December 2002

Sacramento and San Joaquin River Basins

Comprehensive Study

TECHNICAL STUDIES DOCUMENTATION

APPENDIX B

SYNTHETIC HYDROLOGY TECHNICAL DOCUMENTATION

THE RECLAMATION BOARD
PUBLIC SAFETY
WITH FLOOD PROTECTION
STATE OF CALIFORNIA

US Army Corps of Engineers
Sacramento District

EXPECTATIONS OF USE

SYNTHETIC HYDROLOGY
DEVELOPED SPECIFICALLY FOR THE COMPREHENSIVE STUDY

PURPOSE OF THE HYDROLOGY

The intent of the synthetic hydrology developed for the Sacramento and San Joaquin River Basins Comprehensive Study is to provide a basis for defining existing hydrologic conditions on a regional or generalized basis, and to support an array of systematic analyses for required or desired water resource development opportunities throughout the Central Valley of California. Specifically designed to support this particular study, the synthetic hydrology may or may not fulfill the technical requirements of site-specific investigations within the Central Valley. Prior to its use, the size and scope of each study, even at the pre-feasibility level, will need to be evaluated to determine if the Comprehensive Study hydrology can be directly applied. In most cases, more detailed hydrology will need to be performed.

Hydrologic analyses performed for such a large spatial area and at the level of detail documented herein present challenges and opportunities unique to such ambitious studies. The Comprehensive Study has made possible a system-wide update for Central Valley unregulated flood hydrology and an overall modernization of the models used by Sacramento District hydrologists and engineers. These accomplishments have proven valuable to the Comprehensive Study and will prove valuable to future studies undertaken by public and private organizations.

RESPONSIBILITY OF USERS

1) The point of contact for comments and feedback is:

   Mr. Robert Collins, District Hydrologist
   U.S. Army Corps of Engineers
   Sacramento District
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2) The complexity and intricacy in the development of the hydrology of this study require that it be used only by qualified hydrologic/hydraulic engineers and scientists familiar with proper applications of synthetically derived hydrology. Professional expertise and judgment should be exercised for all analyses conducted using this hydrology. The U.S. Army Corps of Engineers and the California State Department of Water Resources do not provide technical support for this hydrology.

BASIC ASSUMPTIONS AND LIMITATIONS

The synthetic hydrology, as presented herein, was created to be "Comprehensive" in nature. Without further investigation, its development offers only enough detail in the storm centerings,

local-flow contributions, and ungaged stream contributions to be applied in pre-feasibility applications. The models developed for the Comprehensive Study analysis were created with the following assumptions and limitations:

- The data are stationary.
- The natural flow frequency curves are strictly rainflood frequency curves. Snowmelt runoff is not directly incorporated into the analysis.
- Centering hydrographs are predicated on flood runoff, not precipitation. The approach was driven entirely by historic flow data; precipitation never entered into any portion of the methodology.
- Storm runoff centerings were formulated based on the Composite Floodplain concept.
- The unregulated frequency curves computed for the Comprehensive Study were created by following procedures outlined in Bulletin 17B.
- Travel times and attenuation factors (Muskingum Coefficients) are fixed for all simulated exceedence frequencies.
- Mainstem unregulated flow frequency curves were designed to quantify the total flows that the basins produced in rainfloods, not the average natural flows expected at mainstem locations during any of the synthetic exceedence frequency storm events.
- Patterns for synthetic floods are formulated based on historic storms.

SYNTHETIC HYDROLOGY TECHNICAL DO CUMENTATION

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REFERENCES

U.S. Army Corps of Engineers. 1977. San Joaquin River Basin, California; Hydrology Office Report, Lower San Joaquin River. Sacramento District. Sacramento, California.

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CHAPTER I

INTRODUCTION

AUTHORITY

In response to extensive flooding and damages experienced in 1997, the United States Congress authorized the U.S. Army Corps of Engineers (USACE), Sacramento District to provide a comprehensive analysis of the Sacramento and San Joaquin River basin flood management systems. The Corps and the State Reclamation Board of California are leading this Comprehensive Study to improve flood management and restore the ecosystem in the Sacramento and San Joaquin River basins.

The authorization for the Comprehensive Study directed the development of hydrologic and hydraulic models for both river basins that will allow systematic evaluation. These models incorporate reservoir operations and flows on the major river systems to effectively evaluate the hydraulic performance of the flood management systems. The models can be used to assess the performance of the current systems or modified systems under a wide range of hydrologic conditions.

PURPOSE OF DOCUMENTATION

This report documents the work conducted for the Sacramento and San Joaquin River Basins Comprehensive Study to develop hydrologic computer models and establish current, baseline condition floodplains. The main product components of this effort include: (1) a description of the hydrologic analysis methodology; (2) development of the models for the Sacramento River and San Joaquin River basins; (3) an illustration of existing conditions based on model results; and (4) conclusions drawn from this effort.

The scope of this document is limited to the use of hydrology to identify and describe baseline conditions. It does not include the formulation or evaluation of flood management alternatives. The performance of modified flood management strategies is not addressed. Future work will use this hydrology as a basis for analysis of alternatives to reduce flood damages in California's Central Valley.

APPROVAL AND CERTIFICATION

Technical review guidelines mandate that individual report elements be reviewed for compliance with appropriate Public Laws, Engineering Reports, Circulars, Memos, and standard engineering and scientific practices appropriate for the corresponding discipline. The information contained within this appendix has been reviewed by an Independent Technical Review Team (ITRT) composed of individuals having expertise in, and representing all disciplines involved in the preparation of this appendix. Technical comments have been provided to the team members

responsible for the derivation of information and data within this appendix and the report has subsequently been revised in accordance with suggestions made by the technical reviewer. Subsequent resolution of all issues has resulted in a Technical Certification and Findings document. To date, the development of the synthetic hydrology (Unregulated Frequency Curves, Historic Flood Event Matrices, Synthetic Flood Runoff Centerings, Computed and Adopted Statistics, Unregulated Rain Flood Flows, and Correlation Data) has surmounted this review process.

STUDY AREA

The study area encompasses the watersheds of the two major river systems of California's Central Valley, the Sacramento River in the north and the San Joaquin River in the south. These river systems comprise a combined drainage area of over 43,000 square miles, an area nearly as large as the state of Florida. The Sacramento River basin and the San Joaquin River basin are illustrated in Plate 1.

Due to its climate and geography, flooding is a frequent and natural event in the Central Valley. Historically, the Sacramento River basin has been subject to floods that result from winter and spring rainfall as well as rainfall combined with snowmelt. The San Joaquin River basin has been subject to floods that result from both rainfall that occurs during the late fall and winter months, and unseasonable and rapid melting of the winter snowpack during the spring and early summer months.

Although the Tulare Lake basin is not part of the geographical focus area of the Comprehensive Study, some hydrologic modeling efforts will include this watershed because flows are exchanged between the San Joaquin and Tulare Lake basins.

CHAPTER II

DESCRIPTIVE HYDROLOGY

SACRAMENTO RIVER BASIN

Basin Characteristics

The Sacramento River basin covers a 26,300 square mile area (above Rio Vista) about 240 miles long and up to 150 miles wide bounded by the Sierra Nevada on the east, the Coast Range on the west, the Cascade and Trinity Mountains on the north, and the Delta on the south. Major tributaries of the Sacramento River in the study area include the Feather and American rivers, which are tributaries from the east. Numerous other smaller creeks flow into the Sacramento from the east and west.

Hydrography

The main drainage basins within the Sacramento Valley are the Sacramento, Feather, and American River basins, covering an area of more than 24,000 square miles in the northern portion of the Central Valley as shown in Plate 2. The Sacramento River basin encompasses the three major basins in the north: the McCloud River, Pit River, and Goose Lake; the Sacramento-San Joaquin River Delta in the south, the Sierra Nevada Mountains and Cascade Ranges in the east including the Feather, Yuba and American River basins, and the Coast Range and Klamath Mountains in the west. Plate 1 shows the Central Valley and surrounding mountain ranges. Drainage in the northern portion of the Central Valley is provided by the Sacramento, Feather, Yuba, and American rivers and major and minor streams and rivers that drain the east and west sides of the basin.

The Sacramento River flows generally north to south from its origin near Mount Shasta to its mouth at the Delta. As the Sacramento River travels to the Delta, it picks up additional flows from the Feather and American rivers. The Feather River flows generally north to south from its origin near Lassen Peak and joins the Sacramento River at Verona. The American River originates in the Sierra Nevada, flows generally east to west, and enters the Sacramento River at the City of Sacramento near I Street.

Topography

Topography of the basin varies from flat valley areas and low rolling foothills, to steep mountainous terrain. Elevations in the Sacramento basin below Shasta and above Red Bluff range from about 280 feet to near 10,000 feet in the upper reaches of Battle Creek. In this reach, the main stem of the Sacramento River has a slope of about 5 ft/mi. In the reach from Red Bluff to Ord Ferry, elevations range from less than 100 feet at Ord Ferry to near 10,000 feet at the top of Mt. Lassen. Approximately 50% of the area is below 1,000 feet. The average slope of the Sacramento River is about 1 ft/mi. Below Ord Ferry and above Fremont Weir, elevations range

from below 100 feet to near 3,000 feet in the Coast Ranges. The slope of the Sacramento River in this area is about 0.9 ft/mi. Below the Fremont Weir, the Sacramento River is fed by the Feather and American rivers. The elevations in the Feather and American rivers ranges from about sea level to near 10,000 feet in the upper reaches of the Sierra. The slope of the Sacramento River from Fremont Weir to Collinsville is about 0.4 ft/mi.

Soils

Soil cover in the Sacramento River Basin is moderately deep with classifications varying from sands, silts and clays in the valley areas to porous volcanic areas in the northern end of the basin. In the American and Feather River basins, the soils range from granitic rock in the upper elevations to alluvial deposits in the valley areas.

Vegetation

Vegetation in the higher elevations of the Sacramento River Basin is dominated by coniferous forest. The foothills and valley areas are dominated by an oak-brush-grassland environment. Many valley areas in the Sacramento River Basin are cultivated for agricultural purposes.

Climate

The climate in the Sacramento River Basin is temperate and varies according to elevation. In the valley and foothill areas the summers are hot and dry and the winters are cool and moist. At higher elevations the summers are warm and slightly moist and the winters are cold and wet.

Temperatures

Average annual temperatures in the Sacramento River Basin range from the middle 60's in the valley areas to the low 50's at the higher elevations. Temperature range from nearly 120 degrees in the northern valley to below zero in the Sierra Nevada Mountains. Average mean monthly minimum and maximum temperatures for Sacramento, Redding, Donner Summit State Park, and Blue Canyon are shown in Table 1.

Precipitation

Normal annual precipitation (NAP) varies widely throughout the basin, ranging from the low teens in valley areas to 90 inches in some mountain areas. Average monthly and annual precipitation are shown in Table 2 for Sacramento, Redding, Blue Canyon and Mc Cloud.

Orographic Influence

The Sierra Nevada and Coast Ranges have an orographic effect on the precipitation. Precipitation increases with altitude, but basins on the east side of the Coast Ranges lie in a rain shadow and receive considerably less precipitation than do basins of similar altitude on the west side of the Sierra Nevada.

TABLE 1

AVERAGE MONTHLY TEMPERATURES FOR SELECTED LOCATIONS IN THE SACRAMENTO RIVER BASIN

Month	Sacramento (1941-2000)		Redding (1931-1979)		Donner Summit State Park (1953-2000)		Blue Canyon (1948-2000)	
	Min. (°F)	Max. (°F)	Min. (°F)	Max. (°F)	Min. (°F)	Max. (°F)	Min. (°F)	Max. (°F)
January	37.8	53.1	37.4	54.9	13.7	40.3	30.7	43.5
February	41.1	59.7	40.5	59.7	15.4	43.4	31.5	45.1
March	42.9	64.4	43.3	65.2	20.1	46.7	31.6	45.5
April	45.9	71.7	47.9	72.5	24.8	53.4	36.2	52.2
May	50.5	79.8	54.9	81.7	31.1	62.7	43.3	60.7
June	55.1	87.1	62.3	90.2	36.7	72.3	51.4	69.6
July	58.0	92.9	68.1	98.4	40.8	80.8	58.7	77.4
August	57.7	91.5	65.9	96.4	39.6	80.0	57.5	76.7
September	55.8	87.6	61.3	90.7	34.3	73.5	53.2	72.0
October	50.2	77.9	53.2	78.7	27.7	63.0	45.8	62.8
November	42.7	63.6	44.4	64.6	21.9	49.1	37.3	51.2
December	38.0	53.5	38.8	55.7	15.0	40.8	32.7	45.8
Average	*48.0*	*73.6*	*51.5*	*75.7*	*26.8*	*58.8*	*42.5*	*58.5*

TABLE 2

AVERAGE MONTHLY PRECIPITATION FOR SELECTED LOCATIONS IN THE SACRAMENTO RIVER BASIN

Month	Sacramento (in)	Redding (in)	Blue Canyon (in)	Mc Cloud (in)
Data Period	(1941-2000)	(1931-1979)	(1948-2000)	(1948-2000)
Location Elevation	20 ft	580 ft	5280 ft	3250 ft
January	3.8	8.0	13.0	9.7
February	3.1	5.9	10.5	8.1
March	2.4	5.0	9.3	6.9
April	1.1	3.0	5.1	3.5
May	0.5	1.5	2.7	2.4
June	0.2	1.0	0.8	1.0
July	0.0	0.2	0.3	0.2
August	0.1	0.3	0.5	0.4
September	0.3	0.8	1.1	1.1
October	0.9	2.2	3.9	3.0
November	2.2	4.7	9.6	6.7
December	2.8	7.0	11.7	8.2
Annual Total	17.2	39.4	68.4	51.1

Note: Prior to use and application, reference the "Expectations of Use" preface.

