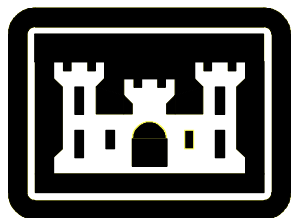


FARMINGTON DAM AND RESERVOIR LITTLEJOHN CREEK, CALIFORNIA

WATER CONTROL MANUAL

**APPENDIX IV TO
MASTER WATER CONTROL MANUAL
SAN JOAQUIN RIVER BASIN, CALIFORNIA**



**US ARMY CORPS
OF ENGINEERS**
Sacramento District

**DECEMBER 1952
REVISED DECEMBER 2004**

[R]



DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, U.S. ARMY CORPS OF ENGINEERS
333 MARKET ST., ROOM 923
SAN FRANCISCO, CALIFORNIA 94105-2195

REPLY TO
ATTENTION OF:

10 DEC 2004

CESPD-PD-TE

MEMORANDUM FOR Commander, Sacramento District, ATTN: CESPK-ED-D

SUBJECT: Approval – Water Control Manual, Appendix IV, Farmington Dam and Reservoir, Littlejohn Creek, California, Revised Oct 2004.

The South Pacific Division, Water Management Team has completed the policy and quality assurance review of subject document. A final copy, if printed and bounded, should be provided to this office once completed. If you have any questions, please contact Mr. Tom Wang of my staff at (415) 977-8120.

FOR THE COMMANDER:

A handwritten signature in black ink, appearing to read "Dennis P. Drennan", is written over a horizontal line.

DENNIS P. DRENNAN
Chief, Program Technical Division

WATER CONTROL MANUAL

FARMINGTON DAM AND RESERVOIR

Littlejohn Creek Basin
California

APPENDIX IV
TO
MASTER WATER CONTROL MANUAL

San Joaquin River Basin
California

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

December 1952
Revised June 1957
Revised October 1967
Revised December 2004

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NOTICE TO USERS OF THIS MANUAL

Regulations specify that this Water Control Manual be published looseleaf form in a hard copy binder, and only those sections, or parts thereof, requiring changes will be revised and printed. Therefore, this copy should be preserved in good condition so that inserts can be added to make the manual current. Changes to individual pages must indicate the date of revision, which is also the Division's approval date. Pages or sections that are changed after the revision is approved and distributed will indicate the new change month/year.

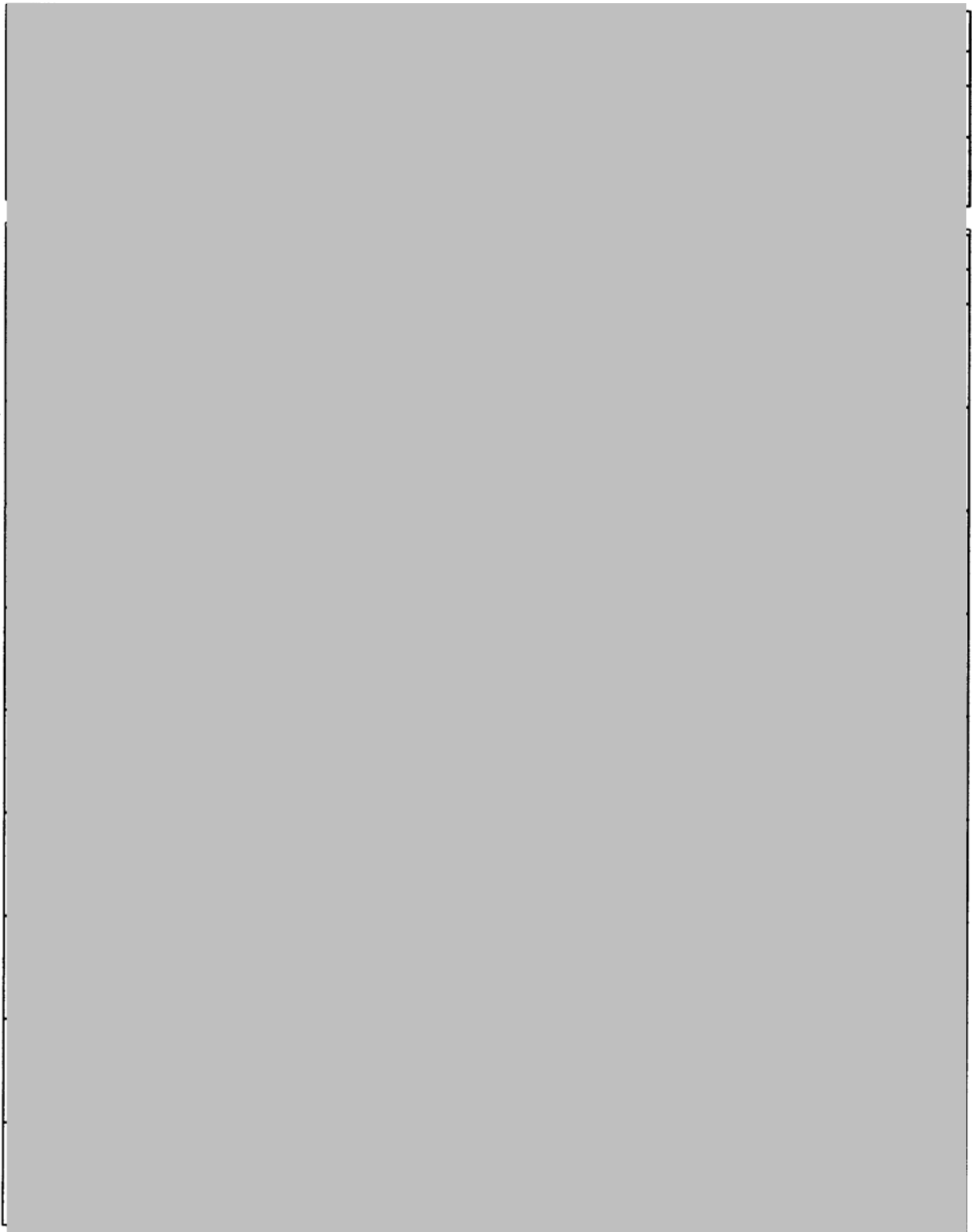
All elevations in this manual are relative to Mean Sea Level and are based on the National Geodetic Vertical Datum of 1929 (NGVD29). As directed by EM 1110-1-1004, the datum has been changed to the North American Vertical Datum of 1988 (NAVD88). However, the elevations in this manual do not reflect the NAVD88.

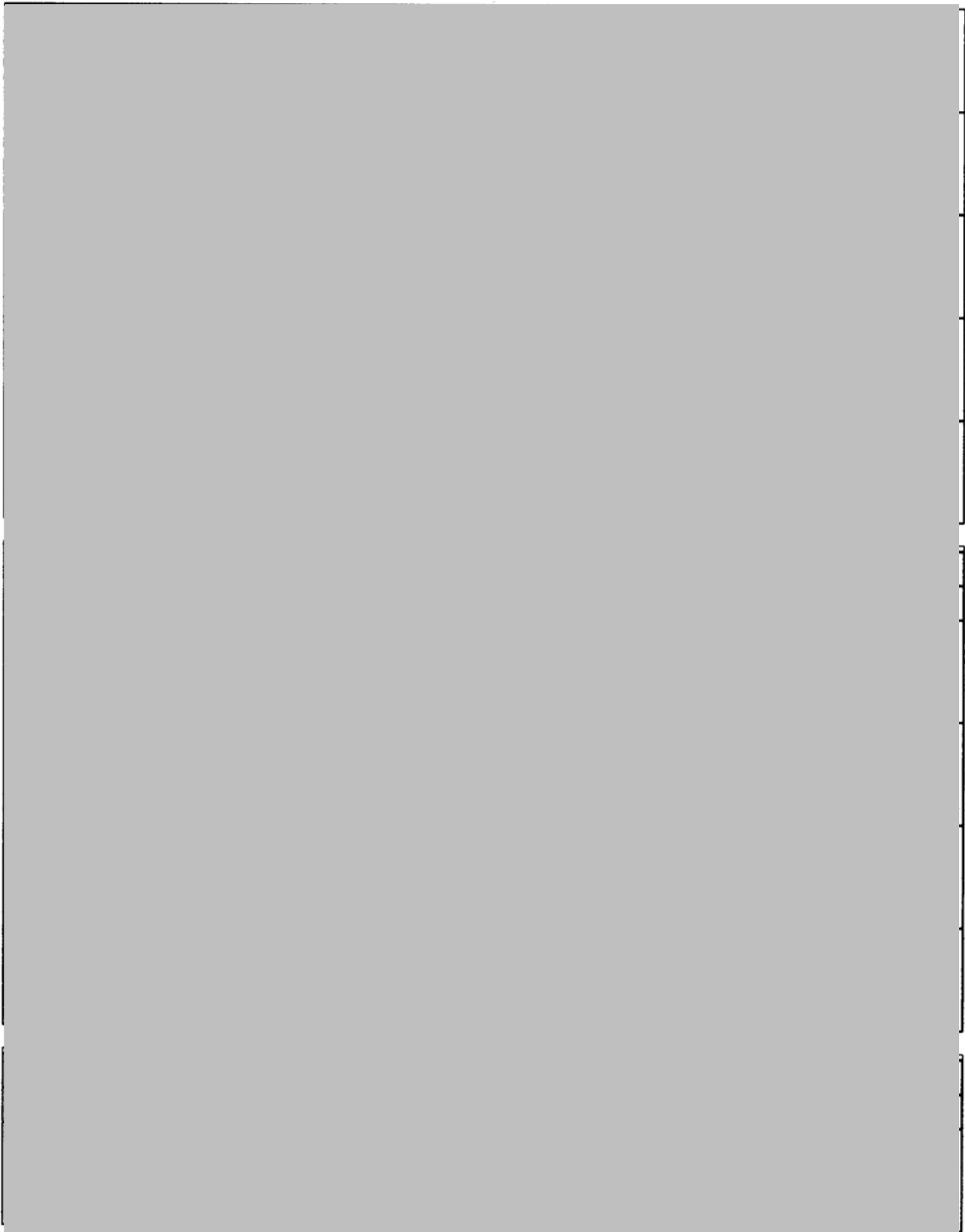
Soft metrics are used throughout the manual for information purposes only. They are not to be used as exact measurements.

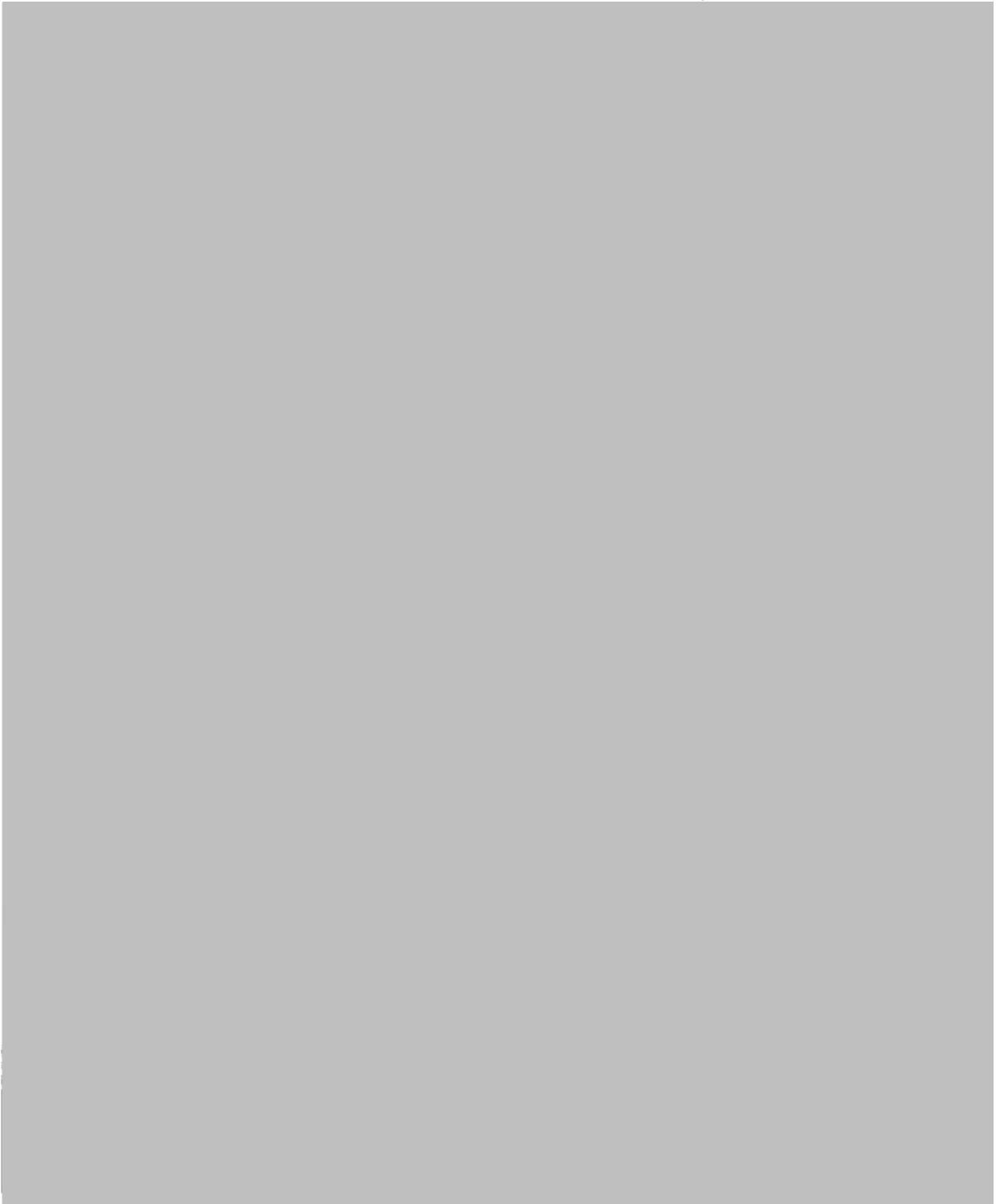
WATER CONTROL PERSONNEL

In the event that unusual conditions arise during non-duty hours, communication can be achieved by contacting the personnel listed in the front of this manual and in Exhibit A.

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FARMINGTON DAM AND RESERVOIR
LITTLEJOHN CREEK, CALIFORNIA

U.S. Army Corps of Engineers
Sacramento District
December 2004

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Abbreviations and Acronyms

ac	acres	ETL	Engineering Technical Letter, U.S. Army Corps of Engineers
ac-ft	acre-feet (the volume of an acre one foot deep)	F	Fahrenheit
API	Antecedent Precipitation Index	FEMA	Federal Emergency Management Agency
C	Celsius	FERC	Federal Energy Regulation Commission
CDEC	California Data Exchange Center	ft	feet
CESPD	U.S. Army Corps of Engineers, South Pacific Division	GOES	Geostationary Operational Environmental Satellite
CESPK	U.S. Army Corps of Engineers, Sacramento District	ha	hectare
CFR	Code of Federal Regulations	hm	hectometer
cfs	cubic feet per second	hm²	square hectometer
cm	centimeter	hm³	cubic hectometer
Corps	Corps of Engineers	in	inches
cu-yd	cubic yards	km	kilometer
dam³	cubic dekameter	km²	square kilometer
DCP	Data Collection Platforms	kv	kilovolts
DETS	Directorate of Engineering and Technical Services	kVA	kilovolt-Ampere
dm	decimeter	kW	kilowatt
DWR	California Department of Water Resources	kWh	kilowatt hours
EA	environmental assessment	m	meter
EIP	Environmental Inventory Paper	m²	square meter
EIS	Environmental Impact Statement	m³	cubic meter
elev	elevation	m³/s	cubic meters per second
EM	Engineering Manual, U.S. Army Corps of Engineers	mgd	million gallons per day
EOC	Emergency Operations Center	mi	mile
ERB	Environmental Review Board	mi²	square mile
ESA	Endangered Species Act	MOA	Memorandum of Agreement
ESRD	Emergency Spillway Release Diagram	MOU	Memorandum of Understanding
ER	Engineering Regulation, U.S. Army Corps of Engineers	MW	Megawatts
		NAP	Normal Annual Precipitation
		NAVD	North American Vertical Datum
		NEPA	National Environmental Policy Act
		NEXRAD	The Next Generation Weather Radar System
		NGVD	National Geodetic Vertical Datum

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NOAA	National Oceanographic Atmospheric Administration	SOP	Standard Operation Procedure
NRCS	Natural Resources Conservation Service	SPF	Standard Project Flood
NWS	National Weather Service (an organization of NOAA)	SRI	Sacramento River Index
PAO	Public Affairs Officer	TDS	Total Dissolved Solids
PC	Personal Computer	USACE	United States Army Corps of Engineers
pf	power factor	USBR	United States Bureau of Reclamation
PL	Public Law	USGS	United States Geological Survey
PMF	Probable Maximum Flood	WCD	Water Control Diagram
PMP	Probable Maximum Precipitation	WCM	Water Control Manual
PMS	Probable Maximum Storm	WCDS	Water Control Data System
PPM	parts per million	WCP	Water Control Plan
PRV	Pressure Regulator Valve	yr	year
QPF	Quantitative Precipitation Forecast	#	
RDF	Reservoir Design Flood	<u>Abbreviations Special to this Manual</u>	
RFC	Joint Federal-California State River Forecast Center	CSJWCD	Central San Joaquin Water Conservation District
RKM	River Kilometer	NCDC	National Climatic Data Center
RM	River Mile (Pacific Southwest Interagency Committee)	SEWD	Stockton East Water District
RPM	Revolutions Per Minute	SJCO	San Joaquin County
SDAT	California State Drought Action Team	WRDA	Water Resources Development Act
SDF	Spillway Design Flood		

CONVERSION CONSTANTS		
TO CONVERT ENGLISH UNITS	MULTIPLY BY	TO OBTAIN METRIC
LENGTH AND HEIGHT		
in	2.54	cm
ft	0.3048	m
mi	1.609	km
AREA		
ft ²	0.0929	m ²
ac	4047	m ²
ac	0.4047	ha
mi ²	2.590	km ²
VOLUME		
ft ³	0.02832	m ³
mgd	0.04381	m ³ /day
ac-ft	0.001233	hm ³
ac-ft	1233	m ³
MISCELLANEOUS		
Slope in ft/mi	0.1894	m/km
ac-ft/mi ²	476.1	m ³ /km ²
Temperature	(F - 32) 5/9	Celsius

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USACE Sacramento District Datum Documentation Report

Project: Farmington Recharge

NGVD 29To NAVD 88 Datum Conversion Factor: add 2.45ft.

Datum Conversion Procedure: The USACE Mapping Unit and A-E Contractor performed field measurements with known historical elevations. All documentation and raw data is filed with the USACE Sacramento District Mapping Unit. All survey and gage control is in US feet and is tied to NGS monument HS2247. For questions or comments contact the Sacramento District Datum Coordinator. The results of this survey produced an averaged difference between NGVD 29 and NAVD 88 of feet for the USACE Farmington Recharge civil works project.

Station ID	COE-NGVD29 record	NAVD 88	Difference
Owen (HS4649)	238.76	241.18	2.42
Peach	197.88	200.35	2.47
CA-2-52	180.12	182.60	2.48
CA-2-110	176.93	179.39	2.46
CA-2-106	174.59	177.02	2.43
			Average= 2.45
Averaged Delta =2.45 <u>ft</u> conversion factor Farmington Recharge			

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

FARMINGTON DAM AND RESERVOIR
ROCK CREEK AND LITTLEJOHN CREEK, CALIFORNIA
Stanislaus County and San Joaquin County

PERTINENT DATA

(IP Units)

GENERAL

Geographic coordinates of the structure

Location of dam

(from French Camp Slough) 25 river mi

Drainage areas

Littlejohn Creek at dam 212 sq mi

Duck Creek near Farmington 8.25 sq mi

Duck Creek at diversion 28 sq mi

Littlejohn Creek at Farmington 247.9 sq mi

Flow at dam site

Minimum mean daily inflow 0 cfs

Maximum mean daily inflow
(February 1986) 9,555 cfs

Maximum instantaneous inflow
(April 1958) 28,900 cfs

Spillway design flood peak inflow 56,000 cfs

Spillway design flood peak outflow 12,600 cfs

Maximum historical water surface elevation

(February 1998) 156.9 ft

Sediment storage allocation rate

1,000 ac-ft in 50 years

MAIN OUTLET (Rock Creek)



AUXILIARY OUTLET (Littlejohn Creek)



DAM



SPILLWAY



RESERVOIR

Elevation

Gross pool 156.5 ft

Take line 161 ft

Spillway design flood pool 169 ft

Area

Gross pool 4,100 ac

Take line 5,000 ac

Spillway design flood pool 6,900 ac

Storage capacity

Gross pool 52,000 ac-ft

Take line 72,000 ac-ft

Spillway design flood pool 120,000 ac-ft

Revised December 2004

DUCK CREEK DIVERSION DAM



DUCK CREEK DIVERSION CHANNEL



NORTH LITTLEJOHN CREEK CONTROL STRUCTURE



DUCK CREEK DIVERSION SPILLWAY



ROCK CREEK DIVERSION STRUCTURE



DUCK CREEK DIVERSION OUTLET



RUNOFF

1 inch basin runoff =	
Littlejohn Creek at dam	11,300 ac-ft
Duck Creek near Farmington	440 ac -ft
Duck Creek at diversion structure	1,490 ac-ft
Littlejohn Creek at Farmington (includes area above diversion structure)	13,220 ac-ft

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FARMINGTON DAM AND RESERVOIR
ROCK CREEK AND LITTLEJOHN CREEK, CALIFORNIA
Stanislaus County and San Joaquin County

PERTINENT DATA

(SI Units)

GENERAL

Geographic coordinates of the structure



Location of dam

(from French Camp Slough)

40.2 river km

Drainage areas

Littlejohn Creek at dam

549.1 sq km

Duck Creek near Farmington

21.4 sq km

Duck Creek at diversion structure

72.5 sq km

Littlejohn Creek at Farmington

642.1 sq km

Flow at dam site

Minimum mean daily inflow

0 m³/s

Maximum mean daily inflow

(February 1986)

270.6 m³/s

Maximum instantaneous inflow

(April 1958)

818.4 m³/s

Spillway design flood peak inflow

1,585.7 m³/s

Spillway design flood peak outflow

356.8 m³/s

Maximum historical water surface elevation

(February 1998)

47.8 m

Sediment storage allocation rate

1.2 cu hm in 50 years

MAIN OUTLET (Rock Creek)



AUXILIARY OUTLET (Littlejohn Creek)



DAM



SPILLWAY



RESERVOIR

Elevation

Gross pool

47.7 m

Take line

49.1 m

Spillway design flood pool

51.1 m

Area

Gross pool

16.6 sq km

Take line

20.2 sq km

Spillway design flood pool

27.9 sq km

Storage capacity

Gross pool

64.1 cu hm

Take line

88.8 cu hm

Spillway design flood pool

148.0 cu hm

Revised December 2004

DUCK CREEK DIVERSION DAM



DUCK CREEK DIVERSION CHANNEL



NORTH LITTLEJOHN CREEK CONTROL STRUCTURE



DUCK CREEK DIVERSION SPILLWAY



ROCK CREEK DIVERSION STRUCTURE



DUCK CREEK DIVERSION OUTLET



RUNOFF

2.5 cm basin runoff =

Littlejohn Creek at dam	14.0 hm ³
Duck Creek near Farmington	0.54 hm ³
Duck Creek at diversion structure	1.8 hm ³
Littlejohn Creek at Farmington (includes area above diversion structure)	16.3 hm ³

I - INTRODUCTION

1-01. Authorization. This Water Control Manual is for Farmington Dam, located on Littlejohn Creek in California, and is Appendix IV to the San Joaquin River Basin Master Water Control Manual. It is prepared in accordance with instructions contained in:

EM 1110-1-1004	Engineering and Design – Geodetic Control Surveying	1 June 2002
EM 1110-2-3600	Management of Water Control Systems	30 November 1987
ER 1110-2-249	Management of Water Control Data Systems	31 August 1995
ER 1110-2-240	Engineering and Design – Water Control Management	8 October 1992
ER 1110-2-8156	Preparation of Water Control Manuals	31 August 1995
CESPD R-1110-2-8	Guidance on the Preparation of Deviations from Approved Water Control Plans	12 September 2002

All instructions pertain to requirements for reports on water management.

1-02. Purpose and Scope. This manual contains descriptive information and a detailed plan for water control management at the Farmington Dam Project on Littlejohn Creek in California. It also assigns responsibilities for water control operation of the project. A description of the overall San Joaquin River Basin plan for flood control is given in the “Master Manual of Reservoir Regulation, San Joaquin River Basin, California.”

1-03. Related Manuals and Reports. This manual replaces the Farmington Reservoir Regulation Manual dated December 1952, revised on 1 June 1957 and 1 October 1967. The Farmington Dam Water Control Manual is Appendix IV to the San Joaquin River Basin Master Water Control Manual. Other related reports are as follows:

<u>Manuals</u>	<u>Date</u>
Master Water Control Manual San Joaquin River Basin, California	July 1954
Appendix I - (Reserved for Consumnes River)	
Appendix II - Camanche Dam and Reservoir	September 1981
Appendix III - New Hogan Dam and Lake	June 1983
Appendix IV - Farmington Dam and Reservoir	October 2004
Appendix V - New Melones Dam and Lake	January 1980
Appendix VI - Don Pedro Dam and Lake	August 1972
Appendix VII - New Exchequer Dam and Reservoir	November 1970
Appendix VIII - Merced County Stream Group Project	September 1959

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Appendix IX	- Buchanan Dam and H.V. Eastman Lake	June 1975
Appendix X	- Hidden Dam and Hensley Lake	March 1975
Appendix XI	- Friant Dam and Millerton Lake	August 1980
Appendix XII	- Redbank-Fancher Creeks Projects	May 1994
Appendix XIII	- Los Banos Detention Basin	October 1970

<u>Related Reports</u>	<u>Date</u>
1. Outlet Works Design Analysis	23 February 1947
2. Preliminary Definite Project Report, Farmington Dam and Reservoir and Alternates Thereto	24 March 1947
3. Aggregate Report - Source Location, Stanislaus River near Oakdale, California	January 1949
4. Structural Design Analysis for Outlet Works	April 1949
5. Farmington Project - Spillway Study	6 April 1949
6. Spillway and Auxiliary Outlet in Littlejohn Creek, Analysis and Design	August 1949
7. Structural Design Analysis for Spillway, Service Bridge and Auxiliary Works	September 1949
8. Hydraulic Design Analysis for Spillway and Auxiliary Outlet Works	September 1949
9. Supplementary Soil Data for Embankment Design Analysis	October 1949
10. Foundation Report, Littlejohn and Rock Creeks	March 1951
11. Reconnaissance Report for Flood Control on Duck Creek, San Joaquin County, California	20 February 1959
12. Detailed Project Report on Duck Creek, San Joaquin County, California	15 May 1961
13. Spillway Service Bridge and Auxiliary Outlet Works - Design Analysis	23 February 1971
14. Farmington Dam - Spillway Adequacy Studies	5 June 1978
15. Reconnaissance Report, Littlejohn Creek Stream Group Investigation, California	June 1981
16. Hydrology Office Report, Littlejohn Creek Stream Group	1983-84
17. Farmington Dam, Rock Creek and Littlejohn Creek, California Periodic Inspection and Continuing Evaluation Report 6	December 1994
18. Environmental Inventory, Farmington Dam and Reservoir, Littlejohn Creek, California	June 1995
19. Initial Appraisal Report, Proposal to Transfer Ownership to Stockton East Water District	July 1995
20. Stockton Metropolitan Area, California Reconnaissance Report	April 1997
21. Farmington Dam and Reservoir, California, WRDA 1996 Section 411(b) - Conjunctive Use Study	December 1997
22. Farmington Groundwater Recharge/Seasonal Habitat Study	August 2001

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Design Memoranda
(Corps of Engineers)

Title

Date

Part I Hydrology

September 1948

Part IV

March 1949

1-04. Project Owner. Farmington Dam is owned by the U.S. Government and represented by the U.S. Army Corps of Engineers, Sacramento District (CESPK).

1-05. Operating Agency. Farmington Dam, an unattended project, is operated [REDACTED] and maintained by the Water Management Section, U.S. Army Corps of Engineers, Sacramento District (CESPK). Maintenance of the dam and appurtenances is performed through the New Hogan Lake Project Office. [REDACTED]

[REDACTED]. Personnel responsible for project operation are listed in the front of this manual and in Exhibit A.

1-06. Regulating Agencies. The U.S. Army Corps of Engineers, Sacramento District, Water Management Section, is responsible for operation of Farmington Dam. The personnel responsible for project operation are listed in the front of this manual and in Exhibit A.

Stockton East Water District (SEWD) and the Central San Joaquin Water Conservation District (CSJWCD) are the two primary water service organizations within the basin. SEWD owns and operates the Rock Creek Diversion Structure just downstream of the outlet works at Farmington Dam, and has the ability to provide diversions for the CSJWCD system. For more detailed information on SEWD operational responsibilities, refer to Exhibit A.

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II - DESCRIPTION OF PROJECT

2-01. Location. The Farmington Dam Project is located in Central California near the foothills of the Sierra Nevada, approximately 20 miles (32.2 km) east of the city of Stockton and 3.5 miles (5.6 km) upstream from the town of Farmington (see General Map, Plate 2-1). Farmington Dam extends across both the Littlejohn Creek, a tributary to the San Joaquin River via French Camp Slough, and Rock Creek channels. The mouth of Littlejohn Creek is located approximately 25 river miles (40.2 RKM) downstream from the dam at the confluence with French Camp Slough; the confluence of Littlejohn Creek and Rock Creek is about two river miles (3.2 RKM) downstream from the dam.

The Littlejohn Creek Basin above Farmington Dam includes portions of San Joaquin, Stanislaus, and Calaveras counties. The project is accessible via California State Highway 4, which connects with U.S. Highway 99, a major north-south freeway route. Its geographic coordinates are:



The Farmington Dam Area Map is shown on Plate 2-2.

2-02. Purpose

a. The sole purpose of the Farmington Project is to restrict flood flows to non-damaging levels throughout the network of channels downstream from the reservoir, without endangering the safety of the structure. Farmington Dam provides flood protection to the city of Stockton, the rural towns of French Camp and Farmington, and adjoining areas. The initial authorizing legislation for Farmington Dam, as summarized in Paragraph 3-01, permitted construction for flood control and water conservation purposes.

b. The following Congressional acts apply to Farmington Dam and Reservoir:

- (1) PL 85-624 Fish and Wildlife Coordination Act of 1958, as amended
- (2) PL 93-205 Endangered Species Act of 1973, as amended (endangered or threatened fish/wildlife)
- (3) PL 92-500 Federal Water Pollution Control Act Amendments of 1972, as amended (water quality)
- (4) PL 102-240 Clean Air Act of 1990, as amended
- (5) PL 91-190 National Environmental Policy Act of 1969, as amended (environmental protection)

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(6) PL 89-665 National Historic Preservation Act of 1966, as amended
(historical and archaeological data preservation)

2-03. Physical Components.

. All elevations in this manual are based on the National Geodetic Vertical Datum of 1929 (NGVD29). As directed by EM 1110-1-1004, the datum has been changed to the North American Vertical Datum of 1988 (NAVD88). The elevations in this manual do not reflect the NAVD88.

a. Dam.

The dam controls runoff from 212 square miles (549.1 km²) of foothill area drained by Littlejohn and Rock creeks, with 1 inch (2.5 cm) of basin runoff equal to about 11,300 acre-feet (14.0 hm³) at the dam. Area-Capacity Curves are presented in Exhibit A, Plate A-1; the Area-Capacity Table is shown on Plate A-2. Plate 2-3 provides the General Plan, Profile and Sections of the Dam and Appurtenances.

b. Outlet Works.

. The General Plan, Profile and Sections for the Outlet Works are shown on Plate 2-4.

The General Plan, Profile and Sections for the Auxiliary Outlet Works are shown on Plate 2-5. Maximum discharge capacity at gross pool elevation is 4,050 cfs (114.7 m³/s) for the main outlet works and 40 cfs (1.1 m³/s) for the auxiliary outlet works. Exhibit A, Plate A-3, shows discharge rating curves for the auxiliary outlet works on Littlejohn Creek. Plate A-4 shows discharge rating curves for the main outlet works on Rock Creek, and Plate A-5 contains the corresponding rating table.

c. Spillway.

Discharge capacity is 12,600 cfs (356.8 m³/s) at elevation 169 feet (51.5 m) with a surcharge head of 12.5 feet (3.8 m). The Spillway Rating Curve for Farmington Dam is presented in Exhibit A, Plate A-7; the Spillway Rating Table is

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provided on Plate A-8. The General Plan, Profile and Sections for the spillway are shown on Plate 2-6.

2-04. Related Control Facilities

a. Duck Creek Diversion Works. The Duck Creek Diversion is operated and maintained by San Joaquin County. Completed in November 1951, the diversion is located about 3 miles (4.8 km) northwest of Farmington Dam.

The diversion channel extends southward about 5,000 feet (1.5 km) from the Duck Creek Diversion Works to Littlejohn Creek, at a point about 4 miles (6.4 km) downstream from Farmington Dam. The drainage area is 28 square miles (72.5 km²) with 1 inch (2.5 cm) of basin runoff equal to 1,490 acre-feet (1.8 hm³) at the diversion dam. The design flow capacity of the diversion channel is 2,000 cfs (56.6 m³/s) with a 3-foot (0.9 m) freeboard. The Duck Creek Diversion Outlet and Spillway Rating Curves are shown in Exhibit A, Plates A-9 and A-10, respectively. The location of the diversion works is shown on the General Map, Plate 2-1.

b. Channel Improvements. The project includes channel improvements of selected distributaries of Littlejohn Creek, located between the town of Farmington and French Camp Slough. Littlejohn Creek splits into North Fork and South Fork Littlejohn creeks, which further subdivide into North and South branches. The improvements found in this area consist of a dike (North Littlejohn Creek Control Structure) across North Littlejohn Creek, located immediately below the first Littlejohn Creek split, and a dike across the South Branch of North Littlejohn Creek. (Information on the North Littlejohn Creek Control Structure is covered in the following paragraph.) Channel improvements along Duck Creek include two dikes that block Duck Creek flow to Mormon Slough, and 14 miles (22.5 km) of channel enlargement along Duck Creek downstream from the diversion dam. Locations of the dikes are shown on the General Map, Plate 2-1.

c. North Littlejohn Creek Control Structure.

d. Rock Creek Diversion Structure. The Stockton East Water District (SEWD) Rock Creek Diversion Structure, completed in 1994, is located within Rock Creek approximately 140 feet (42.7 m) downstream of the Farmington Dam main outlet works stilling basin (see Photos 2-9 and 2-10).

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The Rock Creek Diversion Site Plan and Sections are shown on Plate 2-7, and the Rock Creek Diversion Transition to Canal Plan, Elevation, and Sections are shown on Plate 2-8. The diversion system is comprised of tunnels, canals, and existing natural waterways used to conduct surface water from the Stanislaus River, via Goodwin Dam in Calaveras County, into the Farmington Dam Project. This project includes the following features:

(1) Goodwin Tunnel. A gated diversion structure at Goodwin Dam conveys Stanislaus River flows to the Goodwin Tunnel. The Goodwin Tunnel, completed in 1992, is approximately 3.3 miles (5.3 km) long and 12 feet (3.7 m) in diameter, with a design flow capacity of approximately 850 cfs (24.1 m³/s). The Goodwin Tunnel connects with the Upper Farmington Canal.

(2) Upper Farmington Canal. This is an open trapezoidal channel that extends approximately 10.3 miles (16.6 km) with a flow capacity of 550 cfs (15.6 m³/s). Flows diverted into the Upper Farmington Canal are transported to the Shirley Gulch turnout. Discharges into Shirley Gulch are conveyed naturally into Shirley Creek and will reach Hoods Creek, a tributary of Rock Creek in the Farmington Reservoir. Flows in Rock Creek are conveyed through the Farmington Dam main outlet works.

(3) Lower Farmington Canal. This canal is an open, trapezoidal channel 36 feet (11.0 m) wide and 7 to 8 feet (2.1 to 2.4 m) deep (see Photo 2-11) with a capacity of approximately 200 cfs (5.7 m³/s). The Lower Farmington Canal ends about 8.6 miles (13.8 km) northwest of the Rock Creek Diversion Structure. A 78-inch (198.1 cm) pipeline connection carries flows from the Lower Farmington Canal to the raw water pipeline leading to the SEWD water treatment plant. The Lower Farmington Canal crosses Duck Creek. At the location of the crossing, inverted siphons carry flows under Duck Creek so as not to interfere with the natural channel. A gated turnout, located in the Lower Farmington Canal, allows flows to be returned to the Farmington system via Duck Creek.

2-05. Real Estate Acquisition. The Federal Government acquired project lands totaling 6,344.34 acres (2,567.5 ha), of which 929.39 acres (376.1 ha) are held in fee and 5,414.95 acres (2,191.4 ha) are in easements. The take line for flowage easements is 161 feet (49.1 m) MSL, which is 4.5 feet (1.4 m) above gross pool level. Reservoir lands acquired under a flood control easement are farmed in the non-flood season. The Farmington Real Estate Map appears on Plate 2-9.

2-06. Public Facilities. There are no public or recreational facilities provided within the Farmington Project lands.



Photo 2-1. Two gated conduits (main outlet)



Photo 2-2. Farmington Dam control tower

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Photo 2-3. Auxiliary gate inlet upstream from dam



Photo 2-4. Spillway
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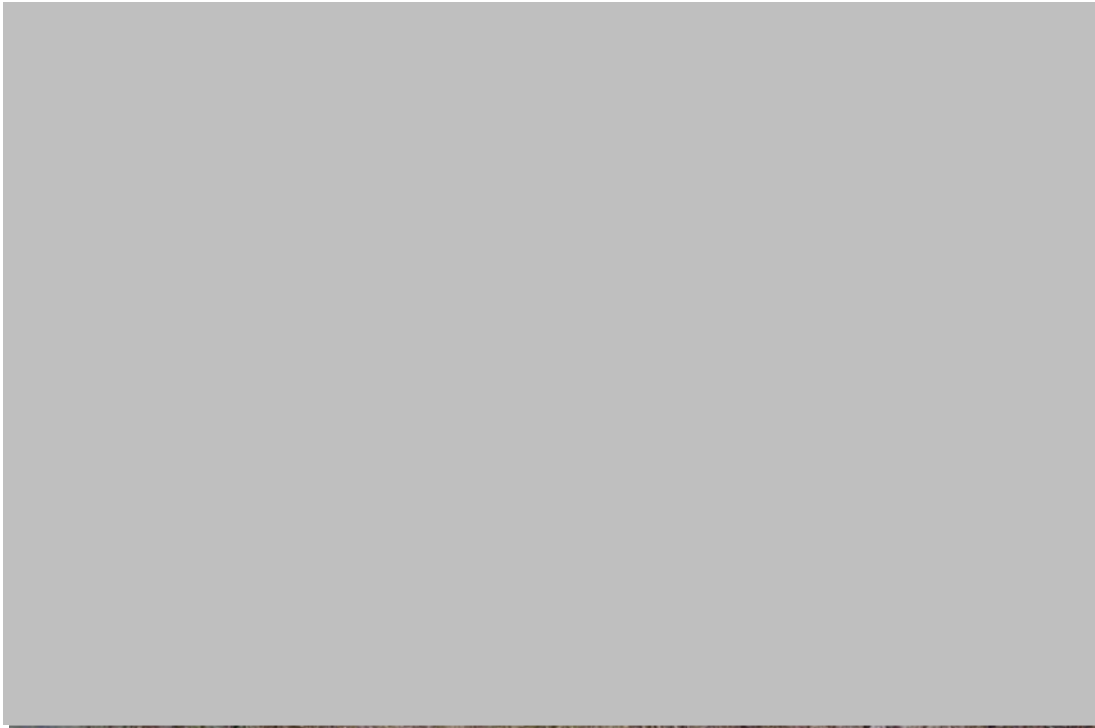


Photo 2-5. Duck Creek Diversion



Photo 2-6. Duck Creek concrete spillway diversion

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2-7. Duck Creek Diversion Spillway and downstream view of diversion channel



Photo 2-8. North Littlejohn Creek Control Structure

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Photo 2-9. Stockton East Diversion Structure, upstream view



Photo 2-10. Stockton East Diversion Structure,
downstream view



2-11. Lower Farmington Canal

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III - HISTORY OF PROJECT

3-01. Authorization. As part of a comprehensive plan of development for the San Joaquin River Basin, Congress authorized the Farmington Project on 22 December 1944 by the Flood Control Act of 1944, Public Law No. 534, Chapter 665. The pertinent portion is as follows:

"... The plan of improvement for flood control and other purposes on the Calaveras River and Littlejohn Creek and tributaries in California, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 545, 78th Congress, 2nd session..."

The Project Document, printed as House Document No. 545, 78th Congress, 2nd session, is entitled "Littlejohn Creek and Calaveras River Stream Groups, California." The document contains a report submitted by the Chief of Engineers, United States Army, dated 14 January 1944, along with accompanying papers and an illustration. It includes a preliminary examination and survey of the Littlejohn Creek and Calaveras River stream groups as authorized by the Flood Control Act and approved on 22 June 1936.

In Paragraph 11 of the report, the Chief of Engineers recommends construction of the Farmington Project for flood control and other purposes, generally in accordance with the plans of the District Engineer and by his own comments included within the report, and with modification by discretion of the Secretary of War and the Chief of Engineers. The plans of the District Engineer are summarized in Paragraph 5 of the report and are as follows:

"The District Engineer, after investigating various possible measures for securing relief from floods, proposes construction of Farmington Reservoir with a capacity of 55,000 acre-feet on Littlejohn Creek, in the foothill section, to control floodwater runoff from 210 square miles; a diversion channel from Duck Creek to Littlejohn Creek below the reservoir so as to limit Duck Creek flows below Farmington to 500 cubic feet per second; and two dikes across downstream channels leading from Duck Creek to Mormon Slough so that the waters of Duck Creek cannot enter the slough..."

In response to comments provided by the U.S. Bureau of Reclamation (USBR), the Chief of Engineers supported incorporating the USBR recommendation to construct Farmington Reservoir with a capacity of 100,000 acre-feet (123.3 hm³), to provide 45,000 acre-feet (55.5 hm³) for irrigation purposes. In Paragraph 8 of the report, the Chief of Engineers concurred that authorization of the reservoir should permit construction to the larger capacity for conservation purposes.

3-02. Planning and Design. Subsequent to authorization, modifications were made by House Document No. 367, 81st Congress, 1st session, according to the recommendations presented in the "Preliminary Definite Project Report, Farmington Dam and Reservoir and Alternates Thereto." The Chief of Engineers authorized this report for the purpose of determining the engineering and economic accomplishments of Farmington Reservoir. The Sacramento

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District's studies considered single- and multi-purpose reservoirs at the site. After comparison of the various plans under study, the final design represented maximum net benefits (measured in dollar costs and benefits), given the operational objectives. A public hearing held on the Farmington Project, and further studies indicating possible leakage problems under the proposed dam and reservoir (which could have potentially damaging effects on downstream lands), resulted in the elimination of the irrigation purpose. Due to local objections, the lack of need at that time, and the immediate and urgent need for additional flood protection on Littlejohn Creek, the most economical method of providing such protection consisted of constructing Farmington Dam and Reservoir for the sole purpose of flood control. Due to the highly developed agricultural lands within the reservoir area, and at the request of local interests, flowage easements were obtained in lieu of fee titles to permit short-term storage only. No special provisions were incorporated in the initial flood control dam to accommodate future irrigation storage or power installation needs.

The Farmington Project (as constructed) incorporates changes to the authorized plan. The principal changes are as follows:

Feature Plan	Project Document	Final Plan
		
		
		

3-03. Construction. Construction of Farmington Dam and appurtenant works was initiated in July 1949 and completed on 1 November 1951. The Duck Creek Diversion Dam, channel, and dikes at the head of Duck Creek Slough Channels were completed by 6 September 1951. The main outflow station on Littlejohn Creek at Farmington was constructed during 1952. Installation of telemetering facilities at the outflow station and the main pool gage on the reservoir, establishment of erosion prevention measures on the upstream side of the dam, and acquisition of most of the necessary flowage easements were completed during fiscal years 1953-1954. The downstream channel enlargement works below Farmington (listed in the

preceding paragraph) and the installation of a recording and telemark stream gaging station on Duck Creek near Highway 4 were completed during fiscal years 1955-1956. Rehabilitation and improvement of Duck Creek, downstream from the diversion works, was completed in 1967. The Duck Creek Improvement Project was transferred to San Joaquin County for operation and maintenance on 12 January 1967.

In November 1998, CESPCK initiated the repair of the upstream embankment erosion by adding additional riprap to the upstream face of the dam and increasing the height of the stone protection. CESPCK also rehabilitated the ineffective relief well system. This work required the replacement of the 17 existing relief wells with 34 new ones, the construction of a downstream berm, and the addition of a concrete-lined channel to convey outflow from the new relief wells to either Littlejohn Creek or Rock Creek.

3-04. Related Projects. The Farmington Project functions independently of other projects in the San Joaquin River Basin. It provides reservoir storage space for floodwaters that would have otherwise spread over the flood plain area. The effect of the project on inflows to the San Joaquin River is negligible. Structures upstream and downstream from Farmington Dam are discussed in Paragraphs 4-10 and 4-11, respectively.

3-05. Modification to Regulations. The aforementioned channel improvements on Duck Creek provide the capacity to accommodate the Project Document plan as well as operation with both outlet gates fully open, under normal circumstances. According to the Project Document, the plan for improving Duck Creek provides for a dam with ungated outlets capable of discharging a total flow of 500 cfs ($14.2 \text{ m}^3/\text{s}$) under maximum head. At the time of construction, it was found that the channel capacity of Duck Creek, below the diversion, was only 250 cfs ($7.1 \text{ m}^3/\text{s}$).



The regulations contained herein are subject to temporary modification during flood or other emergencies by order of the District Engineer. Major changes in the regulations are subject to prior approval of the Chief of Engineers. The current Water Control Plan (WCP) is described in Exhibit A, Plate A-14.

3-06. Principal Regulation Problems. The Stockton East Water District's (SEWD) Rock Creek Diversion Structure is located about 140 feet (42.7 m) downstream of the outlet works stilling basin. Currently, the diversions from the Stanislaus River Basin have raised the water table at the Farmington Dam.



. If the water surface of the incidental pool immediately above the diversion structure rises above elevation 123.9 feet (37.8 m), this will cause spills over the side weir of the diversion structure. The spilled flows will continue down Rock Creek (see Photo 3-1). Prior to 1998, this spill would have degraded the stilling basin

embankment at the free end of the side weir. SEWD initiated repairs to prevent this occurrence (see Photo 3-2). Operation of the diversion structure and closure of the radial gates affects operation, maintenance, and inspection of the gates at Farmington Dam, as well as flow computations. The right-of-way easement, which is described in Exhibit D, grants property rights to SEWD and identifies the Farmington Dam Water Control Manual as the controlling instrument defining the operational requirements of the SEWD facility in conjunction with operation of Farmington Dam.

The spillway is designed to direct flows toward Rock Creek. Discharges from the spillway are now obstructed by the Lower Farmington Canal, located adjacent to the Rock Creek channel. Spills entering the Lower Farmington Canal will be conveyed towards State Highway 4. In 1998, SEWD breached their Lower Farmington Canal to provide a path for spillway discharges into Rock Creek.

Farmington Dam is subject to considerable under-seepage losses due to the pervious foundation. A line of relief wells were installed below the dam to reduce any adverse effects of this seepage to the downstream area, but a portion still caused saturated areas to appear immediately downstream from the dam. Over time, the original line of relief wells became ineffective; therefore, CESPCK rehabilitated the relief well system. A downstream drainage channel was added to collect flows from the relief wells. The under-seepage does not affect the integrity of the dam structure, since it was neither designed nor required to store water for purposes other than flood control, meaning short floodwater retention times. Because the U.S. Government only owns flowage easements on most of the land within the reservoir, only short-term storage is permitted. During an investigation on the feasibility of using Farmington Dam and Reservoir for water conservation storage, the Corps determined that at pool elevation 147 feet (44.8 m), the seepage rate through the foundation would range from 15 to 30 acre-feet (18.5 to 37.0 dam³) per day, but this rate has increased over the years (based on high pool inspections).



New Hogan personnel will be made available to attend to Farmington Dam even if significant rain flood events occur concurrently at both the New Hogan and Farmington projects.

Central San Joaquin Water Conservation District (CSJWCD) operates an irrigation-distribution system, 15 March through 15 September, which utilizes a combination of low-water crossings, check structures, culvert crossings and a pumping plant. Various structures can be found within the Farmington Project boundaries on Duck Creek, Rock Creek, Littlejohn Creek and the North Fork Littlejohn Creek. Backwater effects from the check structure (Photo 3-3), located immediately downstream of the Littlejohn Creek at Farmington stream gage, render this control point useless.

Beavers tend to obstruct flows from the auxiliary outlet on Littlejohn Cr. Occasionally, a pond may develop on the property downstream from the dam, which backs the water up into the Farmington reservoir area (Photos 3-4 and 3-5)

[REDACTED]

The channel capacity has not been maintained at 250 cfs (7.1 m³/s), but has decreased to possibly 50-200 cfs (1.4 - 5.7 m³/s). Due to the above constraints, the North Littlejohn Creek Control Structure cannot be readily used to assist in passing authorized flood releases from Farmington Dam.



3-1. Farmington Dam stilling basin flow over side weir



3-2. Stockton East wing wall

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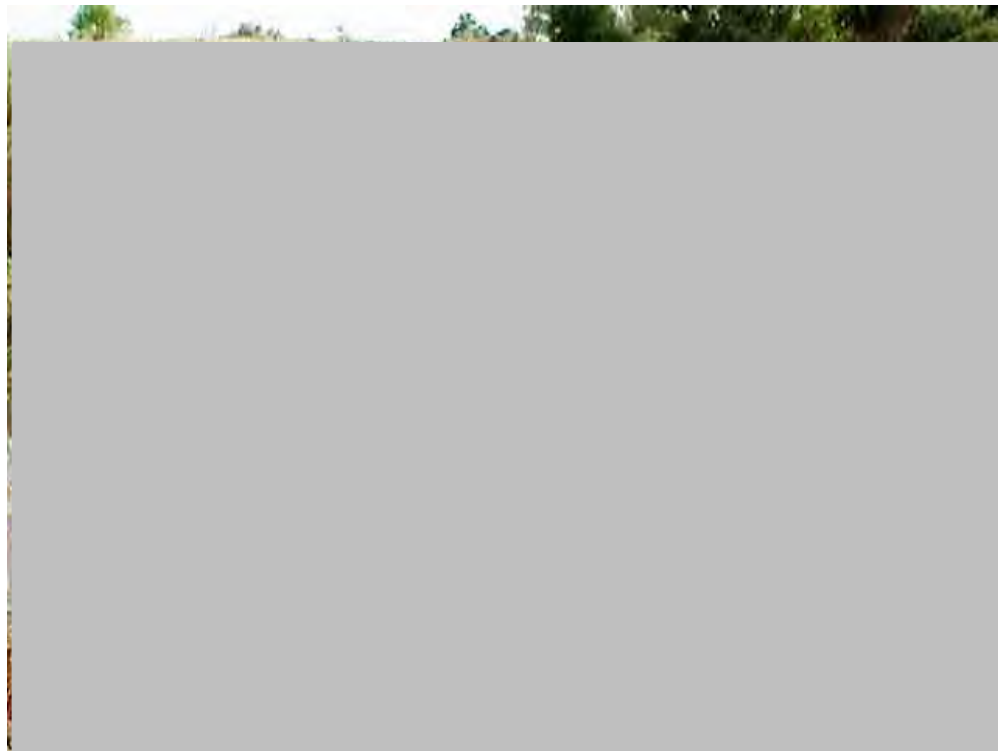


3-3. Check Structure below Littlejohn Creek

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3-4. Below dam – Littlejohn Creek downstream, submerged outlet and ponding



3-5. Above dam – Littlejohn Creek submerged inlet

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IV - WATERSHED CHARACTERISTICS

4-01. General Characteristics. The basin encompassing the Littlejohn Creek Stream Group – bounded on the north and south by the Calaveras and Stanislaus river basins, respectively – is about 15 miles (24.1 km) wide from north to south and 40 miles (64.4 km) long from east to west. Runoff from its approximately 415 square mile (1,075 km²) drainage area flows westward to the San Joaquin River via French Camp Slough. Of the many creeks comprising the Littlejohn Creek Stream Group, three are considered major: Littlejohn, Duck, and Lone Tree, and of these, Littlejohn is the principal stream system.

Above Farmington Dam, the watershed portion of the project is a wing-shaped area extending 20 miles (32.0 km) upstream into the foothills on the western slope of the Sierra Nevada. Principal streams contributing to the reservoir are Littlejohn, Rock and Hoods creeks. These streams drain a combined area of 212 square miles (549.1 km²) at the dam. Above the diversion structure, across Duck Creek, the drainage area is 28 square miles (72.5 km²). Basin features are shown on the General Map, Plate 2-1.

Vegetative cover varies within the basin. Above Farmington Dam, the steep hillsides in the upper basin are sparsely covered by deciduous brush, small stands of trees, and a grassland understory. A discontinuous bank of riparian growth stretches through much of the upper basin. Along portions of Rock and Littlejohn creeks, the banks are completely devoid of riparian vegetation and badly eroded. The existing riparian vegetation is primarily valley oak, Fremont cottonwood, willow and white alder. Shrubs include willow, elderberry, and coyote brush. Annual grassland, such as grasses and forbs, is the predominant vegetation type within the reservoir area. Below Farmington Dam, the lower basin consists primarily of intensely developed agricultural lands and unimproved pastureland. Along lower basin stream channels, native vegetation has diminished, with some light brush and a few scattered oaks remaining.

4-02. Topography. Just east of Stockton, the land is relatively smooth and slopes gently downward to the west. Farther east, the valley lands transform into low rolling foothills, and then ascend to form the western rugged slope of the Sierra Nevada. Elevations range from about 2,600 feet (792.5 m) in the upper basin to 115 feet (35.1 m) at the dam, and to about 25 feet (7.6 m) at State Highway 99 in the valley. The headwaters of Littlejohn Creek begin in the foothills at an elevation of about 2,000 feet (609.6 m). The creek then emerges onto the valley floor near Farmington, where it divides into two distributaries. North and South Littlejohn creeks each divide further into north and south branches, which then flow westerly to French Camp Slough before draining into the San Joaquin River.

The drainage area upstream of Duck Creek Diversion, north of Littlejohn Creek, lies below 550 feet (152.4 m). Duck Creek flows westerly past Farmington and continues across the valley for 20 miles (32.2 km) in a shallow, narrow channel to Walker Slough, which then flows into French Camp Slough. The topographic map is shown on Plate 4-1. Profiles of principal streams are shown on Plate 4-2. Table 4-1 shows the distribution of the basin area above Farmington Dam.

TABLE 4-1 PERCENT OF AREA ABOVE GIVEN ELEVATIONS LITTLEJOHN CREEK BASIN UPSTREAM OF FARMINGTON DAM	
ELEVATION (feet)	PERCENT OF AREA ABOVE ELEVATION
115	100
500	47
1,000	23
1,500	2
2,000	1
Source: Littlejohn Creek Basin, Definite Project Report Part I - Hydrology, September 1948, U.S. Army Corps of Engineers	

Of the 212 square miles (549.1 km²) of watershed above Farmington, about 77 percent is below 1,000 feet (304.8 m) and less than 1 percent is above 2,000 feet (609.6 m). (See the above table and the corresponding Area-Elevation Curve shown on Plate 4-3.)

4-03. Geology and Soils. The basin is part of the Great Central Valley physiographic province, and is overlain with recent deposits. These Holocene sediments are tens of thousands of years old. A thick westerly-dipping wedge of alluvial and marine sediments rests on a basement complex made of hard crystalline or metamorphic rocks. Younger granitic rocks intrude upon the older metamorphosed marine sediments and ancient volcanic rocks as the basement complex crops out into the Sierra Nevada.

Tertiary and Quaternary sediments underlay the upper basin, located near the western margin of the Sierra Nevada physiographic province. These include the Pliocene Mehrten formation, Pliocene or Pleistocene terrace gravel, and recent alluvium. The metamorphic rocks of the Sierra Nevada basement complex consist of one-fourth metamorphosed shales, sandstones, tuffs, agglomerates, and the rest consisting of metamorphosed volcanic rocks.

The Mehrten formation forms much of the foundation for Farmington Dam. The sediments consist of alternating beds (from a few inches to several feet thick) of medium- to coarse-grained bluish friable sand and well-compacted, light-brown, sandy or silty tuff. The beds of sand are very pervious.

The valley in the lower basin lies on a foundation of schists, quartzite, crystalline limestone, and marble, all with intrusions of igneous rock. The alluvium or sedimentary deposits consist of about one-third consolidated clay-like tuff and two-thirds sandy tuff, clays, and sandstones. The

tuff beds are quite impervious, while the sandstone beds are quite permeable. These formations are blanketed by a sandy or clay-like soil, which varies from a few inches to several feet in depth.

Rich layers of organic material and deep minerals (clay) cover a major portion of the basin. Soil depth varies from shallow to moderate in the upper portion of the basin. In the lower basin, the flood plain soils are very rich and vary in depth from deep to moderate. These soils are organic and are classified as peat, peaty muck, and muck. The more common soils in the area include soils of the Stockton-Landlow Verrendos and Dinuba associations. Wyman and Honcut associations have developed from parent material derived from metamorphosed, igneous rock. Wyman association soils (rich, heavy, and compact clay) occur throughout the flood plain. Honcut association soils (gravelly loam subject to seasonal redistribution) occur adjacent to the active channels of Rock, Hoods, and Littlejohn creeks. On the terraces that border the basin to the north and south, the soil grades into the Redding-Pentz-Peters association (well-drained, gently- to steeply-sloping gravelly loams developed on volcanic tuff).

There are no known active fault lines in the immediate vicinity of Farmington Dam. The nearest fault lines are approximately 40 miles (64.4 km) northwest of the dam. The Sacramento-San Joaquin Delta is crossed by three minor faults: the Antioch, Sherman Island, and the Midland faults. The Antioch Fault is reported to run from Antioch across the Sacramento River through Collinsville. The Sherman Island fault is identified from Rio Vista, through Sherman Island to near Big Break. The Antioch Fault was associated with the last earthquake in the area, a mild quake in 1975, and with the area's most destructive quake, which occurred in 1889.

4-04. Sediment. The estimate of sedimentation allowance in Farmington Reservoir is based primarily on data furnished by the U.S. Natural Resources Conservation Service (NRCS), formerly known as the U.S. Soil Conservation Service. This data is contained in the July 1947 Special Report No. 10, entitled "Reservoir Sedimentation in the Sacramento-San Joaquin Drainage Basins, California," prepared by the U.S. Department of Agriculture. The NRCS report indicates that sedimentation within the reservoir may reduce the capacity by about 1,000 acre-feet (1.2 hm^3) in 50 years. No surveys have been made since the dam was constructed. Twenty-eight monumented sedimentation ranges, as indicated on Plate 4-4, have been established to measure sedimentation within the reservoir. In addition, two range lines have been established along Rock Creek to monitor degradation of the stream channel below the dam. Basic reference profiles of the ranges were obtained through a detailed survey completed in February 1952.

According to the Corps' 1948 "Definite Project Report, Farmington Project, Littlejohn Creek, California, Part I - Hydrology," the maximum flood control reservation is 51,000 acre-feet (62.9 hm^3), while gross storage capacity is 52,000 acre-feet (64.1 hm^3).

4-05. Climate

a. General. The climate of the Littlejohn Creek Basin is classified as dry and sub-humid, characterized by two well-defined seasons: long, hot dry summers with very little rain, and short,

mild wet winters with frequent rain but very little snow. The location of climatological stations and normal annual precipitation isohyets are shown on Plate 4-5.

b. **Temperature.** Average temperatures within the basin range between 45°F and 77°F (7.2 to 25°C), with a yearly average of 61.5°F (16.4°C). Summer highs can reach 115°F (43.3°C) and winter lows can drop to near freezing. At Stockton, extreme temperatures have ranged from 114°F (45.6°C) during the summer to 16°F (-8.9°C) during the winter months. Table 4-2 shows the monthly distribution of mean temperatures for Stockton WSO Airport and Knights Ferry 2ESE.

TABLE 4-2 MEAN MONTHLY AND ANNUAL TEMPERATURES (°F)		
MONTH	STOCKTON WSO AIRPORT ⁺ (Elev 22')	KNIGHTS FERRY 2ESE [‡] (Elev 315')
January	45.5	43.0
February	50.5	48.0
March	54.2	53.0
April	59.5	58.0
May	66.3	65.0
June	72.7	73.0
July	77.3	77.0
August	76.3	77.0
September	72.7	70.0
October	64.4	63.0
November	53.3	53.0
December	45.6	45.0
Average Annual	61.5	60.4
Source:	NOAA 1948-2004	NOAA 1960-1972, 1974-1976

⁺ Climatological Data Summary. Monthly Average Temperatures (updated May 2004) retrieved 7 June 2004 from Western Regional Climate Center, Desert Research Institute Web site: <<http://www.wrcc.dri.edu/>>

[‡] Gage discontinued.

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c. Precipitation. Normal annual precipitation (NAP) varies throughout the Littlejohn Creek drainage area, ranging from 12 inches (30.5 cm) on the valley floor to about 30 inches (76.2 cm) in the higher areas. Normal annual precipitation above Farmington Dam is about 17 inches (43.2 cm), while downstream it is about 14 inches (35.6 cm). The mean monthly and annual distribution of precipitation at selected stations is given in Table 4-3.

TABLE 4-3								
MEAN MONTHLY PRECIPITATION								
MONTH	STOCKTON WSO AIRPORT ⁺		KNIGHTS FERRY 2ESE [‡]		COPPEROPOLIS [‡]		FLOWERS MOUNTAIN	
	(Elev 22')		(Elev 315')		(Elev 970')		(Elev 1480')	
	in	%	in	%	in	%	in	%
Jan	2.85	20.4	2.88	16.9	4.52	19.4	4.07	19.2
Feb	2.27	16.3	2.55	15.0	4.08	17.6	3.99	18.8
Mar	2.04	14.6	2.49	14.6	3.83	16.5	3.51	16.5
Apr	1.13	8.1	1.74	10.2	1.80	7.7	1.60	7.5
May	0.41	2.9	0.39	2.3	0.46	2.0	0.82	3.9
Jun	0.08	0.6	0.15	0.9	0.19	0.8	0.21	1.0
Jul	0.03	0.2	0.10	0.6	0.06	0.3	0.09	0.4
Aug	0.04	0.3	0.15	0.9	0.08	0.3	0.08	0.4
Sep	0.28	2.0	0.29	1.7	0.31	1.3	0.18	0.9
Oct	0.69	5.0	0.96	5.6	1.06	4.6	1.29	6.1
Nov	1.81	13.0	2.65	15.5	3.20	13.8	2.53	11.9
Dec	2.31	16.6	2.69	15.8	3.66	15.7	2.85	13.4
Average Annual	13.94	100.0	17.04	100.0	23.25	100.0	21.22	100.0
Nov-Mar	11.28	80.9	13.26	77.8	19.29	83.0	16.95	79.5
Source:	NOAA 1941-2004		NOAA 1960-1972 1974-1976		USACE 1955-1995		USACE 1972-2003	

⁺ Climatological Data Summary. Monthly Average Temperatures (updated June 2004) retrieved 12 July 2004 from Western Regional Climate Center, Desert Research Institute Web site: <<http://www.wrcc.dri.edu/>>

[‡] Gage discontinued.

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About 80 percent of the precipitation runoff occurs during the months of November through March. Snow rarely falls on the area and is not a significant factor in runoff from large storms.

d. Evaporation. There is no evaporation pan at Farmington Dam. Historical mean monthly evaporation rates for Knights Ferry 2ESE are shown in Table 4-4.

TABLE 4-4 HISTORICAL MEAN MONTHLY EVAPORATION				
MONTH	KNIGHTS FERRY 2ESE [‡] (in)	MANTECA [‡] (in)	OAKDALE WOODWARD DAM [‡] (in)	NEW HOGAN LAKE (in)
January	1.00	1.20	1.03	1.18
February	1.69	1.71	1.72	2.00
March	3.14	4.04	3.42	3.64
April	5.65	6.33	5.47	5.39
May	8.54	9.24	8.95	8.20
June	10.14	10.53	11.88	10.08
July	11.60	11.64	14.23	11.80
August	10.31	10.22	12.22	10.58
September	7.74	7.19	8.53	8.01
October	4.62	4.13	5.52	5.14
November	2.69	1.78	2.10	2.04
December	1.00	1.16	1.02	1.11
Annual Total	68.12	69.17	76.09	69.17
Source:	NOAA 1960-1972, 1974-1976	NOAA 1965-1977	NOAA 1948-1967	NOAA 1964-2003

[‡] Gage discontinued.

e. Wind. There is no wind gage at Farmington Dam. Historical mean and peak monthly wind velocities for Stockton WSO Airport are shown in Table 4-5.

TABLE 4-5 MEAN AND PEAK MONTHLY WIND VELOCITIES STOCKTON WSO AIRPORT		
MONTH	MEAN	PEAK (miles per hour)
January	6.6	46
February	7.0	41
March	7.7	39
April	8.4	37
May	9.2	41
June	9.2	35
July	8.2	31
August	7.7	30
September	7.1	33
October	6.4	37
November	5.8	47
December	6.4	44
Average	7.5	-
Source: NOAA 1941-2003 (40 years of record)		

4-06. Storms and Floods. Littlejohn Creek Basin lies on the western, or seaward, slope of the Sierra Nevada. The basin is partially shielded from general storms by the barrier of the Coast Ranges. The peaks rise from 3,000 to 5,000 feet (914 to 1,524 m) in elevation. General rain storms are carried into the basin by moist, unstable Pacific air masses that travel through the San Francisco Bay from the northwest. The Coast Range influences the rate and duration of precipitation that falls on the Littlejohn Creek Basin. General rain floods occur primarily between November and March. Prolonged heavy rainfall produces general rain floods characterized by high peak flows of moderate duration (2-3 days) and relatively shallow depths of 2 to 3 feet (61.0 to 91.4 cm). When antecedent rain has saturated the ground, flooding is more severe.

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Thunderstorms or cloudburst storms, lasting up to three hours, can occur between late spring and early fall. High-intensity rainfall from such storms can produce floods with peak flows that are larger than those from general floods. However, flood flows from cloudbursts have short durations and small volumes. Table 4-6 contains recorded peak flows and volumes of floods occurring over the period of record.

TABLE 4-6			
HISTORICAL FLOOD FLOWS ON LITTLEJOHN CREEK AT FARMINGTON DAM			
DATE	PEAK (cfs)	1-DAY VOL (acre-feet)	3-DAY VOL (acre-feet)
February 1986	23,600	18,952	45,593
April 1958	28,900	14,424	41,136
December 1955	20,000	16,854	34,727
February 1998	24,830	22,865	32,216
January 1983	16,500	12,986	28,128
Source: Water Management Section, Sacramento District, USACE			

Other major floods within this century occurred in January-February 1911 and February 1917. Peak flows prior to these project events were 16,000 and 13,600 cfs (453.1 and 385.1 m³/s), respectively. The legendary floods of 1861-1862 are judged to be the largest in peak flow and volume of runoff, but were less damaging than the floods listed due to the area being less populated and developed.

