21,896	516
457	21,948	22,001	22,053	22,106	22,158	22,211	22,264	22,316	22,369	22,421	526
458	22,474	22,528	22,581	22,635	22,689	22,742	22,796	22,850	22,904	22,957	537
459	23,011	23,066	23,120	23,175	23,230	23,284	23,339	23,394	23,449	23,503	547
460	23,558	23,614	23,670	23,725	23,781	23,837	23,893	23,949	24,004	24,060	558
461	24,116	24,173	24,230	24,286	24,343	24,400	24,457	24,514	24,570	24,627	568
462	24,684	24,742	24,800	24,858	24,916	24,974	25,031	25,089	25,147	25,205	579
463	25,263	25,322	25,381	25,440	25,499	25,558	25,617	25,676	25,735	25,794	590
464	25,853	25,913	25,973	26,033	26,093	26,153	26,213	26,273	26,333	26,393	600
465	26,453	26,514	26,575	26,637	26,698	26,759	26,820	26,881	26,943	27,004	612
466	27,065	27,127	27,189	27,252	27,314	27,376	27,438	27,500	27,563	27,625	622
467	27,687	27,750	27,814	27,877	27,940	28,004	28,067	28,130	28,193	28,257	633
468	28,320	28,384	28,449	28,513	28,578	28,642	28,706	28,771	28,835	28,900	644
469	28,964	29,029	29,095	29,160	29,226	29,291	29,356	29,422	29,487	29,553	654
470	29,618	29,685	29,751	29,818	29,884	29,951	30,018	30,084	30,151	30,217	666
471	30,284	30,352	30,420	30,487	30,555	30,623	30,691	30,759	30,826	30,894	678
472	30,962	31,031	31,100	31,170	31,239	31,308	31,377	31,446	31,516	31,585	692
473	31,654	31,724	31,795	31,865	31,935	32,009	32,076	32,146	32,216	32,287	703
474	32,357	32,428	32,500	32,571	32,643	32,714	32,786	32,858	32,929	33,001	715

CAPACITIES OF TULLOCH RESERVOIR, STANISLAUS RIVER, CALIFORNIA (CONTINUED)

ELEV FEET	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	DIFF.
						ACRE-FEET					
475	33,072	33,145	33,218	33,290	33,363	33,436	33,509	33,582	33,654	33,727	728
476	33,800	33,874	33,948	34,022	34,096	34,170	34,244	34,318	34,392	34,466	740
477	34,540	34,615	34,690	34,766	34,841	34,916	34,991	35,066	35,142	35,217	752
478	35,292	35,368	35,445	35,522	35,598	35,674	35,751	35,828	35,904	35,980	765
479	36,057	36,135	36,212	36,290	36,367	36,445	36,523	36,600	36,678	36,755	776
480	36,833	36,912	36,991	37,070	37,149	37,228	37,307	37,386	37,465	37,544	790
481	37,623	37,703	37,784	37,864	37,944	38,024	38,105	38,185	38,265	38,346	803
482	38,426	38,508	38,590	38,671	38,753	38,835	38,917	38,999	39,080	39,162	818
483	39,244	39,327	39,410	39,493	39,576	39,659	39,742	39,825	39,908	39,991	830
484	40,074	40,158	40,243	40,327	40,412	40,496	40,580	40,665	40,749	40,834	844
485	40,918	41,004	41,090	41,175	41,261	41,347	41,433	41,519	41,604	41,690	858
486	41,776	41,863	41,950	42,037	42,124	42,211	42,298	42,385	42,472	42,559	870
487	42,646	42,734	42,823	42,912	43,000	43,088	43,177	43,266	43,354	43,442	885
488	43,531	43,621	43,711	43,800	43,890	43,980	44,070	44,160	44,249	44,339	898
489	44,429	44,520	44,611	44,702	44,793	44,884	44,974	45,065	45,156	45,247	909
490	45,338	45,431	45,523	45,616	45,708	45,801	45,894	45,986	46,079	46,171	926
491	46,264	46,358	46,452	46,547	46,641	46,735	46,829	46,923	47,018	47,112	942
492	47,206	47,302	47,397	47,493	47,589	47,684	47,780	47,876	47,972	48,067	957
493	48,163	48,260	48,358	48,455	48,552	48,650	48,747	48,844	48,941	49,039	973
494	49,136	49,235	49,334	49,432	49,531	49,630	49,729	49,828	49,926	50,025	988
495	50,124	50,224	50,325	50,426	50,526	50,627	50,727	50,828	50,928	51,029	1005
496	51,129	51,231	51,333	51,435	51,537	51,639	51,741	51,843	51,945	52,047	1020
497	52,149	52,253	52,356	52,460	52,563	52,667	52,771	52,874	52,978	53,081	1036
498	53,185	53,290	53,395	53,500	53,605	53,710	53,816	53,921	54,026	54,130	1051
499	54,236	54,343	54,449	54,556	54,663	54,770	54,876	54,983	55,090	55,196	1067
500	55,303	55,411	55,520	55,628	55,737	55,845	55,953	56,062	56,170	56,279	1084
501	56,387	56,497	56,608	56,718	56,828	56,938	57,049	57,159	57,269	57,380	1103
502	57,490	57,602	57,714	57,826	57,938	58,050	58,162	58,274	58,386	58,498	1120
503	58,610	58,724	58,838	58,952	59,066	59,180	59,294	59,408	59,522	59,636	1140
504	59,750	59,866	59,981	60,097	60,213	60,328	60,444	60,560	60,676	60,791	1157
505	60,907	61,025	61,142	61,260	61,377	61,495	61,613	61,730	61,848	61,965	1176
506	62,083	62,202	62,322	62,441	62,561	62,680	62,799	62,919	63,038	63,158	1194
507	63,277	63,398	63,519	63,641	63,762	63,883	64,004	64,125	64,247	64,368	1212
508	64,489	64,612	64,735	64,858	64,981	65,104	65,228	65,351	65,474	65,597	1231
509	65,720	65,845	65,970	66,094	66,219	66,344	66,469	66,594	66,718	66,843	1248
510	66,968	67,095	67,221	67,348	67,474	67,601	67,728	67,854	67,982	68,108	1267
511	68,235	68,365	68,495	68,625	68,755	68,885	69,015	69,145	69,275	69,405	1300
512	69,535										

NOTES:

1. Data furnished by Oakdale Irrigation District.
2. Elevations correspond to the Oakdale Irrigation District Stage-Storage Gage with a datum of 1.5 feet above the 1929 mean sea level.



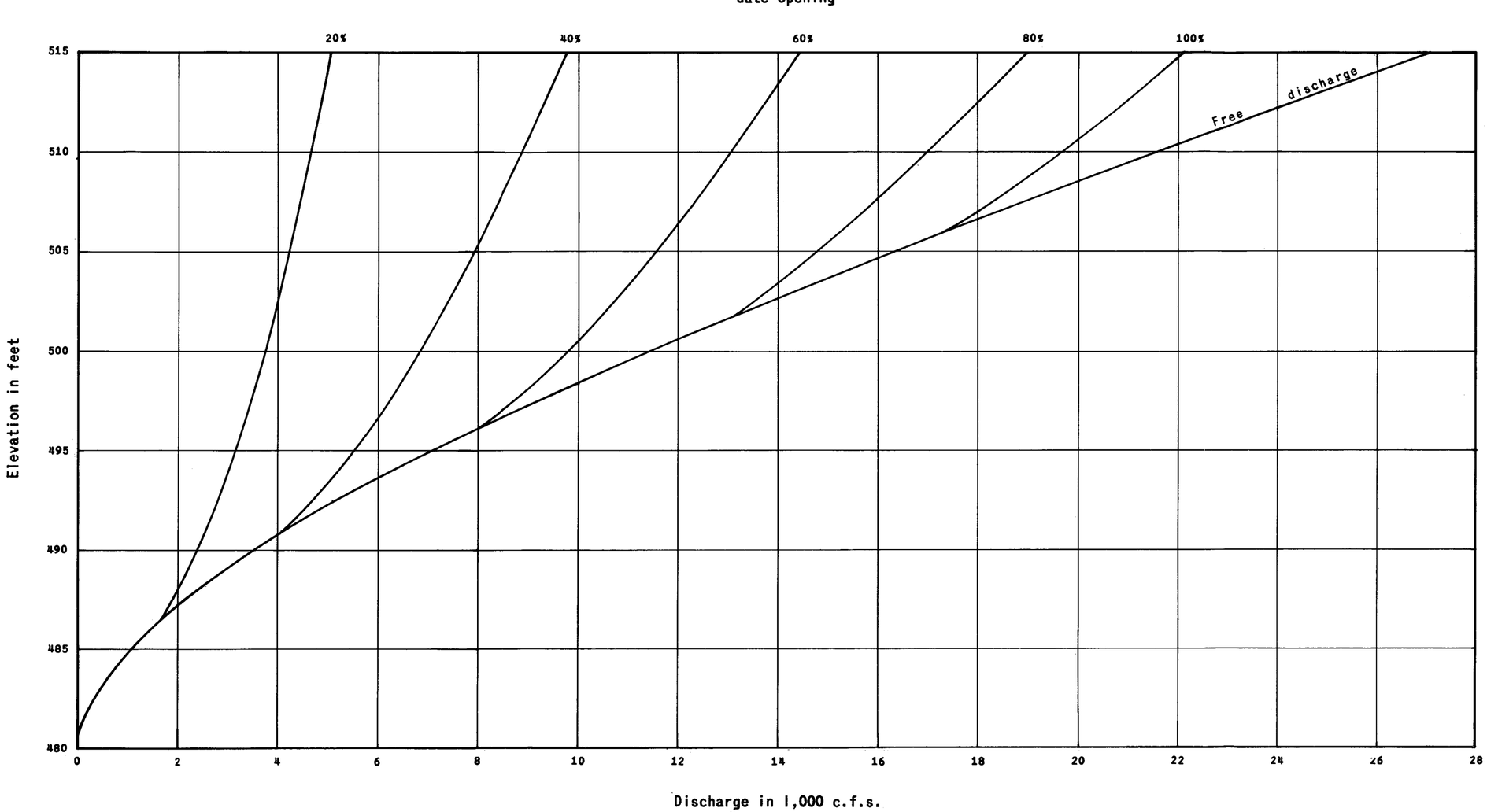
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

SPILLWAY RATING CURVE
NEW MELONES DAM

CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: D.J.H.
Drawn: T.K.B.
Date: OCTOBER 1978

CHART A-5



NOTES:

1. Rating is hypothetical.
2. Elevations correspond to the Oakdale Irrigation District Stage - Storage Gage with a datum of 1.5 feet above the 1929 mean sea level.
3. Rating is for one of seven bays.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

SPILLWAY RATING CURVE
TULLOCH DAM

CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA

Prepared: D.N.V.
Drawn: T.K.B.