Snowpack

During winter and early spring months, precipitation is often in the form of snow at higher elevations in the Sacramento River Basin. Plate 2 illustrates the area of the Sacramento River Basin above 5,000 feet. The ground surface elevations in northern portion of the Sacramento Valley reach nearly 14,000 feet in the headwaters of the Sacramento River. Lassen Peak, which exceeds 10,000 ft in the Cascade Range, receives as much as 90 inches of precipitation, primarily as snow.

Flood Damage Reduction System

The basic flood damage reduction system in the Sacramento Valley consists of a series of levees and bypasses, placed to protect specific areas and take advantage of the natural overflow basins. The management system includes levees along the Sacramento River south of Ord Ferry; levees along the lower portion of the Feather, Bear, and Yuba rivers; and levees along the American River. Additionally, the system benefits from three natural drainage basins: Butte, Sutter, and Yolo. These basins run parallel to the Sacramento River and receive excess flows from the Sacramento, Feather, and American rivers via natural overflow channels and over weirs. When the Sacramento River is high, the three basins form one continuous waterway connecting the Butte, Sutter, and Yolo basins. During low stages on the Sacramento River, water in these basins can reconnect with the Sacramento at several points: the Butte Slough Outfall Gates, the terminus of the Sutter Bypass at Verona, and the east levee toe drain at the terminus of the Yolo Bypass above Rio Vista.

In addition to the leveed system, the flood damage reduction system uses reserved flood storage space in selected reservoirs on the Sacramento, Feather, and American rivers. These reservoirs help to reduce damaging rain flood peaks by holding back floodwater and, ideally, releasing water into the rivers at a slower rate.

SAN JOAQUIN RIVER BASIN

Basin Characteristics

The San Joaquin River Basin lies between the crests of the Sierra Nevada and the Coast Range and extends from the northern boundary of the Tulare Lake Basin, near Fresno, to the Delta near Stockton, as shown in Plate 1. It is drained by the San Joaquin River and its tributary system. The basin has an area of about 13,500 square miles (at the Vernalis Gage), extending about 120 miles from the northern to southern boundaries.

Hydrography

The San Joaquin River Basin extends from the Delta in the north to the Kings River in the south, and from its headwaters upstream from Friant Dam in the Sierra Nevada in the east to the Coast Range in the west. The river basin encompasses about 13,000 square miles at the southern boundary of the Delta, and a total watershed area of 16,700 miles (including the Delta).

The San Joaquin River flows approximately 270 miles from Friant Dam to the river mouth, 4.5 miles below Antioch. The San Joaquin River originates in the Sierra Nevada at an elevation of

more than 10,000 feet, flows into the San Joaquin Valley at Friant Dam, then flows westward to the center of the valley floor, turns sharply northward near Mendota, and flows through the San Joaquin Valley to Vernalis, which is generally considered to represent the southern limit of the Delta. The San Joaquin River receives flows from the Fresno and Chowchilla rivers, Bear and Owens creeks, and several smaller streams through the Chowchilla and Eastside Bypasses. Along the valley floor, the San Joaquin River receives additional flow from the Kings, Merced, Tuolumne, and Stanislaus rivers. Within the Delta, the San Joaquin River receives flows from the Calaveras, Cosumnes, and Mokelumne rivers. Streams on the west side of the basin include Panoche, Los Banos, Orestimba, and Del Puerto creeks. West side streams are intermittent, and their flows rarely reach the San Joaquin River except during large floods. Flood management facilities are found on all major tributaries except the Cosumnes River. Locations along the San Joaquin River are referenced by River Mile (RM), with RM 0 beginning at the mouth of the San Joaquin River (4.5 miles below Antioch), and RM 270 at Friant Dam.

The San Joaquin River Basin and Tulare Lake Basin, shown in Plate 1, are hydrologically connected through the Kings River. In the past, most water in the Kings River naturally drained into the Tulare Lakebed, and small quantities of flood flows would flow north into the San Joaquin River. When the Tulare Lake exceeded capacity, water would overflow into the Fresno Slough and make its way to the San Joaquin River. Today, these basins are connected where part of the Kings River flow is diverted to the Kings River North, then through the James Bypass, Fresno Slough, Mendota Pool, and into the San Joaquin River.

The watersheds of the San Joaquin, Merced, Tuolumne, Stanislaus, and Mokelumne rivers include large areas of high-elevation terrain along the western slope of the Sierra Nevada. As a result, these rivers experience significant snowmelt runoff during the late spring and early summer months. Before construction of water supply and flood management facilities, flows typically peaked in May and June and snowmelt runoff caused flooding in most years along all of the major rivers. When these snowmelt floodflows reached the valley floor, they spread out over the lowlands, creating several hundred thousand acres of permanent tule marshes and more than 1.5 million acres of seasonally flooded wetlands.

Topography

In the San Joaquin River Basin, the Sierra Nevada Mountains have an average crest elevation of about 10,000 feet with occasional peaks as high as 13,000 feet. The Coast Range crest elevations reach up to about 5,000 feet. The valley area measures about 100 miles by 50 miles and slopes gently from both sides towards a shallow trough somewhat west of the center of the valley. Valley floor elevations range from 250 feet at the south to near sea level at the Delta. The trough forms the channel for the lower San Joaquin River and has an average slope of about 0.8 feet per mile between the Merced River and Paradise Cut.

Soils

The basin lies within parts of the Sierra Nevada, California Coast Ranges, and Great Valley geomorphic provinces. Its sedimentary, metamorphic, and igneous rocks range in age from pre-Cretaceous to Recent, being dominated by nonwater-bearing crystalling rocks. In the California Coast Ranges, Jurassic and Cretaceous sandstones and shale dominate. In the valley, upper

Tertiary and Quarternary sediments in places contain fresh water as deep as 2,000 feet. And, in most of the area, impermeable Corcoran clays confine the lower water-bearing zone.

Soils in the valley basin bottoms are poorly drained and fine textured. Some areas are affected by salts and alkali and require reclamation before they are suitable for crops. Bordering and just above the basin are soils of the fans and floodplains. They are generally level, very deep, well drained, non-saline and non-alkaline, and well suited to a wide variety of crops. The soils of the terraces bordering the outer edges of the valleys generally are of poorer quality and have dense clay subsoils or hardpans at shallow depths. These soils are generally used for pasture and rangeland.

Vegetation

The types of vegetation occurring in the San Joaquin River basin consist of a combination of cultivated crops and pasture grasses and forbs, hardwood forests, chapparal mountain brush, and coniferous forests. The distribution of these vegetation types is primarily a function of elevation with the cultivated crops located entirely on the valley floor areas, the hardwood forests and chapparal brush located at the mid-elevations, and the coniferous forests located at the higher elevations.

Climate

The climate of the San Joaquin River Basin is characterized by wet, cool winters, dry, hot summers, and relatively wide variations in relative humidity. In the valley area, relative humidity is very low in summer and high in winter. The characteristic of wet winters and dry summers is due principally to a seasonal shift in the location of a high pressure air mass ("Pacific high") that usually exists approximately a thousand miles west of the mainland. In the summer, the high blocks or deflects storms; in the winter, it often moves southward and allows storms to reach the mainland.

Temperatures

Temperatures in the basin vary considerably due to seasonal changes and the large range of elevation. Temperatures in the lower elevations are normally above freezing but range from slightly below freezing during the winter to highs of over 100 degrees during the summer. At intermediate and high elevations the temperature may remain below freezing for extended periods during the winter. Average mean monthly minimum and maximum temperatures for Stockton, Los Banos, Hetch Hetchy, and Huntington Lake are shown in Table 3.

Precipitation

Normal annual precipitation in the basin varies from 6 inches on the valley floor near Mendota to about 70 inches at the headwaters of the San Joaquin River. Most of the precipitation occurs during the period of November through April. Precipitation is negligible during the summer months, particularly on the valley floor. Average monthly and annual precipitation are shown in Table 4 for Stockton, Los Banos, Hetch Hetchy, and Huntington Lake.

Orographic Influence

Similar to the Sacramento River Basin, the Sierra Nevada and Coast Ranges have an orographic effect on the precipitation. Precipitation increases with altitude, but basins on the east side of the Coast Ranges lie in a rain shadow and receive considerably less precipitation than do basins of similar altitude on the west side of the Sierra Nevada.

TABLE 3

AVERAGE MONTHLY TEMPERATURES FOR SELECTED LOCATIONS IN THE SAN JOAQUIN RIVER BASIN

Month	Stockton 1948-2000		Los Banos (1948-2000)		Hetch Hetchy (1931-2000)		Huntington Lake (1948-2000)	
	Min. (°F)	Max. (°F)	Min. (°F)	Max. (°F)	Min. (°F)	Max. (°F)	Min. (°F)	Max. (°F)
January	36.3	54.0	36.3	55.0	28.5	48.0	23.5	43.8
February	39.5	61.1	39.9	62.4	29.9	52.4	23.2	44.7
March	42.1	66.0	42.6	67.9	32.4	56.4	24.0	45.4
April	45.3	72.8	46.3	75.1	37.2	62.8	28.0	50.2
May	49.9	80.0	51.5	82.3	43.0	69.5	34.0	56.5
June	54.4	87.2	56.4	89.7	49.2	77.6	41.2	65.8
July	56.8	92.3	60.3	96.3	55.6	86.1	47.9	73.5
August	55.9	91.1	59.2	94.8	55.0	85.8	47.4	72.9
September	53.5	87.4	56.0	90.0	50.3	80.9	43.1	67.4
October	47.6	78.5	49.4	80.3	42.1	71.4	36.8	59.3
November	40.8	65.0	41.3	66.1	34.0	57.9	29.7	49.8
December	36.0	54.6	36.0	55.2	29.7	49.1	25.2	44.6
Average	46.5	74.2	47.9	76.3	40.6	66.5	33.7	56.1

TABLE 4

AVERAGE MONTHLY PRECIPITATION FOR SELECTED LOCATIONS IN THE SAN JOAQUIN RIVER BASIN

Month	Stockton (in)	Los Banos (in)	Hetch Hetchy (in)	Huntington Lake (in)
Data Period	(1948-2000)	(1948-2000)	(1931-2000)	(1948-2000)
Elevation	10 ft	120 ft	3870 ft	7020 ft
January	3.3	1.9	6.0	7.7
February	2.7	1.8	5.8	7.3
March	2.3	1.4	5.2	6.6
April	1.3	0.7	3.2	3.3
May	0.5	0.4	1.8	2.0
June	0.1	0.1	0.8	0.6
July	0.0	0.0	0.2	0.3
August	0.0	0.0	0.2	0.2
September	0.3	0.3	0.7	1.3
October	0.8	0.5	2.0	1.8
November	2.0	1.2	4.2	4.3
December	2.5	1.4	5.7	5.8
Annual Total	*15.9*	*9.5*	*36.0*	*41.2*

Note: Prior to use and application, reference the "Expectations of Use" preface.

Snowpack

During winter and early spring months, precipitation is often in the form of snow at higher elevations in the San Joaquin River Basin. Plate 2 illustrates the area of the San Joaquin River Basin above 5,000 feet. The ground surface elevations in southern portions of the San Joaquin River Basin reach nearly 14,000 feet in the headwaters of the San Joaquin River.

Flood Damage Reduction System

The flood damage reduction system includes levees along the lower portions of Ash and Berenda sloughs; Bear Creek; Fresno, Stanislaus, and Calaveras rivers; and leveed sections along the San Joaquin River. The Chowchilla Canal Bypass diverts excess San Joaquin River flow and sends it to the Eastside Bypass. In addition to the Chowchilla Canal Bypass flow, the Eastside Bypass intercepts flows from minor tributaries and rejoins the San Joaquin River between Fremont Ford and Bear Creek. Channel capacity on the San Joaquin River decreases moving downstream until the confluence of the Merced River, where it then begins to increases downstream of the confluence of the Merced River. The San Joaquin River levee and diversion systems are not designed to contain the objective release from each of the project reservoirs simultaneously. Flows in the San Joaquin River that are less than design flow may cause damage to levees.

The travel time for moving floodflows down the river system complicates the management of the flood system. The travel time for water released from Friant Dam on the San Joaquin River is more than 5 days to the Merced River confluence at Newman and about 7 days to Vernalis. On the Merced River, water released from New Exchequer Dam takes 42 hours to reach the San Joaquin River confluence at Newman. The travel time from Don Pedro Dam on the Tuolumne River to Vernalis is almost 2 days. Flow released from New Melones Dam on the Stanislaus River takes just over a day to reach Vernalis.