Farmington Reservoir offers flood protection to about 58,000 acres (23,472 ha) of agricultural land, suburban areas, and industrial properties in the area immediately south of Stockton. Flood damages within the basin are primarily agricultural. Four of the largest floods of record occurred in December 1955, April 1958, February 1986, and February 1998. Maximum storage (53,512 acre-feet (66.0 hm³)) occurred in February 1998. Peak outflow (2,438 cfs (69.0 m³/s)) occurred in February 1986. Peak inflow (28,900 cfs (818.4 m³/s)) occurred in April 1958, as did the largest flows on Duck and Littlejohn creeks. In April 1958, Duck Creek flows at the Diversion reached a peak of 4,100 cfs (116.1 m³/s), compared with 2,700 cfs (76.5 m³/s) in February 1986, 2,600 cfs (73.6 m³/s) in December 1955, and 2,100 cfs (59.5 m³/s) in February 1998. Similarly, the flow at Farmington peaked at 3,600 cfs (101.9 m³/s) in April 1958, compared with 3,000 cfs (85.0 m³/s) in February 1986, 2,750 cfs (77.9 m³/s) in December 1955, and 2,400 cfs (68.0 m³/s) in February 1998. The 1955 and 1958 floods caused much damage. However, no significant flooding occurred within the Littlejohn Creek basin for the February 1986 event.

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In December 1955, flooding in the Littlejohn Creek area affected about 1,800 acres (728.4 ha). Farmington Reservoir controlled Littlejohn Creek inflows to a safe channel capacity, but the uncontrolled flow from Duck Creek through the Duck Creek Diversion Channel was more than the lower creek channels could carry. Flood damage was primarily concentrated about South Littlejohn Creek. On the south branch of the creek, the flood damaged barley crops, farm buildings, supplies and equipment. Flood damages on the north branch were primarily to residences and to small business establishments.

In the months preceding the April 1958 storm event, rainfall served to saturate the ground and increase the flood potential in the basin. Rainfall during January and February was about 200 percent of normal, totaling 11 inches (27.9 cm). During the two storm periods in March, there was an additional 6 inches (15.2 cm) of rain. For the period of 30 March through 6 April, a series of short and intense storms produced 6 inches (15.2 cm) of rain. The April floods were due to high flows and the inability of the local rainfall runoff to drain into the main channels. Sections of the natural sloughs and waterways were filled in, and the ground leveled for irrigation, without providing sufficient alternate drainage channels. The result was that about 2,000 acres (809.4 ha) of farmland were flooded. Depths of flooding varied from a few inches to two feet, with durations ranging from 12 hours to 10 days in ponded areas. Inundated crops included barley, alfalfa, and onions. There was also some damage to land from erosion, as well as to improvements and stored supplies. County roads also sustained fairly extensive damage.

In February 1986, the water level at Farmington Dam reached a high at elevation 155 feet (47.2 m). The flooded area behind the dam was completely drained within 13 days after this record flood event. For the period of 12-21 February, the Flowers Mountain precipitation gage received a total of 7.6 inches (19.3 cm). The Stockton WSO Airport precipitation gage received a total of 5.98 inches (15.2 cm), while a total of 5.88 inches (14.9 cm) was recorded for the Knights Ferry 2 ESE gage.

In February 1998, a succession of intense El Niño-driven storms swept over northern and central California for nearly four weeks. These cold storms, originating from the Gulf of Alaska, were accompanied by strong winds. The storms produced low snow levels and widespread showers and thunderstorms. In many areas the ground became nearly saturated due to the cumulative effect of the rains. According to NOAA, California experienced the wettest February on record. The Stockton WSO Airport precipitation gage received a total of 8.01 inches (20.3 cm), approximately 360 percent of average. The Flowers Mountain precipitation gage received a rainfall amount totaling about 12.2 inches (31.0 cm), approximately 330 percent of average. The Farmington Reservoir pool elevation reached 156.89 feet (47.8 m). This was the first time the pool elevation had exceeded the gross pool level since completion of the project. Farmington Dam and Reservoir were able to prevent an estimated \$3.5 million in flood damages.

4-07. Runoff Characteristics. Significant runoff occurs after the ground approaches saturation. Thereafter, successive storms would produce runoff with very low loss rates unless enough time expires between storms for the basin to dry out. The initial and constant loss rate, used for the Farmington Dam Spillway Adequacy Studies of June 1978, was 0.05 inches (1.3 mm) and 0.05 inches/hour (1.3 mm/hour), respectively. The unit hydrograph, developed in the studies, is considered more reliable than the one developed for the 1948 Definite Project Report on the Farmington Project, because it is based on historical reproductions. The original hydrograph was derived from an analysis of the February 1945 flood in the Dry Creek Basin near Galt. The empirical Clark unit hydrograph parameters ($t_c=4$ and $R=4$) are used to transform excess precipitation into direct runoff. These parameters were developed through historical reproductions of the 1955, 1958 and 1969 events. Time of concentration (t_c) is the number of hours it would take a water drop falling in the farthest part of the basin to reach the drainage outlet or gage. R represents a storage coefficient.

Approximately 77 percent of the drainage basin above Farmington Dam is below the 1,000-foot (304.8 m) elevation, so a large percentage of runoff is derived mainly from rainfall without significant effect from snowmelt. Rainfall is largely concentrated in the winter and early spring seasons with only scattered showers occurring during the remainder of the year. The runoff decreases to minimal rates during the summer and early fall. Table 4-7 (see page T4-1) is a tabulation of derived and observed unregulated inflows to Farmington Dam for water years 1951-2003. The mean monthly distribution and statistical characteristics of annual inflows are summarized in Table 4-8.

TABLE 4-8 AVERAGE MONTHLY INFLOWS TO FARMINGTON DAM		
MONTH	AVERAGE INFLOW (thousand acre- feet)	Percent of Annual Inflow
January	14.6	1.5
February	15.6	2.6
March	11.1	10.4
April	5.2	25.1
May	1.3	26.0
June	0.8	18.5
July	1.0	8.6
August	0.9	2.1
September	1.0	1.2
October	0.9	1.3
November	1.6	1.3
December	6.1	1.5
Annual Total	60.1	100.0
Source: USACE 1951-2003		

Annual runoff volumes are subject to wide variation. The Corps maintains the official operation records for Farmington Reservoir. A graphical presentation of historical operation is shown on Plate 4-6.

4-08. Water Quality. The Corps does not have a program of water quality sampling for the Farmington Project because inundations within the reservoir area and significant channel flows only occur for short durations during rain flood events. Streams in the basin are intermittent with little or no natural flow during the summer. The streams are used primarily for irrigation conveyance and return flow. During low flow conditions, surface water quality is degraded by irrigation return flows. During the high flow periods, irrigation return flows represent only a fraction of the total runoff volume and are therefore diluted. Surface water quality within the watershed has not impacted project operation.

The quality of the ground water is variable. Municipal, industrial and agricultural water users in the area have relied heavily on ground water supplies. In northern and eastern portions of San Joaquin County, the ground water is generally of good quality. The central, southern, and

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western parts of the county have water quality problems caused primarily by saline intrusion and agricultural practices. Ground water extraction rates exceed recharge rates. Ground water overdraft is contributing to the eastern migration of poor quality saline ground water from the Delta into the Stockton area. Ground water quality within the basin does affect project operation. In order to reduce ground water overdrafts and the continued degradation of the ground water quality, Rock Creek is used to convey surface water through Farmington Dam from the New Melones Project. Both Stockton East Water District and the Central San Joaquin Water Conservation District import surface water from outside the basin.

4-09. Channel and Floodway Characteristics. Littlejohn, Rock, Hoods and Simmons creeks drain into the Farmington Reservoir. The flows from Simmons and Rock Creek originate from Woodward and Salt Spring Valley reservoirs, respectively. Floods in this region are most often the result of prolonged general storms in the mountains and valley floor area. Intense rains above Farmington Dam and the Duck Creek Diversion Works produce floods characterized by high peak flows of only a few hours duration. Littlejohn Creek is long and narrow, except at the lower end, and has a much shallower slope than the other creeks. Flood peaks from Littlejohn Creek are expected to be larger and should occur much later than those from Rock and Hoods creeks.

The stream systems in the Littlejohn Creek Stream Group Basin form an extremely complex system of interconnected tributary, distributary, and anabranch channels. Below Farmington Dam, Littlejohn Creek divides into two distributaries, North and South Littlejohn creeks. Each creek divides further into north and south branches, which flow westerly into French Camp Slough, and then into the San Joaquin River. Prior to project construction, simultaneous floods from Lone Tree Creek, Duck Creek, and the main north and south branches of Littlejohn Creek below Farmington Reservoir would produce a common flood plain area. Flooding in the valley floor areas occurs where the stream gradients are fairly flat and the channels do not have sufficient capacity to carry large flood flows. Inadequate drainage facilities, obstruction of natural channels by reeds, brush, and tules, and road and railroad fills across the flood plain also contribute to flooding problems.

The channel capacity on Littlejohn Creek below Farmington Dam is 2,000 cfs (56.6 m³/s). The channel capacity of Duck Creek, below the diversion dam, is 700 cfs (19.8 m³/s). The outlet capacity of the diversion dam is 500 cfs (14.2 m³/s). Soils of the Littlejohn Creek Stream Group and the creek banks of the earthen channels are highly erodible. The Littlejohn Creek channel, between the dam and the town of Farmington, and the Duck Creek Diversion channel are required to be maintained and cleared of any obstructions by San Joaquin County.

Travel time to the town of Farmington is about 3 hours from the Duck Creek near Farmington gage, and about 1 hour from the Duck Creek Diversion gage. Travel time from Farmington Dam to the town of Farmington is about 3 hours. Table 4-9 displays travel times and channel capacities for the area.

TABLE 4-9 TRAVEL TIME AND CHANNEL CAPACITY		
Point to Point	Hours	Capacity (cfs)
Farmington Dam to Duck Creek Diversion Channel	2	2,000
Duck Creek Diversion Channel to Littlejohn Creek at Farmington	1	2,000
Duck Creek Diversion Dam to Littlejohn Creek via Duck Creek Diversion Channel	1	2,000
Duck Creek near Farmington to Duck Creek Diversion Channel	1	1,000-2,000
Source: Water Management Section, Sacramento District, USACE		

4-10. Upstream Structures. There are two dams located upstream that have no significant effect on the flood control operation of Farmington Project, but whose failure could possibly cause damage: Salt Spring Valley Dam and Woodward Dam.

Salt Spring Valley Reservoir, located 16 miles (25.7 km) above Farmington Dam on upper Rock Creek, has a drainage area of 20 square miles (51.8 km²) and a storage capacity of 10,900 acre-feet (13.2 hm³). Salt Spring Valley Reservoir does not contain any flood control storage. Owned and operated by Rock Creek Water District, this reservoir provides irrigation water for land owners in the area. The outlets and spillway discharge into Rock Creek.

Woodward Reservoir, located 5 miles (8.0 km) above Farmington Dam on Simmons Creek, has a drainage area of 11.7 square miles (30.3 km²) and a storage capacity of 36,000 acre-feet (44.4 hm³). Owned and operated by the South San Joaquin Irrigation District, this reservoir stores snowmelt water diverted from the Stanislaus River for subsequent use on lands lying south of Littlejohn Creek. At Woodward Reservoir, a normal wintertime operation consists of maintaining a moderate recreation pool. The outlet works do not discharge into Littlejohn Creek, and there is no spillway.

4-11. Downstream Structures. See Paragraph 2-04 for more on downstream structures.

4-12. Economic Data. The Farmington Project lies in San Joaquin, Stanislaus, and Calaveras counties. Diversified agriculture and related manufacturing and industrial activities, such as food processing and fabrication of agricultural machinery, dominate the economy in this region.

Urban, commercial, and industrial developments are concentrated near the city of Stockton. Stockton is the principal trade center in the area because of its location and transportation facilities. Surface transportation facilities in the area include an interstate highway, three state highways, two major county highways, and a network of county roads. Rail transportation is

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furnished by Union Pacific Railroad, the Atchison, Topeka and Santa Fe Railroad, and the local Tidewater Southern Railroad. The Stockton Metropolitan Airport and the Stockton Deep Water Ship Channel (an inland port) also serve the area.

Land above Farmington Dam is zoned for agricultural use and categorized as limited-based agricultural land, suitable for rangeland or non-irrigated pasture. Land use in the flood control basin consists primarily of seasonal grazing. The reservoir lands and basin, above Farmington Dam, are primarily within Stanislaus and Calaveras counties.

a. Population. The city of Stockton is the administrative, industrial and commercial center for San Joaquin County and the surrounding area. Population estimates from the 2000 Census, within the San Joaquin, Stanislaus, and Calaveras counties, appear in Table 4-10.

TABLE 4-10 POPULATION							
LOCALITY	POPULATION BY YEAR						
	1970	1980	1990	2000	2003	2010*	2020*
San Joaquin	290,208	347,342	480,628	563,598	613,500	747,149	989,462
Stanislaus	194,506	265,900	370,522	446,997	481,600	559,051	653,841
Calaveras	13,585	20,710	31,998	40,554	42,450	49,599	59,691

* Estimated by California State Department of Finance, Demographic Research Unit:
http://www.dof.ca.gov/HTML/DEMOGRAP/DRU_Publications/Projections/P-1_Tables.xls

b. Agriculture. Agricultural pursuits in the valley include irrigated pasture for beef and dairy cattle, vineyards, extensive orchards (including walnut and almond), and the production of alfalfa, wheat, barley, safflower, sugar beets, grain, corn, tomatoes, cucumbers and green peppers. Crops in the Farmington Reservoir Basin include corn, sugar beets, and beans. Untilled portions of the basin support livestock (primarily cattle). Tables 4-11 and 4-12 indicate the value of agricultural activities in the region.

TABLE 4-11			
GROSS VALUE OF COMMODITY GROUP PRODUCTION BY COUNTY, 2002			
COMMODITY GROUP	GROSS VALUE OF AGRICULTURAL PRODUCTION (\$1000)		
	SAN JOAQUIN	CALAVERAS	STANISLAUS
Field Crops	150,922	4,969	139,898
Seed Crops	3,913	0	561
Vegetable Crops	251,032	170	105,508
Fruit and Nut Crops	517,295	2,444	393,520
Nursery and Cut Flowers	119,072	545	85,889
Apiary Products	8,791	257	7,323
Livestock	32,050	6,496	64,785
Livestock Products	239,311	907	390,077
Poultry	5,230	1,932	177,892
Poultry Products	13,000	0	9,998
TOTALS	1,340,616	17,720	1,375,451
Source: Summary of County Agricultural Commissioners' Reports, 2002, California Agricultural Statistics Service. Retrieved from the National Agricultural Statistics Service (NASS) web site: http://www.nass.usda.gov/ca/bul/agcom/indexcav.htm			

TABLE 4-12		
GROSS VALUE OF FIVE MAJOR CROPS GROWN IN SAN JOAQUIN COUNTY, 2002		
CROP	GROSS VALUE (\$1,000)	PERCENT STATE TOTAL
Grapes, All	237,387	7.5
Tomatoes, All	105,802	18.5
Almonds (Meat)	89,840	7.4
Walnuts, English	75,600	21.5
Cherries, All	69,430	45.6
Source: Summary of County Agricultural Commissioners' Reports, 2002, California Agricultural Statistics Service. Retrieved from the National Agricultural Statistics Service (NASS) web site: http://www.nass.usda.gov/ca/bul/agcom/indexcav.htm		

c. Industry. The agricultural industry is the largest employer in the area. Other economic activities in this region include mining, lumbering and forest products, sand and gravel operations, and recreation. Table 4-13 contains 1997 Census "Employment and Total Sales Figures" for the Stockton Metropolitan Area.

TABLE 4-13		
EMPLOYMENT AND TOTAL SALES BY TRADE CATEGORY		
TRADE CATEGORY	TOTAL EMPLOYEES	TOTAL SALES (\$1,000)
Manufacturing	24,646	5,879,100
Wholesale	9,751	7,651,700
Retail	19,957	3,679,600
Source: 1997 Economic Census, Summary Statistics for Stockton-Lodi, CA MSA, U.S. Census Bureau, 1997		

d. Flood Damages. Agricultural losses during floods would include erosion and deposition of debris and silt on crop and pasture lands; damage to orchards due to flooding of trees; damage to farm improvements such as irrigation systems, diversion facilities, and fences; possible loss of crops, livestock, and poultry; increased cost of livestock maintenance; the cost of having land out of production for extended periods, and land treatment for weed infestation. Other flood losses would include damage to foundations, floors, furnishings, and lawns and gardens. Commercial losses would include damage to structures and equipment, loss of business and inventories, and costs of cleanup and repair.

The impact of flooding is not limited to areas actually flooded. For example, floodwater may interrupt or contaminate domestic and industrial water supply or break sewer mains that an entire subdivision depends upon, thus creating inconvenience and potential health hazards. Floods may also interrupt surface transportation, public utility services, and may affect areas far removed from those actually flooded, resulting in personal discomfort, inconvenience, cessation of industrial and commercial activities, and loss of business and worker income. Also, emergency situations could be very difficult to deal with, due to lack of communication or transportation. Meeting the costs of emergency flood relief, flood-fighting, cleanup, and repair and restoration of public facilities damaged or destroyed by floods has an impact that far transcends the flooded areas, because city, county, state and federal tax revenues must be used. This reduces revenues available for other services, especially on the local level. Other impacts outside the flooded areas may include closed schools and inconvenience to the traveling public. Farm-centered communities such as Farmington and French Camp could suffer from loss of business activity when agricultural areas, which the community depends upon, are flooded and crops are lost or significantly reduced.

Table 4-14 shows dollar values of damages prevented by Farmington Project operation during selected historical floods.



The cumulative damages prevented over the 53 years of project operation is calculated by summing the dollar amounts in each year of occurrence. These dollar amounts have not been adjusted for inflation.

V - DATA COLLECTION AND COMMUNICATION NETWORKS

5-01. Hydrometeorological Stations

a. Facilities. Precipitation, stream stage, and reservoir pool elevation data are collected at locations both upstream and downstream from Farmington Dam. Plate 4-1 shows the location of stream gages operated by the Corps (USACE), the U.S. Bureau of Reclamation (USBR), the U.S. Geological Survey (USGS), Stockton East Water District (SEWD), San Joaquin County (SJCO), and the California Department of Water Resources (DWR). Plate 4-5 shows the location of climatological gages operated by USACE, the National Weather Service (NWS), and SJCO.

The Sacramento District Office (CESPK) maintains its own network of Data Collection Platforms (DCP) to collect pertinent hydrometeorological data for Corps projects. This District-wide system is known as the Hydrometeorologic Automatic Data Acquisition (HADA) system. Gages are added to the HADA system when CESPK Water Managers deem a gage site to be necessary for the proper operation of a project. Table 5-1 lists the HADA system gages used by CESPK Water Managers for the real-time flood control regulation of Farmington Dam.



. The various stream gage locations also have staff gages. These can be used to confirm the pool or stage instrument's reading and make manual readings, should the automated instrumentation fail.

The Corps monitors flows conveyed from the Stanislaus basin for SEWD/CSJWCD via the SEWD/Corps cooperative gages described below:

(1) Goodwin Tunnel Outlet. Both flow and precipitation data are collected at the Stockton East Goodwin Dam Diversion tunnel. Flow data is obtained from a flow meter located in the tunnel upstream from the outlet.

EWD also owns and maintains the flow meter system located at the Goodwin Tunnel outlet. The Sutron DCP, solar panels, and tipping bucket are owned and maintained by the Corps of Engineers, Water Management Section; the precipitation records are maintained by the Corps of Engineers.

(2) Upper Farmington Canal Outlet Located at the Shirley Gulch Turnout. Stage and precipitation data is collected where the Upper Farmington Canal discharges at the Shirley

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Gulch turnout. [REDACTED]

[REDACTED] The pressure transducer and power supply are owned and maintained by the Stockton East Water District. The Sutron DCP and precipitation gage are owned and maintained by the Corps of Engineers, Water Management Section. Stage-discharge rating curves and tables are provided to the Corps of Engineers by Stockton East Water District. Official stage and precipitation records are maintained by the Corps of Engineers.

(3) Farmington Dam Outlet. [REDACTED]

[REDACTED] The flow meter is owned and maintained by the Stockton East Water District. During the flood season, the flow meter system in the Farmington Dam outlet supplements the Corps data during low flows. During non-flood periods, the flow meter readings are normally the most accurate and are an alternative means of supplementing or replacing the Corps' computed outflow.

(4) Lower Farmington Canal near Upper Portion. [REDACTED]

[REDACTED] SEWD's Sutron DCP collects data from this site and will be hardwired to the Corps' Farmington Dam Sutron Control/Data Platform, which will log this data also. All equipment located at the diversion facility is owned and maintained by Stockton East Water District. All official records, at this site, are maintained by Stockton East Water District.

(5) Rock Creek near Farmington. The stream gaging station is located on Rock Creek approximately 12 miles downstream of the Lower Farmington Dam Diversion Structure. Stage and precipitation data are collected at this site. [REDACTED]

[REDACTED] The Sutron DCP and all related equipment are owned and maintained by the Corps of Engineers, Water Management Section. Official records of the stage and precipitation are maintained by the Corps of Engineers.

b. Reporting. The telemetered gages, listed in Table 5-1, report directly to the District Office, via line-of-sight (LOS) radio, telephone, and/or through the District's microwave backbone. Under normal operations, the gages are polled on an hourly basis. Data is logged at the gage every 15 minutes and can be collected with the same frequency, if conditions so warrant.

c. Maintenance. The Water Management Section, Engineering Division, Sacramento District, U.S. Army Corps of Engineers, is responsible for maintaining the Corps gages listed in Table 5-1. SEWD is responsible for maintaining portions of the SEWD/Corps cooperative instrumentation located in the Goodwin Tunnel outlet, the Upper Farmington Canal at Shirley Gulch turnout, the Rock Creek outlet, and the Lower Farmington Canal, as identified previously.

Stockton East Water District maintains the official records for these gages.

he Sacramento District has an agreement with a contractor to perform monthly stream flow measurements in this region.

TABLE 5-1
FARMINGTON DAM REAL-TIME
HYDROMETEOROLOGIC DATA COLLECTION SITES

Station Name and Mnemonic		Collected Parameters	Via	Agency
Farmington Dam (Pool)	FRM	Pool Elevation Precipitation Temperature Position of Gate 1 Position of Gate 2	R, P	Corps
Farmington Dam (Outflow)	FRM	Total Outflow Diversion Flow	R, P	SEWD
Duck Creek near Farmington	DCK	Stream Stage	R, P	Corps
Duck Creek Diversion	DUC	Stream Stage	R	Corps
Littlejohn Creek at Farmington	FRG	Stream Stage	R	Corps
Flowers Mountain	FLW	Precipitation Temperature	R	Corps
Rock Creek below Farmington Dam	RCF	Stream Stage	R	Corps
Upper Farmington Canal at Shirley Gulch Turnout	SHG	Stream Stage Precipitation	R	SEWD/Corps
Upper Farmington Canal at Goodwin Tunnel (Stockton East Tunnel)	SET	Total Flow Precipitation	R	SEWD/Corps
<u>KEY</u> Via: Radio (R) Phone (P) Agency: Indicates the agency responsible for the gage.				

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5-02. Water Quality Stations

a. Facilities. CESPK does not maintain or collect water quality data either at the reservoir or on the upstream or downstream tributaries of Farmington Reservoir. This type of data is not required for the real-time flood control operation of Farmington Dam.

b. Reporting. Water quality data is currently not collected, reported, or maintained by CESPK on Farmington Dam.

c. Maintenance. CESPK has no maintenance responsibilities with respect to water quality stations.

5-03. Sediment Stations

a. Facilities. CESPK does not maintain or collect any sediment data on either the upstream or downstream tributaries of Farmington Dam. This type of data is not required for the real-time flood control operation of Farmington Dam.

b. Reporting. Sediment data is currently not collected, reported, or maintained by CESPK on Farmington Dam.

c. Maintenance. CESPK has no maintenance responsibilities with respect to sediment stations.

5-04. Recording Hydrologic Data. In general, the agency or organization responsible for a particular gage is also responsible for maintaining the official record for that gage. Therefore, the Sacramento District maintains the official record for the Corps-maintained gages listed in Table 5-1. SEWD is responsible for maintaining the official record of flow and stage data collected by its downstream flow meters.



Once data is transmitted to the District Office, the data is stored and maintained in database files located on the District's Water Control Data System computers. Both the raw hydrometeorological data listed in Table 5-1 and data computed from the raw data (e.g., reservoir storage, inflow, outflow, and stream flows) are maintained in the database. It is intended that this data will be kept on file, for archival purposes, for the life of the project and beyond.

5-05. Communication Network. Both voice radio and telephone communications are maintained between the Sacramento District Office and its manned projects. 

[REDACTED], voice communications are maintained between the Water Management Section and the responsible Project Office, namely the New Hogan Dam and Lake Project Office. Radios in manned offices have back-up power from batteries and standby generators.

[REDACTED]

5-06. Communication with Project

a. Regulating Office with New Hogan Dam and Lake Project Office. In the event that all communication between the Sacramento District and the Farmington Dam Project should be interrupted, a set of "Standing Instructions to Project Operators" has been compiled for Farmington Dam, and a copy of these instructions is included as Exhibit A of this manual. Personnel responsible for project operation are listed in the front of this manual and in Exhibit A.

b. Between Regulating Office and Others

(1) Close coordination between the Corps and the Stockton East Water District (SEWD) is necessary when transitioning to and from flood operation. This will limit the effects of the operation of the Stockton East Water District's Rock Creek diversion structure on flood operation.

(2) Under special conditions, the Water Management Section may initiate contact with San Joaquin County in regard to channel maintenance or operation of either the Duck Creek Diversion outlets or the North Littlejohn Creek Control Structure.

c. Between New Hogan Lake Project Office and Others. Exhibit E identifies the various agencies that require notification in the event of a flood emergency.

5-07. Project Reporting Instructions. Communications between the Water Management Section and the New Hogan Dam and Lake Project Office may be made to provide special instructions regarding the Farmington Project. Radio or telephone communication should be used by the New Hogan Dam and Lake Project operators to report any failure of machinery, of other equipment, or any other unusual conditions at the dam. Also, hydrologic data should be reported in the same manner, if requested, based on the Operational Data Requirements as described in Exhibit A. Personnel responsible for project operation are listed in the front of this manual and in Exhibit A.

All significant inquiries received from citizens, constituents, or interest groups regarding water control procedures or actions must be referred directly to the Water Management Section. Press inquiries must be referred directly to the Public Affairs Office (PAO), Sacramento District.

5-08. Warnings. CESPK maintains contact with the local district office of the National Weather Service (NWS) at all times concerning general meteorological conditions.

Personnel from the NWS Office in Sacramento and the California Department of Water Resources (DWR) are assigned to the Joint Federal-State River Forecast Center in Sacramento, which monitors weather conditions and river stages on a year-round basis. When floods are imminent, the State Flood Operations Center is activated. It operates on a 24-hour basis in conjunction with the River Forecast Center. In addition, among other flood emergency activities, the center advises interested parties of flood situations as they develop. The Flood Operations Center furnishes flood information and flood warnings to the local news media, law enforcement agencies, and other agencies for dissemination to the public.

The Park Manager of the New Hogan Dam and Lake Project Office will issue warnings to local agencies by telephone. Exhibit E lists the various agencies that will be notified in the event of a serious emergency or imminent dam failure.

The DWR, through the Flood Operations Center, coordinates flood-fighting activities throughout the state, and is authorized to receive requests from local public agencies for assistance during floods. The Corps responds to requests from the DWR Flood Operations Center for flood-fighting and rescues when the emergency is beyond the capabilities of state and local government agencies.



he local jurisdiction must then adopt emergency procedures that include, among other things: specific routes to be used for evacuation, traffic control measures, movement of people without their own transportation, shelter of evacuees, evacuation and care of people from institutions, perimeter security, interior security, and re-occupation of evacuation areas.

VI - HYDROLOGIC FORECASTS

6-01. General. Although reliable long-term rain flood forecasting is not available at this time, short-term precipitation forecasts are currently available. These are useful for anticipating release changes due to increased inflow or changes in downstream conditions, and may also aid in the anticipation of damaging flows, thereby allowing for the earliest possible warnings.

a. Role of the U.S. Army Corps of Engineers. The Corps monitors weather forecasts and Quantitative Precipitation Forecasts (QPF) issued by the National Weather Service (NWS). The Corps also communicates directly with NWS personnel to receive the latest weather conditions and projections. During extreme flood conditions, the Corps of Engineers informs the Joint Federal-State River Forecast Center (RFC) of large flood releases from Corps projects. The RFC uses the information to aid in forecasting flows on the San Joaquin River.

b. Role of Other Agencies

(1) The NWS furnishes meteorological data and weather forecasts on a 24-hour basis. When the meteorological situation indicates general area precipitation, NWS furnishes Quantitative Precipitation Forecasts. For short-term forecasts, the NWS provides a QPF covering the next 24-hour period. The data is broken down into 6-hour increments. These short-term forecasts are updated twice daily at 4:00 a.m. and 4:00 p.m. For long-term forecasts, the NWS provides 6-Day QPFs. The data is provided as daily totals. The NWS provides precipitation forecasts for the Littlejohn Creek Stream Group Basin and the surrounding basins, such as the Calaveras River Basin and the Stanislaus River Basin.

(2) The Joint Federal-State River Forecast Center monitors weather conditions and river stages on a year-round basis. The RFC will forecast stages and flows on major river systems; however, forecasts are not made for the Littlejohn Creek Stream Group.

(3) SEWD and CSJWCD monitor water supply and irrigation demands within the basin.

6-02. Flood Condition Forecasts. There are currently no formalized models for forecasting the inflows into the Farmington Basin or the uncontrolled runoff below Farmington Dam at the Littlejohn Creek control point. Generally, knowledge of basin conditions and runoff characteristics is required for forecasting flows during flood conditions. Real-time streamflow data and anticipated precipitation amounts can be translated into estimated flows by means of a unit hydrograph. While forecasts can be developed for short-term runoff from rainfall, no forecasts for snowmelt-based floods will be made, since snowmelt is not a concern.

6-03. Conservation Purpose Forecasts. Flood control is the only current project purpose; therefore, no conservation forecasts are made.

6-04. Long-Range Forecasts. Long-range forecasting for flood control is not a consideration, due to short storm durations and no significant snow in the basin.

6-05. Drought Forecasts. Flood control is the only current project purpose; therefore, no drought forecasts are made.

The Governor can declare a statewide drought emergency. The Governor's Drought Action Team, headed by the Drought Administrator, exists to address drought planning. This team, established on 1 February 1991 by the Governor's Executive Order No. W-3-91, consists of representatives from the following state agencies:

- State Resource Agency
- Department of Food and Agriculture
- Office of Emergency Services
- Department of Finance
- Department of Fish and Game
- Department of Forestry and Fire Protection
- Department of Health Services
- Office of Planning and Research
- Adjutant General of the Military Department

Representatives from other state agencies may be appointed upon the recommendation of the Drought Administrator, where he finds their department or agency has statutory responsibilities, expertise, or resources which would significantly contribute to mitigation of the effects of the drought.

The Drought Administrator is also directed to invite the participation of any independent boards and commissions, and federal agencies having jurisdiction, expertise and resources which would significantly contribute to the mitigation of the effects of the drought. These include, but are not limited to, the following:

- State Water Resources Control Board
- Public Utilities Commission
- United States Department of Agriculture
- United States Department of the Interior
- United States Army Corps of Engineers
- Federal Emergency Management Agency

Any drought declaration, drought forecasts, or drought planning which may impact project operation will be the responsibility of this Drought Action Team.

VII - WATER CONTROL PLAN

7-01. General Objectives. Farmington Dam is a single-purpose project designed to provide a high degree of flood protection. Its 52,000 acre-feet (6.1 hm^3) of flood control space and downstream channel improvements offer protection to areas downstream of the project.

7-02. Constraints. Releases from Farmington Dam, insofar as possible, will be restricted so that flows in Littlejohn Creek do not exceed 2,000 cfs ($56.6 \text{ m}^3/\text{s}$) near the town of Farmington. Releases from Farmington Dam will be limited to the difference between 2,000 cfs ($56.6 \text{ m}^3/\text{s}$) and the sum of the anticipated coincidental local flow and the flow at Duck Creek Diversion. The North Littlejohn Creek Control Structure cannot be readily used to assist passing authorized flood releases from Farmington Dam, passing flows diverted to Littlejohn Creek from Duck Creek, or passing flows originating in the local area. Further restrictions to flows in Littlejohn Creek might be required to accommodate the loss of use of the North Littlejohn Creek Control Structure. Restrictions on gate setting changes are discussed in Paragraph 7-16.

The right-of-way easement for the Rock Creek Diversion Structure is located in Exhibit D. This easement grants property rights to SEWD and identifies the Farmington Dam Water Control Manual as the controlling instrument that defines the operational requirements of the SEWD facility in conjunction with operation of Farmington Dam. Operation of the diversion structure and closure of the radial gates affects operation, maintenance, and inspection of the gates at Farmington Dam, as well as flow computations. During flood control operation, it is important that the tainter gates on the Stockton East Water District (SEWD) Rock Creek Diversion Structure be operated in conjunction with the Farmington Dam gates. Since the structure is located just downstream of the outlet works stilling basin, it is capable of backing up water through the main outlet works and creating an incidental pool in the Farmington flood control easement.



7-03. Overall Plan for Water Control. The Farmington Project's operational objective is to reduce downstream flood flows along the lower reaches of Littlejohn and Rock creeks to non-damaging levels. This objective is achieved by:

a. Controlling flows in Littlejohn Creek, downstream from Farmington Dam at the Littlejohn Creek at Farmington stream gage, to existing channel capacity by restricting releases from Farmington Dam. These releases are to be restricted, insofar as possible, to the difference between 2,000 cfs ($56.6 \text{ m}^3/\text{s}$) and the sum of the anticipated coincidental local inflow below the dam and the flow diverted from Duck Creek to Littlejohn Creek via the Duck Creek Diversion Channel.

b. Providing temporary reservoir storage space for floodwaters that would otherwise have spread over the flood plain area.

c. Minimizing damaging flows in Duck Creek by diverting flood flows, in excess of the outlet capacity of 500 cfs (14.1 m³/s), into Littlejohn Creek below the reservoir via the Duck Creek Diversion Channel.

7-04. Standing Instructions to Project Operator.

During normal flood periods, the reservoir will be regulated in accordance with the normal regulations for flood control operation, as explained in Paragraph 7-05 and Exhibit A of this manual. Standing Instructions to Project Operators for flood emergencies are contained in Exhibit A. Exhibit A is designed to function as a separate and complete document, and is to be used as a flood control regulation guide. To facilitate independent use of Exhibit A, plates required for the flood control operation of Farmington Dam and Reservoir are provided therein.

7-05. Flood Control. Farmington Dam is operated for flood control only. A detailed explanation of flood control operation, including emergencies, is contained in Exhibit A.

a. Normal Regulation for Flood Control. The entire capacity of the reservoir will be reserved for flood control at all times. Flood control regulation begins when any water is stored temporarily behind Farmington Dam, according to the Water Control Plan, Plate A-14. The Water Control Plan and this manual are the authorized project documents regarding flood control operation. The Corps is responsible for the operation of Farmington Dam and for prescribing the operations of the Duck Creek Diversion and the North Littlejohn Creek Structure for the purpose of flood control. The Water Control Plan is the result of analyses of flood frequency, seasonal flood potential, and downstream channel capacities consistent with project objectives.

When the reservoir pool elevation is below 156.5 feet (47.7 m), flood control releases are made in accordance with the Schedule of Operation located on the Water Control Plan. During floods in which flow over the spillway occurs, flood control releases are made in accordance with the Emergency Operation of Outlet Gates Diagram located on the Water Control Plan. Water stored in the flood control space will be released as rapidly as downstream conditions permit.

b. Emergency Regulation. If communications with the project are disrupted, the following procedures will be followed for project operation:

(1) Continue releases in accordance with the last instructions from the Water Management Section and make every attempt to re-establish communication.

(2) If communication cannot be re-established, make releases in accordance with the Water Control Plan, Plate A-13, located in Exhibit A.

c. Constraints. Releases from Farmington Dam, insofar as possible, will be restricted so that flows in Littlejohn Creek do not exceed 2,000 cfs (56.6 m³/s), the non-damaging channel

capacity at the town of Farmington. Releases from Farmington Dam will be limited to the difference between 2,000 cfs (56.6 m³/s) and the sum of the anticipated coincidental local inflow and flow in the Duck Creek Diversion. These latter flows can be anticipated by observation of the Duck Creek near Farmington stream gage. Plate A-15 and Plate A-16 show the limitations on Farmington Dam releases imposed by the Duck Creek near Farmington flows. Plate A-16 is provided solely as a guideline to aid operation, should the Duck Creek near Farmington gage be destroyed or cease reporting. For pool elevation below 132 feet (40.2 m) during the flood season, a fixed gate opening of 1.5 feet (45.7 cm) is used to minimize the chance that high flows from Duck Creek will coincide with appreciable releases from the dam before the main outlets can be closed.

The auxiliary outlet will be maintained open at all times, except when closure is required for maintenance purposes. [REDACTED]

In addition, the restricted rate of change will minimize sloughing and caving as the flow recedes after an extended period of bank-full flows. Any water temporarily stored in the reservoir will be released as rapidly as practicable by maintaining the maximum rate of release permitted. The take line for flowage easements is 161 feet (49.0 m), which is 4.5 feet (1.4 m) above gross pool level.

This manual also defines the operational requirements of the SEWD diversion facility, located immediately below the dam, in conjunction with operation of Farmington Dam. The SEWD water conveyance system must not affect the Corps' ability to operate the Farmington Dam and Flood Control Project to meet its authorized flood control purpose.

During the rain flood season (1 October through 15 May), flows conveyed to the Farmington basin from the Stanislaus are not expected to exceed 300 cfs (8.5 m³/s). The gate settings would be sufficient to allow the conveyed flow to continue through Farmington Dam. During the non-flood season (16 May through September) of each year, the main outlet gates will be raised enough to allow the conveyed flows to pass freely through Farmington Dam. Flows in excess of 300 cfs up to 550 cfs are contingent on there being no significant impacts to the Farmington Project. The water surface elevation of any impoundment must be maintained at or below 125 feet.

In order to accommodate flood releases from Farmington Dam, close coordination is required between the Corps and SEWD regarding the operation of the Rock Creek Diversion Structure. Both SEWD and the Corps would be able to operate the radial gates of the Rock Creek Diversion Structure on a "real-time" basis either manually, remotely or via automated control in accordance with the mutually agreed upon operating conditions. In the event that [REDACTED] operation of the tainter gates is not possible, the Corps may require that the radial gates be partially or fully open during flood control operation. These requirements are to ensure against unacceptable impacts upon project operations and facilities, including the impoundment of water against the upstream toe of the Farmington Dam embankment.

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In the event of spillway flows from Farmington Dam, the Corps would require SEWD to breach the Lower Farmington Canal to direct the spill into Rock Creek below the project as designed.

The Central San Joaquin Water Conservation District (CSJWCD) operates an irrigation-distribution system, 15 March through 15 September that utilizes a combination of low-water crossings, check structures, culvert crossings and a pumping plant. Various structures can be found within the Farmington Project boundaries on Duck Creek, Rock Creek, Littlejohn Creek and the North Fork Littlejohn Creek. Backwater effects from the check structure immediately downstream of the Littlejohn Creek at Farmington stream gage renders the stream gage useless.

The channel capacity of the North Fork Littlejohn Creek channel has not been maintained at 250 cfs (7.1 m³/s), but has decreased to possibly 50-200 cfs (1.4 - 5.7 m³/s). The two screw gates of the North Littlejohn Creek Control Structure have been maintained in a closed position for several years. Decreased channel capacity, increased urbanization along the North Littlejohn Creek, and the gate closure affect the ability to operate the North Littlejohn Creek Control Structure to the current Water Control Plan.

The North Littlejohn Creek Control Structure cannot readily be used to assist passing authorized flood releases from Farmington Dam, passing flows diverted to Littlejohn Creek from Duck Creek, or passing flows originating in the local area. Further restrictions to flows in Littlejohn Creek might be required to accommodate the loss of use of the North Littlejohn Creek Control Structure.

7-06. Recreation. Although no provisions have been made for recreation, hunting (restricted to guns only) is permitted within the basin and regulated by the California Department of Fish and Game. Waterfowl and game birds are the primary species hunted. Littlejohn Creek has historically provided limited opportunity for sport fishing.

Recreational use of off-road vehicles, though common in the basin, is prohibited.

7-07. Water Quality. Although water quality control is not an authorized project purpose, compliance with Public Law 92-500 requires that all federal facilities be managed, operated, and maintained to protect and enhance the quality of water and land resources through conformance with applicable federal, state, interstate, and local substantive standards. During emergencies, the Water Manager can operate Farmington Dam to contain pollution spills either in, or downstream of, Farmington Dam and Reservoir. An emergency action plan for Farmington Dam and Reservoir is maintained at the New Hogan Dam and Lake Project Office.

7-08. Fish and Wildlife. Although fish and wildlife management is not included in the Farmington Project objective, the riparian and annual grassland areas within the flood control basin support a variety of wildlife species. In addition, Littlejohn Creek supports diverse warm water fish and fauna. An Environmental Inventory, maintained at New Hogan Dam and Lake as part of the Project Operations Management Plan (OMP) for Farmington Dam and Reservoir, contains a representative listing of fish, plant, and wildlife species that might be found in the

project area. The OMP also identifies lists of rare, threatened or endangered species that may be found within the Farmington flood control basin. Some of these endangered species include the bald eagle, Swainson's hawk, the Valley Elderberry longhorn beetle, and the giant garter snake. According to the OMP, bald eagles might use the flood control basin in years when there is water in the reservoir. Swainson hawks have been observed in the flood control basin area, and at least one nest has been recorded immediately downstream from Farmington Dam.

7-09. Water Supply. Water supply is not a project purpose. Both Stockton East Water District (SEWD) and the Central San Joaquin Water Conservation District (CSJWCD) have projects that utilize Littlejohn and Rock creeks as conveyance facilities for surface water supplied from the Stanislaus River via the New Melones and Goodwin projects. The purpose of these projects is to prevent further groundwater overdraft in the area. The surface water serves as a replacement for groundwater. This will conserve the existing groundwater supplies and maintain the water quality by delaying or halting salt-water intrusion.

SEWD operates the diversion structure below the dam to divert water from the outlet on Rock Creek to their water treatment plant via the Lower Farmington Canal. The primary purposes are to provide for irrigation, and to supply water on a wholesale basis to the county of San Joaquin, the city of Stockton, and the California Water Service Company for municipal and industrial uses. The conveyance flow rate may not exceed 550 cfs (15.6 m³/s), the maximum capacity of the Upper Farmington Canal.

 . Along Littlejohn and Rock creeks, downstream of the dam, water rights exist; consequently, neither outlet will be completely closed. Two exceptions are during floods or when proper arrangements have been made with water rights holders. SEWD has no rights to the natural flows in Littlejohn and Rock creeks.

The CSJWCD system includes various structures on Duck Creek, Rock Creek, Temple Creek, Littlejohn Creek, and North Fork Littlejohn Creek. Operation of this system is between 15 March and 15 September. When the SEWD diversion structure is in operation and the tainter gates are closed, the flows conveyed from outside the basin are not to exceed 200 cfs (5.7 m³/s). The diversion structure is operated to provide flows to the water treatment plant or to both the water treatment plant and the irrigation-distribution system. During the former mode of operation, the slide gates on the diversion structure will be open and the radial gates closed. This permits flows from the Farmington Dam outlet works to enter the Lower Farmington Canal. During the latter mode of operation, the slide gates on the diversion structure will be open and the radial gates will be partially open to provide delivery to CSJWCD.

7-10. Hydroelectric Power. There are no facilities for hydroelectric power generation at Farmington Dam.

7-11. Navigation. Navigable waters include all “waters of the United States,” which are in turn defined by regulation to include all waters that might be susceptible to use in interstate commerce and all other waters such as lakes and wetlands, which could affect interstate commerce, including those from which fish could be taken and sold in interstate commerce. There are no facilities for navigation within the basin. Navigation is not a project purpose.

7-12. Drought Contingency Plans. ER 1110-2-1941 Drought Contingency Plans, requires the development and implementation of drought management plans as part of the overall water control management activities for all projects with controlled storage. Farmington Dam and Reservoir is designed for the single purpose of flood control with no accommodations for long-term storage. Therefore, no drought contingency plan has been developed.

The Governor can declare a state-wide drought emergency. The Governor’s State Drought Action Team (SDAT) exists to address drought planning. This team, established 1 February 1991 by the governor’s Executive Order No. W-3-91, consists of key state and federal personnel, who are responsible for overseeing and coordinating state and federal responses to droughts. The Division Engineer is an SDAT member. Any drought declaration, drought forecasts, or drought planning which may impact project operation will be the responsibility of this entity.

7-13. Flood Emergency Action Plans. The New Hogan Dam and Lake Project Office has an emergency notification plan for serious emergencies and imminent dam failure. Procedures and responsibilities during emergencies are presented in Chapter IX and Exhibit A. Exhibit E lists the phone numbers for various agencies requiring notification in the event of a serious emergency or imminent dam failure.

The flood emergency activities of the Sacramento District, U.S. Army Corps of Engineers, are divided into the following four phases:

a. Normal Phase (Normal Operations). This phase is in effect during normal day-to-day operations. Emergency functions will be conducted by the normal organizational units assigned to this type of work. The Engineering Division will determine the need for obtaining hydrologic and meteorologic data during non-duty hours. If the assistance of reservoir personnel is needed, a request will be sent directly to the Project Operators. Prior to the flood season, personnel assigned to the emergency flood organization will review ER 500-1-1 and District Supplements A, B, and C, and then ready themselves to accomplish their duties.

b. Information Phase. The Chief of Water Management will place the District into Information Phase upon indication of impending floods, “flash floods,” localized short duration floods, minor floods, and the early stages of major floods when property damage is not extensive and danger to life is not serious. An alert or warning will be issued to all District personnel, including field offices and local interests in the area affected. The District may assign liaison personnel to the federal or state center during non-duty hours.

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c. Alert Phase. Whenever the flood situation becomes so severe that forecast gage heights indicate that river stages will reach or exceed the bank-full stages, the Chief, Water Management, will recommend to the Chief, Engineering Division, to advise the District Engineer to declare an Alert Stage. The Chief, Construction-Operations Division, will activate the Flood Emergency Operations Center (EOC). The EOC will be staffed with personnel necessary to maintain a close, continuous check on weather and hydrological conditions, and issue situation reports to all District elements concerned. Liaison Engineers will be assigned to the Federal/State Flood Center.

d. Mobilization Phase. The District Engineer will order mobilization whenever major flooding appears imminent, and when the District may be called to furnish major emergency assistance. Notification will be given to all parties as rapidly as possible, and flood emergency activities will be given priority over all other District activities for the duration of the mobilization period. In addition, the District's flood emergency organization will be fully activated.

7-14. Other. There are no other project purposes.

7-15. Deviations from Normal Regulation. Deviations from approved Water Control Plans occur because every possible circumstance cannot be accounted for in a Water Control Plan. Often, because of competing goals and complex interactions of interested groups/agencies, even seemingly inconsequential deviations from an approved plan can lead to unforeseen environmental and legal complications. Deviations from approved Water Control Plans are intended, therefore, to address unforeseen and unique circumstances. They are not intended as a means for identifying or initiating new opportunities to re-operate or reallocate storage in response to new and changing public needs. Section A-04 of Exhibit A and Exhibit B of this manual provides general information for preparing all deviations.

7-16. Rate of Release Change. Gate settings at Farmington Dam shall not be increased or decreased more than half a foot (15.2 cm) in any 15-minute period, except when instructed by the Water Management Section. The rates of release change from Farmington will be restricted to values that will not endanger life and property in the flood plain along Littlejohn Creek below the dam. In addition, the restricted rates of change will minimize sloughing and caving as the flow recedes after an extended period of bank-full flows.

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VIII - EFFECT OF WATER CONTROL PLAN

8-01. General. The Farmington Project regulates flood flows in the Littlejohn Creek Basin to obtain the maximum practical reduction in flood damages. The flood control storage in the reservoir is sufficient to impound up to 52,000 acre-feet (6.1 hm^3) of floodwater from about 212 square miles (549.1 km^2) of foothill area drained by Littlejohn, Rock, and Hoods creeks. The Farmington Project works independently of other projects in the San Joaquin River Basin. The effect of the project on inflows to the San Joaquin River is negligible.

8-02. Flood Control. The Water Control Plan's main objective is to prevent the inundation of areas in the lower Littlejohn Creek Basin.

a. Spillway Design Flood. The Spillway Design Flood (SDF) routing served as a basis for establishing the spillway capacity of 12,600 cfs ($356.8 \text{ m}^3/\text{s}$), the computed peak outflow. The conditions of the SDF assume that the reservoir is full to spillway capacity at the onset of the design flood, and that all outlets are inoperative throughout the passage of the flood. The maximum combined wind set of 0.2 feet (6 cm) and wave ride-up of 4.8 feet (146 cm) at the dam was calculated to be about 5 feet (1.5 m). After considering the possible failure of the existing upstream dams on Simmons and Rock creeks during the design flood, a freeboard of 5 feet (1.5 m) above maximum design pool level was recommended for use in design of Farmington Dam.

A subsequent spillway adequacy study in 1978 reevaluated the Farmington Spillway Design Flood. In 1978, two revised Probable Maximum Floods (PMF) were developed and adopted as the Spillway Design Flood (SDF), based on an analysis of the Probable Maximum Precipitation (PMP) for a general winter event. A flood similar to the PMF could result from a combination of the most severe meteorologic and hydrologic conditions in the basin above the dam. Both of the revised PMF's were routed through Farmington Reservoir with the starting storages at gross pool. Releases from the outlets were decreased as the spillway discharge increased to maintain the maximum permissible release. The outlet gates remained closed until the storage was within 5 feet (1.5 m) of the dam crest. The reservoir would control the larger flood with 1.5 feet (46 cm) of freeboard and the smaller flood with 2.8 feet (85 cm) of freeboard. Feasibility studies for possible enlargement of Farmington Reservoir are discussed in Paragraph 8-12. The revised PMF's would be used for spillway sizing of an enlarged project, if proposed.

The original Spillway Design Flood was based on U.S. Department of Commerce, Weather Bureau, Hydrometeorological Report No. 24, "Maximum Possible Precipitation over the San Joaquin Basin, California (July 1947)." It used a maximum possible 66-hour storm precipitation depth of 11.3 inches (28.7 cm), plus 1.16 inches (2.9 cm) of snowmelt. In October 1969, the Weather Bureau of the U.S. Department of Commerce, currently known as the National Weather Service, published Hydrometeorological Report No. 36, "Interim Report – Probable Maximum Precipitation in California," with revised precipitation amounts. The 1978 Farmington Dam Spillway Adequacy Studies reevaluated the SDF, based on a probable maximum storm (PMS) centered over Farmington Dam for a 64-hour period, with a PMP total of 14.1 inches (35.8 cm).

The average depths of precipitation for 6, 12, 24, 48 and 64 hours are 0.60, 1.26, 2.88, 12.00 and 14.1 inches (1.5, 3.2, 7.3, 30.5, and 35.8 cm), respectively.

Snowmelt was not considered in the reevaluation, since antecedent conditions would melt any snowpack in this low elevation basin. The adopted unit hydrograph for the PMF is similar to that obtained from historical reproductions, except that the peak has been increased slightly and the lag time shortened to make for a more hydraulically efficient basin. The flood computations were made assuming that the entire 212 square mile (549.1 km²) area above Farmington Dam is contributing, even though Woodward Reservoir has sufficient capacity to store PMF runoff originating above it.

Two new PMF's were computed based on failure and no failure at Salt Springs Valley Dam. Pertinent data regarding the original Spillway Design Flood and the two computed PMF's is presented below:

	1949	1978	
	Original	(1)	(2)
Peak Inflow (cfs)	56,000	161,000	100,000
6-Day Volume (acre-feet)	123,000	139,000	128,000
Maximum Storage (acre-feet)	119,000	148,000	139,000
Maximum Spillway Discharge (cfs)	2,600	18,600	16,600
Surcharge (ft)	12.5	16.7	15.4
Surcharge Elevation (ft)	169.0	173.2	171.9
Freeboard (ft)	5.0	0.8	2.1

(1) Assumes failure of Salt Springs Valley Dam

(2) Assumes no failure of Salt Springs Valley Dam

Routings of the original Spillway Design Flood and the revised Probable Maximum Floods through Farmington Reservoir are shown on Plate 8-1, sheets 1 and 2.

b. Reservoir Design Flood. The Reservoir Design Flood (RDF) series, shown on Plate 8-2, was based primarily on the pre-record flows of January 1911. The RDF is based on the most severe series of floods indicated, by all available information, to have occurred in the vicinity. The capacity of the reservoir is designed to control channel capacities downstream to non-damaging levels. The permissible reservoir outflows were governed by the estimated downstream channel capacity of 2,000 cfs (56.6 m³/s), less the coincidental contributions from the intervening Duck Creek Diversion. Such contributions amounted to the coincidental flows from the Duck Creek watershed, less the flow that could be permitted to continue down the Duck Creek channel without damage below the diversion point.

c. Floods of Record. Hypothetical flood routings of the December 1955 and April 1958 rain floods and the historical flood routings of the February 1986 and February 1998 rain floods are shown on Plate 8-3, Sheets 1-4.

8-03. Recreation. Recreation is not a project purpose. Therefore, recreational activities are not monitored. Any impact of project operation on recreational opportunities in the basin is incidental.

8-04. Water Quality. Water quality within the flood control basin is not currently monitored. Project operation is expected to have no impact on water quality within the basin, because the dam impounds water only for short durations during the flood season.

8-05. Fish and Wildlife. Support of fish and wildlife is not a project purpose. Therefore, its effects are not monitored. Any impact of project operation on fish and wildlife in the basin is incidental. Exhibit F contains coordination letters with the environmental resource agencies regarding diversions from the Stanislaus basin. Conveyance of water diverted into the basin is expected to benefit fish and wildlife, since Littlejohn and Rock creeks are normally dry from late spring through early fall.

8-06. Water Supply. The entire capacity of the reservoir is for flood control only. Operation of the project, in accordance with flood control requirements, does not infringe upon any established water rights.

8-07. Hydroelectric Power. There are no hydroelectric power generation facilities associated with this project.

8-08. Navigation. There are no navigation facilities associated with this project. Navigation is not a project purpose.

8-09. Drought Contingency Plans. A drought contingency plan was not prepared for this project. The Farmington Project provides for flood detention storage only, not for long-term water conservation storage.

8-10. Flood Emergency Action Plans. During flood emergencies, project operation provides benefits by defining procedures for warning downstream interests. Benefits can also be expected during non-flood emergencies, such as pollution abatement. Procedures and responsibilities during emergencies are presented in Chapter IX and Exhibit A.

8-11. Frequencies

a. Unregulated Flow Frequency. Unregulated flows and statistical parameters for Littlejohn Creek below Farmington Dam are tabulated in Table 8-1 (see page T8-1). The computed and adopted statistics, shown in Table 8-1, are based on the data presented for water years 1952-2004. The rain flood flow frequency curves for peak, 1-day, 3-day, 7-day, 15-day, and 30-day durations are shown on Plate 8-4. These curves were derived using procedures

contained in Bulletin 17B, "Guidelines for Determining Flood Flow Frequency," published by the U.S. Water Resources Council. Water year 1977 qualified as a zero flow year. The six lowest non-zero points were censored for each curve to show the predominant trend set by the remaining data points. The final statistics have been adjusted to allow for orderly transition between curves of different durations. Also, both an expected probability adjustment and a conditional probability adjustment have been applied to the data.

Unregulated curves and statistical parameters were not developed for the key point, Littlejohn Creek at Farmington. The flow contributions from the 7.9 square mile (20.5 km²), low lying, local drainage area between Farmington Dam and the Littlejohn Creek at Farmington gage are small in comparison with the unimpeded runoff from the 212 square miles (549.1 km²) of drainage area above the dam.

b. Regulated Flow Frequency. Peak Flow Frequency Curves for Littlejohn Creek, below Farmington Dam and Littlejohn Creek at Farmington, are shown on Plates 8-5 and 8-6, respectively. The curves reflect the operation of Farmington Dam from water years 1952-2004. In order to extend the frequency curves to include very rare events, hypothetical floods were routed through Farmington Dam and down to Littlejohn Creek at Farmington.

c. Pool Elevation, Duration and Frequency. Pool Elevation-Frequency and Pool Elevation-Duration curves for Farmington Reservoir are shown on Plates 8-7 and 8-8, respectively. These curves reflect the operation of Farmington Dam from water years 1952-2004.

d. Seasonal Variation of Storage. The Seasonal Variation of Storage Frequency is shown on Plate 8-9. Since Farmington is a dry dam, there is normally little or no impoundment. When impoundment of flood flows does occur, it is for a short duration. Historically, storage variations are due to storm events occurring mainly during the months of November through April.

8-12. Other Studies. Based on SEWD interest in the water storage potential of the facility and on SEWD's expression of interest in obtaining ownership of Farmington Dam, the U.S. Army Corps of Engineers, Sacramento District, prepared an Initial Appraisal Report in July 1995 to assess the possible transfer of Farmington Dam from the Corps of Engineers to the Stockton East Water District (SEWD). Under the Water Resources Development Act (WRDA) of 1996, the Corps of Engineers was directed to complete a reconnaissance study to determine the potential for improving Farmington Dam for increased water supply, the viability of Farmington Dam for conjunctive use as well as the extent and nature of flood control for the Stockton area. Accordingly, the Sacramento District initiated the Stockton Metropolitan Area Reconnaissance Investigation in 1996. Completion of the study resulted in a final revised report dated December 1998, entitled "Farmington Dam and Reservoir, California – WRDA 1996 Section 411 – Conjunctive Use Study."

The results of the Conjunctive Use Study led to the re-programming of WRDA 1996 Section 411 funds to conduct a feasibility study for a groundwater recharge and seasonal waterfowl habitat project using the yield resulting from re-operation of the Farmington Flood Control Project. This

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feasibility study began in July 1999 and produced a final report dated August 2001, entitled "Farmington Groundwater Recharge and Seasonal Habitat Study." The feasibility study was scaled back to a study report because WRDA 1999 authorized \$25,000,000 for groundwater recharge and conjunctive use projects in Stockton East Water District, California, authorizing the project then currently under study. In FY 2002, the Farmington Groundwater Recharge and Seasonal Habitat (Farmington Project) received a construction start with an appropriation of \$600,000. The Farmington Project will be completed in phases over the next seven to ten years. It may ultimately recharge an average of 35,000 acre-feet every year from the Stanislaus River and other existing water supplies, and provide seasonal waterfowl habitat on 1,200 acres.

SEWD has applied for a water right to appropriate flood flows generated from the Littlejohn and Rock Creek watershed, as well as, the Stanislaus River. This water will be used for irrigation, municipal purposes, wildlife enhancement, and recharging the critically overdrafted groundwater basin. This should lead to the creation of an underground hydraulic barrier that will protect the resulting high quality groundwater basin from further saline intrusion from the Sacramento-San Joaquin River Delta side of the basin.

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IX - WATER CONTROL MANAGEMENT

9-01. Responsibilities and Organization

a. The U.S. Army Corps of Engineers. The primary responsibility for operating Farmington Dam and Reservoir is delegated to units of the Engineering Division and Construction-Operations Division of the Sacramento District, Corps of Engineers, as outlined below. The Sacramento District's Public Affairs Office (PAO) coordinates with local news media regarding floods and other aspects of project operation. The names, addresses, and telephone numbers of those individuals whose responsibilities are outlined in the following paragraphs appear at the front of this manual and in Exhibit A.

(1) Water Management Section (Engineering Division) has the following responsibilities:

(a) Obtaining current weather forecasts for the region.

(b) Analyzing current reservoir and hydrometeorologic data, weather forecasts for the region, and determining the schedule under which the reservoir shall be operated.

(c) Accomplishing remote operation of gated outlets.

(d) Performing remote gate testing at least once a month or whenever District personnel are physically present at the Farmington Project. District personnel are usually from the Water Management Section or the New Hogan Project. Each gate is raised and lowered by the Sacramento District Office on a regular basis, in order to ensure that the gates are fully functional. Personnel present at the site provide verification that the remote system is functioning. During the flood season, the main outlet gates may be tested as often as bi-weekly to ensure proper operation. The gates will be brought through a full cycle, raising them a 1/2 foot every 15 minutes until fully open

(e) Providing Project Operator training to New Hogan Dam and Lake personnel.

(f) Providing maintenance for hydrometeorological instrumentation and gage control equipment at the project and supervising its operation.

(g) Preparing monthly operation and other special reports relative to the operation of the project.

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

(2) New Hogan Dam and Lake Park Manager designees (Construction-Operations Division) have the following responsibilities:

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

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

(c) Accomplishing the physical operation of the outlet works in accordance with instructions issued by the Water Management Section, if requested.

(d) Reporting data to the Water Management Section, if requested.

(e) Reporting any unusual conditions of the dam embankment, the downstream channels, or the operating gate equipment that might interfere with planned operation of the project.

(f) Making emergency operation changes when contact with the Water Management Section is broken, and a clearly defined change occurs that warrants immediate action.

(g) Providing maintenance of dam and appurtenances.

(h) Keeping familiar with operation of the tainter gates of the Stockton East Water District (SEWD) Rock Creek Diversion Structure, and being prepared to operate the structure if requested by the Water Management Section.

b. Other Federal Agencies

(1) The National Weather Service (NWS) furnishes meteorological data and weather forecasts on a 24-hour basis. When the meteorological situation indicates general area precipitation, NWS furnishes Quantitative Precipitation Forecasts (QPF). (See Paragraph 6-01 b.)

(2) The Joint Federal-State River Forecast Center (RFC) monitors weather conditions and river stages on a year-round basis. The RFC forecasts stages and flows on major river systems. However, forecasts are not made for the Littlejohn Creek Stream Group.

(3) The Federal-State Flood Operations Center furnishes flood warnings and forecasts of river stages to the local news media, law enforcement agencies, and other responsible agencies for their use and for dissemination to the public.

c. State and County Agencies

(1) The State of California Water Resources Control Board administers water rights for the natural flows along Littlejohn and Duck creeks.

(2) The San Joaquin County Department of Public Works has the following responsibilities:

(a) Providing channel maintenance in Littlejohn and Duck Creeks.

(b) Providing operation of the gated outlet at the Duck Creek Diversion Dam, as indicated in Exhibit A.

(c) Operating the North Littlejohn Creek Control Structure.

(3) The Stockton East Water District, a state-sponsored local agency, owns and operates the Rock Creek Diversion Structure. SEWD is responsible for the following, which apply to both normal and emergency conditions:

(a) Operating the diversion structure in compliance with Corps requirements, as defined in Paragraph A-03. The operation of the water conveyance system shall not impact the Sacramento District's normal operation and maintenance plans or scheduling, dam inspections, or in any way impact the Corps' ability to operate the Farmington Dam and Flood Control Project to meet its authorized flood control purpose. SEWD will maintain the necessary equipment at the site, including a generator and battery-operated drills, to enable rapid operation of the radial gates either manually, remotely, or via automated control at any and all times necessary.

(b) Maintaining all physical components of the diversion structure and canal, including the flow metering system. During the non-flood season (diversion structure operating), the flow meters are necessary because backwater impacts Corps equipment and flow computations. During the flood season, the system supplements Corps data. During periods of low flow, the flow meter readings may be more accurate and are an alternative means of supplementing or replacing the Corps' computed outflow. Real-time outflow, diversion flow, and outlet stage data are recorded by the metering system.

(c) Accommodating Corps dam inspections by evacuating all standing water in the stilling basin, removing sediment accumulated within the stilling basin and below the Rock Creek Diversion Structure, and fulfilling other maintenance requirements.

(d) Having both tainter gates fully open within one hour of a request for such by the Corps, in response to a flood or other emergency. In consideration of the water and riparian rights holders downstream of the dam, SEWD must monitor for natural flows and operate the radial gates to allow passage of these flows to the natural discharge channel. When

no natural flows are anticipated, the radial gates can remain closed to create the pool necessary for up to 300 cfs flow to enter the Lower Farmington Canal. If the Corps determines that naturally occurring or forecasted high flows will impact Farmington flood control operation, the Corps will notify SEWD; SEWD will direct the USBR to cease any conveyances from the Stanislaus River basin into the Farmington basin.

(e) Implementing mitigation measures per Corps requirements:

(i) SEWD established a garter snake mitigation pond and channel adjacent to the Rock Creek Diversion Structure. A pipe extends through the sidewall to connect the forebay area to the mitigation pond area. During the winter diversion, SEWD will ensure that the pipe inlet is shut off either through installation of a valve or by capping. A dry-down period after October 1 is required to minimize the development of large predatory fish in the pond/channel mitigation area. During the period of summer diversion, SEWD will ensure that flows are diverted via the pipe inlet into the giant garter snake mitigation area. The flows will return to Rock Creek below the diversion structure.

(ii) Maintaining operational pump and water trough pipeline, which originates at diversion works facility per mitigation agreement.

d. Private Organizations. None.

9-02. Interagency Coordination. To ensure that the flood control operation of Farmington Dam will be as effective as possible, it is essential that the Corps be continually apprised of possible flood hazards, weather conditions, inflow to the reservoir, and flows at key locations in Littlejohn Creek. This requires close liaison between the Corps, the National Weather Service, the Federal-State River Forecast Center, the California Department of Water Resources, and the Stockton East Water District. (See Paragraph 9-02e.)

a. Local News Media and Corps Bulletins. The Sacramento District, U.S. Army Corps of Engineers, Public Affairs Office (PAO), coordinates with the local news media regarding floods and other aspects of project operation. Official records on Corps projects are maintained by the Water Management Section. Current reservoir status information is available, via “electronic media,” on the Corps' web site.

b. National Weather Service. Congress has given the National Weather Service (NWS) national responsibility for providing flood warnings to the public. The NWS office in Sacramento maintains a year-round surveillance of weather conditions. The National Weather Service also prepares and distributes weather forecasts to agencies responsible for flood protection, and to the public by way of the local news media. The NWS furnishes meteorological data and weather forecasts on a 24-hour basis. Regular forecasts are made twice a day. When the meteorological situation indicates general area precipitation, Quantitative Precipitation Forecasts are also furnished.

c. U.S. Geological Survey. The U.S. Geological Survey (USGS) operates and maintains gaging stations on a cooperative basis with local, state and federal agencies. The USGS publishes records of their own measurements and those furnished by other agencies, such as the California Department of Water Resources, the Bureau of Reclamation, and the Corps. Complete records of flows at Littlejohn Creek at Farmington were published by the USGS for only the 1926 water year. However, the Corps operates, services and maintains the official record for gaging stations used in the operation of Farmington Dam. Refer to Plate 4-1 for the gaging station locations operated by various agencies within and around the basin.

d. Power Marketing Agency. There are currently no hydroelectric facilities at Farmington Dam.

e. Other Federal, State and Local Agencies

(1) Federal-State River Forecast Center. Personnel from the California-Nevada River Forecast Center, the National Weather Service office in Sacramento, and the California Department of Water Resources are assigned to the Joint Federal-State River Forecast Center, which monitors weather conditions and river stages on a year-round basis. The RFC forecasts stages and flows on major river systems. However, forecasts are not made for the Littlejohn Creek Stream Group.