Date: October 1978

CHART A-6

NEW MELONES DAM AND LAKE
STANISLAUS RIVER, CALIFORNIA

REPORT ON RESERVOIR REGULATION
FOR FLOOD CONTROL

JANUARY 1980

APPENDIX
PART II
FLOOD CONTROL REGULATIONS

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

absence of any indication that further public comment would shed any new light on the matter, OSHA concludes that no change in the standard is warranted. Accordingly, the ground-fault protection standard at 29 CFR 1910.309(c) and 29 CFR 1926.400(h), as promulgated on December 21, 1976, is hereby reaffirmed.

(Secs. 6(b) and 8(c), Pub. L. 91-596, 84 Stat. 1593, 1599 (29 U.S.C. 655, 657); sec. 107, Pub. L. 91-54, 83 Stat. 96 (40 U.S.C. 333); Secretary of Labor's Order No. 8-76 (41 FR 25059); 29 CFR Part 1911.)

Signed at Washington, D.C., this 3d day of October 1978.

EULA BINGHAM,
Assistant Secretary of Labor.

[FR Doc. 78-28687 Filed 10-12-78; 8:45 am]

[3710-92-M]

Title 33—Navigation and Navigable Waters

CHAPTER II—CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY

[ER 1110-2-241]

PART 208—FLOOD CONTROL REGULATIONS

Use of Storage Allocated for Flood Control and Navigation Purposes

AGENCY: U.S. Army Corps of Engineers, DOD.

ACTION: Final rule.

SUMMARY: This revision of 33 CFR 208.11 regulations prescribes the policy and procedure for regulating reservoir projects capable of regulation for flood control or navigation and the use of storage allocated for such purposes and provided on the basis of flood control and navigation. The revised regulations are applicable to dam and reservoir projects licensed, maintained, and operated under provisions of the Federal Power Act (41 Stat. 1063 (16 U.S.C. 791(A))), Pub. L. 83-436, and other similar authorizing legislation; as well as to reservoir projects constructed wholly or in part with Federal funds as directed by section 7 of the Flood Control Act of 1944. These regulations are intended to establish an understanding between project owners, operating agencies and the Corps of Engineers with regard to certain activities and responsibilities concerning water control management throughout the Nation in the interest of flood control and navigation. Interested persons were given until November 2, 1977 (42 FR 57141) to submit comments. No written comments were received.

DATES: This regulation is effective on October 15, 1978.

ADDRESSES: HQDA (DAEN-CWE-HY) Washington, D.C. 20314.

FOR FURTHER INFORMATION CONTACT:

Mr. Edgar P. Story, Engineering Division, Civil Works Directorate, Office of the Chief of Engineers, Washington, D.C. 20314 202-693-7330.

SUPPLEMENTARY INFORMATION: This final regulation is essentially the same as the proposed rule (42 FR 53637), however, certain reordering has been done of the reference material presented in § 208.11(b). Specifically, excerpts from sections 4(e), 10(a), and 10(c) of the Federal Power Act have been added for improved clarity. Also Federal Power Commission order No. 540 issued October 31, 1975, and published November 7, 1975 (40 FR 51998), amending § 2.9 of the Commission's general policy and interpretations which prescribed standardized conditions (Forms) for inclusion in preliminary permits and licenses issued under part I of the Federal Power Act has been cited and appropriately excerpted. Reference to and citation from article 33 of Federal Power Commission license No. 2009 have been deleted in lieu thereof.

In addition to the proposed action, certain project names and pertinent data are added to and deleted from the list of projects shown in § 208.11(e), list of projects (42 FR 53637). The following projects are added to the list of projects:

(a) U.S. Army Corps of Engineers, Missouri River Division area: Webster Dam and Lake.

(b) U.S. Army Corps of Engineers, New England Division area:

(i) Bear Swamp Pumped Storage Project.

(ii) Turners Falls Reservoir.

(c) U.S. Army Corps of Engineers, North Pacific Division area:

(i) American Falls Dam and Reservoir.

(ii) Anderson Ranch Dam and Reservoir.

(iii) Arrowrock Dam and Reservoir.

(iv) Brownlee Dam and Reservoir.

(v) Grand Coulee Dam and Franklin D. Roosevelt Lake.

(vi) Hells Canyon Dam and Reservoir.

(vii) Kerr Dam and Flathead Lake.

(viii) Mayfield Dam and Reservoir.

(ix) Mossyrock Dam and Davisson Lake.

(x) Oxbow Dam and Reservoir.

(xi) Priest Rapids Dam and Reservoir.

(xii) Ririe Dam and Reservoir.

(xiii) Rocky Reach Dam and Lake Entiat.

(xiv) Ross Dam and Reservoir.

(xv) Upper Baker Dam and Baker Lake.

(xvi) Wanapum Dam and Reservoir.

(xvii) Wells Dam and Lake Pateros.

(d) U.S. Army Corps of Engineers, South Atlantic Division area: Lewis M. Smith Dam and Reservoir.

(e) U.S. Army Corps of Engineers, South Pacific Division area:

(i) Indian Valley Dam and Reservoir.

(ii) Lemon Dam and Reservoir.

(iii) Navajo Dam and Reservoir.

(iv) Paoina Dam and Reservoir.

(v) Vallecito Dam and Reservoir.

The following projects are deleted from the list of projects:

(a) U.S. Army Corps of Engineers, South Altantic Division area: H. Neely Henry Dam and Reservoir.

(b) U.S. Army Corps of Engineers, South Pacific Division area:

(i) Causey Dam and Reservoir.

(ii) Devil Creek Dam and Reservoir.

NOTE.—The Chief of Engineers has determined that this rule does not contain a major proposal requiring preparation of an inflation impact statement under Executive Order 11821 and OMB Circular A-107 (Statutory Authority Pub. L. 90-483).

Dated: October 10, 1978.

CHARLES I. MCGINNIS,
Major General, USA,
Director of Civil Works.

Section 208.11 is revised to read as follows:

§ 208.11 Regulations for use of storage allocated for flood control or navigation and/or project operation at reservoirs subject to prescription of rules and regulations by the Secretary of the Army in the interest of flood control and navigation.

(a) *Purpose.* This regulation prescribes the responsibilities and general procedures for regulating reservoir projects capable of regulation for flood control or navigation and the use of storage allocated for such purposes and provided on the basis of flood control and navigation, except projects owned and operated by the Corps of Engineers; the International Boundary and Water Commission, United States and Mexico; and those under the jurisdiction of the International Joint Commission, United States, and Canada, and the Columbia River Treaty. The intent of this regulation is to establish an understanding between project owners, operating agencies, and the Corps of Engineers.

(b) *Responsibilities.* The basic responsibilities of the Corps of Engineers regarding project operation are set out in the cited authority and described in the following paragraphs:

(1) Section 7 of the Flood Control Act of 1944 (58 Stat. 890, 33 U.S.C. 709) directs the Secretary of the Army to prescribe regulations for flood control and navigation in the following manner:

Hereafter, it shall be the duty of the Secretary of War to prescribe regulations for the use of storage allocated for flood control or navigation at all reservoirs constructed wholly or in part with Federal funds provided on the basis of such purposes, and the operation of any such project shall be in accordance with such regulations: *Provided*, That this section shall not apply to the Tennessee Valley Authority, except that in case of danger from floods on the lower Ohio and Mississippi Rivers the Tennessee Valley Authority is directed to regulate the release of water from the Tennessee River into the Ohio River in accordance with such instructions as may be issued by the War Department.

(2) Federal Energy Regulatory Commission (formerly Federal Power Commission (FPC)) licenses.

(i) Responsibilities of the Secretary of the Army and/or the Chief of Engineers in Federal Energy Regulatory Commission (FERC) licensing actions are set out in the Federal Power Act. Pertinent sections of that Act are cited herein. The Commission may also stipulate, as part of license conditions, that the licensee enter into an agreement with the Department of the Army providing for operation of the project during flood times, in accordance with rules and regulations prescribed by the Secretary of the Army.

(A) Section 4(e) of the Federal Power Act requires approval by the Chief of Engineers and the Secretary of the Army of plans of dams or other structures affecting the navigable capacity of any navigable waters of the United States, prior to issuance of a license by the Commission as follows:

The Commission is hereby authorized and empowered to issue licenses to citizens * * * for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, powerhouses, transmission lines, or other project works necessary or convenient for the development and improvement of navigation and for the development, transmission, and utilization of power across, along, from or in any of the streams or other bodies of water over which Congress has jurisdiction * * * *Provided further*, That no license affecting the navigable capacity of any navigable waters of the United States shall be issued until the plans of the dam or other structures affecting navigation have been approved by the Chief of Engineers and the Secretary of the Army.

(B) Sections 10(a) and 10(c) of the Federal Power Act specify conditions of project licenses including the following:

(1) Section 10(a). That the project adopted * * * shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use of benefit of interstate or foreign commerce, for the improvement and utilization of waterpower development, and for other beneficial public use * * *.

(2) Section 10(c). That the licensee shall * * * so maintain and operate said works as not to impair navigation, and shall conform to such rules and regulations as the Commisssion may from time to time prescribe for the protection of life, health, and property.* * *

(C) Section 18 of the Federal Power Act directs the operation of any navigation facilities built under the provision of that act, be controlled by rules and regulations prescribed by the Secretary of the Army as follows:

The operation of any navigation facilities which may be constructed as part of or in connection with any dam or diversion structure built under the provisions of this Act, whether at the expense of a licensee hereunder or of the United States, shall at all times be controlled by such reasonable rules and regulations in the interest of navigation; including the control of the pool caused by such dam or diversion structure as may be made from time to time by the Secretary of the Army, * * *

(ii) Federal Power Commission order No. 540 issued October 31, 1975, and published November 7,1975 (40 FR 51998), amending section 2.9 of the Commission's general policy and interpretations prescribed standardized conditions (forms) for inclusion in preliminary permits and licenses issued under part I of the Federal Power Act. As an example, article 12 of standard form L-3, titled: "Terms and Conditions of License for Constructed Major Projects Affecting Navigable Waters of the United States," sets out the Commission's interpretation of appropriate sections of the Act, which deal with navigation aspects, and attendant responsibilities of the Secretary of the Army in licensing actions as follows:

The United States specifically retains and safeguards the right to use water in such amount, to be determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operation of the Licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, * * *, and the Licensee shall release water from the project reservoir at such rate * * *, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

(3) Section 9 of Public Law 436, 83d Congress (68 Stat. 303) provides for the development of the Coosa River, Ala. and Ga., and directs the Secretary of the Army to prescribe rules and regulations for project operation in the interest of flood control and navigation as follows:

The operation and maintenance of the dams shall be subject to reasonable rules and regulations of the Secretary of the Army in the interest of flood control and navigation.