The San Joaquin River basin also receives floodflows from the Tulare Lake Basin. The Kings River Weirs divert floodflows north via the Kings River North, James Bypass, Fresno Slough, and Mendota Pool system into the San Joaquin River basin. Flows greater than flood management operating policies are sent into Tulare Lake Basin via Kings River South.

CHAPTER III

HYDROLOGIC ANALYSES

INTRODUCTION

One of the primary missions of the U.S. Army Corps of Engineers (USACE) is to plan, design, build, and operate water resources and other civil works projects. Among them are projects related to navigation, flood damage reduction, environmental protection, and disaster response. A critical ingredient, common to each of these pursuits is water. Ever too much or too little, society is always seeking a water resources balance that is elusive due to both the unpredictability of nature and the constant changes in public and private demands. This is especially true in California, where the hydrologic cycle is distinctly seasonal and tends towards the extremes and the demand for water is high and often filled with controversy.

An important step in planning studies is establishing "without-project conditions." This step defines the system that exists or will exist before any possible improvements proposed by a study are implemented. As the Comprehensive Study focuses on system operations that are driven in part by the hydrologic cycle, definition of baseline hydrology is central to the establishment of without-project conditions.

In support of the Comprehensive Study, the Water Management Section of the Sacramento District, USACE, has developed synthetic 50-, 10-, 4-, 2-, 1-, 0.5-, and 0.2-percent chance exceedence flood events. These seven synthetic exceedence frequency events will provide a basis for defining existing conditions and eventual alternatives analysis and plan formulation. In this sense, this hydrology study will serve as a cornerstone for future Comprehensive Study investigations.

This report includes details of the methodology used by the Water Management Section of the USACE, in performing this study, including: 1) updated natural flow frequency curves for locations within the basins; 2) a retrospective of historic floods that have impacted Central Valley rivers and the synthetic flood runoff centerings developed to represent flood events of a specific exceedence frequency; and 3) construction of seven synthetic exceedence frequency flood hydrographs.

Ultimately, results from this hydrologic investigation will feed into other Comprehensive Study models and drive parameter development for related aspects of the study.

FLOODPLAIN BACKGROUND

Before entering into a discussion of methodology details, it is important that the reader clearly understand the ultimate goal of this effort, which is to prepare flood runoff centerings and flood hydrographs that feed into reservoir system and hydraulic models, whose simulations culminate in delineation of Central Valley floodplains. Recognition that this hydrology shapes floodplains is a critical concept considering the complexity of floodplains in large spatial areas with

numerous contributing tributaries. It is intuitive that flows create floodplains, but more involved than it first appears.

Composite Floodplain

The "Composite Floodplain" concept recognizes that the floodplains generated through modeling of the seven synthetic exceedence frequency events are not created by a single flood event, but by a combination of several events, each of which shapes the floodplain at different locations as shown in Plate 3 and further described in Appendix D – Hydraulic Technical Documentation. As one moves downstream in a watershed, the Composite Floodplain becomes increasingly complex. With the confluence of each additional tributary, the number of possible scenarios of flow combinations that could shape the floodplain grows. The role of tributaries in shaping floodplains individually and as a system is the foundation of the Composite Floodplain concept and a cornerstone of the Synthetic Hydrology Analysis. It is a theme that guides the methodology and is discussed throughout this report.

An example location to illustrate the composite floodplain concept is the reach of Tuolumne River between New Don Pedro Dam and Reservoir and its confluence with the San Joaquin River near Maze Road Bridge. Don Pedro Reservoir is a flood damage reduction project that regulates flows from the entire upper basin of the Tuolumne River. Directly below the reservoir, the floodplain associated with a 1-percent chance exceedence event is shaped by a 1-percent chance exceedence outflow from Don Pedro, the existing operational criteria for that facility, and the channel shape below the dam. The combined influence of these factors continues until the Tuolumne courses through the City of Modesto and joins with flows from Dry Creek. At this point, the floodplain becomes two-pronged with inundated areas extending up both Dry Creek and the Tuolumne River. Here, the shape of the floodplain is a function of the timing and magnitude of flow from two tributaries, hydraulic (including backwater) influences of each upon the other, and channel and inundated landforms. This changes again when the Tuolumne comes within the realm of influence of the San Joaquin River mainstem and, thereby, the twelve other tributaries that join the mainstem above Maze Road.

Ultimately, the floodplain associated with a 1-percent chance exceedence flow in the Lower Tuolumne River may not be entirely shaped by the 1-percent chance exceedence outflow from Don Pedro. A different storm scenario may generate flows on the San Joaquin mainstem that create larger extents of inundation (despite a lower exceedence frequency event on the Tuolumne River) through backwater effects or by simply introducing large out-of-channel flows to adjacent floodplain areas. The synthetic hydrology for the Comprehensive Study was developed to ensure that such characteristics are reflected and that the composite floodplain represent the maximum extent of inundation possible at all locations for any of the simulated seven synthetic exceedence frequency storm events.

METHODOLOGY

Study Approach

The Synthetic Hydrology Analysis investigated three fundamental subjects during the formulation of synthetic flood events: 1) the amount of runoff produced during each of the seven

synthetic exceedence frequency flood events; 2) the contribution of individual tributaries to this total volume; and 3) translating these flood volumes and distributions to hourly time series ready to feed into the Reservoir Simulations Model.

ANALYSIS

General

Unregulated frequency curves were developed at key mainstem and tributary locations in both the Sacramento and San Joaquin River basins. Unregulated frequency curves plot historic points and statistical distributions of unimpaired flows (no reservoir influence). Curves display volumes or average flow rates for different time durations over a range of annual exceedence probabilities. These curves can be used to translate: 1) hydrographs to frequencies (i.e., in 1997, the 3-day natural inflow to Friant Dam, San Joaquin River was roughly 50,000-cfs, which translates to a 1.54-percent chance exceedence event); and 2) frequencies to flood volumes (i.e., according to the curves, the 3-day natural inflow to Friant Dam associated with an annual 10-percent chance exceedence event is approximately 20,000 cfs). After a curve is developed, the runoff volume for any of the seven synthetic exceedence frequency flood events can be obtained from the plot for that curve's specific location.

Natural Flow Analysis/Unregulated Frequency Analysis

Methodology for Deriving the Unregulated Frequency Curves

The unregulated frequency curves computed for the Comprehensive Study were created by following procedures outlined in Bulletin 17B, Guidelines for Determining Flood Flow Frequency, U.S. Department of the Interior, dated March of 1982. This report directs Federal agencies to use the procedures included therein for all "planning activities involving water and related land resources." Bulletin 17B requires the use of a Pearson Type III distribution with log transformation of the data (Log Pearson Type III distribution) as the method to analyze flood flow frequency.

In this report, charts containing frequency curves display two types of information. The frequency curve itself is one of these. The curve is derived from a statistical analysis of the recorded data after it has been transformed to log values. The mean, standard deviation and skew of the log-transformed data, are computed for the stream gage or reservoir. The data are screened for high and low outliers and if found, adjustments to the statistics are computed as outlined in Bulletin 17B. In addition, the resulting statistics are reviewed and sometimes adjusted or smoothed to account for sampling error differences among the various durations, or after comparison with similar gages in the watershed or region. The second type of information found on each frequency curve is the plot of the historical events given their estimated frequency. To determine its location on the frequency paper, the peak of each annually recorded event or peak flow value is given a hypothetical frequency based upon its assigned plotting position using a Log Pearson Type III distribution. In some instances, visual examination of the unregulated frequency curves contained in this report reveal a significant difference between the statistical frequency curve and the imaginary curve that would be formed if a pencil line were

hand-drawn through the historical data points. For some curves in this report in which the characteristic described above was apparent, further examination was made. In addition, a few frequency curves were re-computed using alternative distributions such as Gumble type III or lognormal. The result was that the other distributions did not result in an improved fit. Bulletin 17B directs the use of a Log Pearson III Distribution unless compelling and substantive evidence can be found that other distributions are more appropriate.

Development of the unregulated frequency curves for the tributaries as shown in Attachment B.1 required daily natural flow data for all target locations. Data were obtained from USACE archives or computed by routing daily change in storage from upstream reservoirs and adding this routed value to the gage record at the location of interest. Most required storage time series were available through USGS publications. Other data were obtained directly from Central Valley and federal water agencies, including U.S. Bureau of Reclamation, U.S. Geological Survey, Oroville-Wyandotte Irrigation District, South Sutter Water District, Placer County Water Association, Nevada Irrigation District, Surface Water Data Inc., Southern California Edison, Sacramento Metropolitan Utility District, and Pacific Gas and Electric.

Data from tributaries were routed to downstream locations for use in constructing mainstem "index" frequency curves. The frequency curves that characterize the total flows through the mainstem index locations represent "at-latitude" flows (i.e., any and all diverted or channelized flows that pass through a particular gage's geographic latitude). Muskingum routings with travel times (in hours) and reach-specific attenuation factors were used to transport daily hydrographs through the basins, as shown in Table 5 for the Sacramento River Basin and Table 6 for the San Joaquin River Basin. Travel times and attenuation factors (Muskingum Coefficients) were obtained from past studies, through communication with local water agencies, or through comparisons of historic flood data. If no information was available from these sources, variables were estimated based on length of reach, average slope, and other channel characteristics. All river routings were assumed to be conservative (routings were simulated with indefinitely large channels); no flow was lost in overbank areas during transit.

This procedure was not intended to reflect the natural dynamics of the Central Valley, where large flood flows often discharge to out-of-bank areas and are lost or greatly attenuated. The unregulated flow frequency curves were designed to quantify the total flows that the basins produced in rain floods throughout the period of record, rather than the average natural flows expected at mainstem locations during any of the seven synthetic exceedence frequency storm events.

Historical data were plotted using moving averages of the daily time series for 3-, 5-, 7-, 10-, 15-, and 30-day duration natural flow at all points of interest. Wintertime maxima were picked from the moving average for each water year. All snowmelt-driven events were screened out from these duration maxima; screened events were replaced with the highest rainflood, or rainfall driven, maxima experienced during that water year, which included any rain-on-snow events occurring during the obvious rainflood season of a particular annual record. Values were sorted, ranked, and graphed with median plotting positions. Statistics were computed for these samples of annual rainfloods with USACE statistical analysis tools (FFA and REGFREQ). Sample mean, standard deviation, and skew were computed and, in some cases, smoothed to better represent the values for each duration. The Pearson Type III Distribution with log transformation of the data and final statistics were used to construct best-fit curves for all durations and were plotted on the same graph as the historic values for each location.

Unregulated frequency curves were prepared for 43 tributary locations and 8 mainstem locations, as shown in Attachment B.2. In all cases, curves were developed or updated to reflect post-1997 hydrology. For any location, the amount of runoff volume produced during simulation of any one of the seven synthetic exceedence frequency flood events can be read off of the family of best-fit curves or computed directly from the final statistical distribution of each duration.

Flood volumes at mainstem index locations represent the sum of volumes contributed by all upstream tributaries, but do not offer any information regarding how each provides to the whole. In this sense, these index curves can provide exceedence frequency targets, in terms of volumes, at mainstem locations for any of the seven synthetic exceedence frequency flood patterns that involve a number of upstream tributaries. During the development process, it was assumed the effects of increased urbanization occurring throughout the period of record was insignificant on the timing of runoff within the watersheds of the Sacramento and San Joaquin rivers. For a further investigation of this assumption, please reference the "Watershed Impact Analysis" done by HEC.

The approach formulated and described above was driven entirely by historic flow data. Each year of record included the influence of snowmelt, infiltration, interception, precipitation distribution, timing of runoff, storm development characteristics, and physical basin attributes for that annual rainflood event. Historic flow data records provided a sufficient sample of flood events to characterize hypothetical flood volumes and tributary-system relationships.

No synthetic precipitation events were required. In fact, precipitation never entered into any portion of the methodology.