(2) Federal-State Flood Operations Center. The Federal-State Flood Operations Center is activated when floods on major streams become imminent. This center operates on a 24-hour basis and, among other flood emergency activities, advises all interested parties of flood situations as they develop. The center furnishes flood warnings and forecasts of river stages to local news media, law enforcement agencies, and other responsible agencies for their use and for dissemination to the public.

(3) The State of California Water Resources Control Board. The State of California Water Resources Control Board administers water rights for the natural flows along Littlejohn and Duck creeks.

9-03. Interagency Agreements. Exhibit D contains the Easement for the Pipeline Right-of-Way that defines the rights granted to the Stockton East Water District for their Rock Creek Diversion Structure. Condition 23 of the Easement, Water Diversion Structure and Canal Operation Rules, includes interim terms of operation, which define the parameters within which SEWD may operate their Rock Creek Diversion Structure. Any departure from the prescribed operation of Duck Creek Diversion or the North Littlejohn Creek Control Structure are communicated directly to county personnel by the Water Management Section, Engineering Division, Sacramento District, U.S. Army Corps of Engineers.

CESPK and SEWD entered into an Operation and Maintenance Agreement dated March 10, 1999 for the purpose of coordinating the operation and maintenance requirements of Farmington Dam with those of the Rock Creek Diversion Structure, and to ensure minimal impact on the Corps' ability to operate Farmington Dam and Flood Control Project. The Corps monitors real-

time gages to ensure compliance. The Operation and Maintenance Agreement is located in Exhibit C.

Specific operational rules for the Farmington Dam and Flood Control Project are contained in Exhibit A. The rules identified in the Easement will be superseded by subsequent updates to the Farmington Dam Water Control Manual and the specific requirements of Exhibit A, Paragraph A-03.

San Joaquin County provides maintenance and physical operation of the Duck Creek Diversion Works and North Littlejohn Creek Control Structure.

9-04. Commissions, River Authorities, Compacts and Committees. There are currently no commissions, river authorities, compacts, or committees addressing operation of Farmington Dam.

9-05. Non-Federal Hydropower. There are currently no hydroelectric facilities at Farmington Dam.

9-06. Reports. Reporting requirements are listed in Exhibit A.

FARMINGTON DAM AND RESERVOIR
LITTLEJOHN CREEK BASIN, CALIFORNIA

U.S. Army Corps of Engineers
Sacramento District
December 2004

TABLES

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TABLE 4-7

HISTORICAL UNREGULATED¹
MONTHLY INFLOWS
TO FARMINGTON RESERVOIR
(1,000 ACRE-FEET)

WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1951	0.0	15.2	42.7	20.7	6.0	11.1	1.5	0.5	0.2	0.2	0.2	0.2	98.5
1952	0.0	0.2	16.8	45.0	12.4	37.6	2.1	0.3	0.0	0.0	0.0	0.0	114.5
1953	0.0	0.0	0.3	11.9	1.3	0.3	0.7	0.4	0.4	0.0	0.0	0.1	15.4
1954	0.1	0.0	0.0	0.0	1.1	4.2	1.0	0.3	0.0	0.0	0.0	0.0	6.7
1955	0.0	0.0	2.9	30.1	1.6	1.2	0.5	0.1	0.0	0.0	0.0	0.0	36.4
1956	0.0	1.4	44.2	50.6	8.3	1.9	1.6	1.0	0.0	0.0	0.0	0.0	109.0
1957	0.0	0.0	0.0	0.0	0.0	6.7	0.0	1.8	0.4	0.0	0.0	0.0	9.0
1958	0.0	0.0	0.0	10.4	42.8	31.6	60.8	10.8	2.6	0.0	0.0	0.0	159.0
1959	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
1960	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.3
1961	0.0	0.0	0.0	0.0	35.8	11.7	0.2	0.0	0.0	0.0	0.0	0.0	47.7
1962	0.0	0.0	0.0	0.0	41.9	14.1	0.2	0.0	0.0	0.0	0.0	0.0	56.2
1963	0.0	0.0	0.0	0.0	17.6	4.7	20.4	1.1	0.0	0.0	0.0	0.0	43.8
1964	0.0	0.2	0.5	5.8	0.5	0.4	0.4	0.3	0.3	0.3	0.4	0.5	9.5
1965	0.7	2.6	52.1	21.6	2.9	3.4	13.5	2.6	2.5	2.3	2.6	2.7	109.3
1966	1.6	2.1	9.6	10.4	7.6	2.9	2.1	1.4	0.0	0.0	0.0	0.0	37.7
1967	0.0	0.0	12.1	35.1	4.6	10.8	48.0	4.3	3.5	3.4	3.6	4.3	129.8
1968	1.5	0.0	0.8	1.0	7.1	3.7	1.0	1.0	0.9	1.3	1.7	1.1	21.1
1969	0.0	0.0	2.9	36.8	26.5	0.5	0.1	0.0	0.0	0.0	0.0	0.0	66.9
1970	0.0	0.0	0.0	17.9	0.1	8.9	0.0	0.0	0.0	0.0	0.0	0.0	27.0
1971	0.5	7.2	17.2	5.7	0.6	0.8	1.1	0.3	0.3	0.3	0.3	0.5	34.8
1972	0.3	0.2	7.3	1.2	4.7	0.3	0.4	0.3	0.3	0.2	0.3	0.2	15.8
1973	0.0	0.0	0.1	19.8	21.8	9.5	0.0	0.0	0.0	0.0	0.0	0.0	51.3
1974	0.0	0.0	7.4	3.0	0.0	12.3	7.3	0.0	0.0	0.0	0.0	0.0	30.0
1975	0.0	0.0	0.0	0.0	13.3	27.0	0.0	0.0	0.0	0.0	0.0	0.0	40.3
1976	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
1977	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978	0.0	0.0	0.0	17.3	27.4	26.1	16.0	2.7	0.0	0.0	0.0	0.0	89.6
1979	0.0	0.0	0.0	16.5	40.7	20.9	2.7	0.0	0.0	0.0	0.0	0.0	80.8
1980	0.0	0.0	0.0	38.3	26.5	11.5	2.5	0.0	0.0	0.0	0.0	0.0	78.8

TABLE 4-7

HISTORICAL UNREGULATED¹
MONTHLY INFLOWS
TO FARMINGTON RESERVOIR
(1,000 ACRE-FEET)

WATER YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
1981	0.0	0.0	0.0	12.9	3.4	17.9	2.0	0.0	0.0	0.0	0.0	0.0	36.2
1982	0.0	4.5	15.6	38.9	31.0	47.8	27.8	1.8	0.0	0.0	0.0	0.0	167.3
1983	2.2	18.4	34.3	66.2	48.7	75.4	7.3	3.0	0.0	0.0	0.0	0.0	255.5
1984	0.0	17.6	32.6	3.6	13.2	2.3	0.3	0.0	0.0	0.0	0.0	0.0	69.6
1985	0.0	5.7	10.8	5.1	11.8	4.1	0.5	0.0	0.0	0.0	0.0	0.0	38.0
1986	0.0	0.0	0.0	3.1	74.4	30.9	1.5	0.4	0.2	0.0	0.0	0.0	110.4
1987	0.0	0.0	0.0	0.0	1.0	11.4	0.3	0.1	0.0	0.0	0.0	0.0	12.8
1988	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
1989	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5
1990	0.0	0.2	0.0	0.7	0.7	0.9	0.7	0.1	0.0	0.1	0.0	0.0	3.4
1991	0.0	0.0	0.0	0.0	0.0	20.2	1.9	0.8	1.1	0.8	2.2	1.1	28.1
1992	0.5	0.5	0.4	0.0	20.6	4.8	0.0	0.0	0.1	0.0	0.0	0.0	26.9
1993	0.0	0.0	0.0	40.9	17.7	9.5	1.3	0.3	0.2	0.0	0.0	0.0	70.0
1994	0.1	0.1	0.1	0.1	2.0	0.5	0.4	0.1	0.0	0.8	0.1	0.2	4.3
1995 ²	0.0	0.0	0.0	53.4	2.1	50.3	2.3	0.8	0.5	0.8	NA	NA	110.3e
1996	NA	NA	1.0	14.7	37.8	7.4	0.5	NA	NA	NA	NA	NA	61.3e
1997	NA	NA	30.5	62.1	0.0	0.0	0.0	NA	NA	NA	NA	NA	92.6e
1998	NA	NA	0.0	42.7	104.0	4.9	11.1	NA	NA	NA	NA	NA	162.8e
1999	NA	NA	0.0	5.2	29.9	0.6	0.1	NA	NA	NA	NA	NA	35.8e
2000	NA	NA	0.6	16.7	47.0	12.8	7.3	NA	NA	NA	NA	NA	84.3e
2001	NA	NA	2.8	1.3	4.0	7.3	5.7	NA	NA	NA	NA	NA	21.1e
2002	NA	NA	10.1	13.2	6.7	12.7	6.2	NA	NA	NA	NA	NA	48.8e
2003	NA	NA	2.7	1.8	0.2	2.4	3.7	NA	NA	NA	NA	NA	10.7e
Shaded area note: Calculated inflow values from low flow periods (May-Nov) are questionable and subject to revision (marked NA). Calculated shaded area values from Dec-Apr are historically reasonable estimates, but are also subject to revision.													
MEAN	0.9	1.6	6.1	14.6	15.6	11.1	5.1	1.3	0.8	1.0	0.9	1.0	57.1e

Notes:

1. Unimpaired flows do not include diversions into the Farmington basin from the Stanislaus River basin
2. Diversions from the Stanislaus River basin to the Farmington basin began intermittently starting in August 1995

TABLE 8-1

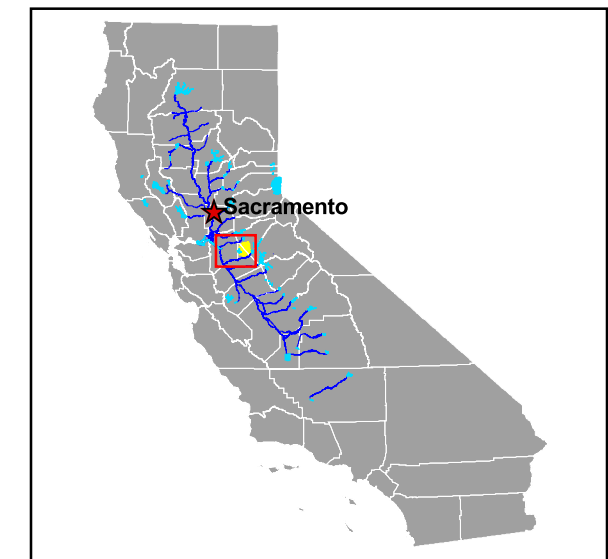
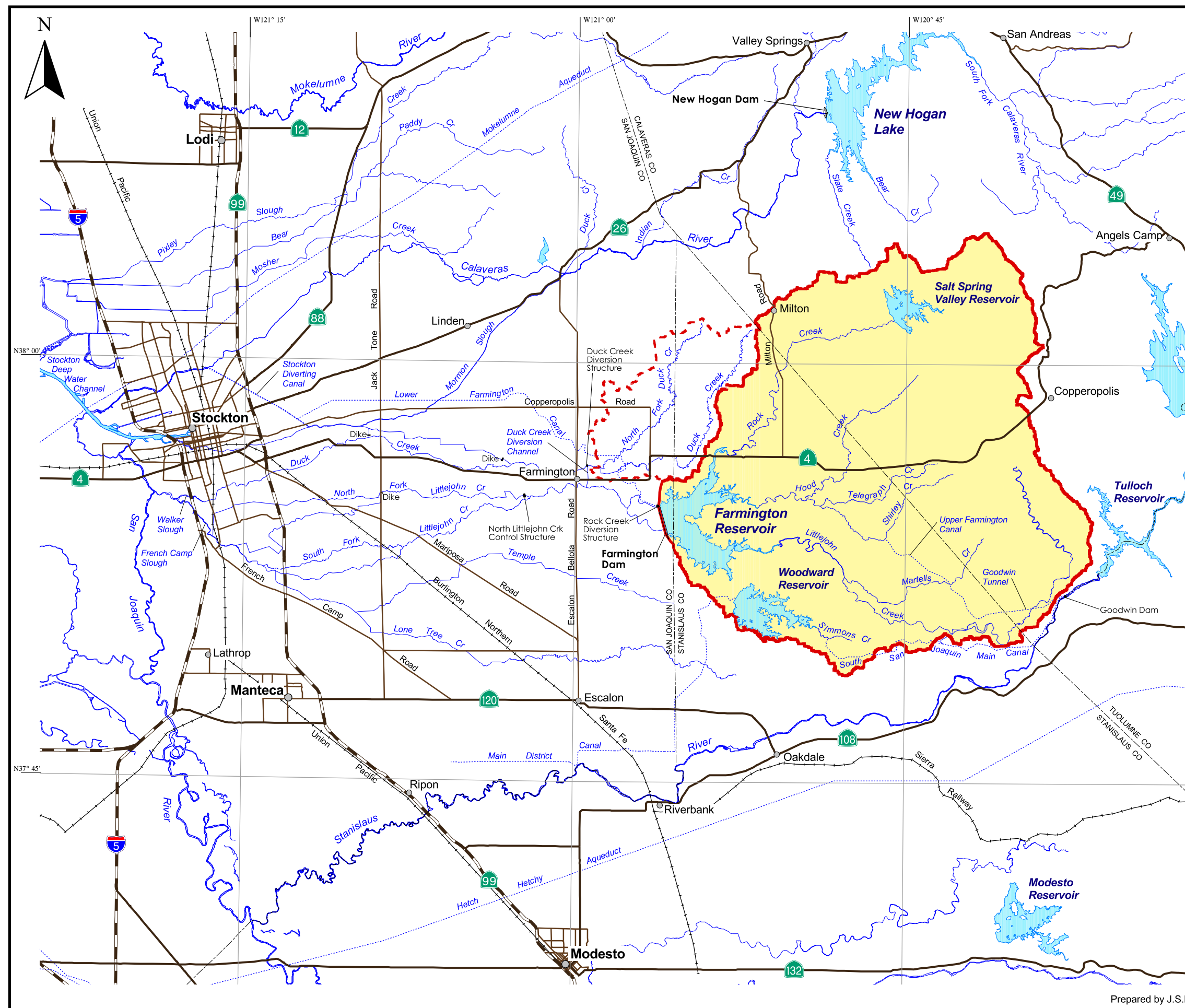
ANNUAL MAXIMUM RAIN FLOOD FLOWS
LITTLEJOHN CREEK BELOW FARMINGTON DAM
UNREGULATED CONDITION
(Flows in cfs)

WATER YEAR	PEAK DATE	FLOW	1-DAY DATE	FLOW	3-DAY DATE	FLOW	7-DAY DATE	FLOW	15-DAY DATE	FLOW	30-DAY DATE	FLOW
1952	MAR	11500	15 MAR	5019	25 JAN	3351	14 MAR	1955	13 JAN	1260	29 DEC	879
1953			14 JAN	725	13 JAN	450	14 JAN	398	07 JAN	316	30 DEC	199
1954			17 MAR	723	17 MAR	278	17 MAR	230	17 MAR	138	15 MAR	83
1955		5700	01 JAN	3556	16 JAN	1945	15 JAN	1245	07 JAN	682	01 JAN	504
1956	DEC	20000	24 DEC	8497	22 DEC	5836	22 DEC	3008	23 DEC	1725	23 DEC	1379
1957		2400	05 MAR	2232	04 MAR	954	05 MAR	428	03 MAR	218	26 FEB	113
1958	APR	28900	03 APR	7272	01 APR	6913	31 MAR	3945	21 MAR	2206	12 MAR	1425
1959		2390	16 FEB	1419	16 FEB	812	15 FEB	601	11 FEB	416	11 FEB	244
1960		1100	10 FEB	1402	09 FEB	638	05 FEB	395	07 FEB	255	01 FEB	142
1961			02 FEB	102	02 FEB	78	02 FEB	61	30 JAN	38	15 JAN	19
1962		7700	15 FEB	5086	13 FEB	2914	10 FEB	2166	09 FEB	1165	09 FEB	769
1963			13 FEB	3205	12 FEB	1434	10 FEB	838	07 APR	545	28 MAR	403
1964		2480	22 JAN	898	11 JAN	542	07 JAN	236	08 JAN	189	24 DEC	98
1965	DEC	18100	26 DEC	8760	24 DEC	4238	22 DEC	3254	23 DEC	1925	21 DEC	1156
1966			30 JAN	2071	29 DEC	1246	27 DEC	583	30 JAN	392	29 JAN	229
1967	22 JAN	8110	22 JAN	4324	21 JAN	2299	05 APR	1553	07 APR	1182	28 MAR	809
1968			21 FEB	1241	20 FEB	699	16 FEB	392	17 FEB	211	17 FEB	147
1969	21 JAN	7390	21 JAN	3707	19 JAN	2429	19 JAN	1428	12 JAN	1237	13 JAN	692
1970			21 JAN	3953	14 JAN	1692	15 JAN	819	07 JAN	602	23 DEC	301
1971			29 NOV	2624	29 NOV	1482	29 NOV	1060	28 NOV	549	29 NOV	388
1972			25 DEC	1267	25 DEC	891	25 DEC	515	25 DEC	266	18 DEC	138
1973	12 FEB	7300	11 FEB	5368	10 FEB	2586	06 FEB	1322	29 JAN	675	14 JAN	533
1974	02 MAR	10500	02 MAR	4749	01 MAR	1741	25 FEB	746	17 FEB	348	01 MAR	207
1975	22 MAR	4400	22 MAR	2742	22 MAR	1100	21 MAR	817	13 MAR	680	02 MAR	452
1976				10		4		2		1		1
1977				0		0		0		0		0
1978			09 FEB	3447	07 FEB	2760	07 FEB	1534	31 JAN	850	06 FEB	783
1979			21 FEB	5080	21 FEB	3581	19 FEB	2319	19 FEB	1511	03 FEB	881
1980	14 JAN	7900	12 JAN	4921	12 JAN	3899	11 JAN	2449	06 JAN	1260	08 JAN	646
1981			29 JAN	3890	28 JAN	1783	26 JAN	932	15 MAR	495	28 FEB	303
1982	31 MAR	14411	31 MAR	6522	15 FEB	4434	31 DEC	2498	29 MAR	1427	14 MAR	1082
1983	22 JAN	16500	30 NOV	6620	22 JAN	4727	22 JAN	3243	18 JAN	2093	17 JAN	1524
1984	25 DEC	9900	25 DEC	5755	24 DEC	3764	22 DEC	1883	18 DEC	941	03 DEC	551
1985			08 FEB	2411	08 FEB	1367	04 FEB	639	27 JAN	344	20 NOV	236

TABLE 8-1

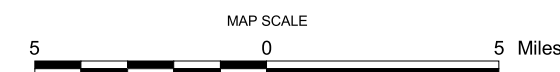
ANNUAL MAXIMUM RAIN FLOOD FLOWS
LITTLEJOHN CREEK BELOW FARMINGTON DAM
UNREGULATED CONDITION
(Flows in cfs)

WATER YEAR	PEAK DATE FLOW	1-DAY DATE FLOW	3-DAY DATE FLOW	7-DAY DATE FLOW	15-DAY DATE FLOW	30-DAY DATE FLOW
1986	19 FEB 23571	19 FEB 9555	17 FEB 7662	14 FEB 4420	10 FEB 2195	15 FEB 1510
1987	05 MAR 6779	06 MAR 2891	05 MAR 1389	05 MAR 603	05 MAR 326	04 MAR 192
1988		18 JAN 63	18 JAN 34	15 JAN 16	08 JAN 8	23 DEC 4
1989	03 MAR 71	04 MAR 45	03 MAR 35	03 MAR 16	28 FEB 13	28 FEB 9
1990		16 APR 25	15 APR 25	15 APR 25	15 APR 24	21 FEB 19
1991	24 MAR 12714	26 MAR 2718	24 MAR 2013	20 MAR 1168	13 MAR 674	13 MAR 502
1992	15 FEB 9595	15 FEB 4517	13 FEB 2115	11 FEB 1363	11 FEB 681	11 FEB 444
1993		13 JAN 2697	13 JAN 1797	12 JAN 1528	08 JAN 1236	12 JAN 1068
1994	20 FEB 807	20 FEB 281	20 FEB 162	19 FEB 104	18 FEB 60	07 FEB 38
1995	10 MAR 12281	23 MAR 4854	10 MAR 3641	23 JAN 2128	10 MAR 1608	04 JAN 910
1996	04 FEB 10185	21 FEB 3941	20 FEB 3054	19 FEB 1599	15 FEB 792	25 JAN 767
1997	02 JAN 12929	02 JAN 7777	01 JAN 4344	21 JAN 2448	21 DEC 1598	30 DEC 1127
1998	06 FEB 24830	03 FEB 11270	06 FEB 5414	03 FEB 4808	02 FEB 2933	12 JAN 1886
1999	09 FEB 8302	09 FEB 4517	07 FEB 2677	07 FEB 1423	07 FEB 891	23 JAN 519
2000	12 FEB 10013	25 JAN 5137	12 FEB 3934	11 FEB 2049	12 FEB 1309	10 FEB 967
2001	24 FEB 2465	04 MAR 1390	04 MAR 770	28 FEB 376	21 FEB 258	05 FEB 167
2002	02 JAN 6331	02 JAN 2653	02 JAN 1679	29 DEC 1355	27 FEB 657	29 DEC 390
2003	16 DEC 1550	16 OCT 354	16 OCT 349	13 OCT 345	05 OCT 335	01 OCT 299
2004	26 FEB 1992	26 FEB 1170	26 FEB 834	26 FEB 567	18 FEB 305	28 OCT 182
COMPUTED STATISTICS						
YEARS	36	53	53	53	53	53
LOG MEAN	3.796	3.342	3.075	2.856	2.643	2.460
STANDARD DEV	0.500	0.595	0.6734	0.6741	0.6677	0.6713
SKEW COEFF	-1.8	-1.7	-1.8	-1.8	-1.9	-1.7
ADOPTED STATISTICS						
EQUIVALENT YEARS	51	53	53	53	53	53
LOG MEAN	3.800	3.409	3.183	2.945	2.752	2.563
STANDARD DEV	0.398	0.410	0.417	0.424	0.430	0.436
SKEW COEFF	-0.7	-0.7	-0.7	-0.7	-0.6	-0.6



MAP LEGEND

- Project Watershed
- Related Watershed
- Lake or Reservoir
- Major River
- Stream
- Canal
- Interstate or Highway
- State Route
- County Road
- Railroad
- County Boundary
- City

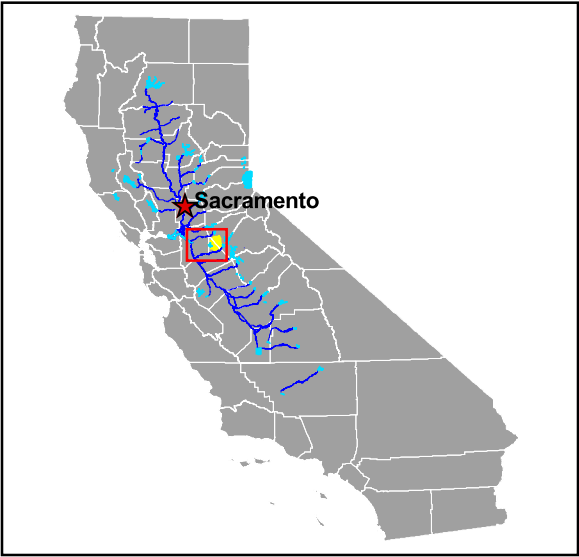
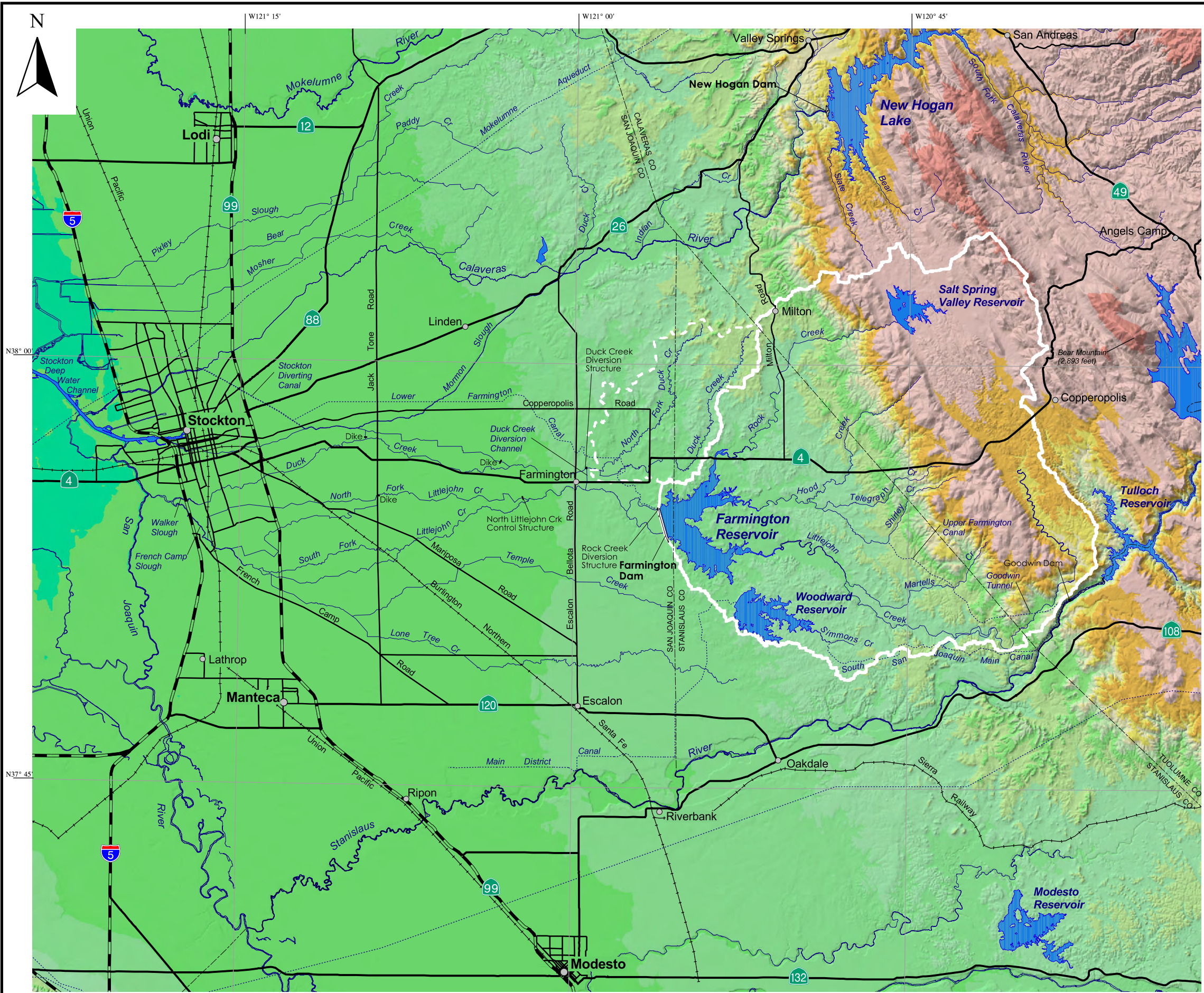


FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

GENERAL MAP

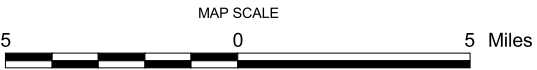
U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by J.S.M.



MAP LEGEND

- Project Watershed
- Related Watershed
- Lake or Reservoir
- Major River
- Stream
- Canal
- Interstate or Highway
- State Route
- County Road
- Railroad
- County Boundary
- City

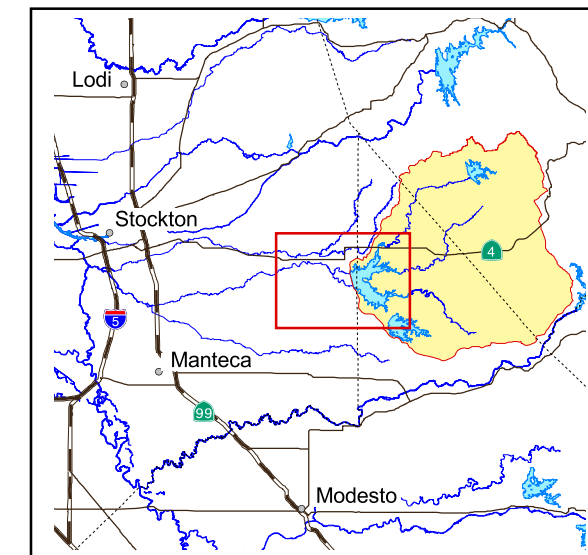
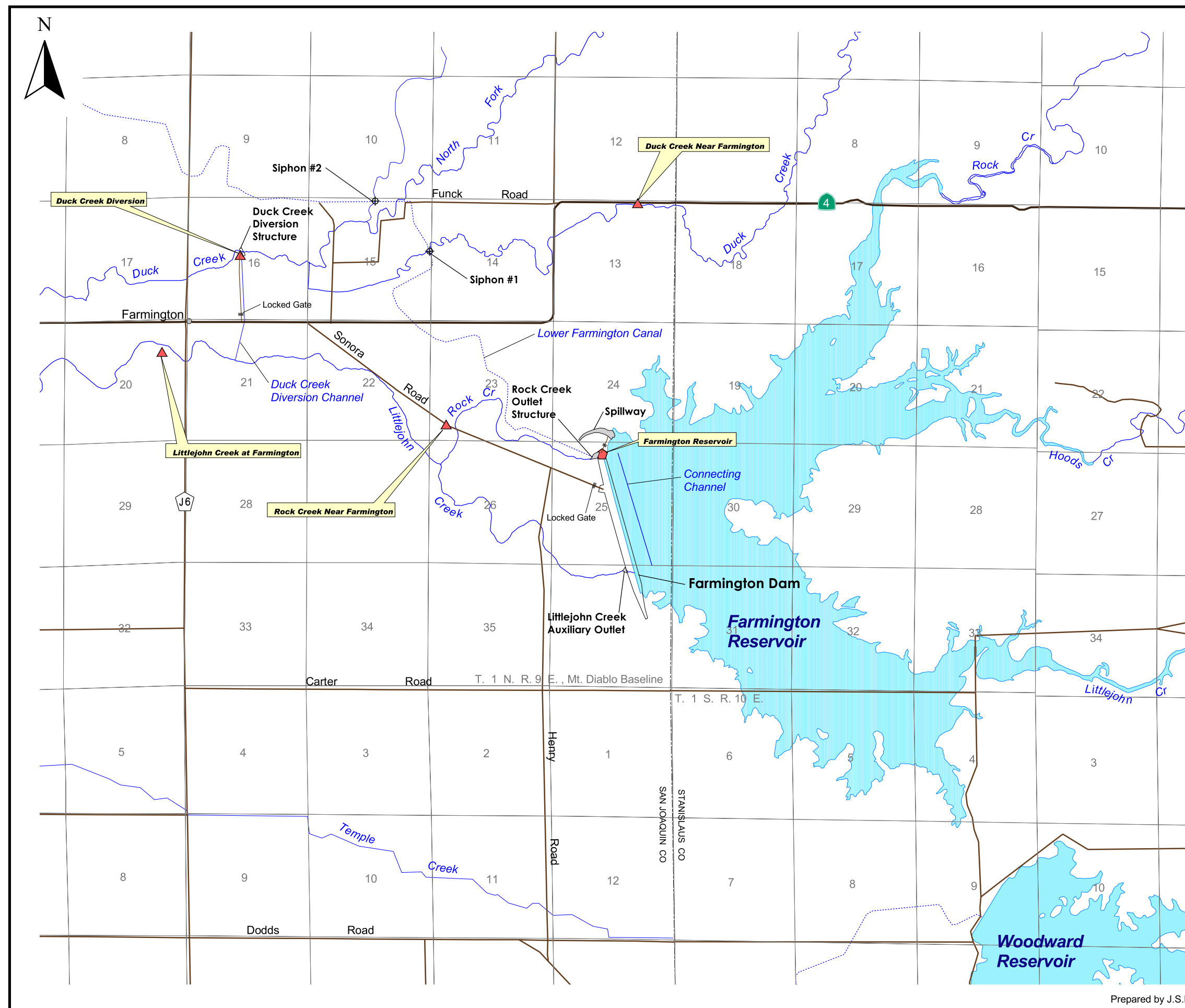


FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

**GENERAL MAP
(TOPOGRAPHIC RELIEF)**

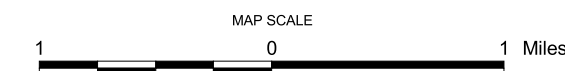
U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by J.S.M.



MAP LEGEND

- Reservoir
- Stream
- Canal
- State Route
- County Road
- County Boundary
- City
- Stream Flow Gage
- Pool Gage



FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

AREA MAP

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by J.S.M.



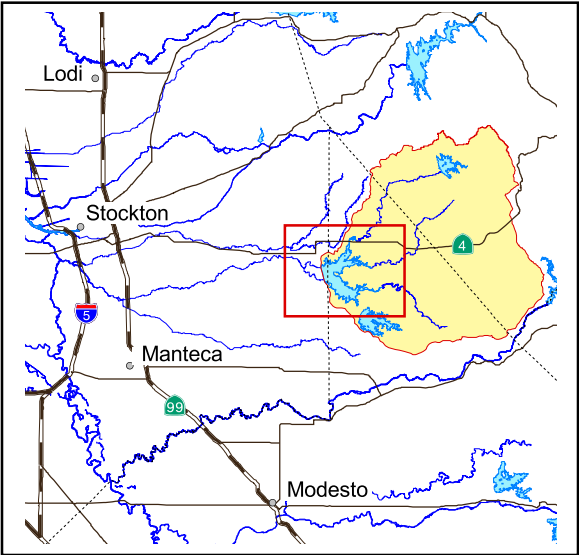
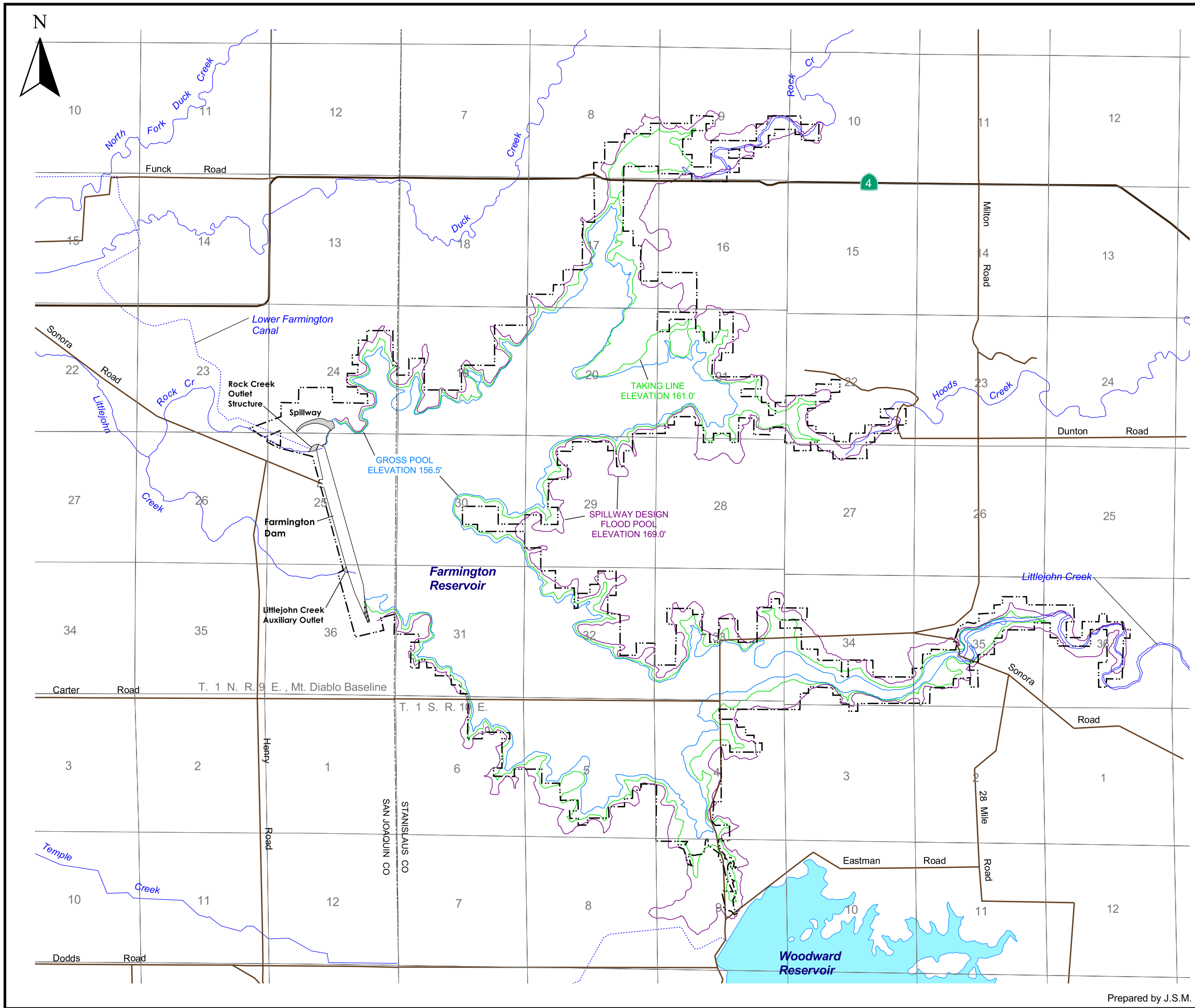












MAP LEGEND

- Project Boundary
- Stream
- Canal
- State Route
- County Road
- County Boundary
- City

Reservoir Elevations:

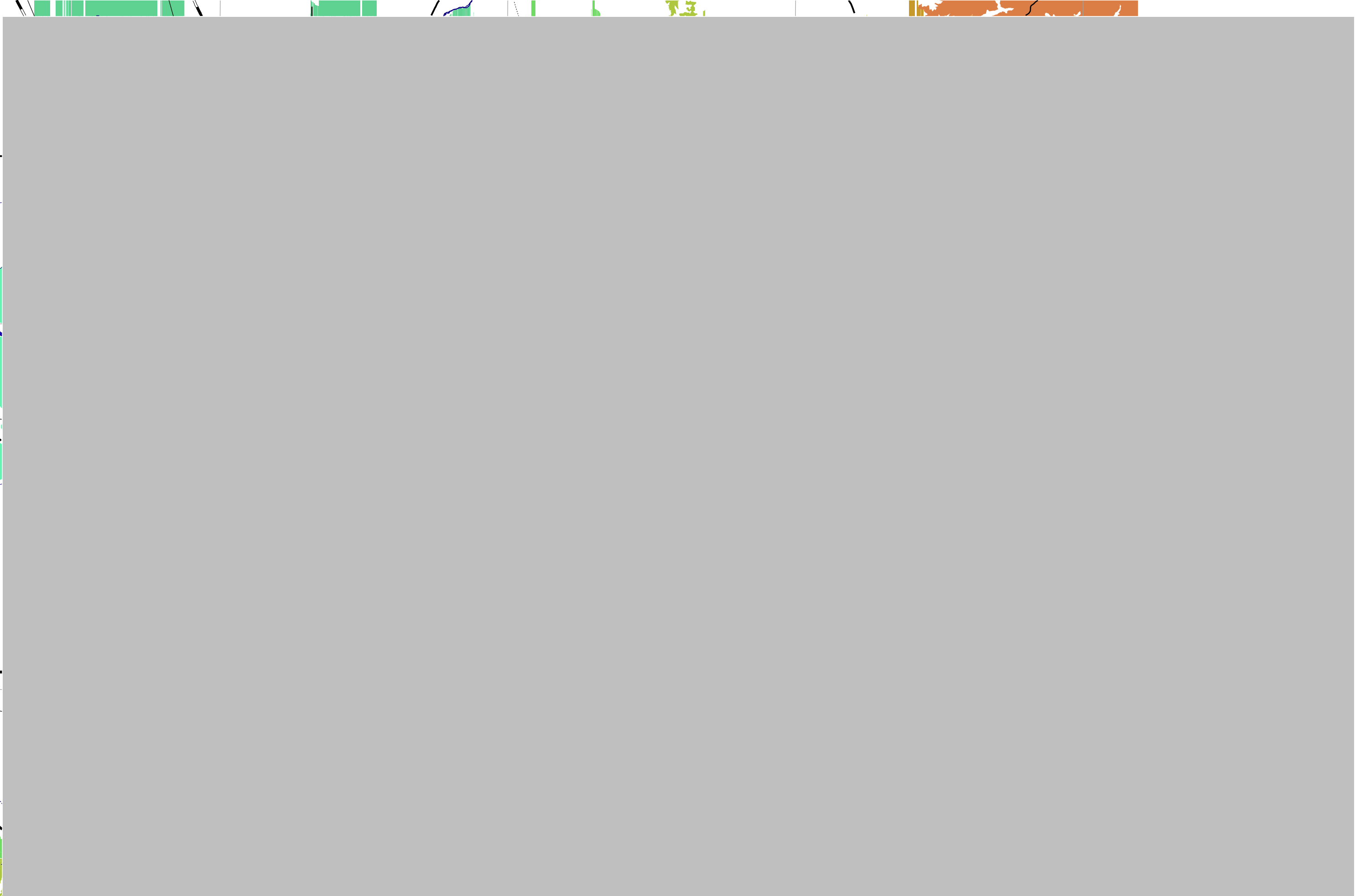
- Gross Pool - 156.5 ft
- Taking Line - 161.0 ft
- Spillway Design Flood Pool - 169.0 ft

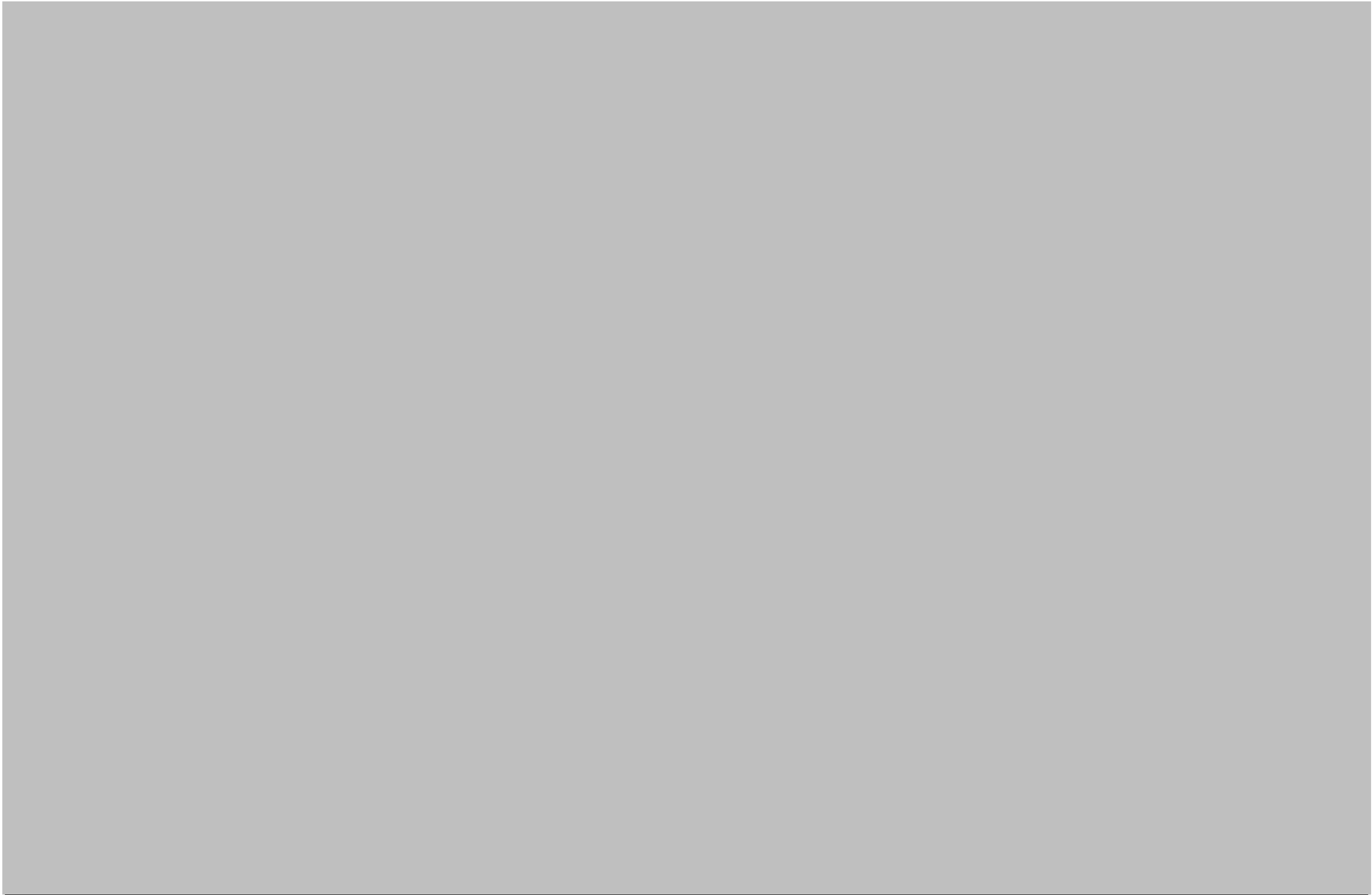


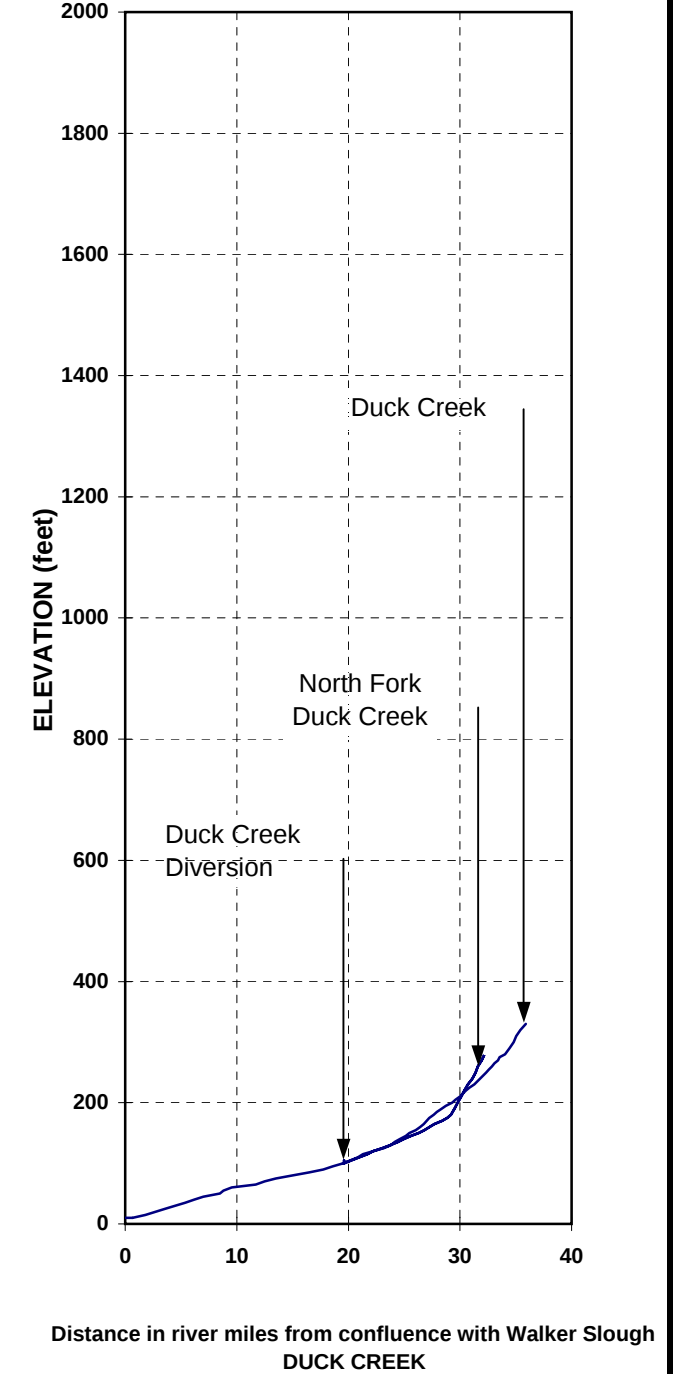
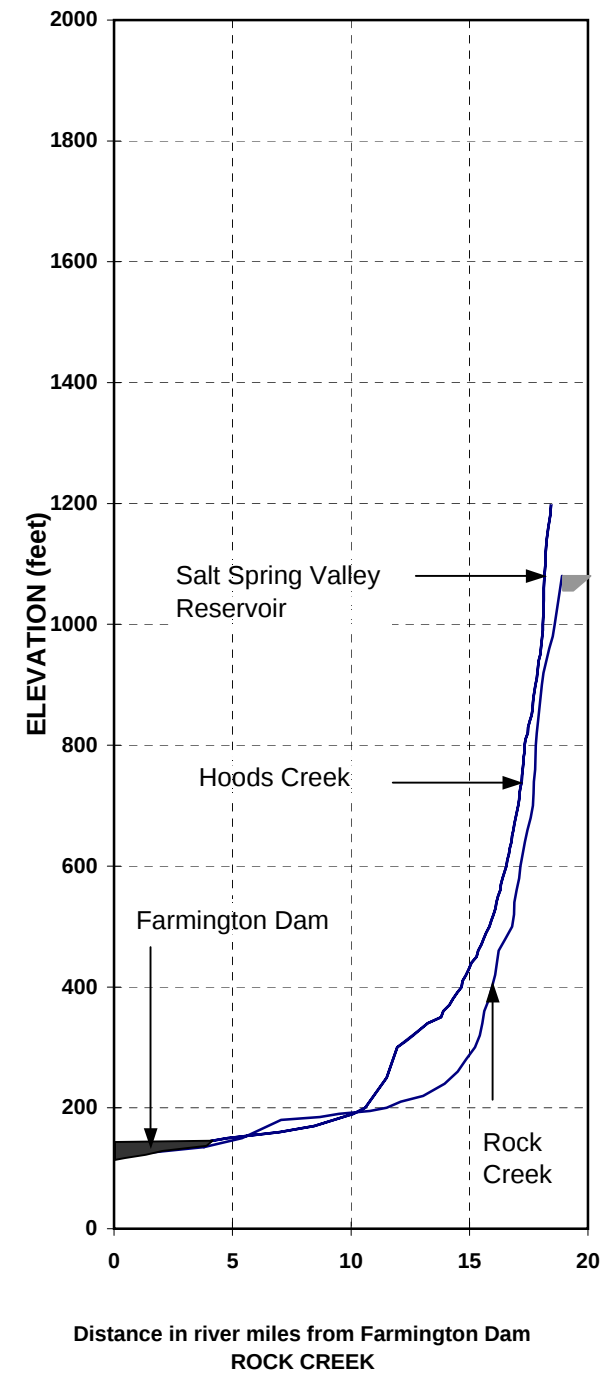
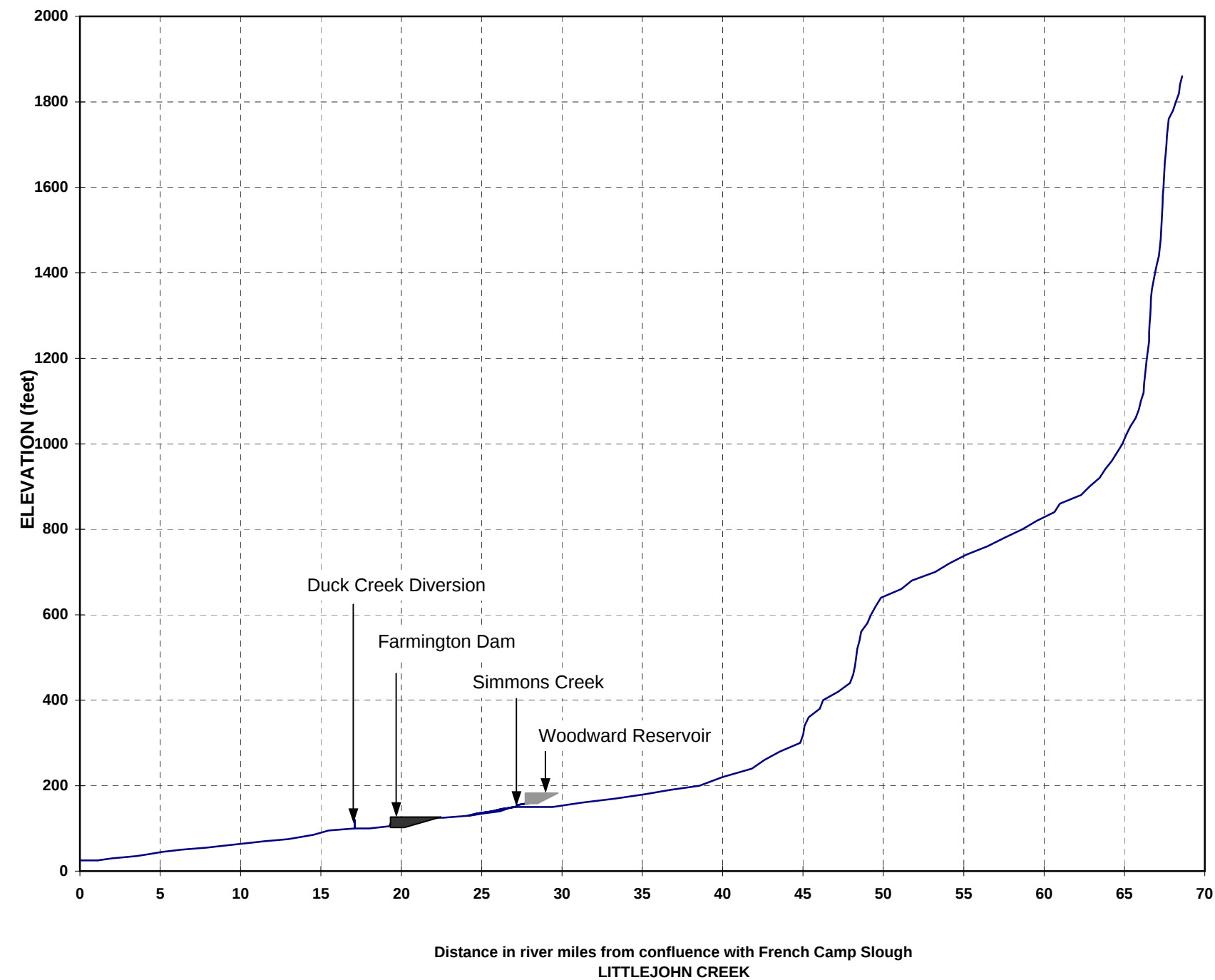
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

REAL ESTATE MAP

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

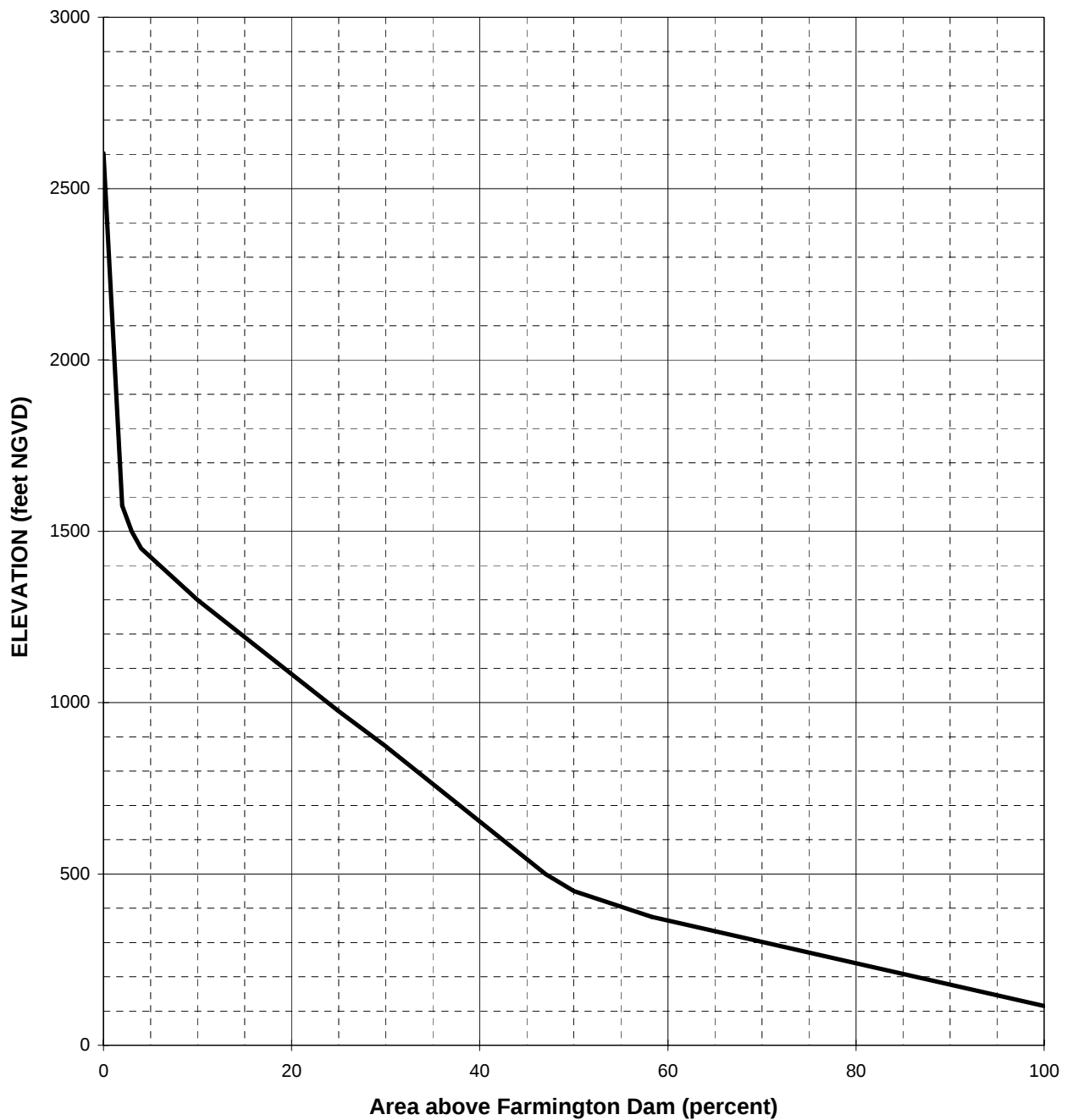






FARMINGTON DAM LITTLEJOHN CREEK, CALIFORNIA
STREAM PROFILES
U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT

Prepared by MVB



NOTES: 1. Area: 212 square miles
2. Dam site elevation: 115 feet

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

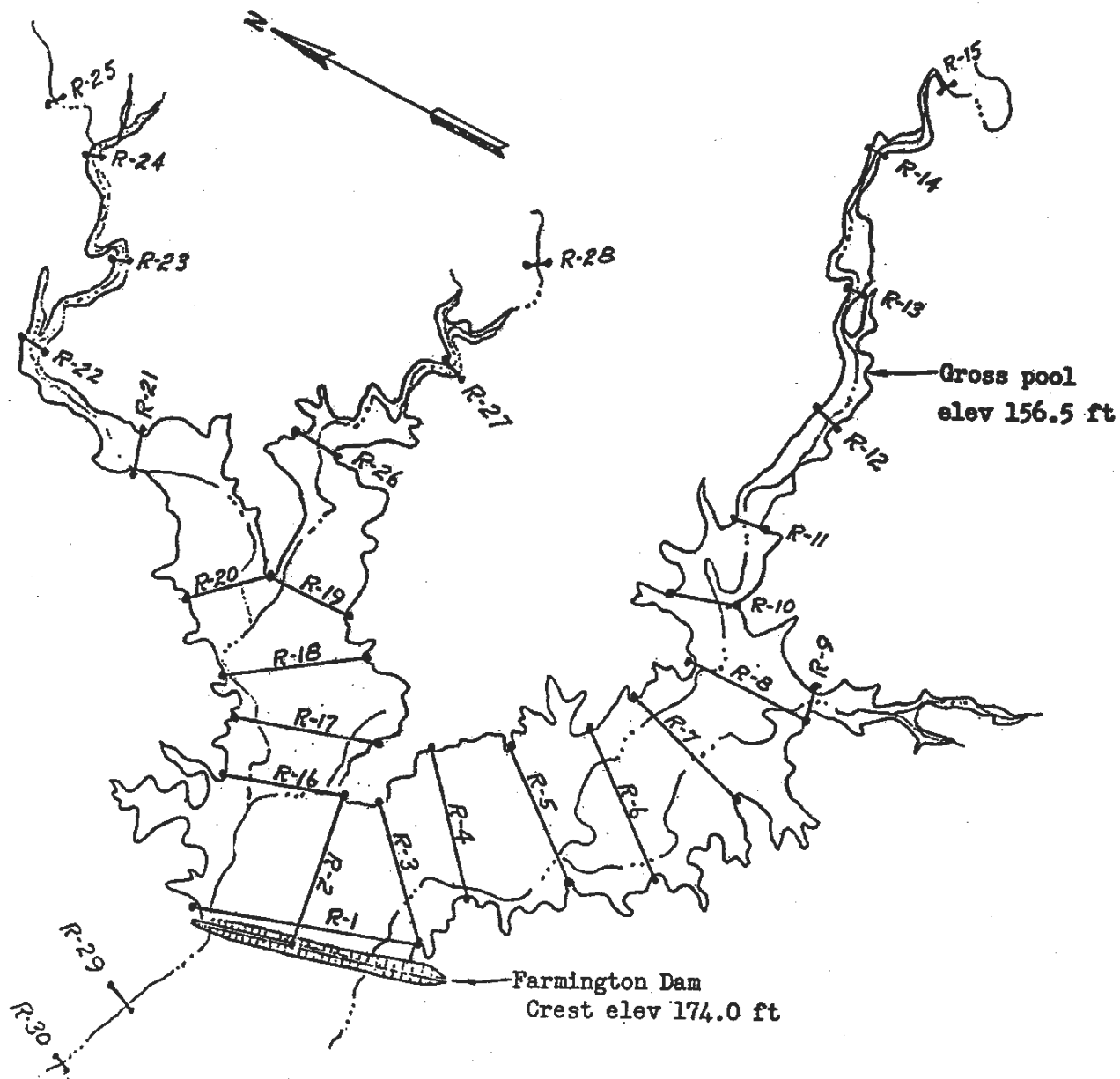
AREA-ELEVATION CURVE

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004

PLATE 4-3



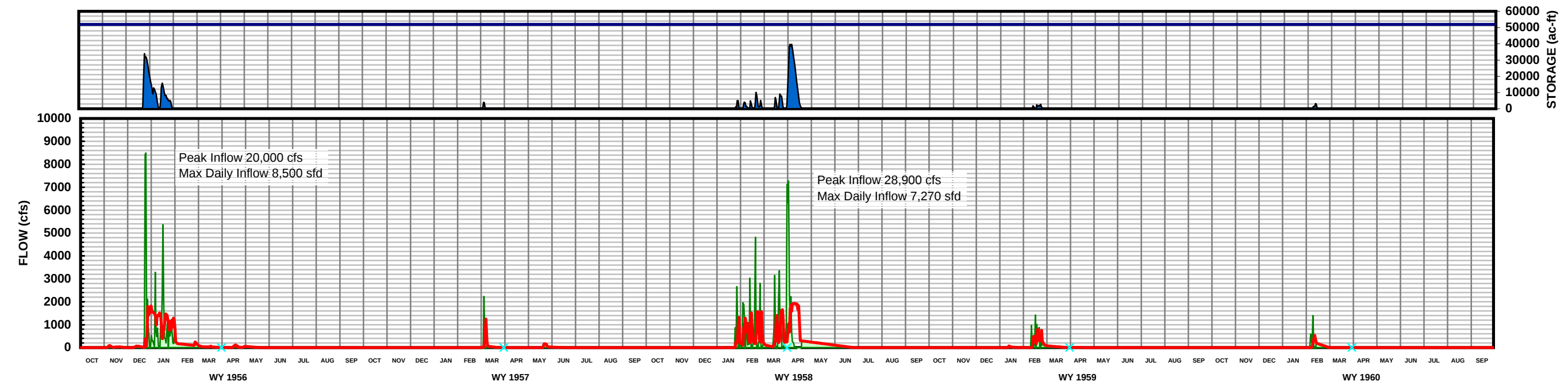
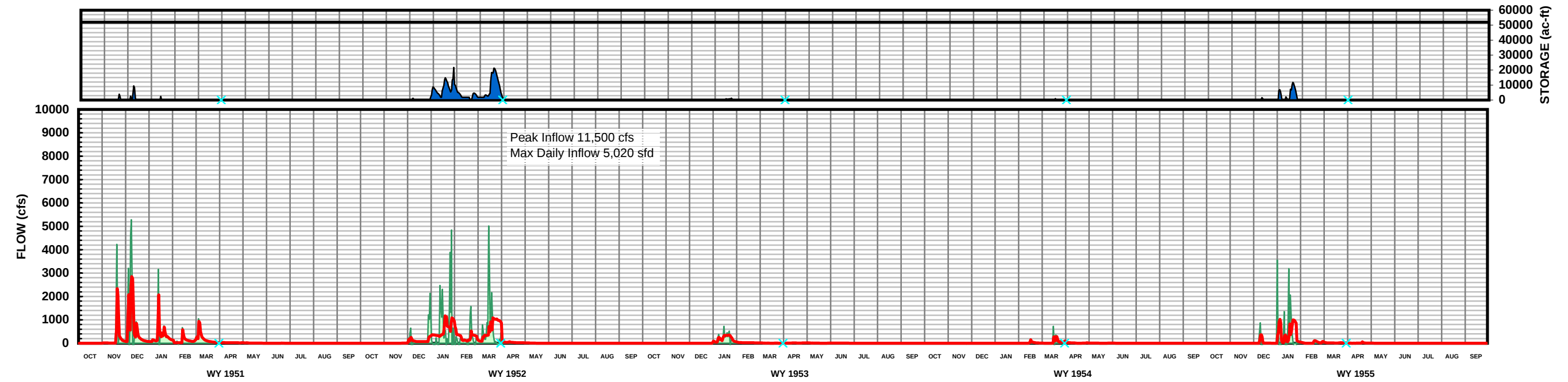
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