NOTE.—This Regulation will also be applicable to dam and reservoir projects operated under provisions of future legislative acts wherein the Secretary of the Army is directed to prescribe rules and regulations in the interest of flood control and navigation. The Chief of Engineers, U.S. Army Corps of Engineers, is designated the duly authorized representative of the Secretary of the Army to exercise the authority set out in the congressional acts. This regulation will normally be implemented by letters of understanding between the Corps of Engineers and project owner and will incorporate the provisions of such letters of understanding prior to the time construction renders the project capable of significant impoundment of water. A water control agreement signed by both parties will follow when deliberate impoundment first begins or at such time as the responsibilities of any corps-owned projects may be transferred to another entity. Promulgation of this regulation for a given project will occur at such time as the name of the project appears in the FEDERAL REGISTER in accordance with the requirements of § 208.11(d)(11). When agreement on a water control plan cannot be reached between the corps and the project owner after coordination with all interested parties, the project name will be entered in the FEDERAL REGISTER and the Corps of Engineers plan will be the officials water control plan until such time as differences can be resolved.

(c) *Scope and terminology.* This regulation applies to Federal authorized flood control and/or navigation storage projects, and to non-Federal projects which require the Secretary of the Army to prescribe regulations as a condition of the license, permit or legislation, during the planning, design and construction phases, and throughout the life of the project. In compliance with the authority cited above, this regulation defines certain activities and responsibilities concerning water control management throughout the Nation in the interest of flood control and navigation. In carrying out the conditions of this regulation, the owner and/or operating agency will comply with applicable provisions of Pub. L. 85-624, the Fish and Wildlife Coordination Act of 1958, and Pub. L. 92-500, the Federal Water Pollution Control Act Amendments of 1972. This regulation does not apply to local flood protection works governed by § 208.10, or to navigation facilities and associated structures which are otherwise covered by part 207 (Navigation Regulations) of title 33 of the code. Small reservoirs, containing less than 12,500 acre-feet of flood control or navigation storage, may be excluded from this regulation and covered under § 208.10, unless specifically required by law or conditions of the license or permit.

(1) The terms "reservoir" and "project" as used herein include all water resource impoundment projects constructed or modified, including natural lakes, that are subject to this regulation.

(2) The term "project owner" refers to the entity responsible for maintenance, physical operation, and safety of the project, and for carrying out the water control plan in the interest of flood control and/or navigation as prescribed by the Corps of Engineers. Special arrangements may be made by the project owner for "operating agencies" to perform these tasks.

(3) The term "letter of understanding" as used herein includes statements which consummate this regulation for any given project and define the general provisions or conditions of the local sponsor, or owner, cooperation agreed to in the authorizing legislative document, and the requirements for compliance with section 7 of the 1944 Flood Control Act, the Federal Power Act or other special congressional act. This information will be specified in the water control plan and manual. The letter of understanding will be signed by a duly authorized representative of the Chief of Engineers and the project owner. A "field working agreement" may be substituted for a letter of understanding, provided that the specified minimum requirements of the latter, as stated above, are met.

(4) The term "water control agreement" refers to a compliation of water control criteria, guidelines, diagrams, release schedules, rule curves and specifications that basically govern the use of reservoir storage space allocated for flood control or navigation and/or release functions of a water control project for these purposes. In general, they indicate controlling or limiting rates of discharge and storage space required for flood control and/or navigation, based on the runoff potential during various seasons of the year.

(5) For the purpose of this regulation, the term "water control plan" is limited to the plan of regulation for a water resources project in the interest of flood control and/or navigation. The water control plan must conform with proposed allocations of storage capacity and downstream conditions or other requirements to meet all functional objectives of the particular project, acting separately or in combination with other projects in a system.

(6) The term "real-time" denotes the processing of current information or data in a sufficiently timely manner to influence a physicial response in the system being monitored and controlled. As used herein the term connotes * * * the analyses for and execution of water control decisions for both minor and major flood events and for navigation, based on prevailing hydrometeorological and other conditions and constraints, to achieve efficient management of water resource systems.

(d) *Procedures.* (1) *Conditions during project formulation.* During the planning and design phases, the project owner should consult with the Corps of Engineers regarding the quantity and value of space to reserve in the reservoir for flood control and/or navigation purposes, and for utilization of the space, and other requirements of the license, permit or conditions of the law. Relevant matters that bear upon flood control and navigation accomplishment include: runoff potential, reservoir discharge capability, downstream channel characteristics, hydrometeorological data collection, flood hazard, flood damage charateristics, real estate acquisition for flowage requirements (fee and easement), and resources required to carry out the water control plan. Advice may also be sought on determination of and regulation for the probable maximum or other design flood under consideration by the project owner to establish the quantity of surcharge storage space, and freeboard elevation of top of dam or embankment for safety of the project.

(2) *Corps of Engineers involvement.* If the project owner is responsible for real-time implemenetation of the water control plan, consultation and assistance will be provided by the Corps of Engineers when appropriate and to the extent possible. During any emergency that affects flood control and/or navigation, the Corps of Engineers may temporarily prescribe regulation of flood control or navigation storage space on a day-to-day (real-time) basis without request of the project owner. Appropriate consideration will be given for other authorized project functions. Upon refusal of the project owner to comply with regulations prescribed by the Corps of Engineers, a letter will be sent to the project owner by the Chief of Engineers or his duly authorized representative describing the reason for the regulations prescribed, events that have transpired, and notification that the project owner is in violation of the Code of Federal Regulations. Should an impasse arise, in that the project owner or the designated operating entity persists in noncompliance with regulations prescribed by the Corps of Engineers, measures may be taken to assure compliance.

(3) *Corps of Engineers implementation of real-time water control decisions.* The Corps of Engineers may prescribe the continuing regulation of flood control storage space for any project subject to this regulation on a day-to-day (real-time) basis. When this is the case, consultation and assistance from the project owner to the extent possible will be expected. Special requests by the project owner, or appropriate operating entity, are preferred before the Corps of Engineers offers advice on real-time regulation during surcharge storage utilization.

(4) *Water control plan and manual.* Prior to project completion, water control managers from the Corps of Engineers will visit the project and the area served by the project to become familiar with the water control facilities, and to insure sound formulation of the water control plan. The formal plan of regulation for flood control and/or navigation, referred to herein as the water control plan, will be developed and documented in a water control manual prepared by the Corps of Engineers. Development of the manual will be coordinated with the project owner to obtain the necessary pertinent information, and to insure compatibility with other project purposes and with surcharge regulation. Major topics in the manual will include: Authorization and description of the project, hydrometeorology, data collection and communication networks, hydrologic forecasting, the water control plan, and water resource management functions, including responsibilities and coordination for water control decisionmaking. Special instructions to the dam tender or reservoir manager on data collection, reporting to higher Federal authority, and on procedures to be followed in the event of a communication outage under emergency conditions, will be prepared as an exhibit in the manual. Other exhibits will include copies of this regulation, letters of understanding consummating this regulation, and the water control agreements. After approval by the Chief of Engineers or his duly authorized representative, the manual will be furnished the project owner.

(5) *Water control agreement.* (i) A water control diagram (graphical) will be prepared by the Corps of Engineers for each project having variable space reservation for flood control and/or navigation during the year; e.g., variable seasonal storage, joint-use space, or other rule curve designation. Reservoir inflow parameters will be included on the diagrams when appropriate. Concise notes will be included on the diagrams prescribing the use of storage space in terms of release schedules, runoff, nondamaging or other controlling flow rates downstream of the damsite, and other major factors as appropriate. A water control release schedule will be prepared in tabular form for projects that do not have variable space reservation for flood control and/or navigation. The water control diagram or release schedule will be signed by a duly authorized representative of the Chief of Engineers, the project owner, and the designated operating agency, and will be used as the basis for carrying out this

regulation. Each diagram or schedule will contain a reference to this regulation.

(ii) When deemed necessary by the Corps of Engineers, information given on the water control diagram or release schedule will be supplemented by appropriate text to assure mutual understanding on certain details or other important aspects of the water control plan not covered in this regulation, on the water control diagram or in the release schedule. This material will include clarification of any aspects that might otherwise result in unsatisfactory project performance in the interest of flood contol and/or navigation. Supplementation of the agreement will be necessary for each project where the Corps of Engineers exercises the discretionary authority to prescribe the flood control regulation on a day-to-day (real-time) basis. The agreement will include delegation of the responsibility. The document should also cite, as appropriate, section 7 of the 1944 Flood Control Act, the Federal Power Act and/or other congressional legislation authorizing construction an/or directing operation of the project.

(iii) All flood control regulations published in the FEDERAL REGISTER under this section (part 208) of the code prior to the date of this publication which are listed in paragraph 208.11(e) are hereby superseded.

(iv) Nothing in this regulation prohibits the promulgation of specific regulations for a project in compliance with the authorizing acts, when agreement on acceptable regulations cannot be reached between the Corps of Engineers and the owner.

(6) *Hydrometeorological instrumentation.* The project owner will provide instrumentation in the vicinity of the damsite and will provide communication equipment necessary to record and transmit hydrometeorological and reservoir data to all appropriate Federal authorities on a real-time basis unless there are extenuating circumstances or are otherwise provided for as a condition of the license or permit. For those projects where the owner retains responsibility for real-time implementation of the water control plan, the owner will also provide or arrange for the measurement and reporting of hydrometeorological parameters required within and adjacent to the watershed and downstream of the damsite, sufficient to regulate the project for flood control and/or navigation in an efficient manner. When data collection stations outside the immediate vicinity of the damsite are required, and funds for installation, observation, and maintenance are not available from other sources, the Corps of Engineers may agree to share the costs for such stations with the project owner. Availability of funds and urgency of data needs are factors which will be considered in reaching decisions on cost sharing.