TABLE 5

ROUTING PARAMETERS FOR SACRAMENTO RIVER BASIN INDEX POINTS

Source	From	To	Travel Time (Hours)	Muskingum Coefficient.
Sacramento	Bend-Bridge	Ord Ferry	18	0.2
Mill Creek	Gage near Los Molinos	Ord Ferry	14	0.2
Elder Creek	Gage near Paskenta	Ord Ferry	20	0.2
Deer Creek	Gage near Vina	Ord Ferry	14	0.2
Thomes Creek	Gage at Paskenta	Ord Ferry	20	0.2
Big Chico Creek	Gage near Chico	Ord Ferry	6	0.2
Stony Creek	Black Butte	Ord Ferry	11	0.2
Sacramento	Ord Ferry	Moulton Weir	13	0.2
Sacramento	Moulton Weir	Colusa Weir	3	0.2
Sacramento	Colusa Weir	Tisdale Weir	9	0.2
Sacramento	Tisdale Weir	Knights Landing	7	0.2
Sacramento	Knights Landing	Fremont Weir	2	0.2
Ord Ferry Overflow	Ord Ferry	Highway 162	32	0.1
Butte Creek	Gage at Chico	Highway 162	7	0.2
Butte Creek and Ord Ferry Overflow	Highway 162	Moulton Weir	10	0.1

TABLE 5 (CONTINUED)

ROUTING PARAMETERS FOR SACRAMENTO RIVER BASIN INDEX POINTS

Source	From	To	Travel Time (Hours)	Muskingum Coefficient
Moulton Weir Spill	Sacramento River	Butte Creek	4	0.10
Butte Basin Flow	Moulton Weir/Butte Creek	Colusa Weir	4	0.10
Butte Basin Flow	Colusa Weir	Butte Sink	16	0.10
Butte Basin Flow	Butte Sink	Tisdale Weir	8	0.10
Sutter Bypass/Tisdale Flow	Tisdale Weir	Fremont Weir	20	0.10
Feather River	Oroville	Gridley	3	0.20
Feather River	Gridley	Honcut	1	0.17
Feather River	Honcut	Yuba City	4	0.17
North Yuba River	Bullards Bar Dam	Englebright	3	0.15
Yuba River	Deer Creek	Dry Creek	2	0.15
Yuba River	Dry Creek	Marysville	1	0.15
Yuba River	Marysville	Mouth	1	0.15
Feather River	Yuba River	Bear River	8	0.35
Bear River	Wheatland	Mouth	5	0.35
Feather River	Bear River	Nicolaus	2	0.35
Feather River	Nicolaus	Fremont Weir	4	0.20
Sacramento River	Verona	Sacramento Weir	5	0.20
American River	Folsom Dam	Fair Oaks	2	0.40
Folsom Inflow	Folsom Dam	Sacramento Weir	8	0.30
Sacramento River	Sacramento River	Freeport	4	0.20
Sacramento River	Freeport	Rio Vista	9	0.20
Colusa Drain	Ord Ferry Overflow	Yolo Bypass	72	0.10
Fremont Overflow	Fremont Weir	Colusa Drain Con.	6	0.20
Yolo Bypass Flow	Colusa Drain	Interstate 5	2	0.20
Cache/Clear Lake	Clear Lake	Rumsey	8	0.28
NFK Cache Creek	Indian Valley Reservoir	Rumsey	7	0.20
Cache Creek	Rumsey	Yolo Bypass	3	0.30
Yolo Bypass Flow	Interstate 5	Putah Creek	6	0.20
Putah Creek	Berryessa Dam	Putah Div. Dam	3	0.00
Putah Creek	Putah Diversion Dam	Yolo Bypass	24	0.00
Yolo Bypass Flow	Putah Creek	Lisbon	16	0.20

TABLE 6

ROUTING PARAMETERS FOR SAN JOAQUIN RIVER BASIN INDEX POINTS

Source	From	To	Travel Time Hours	Muskingum Coefficient
Kings River	Piedra	Army Weir	24	0.25
Kings River	Army Weir	Crescent Bypass	48	0.25
Kings River-North	Crescent Bypass	James Bypass Gage	20	0.20
Kings River-North	James Bypass Gage	Unet Handoff Point	3	0.20
Kings River-North	James Bypass Unet	Mendota Gage	10	0.20
San Joaquin River	Friant Dam	Confluence w/ Little Dry Creek	4	0.25
Big Dry Creek Outflow	Dam	Little Dry Creek	7	0.20
San Joaquin River/ Full Natural Flow	Little Dry Creek	Gravelly Ford	32	0.25
San Joaquin River/ Channel Capacity	Gravelly Ford	Eastside Bypass	14	0.15
San Joaquin River/Channel	Eastside Bypass	Mendota	14	0.15
San Joaquin River In-Channel	Mendota	El Nido	44	0.17
Eastside Bypass Flow		Fresno River	12	0.10
Fresno River	Hidden Dam	Madera Canal	4	0.20
Fresno River	Madera Canal	Unet Handoff Point	14	0.20
Fresno River In-Channel	Unet	Eastside Bypass	8	0.20
Eastside Bypass Flow	Fresno River	Chowchilla River	14	0.25
Chowchilla River	Buchanan Dam	Madera Canal	4	0.20
Chowchilla River In-Channel	Madera Canal	Eastside Bypass	20	0.20
Eastside Bypass In-Channel	El Nido	Mariposa Bypass	24	0.20
Eastside Bypass/ In-Channel	Mariposa Bypass	Merced Stream Group	6	0.30
Mariposa Creek	Mariposa Dam	Owens Diversion	6	0.30
Owens Creek	Owens Dam	Mariposa Creek	5	0.30
Mariposa Creek In-Channel	Owens Diversion	Deadman/Dutchman	12	0.20
Mariposa Creek In-Channel	Deadman/Dutchman	Eastside Bypass	14	0.20
Miles Creek		Owens Creek Channel/Below Owens Bypass	10	0.20
Miles Creek In-Channel	Below Owens Bypass	Eastside Bypass	10	0.20
Bear Creek	Bear Dam	Black Rascal Diversion	8	0.30
Burns Creek	Burns Dam	Black Rascal Diversion	8	0.30
Bear Creek In-Channel	Below Black Rascal Diversion	McKee Road	3	0.30
Note: All routing assumed to remain in channel.				

TABLE 6 (CONTINUED)

ROUTING PARAMETERS FOR SAN JOAQUIN RIVER BASIN INDEX POINTS

Source	From	To	Travel Time Hours	Muskingum Coefficient
Bear Creek In-Channel	McKee Road	R.M. 8.6	22	0.20
Bear Creek In-Channel	R.M. 8.6	Eastside Bypass	8	0.20
San Joaquin River	El Nido	Mariposa Bypass	20	0.20
San Joaquin River	Mariposa Irrigation Canal	End of Eastside Bypass	6	0.20
Los Banos Creek	Los Banos Dam	Local Flow	24	0.20
Los Banos Flow	Local Irrigation Project	San Joaquin River	11	0.02
San Joaquin River/ In-Channel	Los Banos Creek	Newman Gage	7	0.15
Merced River In-Channel	Exchequer	Dry Creek	20	0.20
Merced River In-Channel	Unet	San Joaquin River	18.5	0.20
Merced River In-Channel	Cressey	Unet Handoff Point	3.5	0.20
Del Puerto Creek	Interstate 5	San Joaquin River	5.5	0.20
Orestimba Creek	Interstate 5	San Joaquin River	10	0.10
San Joaquin River In-Channel	Newman Gage	Maze Road Bridge	20	0.15
Tuolumne River In-Channel	Don Pedro Dam	Dry Creek/Near Modesto	20	0.20
Dry Creek/Near Modesto		Tuolumne River	2	0.20
Tuolumne River In-Channel	Modesto	Maze Road Bridge	8	0.20
San Joaquin River In-Channel	Maze Road Bridge	Vernalis	8	0.20
Stanislaus River	New Melones Dam	Tulloch Dam	2	0.20
Stanislaus River In-Channel	Tullock	Orange Blossom Bridge-Inflow	4	0.20
Stanislaus River In-Channel	Orange Blossom Bridge	Ripon	15	0.10
Stanislaus River In-Channel	Ripon	Vernalis	16	0.20
Note: All routing assumed to remain in channel.				

Historic Flood Event Analysis

With the completion of the natural flow data analysis and compilation of the 51 curve sets (43 tributary and 8 mainstem), the amount of flood volumes at discrete locations within the basins were quantified. At mainstem locations, total volumes reflected the combined flows of between 5 and 20 individual tributaries (depending on location). To perform simulations with the reservoir and hydraulic models, this total volume needed to be redistributed into the system of tributaries through a flood pattern.

In nature, storms trigger high flows on isolated tributaries and large-scale river systems as a function of storm structure, air temperature, water content, storm path, orographic influence, basin alignment, and a host of other geophysical and meteorological variables. Ultimately, all storms are unique, but certain dynamics tend to be common to a variety of storm types,

especially those that trigger productive (in terms of volume) events within the Central Valley. Development of patterns is possible through a number of methods, including random generation, use of a singular historic event, and uniform or ramped concurrencies.

The most realistic patterns for synthetic floods are formulated based on historic storms. A detailed analysis of several events was undertaken to identify flood trends and distributions that could be incorporated into generalized patterns.

Retrospective of Historic Flood Events

Nineteen historic flood events were analyzed. Events were chosen based on the natural 3-day rain flood volumes produced at Central Valley flood damage reduction reservoirs. On a project by project basis, any event that was both the largest 3-day natural flow experienced during that water year and one of the five largest 3-day natural flows in the gage history of that project was selected for analysis. Though this selection process focused on tributary events, often the same year was selected for multiple projects. This was especially true for the largest flood years on record (i.e., 1997, 1986, and 1956). Therefore, the 19-storms represent a mixed population of storms that were focused on individual tributaries as well as those that had a powerful system-wide effect.

For each year, a time window was set that contained both the tributary event, which had been elected for inclusion that year, and provided additional time allowing the storm pattern to complete its influence throughout the basin. Duration flows (1-, 3-, 7-, 15-, and 30-day average flows) within this event window were analyzed for all significant tributaries and several mainstem locations. These flows were translated into annual percent chance exceedence values based on the unregulated flow and index frequency curves developed for tributary and mainstem locations during the natural flow analysis.

By comparing annual percent chance exceedences instead of flow rates, the distribution of storm patterns is normalized spatially. Percent chance exceedences provide a consistent measure of intensity from basin to basin, while flow rates, as a function of drainage area, alignment, and others, are tributary specific. Investigating chance exceedences clarifies patterns, in terms of how individual storm systems impacted a system of tributaries. Considering multiple storm events1 highlights trends linking tributary responses and orographic influence in rare events, which form the basis for, and can be incorporated into, the development of generalized storm patterns.

Flood Matrix

All annual chance exceedence events, locations of interest, flood durations, and year of event were tabulated into Sacramento and San Joaquin Basin storm matrices referred to jointly as the Matrix, as shown in Attachment B.3.

The Matrix is a valuable product of this study; it provides the nineteen historic flood events analyzed for comparison of runoff for all major tributaries in a complex hydrologic system. The matrices are laid out in upstream to downstream fashion, allowing storm and tributary dynamics to be looked at in diverse permutations of flood durations, storm combinations, and tributary sets.

Matrix investigations pointed to several trends that were eventually incorporated into the synthetic flood runoff centerings. Among the first dynamics noticed was the presence of spatial trends and storm bull's eyes within individual storm events. Bull's eyes were created as historic storms impacted certain spatial areas with greater intensity than surrounding areas. Nearly all events in the Matrix displayed some sort of spatial trend or bias towards a specific area. The floods of February 1986, for example, were most intense over the mid-latitudes of the Central Valley, including the lower Sacramento Basin (Feather, Yuba, Bear, and American rivers), Delta (Mokelumne and Cosumnes rivers), and Lower San Joaquin rivers (Stanislaus River). Perhaps the most isolated storm centering occurred in 1967 in the southern end of the Central Valley, where Success Reservoir, on the Tule River, filled and spilled overnight. During this event, the Kings River at Pine Flat Reservoir, a neighboring tributary to the north, experienced a 1-day, 1.69-percent chance exceedence event. The chance exceedence exceedence on the San Joaquin River, just one watershed further north, equated to less than an annual 5-percent chance exceedence event. No other tributary north of this point registered higher than an annual 16.67-percent chance exceedence event.

Mainstem locations below these "bull's eyes" experienced greater exceedence frequencies, because here the intensity of flooding is a function of all upstream tributaries, not just those that were especially intense. In this sense, the mainstem acts as a buffer, which absorbs and moderates localized extremes because they alone do not add enough volume to the system to maintain the larger, less frequently occurring storm events.

A key finding was that orographic effects were most pronounced in the rarest, least frequently occurring events. The January 1997 floods were the maximum on record in the lower San Joaquin Basin. In this event, as well as 1982, 1967, 1951 and, to a lesser extent, 1986 and 1956, storm events were consistently more extreme in the higher elevation San Joaquin basins than in the foothill tributaries. This relationship highlights the effects of the high Sierra in the San Joaquin and Tulare basins.

Orographic effects in the Sacramento Basin were definitely visible, but not as well defined as those in the San Joaquin. Still, higher basins in the floods of 1974 and 1956, and to a lesser extent in 1997 and 1986, displayed distinctively more extreme storm events than the lower basins. It is likely that the more pronounced orographic influence in the southern Central Valley is related to the average ridge crest elevation along the Sierras, which is generally lower in the Sacramento Basin than in the San Joaquin and Tulare, but this remains uncertain.

The years cited above for both the Sacramento and San Joaquin basins basically comprise a subset of the Matrix containing the most severe historical events analyzed in this study. For storms that were generally less intense, orographic effects were muted at best and basically not visible. Storms tended to become more and more evenly distributed until any dynamics that could potentially be tied to orographics were just as likely attributed to random noise.

The Matrix also points out that natural dynamics are highly variable. Storm cells nested within the larger storm structure are powerful and have the ability to trigger individual tributaries significantly (i.e., the 1986 flood on the Bear River). Even with the supporting evidence for orographic influence, there are Matrix examples of floods that demonstrate a consistently opposite bias; in the San Joaquin Basin during the March 1995 floods and in the Sacramento Basin during the 1983 floods, annual percent chance exceedences for foothill tributaries were lower than those of neighboring higher basins.