SEDIMENTATION RANGES FARMINGTON RESERVOIR

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT







- █ Inflow
- █ Outflow
- █ TCS
- █ Storage
- █ Gross Pool

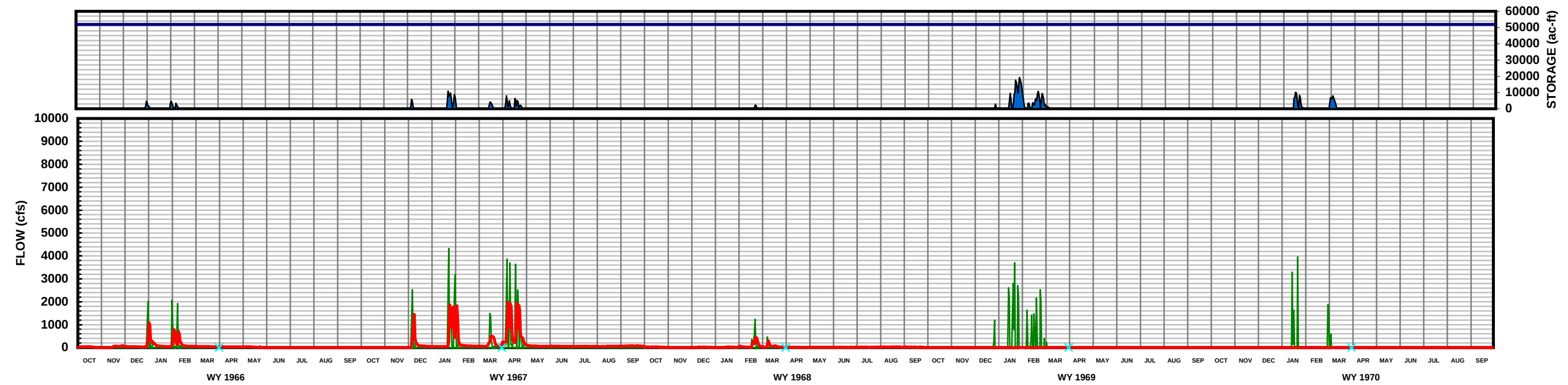
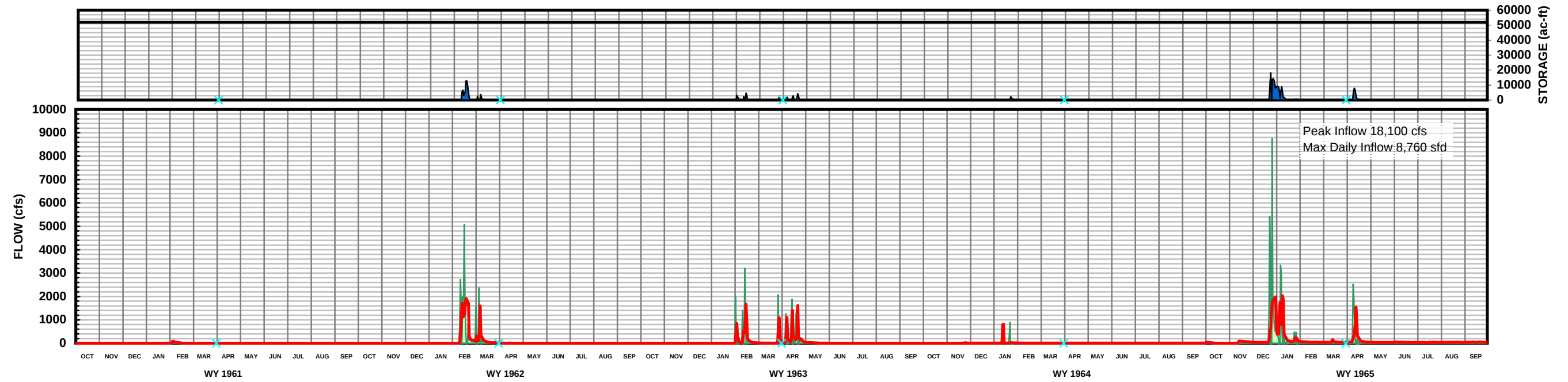
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

HISTORICAL OPERATION

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004 SHEET 1 OF 6 PLATE 4-6



- █ Inflow
- █ Outflow
- █ TCS
- █ Storage
- █ Gross Pool

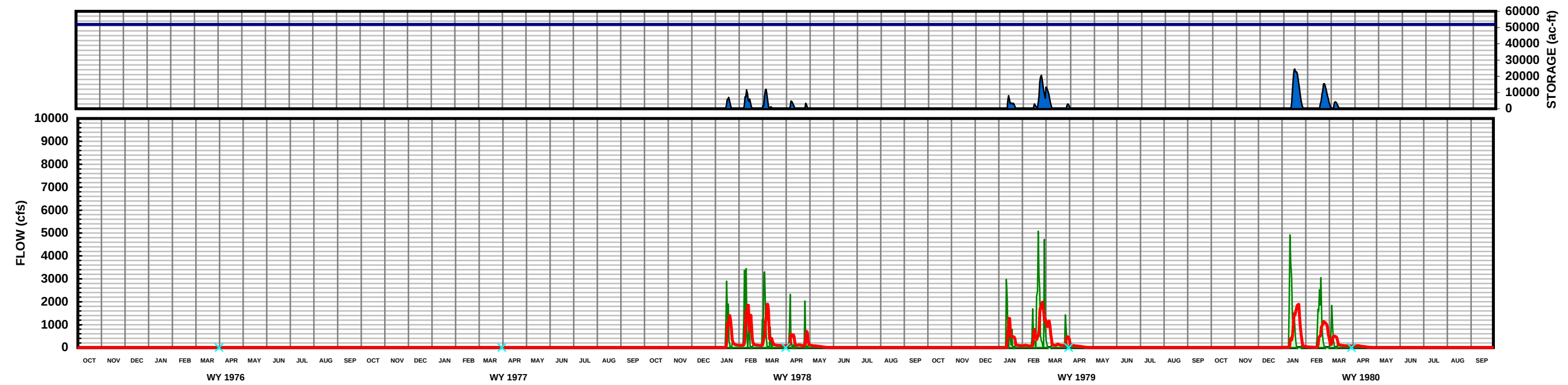
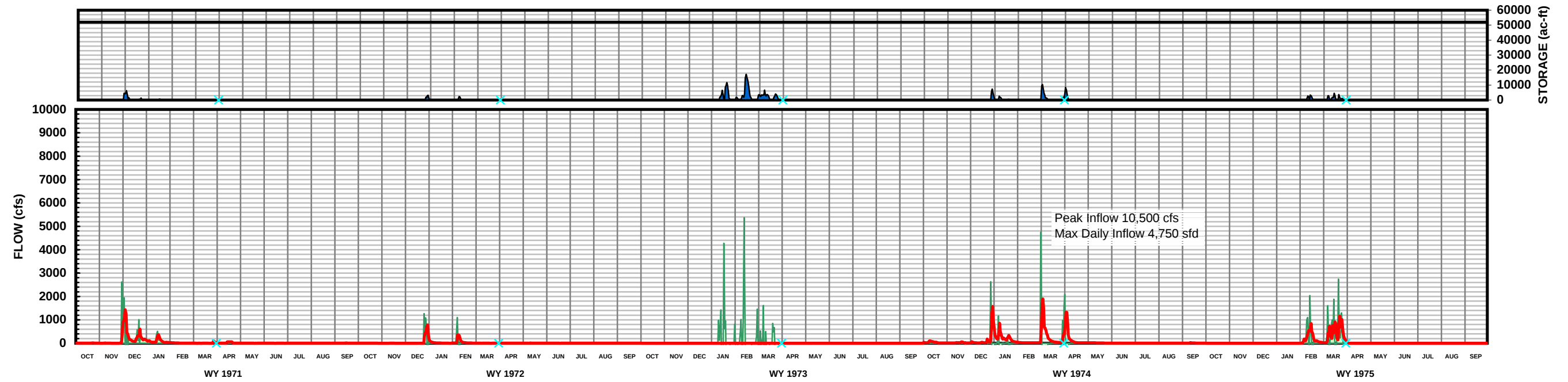
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

HISTORICAL OPERATION

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

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Revised Dec 2004 SHEET 2 OF 6 PLATE 4-6



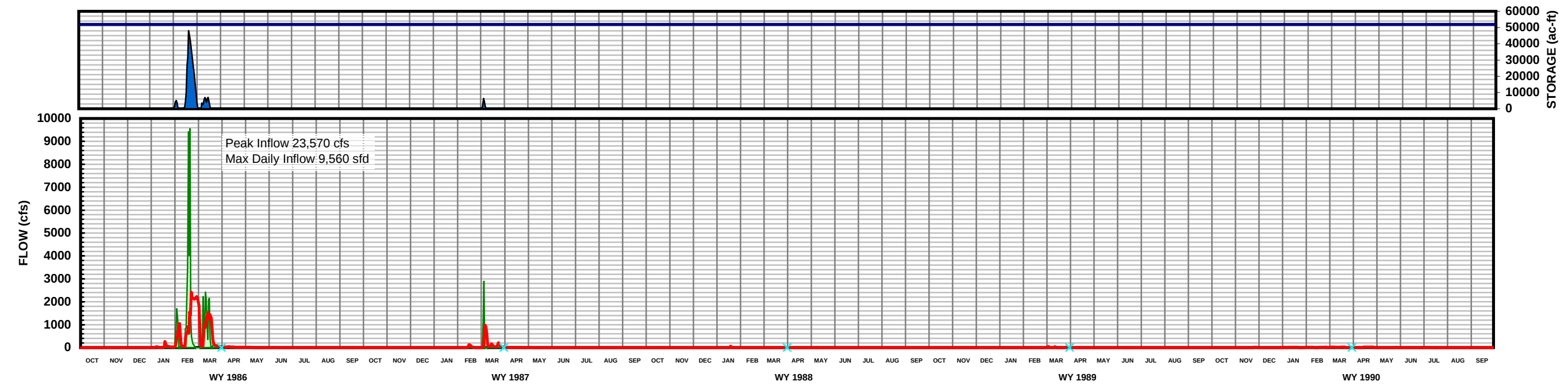
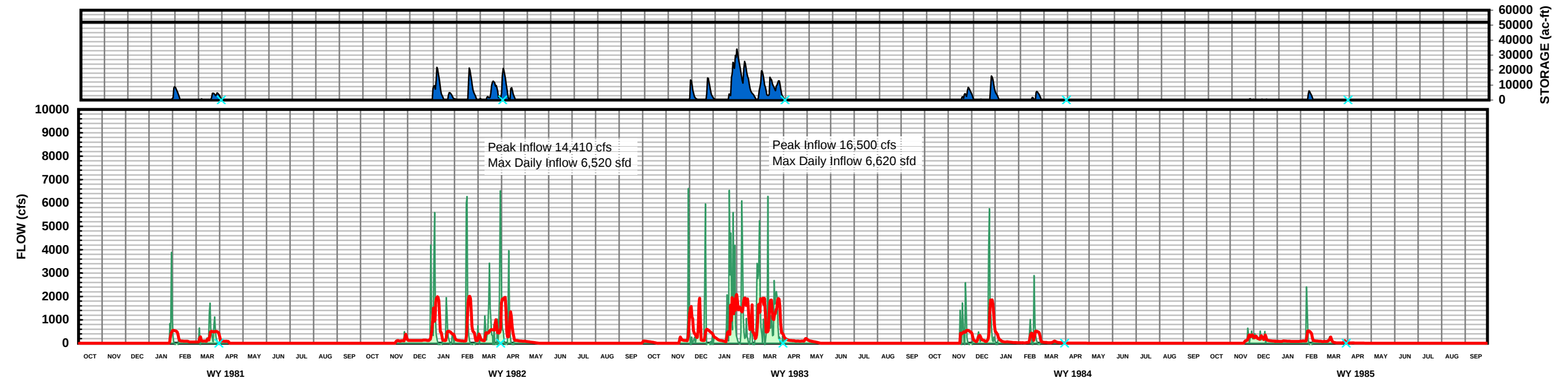
- Inflow
- Outflow
- TCS
- Storage
- Gross Pool

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

HISTORICAL OPERATION

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB



- █ Inflow
- █ Outflow
- █ TCS
- █ Storage
- █ Gross Pool

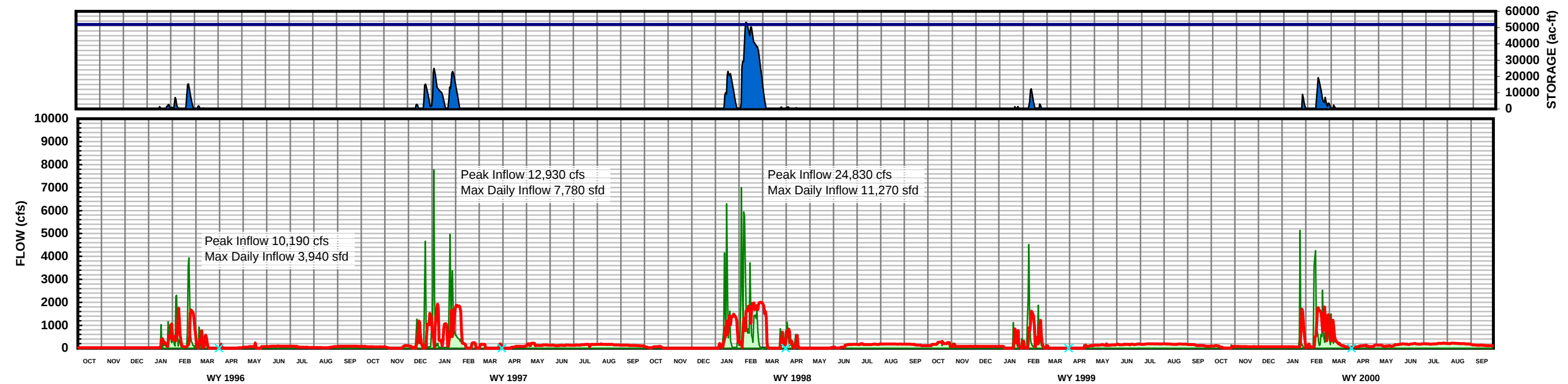
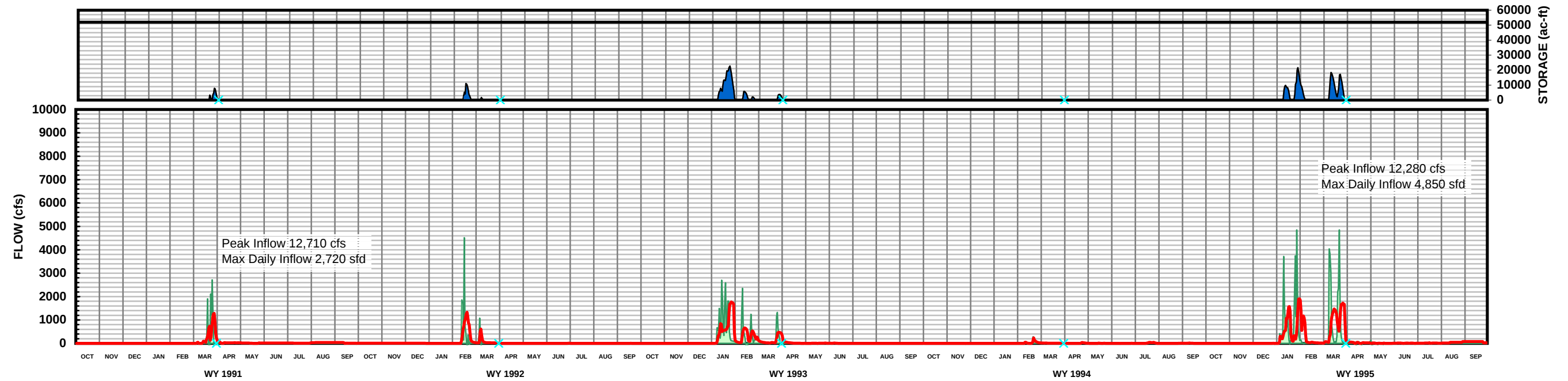
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

HISTORICAL OPERATION

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004 SHEET 4 OF 6 PLATE 4-6



Inflow
Outflow
TCS
Storage
Gross Pool

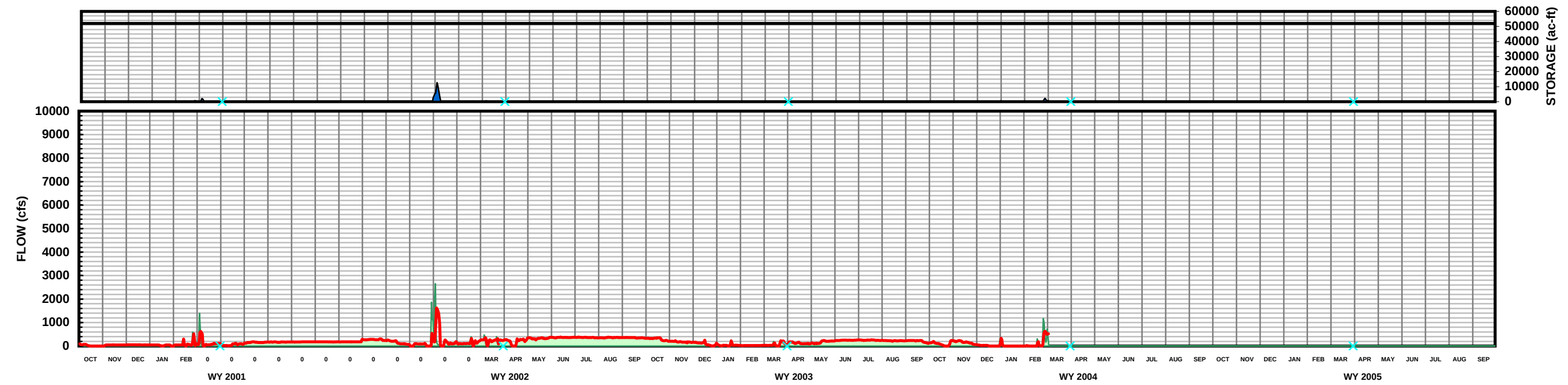
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

HISTORICAL OPERATION

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004 SHEET 5 OF 6 PLATE 4-6



Inflow
Outflow
TCS
Storage
Gross Pool

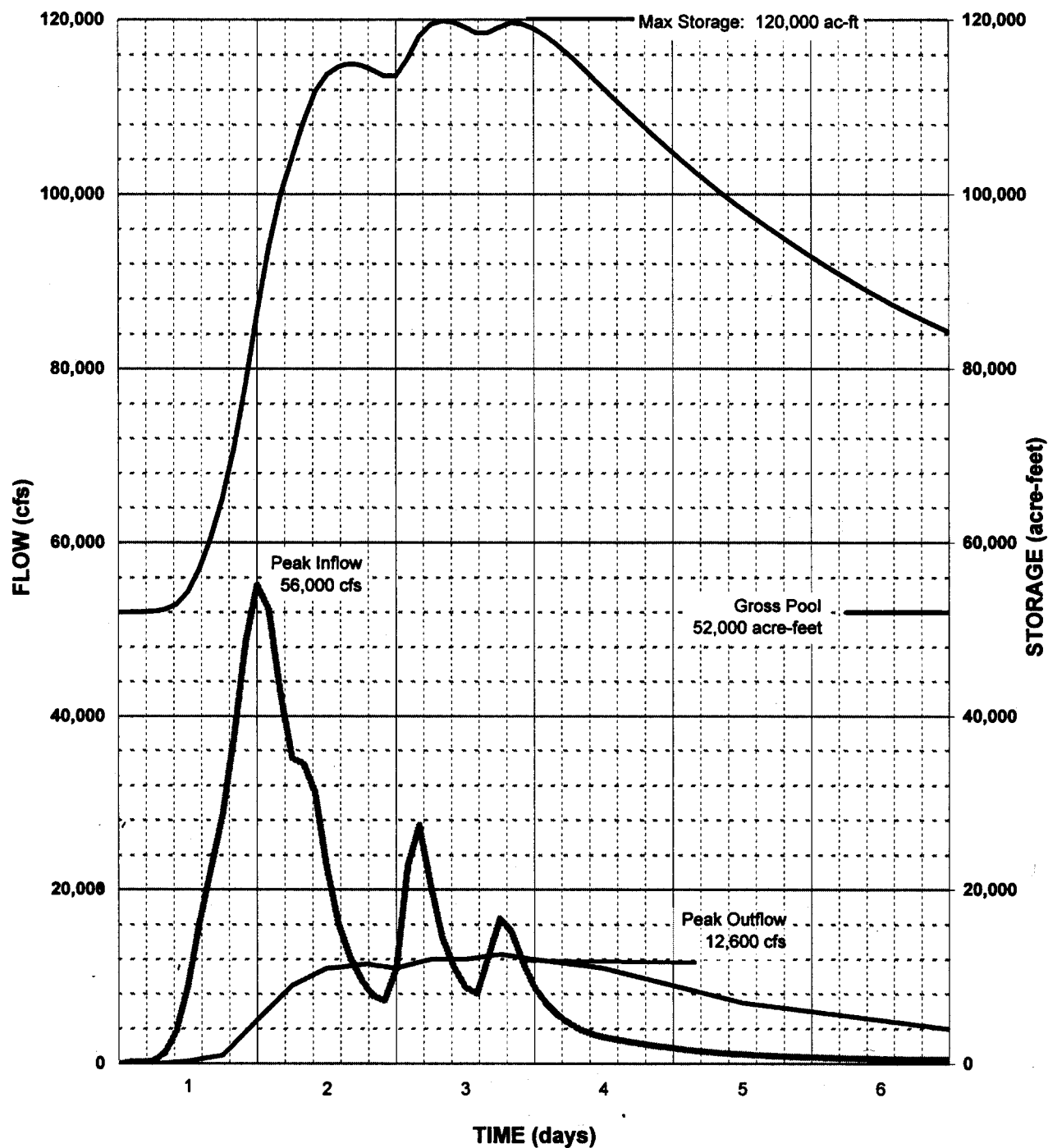
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

HISTORICAL OPERATION

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004 SHEET 6 OF 6 PLATE 4-6



NOTES: 1. Reservoir assumed to be at gross pool at beginning of spillway design flood. Outlet gates are fully closed and inoperable. Negligible effect from failure of upstream dams.

2. Drainage Area: 212 square miles

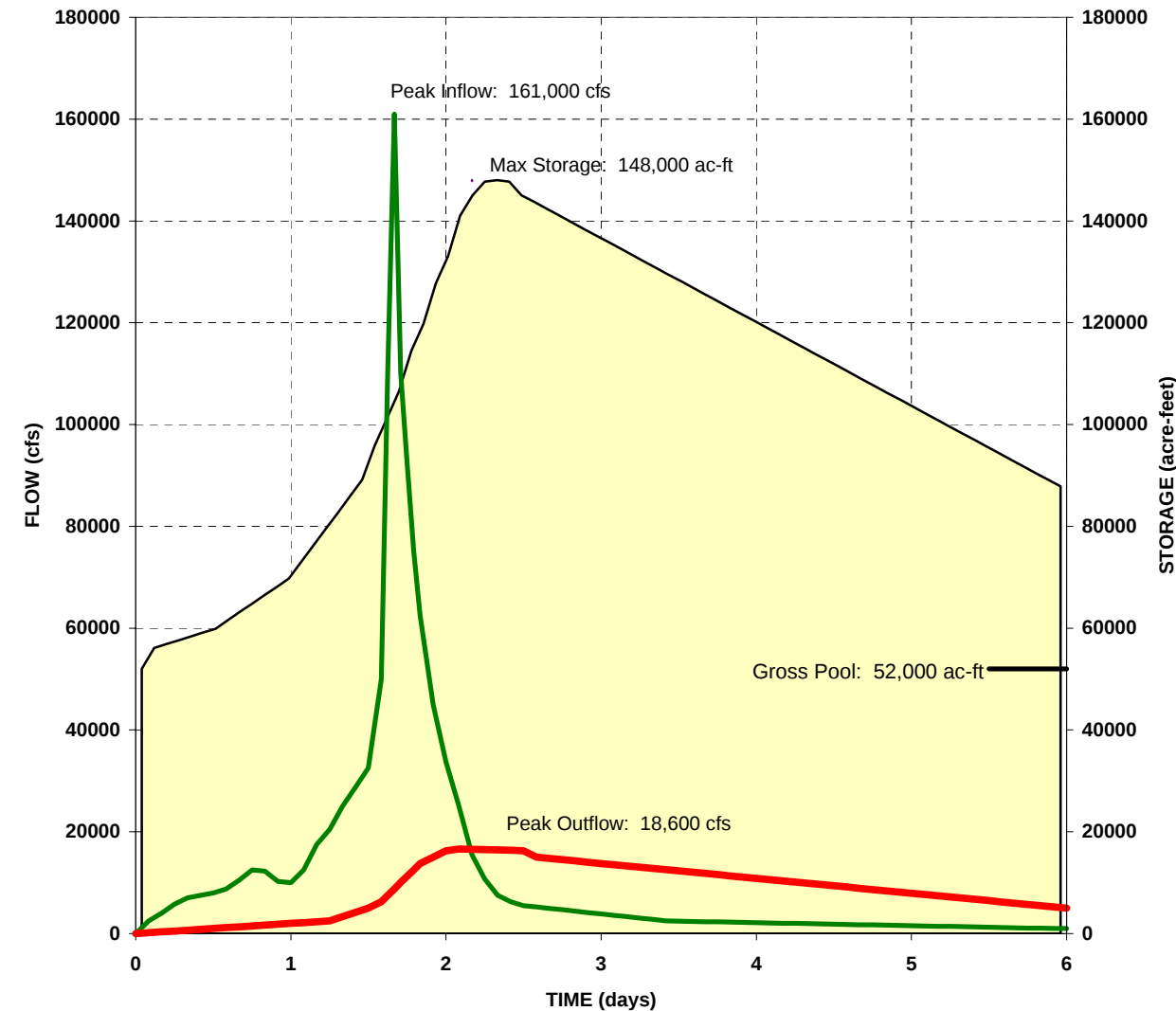
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FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

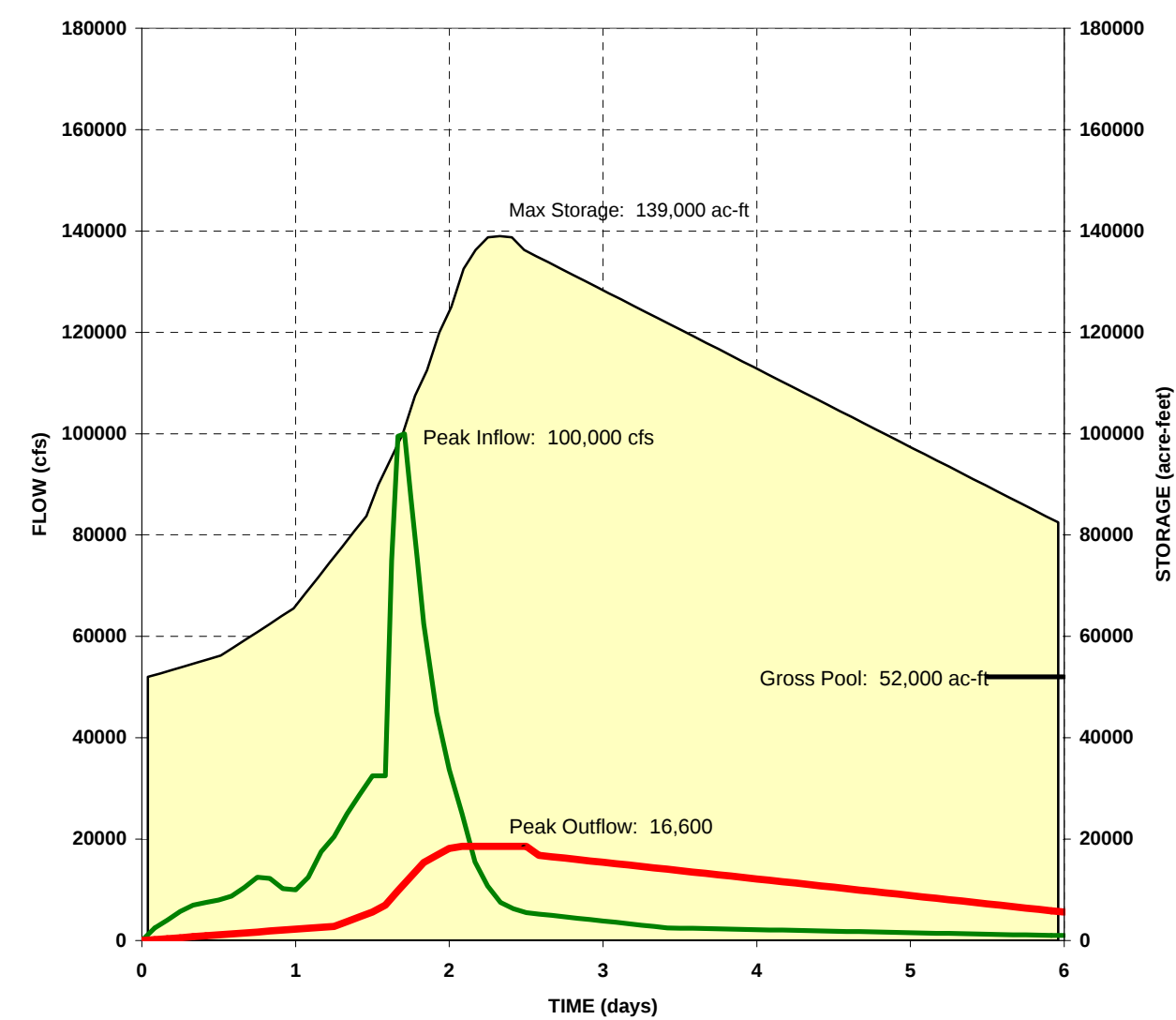
SPILLWAY DESIGN FLOOD

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

ASSUMING FAILURE OF SALT SPRINGS VALLEY DAM



ASSUMING NO FAILURE OF SALT SPRINGS VALLEY DAM



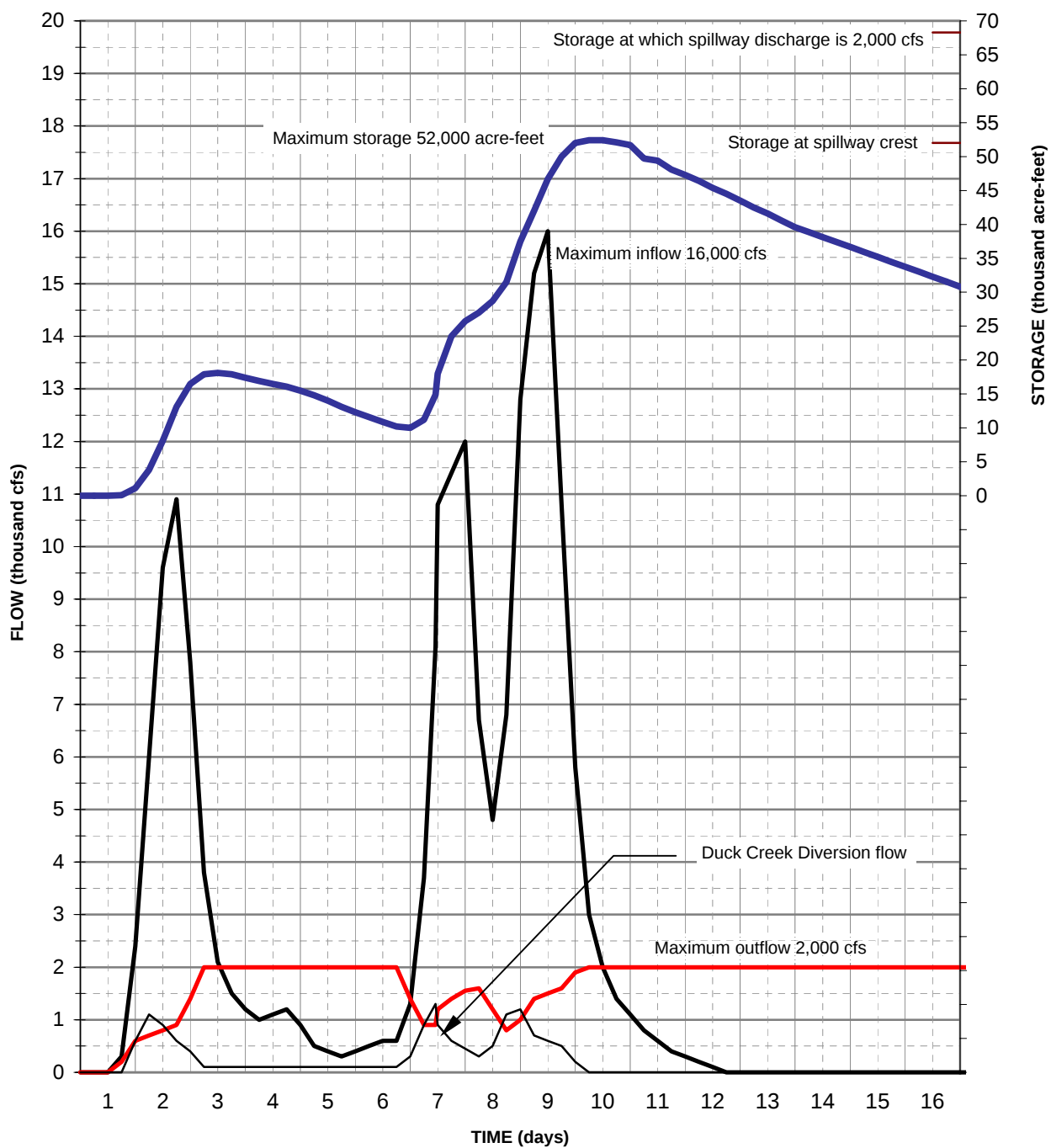
NOTES: 1. Based on the 1978 Farmington Dam Spillway Adequacy Study, two new probable maximum floods (PMF) were developed and adopted as the new Spillway Design Flood.

The HMR-36, "Interim Report - Probable Maximum Precipitation in California," dated October 1969, forms the basis for these probable maximum floods.

2. It was assumed that the reservoir is at gross pool elevation, 156.5 feet, at the beginning of the spillway design flood routing and that the outlet works gates are fully closed and inoperative.

FARMINGTON DAM LITTLEJOHN CREEK, CALIFORNIA
SPILLWAY DESIGN FLOOD ROUTINGS
U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT

Prepared by MVB



FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

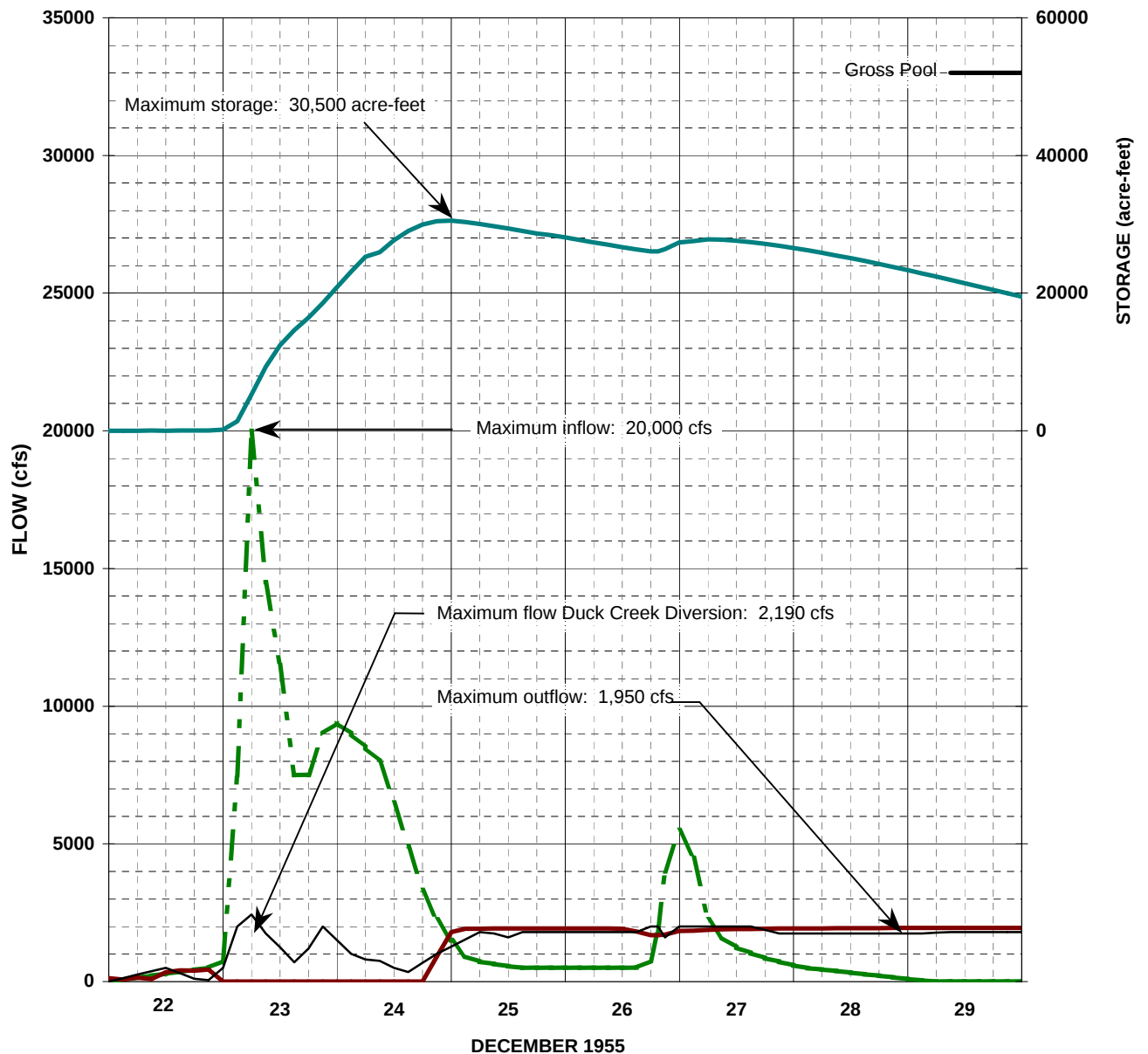
RESERVOIR DESIGN FLOOD

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004

PLATE 8-2



NOTES: 1. Prior to 1967, channel restrictions below the Duck Creek Diversion required that the gated outlet remain fully closed.

2. This routing assumes that both outlets at the Duck Creek Diversion are fully open.

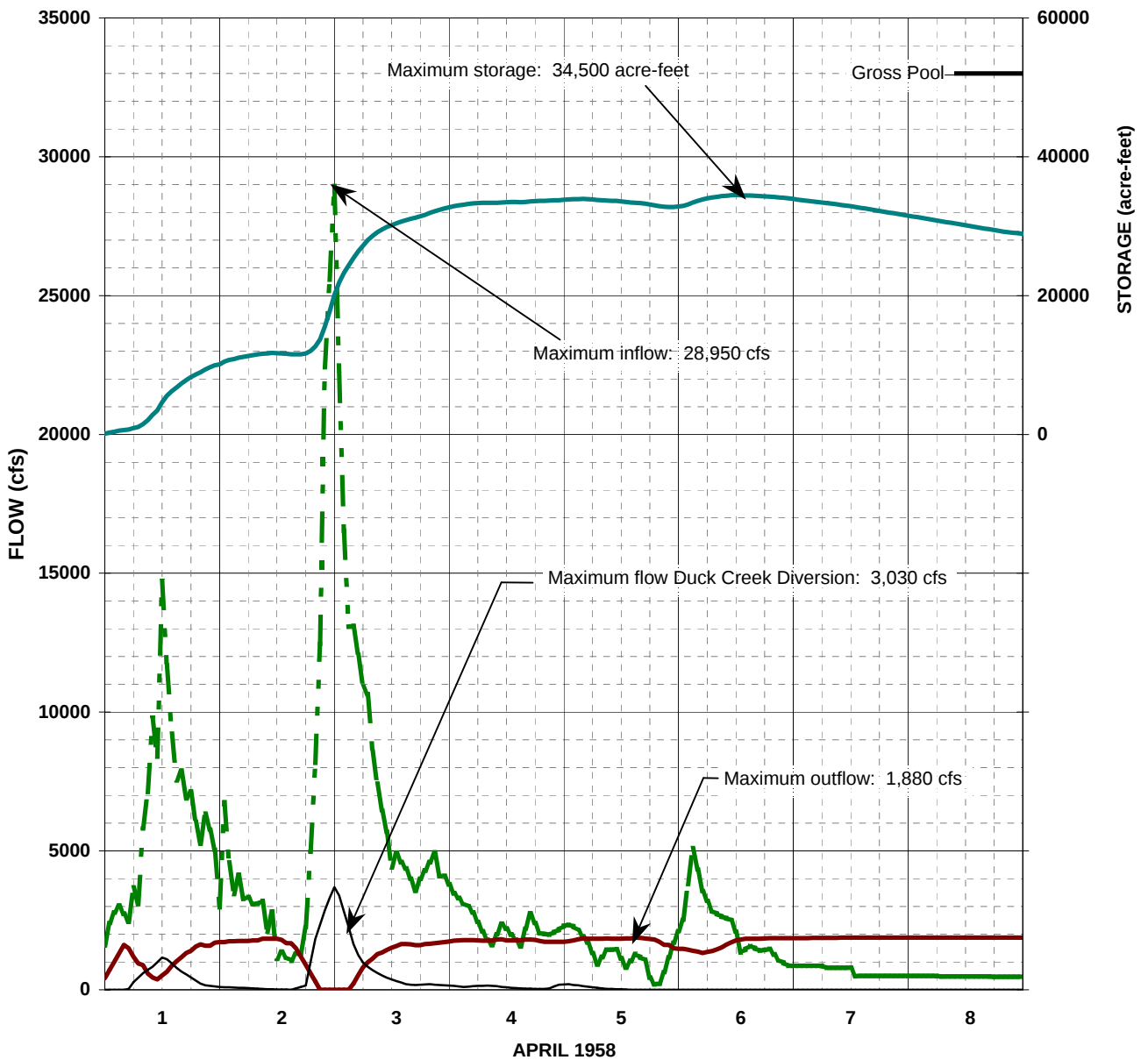
3. Inflow reflects historical record at Farmington Dam.

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

**HYPOTHETICAL
FLOOD ROUTING OF
DECEMBER 1955 RAIN FLOOD**

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB



NOTES: 1. Prior to 1967, channel restrictions below the Duck Creek Diversion required that the gated outlet remain fully closed.

2. This routing assumes that both outlets at the Duck Creek Diversion are fully open.

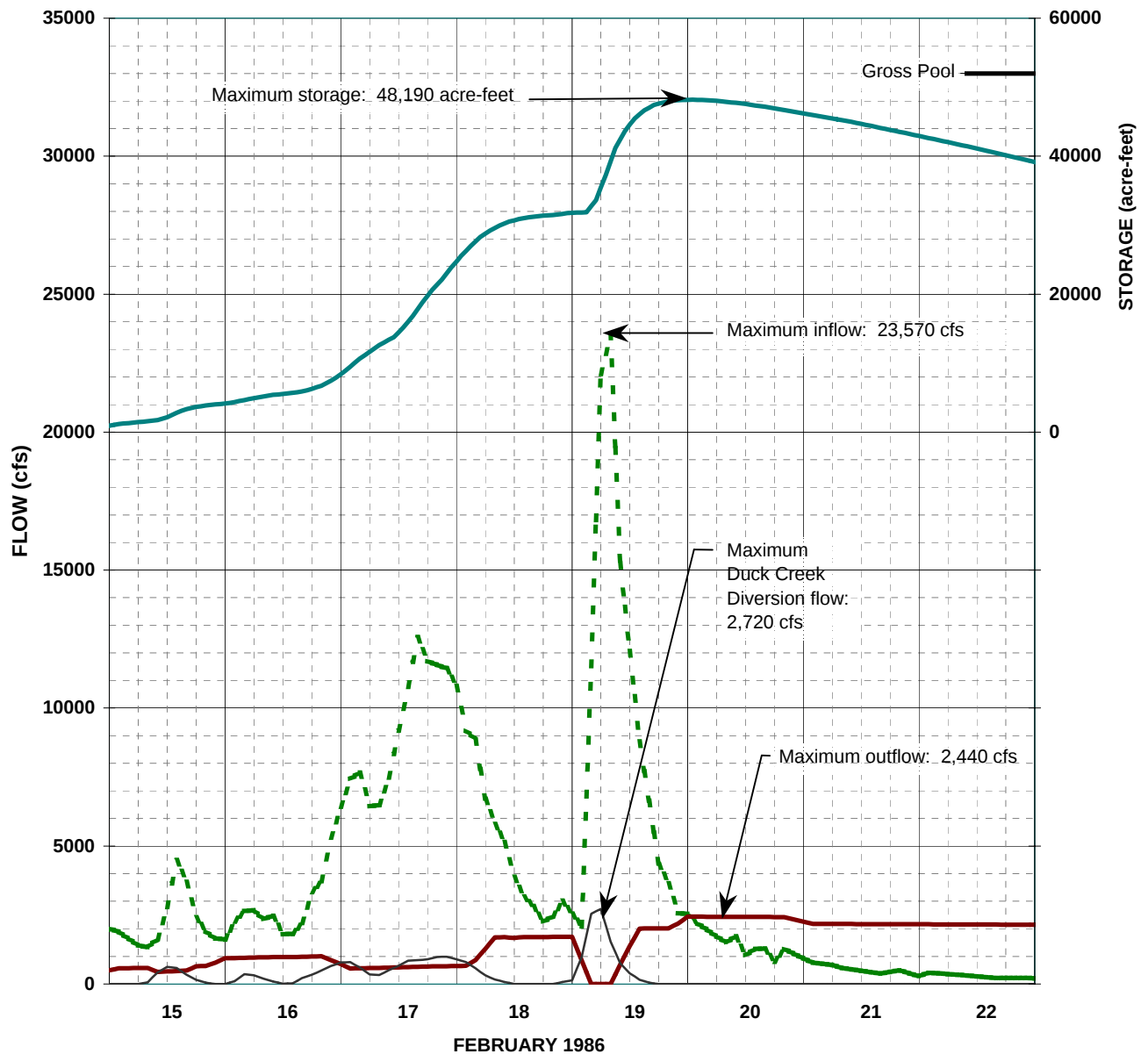
3. Inflow reflects historical record at Farmington Dam.

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

**HYPOTHETICAL
FLOOD ROUTING OF
APRIL 1958 RAIN FLOOD**

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB



NOTES: 1. Both gates full open on Duck Creek Diversion Dam.

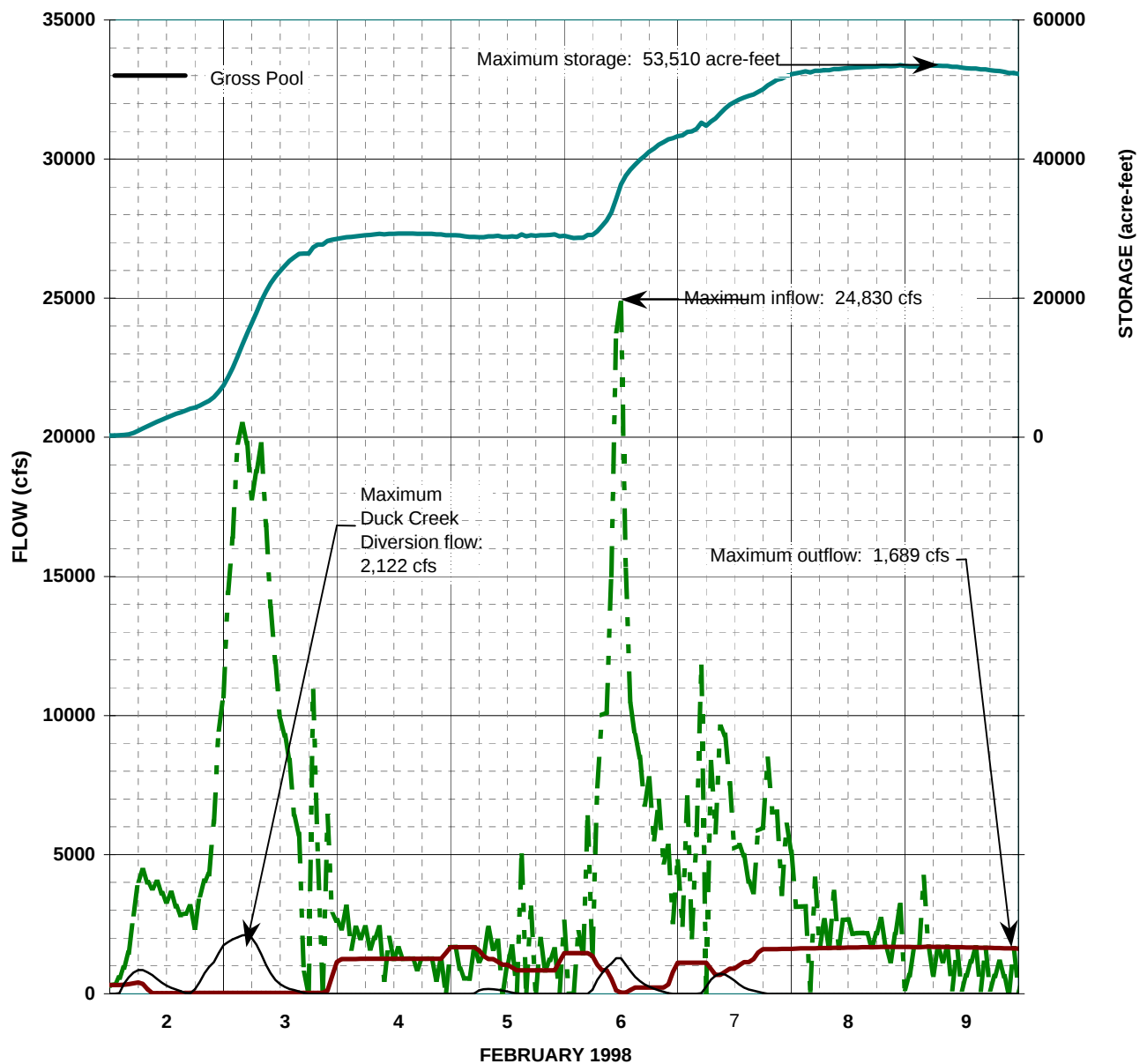
2. Inflow reflects historical record at Farmington Dam.

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

HISTORICAL FLOOD ROUTING OF FEBRUARY 1986 RAIN FLOOD

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB



NOTES: 1. Both gates full open on Duck Creek Diversion Dam.

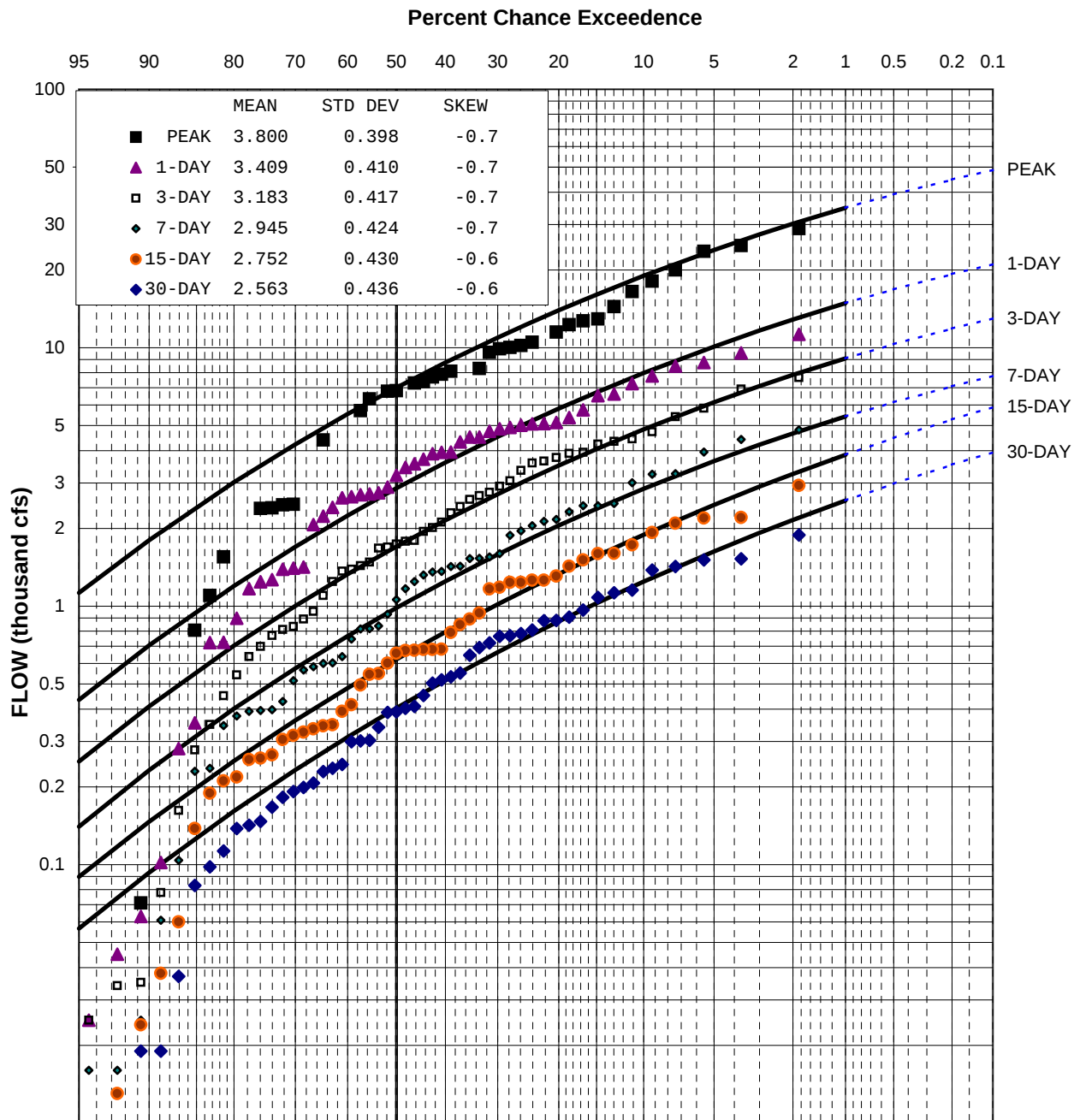
2. Inflow reflects historical record at Farmington Dam.

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

**HISTORICAL
FLOOD ROUTING OF
FEBRUARY 1998 RAIN FLOOD**

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB



NOTES:

1. Weibull plotting positions and expected probability adjustment applied based on 53 equivalent years of record.
2. Six lowest non-zero points censored for each curve to eliminate sensitivity to lower end.
3. Drainage area 212 sq. mi.
4. Period of record: Water years 1952-2004

Prepared by MVB

**FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA**

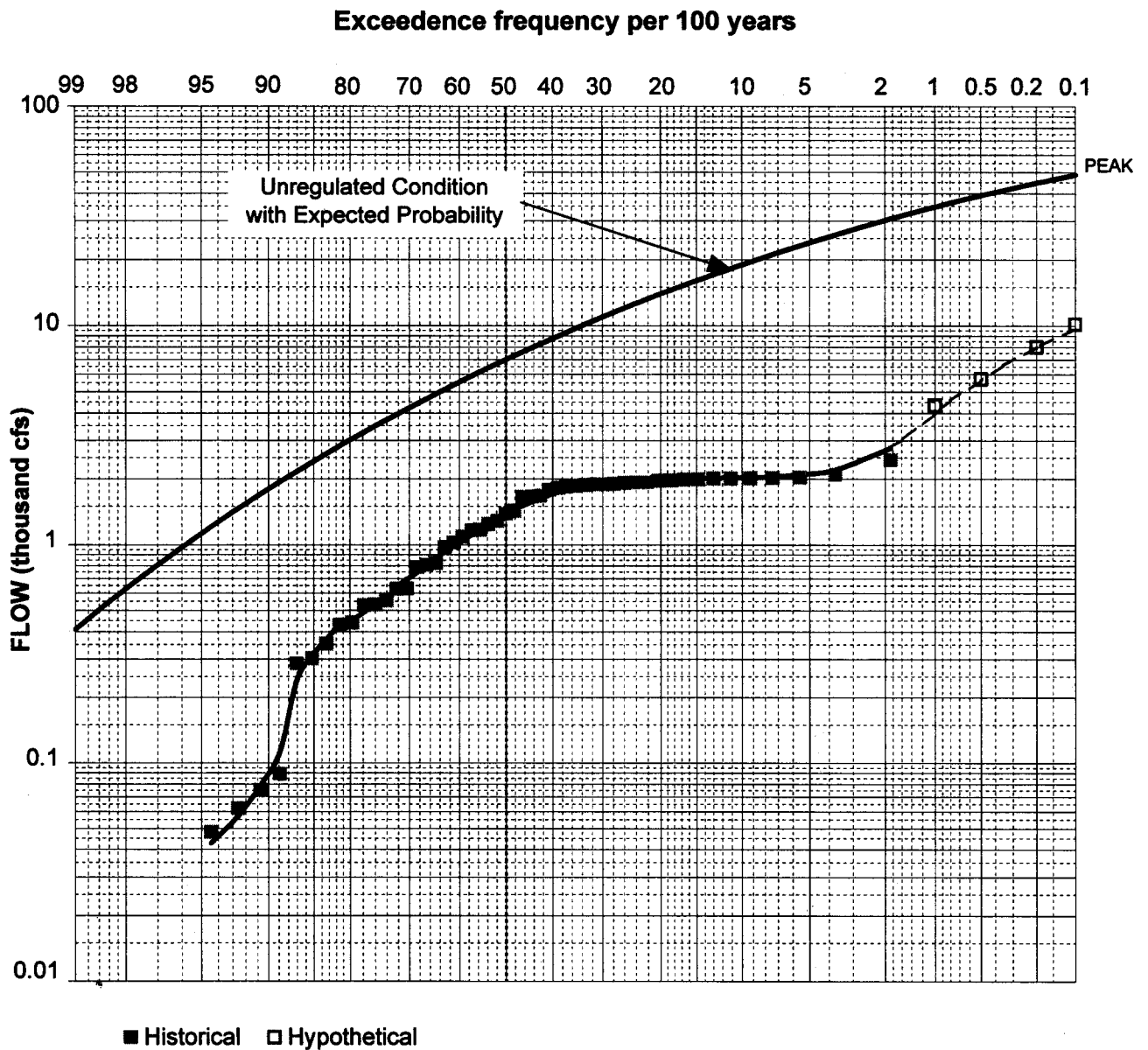
**RAIN FLOOD FREQUENCY CURVES
(UNREGULATED CONDITION)**

LITTLEJOHN CREEK BELOW FARMINGTON DAM

**U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT**

Revised Dec 2004

PLATE 8-4



NOTES: 1. The three maximum historical peak flows in descending order of magnitude are 1958, 1986 and 1955. Farmington gates were closed during the peak flow period at the town of Farmington; therefore, the peaks were a result of diversions from Duck Creek and the local area below Farmington Dam.

2. Duck Creek Diversion operation through 1966 does not reflect current operational criteria.

3. Period of Record: 1952-2004

**FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA**

**RAIN FLOOD FREQUENCY CURVES
(REGULATED CONDITION)**

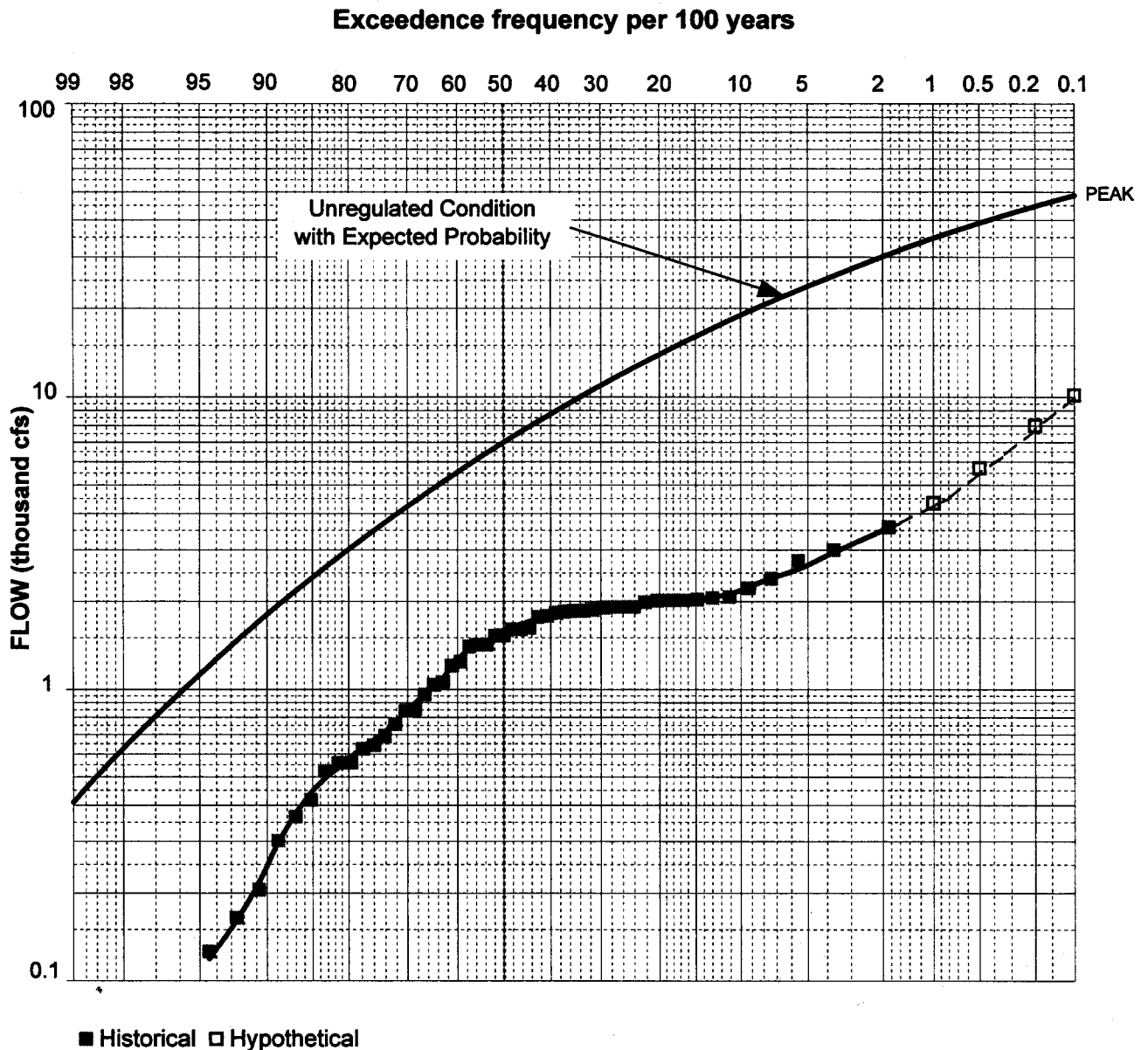
LITTLEJOHN CREEK BELOW FARMINGTON DAM

**U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT**

Prepared by MVB

Revised Dec 2004

PLATE 8-5



NOTES: 1. The three maximum historical peak flows in descending order of magnitude are 1958, 1986 and 1955. Farmington gates were closed during the peak flow period at the town of Farmington; therefore, the peaks were a result of diversions from Duck Creek and the local area below Farmington Dam.