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

(8) *Notification of the general public.* The Corps of Engineers and other interested Federal and State agencies, and the project owner will jointly sponsor public involvement activities, as appropriate, to fully apprise the general public of the water control plan. Public meetings or other effective means of notification and involvement will be held, with the initial meeting being conducted as early as practicable but not later than the time the project first becomes operational. Notice of the initial public meeting shall be published once a week for 3 consecutive weeks in one or more newspapers of general circulation published in each county covered by the water control plan. Such notice shall also be used when appropriate to inform the public of modifications in the water control plan. If no newspaper is published in a county, the notice shall be published in one or more newspapers of general circulation within that county. For the purposes of this section a newspaper is one qualified to publish public notices under applicable State law. Notice shall be given in the event significant problems are anticipated or experienced that will prevent carrying out the approved water control plan or in the event that an extreme water condition is expected that could produce severe damage to property or loss of life. The means for conveying this information shall be commensurate with the urgency of the situation. The water control manual will be made available for examination by the general public upon request at the appropriate office of the Corps of Engineers, project owner or designated operating agency.

(9) *Other generalized requirements for flood control and navigation.* (i) Storage space in the reservoirs allocated for flood control and navigation purposes shall be kept available for those purposes in accordance with the water control agreement, and the plan of regulation in the water control manual.

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

(iii) Nothing in the plan of regulation for flood control shall be construed to require or allow dangerously rapid changes in magnitudes of releases. Releases will be made in a manner consistent with requirements for protecting the dam and reservoir from major damage during passage of the maximum design flood for the project.

(iv) The project owner shall monitor current reservoir and hydro- meteorological conditions in and adjacent to the watershed and downstream of the damsite, as necessary. This and any other pertinent information shall be reported to the Corps of Engineers on a timely basis, in accordance with standing instructions to the damtender or other means requested by the Corps of Engineers.

(v) In all cases where the project owner retains responsibility for real-time implementation of the water control plan, he shall make current determinations of: Reservoir inflow, flood control storage utilized, and scheduled releases. He shall also determine storage space and releases required to comply with the water control plan prescribed by the Corps of Engineers. The owner shall report this information on a timely basis as requested by the Corps of Engineers.

(vi) The water control plan is subject to temporary modification by the Corps of Engineers if found necessary in time of emergency. Requests for and action on such modifications may be made by the fastest means of communication available. The action taken shall be confirmed in writing the same day to the project owner and shall include justification for the action.

(vii) The project owner may temporarily deviate from the water control plan in the event an immediate short-term departure is deemed necessary for emergency reasons to protect the safety of the dam, or to avoid other serious hazards. Such actions shall be immediately reported by the fastest

means of communication available. Actions shall be confirmed in writing the same day to the Corps of Engineers and shall include justification for the action. Continuation of the deviation will require the express approval of the Chief of Engineers, or his duly authorized representative.

(viii) Advance approval of the Chief of Engineers, or his duly authorized representative, is required prior to any deviation from the plan of regulation prescribed or approved by the Corps of Engineers in the interest of flood control and/or navigation, except in emergency situations provided for in paragraph (d)(9)(vii) of this section. When conditions appear to warrant a prolonged deviation from the approved plan, the project owner and the Corps of Engineers will jointly investigate and evaluate the proposed deviation to insure that the overall integrity of the plan would not be unduly compromised. Approval of prolonged deviations will not be granted unless such investigations and evaluations have been conducted to the extent deemed necessary by the Chief of Engineers, or his designated representatives, to fully substantiate the deviation.

(10) *Revisions.* The water control plan and all associated documents will be revised by the Corps of Engineers, as necessary, to reflect changed conditions that come to bear upon flood control and navigation, e.g., reallocation of reservoir storage space due to sedimentation or transfer of storage space to a neighboring project. Revision of the water control plan, water control agreement, water control diagram, or release schedule requires approval of the Chief of Engineers or his duly authorized representative. Each such revision shall be effective upon the date specified in the approval. The original (signed document) water control agreement shall be kept on file in the Office, Chief of Engineers, Department of the Army, Washington, D.C. Copies of the agreement shall be kept on file and may be obtained from the office of the project owner, or from the office of the appropriate Division Engineer, Corps of Engineers.

(11) *Federal Register.* The following information for each project subject to section 7 of the 1944 Flood Control Act and other applicable congressional acts shall be published in the FEDERAL REGISTER prior to the time the projects becomes operational and prior to any significant impoundment before project completion or * * * at such time as the responsibility for physical operation and maintenance of the Corps of Engineers owned projects is transferred to another entity: (i) Reservoir, dam, and lake names, (ii) stream, county, and State corresponding to the damsite location, (iii) the maximum current storage space in acre-feet to be reserved exclusively for flood control and/or navigation purposes, or any multiple-use space (intermingled) when flood control or navigation is one of the purposes, with corresponding elevations in feet above mean sea level, and area in acres at the upper and lower limits of said space, (iv) the name of the project owner, and (v) congressional legislation authorizing the project for Federal participation.

(e) *List of projects.* The following tables, "Pertinent Project Data—Section 208.11 Regulation," show the pertinent data for projects which are subject to this regulation.

(Sec. 7, Pub. L. 78-534, 58 Stat. 890 (33 U.S.C. 709); the Federal Power Act, 41 Stat. 1063 (16 U.S.C. 791(A)); and Sec. 9, Pub. L. 83-436, 68 Stat. 303.)

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PERTINENT PROJECT DATA - SECTION 208.11 REGULATIONS

PROJECT NAME	STREAM	COUNTY & STATE	EXCLUSIVE FLOOD CONTROL/NAVIGATION STORAGE 1000 ac-ft	EXCLUSIVE FLOOD CONTROL/NAVIGATION ELEV. LIMITS feet m.s.l. UPPER	EXCLUSIVE FLOOD CONTROL/NAVIGATION ELEV. LIMITS feet m.s.l. LOWER	EXCLUSIVE FLOOD CONTROL/NAVIGATION AREA acres UPPER	EXCLUSIVE FLOOD CONTROL/NAVIGATION AREA acres LOWER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION STORAGE 1000 ac-ft	MULTIPLE-USE FLOOD CONTROL/NAVIGATION ELEV. LIMITS feet m.s.l. UPPER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION ELEV. LIMITS feet m.s.l. LOWER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION AREA acres UPPER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION AREA acres LOWER	PROJECT OWNER	AUTH. LEGIS.
Alpine Dam	Keith Creek	Winnebago,IL	0.585	796.0	764.0	51.88	0	-	-	-	-	-	City of Rockford,IL	PWA Proj.
Agency Valley Dam & Res	N. Fork Malheur Riv.	Malheur,OR	-	-	-	-	-	60.0	3340.0	3263.21	1,900	0	Bureau of Reclamation	PL 68-292
American Falls Dam & Reservoir	Snake River	Power,ID	-	-	-	-	-	1,700	4343.2	4295.6	56,100	0	Bureau of Reclamation	FPC NO. 2259
Anderson Ranch Dam & Reservoir	S.Fk. Boise River	Elmore,ID	-	-	-	-	-	423.2	4196.0	4043.0	4,740	1,150	Bureau of Reclamation	Rec. Proj. Act of 1939 (53 Stat. 1187)
Arrowrock Dam & Reservoir	Boise River	Elmore,ID	-	-	-	-	-	286.6	3216.0	2967.0	3,100	200	Bureau of Reclamation	Rec.Act of 17 Jun 1902 (32 Stat. 388)
Bear Creek Dam	Bear Creek	Marion & Ralls, MO	8.7	546.5	520.0	540	0	-	-	-	-	-	City of Hannibal,MO	PL 83-780
Bear Swamp Pumped Storage Proj.	Trib. of Deerfield River	Franklin, MA	-	-	-	-	-	(No specific FC/Nav. Storage Allocation)					New Eng Power CO.	Fed. Power Act.
Big Dry Creek and Diversion	Big Dry Creek and Dog Creek	Fresno,CA	16.25	425.0	393.0	1,530	0	-	-	-	-	-	Reclamation Board CA	PL 77-228
Bonny Dam & Reservoir	S. Fork Republican River	Yuma, CO	128.8	3710.0	3672.0	5,036	2,042	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Boysen Dam & Reservoir	Wind River	Fremont, WY	146.0	4732.0	4725.0	22,100	19,560	146.1	4725.0	4717.0	19,560	16,955	Bureau of Reclamation	PL 78-534
Brownlee Dam & Reservoir	Snake River	Baker,OR; Washington,ID	-	-	-	-	-	980.3	2077.0	1976.0	13,840	6,650	Idaho Power Company	FPC No. 1971-C
Bully Creek Dam & Reservoir	Bully Creek	Malheur,OR	-	-	-	-	-	31.65	2523.0	2456.8	1,082	140	Bureau of Reclamation	PL 86-248
Camanche Dam & Reservoir	Mokelumne River	San Joaquin, CA	-	-	-	-	-	200.0	235.5	205.1	7,600	5,507	East Bay Mun Util Dist. Oakland,CA	PL 86-645
Canyon Ferry Dam & Lake	Missouri Riv.	Lewis & Clark, MT	104.3	3800.0	3797.0	35,181	34,435	799.1	3797.0	3770.0	34,435	24,126	Bureau of Reclamation	PL 78-534