SYNTHETIC FLOOD RUNOFF CENTERING

General

Based on trends identified in the historic storm analysis and in keeping with the concept of the Composite Floodplain, guidelines for centering development were formulated and synthetic flood runoff centerings were constructed.

In the context of this study, a flood runoff centering is defined simply as a set of synthetic exceedence frequencies assigned to a set of tributaries. Centerings were developed separately for the Sacramento and San Joaquin basins. Each tributary was included in all centerings within its basin.

Two basic types of flood runoff centerings were analyzed. The first consists of basin-wide flood events (mainstem centerings), which are significant on a regional basis and produce large runoff volumes throughout the system. The second are tributary specific floods (tributary centerings), which generate extremely large floods on individual rivers, but are not widespread enough to produce the runoff volumes typical of basin-wide events.

Mainstem centerings were prepared at Ord Ferry, Sacramento, El Nido, Newman, and Vernalis; tributary centerings were prepared for 18 individual rivers (8 in the Sacramento Basin and 10 in the San Joaquin) to represent synthetic annual 50-, 10-, 4-, 2-, 1-, 0.5-, and 0.2-percent chance exceedence events. Flood runoff centering tables for mainstem and tributaries are located in Attachment B.4.

Due to the differences in flood character, mainstem and tributary centerings needed to be addressed with separate sets of governing guidelines. There are similarities between rule sets, but in general, approaches are dissimilar.

Mainstem Flood Runoff Centering

Mainstem centerings were designed to stress widespread valley areas. Index frequency curves were prepared at Ord Ferry and Sacramento in the Sacramento River Basin, and at El Nido, Newman, and Vernalis in the San Joaquin River Basin. These curves provide the hypothetical volumes that the basin will produce during simulations of each of the seven synthetic exceedence frequency flood events. The role of the mainstem centerings is to distribute these volumes back into the basin, tributary by tributary, in accordance with patterns visible in historic flood events. Once the volume is distributed it will be translated into hydrographs and routed through reservoir simulation models (Appendix C) to produce the seven synthetic exceedence frequency regulated hydrographs needed to construct floodplains throughout the system.

Mainstem centerings reflect a generalized flood pattern based on a number of historic events. Through the incorporation of multiple floods into one characteristic pattern, relationships between tributaries become more stable and the influence of powerful, but isolated, storm cells are downplayed.

Characteristic patterns were developed for each mainstem location. Where available, historic events that displayed flood "bull's eyes" in the watershed above the mainstem location of interest were used to formulate synthetic patterns. The orographic effects noted in the Matrix analysis

were also incorporated, especially for the largest, less frequently occurring synthetic exceedence frequency events.

To assure that patterns were developed consistently, guidelines for mainstem pattern construction were formulated and are presented in Table 7. A key guide and concept is that the exceedence frequency of any single tributary cannot be less than that of the mainstem target location. This constraint was established to accommodate two points of logic. First, concurrent events of the same annual percent chance exceedence (i.e., a 1-percent chance exceedence event) occurring on all tributaries will lead to a mainstem flood more extreme than a storm event of the same percent chance exceedence occurring without any other tributary or upstream contributions. The second point is related to the Composite Floodplain Concept and takes into account that these hydrologic results are intended for use in floodplain delineation and estimation of without-project damages.

Use of the generalized pattern is not necessarily representative of historic flooding. In nature, and as reflected by the Matrix, floods display localized extremes which exceed that of the overall system. However, if a mainstem flood runoff centering was used that incorporated a tributary annual percent chance exceedence lower than the targeted mainstem location, the floodplain delineated would not be directly usable in the Composite Floodplain, because the extent of inundation along the tributary would be larger than that of the simulated synthetic exceedence frequency event.

A potential solution to this would be to use the centering, but to omit that tributary's extent of inundation from the Composite Floodplain and characterize damages along that stretch with an annual percent chance exceedence event equal to that of the target location. This remedy becomes convoluted when one considers how best to represent the influence of that particular tributary. This is especially true in areas where the influence shaping the floodplain begins to transition from this mainstem centering to other centerings, either tributary or mainstem. In these transition zones, it is difficult to isolate the influence of any single tributary and the decision regarding whether to screen out inundation and damages proves to be difficult and subjective. These approaches, all centered around the direct use of a singular historic pattern, were considered and discarded in favor of generalized mainstem patterns.

After an initial pattern was formulated, hydrographs were constructed at tributary locations (in accordance with the pattern) and routed back to the mainstem location with the same procedure used during construction of the index frequencies as shown in Attachment B.4. Duration maxima (1-, 3-, 7-, 15-, and 30-day) were computed for the mainstem hydrograph and compared with the average flows from the index curve. The initial pattern was then increased or decreased by a fixed percentage and the comparison process was repeated. This iterative procedure continued until the final centering produced flood volumes at the mainstem location that were roughly equal to the hypothetical volumes specified by the index curves. A detailed sample mainstem centering development is presented in Attachment B.4.

TABLE 7

GUIDELINES FOR THE PREPARATION OF MAINSTEM CENTERINGS FOR THE SACRAMENTO AND SAN JOAQUIN RIVER BASINS

Guidelines for the Preparation of Mainstem Centerings
1) All mainstem centerings must be supported by patterns visible in historic floods. 2) Flood volumes produced by a mainstem centering must be roughly equal to the hypothetical volumes specified by the index volume curves. 3) The annual percent chance exceedence event of any individual tributary cannot be less than that of the mainstem centering being developed. 4) Orographic effects are most pronounced in the rarest, less frequently occurring events. a) Basins higher in elevation experience less frequent exceedence events than do lower elevation basins during mainstem centering simulations of 1-, 0.5-, and 0.2-percent chance exceedence events. b) During 4- and 2-percent chance exceedence events, orographic effects are less pronounced and mainstem centerings begin to reflect a more evenly distributed pattern. c) In simulating 50- and 10-percent chance exceedence events, mainstem centerings reflect an evenly distributed pattern. 5) As an individual tributary becomes more distant from the mainstem location of interest, the annual percent chance exceedence of that tributary is increased. For example, the percent chance exceedence assigned to the Sacramento River at Shasta Dam must be lower during the simulation of a 1-percent chance exceedence storm runoff centering at Verona than during a 1-percent chance exceedence storm runoff centering at Ord Ferry. This relationship is maintained within the context of the first rule (i.e. if Shasta is reduced for a downstream 1-percent chance exceedence storm runoff centering, Battle Creek must be reduced proportionately to assure that Shasta, as the higher basin, still has a lower annual percent chance exceedence due to orographic influences.

Tributary Flood Runoff Centering

Tributary centerings were designed to stress individual tributary systems. Whereas the mainstem centerings were formulated as spatially distributed events that were productive on a system-wide basis, tributary centerings were designed to simulate extreme floods on individual rivers generated by storm systems that were not widespread enough to produce runoff volumes typical of basin-wide events. In this sense, tributary centerings seek to reflect the powerful and isolated storm cells intentionally downplayed by the mainstem centerings.

Preparation of tributary centerings, as shown in Table 8, was more straightforward than those prepared for the mainstem, because in any tributary centering, the exceedence frequency of the target tributary was set equal to the desired chance exceedence event (i.e., development of a 1-percent chance exceedence storm runoff centering for the Tuolumne River includes a 1-percent chance exceedence inflow to Don Pedro Reservoir). Also, all other tributaries experienced a greater (in frequency) chance exceedence event and, as there were no downstream target volumes, no iterative procedure was required. Considering these inherent features, the only remaining step was to determine how neighboring rivers were related to the target tributary.

Intertributary relationships were defined using historical patterns visible in the Matrix. For each tributary centering, the 19 historic events were analyzed to determine if any were focused most intensely over that specific tributary. Once suitable historic events were found, exceedence frequencies for tributaries neighboring the target river were increased by the highest rate visible in the historic flood patterns. Tributary frequencies were reduced in this manner until reaching a

maximum chance exceedence event or until the tributary was distant enough from the target river to have no possible influence on that tributary's floodplain (at which point it was also increased to a maximum exceedence frequency). The exceedence frequencies of concurrent events on the distant tributaries were assumed to be approximately 10 times the target tributary's exceedence frequency. Again, all tributaries within the Sacramento or San Joaquin Basin were included in each flood runoff centering regardless of proximity to the target location. A detailed sample of tributary centering development is presented in Attachment B.4.

TABLE 8

GUIDELINES FOR THE PREPARATION OF TRIBUTARY CENTERINGS FOR THE SACRAMENTO AND SAN JOAQUIN RIVER BASINS

Guidelines for the Preparation of Tributary Centerings
1. All tributary centerings must be supported by patterns visible in historic floods. 2. Generic patterns not supported by the historic flood analysis may need to be applied to tributaries, which have not been the focal basin in any of the 19 historic events. 3. The exceedence frequency of the target tributary is always set equal to the desired annual chance exceedence event. 4. No other tributary can have an exceedence frequency as large as that specified for the target tributary. 5. a) Exceedence frequencies for adjacent tributaries are reduced by the highest rate visible in historic flood patterns. This maximum reduction rate defines the relationship between those tributaries as the target tributary moves further and further away. b) Tributary exceedence frequencies are reduced in this manner until reaching a maximum chance exceedence event, which is a function of the target exceedence frequency, or until the tributary is distant enough from the target tributary to have no possible influence on that tributary's floodplain, at which point it would also be increased to the established maximum chance exceedence event.

In some cases, individual tributaries were not the focal basin in any of the 19 historic events and did not occur in greater frequency than events of neighboring tributaries consistently enough to formulate a centering. Here, generic patterns unsupported by the historic flood analysis were applied. Tributaries that needed to be simulated with these patterns were typically small foothill or west-side basins.

Once a tributary centering was prepared it was deemed complete pending a test that translated centerings to hydrographs and routed tributary flows to the nearest downstream index curve location. Duration maxima (1-, 3-, 7-, 15-, and 30-day) were then computed for each of the resultant seven synthetic exceedence frequency natural flow hydrographs and compared with the average flows from the corresponding index frequency curves. For each tributary centering, it was confirmed that the flows experienced at the mainstem points were lower than those generated by the corresponding mainstem centering. This affirmed that the floodplains in mainstem locations are more likely to be shaped by the widespread floods simulated with mainstem centerings.

Development of Seven Synthetic Exceedence Frequency Natural Flow Hydrographs

To this point, the discussion has focused primarily on flood frequencies, not on flood flows. The final topic in the Synthetic Hydrology Methodology is the translation of frequencies to hourly

flood hydrographs for use in reservoir simulations (Appendix C) and hydraulic modeling (Appendix D). The translation process is depicted in Plate 4 and involves 3 steps: 1) obtaining the average flood flow rates from the unregulated frequency curves; 2) separate these average flows into wave volumes; and 3) distributing volumes into the 6 wave series. This process is performed only at the tributary locations. Mainstem flood hydrographs always result from the routed contributions of upstream tributaries.

Average Flood Flows

The process of preparing flood hydrographs begins by using unregulated frequency curves to translate all of the exceedence frequencies in the synthetic patterns to average flow rates. In this study, a spreadsheet was developed that used the adopted statistics for the 5-, 10-, 15-, 20-, 25-, and 30-day durations to translate specific annual chance exceedence events to flows. This approach produces the same results as would be obtained by manually reading average flows off of individual curves for each chance exceedence event. By using the adopted statistics to quantitatively describe the frequency curves, the process was automated.

Often, the unregulated frequency curves had been prepared using 1-, 3-, 7-, 15-, and 30-day durations. In these cases, values for the 5-, 10-, 20-, and 25-day durations were obtained through interpolation.

Separation of Average Flows into Wave Volumes

The values from the frequency curves represent the average flow anticipated over a specific time interval. For instance, the 5-day value is the average flow expected during the highest 5-days of flooding during any of the seven synthetic exceedence events. Likewise, the 10-day value is the average over the highest 10-days of flooding. Though not always the case, it is typical for the highest 5- day period to be part of the highest 10-day period as well as part of the highest 15-day, 20-day and so on. Essentially, shorter durations tend to fall within the longer.

Holding this to be true, flood volumes were computed by multiplying the average flows by their respective durations. These values represented the total volumes of water anticipated during the highest 5-, 10- 15-, 20-, 25-, or 30-days of flows. Furthermore, these volumes were portioned into time segments by subtracting volumes of the shorter durations from the next longer duration. For example, the 5-day volume was subtracted from the 10-day volume and the remainder was equal to the amount of flood volume that is produced by the tributary between the extents of the 5-day and 10-day maximum periods.

This procedure was repeated for the 10-, 15-, 20-, 25-, and 30-day durations and resulted in a set of seven synthetic exceedence frequency flood volumes produced by the tributary. These 6 volumes were treated as wave volumes in a series of 5-day waves.

Distribution of Volumes into Hourly Flood Hydrographs

In this study, the basic pattern of all synthetic flood hydrographs was a 30-day hourly time series consisting of 6 waves, each 5-days in duration. Volumes were ranked and distributed into the basic pattern. The highest wave volume was always distributed into the fourth, or main, wave. The second and third highest volumes preceded and followed the main wave, respectively. The fourth highest volume was distributed into the second wave and the fifth highest was distributed

into the final of the six waves. The sixth and smallest wave volume was distributed into the first wave of the series. The shape of each wave is identical and the magnitude is determined by the total volume that the wave must convey.