2. Duck Creek Diversion operation through 1966 does not reflect current operational criteria.

3. Period of Record: 1952-2004

**FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA**

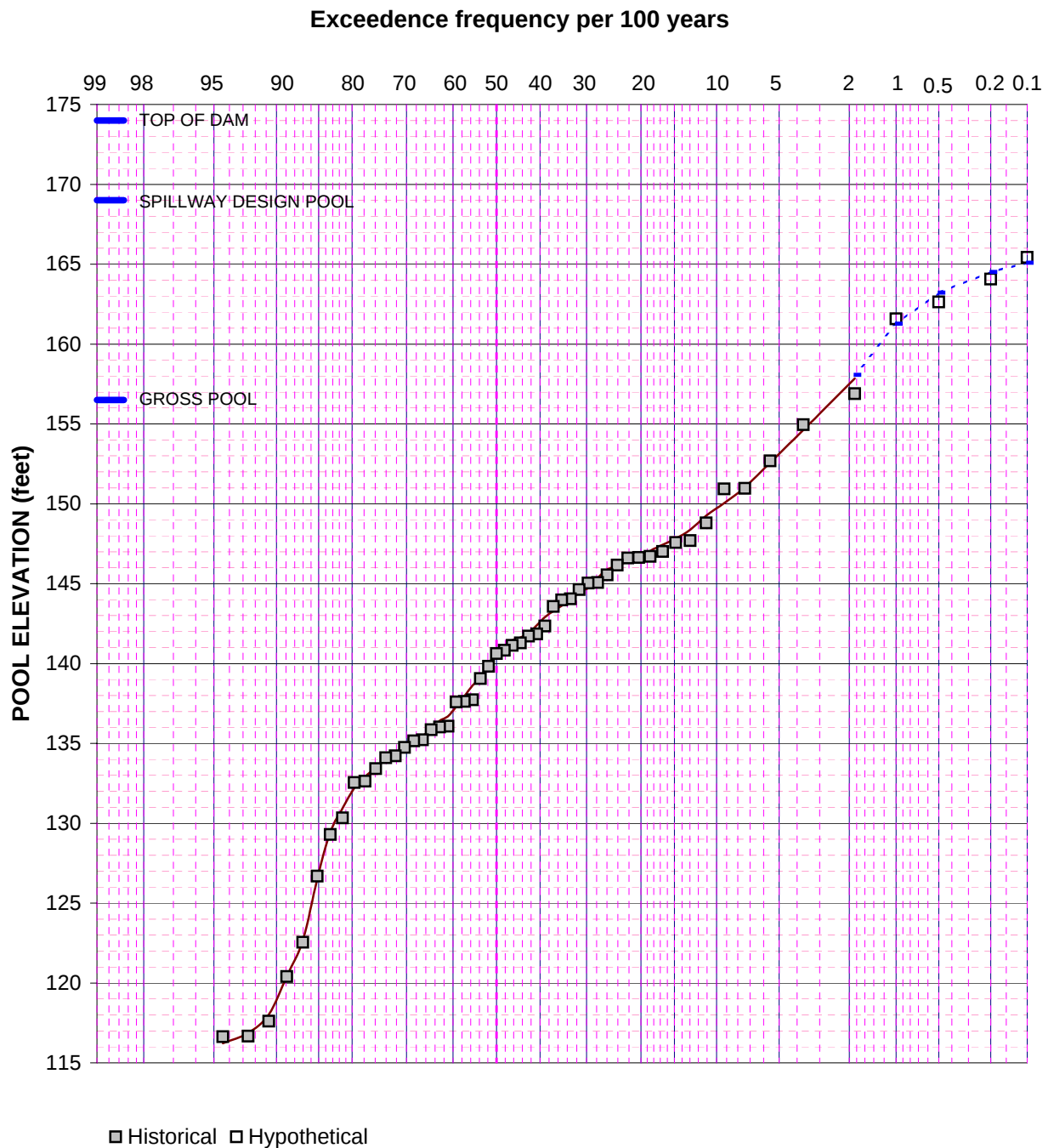
**PEAK RAIN FLOOD FREQUENCY CURVE
REGULATED CONDITION
LITTLEJOHN CREEK AT FARMINGTON**

**U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT**

Prepared by MVB

Revised Dec 2004

PLATE 8-6



FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

POOL ELEVATION-FREQUENCY CURVE

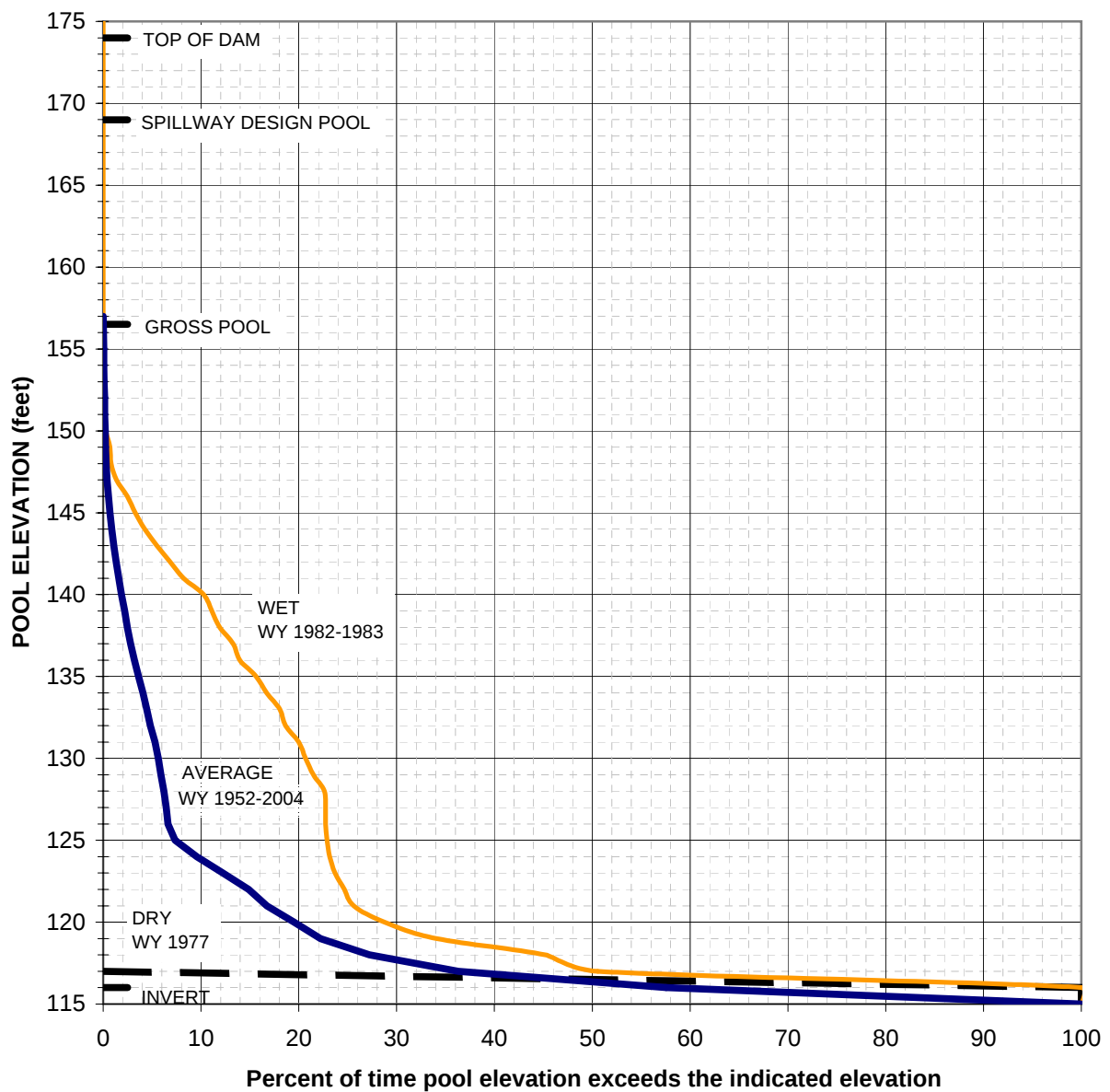
PERIOD OF RECORD: 1952-2004

Prepared by MVB

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Revised Dec 2004

PLATE 8-7



NOTE: Period of Record WY 1952-2004

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

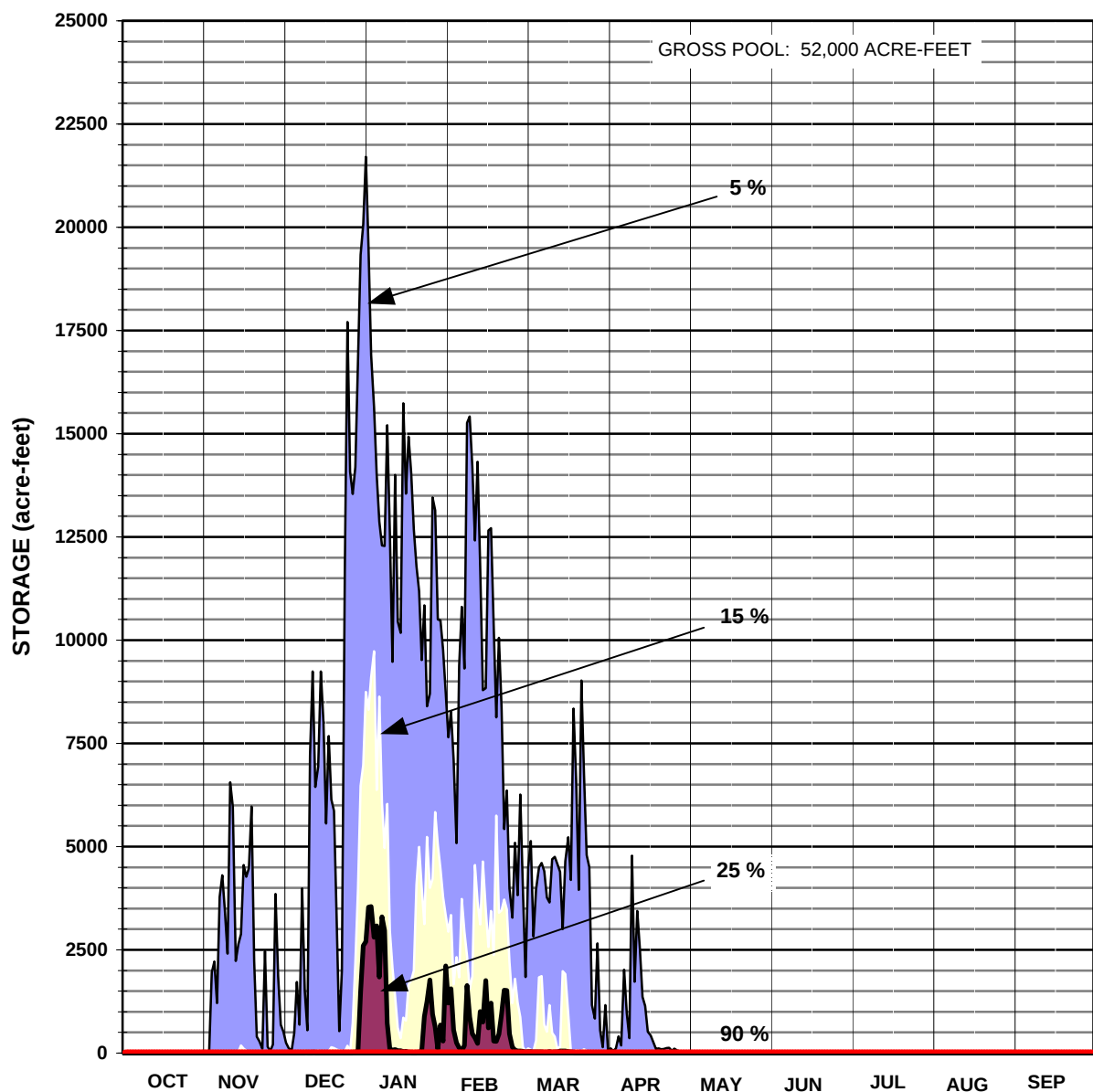
POOL ELEVATION-DURATION CURVE

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004

PLATE 8-8



NOTES: 1. Curve parameters indicate exceedence probability.

2. Curves are based on project operations during water years 1952-2003

Prepared by MVB

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

SEASONAL VARIATION OF STORAGE FREQUENCY

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

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PLATE 8-9

WATER CONTROL MANUAL

FARMINGTON DAM

Littlejohn Creek Basin
California

EXHIBIT A

STANDING INSTRUCTIONS TO PROJECT OPERATORS
FOR
FARMINGTON DAM

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
SACRAMENTO, CALIFORNIA

Revised December 2004

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EXHIBIT A
STANDING INSTRUCTIONS TO PROJECT OPERATORS
FOR FARMINGTON DAM

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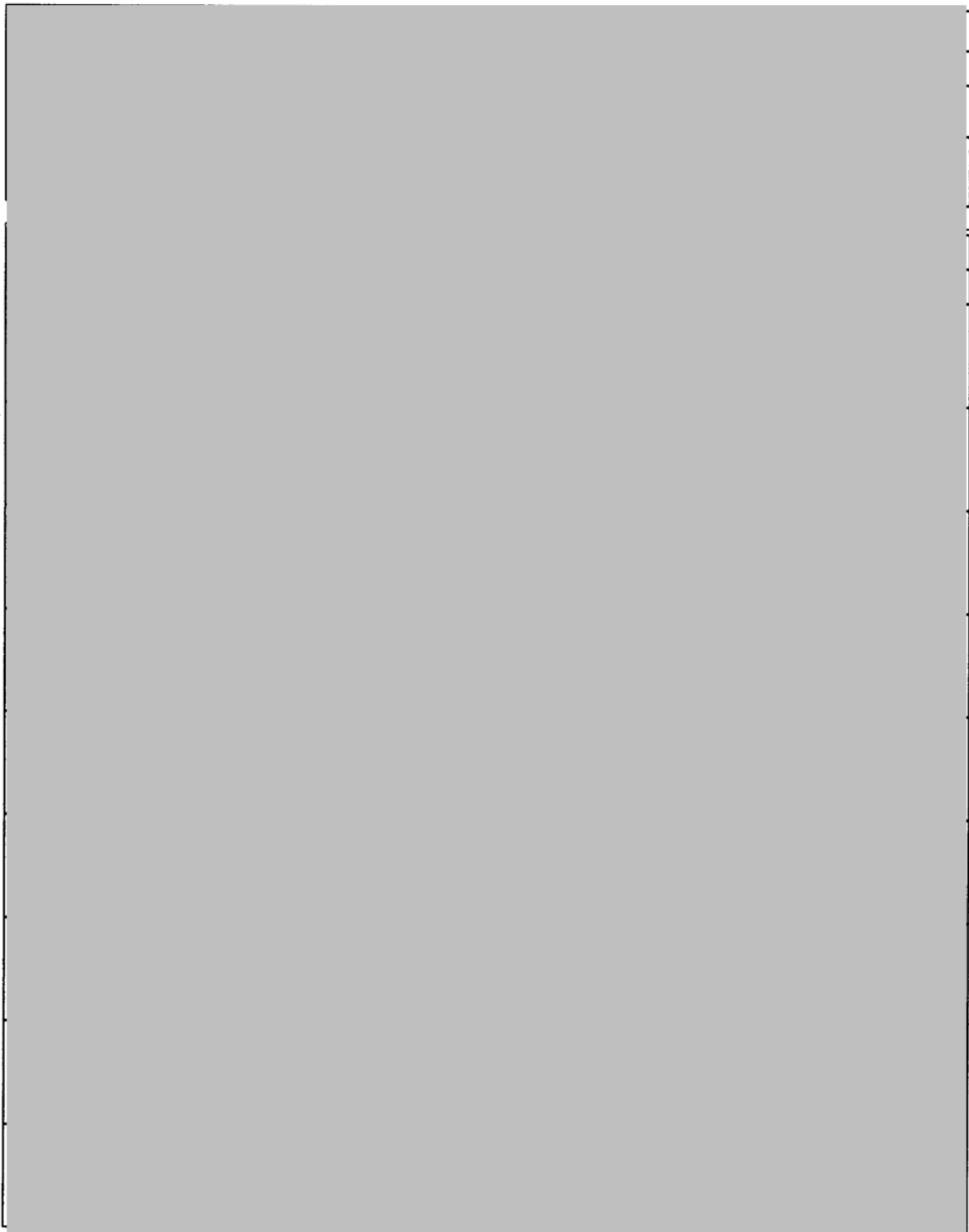
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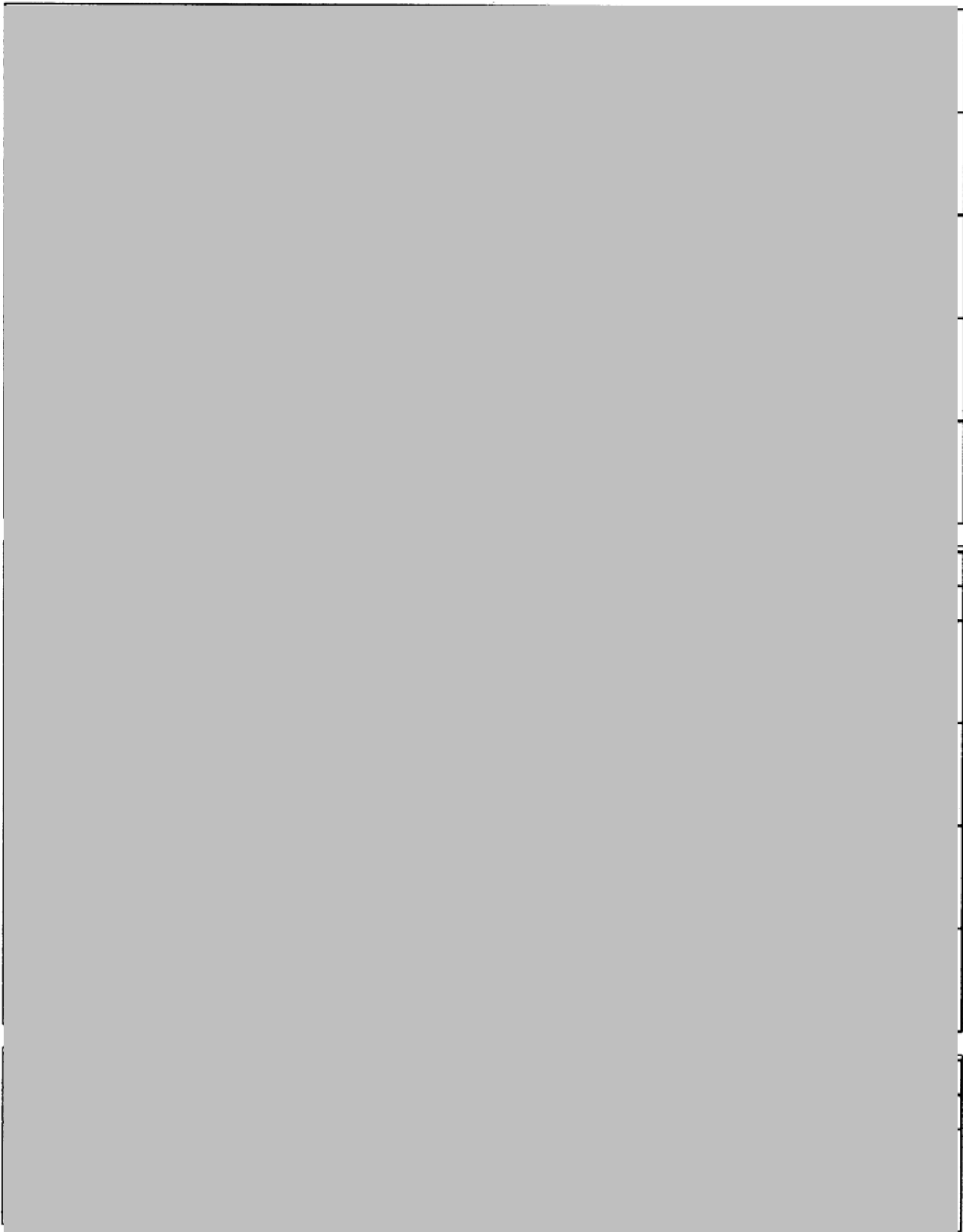
Revised December 2004

LIST OF PLATES
(continued)

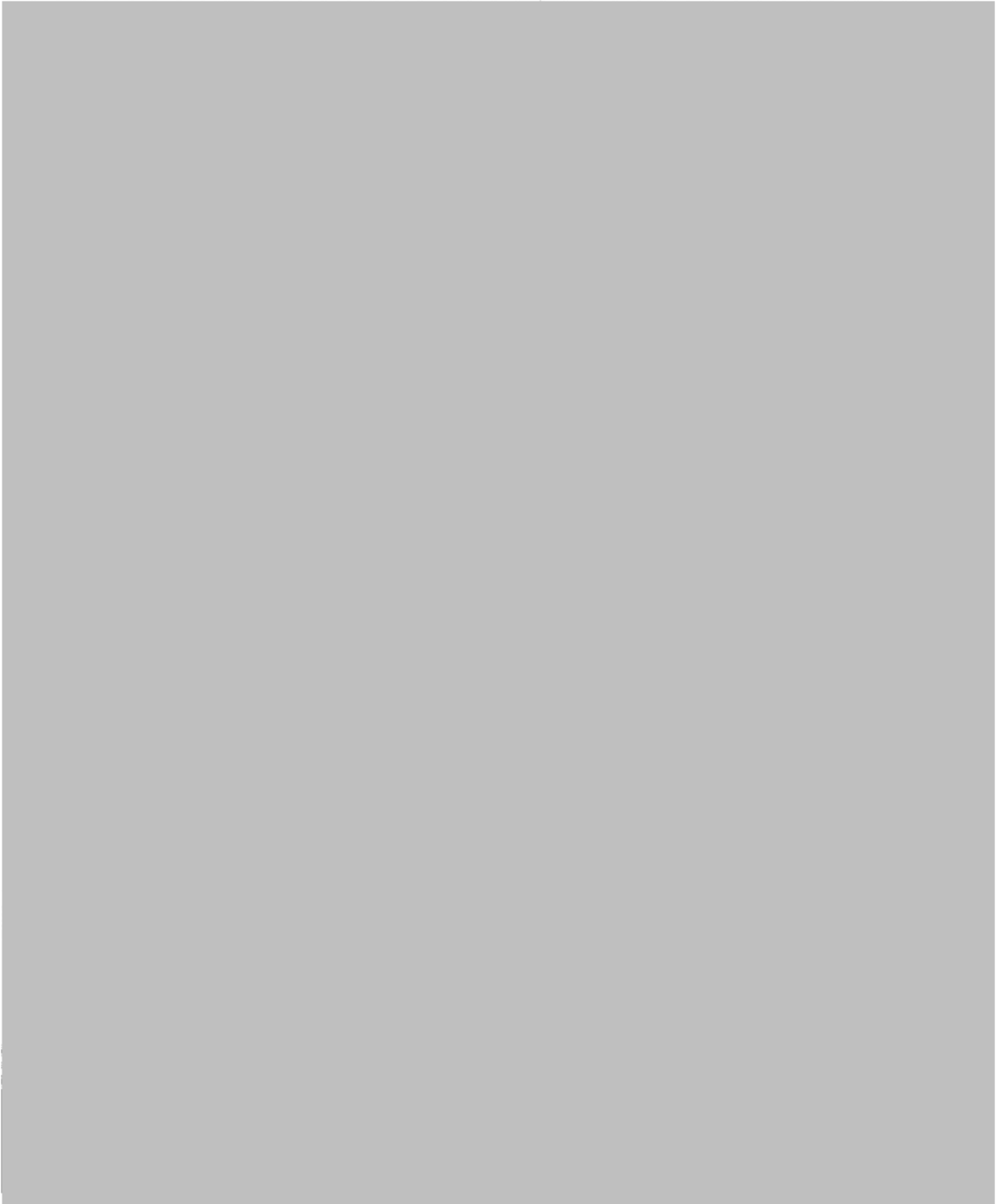
- A-12 Duck Creek near Farmington Rating Curve
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DISTRICT PHASE SPK SUP A to ER 500-1-1 Chapter 4	OPERATIONAL DATA REQUIREMENTS FARMINGTON RESERVOIR, LITTLEJOHN CREEK, CALIFORNIA			
	PROJECT PHASE	PROJECT STATUS CRITERIA	PROJECT BASIN CONDITION	HYDRO- METEOROLOGICAL DATA REQUIREMENTS*
NORMAL OPERATIONS	IV	Reservoir stage below 132.0 ft	No flood threat	Daily data obtained from WCDS at 2400 hrs seven days a week
		Reservoir stage between 132.0 ft and 156.5 ft, with actual or impending flow in Duck Creek Diversion	Forecast storms with flood control space encroachment	Daily data same as for I plus short period data from WCDS at 0600, 1200, 1800, and 2400 hrs.
EMERGENCY WATCH	III	Reservoir stage between 132.0 ft and 156.5 ft, with <u>no</u> actual or impending flow in Duck Creek Diversion	Forecast storms with flood control space encroachment, flood control releases are being made from reservoir	Daily data same as for I plus short period data from WCDS each 2 hrs at 0200, 0400, 0600, etc.
		Reservoir stage above 156.5 ft	Storm in progress with flood control space encroachment, flood control releases are being made from reservoir	Daily data same as for II plus short period data from WCDS hourly
PARTIAL ACTIVATION	II	Declared emergency	Severe flood threat, flood flows occurring, emergency declared by District Engineer	Daily data same as for II plus short period data from WCDS hourly
FULL ACTIVATION	I	Declared emergency	Emergency declared by District Engineer	Data checked hourly.
*OPERATION DATA: (1) All data to be obtained from the Water Control Data System (WCDS) or any of its components if primary systems are not operational. (2) If the WCDS is inoperative, project personnel are to obtain and furnish data from whatever sources are available as outlined in the Water Control Manual. Revised January 2016				

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EXHIBIT A

STANDING INSTRUCTIONS TO PROJECT OPERATORS FOR WATER CONTROL

FARMINGTON DAM LITTLEJOHN CREEK, CALIFORNIA WATER CONTROL MANUAL

A-01. Background and Responsibilities

a. General Information

(1) "Standing Instructions to Project Operators for Water Control" are essential to ensure efficient and safe operation of the project at all times. Any physical operating constraints should be within design limitations and clearly outlined to ensure that water control features are operated in a safe manner during all phases of the project's life, including the construction phase.

This exhibit to the "Farmington Dam and Reservoir, Littlejohn Creek, California, Water Control Manual" is prepared in accordance with instructions contained in EM 1110-2-3600 Management of Water Control Systems, Paragraph 9-2, (Standing Instructions to Project Operators for Water Control) and ER 1110-2-240 Engineering and Design – Water Control Management. All elevations in this manual are based on the National Geodetic Vertical Datum of 1929 (NGVD29). As directed by EM 1110-1-1004 Engineering and Design – Geodetic and Control Surveying, the datum has been changed to the North American Vertical Datum of 1988 (NAVD88). However, the elevations in this manual do not reflect NAVD88.

This exhibit pertains to duties and responsibilities of the Project Operator in connection with the functional operation of Farmington Dam and Reservoir, and the reporting of required hydrologic data. A copy of these Standing Instructions must be kept on hand at all times. Any deviation from the Standing Instructions will require approval of the District Engineer or designee.

Operation and maintenance of the project is performed by the Corps of Engineers. [REDACTED]

[REDACTED] . Operational instructions to the Project Operator are briefly outlined with specific emphasis on the Project Operator's duties and responsibilities during extreme flood emergencies. Exhibit A is designed to be a stand-alone document used independently as the flood control regulation guide, or as published, in conjunction with the Water Control Manual. To facilitate independent use of this exhibit, all plates required for water control operation of Farmington Dam and Reservoir, Plates A-1 through A-16, are included herein.

(2) Farmington Dam and Reservoir is authorized for flood control only. It is operated in accordance with the Water Control Plan, Plate A-14, which defines the requirements

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for water control operation of Farmington Dam. Farmington Dam is operated to restrict flood flows to non-damaging levels throughout Littlejohn Creek's network of channels, downstream from the reservoir, insofar as possible, without endangering the safety of the structure. The flood control objectives, in terms of storage limitations and release limitations, are as follows:

(a) The entire capacity of the Farmington Reservoir is reserved for flood control only. Any water temporarily stored in the reservoir will be released as rapidly as practicable without exceeding the maximum release permitted. Release limitations are described in Paragraph A-03. The taking line for flowage easements is 161 feet, which is 4.5 feet above gross pool level.

Physical limitations on storage are as follows:

Storage (acre-feet)	Water Surface Elevation (ft MSL)	Flow Over Spillway (cfs)	Remarks
52,000	156.5	0	Gross Pool
120,000	169.0	12,600	Spillway Design Flood Pool

(b) The critical channel reach is within Littlejohn Creek and its distributaries downstream of Farmington Dam and Reservoir. Channel capacities are limited to carrying sustained flows up to approximately 2,000 cfs. A stage-discharge rating curve for Littlejohn Creek at Farmington is shown on Plate A-11.

Releases from Farmington Dam must be made with due allowance for the unregulated flows diverted from Duck Creek to Littlejohn Creek and the local inflow to Littlejohn Creek below Farmington Dam. The releases will be augmented by these flows. Flows from Duck Creek Diversion can be anticipated by observation of the stream gage located on Duck Creek near Farmington. The limitation on releases imposed by Duck Creek flows can be determined by use of Plate A-15 or Plate A-16. Plate A-16 is provided solely as a guideline to aid operation, should the Duck Creek near Farmington gage be destroyed or cease reporting. The stage-discharge rating curve for this gage, located upstream from the diversion works, is shown on Plate A-12. The stage-discharge curves for the Duck Creek Diversion outlet and spillway are shown on Plates A-9 and A-10, respectively.

Travel time to the town of Farmington is about 3 hours from Duck Creek near Farmington gage and about 1 hour from the Duck Creek Diversion. Travel time from Farmington Dam to the town of Farmington is approximately 3 hours.

(3) The functional operation of Farmington Dam and Reservoir is performed by the Water Managers or Technicians in the Water Management Section, Sacramento District. The Water Managers or Technicians function as Project Operators.

(4) Farmington Dam is located on Littlejohn and Rock creeks, approximately

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20 miles east of the city of Stockton and 3.5 miles east of the town of Farmington. Portions of the flood control basin are in San Joaquin, Calaveras, and Stanislaus counties. The Duck Creek Diversion is located about 3 miles northwest of Farmington Dam. The diversion channel extends southward about 5,000 feet from the Duck Creek Diversion to Littlejohn Creek, about 4 river miles downstream from Farmington Dam.

(5) Constraints on the physical operation of the structure are as follows:

(a) Releases from Farmington Dam, insofar as possible, will be restricted so that flows in Littlejohn Creek do not exceed 2,000 cfs at the town of Farmington. Releases from Farmington Dam will be limited to the difference between 2,000 cfs and the sum of the anticipated coincidental local inflow and flow at Duck Creek Diversion.

(b) [REDACTED]

[REDACTED]. In addition, the restricted rate of change will minimize sloughing and caving as the flow recedes after an extended period of bank-full flows.

Under dual gate operation, the objective is to obtain a balanced flow through each gate. In the event that only one gate is operable, Farmington gates have been designed to accommodate single gate operation. A single gate rating curve has not been developed, since dual gate operation is the normal mode of operation. If a single gate should fail, the discharge at a given pool elevation will be approximately half of normal discharge with dual-gate operation.

(c) During flood control operation, it is important that the tainter gates on the Stockton East Water District (SEWD) Rock Creek Diversion Structure be fully opened.

Since the Rock Creek Diversion Structure is located about 140 feet downstream of the outlet works stilling basin, it is capable of backing up water through the main outlet works, causing spills over the side weir, and creating an incidental pool in the Farmington flood control easement. Water may become impounded against the upstream toe of the dam embankment if the water surface elevation of the incidental pool exceeds 125 feet. Operation of the Rock Creek Diversion Structure and closure of the radial gates affects operation, maintenance, and inspection of the gates at Farmington Dam, as well as flow computations. Operation of the diversion structure in conjunction with the flood control objectives of the Farmington Dam and Flood Control Project is summarized in Paragraph A-01c.

(d) [REDACTED]

[REDACTED] Should this occur during a storm event, New Hogan personnel will be requested by the Water Management Section, Sacramento District, to manually operate the gates according to the Water Control Plan.

(e) The North Littlejohn Creek Control Structure cannot readily be used to assist passing authorized flood releases from Farmington Dam, passing flows diverted to

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Littlejohn Creek from Duck Creek, or passing flows originating in the local area. Further restrictions to flows in Littlejohn Creek might be required to accommodate the loss of use of the North Littlejohn Creek Control Structure.

(6) [REDACTED]
[REDACTED]. Maintenance is performed by New Hogan Dam and Lake maintenance personnel.

b. Role of the U.S. Army Corps of Engineers. The primary responsibility for operating Farmington Dam and Reservoir is delegated to units of the Engineering Division and Construction-Operations Division of the Sacramento District, Corps of Engineers, as outlined below. The Sacramento District's Public Affairs Office (PAO) coordinates with local news media regarding floods and other aspects of project operation. The names, addresses, and telephone numbers of those individuals whose responsibilities are outlined in the following paragraphs appear at the front of this manual and in Exhibit A.

(1) Water Management Section (Engineering Division) has the following responsibilities:

(a) Obtaining current weather forecasts for the region.

(b) Analyzing current reservoir and hydrometeorologic data, weather forecasts for the region, and determining the schedule under which the reservoir shall be operated.

(c) [REDACTED].

(d) [REDACTED]
[REDACTED]. District personnel are usually from the Water Management Section or the New Hogan Project. Each gate is raised and lowered by the Sacramento District Office on a regular basis, in order to ensure that the gates are fully functional. [REDACTED]

[REDACTED] During the flood season, the main outlet gates may be tested as often as bi-weekly to ensure proper operation. The gates will be brought through a full cycle, raising them a 1/2 foot every 15 minutes until fully open

(e) Providing Project Operator training to New Hogan Dam and Lake personnel.

(f) Providing maintenance for hydrometeorological instrumentation and gage control equipment at the project and supervising its operation.

(g) Preparing monthly operation and other special reports relative to the operation of the project.

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

(2) New Hogan Dam and Lake Park Manager designees (Construction-Operations Division) have the following responsibilities:

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

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

(c) Accomplishing the physical operation of the outlet works in accordance with instructions issued by the Water Management Section, if requested.

(d) Reporting data to the Water Management Section, if requested.

(e) Reporting any unusual conditions of the dam embankment, the downstream channels, or the operating gate equipment that might interfere with planned operation of the project.

(f) Making emergency operation changes when contact with the Water Management Section is broken, and a clearly defined change occurs that warrants immediate action.

(g) Providing maintenance of dam and appurtenances.

(h) Keeping familiar with operation of the tainter gates of the Stockton East Water District (SEWD) Rock Creek Diversion Structure, and being prepared to operate the structure if requested by the Water Management Section.

c. Other Federal Agencies

(1) The National Weather Service (NWS) furnishes meteorological data and weather forecasts on a 24-hour basis. When the meteorological situation indicates general area precipitation, NWS furnishes Quantitative Precipitation Forecasts (QPF). (See Paragraph 6-01 b.)

(2) The Joint Federal-State River Forecast Center (RFC) monitors weather conditions and river stages on a year-round basis. The RFC forecasts stages and flows on major river systems. However, forecasts are not made for the Littlejohn Creek Stream Group.

(3) The Federal-State Flood Operations Center furnishes flood warnings and forecasts of river stages to the local news media, law enforcement agencies, and other responsible agencies for their use and for dissemination to the public.

d. State and County Agencies

(1) The State of California Water Resources Control Board administers water

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rights for the natural flows along Littlejohn and Duck creeks.

(2) The San Joaquin County Department of Public Works has the following responsibilities:

(a) Providing channel maintenance in Littlejohn and Duck Creeks.

(b) Providing operation of the gated outlet at the Duck Creek Diversion Dam, as indicated in Exhibit A.

(c) Operating the North Littlejohn Creek Control Structure.

(3) The Stockton East Water District, a state-sponsored local agency, owns and operates the Rock Creek Diversion Structure. SEWD is responsible for the following, which apply to both normal and emergency conditions:

(a) Operating the diversion structure in compliance with Corps requirements, as defined in Paragraph A-03. The operation of the water conveyance system shall not impact the Sacramento District's normal operation and maintenance plans or scheduling, dam inspections, or in any way impact the Corps' ability to operate the Farmington Dam and Flood Control Project to meet its authorized flood control purpose. SEWD will maintain the necessary equipment at the site, including a generator and battery-operated drills, to enable rapid operation of the radial gates either manually, remotely, or via automated control at any and all times necessary.

(b) Maintaining all physical components of the diversion structure and canal, including the flow metering system. During the non-flood season (diversion structure operating), the flow meters are necessary because backwater impacts Corps equipment and flow computations. During the flood season, the system supplements Corps data. During periods of low flow, the flow meter readings may be more accurate and are an alternative means of supplementing or replacing the Corps' computed outflow. Real-time outflow, diversion flow, and outlet stage data are recorded by the metering system.

(c) Accommodating Corps dam inspections by evacuating all standing water in the stilling basin, removing sediment accumulated within the stilling basin and below the Rock Creek Diversion Structure, and fulfilling other maintenance requirements.

(d) Having both tainter gates fully open within one hour of a request for such by the Corps, in response to a flood or other emergency. In consideration of the water and riparian rights holders downstream of the dam, SEWD must monitor for natural flows and operate the radial gates to allow passage of these flows to the natural discharge channel. When no natural flows are anticipated, the radial gates can remain closed to create the pool necessary for up to 300 cfs flow to enter the Lower Farmington Canal. If the Corps determines that naturally occurring or forecasted high flows will impact Farmington flood control operation, the Corps will notify SEWD; SEWD will direct the USBR to cease any conveyances from the Stanislaus River basin into the Farmington basin.

(e) Implementing mitigation measures per Corps requirements:

(i) SEWD established a garter snake mitigation pond and channel adjacent to the Rock Creek Diversion Structure. A pipe extends through the sidewall to connect the forebay area to the mitigation pond area. During the winter diversion, SEWD will ensure that the pipe inlet is shut off either through installation of a valve or by capping. A dry-down period after October 1 is required to minimize the development of large predatory fish in the pond/channel mitigation area. During the period of summer diversion, SEWD will ensure that flows are diverted via the pipe inlet into the giant garter snake mitigation area. The flows will return to Rock Creek below the diversion structure.

(ii) Maintaining operational pump and water trough pipeline, which originates at diversion works facility per mitigation agreement.

e. Private Organizations. None.

A-02. Data Collection and Reporting

a. Normal Conditions

(1) Reporting. Various reports concerning the regulation of Farmington Dam are listed below:

(a) A daily operation report is produced by the Water Management Section. The Corps of Engineers Reservoir Report includes the following information on project operation:

- (i) Reservoir elevation as of midnight
- (ii) Reservoir storage as of midnight
- (iii) Reservoir storage change from midnight to midnight
- (iv) Reservoir mean daily outflow as of midnight
- (v) Reservoir mean daily inflow as of midnight
- (vi) Daily precipitation as of midnight
- (vii) Duck Creek near Farmington flow as of 0700 hours
- (viii) Duck Creek Diversion flow as of 0700 hours
- (ix) Littlejohn Creek at Farmington flow as of 0700 hours

(b) The District Engineer or designee, U.S. Army Corps of Engineers, also prepares monthly operation reports and other special reports relative to the operation as required by the Chief of Engineers, U.S. Army Corps of Engineers.

(c) The Annual Division Water Control Management Report covers significant activities of the previous water year and a description of project accomplishments planned for the current year.

(d) Project data is computed hourly and is available on the Corps' web site.

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(2) Data Collection. During normal operation, the data collection and computation process is performed automatically by computer. General procedures to determine storage, mean daily outflow, and mean daily inflow are as follows:

(a) A graphical presentation of storage and area capacity versus pool elevation is shown on the Area-Capacity Curves on Plate A-1. The corresponding Area-Capacity Table, used in converting reservoir elevation to storage, is shown on Plate A-2. The daily reservoir storage change increment, necessary for mean inflow computations, is the difference between the most recent midnight storage and the preceding one.

(b) The total mean daily outflow is the sum of the mean outflows through both the Rock Creek (main) outlet works, and the Littlejohn Creek (auxiliary) outlet works, plus the mean flow over the spillway. Flows through the outlets and spillway are determined separately. Discharges through the Littlejohn Creek (auxiliary) outlet works are determined by the reservoir stage at the auxiliary outlet in conjunction with the Outlet Rating Curve shown on Plate A-3. This outlet rating is for a fully opened gate. Discharges from the Rock Creek (main) outlet works are determined by reservoir stage in conjunction with the partial gate opening curves shown on Plate A-4. Spillway discharge is determined by reservoir stage in conjunction with the Farmington Dam Spillway Rating Curve shown on Plate A-7.

(c) The total mean daily inflow is the sum of the mean daily outflow (cfs) and the daily reservoir storage change converted from acre-feet into second-foot-day (sfd).

b. Emergency Conditions. For flood events and other emergency conditions, the information in Paragraph A-02a will also apply (See the Operational Data Requirements in the front of this exhibit).

The Park Manager is responsible for implementing the emergency notification plan; however, such notification should be coordinated with the Water Management Section, if possible.

c. Regional Hydrometeorological Conditions. Water Management will be informed of regional hydrometeorological conditions which could impact the structure. The Water Manager obtains information on hydrometeorological conditions from the following agencies:

(1) The National Weather Service (NWS) prepares and distributes weather forecasts to agencies responsible for flood protection and to the public by way of the local news media. NWS also furnishes meteorological data and weather forecasts on a 24-hour basis. Regular forecasts are made twice a day. When the meteorological situation indicates general area precipitation, Quantitative Precipitation Forecasts are furnished.

(2) The Joint Federal-State River Forecast Center (RFC) monitors weather conditions and river stages on a year-round basis. Personnel from the California-Nevada River Forecast Center, the National Weather Service office in Sacramento, and the California Department of Water Resources are assigned to the RFC. The RFC forecasts stages and flows on major river systems. Special forecasts are not made for the Littlejohn Creek Stream Group.

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(3) The Federal-State Flood Operations Center is activated when floods on major streams become imminent. This center operates on a 24-hour basis and, among other flood emergency activities, advises all interested parties of flood situations as they develop. The center furnishes flood warnings and forecasts of river stages to local news media, law enforcement agencies, and other responsible agencies for their use and for dissemination to the public.

A-03. Water Control Action and Reporting

a. Normal Conditions. Operation of the project will be in accordance with the procedures defined in the following paragraphs.

(1) Releases from Farmington Dam, insofar as possible, will be restricted so that flows in Littlejohn Creek do not exceed 2,000 cfs at the town of Farmington (Littlejohn Creek at Farmington Gage). Releases will be limited to the difference between 2,000 cfs and the sum of the anticipated coincidental local inflow below the dam and the flow diverted from Duck Creek. To assist in accomplishing this operation, the dual gates of Farmington Dam are set at a fixed gate opening of 1.5 feet, except under SEWD diversion operation conditions, as defined in Paragraph A-03a(2). This gate setting minimizes the chance that high flows from Duck Creek will coincide with appreciable releases from the dam before the Project Operator is able to operate the gates of the main outlets. Desired releases will be obtained by manipulating both slide gates at the Rock Creek (main) outlet works, according to the discharge rating curves shown on Plate A-4. The required setting for both gates can then be determined from pool elevation and the desired discharge. The main outlet gates shall be opened or closed at a rate not to exceed 1/2 foot in any 15-minute period. Under dual gate operation, both slide gates are set at the same level. In the event that only one gate is operable, Farmington gates have been designed to accommodate single gate operation. A single gate rating curve has not been developed, since dual gate operation is the normal mode of operation. If a single gate should fail, the discharge at a given pool elevation will be approximately half of normal discharge with dual-gate operation.

The auxiliary outlet will be fully open at all times, except when closure is required for maintenance purposes. Discharge from the auxiliary outlet is determined by the pool elevation in conjunction with the Discharge Rating Curve shown on Plate A-3. The rating is for a fully opened gate.

The maximum objective flow of 2,000 cfs at the town of Farmington shall not be intentionally exceeded, even when flow over the ungated spillway occurs. The spillway is designed to direct flows toward Rock Creek. The Lower Farmington Canal, adjacent to the Rock Creek channel, obstructs spillway flows to Rock Creek. In order to prevent spillway flows from discharging into the Lower Farmington Canal, SEWD would need to breach the canal to provide a path for spills to enter Rock Creek. During floods in which flow over the spillway occurs, the outlets will be operated by gradually closing the outlet gates as the pool rises above gross pool in order to control the total outflow from the spillway and outlets to 2,000 cfs for as long as possible. The dam operator shall refer to the outlet gates emergency operation diagram shown on the Water Control Plan, Plate A-14. If the main outlet gates are not already closed when flow over the spillway occurs, they shall be closed as the pool rises above the spillway crest (156.5 feet) to limit flows to the maximum objective flow. The outlet gates must be fully closed when spillway

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flow reaches 2,000 cfs. Spillway flow is determined by pool elevation in conjunction with the Spillway Rating Curve shown on Plate A-7. The gates will remain closed until the pool exceeds elevation 169 feet. As the pool continues to rise, the main outlet gates will then be fully opened until the pool has receded to elevation 168 feet. If the pool continues to recede, the outlet gates will be closed until the spillway flow is less than 2,000 cfs.

(2) The Rock Creek Diversion Structure is operated and maintained by SEWD. SEWD's water conveyance system may not impact the normal operating and maintenance plans or scheduling, dam inspection, or in any way impact the Corps' ability to operate the Farmington Dam and Flood Control Project to meet its authorized flood control purpose. This requirement is to ensure against unacceptable impacts upon project operations and facilities, including the impoundment of water against the upstream toe of the Farmington Dam embankment. The exceptions are in the immediate vicinity of the outlet works, which is considered a normal result of the authorized flow of water through the structure.

The flood season is designated as 1 October through 15 May of each year. Flows conveyed during the rain flood season are not expected to exceed 300 cfs. The gate settings would be sufficient to allow the conveyed flows to continue through Farmington Dam. During the non-flood season (16 May through September) of each year, the main outlet gates will be raised to allow the conveyed flows to pass freely through Farmington Dam. Flows in excess of 300 cfs up to 550 cfs are contingent on no significant impacts to the Farmington Project. The auxiliary outlet will be maintained open at all times, except when closure is required for maintenance purposes. Gate settings at Farmington Dam shall not be increased or decreased more than a 1/2 foot in any 15-minute period except when instructed by the Water Management Section. The rate of release change from Farmington will be restricted to values that will not endanger life and property in the flood plain along Littlejohn Creek, below the dam. In addition, the restricted rate of change will minimize sloughing and caving as the flow recedes after an extended period of bank-full flows. Any water temporarily stored in the reservoir will be released as rapidly as practicable by maintaining the maximum rate of release permitted.

Farmington gate settings must be increased beyond 1.5 feet to avoid inundation of the embankment upstream of the dam due to backwater effects from the water conveyed through the dam. The water surface elevation of any diversion impoundment must be maintained at or below 125 feet. Data from the flow metering equipment is important during this period because backwater caused by tainter gate operation will impact the Corps' measurements and computations.

In order to accommodate flood releases from Farmington Dam, close coordination is required between the Corps and SEWD regarding the operation of the Rock Creek Diversion Structure. SEWD will have the two radial gates fully open within one hour of a request for such by the Corps, in response to a flood or other emergency or if the remote operating system malfunctions. If the Corps determines that naturally occurring or forecasted high flows will impact Farmington's flood control operation, the Corps will notify SEWD; SEWD will notify the USBR directly to cease any conveyances from the Stanislaus River basin into the Farmington basin. SEWD will operate or provide automated operation of the radial gates to prevent the conveyed water from flowing over the sidewall, if possible.

In the event of spillway flows from Farmington Dam, the Corps would require SEWD to breach the Lower Farmington Canal to direct the spill into Rock Creek below the project as designed.

(3) The Duck Creek Diversion gated outlet to Duck Creek shall be kept fully opened, except when closure is authorized by the Water Management Section, Engineering Division, Sacramento District, during emergency conditions. Both gated and ungated outlets to Duck Creek shall be kept free of obstruction at all times. San Joaquin County provides operation and maintenance of the Duck Creek outlets and downstream channel.

(4) The main flood control objective of the North Littlejohn Creek structure is to prevent, insofar as possible, damaging flood flows along North Littlejohn Creek. Use of the full capacity of North Littlejohn Creek may be required to assist in passing flood waters released from Farmington Dam, diverted to Littlejohn Creek from Duck Creek, or generated in the local area. In order to accomplish this, the two screw gates of the structure shall remain fully open when local inflow to North Littlejohn Creek is nominal. When local inflows to North Littlejohn Creek are high, the gates shall be closed, as necessary, to prevent flows in excess of 250 cfs at any point along North Littlejohn Creek. Operation and maintenance of the North Littlejohn Creek Control Structure is the responsibility of San Joaquin County.

b. Emergency Conditions. During flood and other emergencies, the official regulations are subject to temporary modifications by the District Engineer or designee, Sacramento District, Corps of Engineers. The U.S. Army Corps of Engineers will revisit the flood control criteria, as necessary, to reflect changed conditions that come to bear upon flood control operation of the reservoir. Permanent revisions of the flood control criteria are subject to prior approval of the Chief of Engineers or designee.

c. Inquiries. All significant inquiries received from citizens, constituents, or interest groups regarding water control procedures or actions, must be referred directly to the Water Management Section, Sacramento District. Press inquiries must be directly referred to the Public Affairs Office (PAO), Sacramento District.

d. Water Control Problems. The Sacramento District, Water Management Section, must be informed immediately, by the most rapid means available, in the event that an operational malfunction, erosion, or an incident occurs that could impact project integrity in general or water control capability, in particular.

e. Communication Outage. [REDACTED]. Should this occur during a storm event, New Hogan personnel will be requested by the Water Management Section, Sacramento District, to accomplish manual operation of the gates according to the Water Control Plan.

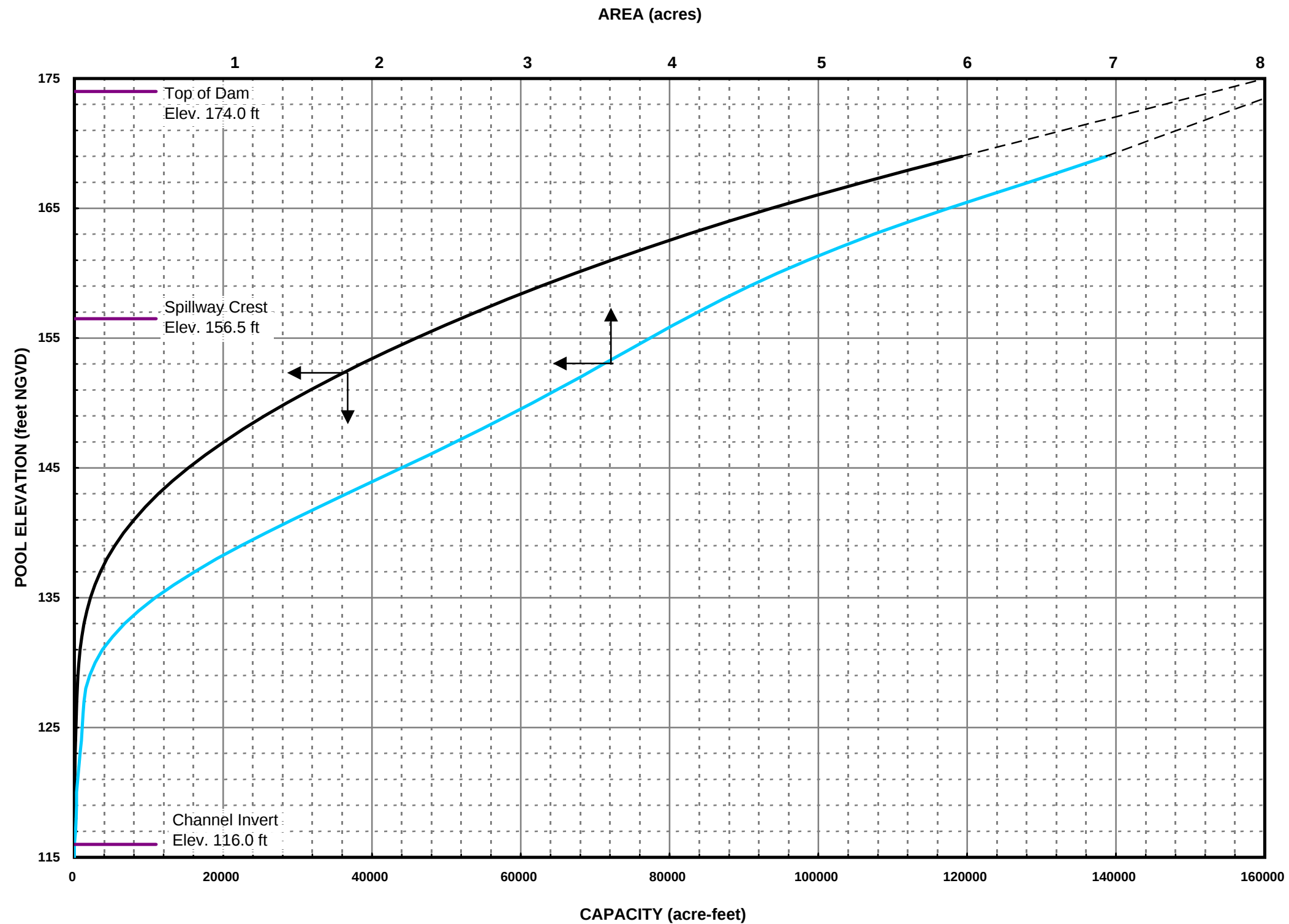
A-04. Deviation from Normal Regulation. Deviations from approved Water Control Plans occur because every possible circumstance cannot be accounted for in a Water Control Plan. Because of the often-competing goals and complex interactions of interested groups/agencies, even seemingly inconsequential deviations from an approved plan can lead to unforeseen environmental and legal complications. The CESP regulation, CESP R 1110-2-8 dated 12 September 2002, serves to assist CESP in preparing their deviation requests. It outlines a

Revised December 2004

minimum set of considerations that need to be addressed when making a recommendation to deviate from an approved Water Control Plan.

Deviations from approved Water Control Plans are intended, therefore, to address unforeseen and unique circumstances. They are not intended as a means for identifying or initiating new opportunities to re-operate or reallocate storage in response to new and changing public needs.

Deviations are discussed in Exhibit B.



FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

AREA-CAPACITY CURVES

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004

PLATE A-1

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
115.0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
115.1	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
115.2	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
115.3	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
115.4	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
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115.5	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
115.6	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
115.7	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
115.8	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
115.9	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
116.0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
116.1	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
116.2	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	1	1	1	1	1
116.3	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	1	1
116.4	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	2	2	2	2	2	2
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
116.5	0	0	0	0	0	0	0	0	1	1
	2	2	2	2	2	2	3	3	3	3
116.6	1	1	1	1	1	1	1	1	1	1
	3	3	3	3	3	3	3	4	4	4
116.7	1	1	1	1	1	1	1	1	1	1
	4	4	4	4	4	4	5	5	5	5
116.8	1	1	1	2	2	2	2	2	2	2
	5	5	5	6	6	6	6	6	6	6
116.9	2	2	2	2	2	2	2	2	3	3
	6	7	7	7	7	7	7	8	8	8
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117.0	3	3	3	3	3	3	3	3	3	3
	8	8	8	8	8	8	8	8	8	8
117.1	3	4	4	4	4	4	4	4	4	4
	8	8	8	8	9	9	9	9	9	9
117.2	4	4	5	5	5	5	5	5	5	5
	9	9	9	9	9	9	9	9	9	9
117.3	5	5	5	6	6	6	6	6	6	6
	9	9	9	9	9	9	9	9	9	9
117.4	6	6	6	6	7	7	7	7	7	7
	10	10	10	10	10	10	10	10	10	10
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117.5	7	7	7	7	8	8	8	8	8	8
	10	10	10	10	10	10	10	10	10	10
117.6	8	8	8	8	9	9	9	9	9	9
	10	10	10	10	10	11	11	11	11	11
117.7	9	9	9	10	10	10	10	10	10	10
	11	11	11	11	11	11	11	11	11	11
117.8	10	10	11	11	11	11	11	11	11	11
	11	11	11	11	11	11	11	11	11	12
117.9	11	12	12	12	12	12	12	12	12	12
	12	12	12	12	12	12	12	12	12	12
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
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118.0	13 12	13 12	13 12	13 12	13 12	13 12	13 12	13 12	14 12	14 12
118.1	14 12	14 12	14 12	14 12	14 12	14 12	15 12	15 12	15 12	15 12
118.2	15 12	15 12	15 12	15 12	16 12	16 12	16 13	16 13	16 13	16 13
118.3	16 13	16 13	17 13	17 13	17 13	17 13	17 13	17 13	17 13	17 13
118.4	18 13	18 13	18 13	18 13	18 13	18 13	18 13	18 13	19 13	19 13
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118.5	19 13	19 13	19 13	19 13	19 13	19 13	20 13	20 13	20 13	20 13
118.6	20 13	20 13	20 13	21 13	21 13	21 13	21 13	21 13	21 13	21 13
118.7	21 13	22 13	22 13	22 13	22 13	22 13	22 14	22 14	23 14	23 14
118.8	23 14	23 14	23 14	23 14	23 14	24 14	24 14	24 14	24 14	24 14
118.9	24 14	24 14	24 14	25 14	25 14	25 14	25 14	25 14	25 14	25 14
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119.0	26 14	26 14	26 14	26 14	26 14	26 14	26 14	27 14	27 14	27 14
119.1	27 14	27 14	27 14	27 14	28 14	28 14	28 14	28 14	28 14	28 14
119.2	28 14	29 14	29 14	29 14	29 14	29 14	29 14	29 14	30 14	30 14
119.3	30 14	30 14	30 14	30 14	30 14	31 14	31 14	31 14	31 14	31 14
119.4	31 14	31 14	32 14	32 14	32 14	32 14	32 14	32 14	32 14	33 14
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
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119.5	33 14	33 15	33 15	33 15	33 15	33 15	34 15	34 15	34 15	34 15
119.6	34 15	34 15	34 15	35 15	35 15	35 15	35 15	35 15	35 15	35 15
119.7	36 15	36 15	36 15	36 15	36 15	36 15	37 15	37 15	37 15	37 15
119.8	37 15	37 15	37 15	38 15	38 15	38 15	38 15	38 15	38 15	38 15
119.9	39 15	39 15	39 15	39 15	39 15	39 15	39 15	40 15	40 15	40 15
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120.0	40 15	40 15	40 15	41 15	41 15	41 15	41 15	41 15	41 16	41 16
120.1	42 16	42 16	42 16	42 16	42 16	42 16	43 16	43 16	43 16	43 16
120.2	43 16	43 16	44 16	44 16	44 17	44 17	44 17	44 17	45 17	45 17
120.3	45 17	45 17	45 17	45 17	46 17	46 17	46 17	46 17	46 18	46 18
120.4	47 18	47 18	47 18	47 18	47 18	47 18	48 18	48 18	48 18	48 18
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120.5	48 18	49 18	49 18	49 19	49 19	49 19	50 19	50 19	50 19	50 19
120.6	50 19	50 19	51 19	51 19	51 19	51 19	51 19	52 20	52 20	52 20
120.7	52 20	52 20	53 20	53 20	53 20	53 20	53 20	54 20	54 20	54 20
120.8	54 20	54 21	55 21	55 21	55 21	55 21	55 21	56 21	56 21	56 21
120.9	56 21	57 21	57 21	57 21	57 22	57 22	58 22	58 22	58 22	58 22
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
121.0	58 22	59 22	59 22	59 22	59 22	60 22	60 22	60 23	60 23	60 23
121.1	61 23	61 23	61 23	61 23	62 23	62 23	62 23	62 23	63 23	63 23
121.2	63 24	63 24	63 24	64 24	64 24	64 24	64 24	65 24	65 24	65 24
121.3	65 24	66 24	66 24	66 25	66 25	67 25	67 25	67 25	67 25	68 25
121.4	68 25	68 25	68 25	69 25	69 25	69 25	69 26	70 26	70 26	70 26
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121.5	70 26	71 26	71 26	71 26	71 26	72 26	72 26	72 26	73 26	73 27
121.6	73 27	73 27	74 27	74 27	74 27	74 27	75 27	75 27	75 27	75 27
121.7	76 27	76 28	76 28	77 28	77 28	77 28	77 28	78 28	78 28	78 28
121.8	79 28	79 28	79 28	79 29	80 29	80 29	80 29	81 29	81 29	81 29
121.9	81 29	82 29	82 29	82 29	83 29	83 30	83 30	83 30	84 30	84 30
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
122.0	84 30	85 30	85 30	85 30	86 30	86 30	86 30	86 31	87 31	87 31
122.1	87 31	88 31	88 31	88 31	89 31	89 31	89 31	90 31	90 31	90 31
122.2	91 32	91 32	91 32	91 32	92 32	92 32	92 32	93 32	93 32	93 32
122.3	94 32	94 32	94 32	95 33	95 33	95 33	96 33	96 33	96 33	97 33
122.4	97 33	97 33	98 33	98 33	98 33	99 33	99 34	99 34	100 34	100 34
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
122.5	100 34	101 34	101 34	101 34	102 34	102 34	102 34	103 34	103 35	103 35
122.6	104 35	104 35	104 35	105 35	105 35	106 35	106 35	106 35	107 35	107 35
122.7	107 36	108 36	108 36	108 36	109 36	109 36	109 36	110 36	110 36	110 36
122.8	111 36	111 36	112 36	112 37	112 37	113 37	113 37	113 37	114 37	114 37
122.9	115 37	115 37	115 37	116 37	116 37	116 38	117 38	117 38	118 38	118 38
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
123.0	118 38	119 38	119 38	119 38	120 38	120 38	121 39	121 39	121 39	122 39
123.1	122 39	123 39	123 39	123 39	124 39	124 39	124 39	125 39	125 40	126 40
123.2	126 40	126 40	127 40	127 40	128 40	128 40	128 40	129 40	129 40	130 41
123.3	130 41	130 41	131 41	131 41	132 41	132 41	133 41	133 41	133 41	134 41
123.4	134 41	135 42	135 42	135 42	136 42	136 42	137 42	137 42	138 42	138 42
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123.5	138 42	139 42	139 43	140 43	140 43	141 43	141 43	141 43	142 43	142 43
123.6	143 43	143 43	144 43	144 44	144 44	145 44	145 44	146 44	146 44	147 44
123.7	147 44	147 44	148 44	148 44	149 45	149 45	150 45	150 45	151 45	151 45
123.8	151 45	152 45	152 45	153 45	153 45	154 46	154 46	155 46	155 46	156 46
123.9	156 46	157 46	157 46	157 46	158 46	158 47	159 47	159 47	160 47	160 47
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
124.0	161 47	161 47	162 47	162 47	163 47	163 47	164 47	164 47	164 47	165 48
124.1	165 48	166 48	166 48	167 48	167 48	168 48	168 48	169 48	169 48	170 48
124.2	170 48	171 48	171 48	172 48	172 48	173 48	173 49	174 49	174 49	175 49
124.3	175 49	176 49	176 49	177 49	177 49	178 49	178 49	179 49	179 49	179 49
124.4	180 49	180 49	181 49	181 50	182 50	182 50	183 50	183 50	184 50	184 50
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124.5	185 50	185 50	186 50	186 50	187 50	187 50	188 50	188 50	189 50	189 50
124.6	190 51	190 51	191 51	191 51	192 51	193 51	193 51	194 51	194 51	195 51
124.7	195 51	196 51	196 51	197 51	197 51	198 51	198 52	199 52	199 52	200 52
124.8	200 52	201 52	201 52	202 52	202 52	203 52	203 52	204 52	204 52	205 52
124.9	205 52	206 52	206 53	207 53	208 53	208 53	209 53	209 53	210 53	210 53
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125.0	211 53	211 53	212 53	212 53	213 53	213 53	214 53	214 53	215 53	215 53
125.1	216 53	217 54	217 54	218 54	218 54	219 54	219 54	220 54	220 54	221 54
125.2	221 54	222 54	222 54	223 54	224 54	224 54	225 54	225 54	226 54	226 54
125.3	227 54	227 55	228 55	228 55	229 55	230 55	230 55	231 55	231 55	232 55
125.4	232 55	233 55	233 55	234 55	234 55	235 55	236 55	236 55	237 55	237 55
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
125.5	238 55	238 56	239 56	239 56	240 56	241 56	241 56	242 56	242 56	243 56
125.6	243 56	244 56	244 56	245 56	246 56	246 56	247 56	247 56	248 56	248 56
125.7	249 56	250 57	250 57	251 57	251 57	252 57	252 57	253 57	254 57	254 57
125.8	255 57	255 57	256 57	256 57	257 57	258 57	258 57	259 57	259 57	260 57
125.9	260 57	261 58	262 58	262 58	263 58	263 58	264 58	264 58	265 58	266 58
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126.0	266 58	267 58	267 58	268 58	268 58	269 58	270 58	270 58	271 58	271 59
126.1	272 59	273 59	273 59	274 59	274 59	275 59	276 59	276 59	277 59	277 59
126.2	278 59	278 59	279 59	280 59	280 59	281 59	281 60	282 60	283 60	283 60
126.3	284 60	284 60	285 60	286 60	286 60	287 60	287 60	288 60	289 60	289 60
126.4	290 60	290 60	291 60	292 61	292 61	293 61	293 61	294 61	295 61	295 61
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
126.5	296 61	297 61	297 61	298 61	298 61	299 61	300 61	300 61	301 61	301 62
126.6	302 62	303 62	303 62	304 62	304 62	305 62	306 62	306 62	307 62	308 62
126.7	308 62	309 62	309 62	310 62	311 62	311 62	312 63	313 63	313 63	314 63
126.8	314 63	315 63	316 63	316 63	317 63	318 63	318 63	319 63	320 63	320 63
126.9	321 63	321 63	322 64	323 64	323 64	324 64	325 64	325 64	326 64	326 64
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
127.0	327 64	328 64	328 64	329 64	330 64	330 65	331 65	332 65	332 65	333 65
127.1	334 65	334 65	335 65	336 66	336 66	337 66	338 66	338 66	339 66	340 66
127.2	340 67	341 67	342 67	342 67	343 67	344 67	344 67	345 67	346 68	346 68
127.3	347 68	348 68	348 68	349 68	350 68	350 68	351 69	352 69	352 69	353 69
127.4	354 69	354 69	355 69	356 69	357 70	357 70	358 70	359 70	359 70	360 70
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
127.5	361 70	361 70	362 71	363 71	364 71	364 71	365 71	366 71	366 71	367 72
127.6	368 72	369 72	369 72	370 72	371 72	371 72	372 72	373 73	374 73	374 73
127.7	375 73	376 73	377 73	377 73	378 74	379 74	379 74	380 74	381 74	382 74
127.8	382 74	383 74	384 75	385 75	385 75	386 75	387 75	388 75	388 75	389 76
127.9	390 76	391 76	391 76	392 76	393 76	394 76	394 76	395 77	396 77	397 77
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
128.0	398 77	398 77	399 77	400 78	401 78	401 78	402 78	403 79	404 79	405 79
128.1	405 79	406 80	407 80	408 80	409 80	409 81	410 81	411 81	412 81	413 82
128.2	413 82	414 82	415 82	416 83	417 83	418 83	418 83	419 84	420 84	421 84
128.3	422 84	423 85	423 85	424 85	425 85	426 86	427 86	428 86	429 86	429 87
128.4	430 87	431 87	432 87	433 88	434 88	435 88	436 88	436 89	437 89	438 89
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
128.5	439 90	440 90	441 90	442 90	443 91	444 91	445 91	445 91	446 92	447 92
128.6	448 92	449 92	450 93	451 93	452 93	453 93	454 94	455 94	456 94	457 95
128.7	458 95	459 95	459 95	460 96	461 96	462 96	463 96	464 97	465 97	466 97
128.8	467 97	468 98	469 98	470 98	471 99	472 99	473 99	474 99	475 100	476 100
128.9	477 100	478 101	479 101	480 101	481 101	482 102	483 102	484 102	485 102	486 103
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
129.0	487 103	488 103	489 104	490 104	491 104	492 105	493 105	495 105	496 106	497 106
129.1	498 106	499 107	500 107	501 107	502 108	503 108	504 109	505 109	506 109	507 110
129.2	509 110	510 110	511 111	512 111	513 111	514 112	515 112	516 112	517 113	519 113
129.3	520 114	521 114	522 114	523 115	524 115	525 115	527 116	528 116	529 116	530 117
129.4	531 117	532 117	534 118	535 118	536 119	537 119	538 119	540 120	541 120	542 120
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129.5	543 121	544 121	546 122	547 122	548 122	549 123	550 123	552 123	553 124	554 124
129.6	555 125	557 125	558 125	559 126	560 126	562 126	563 127	564 127	565 128	567 128
129.7	568 128	569 129	571 129	572 129	573 130	574 130	576 131	577 131	578 131	580 132
129.8	581 132	582 133	584 133	585 133	586 134	588 134	589 134	590 135	592 135	593 136
129.9	594 136	596 136	597 137	599 137	600 138	601 138	603 138	604 139	605 139	607 140
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
130.0	608 140	610 140	611 141	612 141	614 142	615 142	617 143	618 143	620 144	621 144
130.1	622 145	624 145	625 145	627 146	628 146	630 147	631 147	633 148	634 148	636 149
130.2	637 149	639 150	640 150	642 151	643 151	645 152	646 152	648 153	649 153	651 153
130.3	652 154	654 154	655 155	657 155	659 156	660 156	662 157	663 157	665 158	666 158
130.4	668 159	670 159	671 160	673 160	674 161	676 161	678 162	679 162	681 163	682 163
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
130.5	684 164	686 164	687 165	689 165	691 166	692 166	694 167	696 167	697 168	699 168
130.6	701 169	702 169	704 170	706 170	707 171	709 171	711 172	713 172	714 173	716 173
130.7	718 174	720 174	721 175	723 175	725 176	727 176	728 177	730 177	732 178	734 178
130.8	735 179	737 179	739 180	741 180	743 181	744 181	746 182	748 182	750 183	752 183
130.9	753 184	755 184	757 185	759 185	761 186	763 186	765 187	766 187	768 188	770 188
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131.0	772 189	774 190	776 190	778 191	780 192	782 192	784 193	786 193	787 194	789 195
131.1	791 195	793 196	795 197	797 197	799 198	801 199	803 199	805 200	807 200	809 201
131.2	811 202	813 202	815 203	817 204	819 204	821 205	823 206	825 206	828 207	830 208
131.3	832 208	834 209	836 210	838 210	840 211	842 212	844 212	846 213	849 214	851 214
131.4	853 215	855 216	857 216	859 217	862 218	864 218	866 219	868 220	870 220	872 221
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
131.5	875 222	877 222	879 223	881 224	884 224	886 225	888 226	890 226	893 227	895 228
131.6	897 229	900 229	902 230	904 231	906 231	909 232	911 233	913 233	916 234	918 235
131.7	920 236	923 236	925 237	928 238	930 238	932 239	935 240	937 240	939 241	942 242
131.8	944 243	947 243	949 244	952 245	954 245	957 246	959 247	961 248	964 248	966 249
131.9	969 250	971 250	974 251	976 252	979 253	982 253	984 254	987 255	989 256	992 256
132.0	994 257	997 258	999 258	1002 259	1005 260	1007 261	1010 261	1012 262	1015 263	1018 264
132.1	1020 265	1023 265	1026 266	1028 267	1031 268	1034 268	1036 269	1039 270	1042 271	1044 271
132.2	1047 272	1050 273	1053 274	1055 274	1058 275	1061 276	1064 277	1066 278	1069 278	1072 279
132.3	1075 280	1078 281	1080 281	1083 282	1086 283	1089 284	1092 285	1095 285	1097 286	1100 287
132.4	1103 288	1106 288	1109 289	1112 290	1115 291	1118 292	1121 292	1123 293	1126 294	1129 295
132.5	1132 296	1135 296	1138 297	1141 298	1144 299	1147 300	1150 300	1153 301	1156 302	1159 303
132.6	1162 304	1165 305	1168 305	1171 306	1174 307	1178 308	1181 309	1184 309	1187 310	1190 311
132.7	1193 312	1196 313	1199 314	1202 314	1206 315	1209 316	1212 317	1215 318	1218 318	1221 319
132.8	1225 320	1228 321	1231 322	1234 323	1238 323	1241 324	1244 325	1247 326	1251 327	1254 328
132.9	1257 329	1260 329	1264 330	1267 331	1270 332	1274 333	1277 334	1280 334	1284 335	1287 336