PERTINENT PROJECT DATA - SECTION 208.11 REGULATIONS

PROJECT NAME	STREAM	COUNTY & STATE	EXCLUSIVE					MULTIPLE-USE					PROJECT OWNER	AUTH. LEGIS.
			FLOOD CONTROL/NAVIGATION					FLOOD CONTROL/NAVIGATION						
			STORAGE	ELEV. LIMITS		AREA		STORAGE	ELEV. LIMITS		AREA			
			1000 ac-ft	feet m.s.l. UPPER	LOWER	acres UPPER	LOWER	1000 ac-ft	feet m.s.l. UPPER	LOWER	acres UPPER	LOWER		
Cedar Bluff Dam & Reservoir	Smoky Hill River	Trego, KS	191.9	2166.0	2144.0	10,790	6,869	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Clark Canyon Dam & Reservoir	Beaverhead River	Beaverhead, MT	79.1	5560.4	5546.1	5,903	5,160	50.4	5546.1	5535.7	5,160	4,496	Bureau of Reclamation	PL 78-534
Del Valle Dam & Reservoir	Alameda Creek	Alameda,CA	37.0	745.0	703.1	1,060	710	1.0	703.1	702.2	710	700	CA Dept of Water Resources	PL 87-874
East Canyon Dam & Reservoir	East Canyon Creek	Morgan, UT	-	-	-	-	-	48.0	5705.5	5577.0	684	127	Bureau of Reclamation	PL 81-273
Echo Dam and Reservoir	Weber River	Summit, UT	-	-	-	-	-	74.0	5560.0	5450.0	1,455	0	Bureau of Reclamation	PL 81-273
Emigrant Dam & Reservoir	Emigrant Creek	Jackson, OR	39.0	2241.0	2131.5	801	80	-	-	-	-	-	Bureau of Reclamation	PL 83-606
Enders Dam & Reservoir	Frenchman Creek	Chase, NB	30.0	3127.0	3112.3	2,405	1,707	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Folsom Dam & Lake	American River	Sacramento,CA	-	-	-	-	-	400.0	466.0	427.0	11,450	9,040	Bureau of Reclamation	PL 81-356
Friant Dam & Reservoir (Millerton Lake)	San Joaquin River	Fresno, CA	-	-	-	-	-	390.0	578.0	466.3	4,850	2,101	Bureau of Reclamation	PL 75-39 & PL 76-868
Gaston-Roanoke Rapids Dam & Reservoir	Roanoke River	Northampton & Halifax,NC	63.0	203.0	200.0	22,500	20,300	-	-	-	-	-	VA Electric & Power Co.	Fed Power Act
Glen Elder Dam & Waconda Lake	Solomon River	Mitchell, KS	722.3	1488.3	1455.6	3[illegible],682	12,602	-	-	-	-	-	Bureau of Reclamation	PL 78-534 & PL 79-526
Glendo Dam & Reservoir	N. Platte River	Platte,WY	271.9	4653.0	4635.0	17,986	12,365	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Grand Coulee Dam, Franklin D. Roosevelt Lake	Columbia River	Grant & Okanogan,WA	-	-	-	-	-	5185.45	1290.0	1208.0	82,280	45,592	Bureau of Reclamation	PL 89-561 3rd Powerhouse
Heart Butte Dam & Lake Tschida	Heart River	Grant,ND	150.0	2094.5	2064.5	6,625	3,400	-	-	-	-	-	Bureau of Reclamation	PL 78-534

PERTINENT PROJECT DATA - SECTION 208.11 REGULATIONS

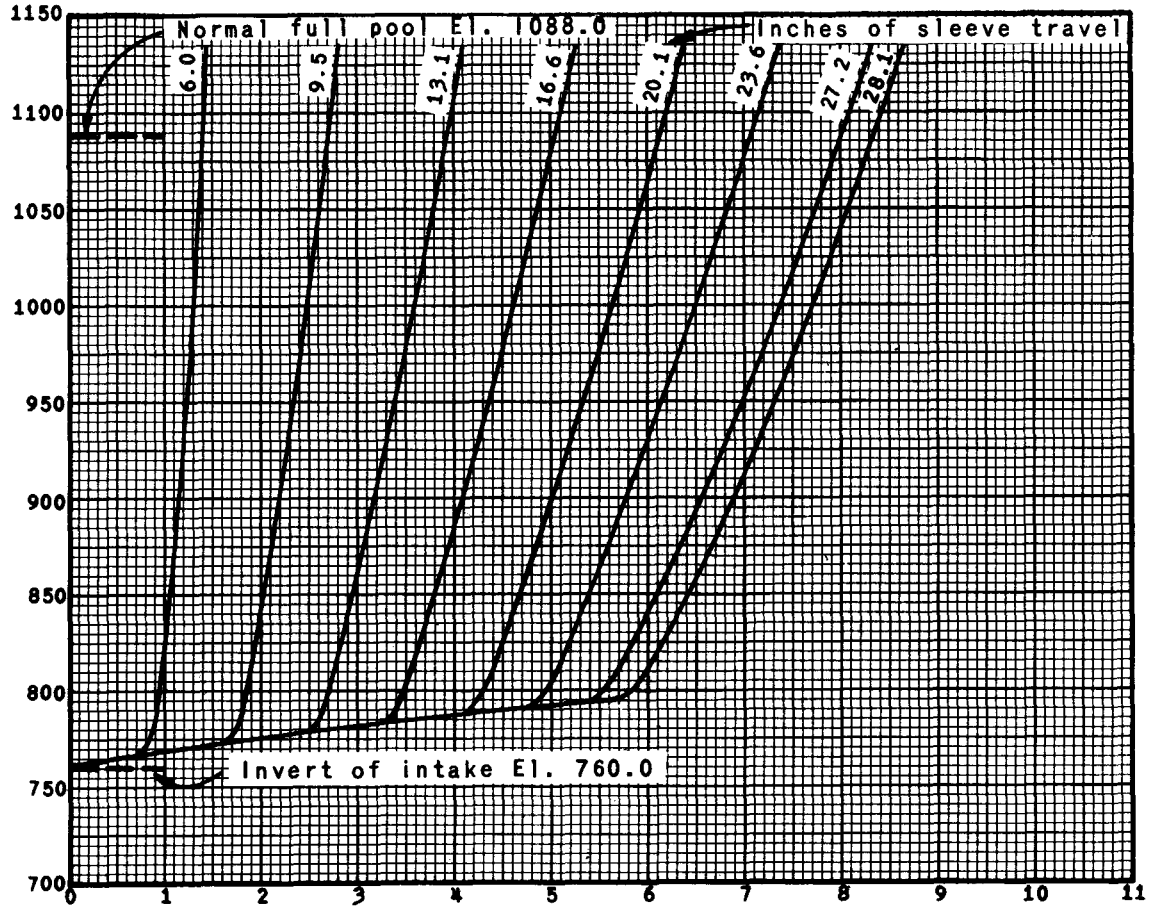
PROJECT NAME	STREAM	COUNTY & STATE	EXCLUSIVE FLOOD CONTROL/NAVIGATION STORAGE 1000 ac-ft	EXCLUSIVE FLOOD CONTROL/NAVIGATION ELEV. LIMITS feet m.s.l. UPPER	EXCLUSIVE FLOOD CONTROL/NAVIGATION ELEV. LIMITS feet m.s.l. LOWER	EXCLUSIVE FLOOD CONTROL/NAVIGATION AREA acres UPPER	EXCLUSIVE FLOOD CONTROL/NAVIGATION AREA acres LOWER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION STORAGE 1000 ac-ft	MULTIPLE-USE FLOOD CONTROL/NAVIGATION ELEV. LIMITS feet m.s.l. UPPER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION ELEV. LIMITS feet m.s.l. LOWER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION AREA acres UPPER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION AREA acres LOWER	PROJECT OWNER	AUTH. LEGIS.
Hells Canyon Dam & Reservoir	Snake River	Wallowa, OR; Adams, ID	-	-	-	-	-	11.7	1688.0	1683.0	2,380	2,280	Idaho Power Company	FPC No. 1971-A
Hoover Dam & Lake Mead	Colorado River	Clark NV & Mohave, AZ	1500.0	1229.0	1219.6	162,700	156,500	15.853	1219.6	1083.0	156,500	83,500	Bureau of Reclamation	PL 70-642
Hungry Horse Dam & Reservoir	S. Fork Flathead Riv.	Flathead, MT	2982.0	3560.0	3336.0	23,800	5,400	-	-	-	-	-	Bureau of Reclamation	PL 78-329
Indian Valley Dam&Reservoir	N.Fork Cache Creek	Lake, CA	-	-	-	-	-	40.0	1485.0	1474.7	3,975	3,749	Yolo Cty Fl. Cont&WtrCons Dist.	PL 84-984
Jamestown Dam & Reservoir	James River	Stutsman, ND	185.4	1454.0	1432.67	13,206	2,555	6.6	1432.67	1429.8	2,555	2,085	Bureau of Reclamation	PL 78-534
Kerr Dam Flathead Lake	Flathead River	Lake, MT	-	-	-	-	-	1219.0	2893.0	2883.0	125,560	120,000	Montana Power Co.	FPC No. 5
Keyhole Dam & Reservoir	Belle Fourche	Crook, WY	140.2	4211.5	4099.3	13,686	9,394	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Kirwin Dam & Reservoir	N. Fork Solomon River	Phillips, KS	215.1	1757.3	1729.25	10,640	5,073	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Lemon Dam & Reservoir	Florida River	La Plata, Colorado	-	-	-	-	-	39.0	8148	8023	622	62	Bureau of Reclamation	PL 84-485
Lewis M. Smith Dam & Reservoir	Sipsey Fork Black Warrior Riv.	Cullman & Walker, AL	280.6	522.0	510.0	25,700	21,200	-	-	-	-	-	Alabama Power Co.	Fed. Power Act
Little Wood River Dam & Reservoir	Little Wood River	Blain, ID	30.0	5237.3	5127.8	574	0	-	-	-	-	-	Bureau of Reclamation	PL 84-993
Logan Martin Dam & Reservoir	Coosa River	Talladega, AL	245.3	477.0	465.0	26,310	15,260	-	-	-	-	-	Alabama Power Co.	PL 83-436
Los Banos Dam & Detention Res.	Los Banos Creek	Merced, CA	-	-	-	-	-	14.0	353.5	327.8	619	467	Bureau of Reclamation	PL 86-488
Lost Creek Dam & Res.	Lost Creek	Morgan, UT	-	-	-	-	-	20.0	6005.0	5912.0	365	93	Bureau of Reclamation	PL 81-273
Lovewell Dam & Reservoir	White Rock Creek	Jewell, KS	50.5	1595.3	1582.6	5,025	2,986	-	-	-	-	-	Bureau of Reclamation	PL 78-534