The presence of six distinct waves in the constructed series appears to be unnatural. While there are examples in the gage record which display this multiple wave dynamic, it is also important to keep in mind that the series of six 5-day waves is first and foremost a method used to redistribute volumes from the frequency curves into hydrographs for further analysis.

5-Day Pattern

In the Sacramento River Basin, no extensive archives of hourly natural patterns existed. Five-day wave patterns were constructed by adjusting regulated gage records for the 1997 flood event in accordance with changes in upstream storage. Natural series were computed for all tributaries locations except the Sacramento River at Shasta Dam, Feather River at Oroville, and Deer Creek near Smartsville. At these sites, insufficient data at headwater reservoirs precluded the accurate computation of natural flows; regulated flows were used as pattern hydrographs.

The distribution of tributary flood volumes into these 5-day wave patterns was automated within the same spreadsheet that translated frequencies to average flows. In fact, the process was mechanized to the point where generation of the 30-day hourly series was entirely driven by entering the exceedence frequencies of the tributaries within each centering into the spreadsheet. Hydrographs were automatically computed and could be copied into text files for direct entry into HEC-DSS (HEC, Data Storage System).

QUALIFICATION OF BASE CONDITION RESULTS

In defining baseline hydrologic conditions for the occurrence of 50-, 10-, 4-, 2-, 1-, 0.5-, and 0.2-percent chance exceedence events, 70 Sacramento and 91 San Joaquin Basin flood runoff centerings have been analyzed. As each centering involved the construction of at least 20 hydrographs, over 3,220 flood series have been prepared. All work was performed with consistent approaches while maintaining the vision that tools capable of replicating the process and testing the methodology must support definition of the baseline. This hydrology provides a sound basis for feasibility level, regional plan formulation as well as regional reservoir, hydraulic, and economic modeling, but does not necessarily provide the detail required for project implementation.

Hydrologic analyses performed for such a large spatial area, and at the level of detail documented herein, present challenges and opportunities unique to such an ambitious study. The Comprehensive Study has made possible a system-wide update for Central Valley unregulated flood hydrology and an overall modernization of the models used by Sacramento District hydrologists and engineers. These accomplishments will prove valuable to the Comprehensive Study and to future studies undertaken by public and private organizations.

One product not discussed in this report is the hydrologic data set that has been compiled in the process of investigating and defining the baseline hydrology. A massive data collection effort was undertaken to support the construction of unregulated frequency curves and model development and calibration. Data were obtained directly from Central Valley and federal water

agencies, including U.S. Bureau of Reclamation, U.S. Geological Survey, U.S. National Weather Service, California Department of Water Resources (Northern, Central, and San Joaquin Districts), California Irrigation Management Information System, Oroville-Wyandotte Irrigation District, South Sutter Water District, Placer County Water Association, Nevada Irrigation District, Surface Water Data, Sacramento County, East Bay Municipal Utility District, Fresno Metropolitan Flood Control District, Tri-Dams, City of Roseville, Southern California Edison, Sacramento Metropolitan Utility District, and Pacific Gas and Electric. It is anticipated that this data will be made available to all interested parties via the Internet and it is further recommended that these archives be maintained in cooperation with all involved organizations to expedite future studies and research.

Recent developments in policy have advocated the use of watershed approaches in hydrologic studies. The Riverine Ecosystem Restoration and Flood Hazard Mitigation Initiative (Challenge 21) provides funding and expanded authority for the USACE to undertake studies with a broad focus on entire watersheds and possible implementation of nonstructural flood damage reduction projects and floodplain and riverine restoration. The Sacramento and San Joaquin River Basins Comprehensive Study, and specifically the Synthetic Hydrologic Analysis, has embraced this holistic watershed emphasis.

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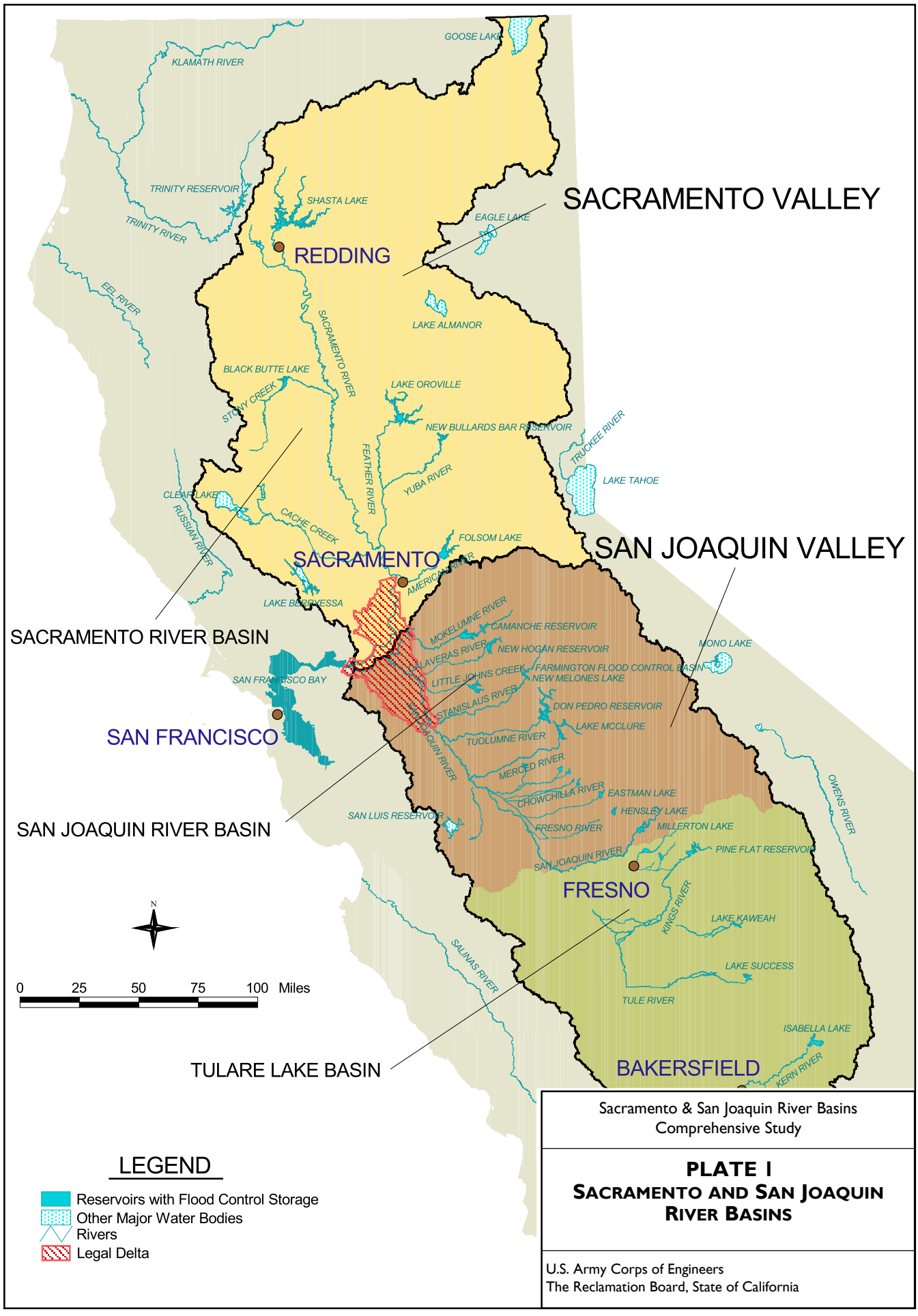

GOOSE LAKE
KLAMATH RIVER
TRINITY RESERVOIR
TRINITY RIVER
SHASTA LAKE
EAGLE LAKE
SACRAMENTO VALLEY
REDDING
EEL RIVER
LAKE ALMANOR
SACRAMENTO RIVER
BLACK BUTTE LAKE
STONY CREEK
LAKE OROVILLE
NEW BULLARDS BAR RESERVOIR
TRUCKEE RIVER
FEATHER RIVER
YUBA RIVER
LAKE TAHOE
CLEAR LAKE
RUSSIAN RIVER
CACHE CREEK
FOLSOM LAKE
SAN JOAQUIN VALLEY
SACRAMENTO
AMERICAN RIVER
LAKE BERRYESSA
SACRAMENTO RIVER BASIN
MOKELUMNE RIVER
CAMANCHE RESERVOIR
MONO LAKE
CALAVERAS RIVER
NEW HOGAN RESERVOIR
FARMINGTON FLOOD CONTROL BASIN
LITTLE JOHNS CREEK
NEW MELONES LAKE
SAN FRANCISCO BAY
STANISLAUS RIVER
DON PEDRO RESERVOIR
SAN FRANCISCO
LAKE MCCLURE
SAN JOAQUIN RIVER
TUOLUMNE RIVER
MERCED RIVER
OWENS RIVER
CHOWCHILLA RIVER
EASTMAN LAKE
HENSLEY LAKE
SAN LUIS RESERVOIR
MILLERTON LAKE
FRESNO RIVER
SAN JOAQUIN RIVER BASIN
PINE FLAT RESERVOIR
SAN JOAQUIN RIVER
FRESNO
KINGS RIVER
LAKE KAWEAH
SALINAS RIVER
LAKE SUCCESS
TULE RIVER
ISABELLA LAKE
TULARE LAKE BASIN
BAKERSFIELD
KERN RIVER
N
0 25 50 75 100 Miles
LEGEND
Reservoirs with Flood Control Storage
Other Major Water Bodies
Rivers
Legal Delta
Sacramento & San Joaquin River Basins
Comprehensive Study
PLATE 1
SACRAMENTO AND SAN JOAQUIN
RIVER BASINS
U.S. Army Corps of Engineers
The Reclamation Board, State of California

Sacramento & San Joaquin River Basins
Comprehensive Study

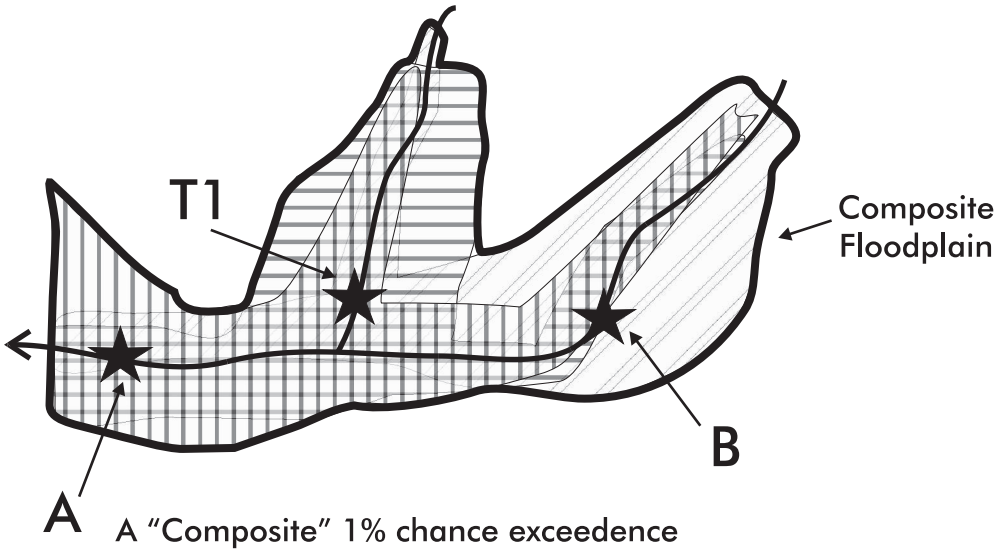
PLATE 2
WATERSHED AND SNOWPACK AREAS ABOVE MAJOR CENTRAL VALLEY FLOOD MANAGEMENT DAMS

U.S. Army Corps of Engineers
The Reclamation Board, State of California

Floodplain from event that produces 1% chance exceedence flows at index point A on mainstem river

Floodplain from a 1% chance exceedence event at an index point on Tributary 1

Floodplain from event that produces 1% chance exceedence flows at index point B on mainstem river



A "Composite" 1% chance exceedence floodplain is the maximum extent of floodplains resulting from 1% chance exceedence events at all index points