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
133.0	1290 337	1294 338	1297 339	1301 340	1304 341	1307 342	1311 342	1314 343	1318 344	1321 345
133.1	1325 346	1328 347	1331 348	1335 349	1338 350	1342 351	1345 352	1349 352	1352 353	1356 354
133.2	1360 355	1363 356	1367 357	1370 358	1374 359	1377 360	1381 361	1385 362	1388 363	1392 364
133.3	1396 365	1399 365	1403 366	1407 367	1410 368	1414 369	1418 370	1421 371	1425 372	1429 373
133.4	1432 374	1436 375	1440 376	1444 377	1448 378	1451 379	1455 380	1459 381	1463 382	1467 383
133.5	1470 383	1474 384	1478 385	1482 386	1486 387	1490 388	1494 389	1497 390	1501 391	1505 392
133.6	1509 393	1513 394	1517 395	1521 396	1525 397	1529 398	1533 399	1537 400	1541 401	1545 402
133.7	1549 403	1553 404	1557 405	1561 406	1565 407	1569 408	1573 409	1577 410	1582 411	1586 412
133.8	1590 413	1594 414	1598 415	1602 416	1606 417	1611 418	1615 419	1619 420	1623 421	1627 422
133.9	1632 423	1636 424	1640 425	1644 426	1649 427	1653 428	1657 429	1661 430	1666 431	1670 432
134.0	1674 433	1679 434	1683 435	1687 436	1692 437	1696 438	1701 439	1705 440	1709 441	1714 442
134.1	1718 443	1723 444	1727 446	1732 447	1736 448	1740 449	1745 450	1749 451	1754 452	1759 453
134.2	1763 454	1768 455	1772 456	1777 457	1781 458	1786 459	1790 460	1795 461	1800 463	1804 464
134.3	1809 465	1814 466	1818 467	1823 468	1828 469	1832 470	1837 471	1842 472	1847 473	1851 474
134.4	1856 476	1861 477	1866 478	1870 479	1875 480	1880 481	1885 482	1890 483	1894 484	1899 485

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
134.5	1904 486	1909 488	1914 489	1919 490	1924 491	1929 492	1933 493	1938 494	1943 495	1948 496
134.6	1953 498	1958 499	1963 500	1968 501	1973 502	1978 503	1983 504	1988 505	1993 506	1999 508
134.7	2004 509	2009 510	2014 511	2019 512	2024 513	2029 514	2034 515	2039 517	2045 518	2050 519
134.8	2055 520	2060 521	2065 522	2071 523	2076 525	2081 526	2086 527	2092 528	2097 529	2102 530
134.9	2108 531	2113 533	2118 534	2124 535	2129 536	2134 537	2140 538	2145 540	2150 541	2156 542
135.0	2161 543	2167 544	2172 545	2178 547	2183 548	2189 549	2194 550	2200 551	2205 553	2211 554
135.1	2216 555	2222 556	2227 557	2233 559	2239 560	2244 561	2250 562	2255 563	2261 565	2267 566
135.2	2272 567	2278 568	2284 570	2289 571	2295 572	2301 573	2307 574	2312 576	2318 577	2324 578
135.3	2330 579	2335 581	2341 582	2347 583	2353 584	2359 586	2365 587	2371 588	2376 589	2382 591
135.4	2388 592	2394 593	2400 594	2406 596	2412 597	2418 598	2424 599	2430 601	2436 602	2442 603
135.5	2448 604	2454 606	2460 607	2466 608	2472 609	2478 611	2485 612	2491 613	2497 614	2503 616
135.6	2509 617	2515 618	2521 620	2528 621	2534 622	2540 623	2546 625	2553 626	2559 627	2565 629
135.7	2571 630	2578 631	2584 632	2590 634	2597 635	2603 636	2609 638	2616 639	2622 640	2629 641
135.8	2635 643	2642 644	2648 645	2654 647	2661 648	2667 649	2674 651	2680 652	2687 653	2693 654
135.9	2700 656	2707 657	2713 658	2720 660	2726 661	2733 662	2740 664	2746 665	2753 666	2760 668

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
136.0	2766 669	2773 670	2780 672	2786 673	2793 674	2800 676	2807 677	2813 678	2820 680	2827 681
136.1	2834 682	2841 684	2847 685	2854 686	2861 688	2868 689	2875 690	2882 692	2889 693	2896 694
136.2	2903 696	2910 697	2917 698	2924 700	2931 701	2938 702	2945 704	2952 705	2959 706	2966 708
136.3	2973 709	2980 710	2987 712	2994 713	3001 714	3009 716	3016 717	3023 719	3030 720	3037 721
136.4	3044 723	3052 724	3059 725	3066 727	3074 728	3081 729	3088 731	3095 732	3103 734	3110 735
136.5	3117 736	3125 738	3132 739	3140 741	3147 742	3154 743	3162 745	3169 746	3177 747	3184 749
136.6	3192 750	3199 752	3207 753	3214 754	3222 756	3229 757	3237 759	3245 760	3252 761	3260 763
136.7	3267 764	3275 766	3283 767	3290 768	3298 770	3306 771	3314 773	3321 774	3329 776	3337 777
136.8	3345 778	3352 780	3360 781	3368 783	3376 784	3384 785	3392 787	3399 788	3407 790	3415 791
136.9	3423 793	3431 794	3439 795	3447 797	3455 798	3463 800	3471 801	3479 803	3487 804	3495 806
137.0	3503 807	3511 808	3519 810	3527 811	3536 813	3544 814	3552 816	3560 817	3568 819	3576 820
137.1	3585 821	3593 823	3601 824	3609 826	3618 827	3626 829	3634 830	3642 832	3651 833	3659 835
137.2	3667 836	3676 837	3684 839	3693 840	3701 842	3709 843	3718 845	3726 846	3735 848	3743 849
137.3	3752 851	3760 852	3769 854	3777 855	3786 857	3795 858	3803 860	3812 861	3820 862	3829 864
137.4	3838 865	3846 867	3855 868	3864 870	3872 871	3881 873	3890 874	3899 876	3907 877	3916 879

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
137.5	3925 880	3934 882	3943 883	3951 885	3960 886	3969 888	3978 889	3987 891	3996 892	4005 894
137.6	4014 895	4023 897	4032 898	4041 900	4050 902	4059 903	4068 905	4077 906	4086 908	4095 909
137.7	4104 911	4113 912	4122 914	4131 915	4141 917	4150 918	4159 920	4168 921	4177 923	4187 924
137.8	4196 926	4205 928	4214 929	4224 931	4233 932	4242 934	4252 935	4261 937	4270 938	4280 940
137.9	4289 941	4299 943	4308 945	4317 946	4327 948	4336 949	4346 951	4355 952	4365 954	4375 955
138.0	4384 957	4394 959	4403 960	4413 962	4422 963	4432 965	4442 966	4451 968	4461 969	4471 971
138.1	4481 973	4490 974	4500 976	4510 977	4520 979	4529 980	4539 982	4549 983	4559 985	4569 987
138.2	4579 988	4589 990	4598 991	4608 993	4618 994	4628 996	4638 998	4648 999	4658 1001	4668 1002
138.3	4678 1004	4688 1006	4698 1007	4708 1009	4718 1010	4729 1012	4739 1014	4749 1015	4759 1017	4769 1018
138.4	4779 1020	4790 1021	4800 1023	4810 1025	4820 1026	4831 1028	4841 1030	4851 1031	4862 1033	4872 1034
138.5	4882 1036	4893 1038	4903 1039	4913 1041	4924 1042	4934 1044	4945 1046	4955 1047	4966 1049	4976 1050
138.6	4987 1052	4997 1054	5008 1055	5018 1057	5029 1059	5039 1060	5050 1062	5061 1063	5071 1065	5082 1067
138.7	5093 1068	5103 1070	5114 1072	5125 1073	5135 1075	5146 1077	5157 1078	5168 1080	5179 1082	5189 1083
138.8	5200 1085	5211 1086	5222 1088	5233 1090	5244 1091	5255 1093	5266 1095	5277 1096	5288 1098	5299 1100
138.9	5310 1101	5321 1103	5332 1105	5343 1106	5354 1108	5365 1110	5376 1111	5387 1113	5398 1115	5409 1116

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
139.0	5421 1118	5432 1120	5443 1121	5454 1123	5465 1125	5477 1126	5488 1128	5499 1130	5511 1131	5522 1133
139.1	5533 1134	5545 1136	5556 1138	5567 1139	5579 1141	5590 1143	5602 1144	5613 1146	5624 1148	5636 1149
139.2	5647 1151	5659 1153	5671 1154	5682 1156	5694 1158	5705 1159	5717 1161	5728 1163	5740 1164	5752 1166
139.3	5763 1168	5775 1169	5787 1171	5798 1173	5810 1174	5822 1176	5834 1178	5846 1179	5857 1181	5869 1183
139.4	5881 1185	5893 1186	5905 1188	5917 1190	5929 1191	5940 1193	5952 1195	5964 1196	5976 1198	5988 1200
139.5	6000 1201	6012 1203	6024 1205	6036 1207	6048 1208	6061 1210	6073 1212	6085 1213	6097 1215	6109 1217
139.6	6121 1219	6133 1220	6146 1222	6158 1224	6170 1225	6182 1227	6195 1229	6207 1231	6219 1232	6232 1234
139.7	6244 1236	6256 1237	6269 1239	6281 1241	6294 1243	6306 1244	6318 1246	6331 1248	6343 1250	6356 1251
139.8	6368 1253	6381 1255	6394 1257	6406 1258	6419 1260	6431 1262	6444 1263	6457 1265	6469 1267	6482 1269
139.9	6495 1270	6507 1272	6520 1274	6533 1276	6546 1277	6558 1279	6571 1281	6584 1283	6597 1284	6610 1286
140.0	6623 1288	6635 1290	6648 1291	6661 1293	6674 1295	6687 1297	6700 1298	6713 1300	6726 1302	6739 1303
140.1	6752 1305	6765 1307	6778 1309	6791 1310	6805 1312	6818 1314	6831 1315	6844 1317	6857 1319	6870 1321
140.2	6884 1322	6897 1324	6910 1326	6923 1327	6937 1329	6950 1331	6963 1333	6977 1334	6990 1336	7003 1338
140.3	7017 1340	7030 1341	7044 1343	7057 1345	7070 1347	7084 1348	7097 1350	7111 1352	7124 1354	7138 1355
140.4	7151 1357	7165 1359	7179 1361	7192 1362	7206 1364	7220 1366	7233 1368	7247 1369	7261 1371	7274 1373

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
140.5	7288 1375	7302 1376	7316 1378	7329 1380	7343 1382	7357 1383	7371 1385	7385 1387	7399 1389	7413 1390
140.6	7426 1392	7440 1394	7454 1396	7468 1398	7482 1399	7496 1401	7510 1403	7524 1405	7538 1406	7552 1408
140.7	7567 1410	7581 1412	7595 1414	7609 1415	7623 1417	7637 1419	7651 1421	7666 1423	7680 1424	7694 1426
140.8	7708 1428	7723 1430	7737 1431	7751 1433	7766 1435	7780 1437	7794 1439	7809 1440	7823 1442	7838 1444
140.9	7852 1446	7867 1448	7881 1450	7896 1451	7910 1453	7925 1455	7939 1457	7954 1459	7968 1460	7983 1462
141.0	7998 1464	8012 1466	8027 1467	8042 1469	8056 1471	8071 1473	8086 1475	8101 1476	8115 1478	8130 1480
141.1	8145 1482	8160 1483	8175 1485	8189 1487	8204 1489	8219 1490	8234 1492	8249 1494	8264 1496	8279 1497
141.2	8294 1499	8309 1501	8324 1503	8339 1504	8354 1506	8369 1508	8384 1510	8399 1512	8414 1513	8430 1515
141.3	8445 1517	8460 1519	8475 1520	8490 1522	8506 1524	8521 1526	8536 1528	8551 1529	8567 1531	8582 1533
141.4	8597 1535	8613 1537	8628 1538	8643 1540	8659 1542	8674 1544	8690 1546	8705 1547	8721 1549	8736 1551
141.5	8752 1553	8767 1554	8783 1556	8798 1558	8814 1560	8830 1562	8845 1564	8861 1565	8876 1567	8892 1569
141.6	8908 1571	8924 1573	8939 1574	8955 1576	8971 1578	8987 1580	9002 1582	9018 1583	9034 1585	9050 1587
141.7	9066 1589	9082 1591	9098 1593	9114 1594	9130 1596	9146 1598	9161 1600	9178 1602	9194 1604	9210 1605
141.8	9226 1607	9242 1609	9258 1611	9274 1613	9290 1614	9306 1616	9322 1618	9339 1620	9355 1622	9371 1624
141.9	9387 1626	9404 1627	9420 1629	9436 1631	9452 1633	9469 1635	9485 1637	9502 1638	9518 1640	9534 1642

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
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Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
142.0	9551 1644	9567 1646	9584 1648	9600 1649	9617 1651	9633 1653	9650 1655	9666 1657	9683 1658	9699 1660
142.1	9716 1662	9733 1664	9749 1666	9766 1667	9783 1669	9799 1671	9816 1673	9833 1675	9850 1677	9866 1678
142.2	9883 1680	9900 1682	9917 1684	9934 1686	9951 1688	9967 1689	9984 1691	10001 1693	10018 1695	10035 1697
142.3	10052 1698	10069 1700	10086 1702	10103 1704	10120 1706	10137 1708	10154 1709	10171 1711	10189 1713	10206 1715
142.4	10223 1717	10240 1719	10257 1720	10274 1722	10292 1724	10309 1726	10326 1728	10343 1730	10361 1732	10378 1733
142.5	10395 1735	10413 1737	10430 1739	10448 1741	10465 1743	10482 1745	10500 1746	10517 1748	10535 1750	10552 1752
142.6	10570 1754	10587 1756	10605 1758	10623 1759	10640 1761	10658 1763	10675 1765	10693 1767	10711 1769	10729 1771
142.7	10746 1772	10764 1774	10782 1776	10799 1778	10817 1780	10835 1782	10853 1784	10871 1786	10889 1787	10906 1789
142.8	10924 1791	10942 1793	10960 1795	10978 1797	10996 1799	11014 1801	11032 1803	11050 1804	11068 1806	11086 1808
142.9	11104 1810	11123 1812	11141 1814	11159 1816	11177 1818	11195 1820	11213 1821	11232 1823	11250 1825	11268 1827
143.0	11286 1829	11305 1831	11323 1833	11341 1834	11360 1836	11378 1838	11396 1840	11415 1842	11433 1843	11452 1845
143.1	11470 1847	11489 1849	11507 1851	11526 1852	11544 1854	11563 1856	11581 1858	11600 1860	11619 1861	11637 1863
143.2	11656 1865	11674 1867	11693 1869	11712 1871	11731 1872	11749 1874	11768 1876	11787 1878	11806 1880	11824 1881
143.3	11843 1883	11862 1885	11881 1887	11900 1889	11919 1891	11938 1892	11957 1894	11976 1896	11994 1898	12013 1900
143.4	12032 1902	12052 1903	12071 1905	12090 1907	12109 1909	12128 1911	12147 1913	12166 1914	12185 1916	12204 1918

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
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Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
143.5	12224 1920	12243 1922	12262 1924	12281 1925	12300 1927	12320 1929	12339 1931	12358 1933	12378 1935	12397 1936
143.6	12416 1938	12436 1940	12455 1942	12475 1944	12494 1946	12514 1948	12533 1949	12553 1951	12572 1953	12592 1955
143.7	12611 1957	12631 1959	12650 1961	12670 1962	12690 1964	12709 1966	12729 1968	12749 1970	12768 1972	12788 1974
143.8	12808 1975	12828 1977	12847 1979	12867 1981	12887 1983	12907 1985	12927 1987	12947 1989	12966 1990	12986 1992
143.9	13006 1994	13026 1996	13046 1998	13066 2000	13086 2002	13106 2004	13126 2005	13146 2007	13166 2009	13187 2011
144.0	13207 2013	13227 2015	13247 2017	13267 2018	13287 2020	13308 2022	13328 2024	13348 2026	13368 2028	13389 2029
144.1	13409 2031	13429 2033	13450 2035	13470 2037	13490 2038	13511 2040	13531 2042	13552 2044	13572 2046	13592 2048
144.2	13613 2049	13633 2051	13654 2053	13674 2055	13695 2057	13716 2058	13736 2060	13757 2062	13777 2064	13798 2066
144.3	13819 2068	13839 2069	13860 2071	13881 2073	13902 2075	13922 2077	13943 2079	13964 2081	13985 2082	14006 2084
144.4	14026 2086	14047 2088	14068 2090	14089 2092	14110 2093	14131 2095	14152 2097	14173 2099	14194 2101	14215 2103
144.5	14236 2104	14257 2106	14278 2108	14299 2110	14320 2112	14341 2114	14363 2116	14384 2117	14405 2119	14426 2121
144.6	14447 2123	14469 2125	14490 2127	14511 2129	14532 2130	14554 2132	14575 2134	14596 2136	14618 2138	14639 2140
144.7	14661 2142	14682 2144	14703 2145	14725 2147	14746 2149	14768 2151	14789 2153	14811 2155	14833 2157	14854 2158
144.8	14876 2160	14897 2162	14919 2164	14941 2166	14962 2168	14984 2170	15006 2172	15027 2173	15049 2175	15071 2177
144.9	15093 2179	15114 2181	15136 2183	15158 2185	15180 2187	15202 2189	15224 2190	15246 2192	15268 2194	15290 2196

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
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Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
145.0	15312 2198	15333 2200	15356 2202	15378 2203	15400 2205	15422 2207	15444 2209	15466 2211	15488 2213	15510 2214
145.1	15532 2216	15554 2218	15577 2220	15599 2222	15621 2224	15643 2225	15666 2227	15688 2229	15710 2231	15732 2233
145.2	15755 2235	15777 2236	15799 2238	15822 2240	15844 2242	15867 2244	15889 2246	15912 2247	15934 2249	15957 2251
145.3	15979 2253	16002 2255	16024 2257	16047 2259	16069 2260	16092 2262	16115 2264	16137 2266	16160 2268	16183 2270
145.4	16205 2271	16228 2273	16251 2275	16274 2277	16296 2279	16319 2281	16342 2283	16365 2284	16388 2286	16411 2288
145.5	16433 2290	16456 2292	16479 2294	16502 2296	16525 2298	16548 2299	16571 2301	16594 2303	16617 2305	16640 2307
145.6	16663 2309	16686 2311	16710 2312	16733 2314	16756 2316	16779 2318	16802 2320	16825 2322	16849 2324	16872 2326
145.7	16895 2327	16918 2329	16942 2331	16965 2333	16988 2335	17012 2337	17035 2339	17059 2341	17082 2342	17105 2344
145.8	17129 2346	17152 2348	17176 2350	17199 2352	17223 2354	17246 2356	17270 2358	17294 2359	17317 2361	17341 2363
145.9	17364 2365	17388 2367	17412 2369	17435 2371	17459 2373	17483 2375	17507 2376	17530 2378	17554 2380	17578 2382
146.0	17602 2384	17626 2386	17650 2387	17673 2389	17697 2391	17721 2393	17745 2394	17769 2396	17793 2398	17817 2400
146.1	17841 2401	17865 2403	17889 2405	17913 2407	17937 2408	17961 2410	17986 2412	18010 2413	18034 2415	18058 2417
146.2	18082 2419	18106 2420	18131 2422	18155 2424	18179 2426	18203 2427	18228 2429	18252 2431	18276 2433	18301 2434
146.3	18325 2436	18349 2438	18374 2440	18398 2441	18422 2443	18447 2445	18471 2447	18496 2448	18520 2450	18545 2452
146.4	18569 2454	18594 2455	18618 2457	18643 2459	18668 2461	18692 2462	18717 2464	18742 2466	18766 2468	18791 2469

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
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Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
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146.5	18816 2471	18840 2473	18865 2475	18890 2476	18915 2478	18939 2480	18964 2482	18989 2484	19014 2485	19039 2487
146.6	19064 2489	19089 2491	19113 2492	19138 2494	19163 2496	19188 2498	19213 2499	19238 2501	19263 2503	19288 2505
146.7	19313 2507	19338 2508	19364 2510	19389 2512	19414 2514	19439 2515	19464 2517	19489 2519	19514 2521	19540 2523
146.8	19565 2524	19590 2526	19615 2528	19641 2530	19666 2531	19691 2533	19717 2535	19742 2537	19767 2539	19793 2540
146.9	19818 2542	19844 2544	19869 2546	19895 2547	19920 2549	19946 2551	19971 2553	19997 2555	20022 2556	20048 2558
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147.0	20073 2560	20099 2562	20125 2564	20150 2565	20176 2567	20202 2569	20227 2571	20253 2572	20279 2574	20304 2576
147.1	20330 2578	20356 2579	20382 2581	20408 2583	20433 2585	20459 2586	20485 2588	20511 2590	20537 2592	20563 2594
147.2	20589 2595	20615 2597	20641 2599	20667 2601	20693 2602	20719 2604	20745 2606	20771 2608	20797 2610	20823 2611
147.3	20849 2613	20875 2615	20902 2617	20928 2618	20954 2620	20980 2622	21006 2624	21033 2626	21059 2627	21085 2629
147.4	21111 2631	21138 2633	21164 2634	21190 2636	21217 2638	21243 2640	21270 2642	21296 2643	21323 2645	21349 2647
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147.5	21375 2649	21402 2651	21428 2652	21455 2654	21482 2656	21508 2658	21535 2659	21561 2661	21588 2663	21615 2665
147.6	21641 2667	21668 2668	21695 2670	21721 2672	21748 2674	21775 2676	21802 2677	21828 2679	21855 2681	21882 2683
147.7	21909 2685	21936 2686	21963 2688	21989 2690	22016 2692	22043 2694	22070 2695	22097 2697	22124 2699	22151 2701
147.8	22178 2703	22205 2705	22232 2706	22259 2708	22286 2710	22314 2712	22341 2714	22368 2715	22395 2717	22422 2719
147.9	22449 2721	22477 2723	22504 2724	22531 2726	22558 2728	22586 2730	22613 2732	22640 2734	22668 2735	22695 2737
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
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Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
148.0	22722 2739	22750 2741	22777 2742	22805 2744	22832 2746	22860 2747	22887 2749	22915 2751	22942 2752	22970 2754
148.1	22997 2756	23025 2757	23052 2759	23080 2761	23107 2762	23135 2764	23163 2766	23190 2768	23218 2769	23246 2771
148.2	23273 2773	23301 2774	23329 2776	23357 2778	23385 2779	23412 2781	23440 2783	23468 2784	23496 2786	23524 2788
148.3	23552 2789	23580 2791	23607 2793	23635 2795	23663 2796	23691 2798	23719 2800	23747 2801	23775 2803	23803 2805
148.4	23831 2806	23859 2808	23888 2810	23916 2811	23944 2813	23972 2815	24000 2817	24028 2818	24056 2820	24085 2822
148.5	24113 2823	24141 2825	24169 2827	24198 2828	24226 2830	24254 2832	24283 2834	24311 2835	24339 2837	24368 2839
148.6	24396 2840	24424 2842	24453 2844	24481 2846	24510 2847	24538 2849	24567 2851	24595 2852	24624 2854	24652 2856
148.7	24681 2857	24710 2859	24738 2861	24767 2863	24795 2864	24824 2866	24853 2868	24881 2869	24910 2871	24939 2873
148.8	24968 2875	24996 2876	25025 2878	25054 2880	25083 2881	25112 2883	25140 2885	25169 2887	25198 2888	25227 2890
148.9	25256 2892	25285 2893	25314 2895	25343 2897	25372 2899	25401 2900	25430 2902	25459 2904	25488 2906	25517 2907
149.0	25546 2909	25575 2911	25604 2912	25633 2914	25662 2916	25692 2917	25721 2919	25750 2921	25779 2922	25808 2924
149.1	25838 2926	25867 2927	25896 2929	25926 2931	25955 2932	25984 2934	26014 2936	26043 2937	26072 2939	26102 2941
149.2	26131 2942	26161 2944	26190 2946	26219 2947	26249 2949	26278 2951	26308 2952	26337 2954	26367 2956	26397 2958
149.3	26426 2959	26456 2961	26485 2963	26515 2964	26545 2966	26574 2968	26604 2969	26634 2971	26663 2973	26693 2974
149.4	26723 2976	26753 2978	26782 2979	26812 2981	26842 2983	26872 2984	26902 2986	26932 2988	26962 2990	26991 2991

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
149.5	27021 2993	27051 2995	27081 2996	27111 2998	27141 3000	27171 3001	27201 3003	27231 3005	27261 3006	27291 3008
149.6	27322 3010	27352 3012	27382 3013	27412 3015	27442 3017	27472 3018	27502 3020	27533 3022	27563 3023	27593 3025
149.7	27623 3027	27654 3028	27684 3030	27714 3032	27745 3034	27775 3035	27805 3037	27836 3039	27866 3040	27896 3042
149.8	27927 3044	27957 3046	27988 3047	28018 3049	28049 3051	28079 3052	28110 3054	28140 3056	28171 3057	28201 3059
149.9	28232 3061	28263 3063	28293 3064	28324 3066	28355 3068	28385 3069	28416 3071	28447 3073	28477 3075	28508 3076
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150.0	28539 3078	28570 3080	28601 3081	28631 3083	28662 3084	28693 3086	28724 3088	28755 3089	28786 3091	28817 3092
150.1	28848 3094	28879 3096	28910 3097	28941 3099	28972 3100	29002 3102	29034 3103	29065 3105	29096 3107	29127 3108
150.2	29158 3110	29189 3111	29220 3113	29251 3115	29282 3116	29314 3118	29345 3119	29376 3121	29407 3123	29438 3124
150.3	29470 3126	29501 3127	29532 3129	29563 3131	29595 3132	29626 3134	29657 3135	29689 3137	29720 3139	29752 3140
150.4	29783 3142	29814 3144	29846 3145	29877 3147	29909 3148	29940 3150	29972 3152	30003 3153	30035 3155	30066 3156
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150.5	30098 3158	30130 3160	30161 3161	30193 3163	30224 3164	30256 3166	30288 3168	30319 3169	30351 3171	30383 3172
150.6	30415 3174	30446 3176	30478 3177	30510 3179	30542 3181	30573 3182	30605 3184	30637 3185	30669 3187	30701 3189
150.7	30733 3190	30765 3192	30797 3194	30829 3195	30861 3197	30893 3198	30924 3200	30957 3202	30989 3203	31021 3205
150.8	31053 3206	31085 3208	31117 3210	31149 3211	31181 3213	31213 3215	31245 3216	31277 3218	31310 3219	31342 3221
150.9	31374 3223	31406 3224	31439 3226	31471 3228	31503 3229	31535 3231	31568 3232	31600 3234	31632 3236	31665 3237
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
151.0	31697 3239	31730 3241	31762 3242	31794 3244	31827 3245	31859 3247	31892 3249	31924 3250	31957 3252	31989 3253
151.1	32022 3255	32054 3257	32087 3258	32120 3260	32152 3261	32185 3263	32217 3265	32250 3266	32283 3268	32315 3269
151.2	32348 3271	32381 3273	32414 3274	32446 3276	32479 3278	32512 3279	32545 3281	32578 3282	32610 3284	32643 3286
151.3	32676 3287	32709 3289	32742 3290	32775 3292	32808 3294	32841 3295	32874 3297	32907 3298	32940 3300	32973 3302
151.4	33006 3303	33039 3305	33072 3307	33105 3308	33138 3310	33171 3311	33204 3313	33237 3315	33270 3316	33304 3318
151.5	33337 3320	33370 3321	33403 3323	33436 3324	33470 3326	33503 3328	33536 3329	33570 3331	33603 3332	33636 3334
151.6	33670 3336	33703 3337	33736 3339	33770 3341	33803 3342	33837 3344	33870 3345	33903 3347	33937 3349	33970 3350
151.7	34004 3352	34037 3354	34071 3355	34105 3357	34138 3359	34172 3360	34205 3362	34239 3363	34273 3365	34306 3367
151.8	34340 3368	34374 3370	34407 3372	34441 3373	34475 3375	34509 3376	34542 3378	34576 3380	34610 3381	34644 3383
151.9	34678 3385	34711 3386	34745 3388	34779 3390	34813 3391	34847 3393	34881 3394	34915 3396	34949 3398	34983 3399
152.0	35017 3401	35051 3403	35085 3404	35119 3406	35153 3407	35187 3409	35221 3410	35255 3412	35289 3413	35324 3415
152.1	35358 3416	35392 3418	35426 3419	35460 3421	35494 3422	35529 3424	35563 3426	35597 3427	35631 3429	35666 3430
152.2	35700 3432	35734 3433	35769 3435	35803 3436	35838 3438	35872 3439	35906 3441	35941 3443	35975 3444	36010 3446
152.3	36044 3447	36079 3449	36113 3450	36148 3452	36182 3453	36217 3455	36251 3456	36286 3458	36320 3459	36355 3461
152.4	36390 3463	36424 3464	36459 3466	36493 3467	36528 3469	36563 3470	36598 3472	36632 3473	36667 3475	36702 3477

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
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Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
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152.5	36737 3478	36771 3480	36806 3481	36841 3483	36876 3484	36911 3486	36946 3487	36980 3489	37015 3490	37050 3492
152.6	37085 3494	37120 3495	37155 3497	37190 3498	37225 3500	37260 3501	37295 3503	37330 3504	37365 3506	37400 3508
152.7	37435 3509	37470 3511	37506 3512	37541 3514	37576 3515	37611 3517	37646 3518	37681 3520	37717 3522	37752 3523
152.8	37787 3525	37822 3526	37858 3528	37893 3529	37928 3531	37963 3533	37999 3534	38034 3536	38069 3537	38105 3539
152.9	38140 3540	38176 3542	38211 3543	38247 3545	38282 3547	38317 3548	38353 3550	38388 3551	38424 3553	38460 3554
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153.0	38495 3556	38531 3558	38566 3559	38602 3561	38637 3562	38673 3564	38709 3565	38744 3567	38780 3568	38816 3570
153.1	38851 3572	38887 3573	38923 3575	38959 3576	38994 3578	39030 3579	39066 3581	39102 3582	39138 3584	39174 3586
153.2	39209 3587	39245 3589	39281 3590	39317 3592	39353 3593	39389 3595	39425 3596	39461 3598	39497 3600	39533 3601
153.3	39569 3603	39605 3604	39641 3606	39677 3607	39713 3609	39749 3611	39785 3612	39821 3614	39858 3615	39894 3617
153.4	39930 3618	39966 3620	40002 3622	40039 3623	40075 3625	40111 3626	40147 3628	40184 3629	40220 3631	40256 3633
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153.5	40293 3634	40329 3636	40365 3637	40402 3639	40438 3640	40474 3642	40511 3644	40547 3645	40584 3647	40620 3648
153.6	40657 3650	40693 3651	40730 3653	40766 3655	40803 3656	40839 3658	40876 3659	40913 3661	40949 3662	40986 3664
153.7	41023 3666	41059 3667	41096 3669	41133 3670	41169 3672	41206 3673	41243 3675	41280 3677	41316 3678	41353 3680
153.8	41390 3681	41427 3683	41464 3684	41500 3686	41537 3688	41574 3689	41611 3691	41648 3692	41685 3694	41722 3696
153.9	41759 3697	41796 3699	41833 3700	41870 3702	41907 3703	41944 3705	41981 3707	42018 3708	42055 3710	42092 3711
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
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154.0	42129 3713	42166 3715	42204 3716	42241 3718	42278 3719	42315 3721	42352 3722	42390 3724	42427 3725	42464 3727
154.1	42501 3728	42539 3730	42576 3731	42613 3733	42651 3735	42688 3736	42725 3738	42763 3739	42800 3741	42838 3742
154.2	42875 3744	42912 3745	42950 3747	42987 3748	43025 3750	43062 3751	43100 3753	43137 3755	43175 3756	43212 3758
154.3	43250 3759	43288 3761	43325 3762	43363 3764	43401 3765	43438 3767	43476 3768	43514 3770	43551 3772	43589 3773
154.4	43627 3775	43665 3776	43702 3778	43740 3779	43778 3781	43816 3782	43854 3784	43891 3785	43929 3787	43967 3789
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154.5	44005 3790	44043 3792	44081 3793	44119 3795	44157 3796	44195 3798	44233 3799	44271 3801	44309 3803	44347 3804
154.6	44385 3806	44423 3807	44461 3809	44499 3810	44537 3812	44575 3813	44613 3815	44652 3816	44690 3818	44728 3820
154.7	44766 3821	44804 3823	44843 3824	44881 3826	44919 3827	44957 3829	44996 3831	45034 3832	45072 3834	45111 3835
154.8	45149 3837	45187 3838	45226 3840	45264 3841	45303 3843	45341 3845	45380 3846	45418 3848	45457 3849	45495 3851
154.9	45533 3852	45572 3854	45611 3855	45649 3857	45688 3859	45726 3860	45765 3862	45804 3863	45842 3865	45881 3866
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155.0	45920 3868	45958 3870	45997 3871	46036 3873	46074 3874	46113 3876	46152 3877	46191 3879	46229 3880	46268 3882
155.1	46307 3883	46346 3885	46385 3887	46424 3888	46463 3890	46501 3891	46540 3893	46579 3894	46618 3896	46657 3897
155.2	46696 3899	46735 3901	46774 3902	46813 3904	46852 3905	46891 3907	46930 3908	46970 3910	47009 3911	47048 3913
155.3	47087 3914	47126 3916	47165 3918	47204 3919	47244 3921	47283 3922	47322 3924	47361 3925	47401 3927	47440 3928
155.4	47479 3930	47518 3932	47558 3933	47597 3935	47636 3936	47676 3938	47715 3939	47755 3941	47794 3942	47833 3944
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
155.5	47873 3946	47912 3947	47952 3949	47991 3950	48031 3952	48070 3953	48110 3955	48149 3957	48189 3958	48229 3960
155.6	48268 3961	48308 3963	48347 3964	48387 3966	48427 3967	48466 3969	48506 3971	48546 3972	48586 3974	48625 3975
155.7	48665 3977	48705 3978	48745 3980	48785 3982	48824 3983	48864 3985	48904 3986	48944 3988	48984 3989	49024 3991
155.8	49064 3993	49104 3994	49144 3996	49183 3997	49223 3999	49263 4000	49303 4002	49343 4004	49384 4005	49424 4007
155.9	49464 4008	49504 4010	49544 4011	49584 4013	49624 4015	49664 4016	49704 4018	49745 4019	49785 4021	49825 4022
156.0	49865 4024	49905 4026	49946 4027	49986 4029	50026 4031	50067 4032	50107 4034	50147 4036	50188 4037	50228 4039
156.1	50269 4041	50309 4042	50349 4044	50390 4045	50430 4047	50471 4049	50511 4050	50552 4052	50592 4054	50633 4055
156.2	50673 4057	50714 4059	50755 4060	50795 4062	50836 4064	50876 4065	50917 4067	50958 4069	50998 4070	51039 4072
156.3	51080 4074	51121 4075	51161 4077	51202 4079	51243 4080	51284 4082	51325 4084	51365 4085	51406 4087	51447 4089
156.4	51488 4090	51529 4092	51570 4094	51611 4095	51652 4097	51693 4099	51734 4100	51775 4102	51816 4104	51857 4105
156.5	51898 4107	51939 4109	51980 4110	52021 4112	52062 4114	52104 4115	52145 4117	52186 4118	52227 4120	52268 4122
156.6	52310 4123	52351 4125	52392 4127	52433 4128	52475 4130	52516 4132	52557 4133	52599 4135	52640 4136	52681 4138
156.7	52723 4140	52764 4141	52805 4143	52847 4145	52888 4146	52930 4148	52971 4150	53013 4151	53054 4153	53096 4154
156.8	53137 4156	53179 4158	53221 4159	53262 4161	53304 4163	53345 4164	53387 4166	53429 4168	53470 4169	53512 4171
156.9	53554 4173	53596 4174	53637 4176	53679 4177	53721 4179	53763 4181	53805 4182	53846 4184	53888 4186	53930 4187

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
157.0	53972 4189	54014 4191	54056 4192	54098 4194	54140 4196	54182 4197	54224 4199	54266 4201	54308 4202	54350 4204
157.1	54392 4206	54434 4207	54476 4209	54518 4211	54560 4212	54602 4214	54644 4216	54686 4217	54729 4219	54771 4221
157.2	54813 4223	54855 4224	54898 4226	54940 4228	54982 4229	55024 4231	55067 4233	55109 4234	55151 4236	55194 4238
157.3	55236 4239	55279 4241	55321 4243	55363 4244	55406 4246	55448 4248	55491 4249	55533 4251	55576 4253	55618 4255
157.4	55661 4256	55704 4258	55746 4260	55789 4261	55831 4263	55874 4265	55917 4266	55959 4268	56002 4270	56045 4271
157.5	56087 4273	56130 4275	56173 4276	56216 4278	56258 4280	56301 4282	56344 4283	56387 4285	56430 4287	56473 4288
157.6	56516 4290	56558 4292	56601 4293	56644 4295	56687 4297	56730 4298	56773 4300	56816 4302	56859 4304	56902 4305
157.7	56945 4307	56989 4309	57032 4310	57075 4312	57118 4314	57161 4315	57204 4317	57247 4319	57291 4321	57334 4322
157.8	57377 4324	57420 4326	57464 4327	57507 4329	57550 4331	57593 4332	57637 4334	57680 4336	57723 4338	57767 4339
157.9	57810 4341	57854 4343	57897 4344	57940 4346	57984 4348	58027 4349	58071 4351	58115 4353	58158 4355	58202 4356
158.0	58245 4358	58289 4360	58332 4362	58376 4363	58420 4365	58463 4367	58507 4369	58551 4370	58594 4372	58638 4374
158.1	58682 4376	58726 4377	58769 4379	58813 4381	58857 4383	58901 4384	58945 4386	58989 4388	59032 4390	59076 4392
158.2	59120 4393	59164 4395	59208 4397	59252 4399	59296 4400	59340 4402	59384 4404	59428 4406	59472 4407	59516 4409
158.3	59561 4411	59605 4413	59649 4415	59693 4416	59737 4418	59781 4420	59825 4422	59870 4423	59914 4425	59958 4427
158.4	60002 4429	60047 4431	60091 4432	60135 4434	60180 4436	60224 4438	60269 4439	60313 4441	60357 4443	60402 4445

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
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158.5	60446 4447	60491 4448	60535 4450	60580 4452	60624 4454	60669 4455	60713 4457	60758 4459	60803 4461	60847 4463
158.6	60892 4464	60936 4466	60981 4468	61026 4470	61071 4472	61115 4473	61160 4475	61205 4477	61250 4479	61294 4480
158.7	61339 4482	61384 4484	61429 4486	61474 4488	61519 4489	61563 4491	61608 4493	61653 4495	61698 4497	61743 4498
158.8	61788 4500	61833 4502	61878 4504	61923 4505	61968 4507	62014 4509	62059 4511	62104 4513	62149 4514	62194 4516
158.9	62239 4518	62284 4520	62330 4522	62375 4523	62420 4525	62465 4527	62511 4529	62556 4531	62601 4532	62647 4534
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159.0	62692 4536	62737 4538	62783 4540	62828 4542	62873 4543	62919 4545	62964 4547	63010 4549	63055 4551	63101 4553
159.1	63146 4555	63192 4557	63238 4558	63283 4560	63329 4562	63374 4564	63420 4566	63466 4568	63511 4570	63557 4572
159.2	63603 4573	63649 4575	63694 4577	63740 4579	63786 4581	63832 4583	63878 4585	63923 4587	63969 4589	64015 4590
159.3	64061 4592	64107 4594	64153 4596	64199 4598	64245 4600	64291 4602	64337 4604	64383 4605	64429 4607	64475 4609
159.4	64521 4611	64567 4613	64614 4615	64660 4617	64706 4619	64752 4621	64798 4622	64845 4624	64891 4626	64937 4628
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159.5	64983 4630	65030 4632	65076 4634	65122 4636	65169 4638	65215 4639	65261 4641	65308 4643	65354 4645	65401 4647
159.6	65447 4649	65494 4651	65540 4653	65587 4655	65633 4657	65680 4658	65727 4660	65773 4662	65820 4664	65866 4666
159.7	65913 4668	65960 4670	66007 4672	66053 4674	66100 4675	66147 4677	66194 4679	66240 4681	66287 4683	66334 4685
159.8	66381 4687	66428 4689	66475 4691	66522 4693	66568 4694	66615 4696	66662 4698	66709 4700	66756 4702	66803 4704
159.9	66850 4706	66898 4708	66945 4710	66992 4712	67039 4714	67086 4715	67133 4717	67180 4719	67228 4721	67275 4723
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
160.0	67322 4725	67369 4727	67417 4729	67464 4731	67511 4733	67559 4735	67606 4737	67653 4739	67701 4741	67748 4743
160.1	67796 4745	67843 4747	67890 4749	67938 4751	67986 4753	68033 4755	68081 4757	68128 4759	68176 4761	68223 4763
160.2	68271 4765	68319 4767	68366 4769	68414 4771	68462 4773	68510 4775	68557 4777	68605 4779	68653 4781	68701 4783
160.3	68749 4785	68796 4787	68844 4789	68892 4792	68940 4794	68988 4796	69036 4798	69084 4800	69132 4802	69180 4804
160.4	69228 4806	69276 4808	69324 4810	69372 4812	69421 4814	69469 4816	69517 4818	69565 4820	69613 4822	69662 4824
160.5	69710 4826	69758 4828	69806 4830	69855 4832	69903 4834	69951 4836	70000 4838	70048 4840	70096 4842	70145 4844
160.6	70193 4846	70242 4848	70290 4850	70339 4852	70387 4854	70436 4856	70485 4859	70533 4861	70582 4863	70630 4865
160.7	70679 4867	70728 4869	70776 4871	70825 4873	70874 4875	70923 4877	70971 4879	71020 4881	71069 4883	71118 4885
160.8	71167 4887	71216 4889	71265 4891	71313 4893	71362 4895	71411 4897	71460 4899	71509 4901	71558 4903	71607 4905
160.9	71656 4908	71706 4910	71755 4912	71804 4914	71853 4916	71902 4918	71951 4920	72000 4922	72050 4924	72099 4926
161.0	72148 4928	72197 4930	72247 4932	72296 4934	72345 4937	72395 4939	72444 4941	72494 4943	72543 4945	72593 4947
161.1	72642 4949	72692 4951	72741 4954	72791 4956	72840 4958	72890 4960	72939 4962	72989 4964	73039 4966	73088 4968
161.2	73138 4971	73188 4973	73238 4975	73287 4977	73337 4979	73387 4981	73437 4983	73487 4986	73536 4988	73586 4990
161.3	73636 4992	73686 4994	73736 4996	73786 4998	73836 5001	73886 5003	73936 5005	73986 5007	74036 5009	74086 5011
161.4	74136 5013	74187 5016	74237 5018	74287 5020	74337 5022	74387 5024	74438 5026	74488 5028	74538 5031	74589 5033

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
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161.5	74639 5035	74689 5037	74740 5039	74790 5041	74840 5044	74891 5046	74941 5048	74992 5050	75042 5052	75093 5054
161.6	75143 5056	75194 5059	75245 5061	75295 5063	75346 5065	75397 5067	75447 5069	75498 5072	75549 5074	75599 5076
161.7	75650 5078	75701 5080	75752 5082	75803 5084	75853 5087	75904 5089	75955 5091	76006 5093	76057 5095	76108 5097
161.8	76159 5100	76210 5102	76261 5104	76312 5106	76363 5108	76414 5110	76465 5113	76517 5115	76568 5117	76619 5119
161.9	76670 5121	76721 5123	76773 5126	76824 5128	76875 5130	76926 5132	76978 5134	77029 5136	77080 5139	77132 5141
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162.0	77183 5143	77235 5145	77286 5148	77338 5150	77389 5152	77441 5154	77492 5157	77544 5159	77595 5161	77647 5163
162.1	77699 5166	77750 5168	77802 5170	77854 5172	77906 5175	77957 5177	78009 5179	78061 5182	78113 5184	78165 5186
162.2	78216 5188	78268 5191	78320 5193	78372 5195	78424 5198	78476 5200	78528 5202	78580 5204	78632 5207	78684 5209
162.3	78736 5211	78789 5213	78841 5216	78893 5218	78945 5220	78997 5223	79050 5225	79102 5227	79154 5229	79206 5232
162.4	79259 5234	79311 5236	79363 5239	79416 5241	79468 5243	79521 5245	79573 5248	79626 5250	79678 5252	79731 5255
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162.5	79783 5257	79836 5259	79888 5261	79941 5264	79994 5266	80046 5268	80099 5271	80152 5273	80205 5275	80257 5278
162.6	80310 5280	80363 5282	80416 5284	80469 5287	80521 5289	80574 5291	80627 5294	80680 5296	80733 5298	80786 5300
162.7	80839 5303	80892 5305	80945 5307	80998 5310	81052 5312	81105 5314	81158 5317	81211 5319	81264 5321	81317 5323
162.8	81371 5326	81424 5328	81477 5330	81531 5333	81584 5335	81637 5337	81691 5340	81744 5342	81797 5344	81851 5347
162.9	81904 5349	81958 5351	82011 5353	82065 5356	82119 5358	82172 5360	82226 5363	82279 5365	82333 5367	82387 5370
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
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163.0	82440 5372	82494 5374	82548 5377	82602 5379	82655 5382	82709 5384	82763 5387	82817 5389	82871 5391	82925 5394
163.1	82979 5396	83033 5399	83087 5401	83141 5404	83195 5406	83249 5409	83303 5411	83357 5413	83411 5416	83465 5418
163.2	83520 5421	83574 5423	83628 5426	83682 5428	83737 5431	83791 5433	83845 5435	83900 5438	83954 5440	84008 5443
163.3	84063 5445	84117 5448	84172 5450	84226 5453	84281 5455	84336 5457	84390 5460	84445 5462	84499 5465	84554 5467
163.4	84609 5470	84663 5472	84718 5475	84773 5477	84828 5480	84882 5482	84937 5484	84992 5487	85047 5489	85102 5492
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163.5	85157 5494	85212 5497	85267 5499	85322 5502	85377 5504	85432 5507	85487 5509	85542 5512	85597 5514	85652 5516
163.6	85708 5519	85763 5521	85818 5524	85873 5526	85929 5529	85984 5531	86039 5534	86094 5536	86150 5539	86205 5541
163.7	86261 5544	86316 5546	86372 5549	86427 5551	86483 5554	86538 5556	86594 5558	86649 5561	86705 5563	86761 5566
163.8	86816 5568	86872 5571	86928 5573	86983 5576	87039 5578	87095 5581	87151 5583	87207 5586	87263 5588	87318 5591
163.9	87374 5593	87430 5596	87486 5598	87542 5601	87598 5603	87654 5606	87710 5608	87767 5611	87823 5613	87879 5616
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164.0	87935 5618	87991 5621	88047 5623	88104 5626	88160 5628	88216 5631	88272 5633	88329 5636	88385 5638	88442 5641
164.1	88498 5643	88554 5646	88611 5649	88667 5651	88724 5654	88780 5656	88837 5659	88894 5661	88950 5664	89007 5666
164.2	89064 5669	89120 5671	89177 5674	89234 5677	89291 5679	89347 5682	89404 5684	89461 5687	89518 5689	89575 5692
164.3	89632 5694	89689 5697	89746 5700	89803 5702	89860 5705	89917 5707	89974 5710	90031 5712	90088 5715	90145 5718
164.4	90202 5720	90260 5723	90317 5725	90374 5728	90432 5730	90489 5733	90546 5736	90604 5738	90661 5741	90718 5743
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Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
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164.5	90776 5746	90833 5748	90891 5751	90948 5753	91006 5756	91063 5759	91121 5761	91179 5764	91236 5766	91294 5769
164.6	91352 5772	91409 5774	91467 5777	91525 5779	91583 5782	91641 5784	91698 5787	91756 5790	91814 5792	91872 5795
164.7	91930 5797	91988 5800	92046 5802	92104 5805	92162 5808	92220 5810	92278 5813	92337 5815	92395 5818	92453 5821
164.8	92511 5823	92569 5826	92628 5828	92686 5831	92744 5833	92803 5836	92861 5839	92919 5841	92978 5844	93036 5846
164.9	93095 5849	93153 5852	93212 5854	93270 5857	93329 5859	93388 5862	93446 5865	93505 5867	93563 5870	93622 5872
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165.0	93681 5875	93740 5878	93799 5880	93857 5883	93916 5886	93975 5888	94034 5891	94093 5893	94152 5896	94211 5899
165.1	94270 5901	94329 5904	94388 5907	94447 5909	94506 5912	94565 5915	94624 5917	94684 5920	94743 5922	94802 5925
165.2	94861 5928	94921 5930	94980 5933	95039 5936	95099 5938	95158 5941	95217 5944	95277 5946	95336 5949	95396 5952
165.3	95455 5954	95515 5957	95575 5959	95634 5962	95694 5965	95753 5967	95813 5970	95873 5973	95933 5975	95992 5978
165.4	96052 5981	96112 5983	96172 5986	96232 5989	96292 5991	96351 5994	96411 5997	96471 5999	96531 6002	96591 6005
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
165.5	96651 6007	96712 6010	96772 6013	96832 6015	96892 6018	96952 6021	97012 6023	97073 6026	97133 6029	97193 6031
165.6	97254 6034	97314 6037	97374 6039	97435 6042	97495 6045	97556 6047	97616 6050	97677 6053	97737 6055	97798 6058
165.7	97858 6061	97919 6063	97980 6066	98040 6069	98101 6071	98162 6074	98222 6077	98283 6079	98344 6082	98405 6085
165.8	98466 6087	98527 6090	98587 6093	98648 6095	98709 6098	98770 6101	98831 6103	98892 6106	98954 6109	99015 6111
165.9	99076 6114	99137 6117	99198 6120	99259 6122	99321 6125	99382 6128	99443 6130	99504 6133	99566 6136	99627 6138
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
166.0	99688 6141	99750 6144	99811 6146	99873 6149	99934 6152	99996 6154	100057 6157	100119 6160	100181 6162	100242 6165
166.1	100304 6168	100366 6170	100427 6173	100489 6176	100551 6178	100613 6181	100674 6184	100736 6186	100798 6189	100860 6192
166.2	100922 6195	100984 6197	101046 6200	101108 6203	101170 6205	101232 6208	101294 6211	101356 6213	101418 6216	101481 6219
166.3	101543 6221	101605 6224	101667 6227	101730 6229	101792 6232	101854 6235	101917 6238	101979 6240	102041 6243	102104 6246
166.4	102166 6248	102229 6251	102291 6254	102354 6256	102416 6259	102479 6262	102542 6264	102604 6267	102667 6270	102730 6273
166.5	102792 6275	102855 6278	102918 6281	102981 6283	103044 6286	103107 6289	103169 6291	103232 6294	103295 6297	103358 6300
166.6	103421 6302	103484 6305	103547 6308	103611 6310	103674 6313	103737 6316	103800 6319	103863 6321	103926 6324	103990 6327
166.7	104053 6329	104116 6332	104180 6335	104243 6338	104306 6340	104370 6343	104433 6346	104497 6348	104560 6351	104624 6354
166.8	104687 6357	104751 6359	104814 6362	104878 6365	104942 6367	105005 6370	105069 6373	105133 6376	105197 6378	105260 6381
166.9	105324 6384	105388 6386	105452 6389	105516 6392	105580 6395	105644 6397	105708 6400	105772 6403	105836 6406	105900 6408
167.0	105964 6411	106028 6414	106092 6416	106156 6419	106221 6422	106285 6424	106349 6427	106413 6429	106478 6432	106542 6435
167.1	106606 6437	106671 6440	106735 6443	106800 6445	106864 6448	106929 6451	106993 6453	107058 6456	107122 6458	107187 6461
167.2	107251 6464	107316 6466	107381 6469	107445 6472	107510 6474	107575 6477	107640 6480	107705 6482	107769 6485	107834 6488
167.3	107899 6490	107964 6493	108029 6496	108094 6498	108159 6501	108224 6503	108289 6506	108354 6509	108419 6511	108484 6514
167.4	108549 6517	108615 6519	108680 6522	108745 6525	108810 6527	108876 6530	108941 6533	109006 6535	109072 6538	109137 6541

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

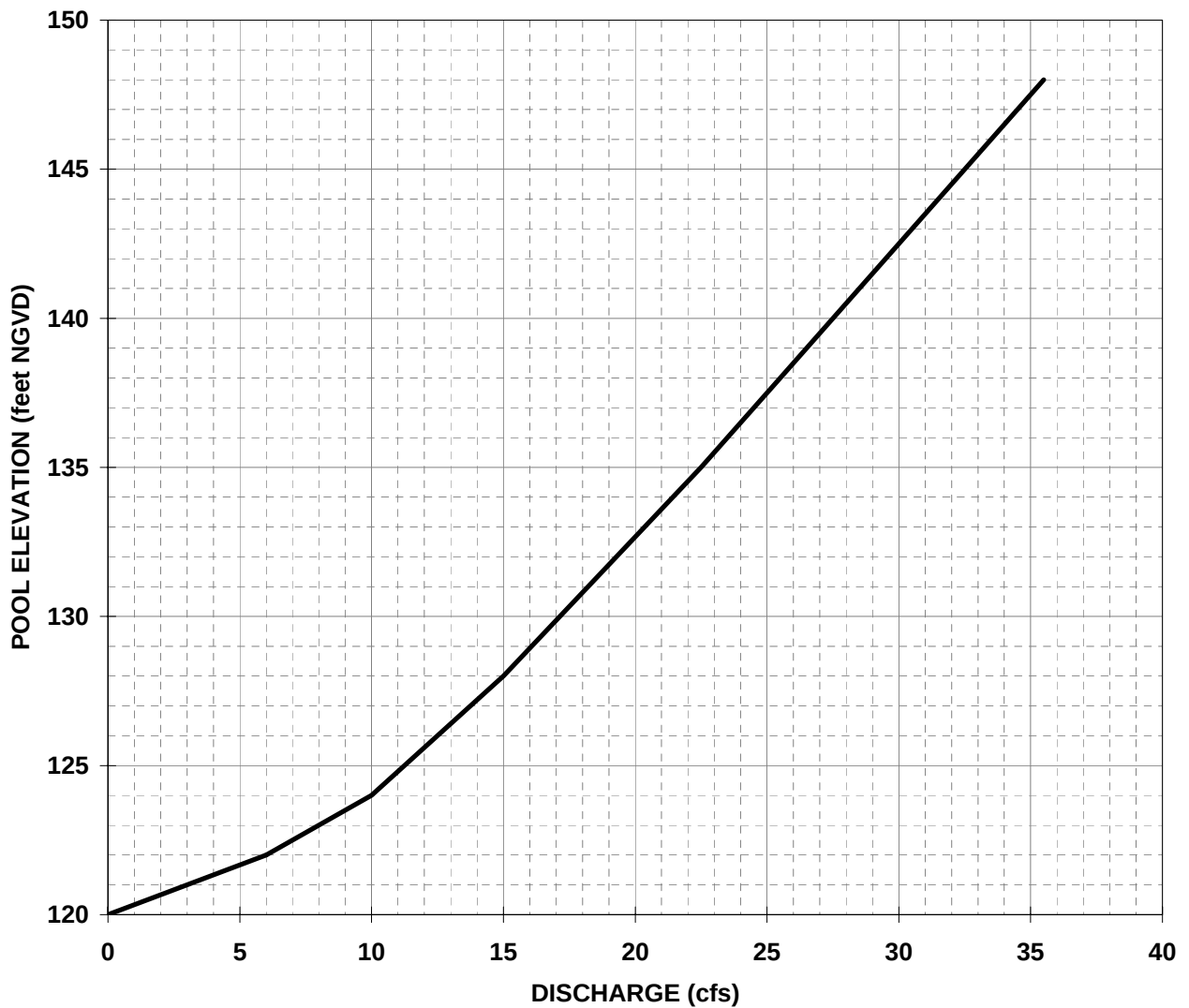
ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
167.5	109203 6543	109268 6546	109333 6549	109399 6551	109464 6554	109530 6557	109596 6559	109661 6562	109727 6565	109792 6567
167.6	109858 6570	109924 6573	109990 6575	110055 6578	110121 6581	110187 6583	110253 6586	110319 6589	110385 6591	110451 6594
167.7	110516 6597	110583 6599	110648 6602	110714 6605	110781 6607	110847 6610	110913 6613	110979 6615	111045 6618	111111 6621
167.8	111178 6623	111244 6626	111310 6629	111376 6631	111443 6634	111509 6637	111575 6639	111642 6642	111708 6645	111775 6647
167.9	111841 6650	111908 6653	111974 6656	112041 6658	112107 6661	112174 6664	112241 6666	112307 6669	112374 6672	112441 6674
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
168.0	112508 6677	112574 6680	112641 6682	112708 6685	112775 6687	112842 6690	112909 6692	112976 6695	113043 6698	113109 6700
168.1	113177 6703	113244 6705	113311 6708	113378 6711	113445 6713	113512 6716	113579 6718	113646 6721	113714 6723	113781 6726
168.2	113848 6729	113915 6731	113983 6734	114050 6736	114117 6739	114185 6742	114252 6744	114320 6747	114387 6749	114455 6752
168.3	114522 6754	114590 6757	114657 6760	114725 6762	114793 6765	114860 6767	114928 6770	114996 6773	115063 6775	115131 6778
168.4	115199 6780	115267 6783	115335 6786	115402 6788	115470 6791	115538 6793	115606 6796	115674 6799	115742 6801	115810 6804
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
168.5	115878 6806	115946 6809	116015 6812	116083 6814	116151 6817	116219 6819	116287 6822	116355 6825	116424 6827	116492 6830
168.6	116560 6832	116629 6835	116697 6838	116765 6840	116834 6843	116902 6845	116971 6848	117039 6851	117108 6853	117176 6856
168.7	117245 6858	117313 6861	117382 6864	117451 6866	117519 6869	117588 6872	117657 6874	117726 6877	117794 6879	117863 6882
168.8	117932 6885	118001 6887	118070 6890	118139 6892	118208 6895	118277 6898	118346 6900	118414 6903	118484 6906	118553 6908
168.9	118622 6911	118691 6913	118760 6916	118829 6919	118898 6921	118968 6924	119037 6927	119106 6929	119175 6932	119245 6934
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Area - Capacity Table
Surveyed January 1953

Capacity Table in acre-feet and Area Table in acres at 0.01 foot

ELEV (FEET)	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA	CAP AREA
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
169.0	119314									
	6937									

-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Example: Elev	.00	.01								
	-----	-----								
136.1	2834	2841	This is the capacity in ac-ft at elev 136.11							
	682	684	This is the corresponding area in acres							



NOTES: 1. One 36-inch diameter outlet
with 15-inch round gated choke.