PERTINENT PROJECT DATA - SECTION 208.11 REGULATIONS

PROJECT NAME	STREAM	COUNTY & STATE	EXCLUSIVE FLOOD CONTROL/NAVIGATION STORAGE 1000 ac-ft	ELEV. LIMITS feet m.s.l. UPPER	ELEV. LIMITS feet m.s.l. LOWER	AREA acres UPPER	AREA acres LOWER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION STORAGE 1000 ac-ft	ELEV. LIMITS feet m.s.l. UPPER	ELEV. LIMITS feet m.s.l. LOWER	AREA acres UPPER	AREA acres LOWER	PROJECT OWNER	AUTH. LEGIS.
Markham Ferry Dam & Lake Wash E. Hudson	Grand (Neosho) River	Mayes, OK	244.2	636.0	619.0	18,000	10,900	-	-	-	-	-	Grand River Dam Authority	PL 76-476
Mayfield Dam & Reservoir	Cowlitz River	Lewis, WA	-	-	-	-	-	21.4	425.0	415.0	2,070	1,825	City of Tacoma	FPC No. 2016-A
Medicine Creek Dam & Harry Strunk Lake	Medicine Creek	Frontier, NB	52.2	2386.2	2366.1	3,465	1,850	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Mossyrock Dam Davisson Lake	Cowlitz River	Lewis, WA	-	-	-	-	-	1397.0	778.5	621.5	11,800	5,000	City of Tacoma	FPC No. 2016-B
Navajo Dam Reservoir	San Juan River	Rio Arriba & San Juan, NM	-	-	-	-	-	1036.1	6085	5990	15,610	7,400	Bureau of Reclamation	PL 84-485
New Exchequer Dam & Lake McClure	Merced River	Tuolomne, CA	-	-	-	-	-	400.0	867.0	799.7	7,110	4,849	Merced Irrig. District	PL 86-645
Norton Dam & Reservoir	Prairie Dog Creek	Norton, KS	98.8	2331.4	2304.3	5,316	2,181	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Ochoco Dam & Reservoir	Ochoco Creek	Crook, OR	51.4	3136.2	3048.1	1,150	120	-	-	-	-	-	Bureau of Reclamation	PL 84-992
Oroville Dam & Lake	Feather River	Butte, CA	-	-	-	-	-	750.0	900.0	848.5	15,800	13,346	CA Dept of Wtr Resources	PL 85-500
Oxbow Dam & Reservoir	Snake River	Baker, OR; Adams, ID	-	-	-	-	-	5.0	1805.0	1800.0	1,165	1,115	Idaho Power Company	FPC No. 1971-B
Pactola Dam & Reservoir	Rapid Creek	Pennington, SD	43.0	4621.5	4580.2	1,232	860	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Palisades Dam & Reservoir	Snake River	Bonneville, ID	1202.0	5620.0	5452.43	16,100	2,170	-	-	-	-	-	Bureau of Reclamation	PL 81-864
Paonia Dam & Reservoir	Muddy Creek	Gunnison, Colorado	-	-	-	-	-	17.0	6447.5	6373.0	334	120	Bureau of Reclamation	PL 80-117 PL 84-485
Pineview Dam & Reservoir	Odgen River	Weber, UT	-	-	-	-	-	110.0	4900.0	4818.0	2,874	0	Bureau of Reclamation	PL 81-273
Platora Dam & Reservoir	Conejos River	Conejos, CO	6.0	10034.0	10027.5	947	920	540.0	10027.5	994.5	920	0	Bureau of Reclamation	PL 76-640
Priest Rapids Dam & Reservoir	Columbia River	Grant, WA	-	-	-	-	-	44.0	488.0	481.5	7,100	6,500	Grant County PUD No. 2	FPC No. 2114-A
Prineville Dam & Reservoir	Crooked Creek	Crook, OR	153.0	3234.8	3112.0	2,990	120	-	-	-	-	-	Bureau of Reclamation	PL 84-992

PERTINENT PROJECT DATA - SECTION 208.11 REGULATIONS

PROJECT NAME	STREAM	COUNTY & STATE	EXCLUSIVE FLOOD CONTROL/NAVIGATION STORAGE 1000 ac-ft	ELEV. LIMITS feet m.s.l. UPPER	ELEV. LIMITS feet m.s.l. LOWER	AREA acres UPPER	AREA acres LOWER	MULTIPLE-USE FLOOD CONTROL/NAVIGATION STORAGE 1000 ac-ft	ELEV. LIMITS feet m.s.l. UPPER	ELEV. LIMITS feet m.s.l. LOWER	AREA acres UPPER	AREA acres LOWER	PROJECT OWNER	AUTH. LEGIS.
Prosser Creek & Reservoir	Prosser Creek	Nevada, CA	-	-	-	-	-	20.0	5741.2	5703.7	745	334	Bureau of Reclamation	PL 84-858
Red Willow Dam & Hugh Butler Lake	Red Willow Creek	Frontier, NB	48.9	2604.9	2581.8	2,682	1,629	-	-	-	-	-	Bureau of Reclamation	PL 78-534 &PL 85-783
Ririe Dam & Reservoir	Willow Creek Snake River	Bonneville,ID	-	-	-	-	-	90.0	5119.0	5023.0	1,560	360	Bureau of Reclamation	PL 87-874
Rocky Reach Dam Lake Entiat	Columbia River	Chelan, WA	-	-	-	-	-	37.0	707.0	703.0	9,600	0	Chelan Cnty PUD No. 1	FPC No. 2145
Ross Dam & Reservoir	Skagit River	Whatcom, WA	-	-	-	-	-	530.5	1602.5	1475.0	6,000	2,168	City of Seattle	FPC No. 553-C
Savage River Dam & Res.	Savage River	Garrett, MD	-	-	-	-	-	16.028	1468.5	1400.0	366	127	Upper Potomac Riv Commission	PL 79-526
Shadehill Dam & Reservoir	Grand River	Perkins, SD	217.7	2302.0	2272.0	9,900	4,800	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Shasta Dam & Lake	Sacramento River	Shasta, CA	-	-	-	-	-	1300.0	1067.0	1018.6	29,570	23,894	Bureau of Reclamation	PL 75-392 &PL 76-868
Smith Mtn & Leesville Dam & Res.	Roanoke River	Bedford, Campbell & Pittsylvania,VA	-	-	-	-	-	(No Specific FC/Nav. Storage Allocation)					Appalacian Power Co.	Fed.Power Act
Trenton Dam & Reservoir	Republican River	Hitchcock,NB	133.8	2773.0	2752.0	7,975	4,974	-	-	-	-	-	Bureau of Reclamation	PL 78-534
Turner Falls Res (Includes Northfield Mtn Pumped Storage Project)	Connecticut River (Briggs Brook)	Franklin, MA	-	-	-	-	-	(No Specific FC/Nav. Storage Allocation)					Northeast Utilities Service Co. Hartford, CT	Fed. Power Act
Twitchell Dam & Reservoir	Cuyama River	Santa Barbara, CA	89.0	651.5	623.0	3,690	2,650	-	-	-	-	-	Bureau of Reclamation	PL 83-774
Upper Baker Dam Baker Lake	Baker River	Whatcom, WA	-	-	-	-	-	220.63	724.0	655.0	4,890	0	Puget Sound Power & Light Co.	Sec. 201 PL 89-298 FPC No. - 2150-B



NOTES:

1. [redacted].
2. Ratings are based on model valves and theoretical maximum conduit losses.
3. Sleeve travel is limited to 28.1 inches to avoid excessive vibration.
4. During initial reservoir operations, remote operation of these valves is limited to a 25.0 inch opening until safe operation has been verified by manual operation over a range of reservoir pool elevations.

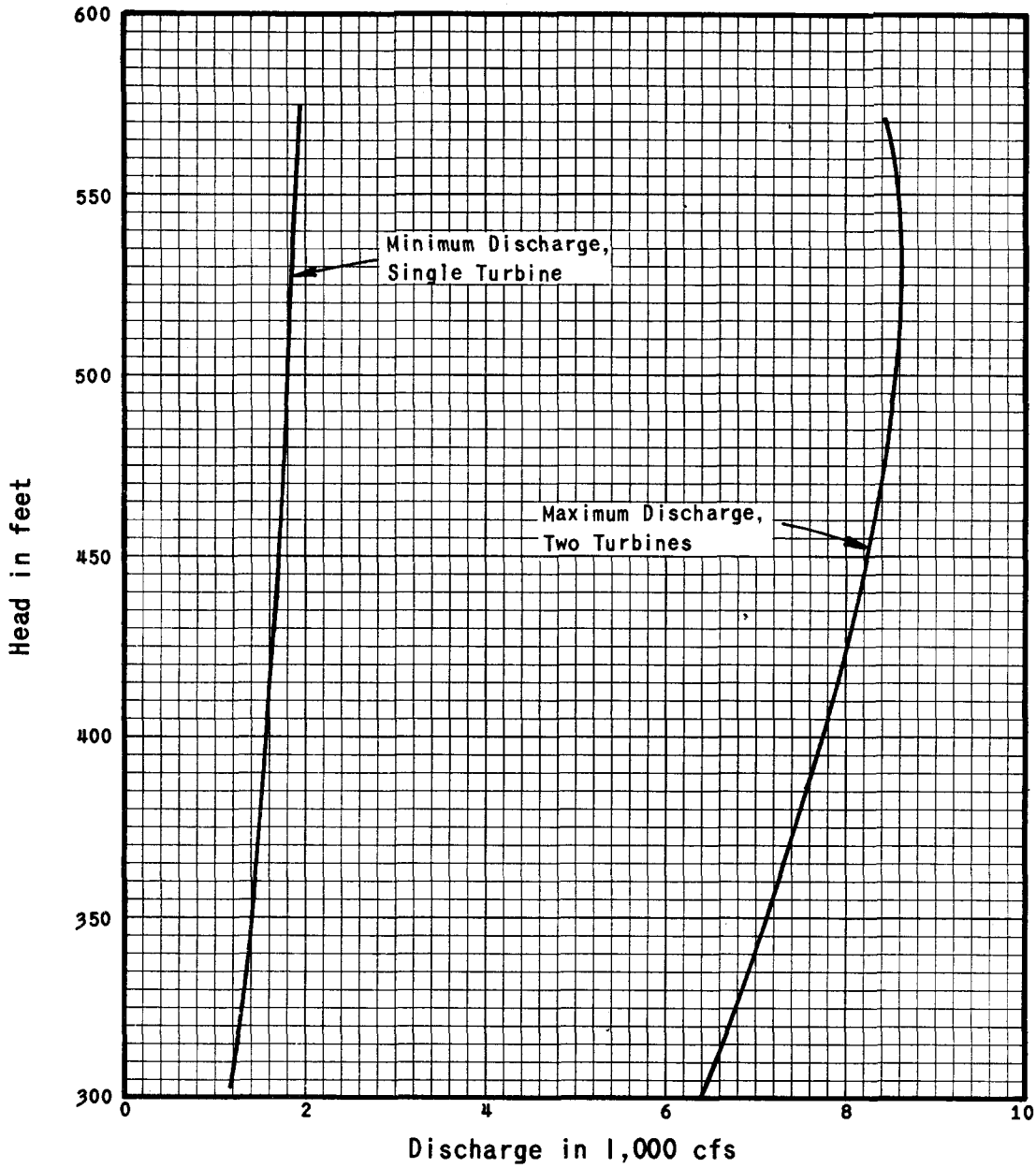
NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