Sacramento & San Joaquin River Basins Comprehensive Study

PLATE 3

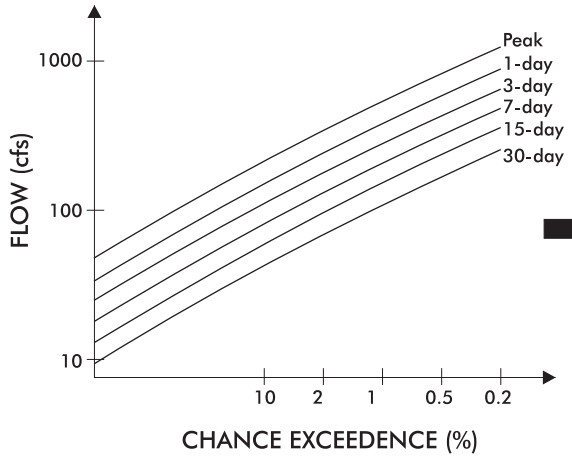
COMPOSITE FLOODPLAIN CONCEPT

U.S. Army Corps of Engineers
Reclamation Board, State of California

June 2002

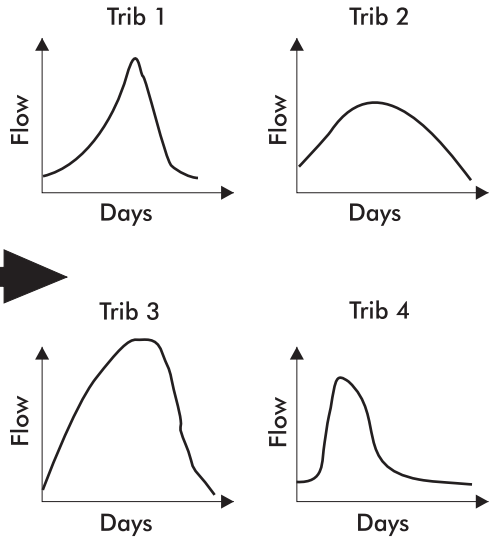
US_Army_COE-Sac\comprehensive study\F4 conference\appendix figs dec 02.cdr

Full Natural Flow



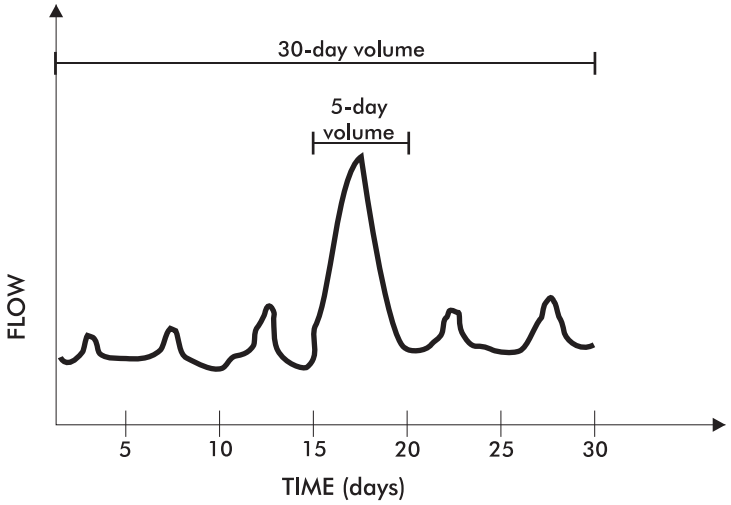
Full natural flow volumes were developed for each of 7 synthetic exceedence events on each tributary

Tributary-Specific Patterns



Tributary-specific hydrograph patterns were used to translate 5-day incremental volumes to flow patterns

Flow Patterns were combined to develop a 30-day period



Resulting 30-day hydrographs for each of the 7 exceedence events on each tributary

Sacramento & San Joaquin River Basins Comprehensive Study

Plate 4

HYDROGRAPH CONSTRUCTION

U.S. Army Corps of Engineers
Reclamation Board, State of California

July 2002

ATTACHMENT B.1

NATURAL FLOW DATA DOCUMENTATION

TABLES

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TABLE B.1-1

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
1	**Sacramento River at Shasta Dam**			
	1931-1944	Sacramento River at Kennett	Adjusted for changes in storage in Britton.	a, b
	1945-1998	Shasta Inflow	Adjusted for changes in storage in Britton, Pit 6, Pit 7, Iron Canyon, and McCloud and Shasta Reservoirs.	a, b
2	**Clear Creek near Igo**			
	1940-1963	Clear Creek near Igo	None	a, b
	1964-1999	Clear Creek near Igo	Adjusted for changes in storage in Whiskeytown by subtracting Trinity River inflow and adding outflow through Clear Creek Powerplant. Local inflow between Whiskeytown and Igo not considered. Water year 1977 excluded as low outlier.	a, b
3	**Cottonwood Creek near Cottonwood**			
	1941-1999	Cottonwood Creek near Cottonwood	Water year 1977 excluded as low outlier.	a, b
4	**Cow Creek near Millville**			
	1950-1999	Cow Creek near Millville	Water year 1977 excluded as low outlier.	a, b
5	**Battle Creek below Coleman Fish Hatchery**			
	1941-1961	Nr. Cottonwood gage 0.6 miles upstream of current location	Considered unregulated flow – effect of small hydropower plants and reservoirs not significant during high flow.	a, b
	1962-1996	Nr. Cottonwood gage at current location High flow gage discontinued in 1996	Same as above. Water year 1977 excluded as low outlier.	a, b
	1997	Mill Creek near Los Molinos	Based on January through March 1995 data, the following correlation was developed: Battle Creek = 1.007*Mill Creek + 485 cfs	a, b

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

TABLE B.1-1 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
6	**Mill Creek near Los Molinos**			
	1922-1928	Deer Creek near Vina	Mill Creek flows estimated at 89.4 percent of Deer Creek flows.	b
	1929-1998	Mill Creek near Los Molinos	Water year 1977 excluded as low outlier.	a, b
7	**Elder Creek near Paskenta**			
	1922-1947	Thomes Creek near Paskenta	Elder Creek flows estimated at 32.8 percent of Thomes Creek flows.	b
	1948-1998	Elder Creek near Paskenta	Water year 1977 excluded as low outlier.	a, b
8	**Thomes Creek near Paskenta**			
	1920-1996	Thomes Creek near Paskenta High flow gage discontinued in 1996	Water year 1977 excluded as low outlier.	a, b
	1997	Elder Creek near Paskenta	Thomes Creek flows estimated at 305 percent of Elder Creek flows.	a, b
9	**Deer Creek near Vina**			
	1912-1915 1921-1998	Deer Creek near Vina	Water year 1977 excluded as low outlier.	a, b
10	**Big Chico Creek near Chico**			
	1922-1930	Deer Creek near Vina	Big Chico Creek flows estimated at 45.8 percent of Deer Creek flows.	a
	1931-1986	Big Chico Creek near Chico	Water year 1977 excluded as low outlier.	a, b
	1987-1997	Deer Creek near Vina	Big Chico Creek flows estimated at 45.8 percent of Deer Creek flows.	a
	1987-1997	Big Chico Creek at Chico, Lindo Creek Channel, Mud Creek Diversion	Big Chico Creek flows estimated as sum of flow at three gages.	b

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

TABLE B.1-1 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
11	**Stony Creek at Black Butte Dam**			
	1922-1963	Thomes Creek near Paskenta	Applied water year volume ratio between Stony Creek at Black Butte Dam and Thomes Creek at Paskenta to Thomes Creek daily flows except for years 1938 and 1940, in which a ratio of 2.07 was used based on ratios for 1964 through 1996 flows.	a
	1964-1998	Stony Creek below Black Butte	Regulated flows adjusted by daily storage changes in Black Butte storage, Stony Gorge, and East Park reservoirs with no lag for travel time. Adjusted high and low spikes in summer flows. Some high spikes exceeded full natural volume of winter flows in same water year. Some low spikes were negative.	a, b
12	**Butte Creek Near Chico**			
	1922-1930	Deer Creek Near Vina	Deer Creek flows multiplied by 1.224, based on 97% correlation of annual flows between this gage and Buttte Creek near Chico gage for period 1931-1996.	a
	1931-1998	Butte Creek Near Chico	Unregulated flow at this location.	a, b
13	**Feather River At Oroville Dam**			
	1901-1987	Feather River at Oroville and Feather River at Thermalito Afterbay	Combined daily changes in storage: Lake Oroville Thermalito Afterbay Sly Creek Reservoir Little Grass Valley Res (lag 1 day), Bucks Lake (lag 1 day) Butt Valley Res (lag 1 day) Lake Almanor (lag 1 day) Antelope Lake (lag 1 day) Mountain Meadows Res (lag 1 day) Lake Davis (lag 1 day) With mean flows at these gages.	a, b
	1987-1997	Feather River at Shanghai Bend	Same adjustments as above, but data set had negative or missing summer flows from 1987 through 1997, which were set to zero. March through September 1997 values based on observed inflow to Oroville Reservoir, not adjusted for upstream operations.	a, b
14	**North Yuba River at New Bullards Bar Dam**			
	1938-1998	North Yuba River at New Bullards Bar Dam	Adjusted for daily change in storage in Bullards Bar beginning in 1968.	a

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

TABLE B.1-1 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
15	**Yuba River at Marysville**			
	1903-1941	Yuba River at Smartville, below Deer Creek	Adjusted all records (beginning year) for daily changes in upstream storage at: Bowman Lake (1926) Scotts Flat Res (1949) Jackson Meadows Res (1946) Bullards Bar (1968) No adjustment made for Englebright because inflow approximates outflow. No travel times used to route upstream storage changes to downstream locations. After upstream adjustments completed, all negative and missing flows were set to zero.	a, b
	1942-1943	Yuba River below Englebright Dam	Same as above.	a, b
	1944-1998	Yuba River Near Marysville	Same as above.	a, b
16	**Deer Creek at Smartville**			
	1935-1998	Deer Creek at Smartville	Adjusted for upstream regulation at Scotts Flat Res from 1949-1998. Daily change in storage at Scotts Flat are not available, but was estimated from end of month storage in CDEC.	a, b
17	**Bear River near Wheatland**			
	1906-1927	Bear River at Van Trent	Intended to increase daily flows at Van Trent by 10 percent to account for differences in drainage area of 263 sq. mi at Trent to 292 sq. mi. near Wheatland. Actually increased by 1 percent.	a
	1922-1998	Bear River Near Wheatland	Adjusted all records (beginning year) for daily changes in upstream storage at: Camp Far West Res (1963) Rollins Res (1964) 1928 estimated as 0.24 times Yuba River at Smartville streamgage flow. Daily reservoir data through 1987 from Corps, 1988-1998 from agencies. No travel times used to route upstream storage changes to downstream locations. Bear River flows for water year 1928 and part of 1929 were estimated as 24 percent of gaged flows for Yuba River at Smartville.	a, b

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

TABLE B.1-1 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
18	**Cache Creek at Clear Lake**			
	1922-1998	Cache Creek at Clear Lake	Adjusted flows at lake outlet with daily changes in storage based on lake elevation. Water year 1977 excluded as low outlier.	a, b
19	**North Fork Cache Creek at Indian Valley Dam**			
	1931-1998	North Fork Cache Creek near Lower Lake	Used ratio of flow at gage prior to construction of Indian Valley Res. (1975). Adjusted for reservoir operation for period following construction. Water year 1977 excluded as low outlier.	a
20	**American River at Fair Oaks**			
	1905-1998	American River at Fair Oaks	Adjusted for daily changes in storage at upstream reservoirs: French Meadows Hell Hole LoonLake Union Valley Folsom All upstream adjustments lagged 1 day. Inter-basin diversions considered minor in comparison to total natural flows and were neglected.	a, b
21	**Putah Creek near Winters**			
	1931-1998	Putah Creek near Winters	Adjusted for daily changes in storage in Berryessa based on elevation starting in 1957. Has potential for error due to large size of reservoir as compared to daily inflow. Water year 1977 excluded as low outlier.	a
22	**Kings River at Pine Flat Dam**			
	1896-1998	Kings River near Piedra	Adjusted for operations of Wishon and Courtright and Pine Flat reservoirs.	c
23	**Big Dry Creek at Big Dry Creek Dam**			
	1917-1947	Unregulated Inflow to Friant	Big Dry Creek daily flows set at 2.5 percent of unregulated inflow into Friant.	a, c
	1948-1990 1995-1998	Big Dry Creek at Big Dry Creek Dam	No data available for years 1991 to 1994 due construction of dam.	b, c

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

TABLE B.1-1 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
24	**San Joaquin River at Friant Dam**			
	1902-1998	San Joaquin River at Friant	Adjusted for changes in storage at upstream reservoirs: Edison, Florence, Huntington, Shaver, Mammoth, Redinger, Kerckoff and Friant.	c
25	**Fresno River at Hidden Dam**			
	1917-1940	Fresno River near Knowles	Adjusted flow data at Knowles: drainage areas above Knowles is 132 sq. mi.,drainage area above Hidden Dam is 243 sq. mi.	c
	1941	Chowchilla River Inflow to Buchanan	Fresno River flow =111% of Chowchilla River flow.	c
	1942-1975	Fresno River near Daulton	None	a, c
	1976-1998	Fresno River inflow to Hidden	Adjusted for change in storage in Hidden Dam.	a, c
26	**Chowchilla River at Buchanan Dam**			
	1917-1921 1924-1930	Fresno River unregulated flow	Set inflow to 90 percent of Fresno river flows based on inflow volume relationship between Fresno and Chowchilla rivers for years in which annual volume was greater than 30,000 cfs.	c
	1922-1923 1931-1975	Chowchilla River at Buchanan	No regulation upstream or at Buchanan Dam.	a, c
	1976-1998	Chowchilla River Inflow to Buchanan	Adjusted for change in storage in Buchanan Dam.	a, c
27	**Mariposa Creek at Mariposa Dam**			
	1917-1932	Fresno River unregulated flow	Based on data from 1984 through 1999, developed the following correlation with Fresno River flows: Mariposa Creek = 0.643571 + 1.062561 * Fresno River flow	c
	1917-1982	Chowchilla River Inflow	Based on correlation data for 1984-1999, the following relation was used: Mariposa Creek = 0.644+0.4859 * Fresno River Flow.	a, c
	1983-1998	Mariposa Reservoir Inflow	Adjusted for change in storage in Mariposa Dam.	a, c
28	**Owens Creek at Owens Dam**			
	1917-1932	Fresno River unregulated flow	Based on correlation data for 1984 - 1999, the following relation was used: Owens Creek = 0.392 + 0.0754 * Fresno River flow	c
	1917-1982	Chowchilla River Inflow	Owens Reservoir Inflow = 0.103 * Chowchilla River flows	a, c
	1983-1998	Owens Reservoir Inflow	Adjusted for change in storage in Owens Dam.	a, c