2. Rating is for fully opened gate.

Prepared by MVB

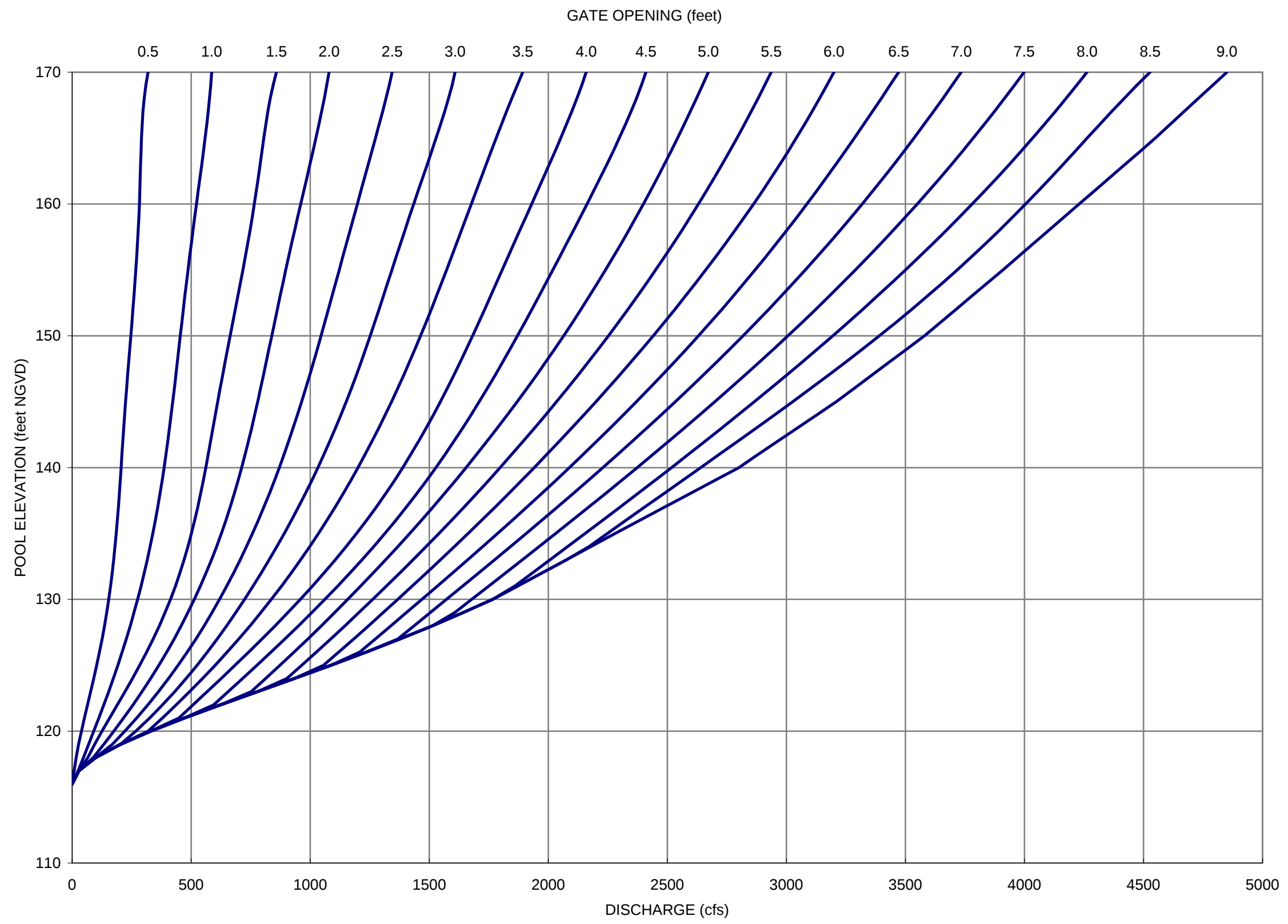
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

**AUXILIARY OUTLET WORKS AT
LITTLEJOHN CREEK DISCHARGE
RATING CURVE**

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Revised Dec 2004

PLATE A-3



FARMINGTON DAM LITTLEJOHN CREEK, CALIFORNIA
OUTLET WORKS DISCHARGE RATING CURVE PARTIAL GATE OPENINGS
U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT

Prepared by MVB

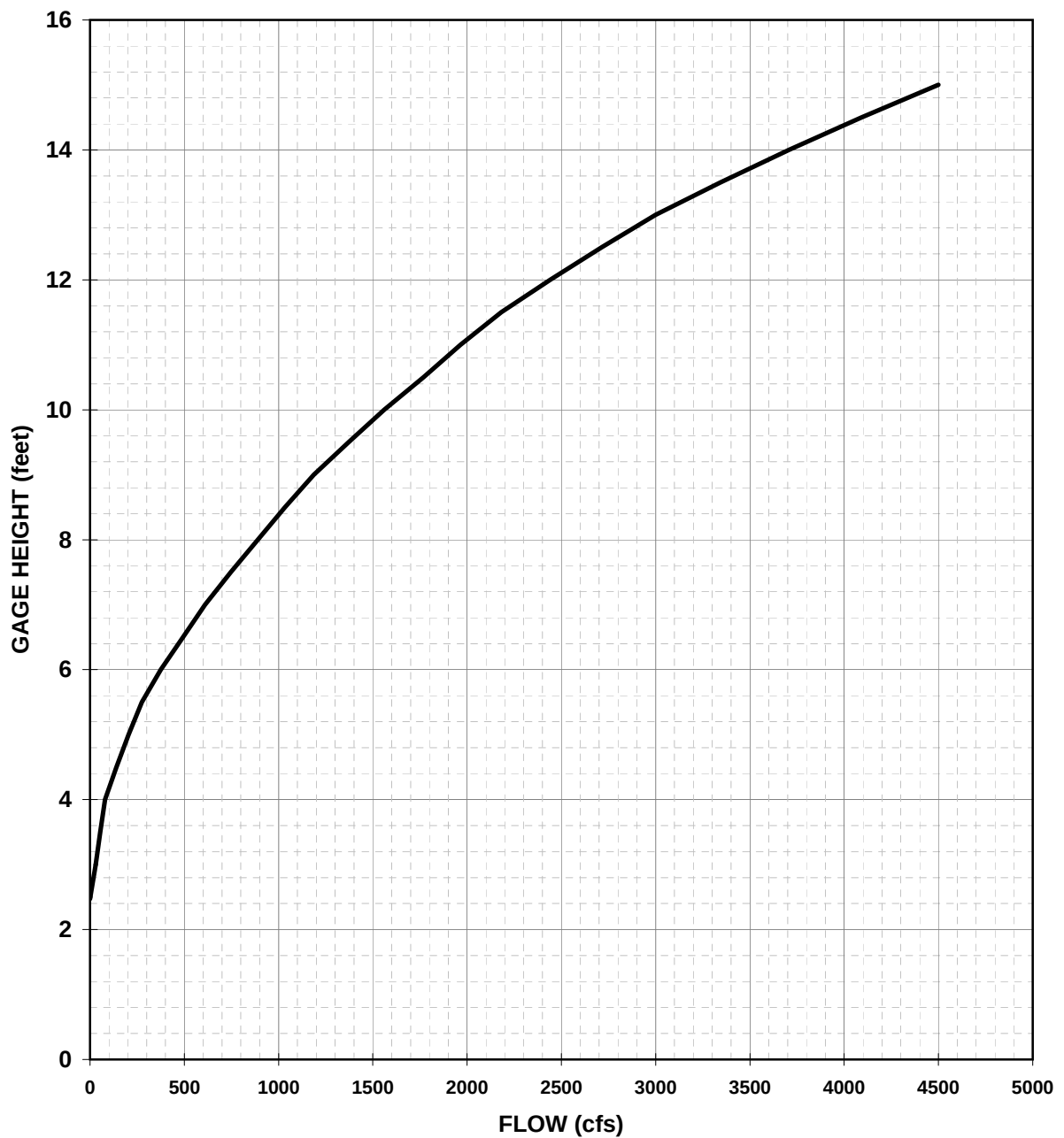
Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Outlet Works Rating Table
Revised December 2004

Discharge in cubic feet per second

	Gate Opening (feet)																	
<u>ELEV</u> <u>FEET</u>	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>	<u>3.5</u>	<u>4.0</u>	<u>4.5</u>	<u>5.0</u>	<u>5.5</u>	<u>6.0</u>	<u>6.5</u>	<u>7.0</u>	<u>7.5</u>	<u>8.0</u>	<u>8.5</u>	<u>9.0</u>
116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
117	18	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
118	36	46	70	89	93	93	93	93	93	93	93	93	93	93	93	93	93	93
119	52	66	91	117	156	192	192	192	192	192	192	192	192	192	192	192	192	192
120	66	88	116	147	197	252	315	315	315	315	315	315	315	315	315	315	315	315
121	79	112	142	179	238	295	363	455	455	455	455	455	455	455	455	455	455	455
122	91	137	170	213	277	338	410	503	609	609	609	609	609	609	609	609	609	609
123	102	161	199	248	316	380	455	550	666	769	769	769	769	769	769	769	769	769
124	112	185	228	283	354	422	501	597	712	826	933	933	933	933	933	933	933	933
125	121	207	257	318	391	463	546	644	758	872	986	1094	1094	1094	1094	1094	1094	1094
126	129	229	286	354	427	503	591	691	804	918	1032	1144	1227	1252	1252	1252	1252	1252
127	137	249	314	389	463	543	635	737	851	965	1079	1192	1273	1387	1402	1402	1402	1402
128	144	267	341	423	497	582	679	784	898	1012	1127	1241	1322	1436	1542	1542	1542	1542
129	151	283	366	456	531	621	722	830	945	1060	1176	1292	1374	1490	1605	1672	1672	1672
130	157	298	390	488	565	659	765	876	993	1109	1225	1343	1429	1546	1662	1778	1790	1790
131	163	311	413	520	597	697	807	922	1040	1158	1275	1395	1486	1604	1722	1840	1894	1894
132	168	323	435	549	629	733	849	968	1087	1207	1326	1448	1546	1665	1785	1904	1992	1992
133	174	333	455	578	660	770	890	1013	1134	1256	1377	1502	1607	1728	1850	1971	2093	2090
134	179	342	473	605	690	805	931	1058	1182	1305	1429	1556	1669	1793	1916	2040	2164	2188
135	184	350	491	630	720	840	971	1102	1229	1355	1481	1611	1732	1858	1985	2111	2237	2280
136	188	357	507	654	749	875	1011	1147	1276	1405	1534	1666	1796	1925	2054	2183	2312	2384
137	193	364	522	677	777	909	1050	1190	1322	1454	1586	1722	1860	1992	2124	2256	2388	2488
138	198	370	536	698	805	942	1088	1234	1369	1504	1639	1778	1925	2060	2195	2330	2465	2592
139	202	376	549	718	832	974	1126	1276	1415	1553	1692	1834	1990	2128	2267	2405	2543	2696
140	207	381	562	736	858	1006	1163	1318	1461	1603	1745	1891	2054	2196	2338	2480	2622	2800
141	211	387	573	753	884	1037	1199	1360	1506	1652	1798	1947	2118	2263	2409	2555	2701	2882
142	215	393	585	770	909	1068	1235	1401	1551	1701	1850	2003	2181	2331	2480	2630	2779	2964
143	220	399	595	785	933	1098	1270	1441	1595	1749	1903	2059	2243	2397	2550	2704	2858	3046
144	224	405	606	799	957	1127	1305	1481	1639	1797	1955	2115	2305	2462	2620	2778	2936	3128
145	228	412	616	813	980	1156	1339	1520	1682	1845	2007	2171	2365	2527	2689	2851	3013	3210

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Outlet Works Rating Table
Revised December 2004

<u>ELEV</u>	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>	<u>3.5</u>	<u>4.0</u>	<u>4.5</u>	<u>5.0</u>	<u>5.5</u>	<u>6.0</u>	<u>6.5</u>	<u>7.0</u>	<u>7.5</u>	<u>8.0</u>	<u>8.5</u>	<u>9.0</u>
146	232	419	626	826	1002	1184	1372	1559	1725	1892	2058	2226	2424	2591	2757	2923	3089	3284
147	236	427	636	838	1024	1211	1404	1596	1767	1938	2109	2281	2482	2653	2824	2994	3165	3358
148	240	435	646	850	1045	1237	1435	1633	1808	1984	2159	2335	2539	2714	2889	3064	3239	3432
149	244	444	655	862	1066	1263	1466	1669	1849	2029	2209	2389	2594	2774	2953	3133	3313	3506
150	248	452	665	874	1086	1288	1496	1704	1889	2073	2257	2442	2648	2832	3016	3200	3385	3580
151	252	461	675	885	1106	1313	1526	1739	1927	2116	2305	2494	2700	2889	3077	3266	3455	3646
152	255	470	685	897	1125	1337	1554	1772	1965	2159	2352	2545	2751	2944	3137	3331	3524	3712
153	259	479	695	909	1143	1360	1582	1804	2002	2200	2398	2595	2800	2998	3196	3394	3592	3778
154	262	487	705	921	1161	1382	1608	1836	2038	2241	2443	2644	2848	3050	3253	3455	3658	3844
155	265	495	715	933	1178	1404	1634	1866	2073	2280	2487	2692	2894	3101	3308	3515	3722	3910
156	269	503	725	946	1195	1425	1659	1896	2107	2318	2530	2739	2939	3151	3362	3573	3785	3974
157	271	510	734	959	1211	1445	1684	1924	2140	2356	2571	2785	2983	3199	3415	3630	3846	4038
158	274	517	744	972	1227	1464	1707	1951	2171	2391	2611	2829	3026	3246	3466	3686	3906	4102
159	277	523	754	986	1242	1483	1729	1978	2202	2426	2650	2871	3067	3292	3516	3740	3964	4166
160	280	528	763	1000	1257	1501	1751	2003	2231	2459	2687	2912	3108	3336	3565	3793	4021	4230
161	282	533	772	1015	1271	1518	1771	2026	2258	2490	2722	2952	3148	3380	3613	3845	4077	4294
162	285	537	781	1029	1285	1535	1791	2049	2285	2520	2756	2989	3188	3424	3660	3896	4132	4358
163	288	540	790	1044	1298	1550	1809	2070	2310	2549	2788	3025	3227	3466	3706	3945	4185	4422
164	291	544	799	1058	1311	1565	1827	2091	2333	2576	2819	3059	3266	3509	3752	3994	4237	4486
165	294	548	808	1072	1323	1579	1844	2109	2355	2601	2847	3091	3305	3551	3797	4043	4289	4550
166	298	552	817	1085	1335	1593	1859	2127	2376	2625	2873	3121	3344	3593	3842	4091	4340	4610
167	302	558	826	1097	1346	1605	1874	2143	2395	2646	2898	3149	3384	3636	3887	4139	4391	4670
168	307	565	836	1109	1358	1617	1888	2158	2412	2666	2920	3175	3425	3679	3933	4187	4441	4730
169	312	575	846	1118	1368	1628	1900	2171	2427	2684	2940	3198	3467	3723	3979	4236	4492	4790
170	318	590	857	1126	1378	1639	1912	2183	2441	2700	2958	3219	3510	3768	4026	4285	4543	4850



FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

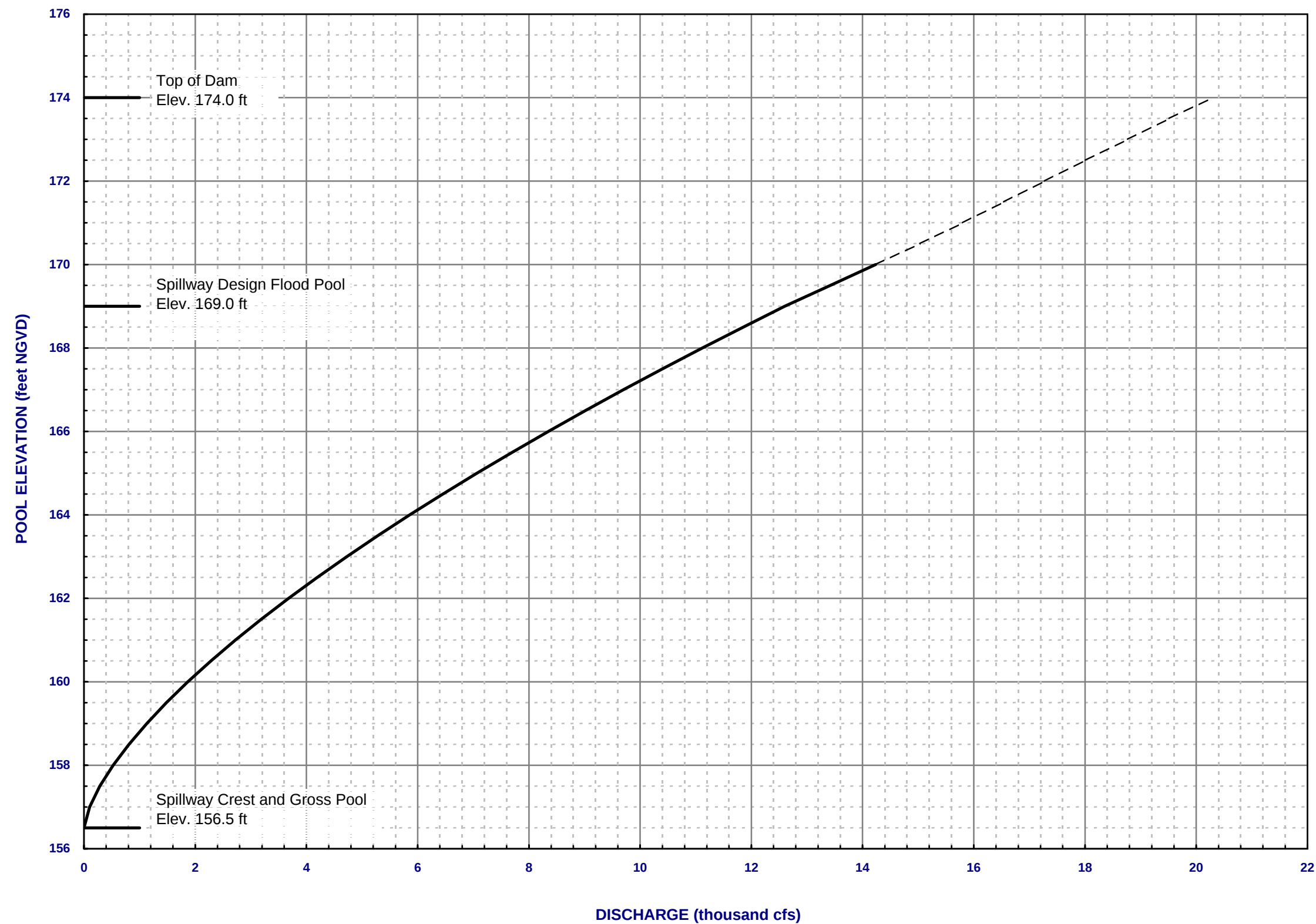
**ROCK CREEK
BELOW FARMINGTON DAM
RATING CURVE**

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004

PLATE A-6



FARMINGTON DAM LITTLEJOHN CREEK, CALIFORNIA
SPILLWAY RATING CURVE
U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT

Prepared by MVB

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Spillway Rating Table

December 2004

Discharge in cubic feet per second

<u>ELEV</u> <u>FEET</u>	<u>0.00</u>	<u>0.01</u>	<u>0.02</u>	<u>0.03</u>	<u>0.04</u>	<u>0.05</u>	<u>0.06</u>	<u>0.07</u>	<u>0.08</u>	<u>0.09</u>
156.00	0	0	0	0	0	0	0	0	0	0
156.10	0	0	0	0	0	0	0	0	0	0
156.20	0	0	0	0	0	0	0	0	0	0
156.30	0	0	0	0	0	0	0	0	0	0
156.40	0	0	0	0	0	0	0	0	0	0
156.50	0	2	4	6	8	10	12	14	16	18
156.60	20	22	24	26	28	30	32	34	36	38
156.70	40	42	44	46	48	50	52	54	56	58
156.80	60	62	64	66	68	70	72	74	76	78
156.90	80	82	84	86	88	90	92	94	96	98
157.00	100	104	107	111	114	118	122	125	129	132
157.10	136	140	143	147	150	154	158	161	165	168
157.20	172	176	179	183	186	190	194	197	201	204
157.30	208	212	215	219	222	226	230	233	237	240
157.40	244	248	251	255	258	262	266	269	273	276
157.50	280	285	290	294	299	304	309	314	318	323
157.60	328	333	338	342	347	352	357	362	366	371
157.70	376	381	386	390	395	400	405	410	414	419
157.80	424	429	434	438	443	448	453	458	462	467
157.90	472	477	482	486	491	496	501	506	510	515
158.00	520	526	532	537	543	549	555	561	566	572
158.10	578	584	590	595	601	607	613	619	624	630
158.20	636	642	648	653	659	665	671	677	682	688
158.30	694	700	706	711	717	723	729	735	740	746
158.40	752	758	764	769	775	781	787	793	798	804
158.50	810	816	823	829	836	842	848	855	861	868
158.60	874	880	887	893	900	906	912	919	925	932
158.70	938	944	951	957	964	970	976	983	989	996
158.80	1002	1008	1015	1021	1028	1034	1040	1047	1053	1060
158.90	1066	1072	1079	1085	1092	1098	1104	1111	1117	1124
159.00	1130	1137	1144	1151	1158	1165	1172	1179	1186	1193
159.10	1200	1207	1214	1221	1228	1235	1242	1249	1256	1263
159.20	1270	1277	1284	1291	1298	1305	1312	1319	1326	1333
159.30	1340	1347	1354	1361	1368	1375	1382	1389	1396	1403
159.40	1410	1417	1424	1431	1438	1445	1452	1459	1466	1473
159.50	1480	1488	1496	1503	1511	1519	1527	1535	1542	1550
159.60	1558	1566	1574	1581	1589	1597	1605	1613	1620	1628
159.70	1636	1644	1652	1659	1667	1675	1683	1691	1698	1706
159.80	1714	1722	1730	1737	1745	1753	1761	1769	1776	1784
159.90	1792	1800	1808	1815	1823	1831	1839	1847	1854	1862

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Spillway Rating Table

December 2004

Discharge in cubic feet per second

<u>ELEV</u> <u>FEET</u>	<u>0.00</u>	<u>0.01</u>	<u>0.02</u>	<u>0.03</u>	<u>0.04</u>	<u>0.05</u>	<u>0.06</u>	<u>0.07</u>	<u>0.08</u>	<u>0.09</u>
160.00	1870	1878	1886	1895	1903	1911	1919	1927	1936	1944
160.10	1952	1960	1968	1977	1985	1993	2001	2009	2018	2026
160.20	2034	2042	2050	2059	2067	2075	2083	2091	2100	2108
160.30	2116	2124	2132	2141	2149	2157	2165	2173	2182	2190
160.40	2198	2206	2214	2223	2231	2239	2247	2255	2264	2272
160.50	2280	2289	2298	2306	2315	2324	2333	2342	2350	2359
160.60	2368	2377	2386	2394	2403	2412	2421	2430	2438	2447
160.70	2456	2465	2474	2482	2491	2500	2509	2518	2526	2535
160.80	2544	2553	2562	2570	2579	2588	2597	2606	2614	2623
160.90	2632	2641	2650	2658	2667	2676	2685	2694	2702	2711
161.00	2720	2729	2739	2748	2758	2767	2776	2786	2795	2805
161.10	2814	2823	2833	2842	2852	2861	2870	2880	2889	2899
161.20	2908	2917	2927	2936	2946	2955	2964	2974	2983	2993
161.30	3002	3011	3021	3030	3040	3049	3058	3068	3077	3087
161.40	3096	3105	3115	3124	3134	3143	3152	3162	3171	3181
161.50	3190	3200	3210	3219	3229	3239	3249	3259	3268	3278
161.60	3288	3298	3308	3317	3327	3337	3347	3357	3366	3376
161.70	3386	3396	3406	3415	3425	3435	3445	3455	3464	3474
161.80	3484	3494	3504	3513	3523	3533	3543	3553	3562	3572
161.90	3582	3592	3602	3611	3621	3631	3641	3651	3660	3670
162.00	3680	3690	3700	3711	3721	3731	3741	3751	3762	3772
162.10	3782	3792	3802	3813	3823	3833	3843	3853	3864	3874
162.20	3884	3894	3904	3915	3925	3935	3945	3955	3966	3976
162.30	3986	3996	4006	4017	4027	4037	4047	4057	4068	4078
162.40	4088	4098	4108	4119	4129	4139	4149	4159	4170	4180
162.50	4190	4201	4212	4222	4233	4244	4255	4266	4276	4287
162.60	4298	4309	4320	4330	4341	4352	4363	4374	4384	4395
162.70	4406	4417	4428	4438	4449	4460	4471	4482	4492	4503
162.80	4514	4525	4536	4546	4557	4568	4579	4590	4600	4611
162.90	4622	4633	4644	4654	4665	4676	4687	4698	4708	4719
163.00	4730	4741	4753	4764	4775	4787	4798	4809	4820	4832
163.10	4843	4854	4866	4877	4888	4900	4911	4922	4933	4945
163.20	4956	4967	4979	4990	5001	5013	5024	5035	5046	5058
163.30	5069	5080	5092	5103	5114	5126	5137	5148	5159	5171
163.40	5182	5193	5205	5216	5227	5239	5250	5261	5272	5284
163.50	5295	5306	5318	5329	5340	5352	5363	5374	5385	5397
163.60	5408	5419	5431	5442	5453	5465	5476	5487	5498	5510
163.70	5521	5532	5544	5555	5566	5578	5589	5600	5611	5623
163.80	5634	5645	5657	5668	5679	5691	5702	5713	5724	5736
163.90	5747	5758	5770	5781	5792	5804	5815	5826	5837	5849

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Spillway Rating Table

December 2004

Discharge in cubic feet per second

<u>ELEV</u> <u>FEET</u>	<u>0.00</u>	<u>0.01</u>	<u>0.02</u>	<u>0.03</u>	<u>0.04</u>	<u>0.05</u>	<u>0.06</u>	<u>0.07</u>	<u>0.08</u>	<u>0.09</u>
164.00	5860	5872	5884	5895	5907	5919	5931	5943	5954	5966
164.10	5978	5990	6002	6013	6025	6037	6049	6061	6072	6084
164.20	6096	6108	6120	6131	6143	6155	6167	6179	6190	6202
164.30	6214	6226	6238	6249	6261	6273	6285	6297	6308	6320
164.40	6332	6344	6356	6367	6379	6391	6403	6415	6426	6438
164.50	6450	6462	6475	6487	6500	6512	6524	6537	6549	6562
164.60	6574	6586	6599	6611	6624	6636	6648	6661	6673	6686
164.70	6698	6710	6723	6735	6748	6760	6772	6785	6797	6810
164.80	6822	6834	6847	6859	6872	6884	6896	6909	6921	6934
164.90	6946	6958	6971	6983	6996	7008	7020	7033	7045	7058
165.00	7070	7083	7095	7108	7120	7133	7146	7158	7171	7183
165.10	7196	7209	7221	7234	7246	7259	7272	7284	7297	7309
165.20	7322	7335	7347	7360	7372	7385	7398	7410	7423	7435
165.30	7448	7461	7473	7486	7498	7511	7524	7536	7549	7561
165.40	7574	7587	7599	7612	7624	7637	7650	7662	7675	7687
165.50	7700	7713	7726	7739	7752	7765	7778	7791	7804	7817
165.60	7830	7843	7856	7869	7882	7895	7908	7921	7934	7947
165.70	7960	7973	7986	7999	8012	8025	8038	8051	8064	8077
165.80	8090	8103	8116	8129	8142	8155	8168	8181	8194	8207
165.90	8220	8233	8246	8259	8272	8285	8298	8311	8324	8337
166.00	8350	8363	8377	8390	8404	8417	8430	8444	8457	8471
166.10	8484	8497	8511	8524	8538	8551	8564	8578	8591	8605
166.20	8618	8631	8645	8658	8672	8685	8698	8712	8725	8739
166.30	8752	8765	8779	8792	8806	8819	8832	8846	8859	8873
166.40	8886	8899	8913	8926	8940	8953	8966	8980	8993	9007
166.50	9020	9034	9047	9061	9074	9088	9102	9115	9129	9142
166.60	9156	9170	9183	9197	9210	9224	9238	9251	9265	9278
166.70	9292	9306	9319	9333	9346	9360	9374	9387	9401	9414
166.80	9428	9442	9455	9469	9482	9496	9510	9523	9537	9550
166.90	9564	9578	9591	9605	9618	9632	9646	9659	9673	9686
167.00	9700	9714	9728	9742	9756	9770	9784	9798	9812	9826
167.10	9840	9854	9868	9882	9896	9910	9924	9938	9952	9966
167.20	9980	9994	10008	10022	10036	10050	10064	10078	10092	10106
167.30	10120	10134	10148	10162	10176	10190	10204	10218	10232	10246
167.40	10260	10274	10288	10302	10316	10330	10344	10358	10372	10386
167.50	10400	10414	10429	10443	10458	10472	10486	10501	10515	10530
167.60	10544	10558	10573	10587	10602	10616	10630	10645	10659	10674
167.70	10688	10702	10717	10731	10746	10760	10774	10789	10803	10818
167.80	10832	10846	10861	10875	10890	10904	10918	10933	10947	10962
167.90	10976	10990	11005	11019	11034	11048	11062	11077	11091	11106

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Spillway Rating Table

December 2004

Discharge in cubic feet per second

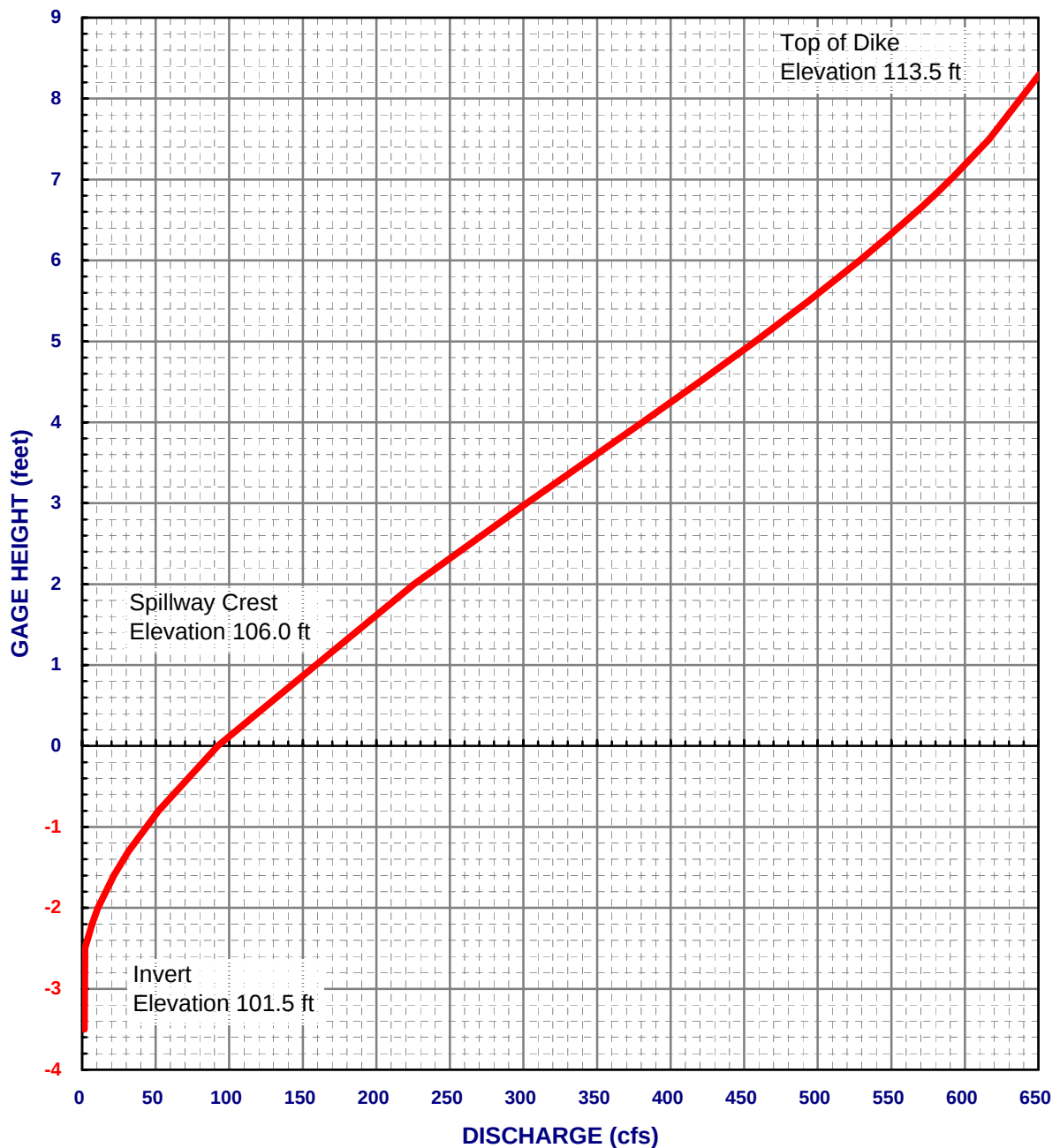
<u>ELEV</u> <u>FEET</u>	<u>0.00</u>	<u>0.01</u>	<u>0.02</u>	<u>0.03</u>	<u>0.04</u>	<u>0.05</u>	<u>0.06</u>	<u>0.07</u>	<u>0.08</u>	<u>0.09</u>
168.00	11120	11135	11150	11164	11179	11194	11209	11224	11238	11253
168.10	11268	11283	11298	11312	11327	11342	11357	11372	11386	11401
168.20	11416	11431	11446	11460	11475	11490	11505	11520	11534	11549
168.30	11564	11579	11594	11608	11623	11638	11653	11668	11682	11697
168.40	11712	11727	11742	11756	11771	11786	11801	11816	11830	11845
168.50	11860	11875	11890	11904	11919	11934	11949	11964	11978	11993
168.60	12008	12023	12038	12052	12067	12082	12097	12112	12126	12141
168.70	12156	12171	12186	12200	12215	12230	12245	12260	12274	12289
168.80	12304	12319	12334	12348	12363	12378	12393	12408	12422	12437
168.90	12452	12467	12482	12496	12511	12526	12541	12556	12570	12585
169.00	12600	12616	12633	12649	12666	12682	12698	12715	12731	12748
169.10	12764	12780	12797	12813	12830	12846	12862	12879	12895	12912
169.20	12928	12944	12961	12977	12994	13010	13026	13043	13059	13076
169.30	13092	13108	13125	13141	13158	13174	13190	13207	13223	13240
169.40	13256	13272	13289	13305	13322	13338	13354	13371	13387	13404
169.50	13420	13436	13453	13469	13486	13502	13518	13535	13551	13568
169.60	13584	13600	13617	13633	13650	13666	13682	13699	13715	13732
169.70	13748	13764	13781	13797	13814	13830	13846	13863	13879	13896
169.80	13912	13928	13945	13961	13978	13994	14010	14027	14043	14060
169.90	14076	14092	14109	14125	14142	14158	14174	14191	14207	14224
170.00	14240	14256	14272	14287	14303	14319	14335	14351	14366	14382
170.10	14398	14414	14430	14445	14461	14477	14493	14509	14524	14540
170.20	14556	14572	14588	14603	14619	14635	14651	14667	14682	14698
170.30	14714	14730	14746	14761	14777	14793	14809	14825	14840	14856
170.40	14872	14888	14904	14919	14935	14951	14967	14983	14998	15014
170.50	15030	15045	15061	15076	15092	15107	15122	15138	15153	15169
170.60	15184	15199	15215	15230	15246	15261	15276	15292	15307	15323
170.70	15338	15353	15369	15384	15400	15415	15430	15446	15461	15477
170.80	15492	15507	15523	15538	15554	15569	15584	15600	15615	15631
170.90	15646	15661	15677	15692	15708	15723	15738	15754	15769	15785
171.00	15800	15815	15830	15844	15859	15874	15889	15904	15918	15933
171.10	15948	15963	15978	15992	16007	16022	16037	16052	16066	16081
171.20	16096	16111	16126	16140	16155	16170	16185	16200	16214	16229
171.30	16244	16259	16274	16288	16303	16318	16333	16348	16362	16377
171.40	16392	16407	16422	16436	16451	16466	16481	16496	16510	16525
171.50	16540	16555	16569	16584	16598	16613	16628	16642	16657	16671
171.60	16686	16701	16715	16730	16744	16759	16774	16788	16803	16817
171.70	16832	16847	16861	16876	16890	16905	16920	16934	16949	16963
171.80	16978	16993	17007	17022	17036	17051	17066	17080	17095	17109
171.90	17124	17139	17153	17168	17182	17197	17212	17226	17241	17255

Farmington Dam and Reservoir, Littlejohn and Rock Creek, California
Spillway Rating Table

December 2004

Discharge in cubic feet per second

<u>ELEV</u> <u>FEET</u>	<u>0.00</u>	<u>0.01</u>	<u>0.02</u>	<u>0.03</u>	<u>0.04</u>	<u>0.05</u>	<u>0.06</u>	<u>0.07</u>	<u>0.08</u>	<u>0.09</u>
172.00	17270	17285	17300	17314	17329	17344	17359	17374	17388	17403
172.10	17418	17433	17448	17462	17477	17492	17507	17522	17536	17551
172.20	17566	17581	17596	17610	17625	17640	17655	17670	17684	17699
172.30	17714	17729	17744	17758	17773	17788	17803	17818	17832	17847
172.40	17862	17877	17892	17906	17921	17936	17951	17966	17980	17995
172.50	18010	18025	18040	18056	18071	18086	18101	18116	18132	18147
172.60	18162	18177	18192	18208	18223	18238	18253	18268	18284	18299
172.70	18314	18329	18344	18360	18375	18390	18405	18420	18436	18451
172.80	18466	18481	18496	18512	18527	18542	18557	18572	18588	18603
172.90	18618	18633	18648	18664	18679	18694	18709	18724	18740	18755
173.00	18770	18785	18800	18814	18829	18844	18859	18874	18888	18903
173.10	18918	18933	18948	18962	18977	18992	19007	19022	19036	19051
173.20	19066	19081	19096	19110	19125	19140	19155	19170	19184	19199
173.30	19214	19229	19244	19258	19273	19288	19303	19318	19332	19347
173.40	19362	19377	19392	19406	19421	19436	19451	19466	19480	19495
173.50	19510	19526	19542	19557	19573	19589	19605	19621	19636	19652
173.60	19668	19684	19700	19715	19731	19747	19763	19779	19794	19810
173.70	19826	19842	19858	19873	19889	19905	19921	19937	19952	19968
173.80	19984	20000	20016	20031	20047	20063	20079	20095	20110	20126
173.90	20142	20158	20174	20189	20205	20221	20237	20253	20268	20284
174.00	20300	20301	20302	20304	20305	20306	20307	20308	20309	20311



NOTES: 1. Combined capacity of 60-inch ungated conduit and 72-inch conduit with gate fully open.

2. Gage datum: 105.0 ft NGVD

Prepared by MVB

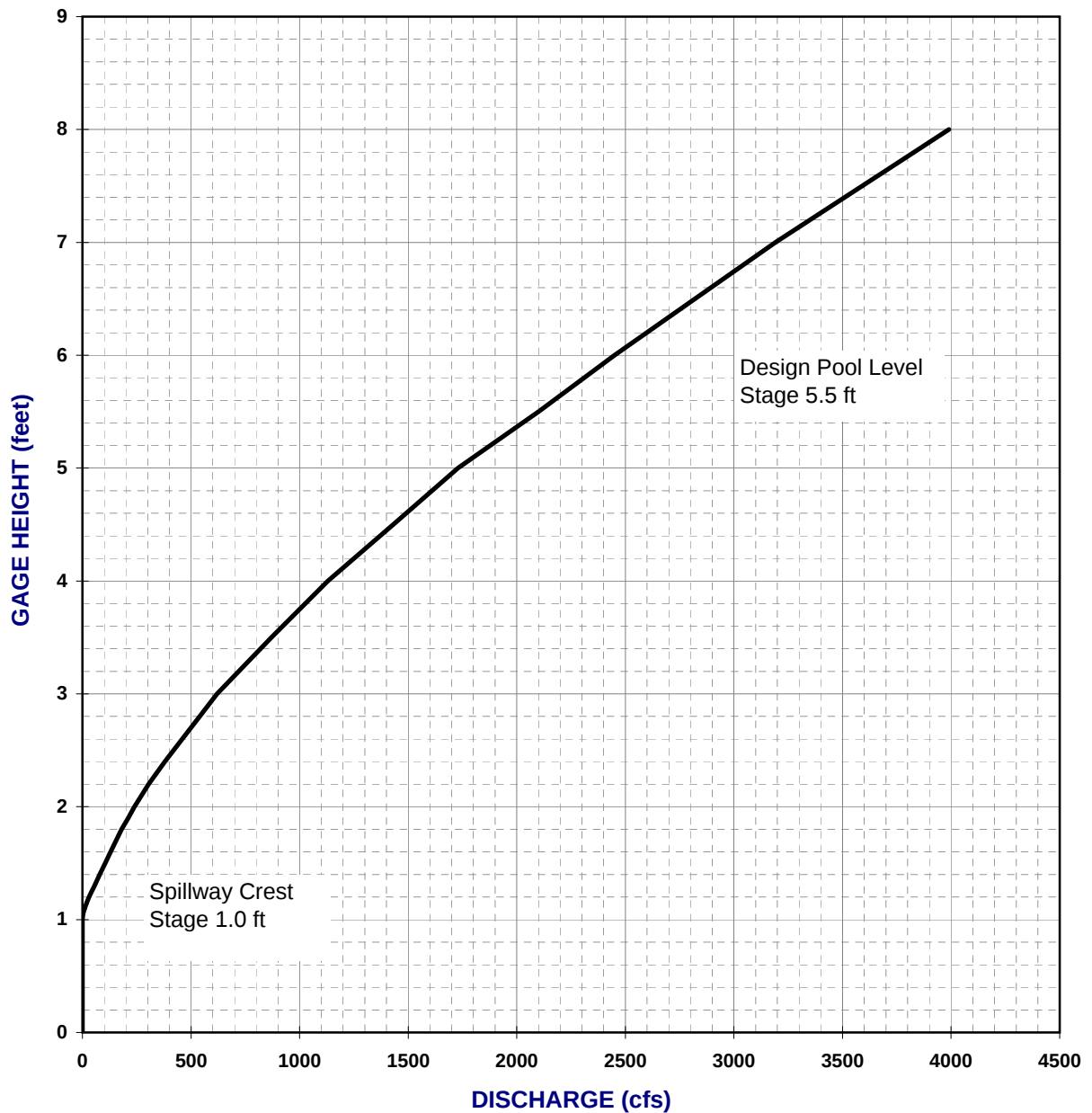
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

DUCK CREEK DIVERSION OUTLET RATING CURVE

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Revised Dec 2004

PLATE A-9



NOTES: 1. Spillway discharges into Littlejohn Creek through diversion canal.

2. Gage datum: 105.0 ft NGVD

Prepared by MVB

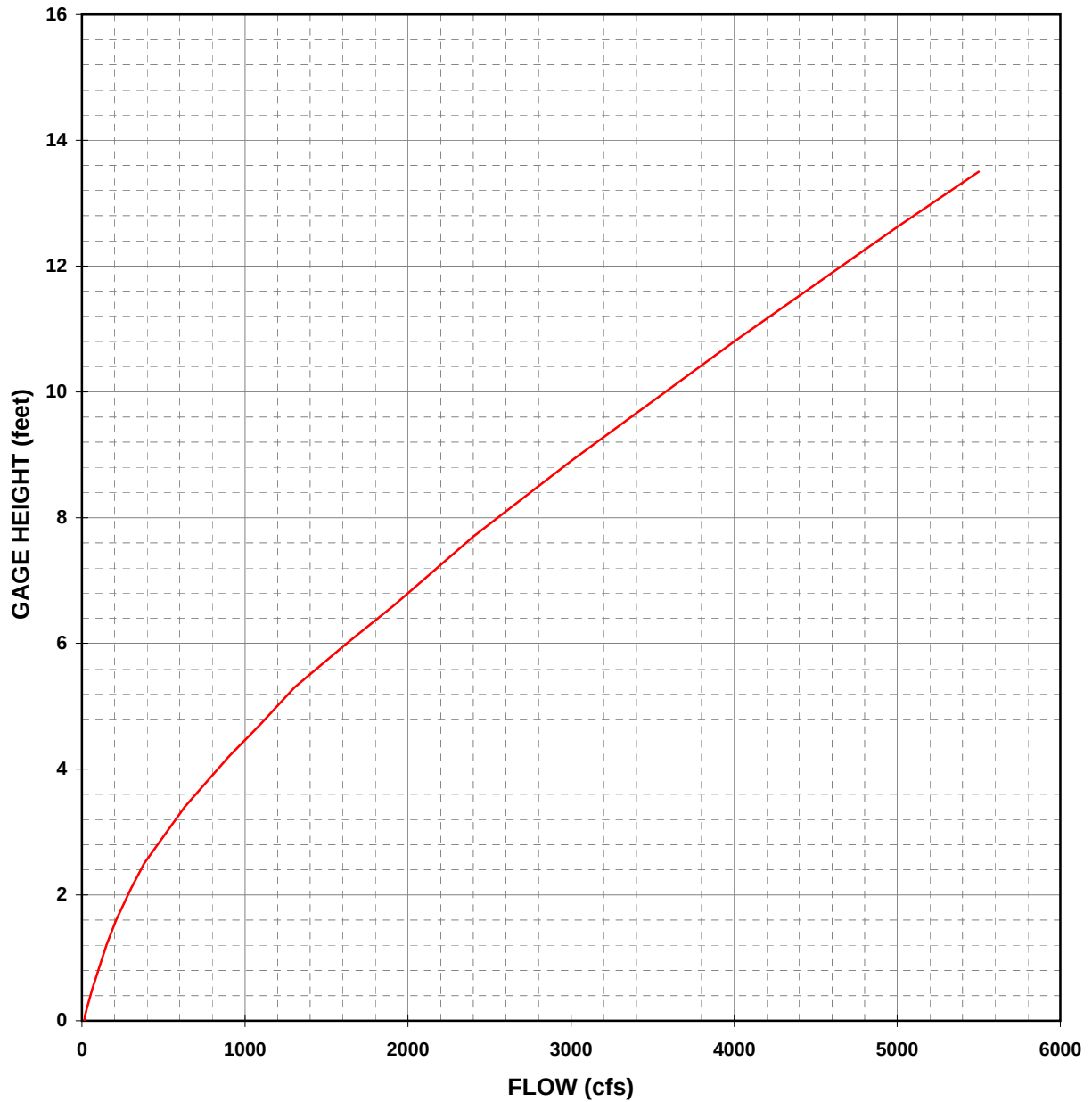
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

**DUCK CREEK DIVERSION
SPILLWAY RATING CURVE**

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Revised Dec 2004

PLATE A-10



Gage datum: 90.0 ft NGVD

Prepared by MVB

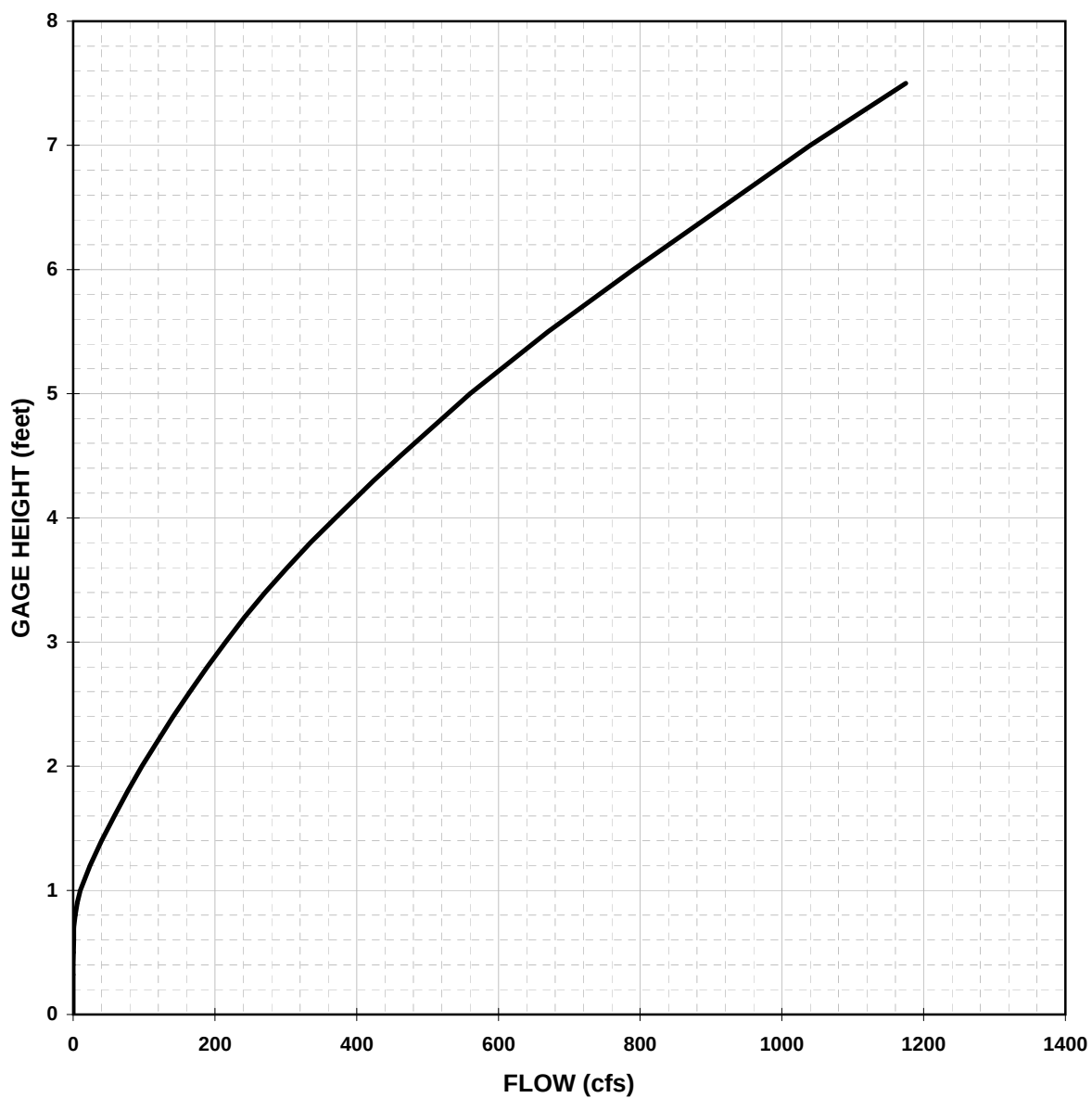
FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

**LITTLEJOHN CREEK
AT FARMINGTON
RATING CURVE**

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Revised Dec 2004

PLATE A-11



Gage Datum: 140.8 feet NGVD

Prepared by MVB

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

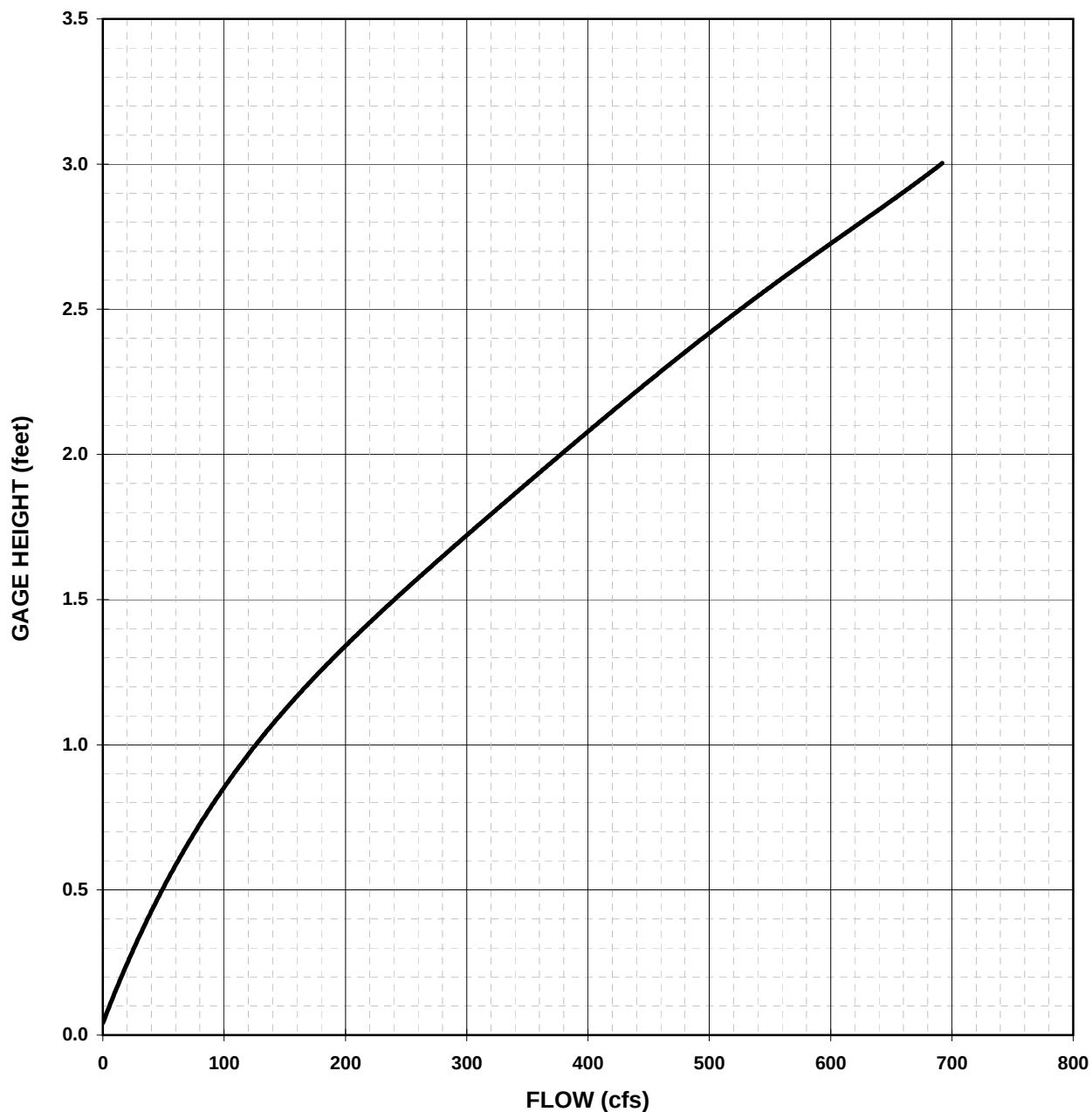
DUCK CREEK NEAR FARMINGTON

RATING CURVE

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Revised Dec 2004

PLATE A-12



FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

UPPER FARMINGTON CANAL
AT SHIRLEY GULCH
RATING CURVE

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB

Revised Dec 2004

PLATE A-13

SCHEDULE OF OPERATION

Condition	Schedule	Objective Flow at Farmington
Pool Elevation below 132.0 ft with actual or impending flow in Duck Creek Diversion	Main gates fixed at 1.5 ft open; auxiliary outlet full open	500 cfs or less plus Duck Creek Diversion flow plus local flow
Pool Elevation between 132.0 ft and 156.5 ft, with actual or impending flow in Duck Creek Diversion	Main gates raised or lowered so as to not exceed forecasted objective flow; auxiliary outlet full open; (See Limitation 2.b.)	2,000 cfs
Pool Elevation between 132.0 ft and 156.5 ft, with no actual or impending flow in Duck Creek Diversion	Main gates raised or lowered so as to not exceed forecasted objective flow; auxiliary outlet full open	2,000 cfs
Pool Elevation above 156.5 ft, or emergency condition declared by Water Management Section	Refer to Emergency Operation of Outlet Gates Diagram; auxiliary outlet full open	2,000 cfs

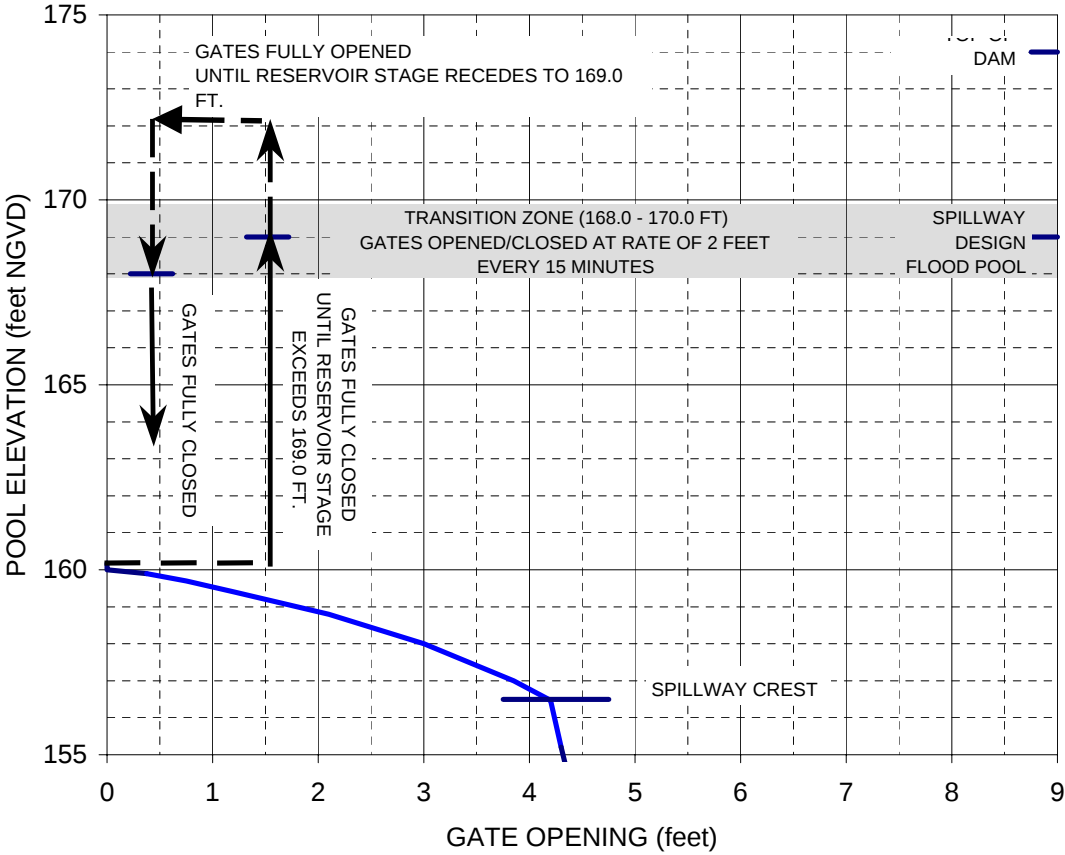
NOTES:

- Farmington Dam and Reservoir will be operated for flood control in accordance with the SCHEDULE OF OPERATION and the EMERGENCY OPERATION OF OUTLET GATES DIAGRAM, subject to the LIMITATIONS shown hereon.
- The entire capacity of the Farmington Reservoir is reserved for flood control only. SEWD operates the Rock Creek Diversion Structure in order to divert the imported flows to the Lower Farmington Canal or into Rock Creek. The surface water elevation of any impoundment must be maintained at or below 125 feet.

LIMITATIONS:

- Any water temporarily stored in the reservoir will be released as rapidly as practicable without exceeding the maximum objective flow at the town of Farmington. The taking line for flowage easements is pool elevation 161 feet.
- Releases from Farmington Dam, insofar as possible, will be restricted so that flows in Littlejohn Creek:
 - do not exceed 2,000 cfs at the town of Farmington, even when flow over the ungated spillway occurs.
 - are limited to the difference between 2,000 cfs and the sum of the anticipated coincidental local inflow at the town of Farmington and flow from the Duck Creek Diversion. Plate A-15 and A-16 assists with real-time gate operation by indicating the limitations on releases from Farmington Dam imposed by the Duck Creek flows. Plate A-16 is provided solely as a guideline to aid operation, should the Duck Creek near Farmington gage be destroyed or cease reporting.
- Gate settings at Farmington Dam will not be increased or decreased more than 1/2 foot in any 15 minute period except when instructed by the Water Management Section or required by Plate A-14.
- The auxiliary outlet will be fully open at all times, except when closure is required for maintenance purposes.

EMERGENCY OPERATION OF OUTLET GATES DIAGRAM



USE OF DIAGRAM:

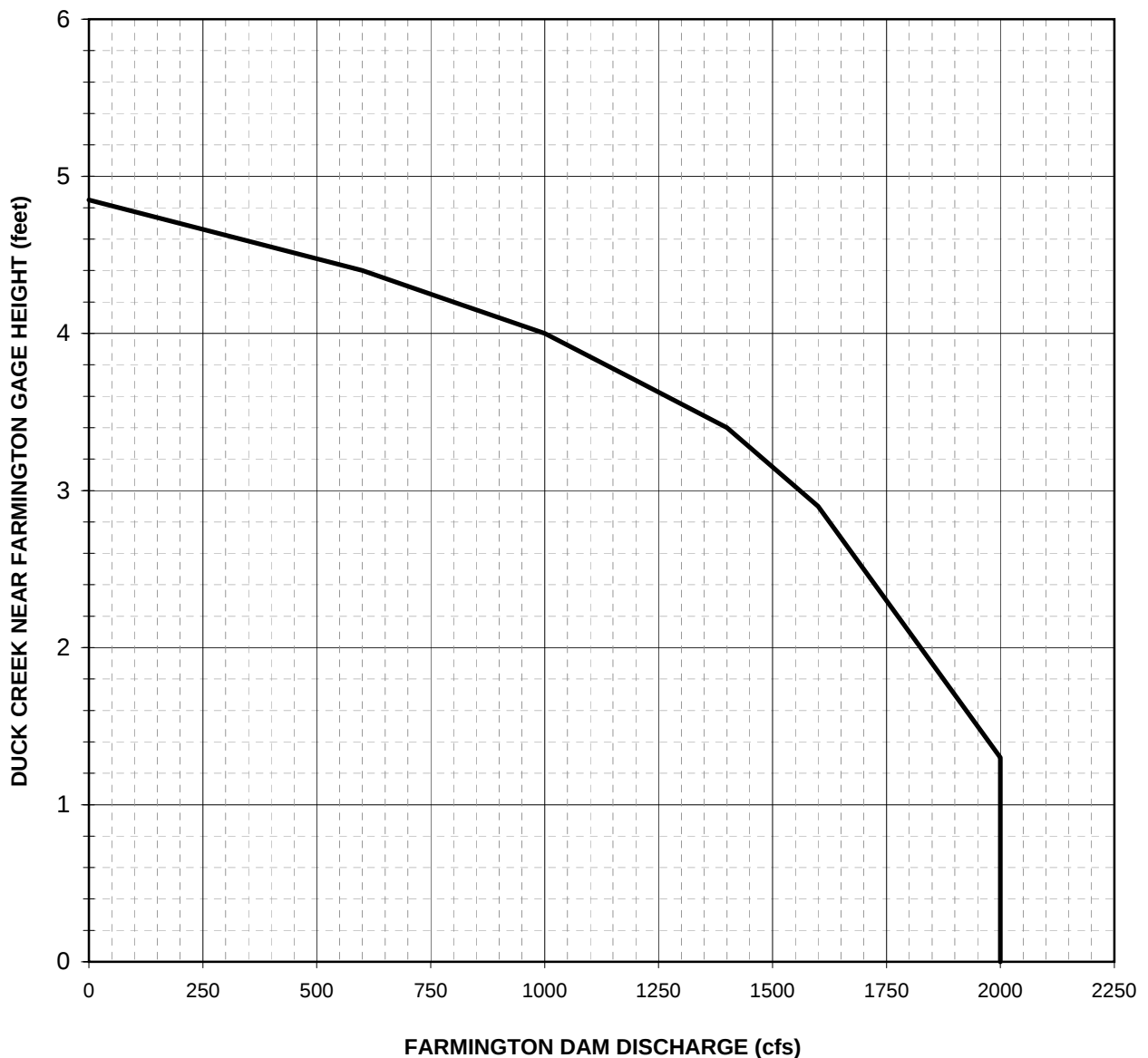
- This diagram is used when the pool elevation exceeds 156.5 feet.
- The curve indicates required gate openings versus pool elevation to achieve 2,000 cfs at Farmington with no contributing flows from Duck Creek.
 - When the pool is rising, maintain the indicated gate opening until the diagram indicates a reduction in gate opening. When spillway flows reach 2,000 cfs, the outlet gates must be fully closed. The gates will remain closed until the pool exceeds elevation 169.0 feet. If the pool continues to rise, the gates must be opened at the rate of 2 feet every 15 minutes.
 - When the pool is falling and the pool elevation exceeds 170.0 feet, the gates must remain open. If the pool continues to fall, the gates will be closed at the rate of 2 feet every 15 minutes until fully closed at pool elevation 168.0 feet. Maintain closed gates until spillway flow is less than 2,000 cfs.

FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA

WATER CONTROL PLAN

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Prepared by MVB



- NOTES: 1. This index curve is used when the pool elevation is below 156.5 ft.
This curve indicates the maximum allowable release from Farmington Dam based on the stage at the Duck Creek near Farmington gage.
2. Because flows can change rapidly on Duck Creek, this index curve should only be used on a real-time basis at monitoring intervals no less frequent than once every 15 minutes.
3. If no gage data is available, every effort should be made to ensure that the objective flow at Littlejohn Creek at Farmington is not exceeded.
4. The development of this relationship is based on the latest gage rating table.
5. Gage datum: 140.8 ft

**FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA**

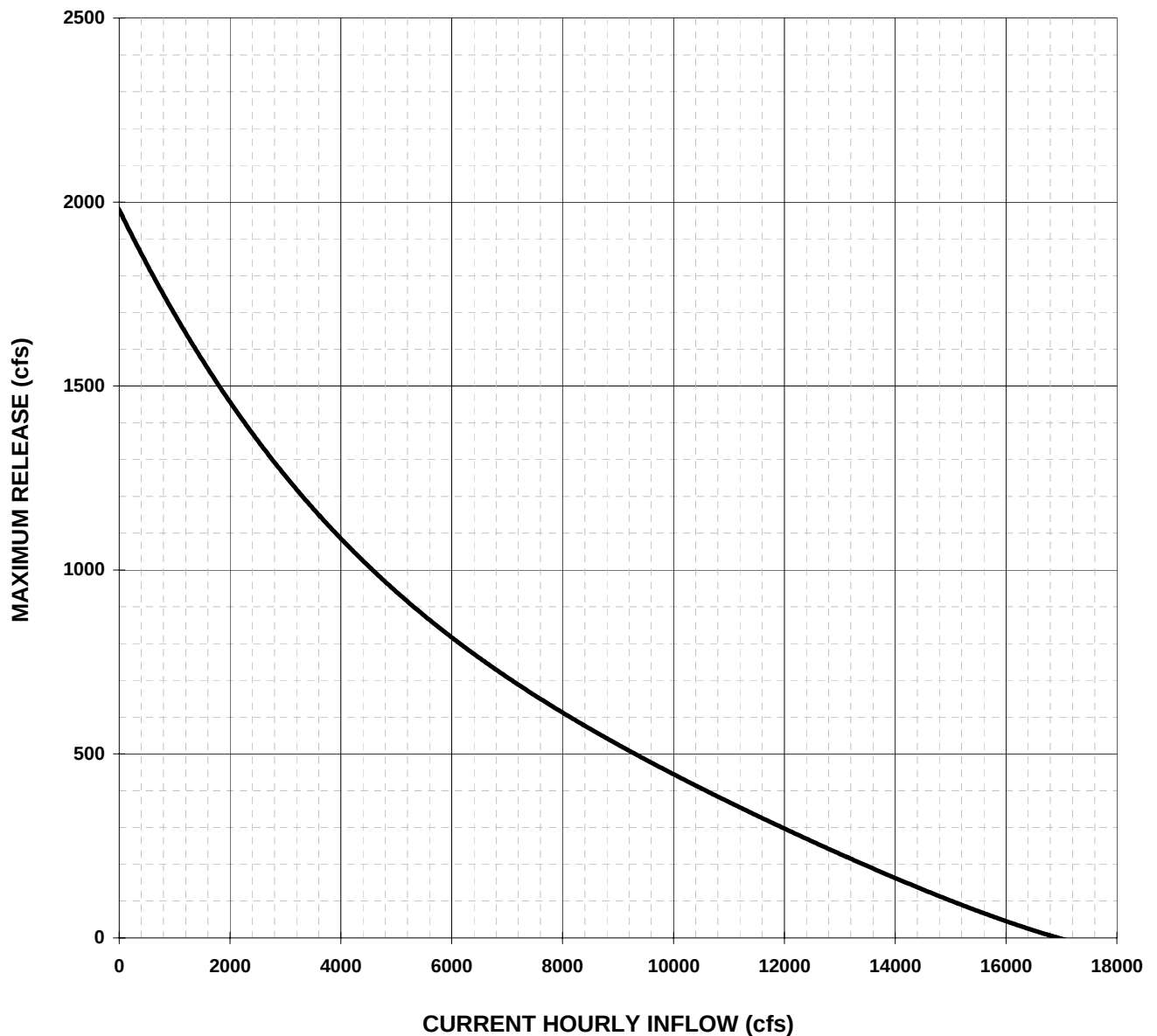
**LIMITATION ON RELEASES
IMPOSED BY
DUCK CREEK FLOWS**

**U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT**

Prepared by MVB

Revised Dec 2004

PLATE A-15



- NOTES: 1. The curve was developed to aid operation if the Duck Creek near Farmington gage is destroyed or not reporting. It is provided for guidance only.
2. The curve was derived from flow data during high flow periods in 1997 and 1998.
3. The curve identifies maximum limiting release when inflows are rising or are expected to continue to rise (Duck Creek Diversion flows expected to occur or increase). It should not be used when inflow is receding or to evacuate the pool.

**FARMINGTON DAM
LITTLEJOHN CREEK, CALIFORNIA**

**INTERIM OPERATION
GUIDELINES**

**U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT**

Prepared by MVB

Revised Dec 2004

PLATE A-16

WATER CONTROL MANUAL
FARMINGTON DAM AND RESERVOIR

Littlejohn Creek Basin
California

EXHIBIT B

CESPD-R-1110-2-8

GUIDANCE ON THE PREPARATION OF DEVIATIONS
FROM APPROVED WATER CONTROL PLANS

U.S. Army Corps of Engineers
Sacramento District
Sacramento, California

12 September 2002

Manual Revised December 2004

B-i

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DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION CORPS OF ENGINEERS

CESPD-MT-E
333 Market Street
San Francisco, California 94105-2195

REGULATION
No. 1110-2-8

12 September 2002

Engineering and Design
GUIDANCE ON THE PREPARATION OF DEVIATIONS
FROM APPROVED WATER CONTROL PLANS

1. PURPOSE. This document establishes the protocol for reporting deviations from approved Water Control Plans for water control projects within the South Pacific Division. It defines coordination, review, and approval procedures between the Division and District offices. Approval from Division must be obtained from all deviations (reference e., paragraph 6.b.)¹

2. APPLICABILITY. The following is applicable to all South Pacific Division Districts and field-operating activities having civil works responsibilities.

3. REFERENCES. Authority and guidance can be found in:

- a. ER 200-2-2 (33 CFR 230), 4 March 1988, subject: Procedures for Implementing NEPA.
- b. ER 1105-2-100, 22 April 2000, subject: Guidance for Conducting Civil Works Planning Studies.
- c. ER 1110-2-240 (33 CFR 222.5), 8 October 1982, subject: Water Control Management.
- d. ER 1110-2-241 (33 CFR 208.1), 24 May 1990, subject: Use of Storage Allocated for Flood Control and Navigation at Non-Corps Projects.
- e. ER 1110-2-1400, 30 September 1993, subject: Reservoir Water Control Centers.
- f. ER 1110-2-8156, 31 August 1995, subject: Preparation of Water Control Manuals.
- g. ER 1165-2-501, 30 September 1999, subject: Civil Works Ecosystem Restoration Policy.

¹ This regulation supercedes CESPD-ET-EW Regulation, Subject: Guidance On The Preparation Of Deviations From Approved Water Control Plans dated 1 August 1999.

- h. EP 1165-2-502, 30 September 1999, subject: Ecosystem Restoration – Supporting Policy Information.
- i. EM 1110-2-3600, 30 November 1987, subject: Management of Water Control Systems.
- j. CESPD R 1110-2-8, August 1999, subject: Guidance on the Preparation of Deviations From Approved Water Control Plans.

4. OVERVIEW.

a. Water Control Plans are prepared for all Corps projects and non-Corps projects within Federal flood control space. For Corps projects, the Water Control Plan is all encompassing in that it covers regulation of the project over the entire regime of pool elevations and conditions. The Corps' responsibility regarding non-Corps reservoirs is defined by Section 7 of the Flood Control Act of 1944 (58 Stat 890), which directs the Secretary of the Army 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.

b. Water Control Plans define the regulation criteria and guidelines that govern how and when water will be stored and released from a project. The process of formulation and eventual approval of the Water Control Plan is a complex and time-consuming process because the plan must account for diverse goals (flood control, the environment, water quality, recreation, water supply, hydropower, etc.) and situations (e.g. normal, flood, drought, and emergency operations). Formulation of these plans requires a comprehensive knowledge of such diverse items as: project goals, project history, authorizing legislation, Corps policies and regulations, how a project interacts with other reservoirs within a basin, the role of other water interests/agencies, the effects to the general public in relation to environmental and aesthetic considerations, basin meteorology and hydrology, changing conditions (e.g. sedimentation, channel capacity, scour, etc.), and the physical capabilities of project features, such as outlet works, spillways, flood routing characteristics, etc.). Prior to approval and implementation, the proposed Water Control Plan is released for public review and comment. The public review process normally occurs concurrently with the NEPA public review process.

c. Deviations from approved Water Control Plans occur because every possible circumstance cannot be accounted for in a Water Control Plan. The competing goals and complex interactions of interested groups/agencies can cause even seemingly inconsequential deviations from an approved plan to lead to unforeseen environmental and legal complications. This regulation serves to assist a District in preparing their deviation requests. It outlines a minimum set of considerations that need to be addressed when making a recommendation to deviate from an approved Water Control Plan.

d. Deviations from approved Water Control Plans are intended, therefore, to address unforeseen and unique circumstances. They are not intended as a means for identifying or

initiating new opportunities to re-operate or reallocate storage in response to new and changing public needs.