FLOOD CONTROL AND IRRIGATION OUTLET RATING CURVE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.J.H.
Drawn: T.K.B.
Date: AUGUST 1979

CHART A-7



NOTES:

1. Rating is hypothetical and is based on cavitation limits.
2. Power releases would not be made when storage is above gross pool due to danger of overtopping surge tank.
3. See Chart A-9 for tailwater rating curves.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

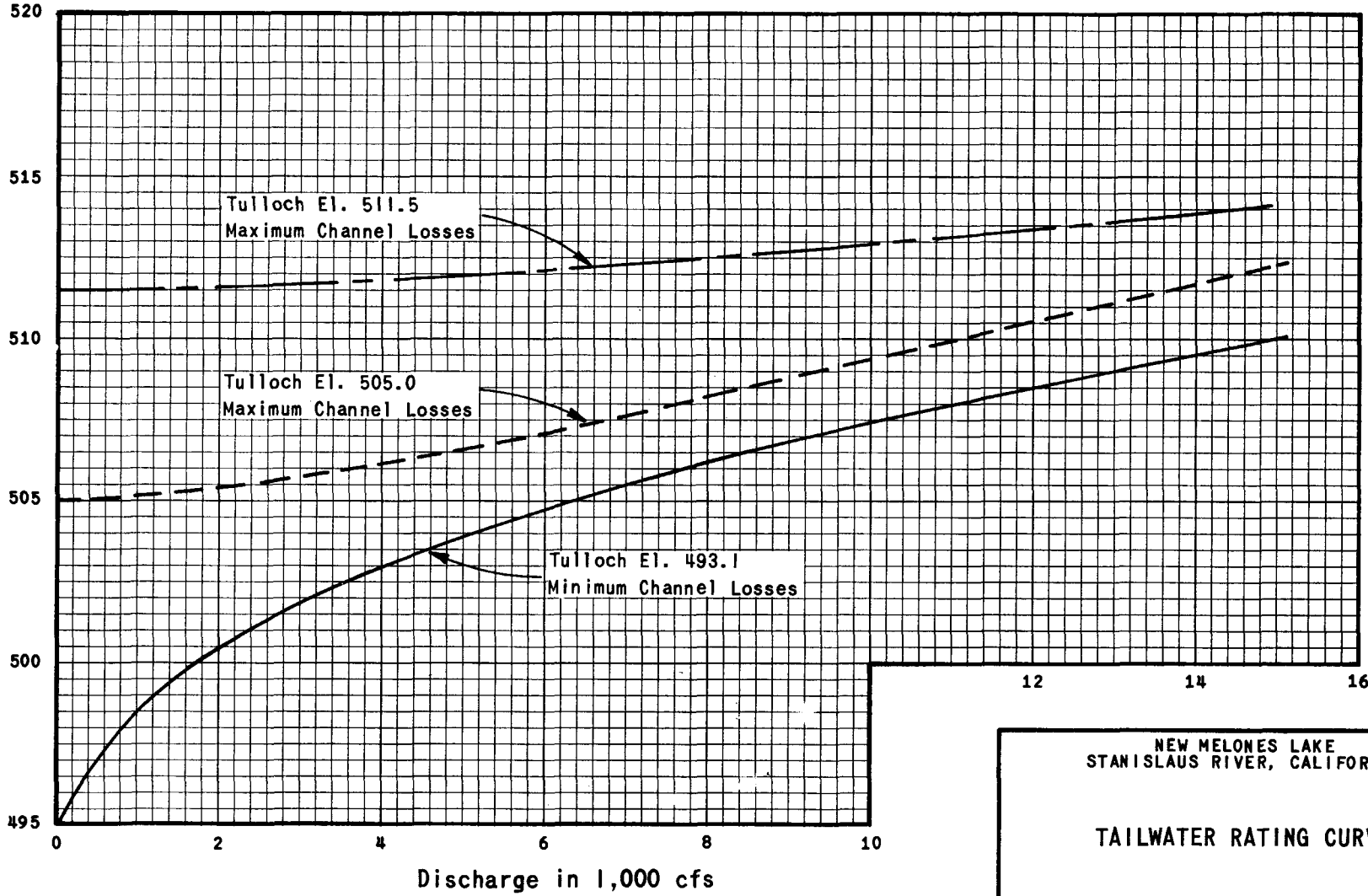
MINIMUM AND MAXIMUM TURBINE RATING CURVES

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.J.H.
Drawn: T.K.B.

Date: OCTOBER 1978

CHART A-8



NOTE:

Rating is hypothetical, based on backwater analysis of project design channel configuration.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

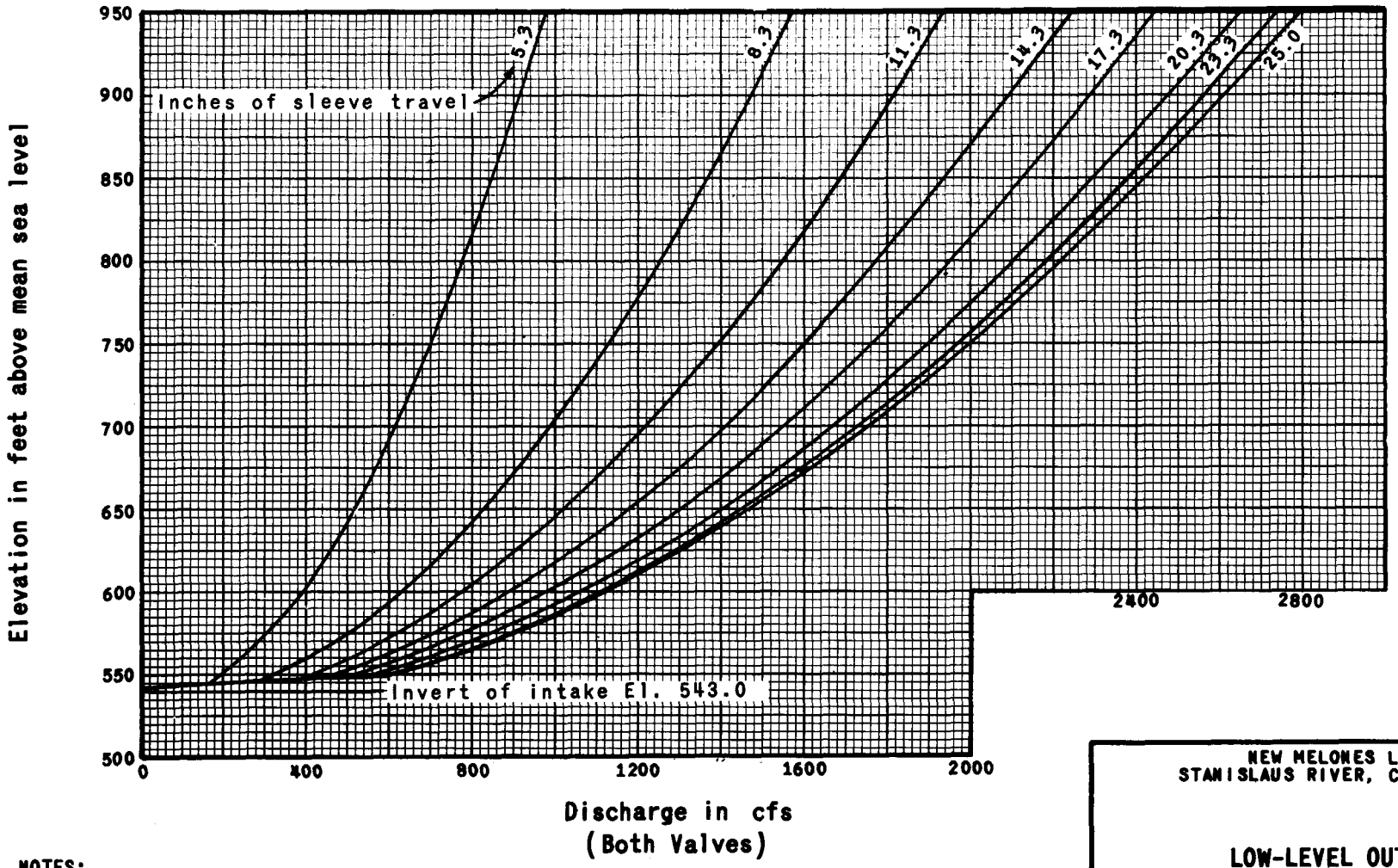
TAILWATER RATING CURVE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.J.H.
Drawn: T.K.B.

Date: OCTOBER 1978

CHART A-9



NOTES:

1. Valves are 66-inch diameter fixed cone type.
2. Ratings are based on model valves and theoretical maximum conduit losses.
3. Sleeve travel is limited to 25.0 inches to avoid excessive vibration.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