5. DEFINITIONS.

a. Emergency Deviations. An emergency deviation from an approved Water Control Plan is one that is required due to an emergency situation. An emergency situation is defined herein as a situation in which there is a potential for injury, loss of life, threat to the project, or other serious hazards; but furthermore, also demanding immediate action, such that time constraints render impractical notification to the division. Depending upon the need for immediate action, an emergency situation could include: drowning and other accidents, assistance to local authorities responding to an emergency (e.g. police and fire departments), failure of operations facilities, chemical spills, treatment plant failures, and other temporary pollution or water quality problems. Water control actions necessary to abate the problem are taken immediately unless such action would create equal or worse conditions.

b. Planned Deviations. Planned deviations cover all other deviations not addresses by an emergency deviation.

6. OFFICE OF RECORD. The originating District's water control management office will be responsible for maintaining all relevant records documenting the deviation.

7. GENERAL INFORMATION FOR PREPARING ALL DEVIATIONS.

a. Approval of Deviations. Approval for all deviations must be obtained from the Division Commander or delegated representative prior to their implementation. As noted in paragraph 5.a, an emergency deviation situation may warrant an immediate action, delegated to the Leader, Water Management Team or his designated representative. The Leader of the Water Management Team shall consult with the Chief of Engineering and Construction and appropriate SPD staff and subsequently advise the Director, Military and Technical Services Directorate of the temporary change. Approval may be made by telephone, E-mail, or FAX.

b. Preparation of Deviations. Processing of a deviation request originates at the District water control management office. The District Commander may delegate signature authority for requesting deviations from approved water control plans to the appropriate functional division head or designated representative. Consultation with the District staffs, including engineering, planning, environmental, economics, operations, construction and legal must take place.

c. Costs and Charges for Preparing Deviations. Deviations from approved Water Control Plans require a similar level of scrutiny as applied to permanent changes to a water control plan. Any District charges incurred for processing a deviation are to be assessed and collected from the agency/entity requesting the deviation. The District should estimate the cost to process the deviation and provide that estimate to the requesting agency/entity. The District must collect the funds (in a revolving fund advance account under Support for Others) prior to processing the deviation request. Examples of costs for which the requesting entity would be responsible include costs for any required reviews or studies concerning associated hydrologic, water

control, legal, real estate, and environmental matters. After the deviation work is completed, any amount of funds left over in the account would be paid back to the requesting entity.

d. Fees for Water Supply Deviations. Deviations that result in Corps project flood control space being used for water supply purposes must address reimbursement by the sponsor to the Federal government for use of the flood control space. The district's deviation request package must include an economic analysis that determines a value for the reallocated flood control space. Section 7 projects will not require the economic analysis, as water supply charges are under the authority of the project owner.

e. Time to Prepare Deviations. District offices should also inform potential agencies/entities that the lead time required to assemble the necessary information required to evaluate a deviation request may be on the order of months (normally due to the required environmental analysis and the public review process). Thus, the request to the District should be made well in advance of the proposed initiation date for the deviation. The requesting agency/entity should also be made aware that approval of the deviation request would depend upon such things as a review of the impacts (e.g., environmental, hydrologic, legal, etc.).

f. Coordinating with Division Staff. Preparation of a deviation package is a time consuming and costly undertaking, and incomplete or inadequate package can delay approval. District personnel are encouraged to coordinate any questions or concerns about potential deviations and to discuss any atypical situations with their Division counterparts early in the process and before the package submittal. All technical review will be conducted at the District level and will provide a review certification. In an emergency situation, a formal quality certification will most likely not be required. Appendix D lists the Division staff with which deviation-related issues are to be coordinated. Division will provide updates to Appendix A as needed.

g. Non-Corps Projects. Deviation requests for non-Corps (Section 7) projects must be prepared with the approval of the project owner. This is required because project owners are responsible for assuring that the project is operated as prescribed in the Water Control Plan developed in concert with the Corps' flood control interest. The owner is also ultimately responsible for dam safety at the project and for funding the project.

h. Environmental Requirements. Each deviation request shall include a summary of the environmental effects of the proposed deviation and a statement of how the proposal is in compliance with pertinent environmental requirements, including but not limited to the National Environmental Policy Act (NEPA), Endangered Species Act, the Clean Water Act, and the Clean Air Act and Section 176 Conformity Determination. NEPA documentation requirements ordinarily are met by an Environmental Assessment (EA) of the proposed action with a Finding of No Significant Impact (FONSI) signed by the District Commander. If an existing Environmental Impact Statement/Record of Decision or EA/FONSI accurately covers the action, and if there have been no environmental changes since that documentation, this can be cited. Supporting environmental documents shall be included in the deviation request package when it is submitted. Typically these will include an EA, a signed FONSI, a Biological Assessment, and a final Biological Opinion or a letter from Fish & Wildlife or National Marine and Fishery

Service concurring that there is not likely to be adverse effect on listed species. Sometimes other documents, such as 404(b)(1) evaluation are required. In the case of emergency deviation, the emergency provisions and requirements of the various environmental laws should be followed.

i. Required Information/Analysis. Table 1 outlines the information and analysis that are required in a deviation request package that is submitted to Division.

TABLE 1
Information and Analysis Required in a Deviation Request Package

- a. Copy of sponsor's/project owner's letter requesting a deviation.
 - b. A description of the deviation.
 - c. Its effects on the operational objectives or project purposes.
 - d. A description of the potential flood threat over the period of the deviation.
 - e. The current and predicted maximum reservoir storage and elevation.
 - f. Documentation that the proposed deviation is in compliance with all pertinent environmental laws.
 - g. The effect on other agencies and individual interest.
 - h. The coordination that has taken place with other agencies.
 - i. Alternative measures that could be taken.
 - j. Recommendation/rationale on whether a permanent change to the Water Control Plan for this situation is warranted.
 - k. A District legal opinion.
 - l. Any recommended fees or reimbursements to the Federal Government.
 - m. Any other information that may be pertinent to the deviation request.
 - n. The District Commander's recommendation.
 - o. Quality Control Certification
-

8. PREPARING EMERGENCY DEVIATIONS

a. Emergency deviations are the only type of deviation that do not require prior approval from Division, and must only be used if events warrant an immediate emergency action, such that time constraints render impractical notification to the Division. However, even in an emergency situation, the District shall notify the Division of the action as soon as possible, and shall comply with all applicable requirements.

b. A record of the emergency deviation shall be developed at the district office and transmitted to the Division office within a day of the action taken.

c. Procedures for emergency deviations:

(1) Take the necessary action.

(2) Contact Division as soon as possible (See Appendix A for telephone numbers) to describe the action taken and the cause (NOTE: The order of (1) and (2) may be reversed depending on the nature of the emergency). Continuation of the deviation will require Division approval.

(3) The District shall provide written conformation to the Division office within 7 days of the deviation. The correspondence shall include the items outlined in Table 1 (as applicable).

(4) The Division shall respond within 3 days of the district's notification of the emergency deviation.

9. PREPARING PLANNED DEVIATIONS.

a. The District shall inform Division within 2 days of receiving a request for a proposed deviation.

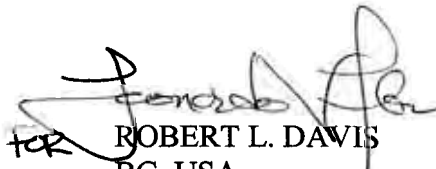
b. At least 7 days prior to the proposed action, the District shall transmit a deviation request package to the Division office. The deviation request package shall include the items in Table 1. This package may be initially transmitted electronically.

c. The Division shall review the proposal and approve or disapprove the District's deviation request within 5 days, assuming a complete package with all required documentation has been received. Early, detailed, coordination and transmittal of documents to Division may reduce the processing time.

d. The District and Division shall follow-up with formal correspondence within 3 days of their electronically transmitted request (District) and approval/disapproval (Division).

10. SPECIAL CIRCUMSTANCES.

Per reference 3.c, Water Control Plans are subject to continuing and progressive study in order to keep them current. Should a new re-operation or reallocation opportunity be identified for a Corps project, then it should be addressed under authority of Section 216 of Public Law 911-611, an Initial Appraisal Report can be conducted with O&M funding to determine whether or not a study, if deemed appropriate, among other things, could initiate the process to incorporate the new opportunity in the project's Water Control Plan. Re-operation or reallocation studies for non-Corps projects would need to be initiated by the project owner.


for ROBERT L. DAVIS
BG, USA
Commanding
COL, EN
DEPCDR

1 Appendix

APP A – CESPD Phone list for Coordination of Water Control Plan Deviations

APP B - Quality Control Certification

DISTRIBUTION:

Electronic Copy Available

APPENDIX A

CESPD Phone List for Coordination of Water Control Plan Deviations

Diagram illustrating the layout of a building, showing various rooms and their relative positions. The layout includes a large central hall, several smaller rooms, and a kitchen area. The rooms are labeled with numbers 1 through 14.

- 1. Top left room
- 2. Top right room
- 3. Middle left room
- 4. Middle right room
- 5. Bottom left room
- 6. Bottom right room
- 7. Kitchen area
- 8. Bathroom area
- 9. Hallway
- 10. Entry area
- 11. Living area
- 12. Dining area
- 13. Bedroom area
- 14. Another bedroom area

APPENDIX B

DISTRICT ENGINEER'S QUALITY CERTIFICATION

COMPLETION OF QUALITY CONTROL ACTIVITIES

The District has completed the review/analysis of the water control deviation from the Approved Water Control Plan for (Project Name and Location). Certification is hereby given that all quality control activities appropriate to the level of risk and complexity inherent in this analysis have been completed.

GENERAL FINDINGS

Compliance with clearly established policy principles and procedures, utilizing clearly justified and valid assumptions, data and the reasonableness of the results. The undersigned recommends certification of the quality control certification for this deviation request.

(Signature)
Chief, Responsible Functional Element

(Date)

CERTIFICATION OF LEGAL REVIEW*

The request for a water control deviation from the approved Water Control Plan report for indicate name of project, has been fully reviewed by the Office of Counsel, and is approved as legally sufficient.

(Signature)
District Counsel

(Date)

QUALITY CERTIFICATION

All issues and concerns resulting from technical review of the water control deviation have been resolved. This deviation is recommended for approval.

(Signature)
District Commander

(Date)

WATER CONTROL MANUAL
FARMINGTON DAM AND RESERVOIR

Littlejohn Creek Basin
California

EXHIBIT C
OPERATION AND MAINTENANCE AGREEMENT
BETWEEN
SACRAMENTO DISTRICT AND STOCKTON EAST WATER DISTRICT

U.S. Army Corps of Engineers
Sacramento District
Sacramento, California

16 March 1999

Manual Revised December 2004
C-i

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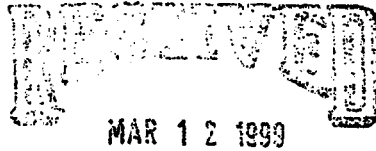
REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

492010 3/10/99
0-7

Water Management Section

Mr. Edward M. Steffani
Stockton East Water District
P.O. Box 5157
Stockton, California 95205-0157



STOCKTON EAST WATER DISTRICT

10 Apr 99

Dear Mr. Steffani:

We request your concurrence with the basic operation and maintenance conditions for the Rock Creek Diversion Structure. As per paragraph 23 of easement No. DACW05-2-95-592, the Stockton East Water District (SEWD) water conveyance system shall not impact normal operation and maintenance plans or scheduling, dam inspections, or in any way impact the Corps' ability to operate the Farmington Dam and Flood Control Project to meet its authorized flood control purpose. The purpose of the operation and maintenance agreement is to coordinate the operation and maintenance requirements of Farmington Dam with those of the Rock Creek Diversion Structure to ensure minimal impact.

The following items need to be incorporated into the water control plan: the trans-basin conveyances in conjunction with the operation of the diversion structure during the flood season and non-flood season; the transition to and from flood operation; the coordination of maintenance and inspection schedules; and the maintenance of physical components of the diversion structure and canal, including the flow-metering system, gate systems, and the SEWD/Corps cooperative gages.

We would appreciate your immediate attention to our request for concurrence on the operating conditions by signing the enclosed agreement in the space provided, and returning the agreement to us by March 19, 1999. The Operating and Maintenance Agreement will provide the information needed to update the Farmington Dam Water Control Manual. Upon completion of the draft, SEWD will be given the opportunity to review a draft of the water control manual and provide comments. If you have any questions, please contact Mr. Paul E. Pugner, Chief, Water Management Section at (916) 557-7101.

Sincerely,

Michael J. Walsh
Lieutenant Colonel (P),
Corps of Engineers
District Engineer

Enclosure

(4)

OPERATION AND MAINTENANCE AGREEMENT

BETWEEN

UNITED STATES DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
SACRAMENTO DISTRICT

AND

STOCKTON EAST WATER DISTRICT

a. Project Description. The SEWD water diversion facility would convey flows from the Stanislaus River basin through Farmington Dam on a year round basis. The primary purposes are to provide for irrigation, to supply water on a wholesale basis to the County of San Joaquin, the City of Stockton, and the California Water Service Company for municipal and industrial uses, and to correct groundwater overdraft in the area. The conveyance flow rate would not exceed 550 cfs, the maximum capacity of the Upper Farmington Canal. The diversion structure has four slide gates used to deliver the imported water from the Farmington Dam outlet into the Lower Farmington Canal. SEWD would operate the slide gates and any other structure feature so that operation for a constant forebay stage will provide the correct flow to the Lower Farmington Canal. The diversion structure's two radial gates are used to build up enough head for flows to enter the Lower Farmington Canal and to deliver imported water to Rock Creek on behalf of the Central San Joaquin Water Conservation District. Both SEWD and the Corps would be able to operate the radial gates of the Rock Creek Diversion Structure on a "real-time" basis either manually, remotely, or via automated control depending on the current conditions. The conveyed flows will be regulated in accordance with the mutually agreed upon operating conditions.

(1) Flood season (October 1 through May 15). Flows conveyed during the rain flood season are not expected to exceed 300 cubic feet per second. Flows would be transported primarily to SEWD's water treatment plant. During April and May the flows would include the Central San Joaquin Water Conservation District's (CSJWCD) portion. Either SEWD or the Corps would operate the diversion structure's radial gates. Also, SEWD would operate the slide gates and any other structure features to maintain a constant stage in the forebay. This stage reference would allow SEWD to control flows to the Lower Farmington Canal more efficiently. Conveyances are subject to the conditions noted in paragraph b(3)(a)(i).

(2) Non-flood season (May 16 through September 30). Conveyance rates could reach up to 550 cfs during the spring/summer period when both the Stockton East Water District and the Central San Joaquin Water Conservation District are importing flows, concurrently. SEWD alone would operate all diversion structure features. Conveyances in excess of 300 cfs are subject to the conditions noted in paragraph b(3)(a)(ii).

b. Rock Creek Diversion Structure

(1) Radial gates. SEWD will be automating the gates of the Rock Creek Diversion Structure to enable remote, local or automated operation. In the event remote or automated control operation is not possible, SEWD will have personnel on standby to manually operate the radial gates

on the Rock Creek Diversion Structure. SEWD will maintain the necessary equipment, including a generator and battery operated drills, at the site to enable rapid operation of the radial gates either manually, remotely, or via automated control at any and all times necessary.

(2) Flow Measurement Instrumentation. The conveyed flows will be monitored via the Corps and SEWD/Corps cooperative gages. The sensor data from these instruments will be transmitted to the Corps' data collection system via line-of-sight radio. For the SEWD/Corps cooperative gages, SEWD will acquire the necessary hardware and Sutron software to monitor or "listen" to the radio gage data signals and log the data into their system. The following identifies the data collected and the location of the gages:

(a) Goodwin Tunnel outlet. Both flow and precipitation data is collected at the Stockton East Goodwin Dam Diversion tunnel. [REDACTED]

[REDACTED] The Sutron Data Collection Platform and tipping bucket are owned and maintained by the Corps of Engineers, Water Management Section. All data are collected, via radio, by the Corps of Engineers. Official flow records are maintained by the Stockton East Water District while precipitation records are maintained by the Corps of Engineers.

(b) Upper Farmington Canal outlet located at the Shirlev Gulch turnout. [REDACTED]

[REDACTED] The pressure transducer and power supply are owned and maintained by the Stockton East Water District. The Sutron Data Collection Platform and precipitation gage are owned and maintained by the Corps of Engineers, Water Management Section. Stage-Discharge rating curves and tables are provided to the Corps of Engineers by Stockton East Water District. All data are collected, via radio, by the Corps of Engineers. Official stage and precipitation records are maintained by the Corps of Engineers.

(c) Farmington Dam outlet. [REDACTED]

[REDACTED] The flow meter is owned and maintained by the Stockton East Water District. All data are collected, via phone, by the Corps of Engineers. Official records of elevation, precipitation, and gate openings are maintained by the Corps of Engineers. During the flood season, the flow meter system in the Farmington Dam outlet supplements the Corps data during low flows. During periods of low flow, the flow meter readings are normally the most accurate and are an alternative means of supplementing or replacing the Corps' computed outflow.

(d) Lower Farmington Canal near upper portion. [REDACTED]

[REDACTED] This SEWD Data Collection Platform will also be hardwired to the

Corps' Farmington Dam Sutron Control/Data Platform which will log this data, also. All equipment located at the diversion facility is owned and maintained by Stockton East Water District. All official records, at this site, are maintained by Stockton East Water District.

(e) Rock Creek near Farmington.

The Sutron Data Collection Platform and all related equipment are owned and maintained by the Corps of Engineers, Water Management Section. All data are collected, via radio, by the Corps of Engineers. Official records of the stage and precipitation are maintained by the Corps of Engineers.

(3) Operating Parameters

(a) Limitations on conveyed flows

(i) If the Corps determines that naturally occurring or forecasted high flows will impact Farmington's flood control operation, the Corps will notify SEWD. SEWD will direct the USBR to cease any conveyances from the Stanislaus River basin into the Farmington basin.

(ii) Flows in excess of 300 cfs through Farmington Dam will not be allowed in conjunction with closed radial gates until field tests confirm that the upstream toe of the dam experiences no significant impact and that the stilling basin embankment around the wing wall shows little or no erosion if flows should spill over the side wall. The water surface elevation of any diversion impoundment must be maintained at or below 125 feet.

(b) Limitations on radial gate operation

(i) SEWD will operate or provide automated operation of the radial gates to prevent the conveyed water from flowing over the side wall.

(ii) In order to accommodate flood releases from Farmington Dam, close coordination is required between the Corps and SEWD regarding the operation of the Rock Creek Diversion Structure. In the event that operation is not possible, the Corps may require that the radial gates be partially or fully open during flood control operation.

(c) Natural Flows. In consideration of the water and riparian rights holders downstream from the dam, SEWD must monitor for natural flows and operate the radial gates to allow passage of these flows to the natural discharge channel. When no natural flows are anticipated, the radial gates can remain closed to create the pool necessary for up to 300 cfs flow to enter SEWD's Lower Farmington Canal.

(d) SEWD Responsibilities

(i) SEWD will maintain all physical components of the diversion structure and the Upper and Lower Farmington Canal systems. Maintenance of the diversion structure radial gates is important. Remote and automated radial gate operation may necessitate

numerous gate changes. SEWD will set up adequate maintenance routines which will ensure the proper functioning of the diversion structure radial gates.

(ii) The SEWD will maintain the gage instruments in the Goodwin Tunnel outlet, Shirley Gulch turnout, Rock Creek outlet, and Lower Farmington Canal. In the event a gage becomes inoperable, SEWD is responsible for restoring the gage to working condition as soon as possible. The SEWD will provide data for any inoperative gage at a frequency determined by the Corps.

(iii) SEWD will dewater or assist Corps personnel in dewatering and cleaning the outlet works for inspections or repairs. Downstream of the dam an increased amount of sediment is accumulating in the stilling basin and in the area below the diversion structure. Sediment in the stilling basin could contribute to abrasion erosion problems depending on the operation of the diversion structure. The sediment consisting of rock cobbles, sand and silt would need to be removed, annually or when needed, since the stilling basin configuration is not self cleaning.

(iv) Backwater in the channel 1/4 mile upstream of the dam is feeding vegetative growth that has the potential to attract wildlife and increase the production of debris. SEWD is required to cut and dispose of brush that is found along approximately 200 yards of the Rock Creek channel and the cross channel.

(v) If conditions require Corps personnel to perform inspections of or repairs to the Farmington outlet facilities, SEWD will contact the USBR to cease diversions to the Farmington basin, immediately.

(vi) SEWD will have the two radial gates fully open within one hour of a request for such by the Corps, in response to a flood or other emergency or if the remote operating system malfunctions.

(vii) As per the Corps' requirements, SEWD established a garter snake mitigation pond and channel adjacent to the Rock Creek Diversion Structure. A pipe extends through the side wall to connect the forebay area to the mitigation pond area. During the period of winter diversions, SEWD will ensure that the pipe inlet is shut off either through installation of a valve or by capping. A dry down period after October 1 is required to minimize the development of large predatory fish in the pond/channel mitigation area. During the period of summer diversions, SEWD will ensure that flows are diverted via the pipe inlet into the giant garter snake mitigation area. The flows will return to Rock Creek below the diversion structure.

c. Farmington Dam

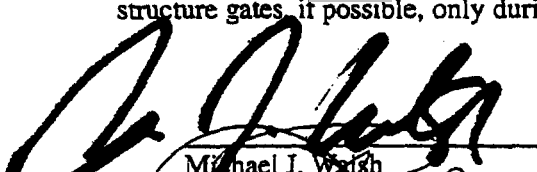
(1) Gate Operation

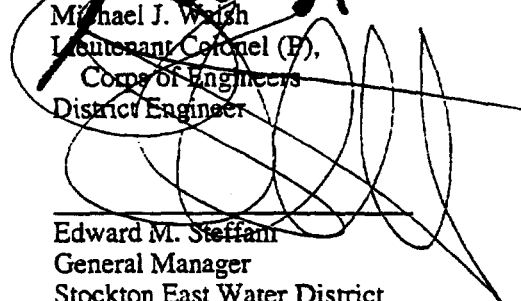
(a) From October through March of each year, a 1.5 ft fixed gate opening will be maintained at the Farmington Dam main outlet works. This gate setting will ensure a minimal chance of appreciable releases from the dam before the Sacramento District Water Management Section is able to operate the gates of the main outlets for flood flows. Also, the gate settings should be sufficient to allow up to 250 cfs of the conveyed flow to continue through Farmington Dam.

(b) From April through September of each year when SEWD will be allowed to convey flows up to 300 cfs or possibly up to 550 cfs per conditions noted in paragraph b(3)(a)(ii), the main outlet gates will be raised enough to allow the conveyed flows to pass freely through Farmington Dam. The water surface elevation of any diversion impoundment must be maintained at or below 125 feet.

(c) The Corps test cycles both gates through their normal flood release openings every two weeks during the flood season if no flood releases have been made during the preceding week. Every precaution will be taken so as to avoid interrupting SEWD flows.

(2) Gate Controller [redacted] for remote structure gates, if possible, only during the flood season. The Corps would operate the diversion


Michael J. Walsh
Lieutenant Colonel (P),
Corps of Engineers
District Engineer


Edward M. Steffani
General Manager
Stockton East Water District

10 Nov 88
Date

March 16, 1999
Date

WATER CONTROL MANUAL
FARMINGTON DAM AND RESERVOIR

Littlejohn Creek Basin
California

EXHIBIT D
EASEMENT FOR PIPELINE RIGHT-OF-WAY LOCATED IN
FARMINGTON DAM AND FLOOD CONTROL PROJECT

U.S. Army Corps of Engineers
Sacramento District
Sacramento, California

19 June 1996

Manual Revised December 2004

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June 27, 1996

Management & Disposal Branch

SUBJECT: Farmington Dam and Reservoir Flood Control Project,
California; Easement No. DACW05-1-95-592

Edward M. Steffani
General Manager
Stockton East Water District (SEWD)
6767 East Main Street
P.O. Box 5157, East Main Street
Stockton, California 95205-0157

Dear Mr. Steffani:

Enclosed is a fully executed and notarized copy of Easement No. DACW05-1-95-592. Should the SEWD decide to record subject easement, please provide this office with a copy of the notarized instrument.

Subject has been drafted to insure congruity with the Farmington Dam Water Control Manual. As a clarification, the easement is the controlling instrument regarding the estate granted. The Farmington Dam Water Control Manual is the controlling instrument regarding the operational procedures of SEWD's facilities placed under the terms of this easement. We request your close coordination of operational procedures with the Reservoir Control Section of our Engineering Division. Point of contact in that regard is Mr. Russell Yaworsky ((916) 557-7103).

Your adherence to the terms and conditions of the easement will be appreciated. Should you have any questions concerning

-2-

the easement you may contact Mr. Robert J. Vincent of my staff at the above letterhead address or by calling (916) 557-6868/6815.

Sincerely,

Michael J. Garrett
Chief, Management Section

Enclosure

cc: (with enclosure)

✓ CESP-K-ED-D (Yaworski)

CESP-K-CO-O (Sandner)

Park Manager, New Hogan Lake

RE Insp File

VINCENT

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GARRETT

DEPARTMENT OF THE ARMY
EASEMENT FOR PIPELINE RIGHT-OF-WAY
LOCATED ON
FARMINGTON DAM AND FLOOD CONTROL PROJECT
FARMINGTON, CALIFORNIA

THE SECRETARY OF THE ARMY under and by virtue of the authority vested in the Secretary by Title 10 United States Code, Section 2669, having found that the granting of this easement will be in the public interest and will not substantially injure the interests of the United States, hereby grants to, **STOCKTON EAST WATER DISTRICT**, a political subdivision of the State of California, hereinafter referred to as the grantee, an easement for the construction, operation, and maintenance of a water diversion structure and canal, hereinafter referred to as the facilities, over, across, in and upon lands of the United States described herein, and hereinafter referred to as the premises.

Parcel A, a 30' x 2300' (1.58 acres) road from the end of Sonora Road over the access ramp to Farmington Dam and along the road on the Dam to the north end of the Dam, to be used for pedestrian and vehicular access for operation of the Diversion Structure; and

Parcel B, a 40' x 250' (0.23 acres) area for a foot path from the existing Farmington Dam Road to the Diversion Structure; and

Parcel C, a 220' x 220' (1.11 acres) area for the Diversion Structure; and

Parcel D, a 20' x 1000' (0.46 acres) area for vehicular access over an existing road leading from Sonora Road to the Farmington Dam stilling basin; and

Parcel E, an 80' x 90' (0.17 acres) area for construction, maintenance, and operation of the Diversion Structure to serve as a parking and turn-around area for vehicles and for any equipment required for construction and maintenance of the Diversion Structure; and

Parcel F, a 140' x 2180' (7.0 acres) area for construction, maintenance and operation of the canal;

And as identified in Exhibits "A", and "AA" (the As-Built Drawing of the facilities), which are attached hereto and made a part hereof.

The grant of this easement terminates of Right-of-Entry DACW05-9-93-538.

NO. DACW05-2-95-592
FARMINGTON DAM AND FLOOD CONTROL PROJECT

THIS EASEMENT is granted subject to the following conditions.

1. TERM

This easement is hereby granted for a term of fifty years beginning 1 October 1995, and ending 30 September 2045.

2. CONSIDERATION

The consideration for this easement shall be the construction, operation, and maintenance of the facilities for the benefit of the general public in accordance with the terms and conditions hereinafter set forth.

3. NOTICES

All correspondence and notices to be given pursuant to this easement shall be addressed, if to the grantee, to:

Mr. Edward M. Steffanni
General Manager
Stockton East Water District
6767 Main Street
P.O. Box 5157
Stockton, California 95205-0157,

and, if to the United States, to:

District Engineer
Attention: Chief, Real Estate Division
U.S. Army Engineer District, Sacramento
1325 J Street
Sacramento, California 95814-2922,

or as may from time to time otherwise be directed by the parties. Notice shall be deemed to have been duly given if and when enclosed in a properly sealed envelope or wrapper addressed as aforesaid, and deposited postage prepaid in a post office regularly maintained by the United States Postal Service.

4. AUTHORIZED REPRESENTATIVES

Except as otherwise specifically provided, any reference herein to "Secretary", "District Engineer", "Installation Commander", or "said officer" shall include their duly authorized representatives. Any reference to "grantee" shall include assignees, transferees and their duly authorized representatives.

NO. DACW05-2-95-592
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5. SUPERVISION BY THE DISTRICT ENGINEER

The construction, operation, maintenance, repair or replacement of said facilities, including culverts and other drainage facilities, shall be performed at no cost or expense to the United States and subject to the approval of the District Engineer, U.S. Army Engineer District, Sacramento, hereinafter referred to as said officer. Upon the completion of any of the above activities, the Grantee shall immediately restore the premises to the satisfaction of said officer. The use and occupation of the premises for the purposes herein granted shall be subject to such rules and regulations as said officer prescribes in writing from time to time.

6. APPLICABLE LAWS AND REGULATIONS

The grantee shall comply with all applicable Federal, state, county and municipal laws, ordinances and regulations wherein the premises are located.

7. CONDITION OF PREMISES

The grantee acknowledges that it has inspected the premises, knows the condition, and understands that the same is granted without any representation or warranties whatsoever and without any obligation on the part of the United States.

8. INSPECTION AND REPAIRS

The grantee shall inspect the facilities at reasonable intervals and immediately repair any defects found by such inspection or when required by said officer to repair any such defects.

9. PROTECTION OF GOVERNMENT PROPERTY

The grantee shall be responsible for any damage that may be caused to the property of the United States by the activities of the grantee under this easement and shall exercise due diligence in the protection of all property located on the premises against fire or damage from any and all other causes. Any property of the United States damaged or destroyed by the grantee incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the grantee to a condition satisfactory to said officer, or at the election of said officer, reimbursement made therefor by the grantee in an amount necessary to restore or replace the property to a condition satisfactory to said officer.

10. RIGHT TO ENTER

The right is reserved to the United States, its officers, agents, and employees to enter upon the premises at any time and for any purpose necessary or convenient in connection with government purposes, to make inspections, to remove timber or other material, except property of the grantee, to flood the premises and/or to make any other use of the lands as may be necessary in connection with government purposes, and the grantee shall have no claim for damages on account thereof against the United States or any officer, agent, or employee thereof.

11. TRANSFERS AND ASSIGNMENTS

Without prior written approval by said District Engineer, the grantee shall neither transfer nor assign this easement or any part thereof nor grant any interest, privilege or license whatsoever in connection with this easement. The provisions and conditions of this easement shall extend to and be binding upon and shall inure to the benefit of the representatives, successors and assigns of the grantee.

12. INDEMNITY

The United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the exercise of the privileges herein granted, or for damages to the property or injuries to the person of the grantee's officers, agents, or employees or others who may be on the premises at their invitation or the invitation of any one of them, and the grantee shall hold the United States harmless from any and all such claims not including damages due to the fault or negligence of the United States or its contractors.

13. SUBJECT TO EASEMENTS

This easement is subject to all other existing easements, or those subsequently granted as well as established access routes for roadways and utilities located, or to be located, on the premises, provided that the proposed grant of any new easement or route will be coordinated with the grantee, and easements will not be granted which will, in the opinion of said officer, interfere with the use of the premises by the grantee.

14. REQUIRED SERVICES

The grantee shall furnish through said facilities such services as may be required from time to time for governmental purposes, such services shall not unreasonably interfere with the grantee's ability to operate its facilities for the purpose of providing service to its customers, and payment for such services will be made by the United States at rates which shall be mutually agreeable but which shall never exceed the most favorable rates granted by the grantee for similar services.

15. RELOCATION OF FACILITIES

In the event all or any portion of the premises occupied by the said facilities shall be needed by the United States, or in the event the existence of said facilities is determined to be detrimental to governmental activities, the grantee shall from time to time, upon notice to do so, and as often as so notified, remove said facilities to such other location on the premises as may be designated by said officer. In the event said facilities shall not be removed or relocated within ninety (90) days after such notice, the United States may cause such relocation at the sole expense of the grantee. The right to demand relocation reserved by the United States by this condition shall be exercised in a reasonable manner so as not to impose an unreasonable burden on the grantee during the term of this easement.

16. TERMINATION

This easement may be terminated by the Secretary upon 30 days written notice to the grantee if the Secretary shall determine that the right-of-way hereby granted interferes with the use or disposal of said land by the United States, or it may be revoked by the Secretary for failure of the grantee to comply with any or all of the conditions of this easement, or for non-use for a period of two (2) years, or for abandonment.

17. SOIL AND WATER CONSERVATION

The grantee shall maintain, in a manner satisfactory to said officer, all soil and water conservation structures that may be in existence upon said premises at the beginning of or that may be constructed by the grantee during the term of this easement, and the grantee shall take appropriate measures to prevent or control soil erosion within the right-of-way herein granted. Any soil erosion occurring outside the premises resulting from the activities of the grantee shall be corrected by the grantee as directed by said officer.

NO. DACW05-2-95-592

FARMINGTON DAM AND FLOOD CONTROL PROJECT

18. ENVIRONMENTAL PROTECTION

a. Within the limits of their respective legal powers, the parties hereto shall protect the premises against pollution of its air, ground, and water. The grantee shall promptly comply with any laws, regulations, conditions or instructions affecting the activity hereby authorized if and when issued by the Environmental Protection Agency, or any Federal, state, interstate or local governmental agency having jurisdiction to abate or prevent pollution. The disposal of any toxic or hazardous materials within the premises is strictly prohibited. Such regulations, conditions, or instructions in effect or prescribed by the said Environmental Protection Agency or any Federal, state, interstate or local governmental agency are hereby made a condition of this easement. The grantee shall not discharge waste or effluent from the premises in such a manner that the discharge will contaminate streams or other bodies of water or otherwise become a public nuisance.

b. The use of any pesticides or herbicides within the premises shall be in conformance with all applicable Federal, state and local laws and regulations. The grantee must obtain approval in writing from said officer before any pesticides or herbicides are applied to the premises.

c. The grantee will use all reasonable means available to protect the environment and natural resources, and where damage nonetheless occurs arising from the grantee's activities, the grantee shall be liable to restore the damaged resources.

19. PRELIMINARY ASSESSMENT SCREENING

A Preliminary Assessment Screening (PAS) documenting the known history of the property with regard to the storage, release or disposal of hazardous substances thereon, is attached hereto and made a part hereof as Exhibit "B". Upon expiration, revocation or termination of this easement, another PAS shall be prepared which will document the environmental condition of the property at that time. A comparison of the two assessments will assist the said officer in determining any environmental restoration requirements and the responsible party. The grantee will be responsible for restoration of the premises due to the disposal of hazardous substances on the property caused by the grantee or its officers, agents or employees or in anyway from the grantee's construction or operation of the facilities. Any such requirements will be completed by the grantee in accordance with the condition on RESTORATION.

NO. DACW05-2-95-592
FARMINGTON DAM AND FLOOD CONTROL PROJECT

20. HISTORIC PRESERVATION

The grantee shall not remove or disturb, or cause or permit to be removed or disturbed, any historical, archeological, architectural or other cultural artifacts, relics, remains or objects of antiquity. In the event such items are discovered on the premises, the grantee shall immediately notify said officer and protect the site and material from further disturbance until said officer gives clearance to proceed.

21. NON-DISCRIMINATION

The grantee shall not discriminate against any person or persons because of race, color, age, sex, handicap, national origin, or religion in the conduct of operations on the premises.

22. RESTORATION

On or before the expiration or termination of this easement, the grantee shall, without expense to the United States, and within such time as said officer may indicate, remove said facilities and restore the premises to the satisfaction of said officer. In the event the grantee shall fail to remove said facilities and restore the premises, the United States shall have the option to take over said facilities without compensation, or to remove said facilities and perform the restoration at the expense of the grantee, and the grantee shall have no claim for damages against the United States or its officers or agents for such action.

23. WATER DIVERSION STRUCTURE AND CANAL OPERATION RULES

a. Normal Operation Procedures

The grantee's operation of the water conveyance system shall not impact the U.S. Army Engineer District's, Sacramento, hereinafter Corps, normal operation and maintenance plans or scheduling, dam inspection, or in any way impact the Corps' ability to operate the Farmington Dam and Flood Control Project to meet its authorized flood control purpose. The Corps will not authorize water diversions in excess of 200 cfs into the Farmington Dam structure and through the Rock Creek Diversion Structure that would affect operation of Farmington Dam as defined in the Farmington Dam Water Control Manual, which is incorporated herein by reference and provided as an enclosure to this easement. This requirement is to insure against unacceptable impacts upon project operations and facilities, including the impoundment of water against the embankment of Farmington Dam except in the immediate vicinity of the outlet works and that which is a normal result of the authorized flow of water through the structure.

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The flow instrumentation installed by the grantee, which provides stage and flow data through the Farmington Dam outlet works and flow data through the diversion canal, shall be operational, tested, and its function accepted by the Corps prior to the diversion and flow of water through the structure. The grantee is required to keep the flow equipment and instrumentation operational at all times. The instrumentation will provide a real time data interface with the Corps' equipment. The data must include outflow diversion, and outlet state information.

b. Flood Operation Procedures

The flood season is designated as 1 October through 15 May of each year. During this period, the radial gates of the diversion structure shall remain fully open and diversions shall not be made into the Farmington Dam Drainage Basin. Deviations from these seasonal dates will be considered upon specific application by the grantee. Approval of deviations will be based upon the persistence of dry conditions within the Farmington Drainage Basin. However, once flood operations begin, closure of the radial gates will not be allowed until the end of the flood season.

24. DISCLAIMER

This instrument is effective only insofar as the rights of the United States in the property are concerned, and the grantee shall obtain such permission as may be required on account of any other existing rights. It is understood that the granting of this easement does not eliminate the necessity of obtaining any Department of the Army permit which may be required pursuant to the provisions of Section 10 of the Rivers and Harbors Act of 3 March 1899 (30 Stat. 1151; 33 U.S.C. § 403), Section 404 of the Clean Water Act (33 U.S.C. § 1344) or any other permit or license which may be required by Federal, state or local statute in connection with use of the premises.

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

No. 5907

State of California

County of Sacramento

On 26 June 1996 before me Linda Ann Kenney, Notary Public
DATE NAME, TITLE OF OFFICER - E.G., JANE DOE, NOTARY PUBLIC

personally appeared Marvin S. Fisher
NAME(S) OF SIGNER(S)

☒ personally known to me - OR - ☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.



WITNESS my hand and official seal.

Linda Ann Kenney
SIGNATURE OF NOTARY

OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

CAPACITY CLAIMED BY SIGNER

- ☐ INDIVIDUAL
☐ CORPORATE OFFICER

TITLE(S)

- ☐ PARTNER(S) ☐ LIMITED
☐ GENERAL

- ☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: _____

SIGNER IS REPRESENTING:
NAME OF PERSON(S) OR ENTITY(IES)

DESCRIPTION OF ATTACHED DOCUMENT

TITLE OR TYPE OF DOCUMENT

NUMBER OF PAGES

DATE OF DOCUMENT

SIGNER(S) OTHER THAN NAMED ABOVE

NO. DACW05-2-95-592
FARMINGTON DAM AND FLOOD CONTROL PROJECT

THIS EASEMENT is not subject to Title 10, United States Code, Section 2662, as amended.

IN WITNESS WHEREOF, I have hereunto set my hand by authority of the Secretary of the Army, this 19th day of June, 1995⁶.

Approved For
Legal Sufficiency

B. E. Fisher
Attorney

M. D. Fisher
MARVIN D. FISHER
Chief, Real Estate Division

THIS EASEMENT is also executed by the grantee this 11th day of June, 1995.

Name:

Title General Manager

Stockton East Water District

OACW05-2-95-592

PRELIMINARY ASSESSMENT SCREENING (PAS)

**EASEMENTS FOR ROCK CREEK DIVERSION
FARMINGTON DAM, CALIFORNIA**

9 JUNE 1993

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT
ENVIRONMENTAL ENGINEERING BRANCH

CESPK-ED-EG/LMH
FILE: PAS0528.WP

EXHIBIT B

FNC. / 1

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PRELIMINARY ASSESSMENT SCREENING (PAS) STATEMENT OF FINDINGS

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2. RECORDS SEARCH	1
3. SITE INSPECTION	1
4. FINDINGS AND RECOMMENDATIONS	2

APPENDIX

Field Sketch and Photographs from Site Visit of 27 May 1993

PRELIMINARY ASSESSMENT SCREENING (PAS)

1. REAL PROPERTY TRANSACTION.

This project consists of the issuance of permanent and temporary easements for the construction and operation of a diversion structure and canal along Rock Creek near the north side of Farmington Dam. The project is located in the northwest quarter of Section 25, T.1 N., R. 9 E., M.D.M. The Farmington Dam vicinity is shown on the Project Vicinity Map.

2. ASSESSMENT.

a. RECORDS SEARCH.

Records from the Real Estate Division, the Engineering Division, and the Construction-Operations Division of the Sacramento District were reviewed and evaluated. The following sources were utilized during the development of this assessment.

Personal Communication between Mr. Jim Sanders (New Hogan Lake Park Office) and Lynn Hornecker of 8 June 1993.

Annotation: Mr. Sanders said that the Corps of Engineers periodically performs maintenance activities involving the filling of cracks in the concrete at the tower and the intake structure at Farmington Dam and that no hazardous materials are stored at the project site.

Stockton East Water District, Lower Farmington Canal Project, Canal Plan and Profile, Station 1+00 to Station 3+00, February 1990.

Annotation: The drawing shows the various easement locations and the canal profile.

Stockton East Water District, September 26, 1990. Letter to Sacramento District Engineer, Subject: Rock Creek Diversion - Corps of Engineers.

Annotation: The letter describes the areas required for permanent and temporary easements associated with the construction and operation of the diversion.

b. SITE INSPECTION.

A site inspection was performed by Ms. Lynn Hornecker and Mr. Robert Vincent on 27 May 1993. The upstream and downstream areas in the vicinity of the proposed easement locations, including the intake structure and Rock Creek, were visually inspected and photographed. There was no water behind the dam and the high water mark appeared to be approximately 20 to 25 feet above the existing ground level. There was no visible evidence of prior hazardous waste disposal operations in the upstream and downstream areas associated with the easement locations. The downstream property along the proposed easement locations is used for agricultural purposes. Photographs and a field sketch map are presented in the Appendix to the PAS Statement of Findings.

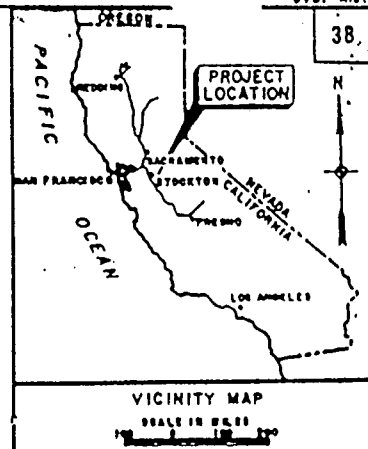
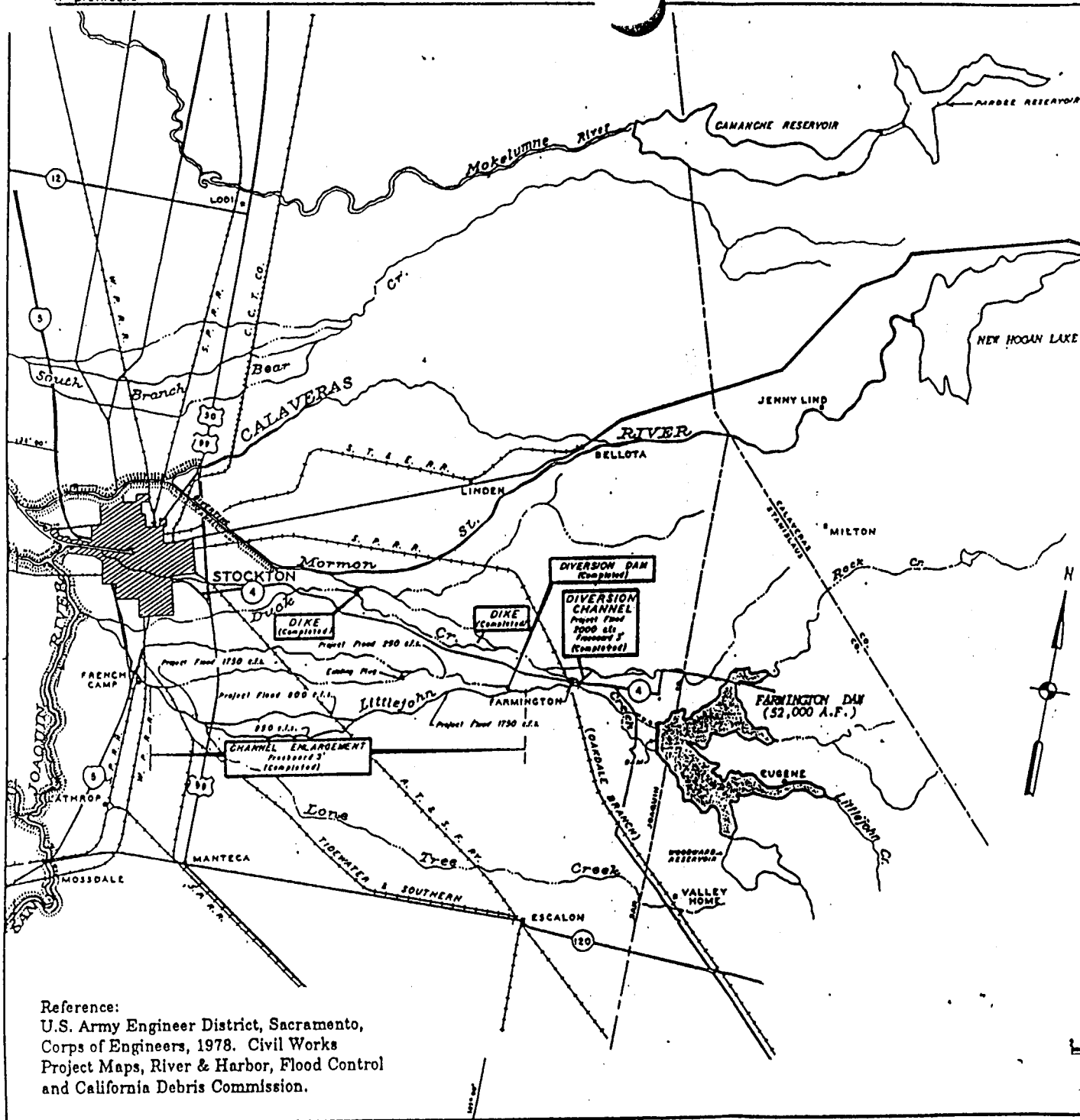
3. A summary of this PAS is provided in the Statement of Findings.

Signed: Lynn Hornecker Date: 6/9/93

Prepared by:
L. M. Hornecker
Civil Engineer
Environmental Engineering Branch

Signed: L. Bergmooser Date: 9 June 93

Approved by:
L. Bergmooser
Technical Manager
Environmental Engineering Branch



NOTE: Minor levees (height less than 10 ft.) not shown.

PROJECT VICINITY MAP

FLOOD CONTROL
CALAVERAS RIVER & LITTLEJOHN CREEK
AND TRIBUTARIES INCLUDING
NEW HOGAN & FARMINGTON PROJECTS
CALIFORNIA

FARMINGTON DAM

SCALE IN MILES



U.S. ARMY ENGINEER DISTRICT
SACRAMENTO, CALIFORNIA
Revised 30 September 1981

Reference:
U.S. Army Engineer District, Sacramento,
Corps of Engineers, 1978. Civil Works
Project Maps, River & Harbor, Flood Control
and California Debris Commission.

PERMANENT
x 1000
NO. 1000
PERMANENT
x 1000
NO. 1000



7-2-2

PRELIMINARY ASSESSMENT SCREENING (PAS)

STATEMENT OF FINDINGS

1. REAL PROPERTY TRANSACTION.

This project consists of the issuance of permanent and temporary easements for the construction and operation of a diversion structure and canal along Rock Creek near the north side of Farmington Dam. The project is located in the northwest quarter of Section 25, T.1 N., R. 9 E., M.D.M.

2. RECORDS SEARCH.

Based upon the review of the available records at the Real Estate Division, the Construction-Operations Division, and the Engineering Division of the Sacramento District, it was determined that there is no documented evidence of releases of hazardous, toxic, or radiological substances to the environment at the Farmington Dam project.

3. SITE INSPECTION.

The site was inspected by Sacramento District representatives on 27 May 1993. No visible evidence of releases to the environment of hazardous, toxic, or radiological substances was observed at the site. A field sketch map and photographs from the site visit are included as an Appendix to the Statement of Findings.

4. FINDINGS AND RECOMMENDATIONS.

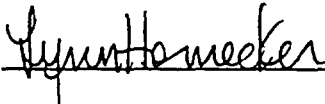
a. The PAS was performed during May and June 1993 to determine if any hazardous substances were stored or released that would prohibit the issuance of the easements at the Farmington Dam property. The conclusion of this PAS is that no specific or unusual environmental concerns have been identified which would affect the issuance of the easements.

b. It is recommended that the easements be issued with the following conditions clearly stated in the easement documentation: (1) the grantee must comply with all applicable Federal, State, and Local environmental laws, rules, and regulations; (2) the grantee must provide copies to the Army Corps of Engineers, Sacramento District, Real Estate Division of all environmental permits associated with the construction of the diversion structure and/or improvements to the diversion structure and any other activities or operations associated with the temporary and permanent easements; additionally, the grantee must provide copies of all documentation, such as written notifications, associated with any releases to the environment of hazardous, toxic, or radiological substances or wastes which occur as a result of activities performed by the grantee on or adjacent to the easements.

c. It is recommended that the water conveyed by the canal not be used as a potable water supply unless water quality testing is performed and the test results indicate that none of the Maximum Contaminant Levels for Drinking Water, as stated in the California Code of Regulations, are exceeded. Pesticides and herbicides, potentially applied to the adjacent agricultural property, could be transported from the area of application to the adjacent surface soils, subsurface soils, and canal by surface runoff.

d. The PAS is a real property transaction record to serve as documentation for the hazardous substance contamination condition of the property. The proposed real property transaction consisting of the issuance of easements should proceed in accordance with the recommendations of Paragraphs 4.a and 4.b of this report.

Signed:



Date:

6/9/93

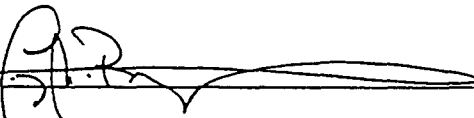
Prepared by:

L. M. Hornecker

Civil Engineer

Environmental Engineering Branch

Signed:



Date:

9 June 93

Approved by:

L. Bergmooser

Technical Manager

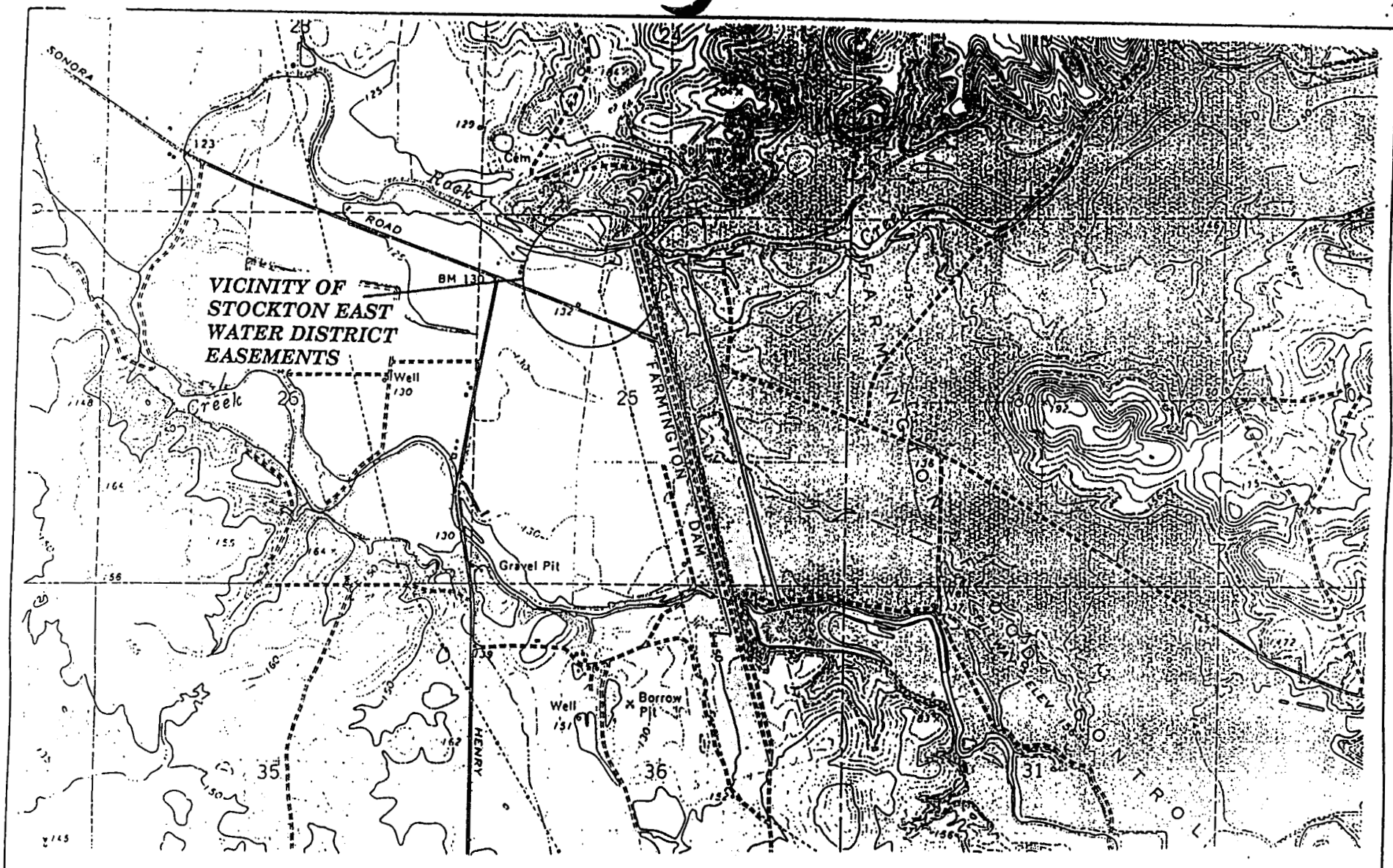
Environmental Engineering Branch

CESPK-ED-EG/LMH
FILE: FRMTNDAM.PAS

Farmington Dam
Preliminary Assessment Screening

APPENDIX

Field Sketch Map and Photographs from Site Visit of 27 May 1993



Reference:
U.S. Geological Survey, Farmington, California,
N3752.5 - W12052.5/7.5, 1968.

Scale:
1 : 24000

FIELD SKETCH MAP

Farmington Dam

RISK ASSESSMENT

Installation/Project: Farmington Dam and Reservoir
State: California
County: Stanislaus

Transferee: Stockton East Water District

Type of Transfer: Grant of Right of Entry and Easement

Date of PAS: June 9, 1993

Intended use by
transferee: Construction of Water Diversion Structure
and Appurtenances

Recommendations:

This action involves the Stockton East Water District's, request for easements, both temporary and permanent, necessary to place, operate and maintain a water diversion structure at the foot of the outlet structure of the Farmington Dam and Reservoir. The purpose of the structure is to be the diversion and delivery of the Water District's irrigation water. The requested easement areas have been evaluated and those findings and recommendations are documented in the Preliminary Assessment Survey (PAS) Report. Based on a review of available records and an inspection of the site as detailed in the PAS, the Government lands comprising the Farmington Dam and Reservoir Project have no record of past storage, release or disposal of hazardous substances. Available records indicate that the prior use of the subject areas was limited to dry agriculture, primarily cattle grazing.

Given the property's past usage, the potential for risk to human health and the environment is minimal. The risk to the Department of Defense in indemnifying the Stockton East Water District, a political subdivision of the State of California, for all environmental risks associated with Defense or Civil Works activities is correspondingly minimal. We recommend this action be approved.


Larry M. Bergmooser
Technical Manager
Environmental Engineering Branch

6 July 93
Date:

WATER CONTROL MANUAL
FARMINGTON DAM AND RESERVOIR

Littlejohn Creek Basin
California

EXHIBIT F
COORDINATION LETTERS FOR YEAR-ROUND DIVERSIONS
FROM THE STANISLAUS BASIN

U.S. Army Corps of Engineers
Sacramento District
Sacramento, California

Manual Revised October 2004
F-i

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

IN REPLY REFER TO:
1-1-99-1-2144

September 30, 1999

Mr. Walter Yep
Chief, Planning Division
Department of the Army
Sacramento District
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Request for Concurrence of Not Likely to Adversely Affect for the
Planned Deviation of Flood Control Operations at Farmington Dam

Dear Mr. Yep:

The U. S. Fish and Wildlife Service (Service) has reviewed the documents submitted by the U.S. Army Corps of Engineers concerning the effects of the planned long-term deviation of flood control operations at the Farmington Dam on Littlejohns Creek. In your letter you requested our concurrence that the planned deviation would not likely adversely affect any federally listed species. We concur that this action will not adversely affect listed species.

The Service did have concerns related to the timing and magnitude of water delivery by the U.S. Bureau of Reclamation under a contract with Stockton East Water District (SEWD). The Service had concerns that the long-term deviation may be an interrelated and interdependent action which would result in either adverse effects to listed species in the Delta or to listed species within the place of use. Based on discussions with SEWD, the Bureau of Reclamation and the Corps, we have concluded that this is not the case.

Should information become available that indicates there will be affects to listed species not otherwise considered, the Corps will be required to reinstate section 7 consultation pursuant to the Endangered Species Act of 1973, as amended. Please contact Michael G. Thabault of my staff at (916) 414-6600, if you have questions regarding this response.

Sincerely,

Cay C. Goude
Acting Field Supervisor

cc: PARD(ES), Portland, OR

bcc: FWS-SFWO, Wetlands Branch, Sacramento, CA
FWS-SFWO, Corps Branch, Sacramento, CA



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

January 4, 2002

In Reply Refer to:
SWR-01-SA-0157:MTM

Brian W. Doyle
Chief, Engineering Division
Department of Army, Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

Dear Mr. Doyle:

This is in response to your December 6, 2001 letter which was faxed on December 27, 2001. Your letter requested concurrence for a permanent change in the U.S. Army Corps of Engineers (Corps) Farmington Dam on Little Johns Creek, California Water Control Manual (Farmington Flood Control Manual) dated October 1967. The permanent change will allow Stockton East Water District (SEWD) to deliver water from Stanislaus River on a year-round basis. The Corps has determined that the proposed project "may effect" but is "not likely to adversely affect" federally listed threatened Central Valley steelhead (*Oncorhynchus mykiss*) or their critical habitat pursuant to section 7 of the Endangered Species Act of 1973, as amended (ESA). In addition, you have determined that the proposed project also may effect but not likely to adversely affect Essential Fish Habitat (EFH) for Central Valley fall/late fall-run chinook salmon (*O. tshawytscha*) as described in Amendment 14 of the Pacific Salmon Fishery Management Plan pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

As stated in your letter, SEWD will utilize its existing conveyance system for delivery of water including the Goodwin Tunnel, the upper Farmington Canal, natural watercourses, Farmington Dam, the Rock Creek Diversion Structure and the lower Farmington Canal. In addition, you stated that no new construction will be required by SEWD in order to take water on a year-round basis. To assure this, the Corps provided information in September 1999 to the National Marine Fisheries Service (NMFS) that confirms that this permanent change to the Farmington Flood Control Manual will not result in SEWD taking more water under its contract with the U.S. Bureau of Reclamation (BOR). The BOR is committed to meet all regulatory requirements in accordance to the BOR's Interim Plan of Operations (IOP) and make water available to SEWD. This IOP meets fishery needs by delivering water appropriately throughout the year and New Melones Reservoir carryover storage. These details were discussed and reassured on September 20, 2001 meeting that was attended by the NMFS, CORPS, U.S. Fish and Wildlife Service, BOR, and SEWD staff.

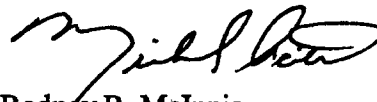


Based on a review of the project description, additional information provided and agreed discussion during the September 20, 2001 meeting, NMFS believes that the concerns and issues were fully addressed. As long as there is no additional water taken for SEWD and SEWD receives and manage their appropriate water supply according to BOR's IOP, NMFS concurs with your determination that the proposed project will not likely adversely affect federally listed Central Valley steelhead or their critical habitat and Central Valley fall/late fall-run chinook salmon. This concurrence is based on the project as described in your letter and does not provide incidental take authorization pursuant to Section 7(b)(4) and Section 7(o)(2) of the ESA. Therefore, unless new information indicates that the project may affect listed species in a manner or to an extent not considered in this review, or a new species or critical habitat is designated that may be affected by the proposed action, no further action pursuant to the ESA is necessary.

Essential Fish Habitat (EFH) Conservation Recommendations are not required at this time, pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA). This is because the proposed action on the Farmington Dam on Little Johns Creek, California Water Control Manual (Farmington Flood Control Manual) project is not likely to adversely affect species listed under the ESA and the habitat requirements of Central Valley fall/late fall-run chinook salmon in the project area are similar to the listed species. However, if there is a substantial revision to the proposed action, the Corps will need to initiate EFH consultation.

We appreciate your continued cooperation in the conservation of listed species and their habitat and look forward to working with you and your staff in the future. If you have any questions regarding this response, please contact Ms. Madelyn T. Martinez in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, CA 95814. Ms. Martinez may be reached by telephone at (916) 930-3605 or by Fax at (916) 930-3629.

Sincerely,



for Rodney R. McInnis
Acting, Regional Administrator

cc: NMFS-PRD, Long Beach, CA
Stephen A. Meyer, ASAC, NMFS, Sacramento, CA
U.S. Army Corps of Engineers, 1325 J Street, Sacramento, CA 95814-2922,
Daniel Kramer, Marchia Bond, Paul Pugner, Brett Whitin, and Brian Anderson
U.S. Bureau of Reclamation, Division of Planning, 2800 Cottage Way, Sacramento, CA
95825, Lloyd Peterson, Michael Tansey, Rick Johnson, and Peggy Manza
Andrew Hamilton, USFWS, 2800 Cottage Way, Sacramento, CA 95825
Kevin Kauffman, General Manager, Stockton East Water District, P.O. Box 5157,
Stockton, CA 95205-0157
Karna E. Harrinfeld, Herum, Crabtree Brown, 2291 W. March Lane, Suite B-100,
Stockton, CA 95207



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922
December 6, 2001

Water Management Section

Mr. Michael Aceituno
Ms. Madelyn T. Martinez
Protected Resources Division
National Marine Fisheries Service
650 Capitol Mall, Suite 8-300
Sacramento, California 95814-4706

Dear Mr. Aceituno and Ms. Martinez:

As you are aware, in 1997 Stockton East Water District (SEWD) requested a permanent change in the U.S. Army Corps of Engineers' (Corps) Farmington Dam Littlejohns Creek, California Water Control Manual (Farmington Flood Control Manual) dated October 1967. The permanent change will allow SEWD to deliver water from the Stanislaus River on year-round basis.

SEWD will utilize its existing conveyance system for delivery of water including the Goodwin Tunnel, the upper Farmington Canal, natural watercourses, Farmington Dam, the Rock Creek Diversion Structure and the lower Farmington Canal. No new construction will be required by SEWD in order to take water on a year-round basis. If ponding behind Farmington Dam above elevation 125 feet does not occur during diversions, then the maximum diversion through Farmington Dam would be 550 cfs during the non-flood season. Diversions to the lower Farmington Canal would be limited to its channel capacity, approximately 200 cfs, the remaining diverted flows would continue down Rock Creek to its confluence with Littlejohns Creek for other ID beneficial use. It is the intent of all irrigation districts and National Marine Fisheries Service (NMFS) to not allow diverted flows to continue down Littlejohns Creek or to the SDWSC and the Delta, thereby not enticing endangered salmonoids up Littlejohns Creek.

The Corps in April 1999, with NMFS and Department of Fish and Game (DFG) concurrence granted a temporary deviation and two extensions to SEWD to allow water conveyance from the Stanislaus basin through Farmington Dam during the flood control season, the latest being through September 30, 2002. Both the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Services (NMFS) concurred that the temporary deviation will not adversely affect federally listed species.

The Corps requested USFWS and NMFS in February 1999 to concur that the permanent change in the Farmington Water Control Plan allowing year round diversions would not likely have an adverse affect on any federally listed species. By letter dated September 30, 1999, the USFWS concurred that a permanent change in the Farmington Water Control Plan for year round diversion will not adversely affect listed species.

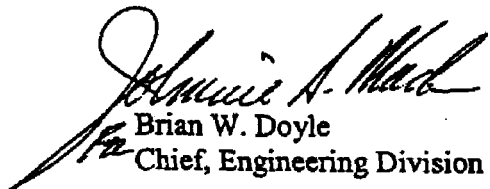
NMFS requested additional information in April 1999 on the cumulative impacts associated with this permanent change in the Farmington Water Control Plan. The Corps in September 1999 provided information to NMFS that confirms that this permanent change to the Farmington Flood Control Manual will not result in SEWD taking more water under its contract with the U.S. Bureau of Reclamation (Bureau). This permanent change would change the time in which water is taken, but not the overall amount of water taken through Farmington Dam. Information was provided since July 1999 by SEWD that confirms that this permanent change to the Farmington Flood Control Manual will not have any affect on New Melones Reservoir carryover storage or water made available for fishery or other regulatory purposes. The Bureau's Interim Plan of Operations (IOP) governs water deliveries and the Bureau is committed to meet all of their other regulatory requirements in accordance with the IOP and will make water available to SEWD in accordance with the IOP. In a letter dated August 4, 1999, the Bureau confirmed that deliveries to Stanislaus River contractors will not impact its ability to meet its other regulatory requirements including compliance with the Bay-Delta Water Quality Control Plan and the San Joaquin River Agreement.

Additional information was supplied to NMFS in July 1999 by SEWD that also confirms that there are a number of benefits to New Melones Reservoir if water is taken on a year round basis. New Melones Reservoir storage would benefit because by taking water on a year round basis, more water is evacuated during the winter which will enable the Bureau of Reclamation to capture and store more snowmelt water in the spring. This permanent change will also provide the Bureau will greater flexibility for management of the cold water pool. This information was discussed in detail at a meeting held on September 20, 2001 that was attended by staff of NMFS, Corps, USFWS, Bureau, and SEWD.

Based on the additional information provided at this meeting, the Corps requests NMFS concur that there will be no adverse affect on federally listed species by the SEWD year round deviation permanent change to the Farmington Flood Control Manual.

If you have any questions, please contact Mr. Dan Kramer, Water Management Section at (916) 557-7129.

Sincerely,



Brian W. Doyle
Chief, Engineering Division

Copy Furnished:

Mr. Kevin M. Kauffman, General Manager
Stockton East Water District
Post Office Box 5157
Stockton, California 95205-0157

Karna E. Harrigfeld
Herum Crabtree Brown
2291 W. March Lane, Suite B-100
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