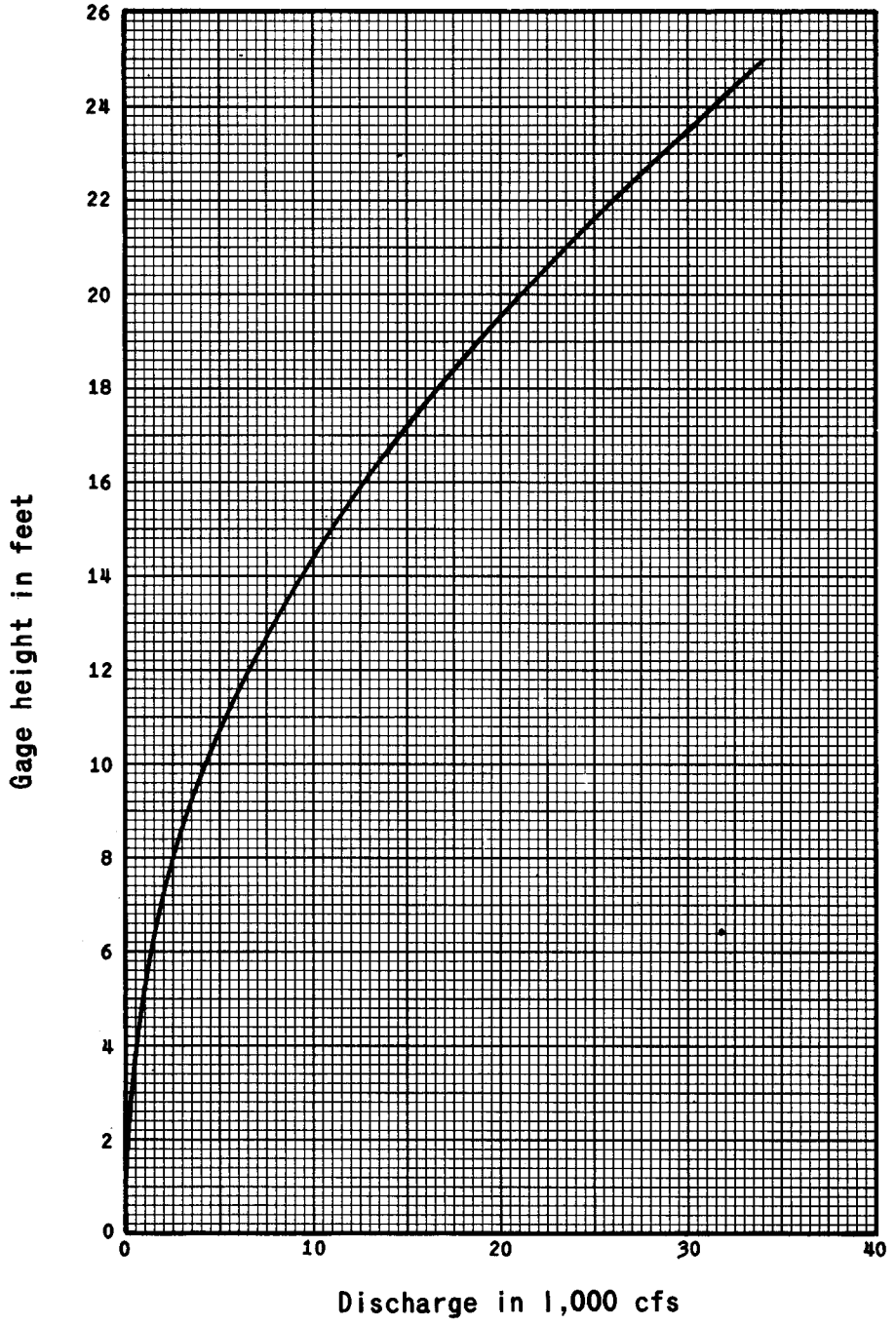
LOW-LEVEL OUTLET RATING CURVE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.J.H.
Drawn: T.G.K.

Date: NOVEMBER 1979

CHART A-10



NOTE: Zero gage ht. = 117.20 ft msl

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

DISCHARGE RATING CURVE

STANISLAUS RIVER AT
ORANGE BLOSSOM BRIDGE

CORPS OF ENGINEERS, SACRAMENTO, CALIFORNIA

Prepared: D.N.V.
Drawn: T.K.B.
Date: OCTOBER 1978

CHART A - 11

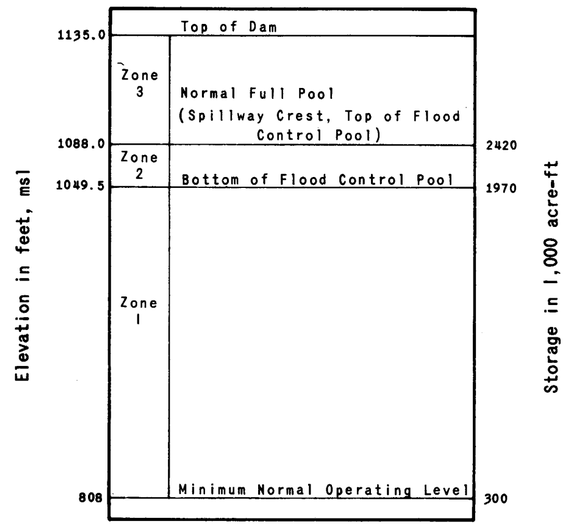


FIGURE A

BASIC FLOOD CONTROL OPERATION PROCEDURES *

ZONE	REQUIRED ACTION
1	Normal power and conservation operation.
2	Follow operation procedure in Figure B, Flood Control Operation and Utilization of Flood Space. Notify Sacramento District personnel.
3	Initiate emergency operation and notify local authorities for possible evacuation of flood plain. The Flood Control and Irrigation Outlet will be operated to maintain the objective flow (8,000 cfs at Orange Blossom Bridge) as long as possible by gradually closing the outlets as pool rises above normal full pool elevation (1088.0 feet). For a receding pool, outlets will remain closed until objective flow has been obtained. The outlets will then be opened to maintain a total flow of 8,000 cfs at Orange Blossom Bridge. When the water surface has receded to normal full pool elevation resume flood control operation as in Zone 2. Notify Sacramento District personnel and request assistance if desired.

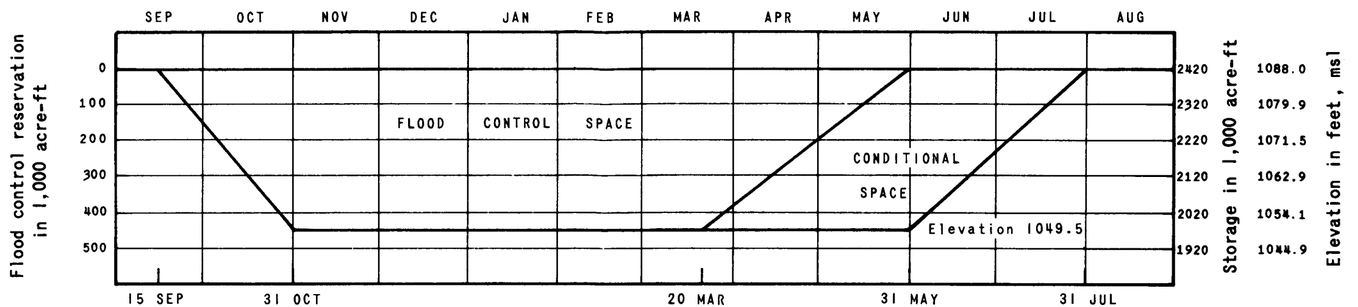


FIGURE B

FLOOD CONTROL OPERATION AND UTILIZATION OF FLOOD CONTROL SPACE *

1. Whenever water is stored in the Flood Control Space it shall be released as rapidly as possible without causing flows in the Stanislaus River at Orange Blossom Bridge to exceed 8,000 cfs insofar as possible.

2. Whenever water is stored in the Conditional Flood Control Space releases shall be made at a sufficient rate, based on anticipated snowmelt runoff, so that the pool elevation will not exceed 1088 feet subject to the limitations in paragraph 1 above.

* Control of Stanislaus River floodflows requires coordinated operation with Tulloch Reservoir.

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

FLOOD CONTROL DIAGRAM
NEW MELONES LAKE

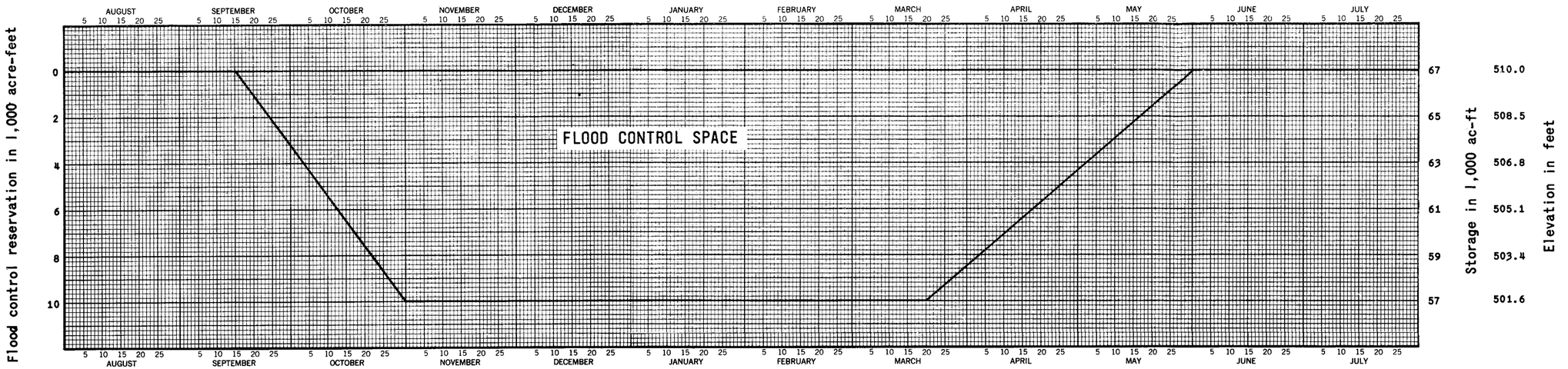
Prepared pursuant to Flood Control Regulations for New Melones Dam and Lake in accordance with Code of Federal Regulations Title 33 Part 208.11

APPROVED: _____
Brigadier General, USA, Division Engineer
South Pacific Division

APPROVED: _____
Regional Director, Mid-Pacific Region
U S B R

Effective Date: 2 JUL 1970 File No. ST-1-26-352

CHART A-12



NOTES:

1. Water stored in the flood control space will be released as rapidly as possible without causing flows in the Stanislaus River at Orange Blossom Bridge to exceed 8,000 c.f.s.
2. Flood control releases will not be changed more than 1,000 c.f.s. per hour.
3. Elevations correspond to the Oakdale Irrigation District Stage-Storage Gage with a datum of 1.5 feet above the 1929 mean sea level.

PROPOSED

NEW MELONES LAKE
STANISLAUS RIVER, CALIFORNIA

FLOOD CONTROL DIAGRAM
TULLOCH RESERVOIR

Prepared pursuant to Flood Control Regulations for New Melones Dam and Lake in accordance with Code of Federal Regulations Title 33 Part 208.11

APPROVED: _____
Brigadier General, USA, Division Engineer
South Pacific Division

APPROVED: _____
Regional Director Mid Pacific Region
W P R S

APPROVED: _____
General Manager, Tri-Dam Project

Effective Date: _____ File No. ST-1-26-353

CHART A-13

FIELD WORKING AGREEMENT
BETWEEN
DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION
AND
DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS
FOR
FLOOD CONTROL OPERATION
OF
CENTRAL VALLEY PROJECT DAMS AND RESERVOIRS
IN
CALIFORNIA

THIS agreement, made and entered into this 14th day of August, 1978, between the Bureau of Reclamation and the Corps of Engineers,

WITNESSETH THAT:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CORPS OF ENGINEERS

By: William E. Vandenberg
Division Engineer
South Pacific Division

BUREAU OF RECLAMATION

By: M. A. Catino
Acting Regional Director
Mid Pacific Region