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

TABLE B.1-1 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
29	**Bear Creek at Bear Dam**			
	1917-1932	Fresno River unregulated flow	Based on correlation data for 1984-1999, the following relation was used: Bear Creek = 1.122 + 0.2967 * Fresno River flow	c
	1917-1982	Chowchilla River Inflow	Burns Reservoir Inflow = 0.304 * Chowchilla River flows.	a, c
	1983-1998	Bear Reservoir Inflow	Adjusted for change in storage in Bear Dam.	a, c
30	**Burns Creek at Burns Dam**			
	1917-1932	Fresno River unregulated flow	Based on correlation data for 1984-1999, the following relation was used: Burns Creek = 2.362 + 0.2343 * Fresno River flow	c
	1917-1982	Chowchilla River Inflow	Burns Reservoir Inflow = 0.288 * Chowchilla River flows	a, c
	1983-1998	Burns Reservoir Inflow	Adjusted for change in storage in Burns Dam.	a, c
31	**Los Banos Creek at Los Banos Dam**			
	1917-1932	Arroyo Seco near Soledad	Based on correlation data for 1965-1997, the following relation was used: Los Banos Creek = 1.401 + 0.0882 * Arroyo Seco flow	c
	1933-1958	Orestimba Creek near Newman	Los Banos flow = 0.80 * Orestimba Creek flow	a, c
	1959-1966	Los Banos Creek near Los Banos	No upstream regulation – pre-Los Banos Reservoir.	a, c
	1967-1998	Los Banos Reservoir inflow	Adjusted for change in storage in Los Banos Dam.	a, c
32	**Orestimba Creek near Newman**			
	1917-1932	Arroyo Seco near Soledad	Based on correlation data for 1965-1997, the following relation was used: Orestimba Creek = 0.226 + 0.1758 * Arroyo Seco flow	c
	1933-1998	Orestimba Creek near Newman	No upstream regulation.	a, c
33	**Del Puerto Creek near Patterson**			
	1917-1932	Arroyo Seco near Soledad	Based on correlation data for 1965-1997, the following relation was used: Del Puerto Creek = 0.544 + 0.054 * Arroyo Seco flow	c
	1933-1964 1994	Orestimba Creek near Newman	Del Puerto flow = 0.32 * Orestimba Creek flow	a, c
	1965-1998	Del Puerto Creek near Patteson	No upstream regulation.	a, c

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

TABLE B.1-1 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
34	**Merced River at Exchequer Dam**			
	1901-1998	Merced River at Exchequer	Local inflow to Dry Creek at Snelling gage computed as 7 percent of Merced River inflow to New Exchequer Reservoir.	c
	1927-1998	Merced River at Exchequer	Adjusted for change in flow at Exchequer Dam.	a, c
35	**Tuolumne River at New Don Pedro Dam**			
	1896-1949	Tuolumne River at LaGrange	Adjusted for change in storage in Hetch Hetchy, Eleanor and Don Pedro reservoirs.	a, c
	1950-1998	Inflow to New Don Pedro Reservoir	Adjusted for change in storage in Hetch Hetchy, Cherry Valley, Eleanor and New Don Pedro reservoirs.	a, c
36	**Dry Creek near Modesto**			
	1917-1948	Tuolumne River at Don Pedro	Dry Creek flow = 0.05 * Tuolumne River natural flow	c
	1949-1998	Dry Creek near Modesto	No upstream regulation.	a, c
37	**Stanislaus River at New Melones Dam**			
	1917-1998	Stanislaus River at New Melones	Adjusted for change in storage in Donnells, Beardsley and Melones reservoirs.	a, c
38	**Littlejohn Creek at Farmington Dam**			
	1958-1998	Farmington Reservoir inflow	Adjusted for change in storage in Farmington Dam.	a
39	**Duck Creek near Farmington**			
	1958-1979	Farmington Reservoir inflow	Correlation with Littlejohn Creek used to extend record.	a
	1980-1998	Duck Creek near Farmington	No upstream regulation.	a
40	**Cosgrove Creek near Valley Springs**			
	1930-1969	Cosgrove Creek near Valley Springs	USGS gage discontinued in 1969.	a
	1991-1993 1996-1998	Cosgrove Creek near Valley Springs	COE established gage in 1991, data not available in 1994, 1995.	a

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

TABLE B.1-1 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS ON TRIBUTARIES IN SACRAMENTO AND SAN JOAQUIN RIVER BASINS

No.	Period	Gage	Adjustments	Use
41	**Calaveras River at New Hogan Dam**			
	1930-1963	Calaveras River at Jenny Lind	No data 1944-1955 and 1960-1963.	a
	1964-1998	New Hogan inflow and Jenny Lind gage	Adjusted for change in storage in New Hogan Dam.	a
42	**Mokelumne River at Camanche Dam**			
	1901-1998	Mokelumne River at Camanche Dam	Adjusted for change in storage in Salt Springs, Bear, Pardee, and Camanche reservoirs.	a
43	**Cosumnes River at Michigan Bar**			
	1908-1998	Cosumnes River at Michigan Bar	Adjustment made for upstream regulation at Sly Park Reservoir. 1977 excluded as low outlier.	a

Notes:

a. Flow data used to develop full natural flows on tributary.
b Flow data from 1922-1998 used to develop full natural flows at Sacramento River mainstem index points.
c. Flow data from 1917-1998 used to develop full natural flows at San Joaquin River mainstem index points.

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TABLE B.1-2

DATA USED TO DEVELOP FULL NATURAL FLOWS AT INDEX POINTS ON MAINSTEM SACRAMENTO AND SAN JOAQUIN RIVERS

No.	Adjustments
44	**Sacramento River at Bend Bridge – Estimation of Local Inflow**
	The following adjustments were made to estimate local inflow at Bend Bridge: (1) The period Dec – Feb for every year was used, since flows usually increase from upstream to downstream during the storm period. The period of record used is 1950 (when Cow Creek near Millville gage began) to 1996 (when Battle Creek high flow gage stopped). (2) The volumes for the 3-month periods were tabulated for Sacramento River at Keswick (Keswick Reservoir releases) and for Bend Bridge. Keswick volumes were subtracted from the Bend Bridge volumes. (3) For the volumes to be unregulated, Dec-Feb volumes for Clear Creek near Igo were subtracted from the difference in flow between Bend Bridge and Keswick. The results are the "Bend Bridge unregulated local flows." Clear Creek flows above Igo gage were not involved in subsequent computations to estimate local flow on Sacramento River above Bend Bridge. (4) The 3-month volumes for 1950 – 1996 were tabulated for streams contributing to the local flow – Cow Creek near Millville, Cottonwood Creek near Cottonwood, Battle Creek below Coleman Fish Hatchery. (5) The volumes for the 3 tributaries were added together and plotted against the Bend Bridge unregulated local flows. (6) A correlation analysis was made for the plotted points. Bend Bridge ungaged local volumes are 43 percent of the sum of the 3 tributaries. The R-Squared for the correlation between Bend Bridge local volumes and sum of 3 gaged tributaries was 0.986. The 43 percent relationship was used for the entire year, since flows can be used locally (and not returned to the system) during dry periods every year. (7) The gaged drainage area for the 3 tributaries is 1711 square miles, compared with a total local drainage between Keswick Dam and Bend Bridge of 2204 square miles (minus Clear Creek near Igo, which is regulated). 78 percent (gaged) of the drainage contributes 70 percent of the local flow. The 22 percent ungaged drainage includes the high rainfall areas south of Shasta Lake (Churn and Stillwater Creeks) and local flow on Clear Creek downstream of the Igo gage.
	(8) The 47 square mile local drainage area between Shasta Dam and Keswick was added to the local ungaged area, increasing the 493-square-mile ungaged local drainage above Bend Bridge by 10 percent. Estimated local flow contribution was increased, from 43 percent of gaged flow, to 47 percent of the gaged flow.

TABLE B.1-2 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS AT INDEX POINTS ON MAINSTEM SACRAMENTO AND SAN JOAQUIN RIVERS

No.	Adjustments
44	**Sacramento River at Bend Bridge – Estimation of Local Inflow (Continued)**
	Local flow (minus the regulated Clear Creek near Igo gage) between Shasta Dam and Bend Bridge is 147 percent of the sum of the following gaged tributaries: • Cottonwood Creek near Cottonwood • Cow Creek near Millville • Battle Creek below Coleman Fish Hatchery
45	**Sacramento River at Ord Ferry**
	The following adjustments were made to estimate local daily flows between Bend Bridge and Ord Ferry: (1) The period Dec – Feb for every year was used, since flows are usually increasing from upstream to downstream during the storm period. (2) Volumes for the 3 month periods were tabulated for Ord Ferry (1949 to 1978) and for Bend Bridge. Bend Bridge volumes were subtracted from the Ord Ferry volumes. For 1965 and 1979-81, Sacramento River at Butte City was used instead of Ord Ferry. (3) For the volumes to be unregulated, Dec-Feb volumes for Stony Creek were subtracted from the difference in flow between Bend Bridge and Ord Ferry. (4) The 3-month volumes for 1949 – 1981 were tabulated for following streams contributing to the local flow: – Mill Creek near Los Molinos, Deer Creek near Vina, Big Chico Creek near Chico (eastside tributaries) and Elder Creek near Paskenta and Thomes Creek near Paskenta (westside tributaries). Gages on other local tributaries – Paynes Creek, Antelope Creek, Red Bank Creek, have been discontinued, and those creeks do not extend into the east or west headwaters of the local drainage from Bend Bridge to Ord Ferry. (5) The volumes for the 5 tributaries were added together and plotted against the volumes for Ord Ferry unregulated local flows. (6) Based on flows for Dec – March for 1948 to 1981, corrected (due to streamflow into Butte Basin) flows for water years 1956 and 1958. Removed the years 1950, 1952, 1953, 1955, 1959, 1960, 1961, 1962, 1966, 1971, 1975, 1978, and 1979, from consideration. The year 1958 is an outlier. Volumes for Dec – Feb for the remaining years were plotted against the Ord Ferry unregulated local volumes. (7) Developed a correlation between the plotted points. Ord Ferry local volumes are 55 percent of the sum of the 5 tributaries. This relationship was used for the entire years, since flows are used locally (and not returned to the system) during the dry period every year.

TABLE B.1-2 (CONT.)

DATA USED TO DEVELOP FULL NATURAL FLOWS AT INDEX POINTS ON MAINSTEM SACRAMENTO AND SAN JOAQUIN RIVERS

No.	Adjustments
45	**Sacramento River at Ord Ferry (Continued)**
	(8) The gaged drainage area for the 5 tributaries is 707 square miles, compared with a total local drainage between Ord Ferry and Bend Bridge of 2409 square miles (minus Stony Creek at Black Butte). 29 percent of the drainage contributes 64 percent of the local flow. The 29 percent of the drainage includes the local headwaters. (9) Sacramento River unregulated flows at Bend Bridge were routed to Ord Ferry – 18 hours travel time, X = 0.2. Mill Creek gaged flows were routed to Ord Ferry – 14 hours travel time, X = 0.2; Elder Creek gaged flows were routed to Ord Ferry – 20 hours travel time, X = 0.2; Deer Creek gaged flows were routed to Ord Ferry – 14 hours travel time, X = 0.2; Thomes Creek gaged flows were routed to Ord Ferry – 20 hours travel time, X = 0.2. The 5 tributary flows are added together and Ord Ferry unregulated local flow is estimated as 155 percent of the sum (local flow includes the sum of the tributaries). Unregulated Stony Creek at Black Butte flows are routed to Ord Ferry – travel time 11 hours, X = 0.2 and added to Bend Bridge (routed) flows and local flow, for Sacramento River unregulated flow at Ord Ferry before high flows spill over into Colusa and Butte Basins.
46	**Sacramento River at Verona**
	Routed upstream flows, as described on Table B.1-1 and above.
47	**Sacramento River at Latitude Sacramento**
	Routed upstream flows, as described on Table B.1-1 and above.
48	**San Joaquin River at El Nido**
	Routed upstream flows, as described on Table B.1-1.
49	**San Joaquin River at Newman**
	Routed upstream flows, as described on Table B.1-1.
50	**San Joaquin River at Maze Rd**
	Routed upstream flows, as described on Table B.1-1.
51	**San Joaquin River at Vernalis**
	Routed upstream flows, as described on Table B.1-1.

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ATTACHMENT B.2

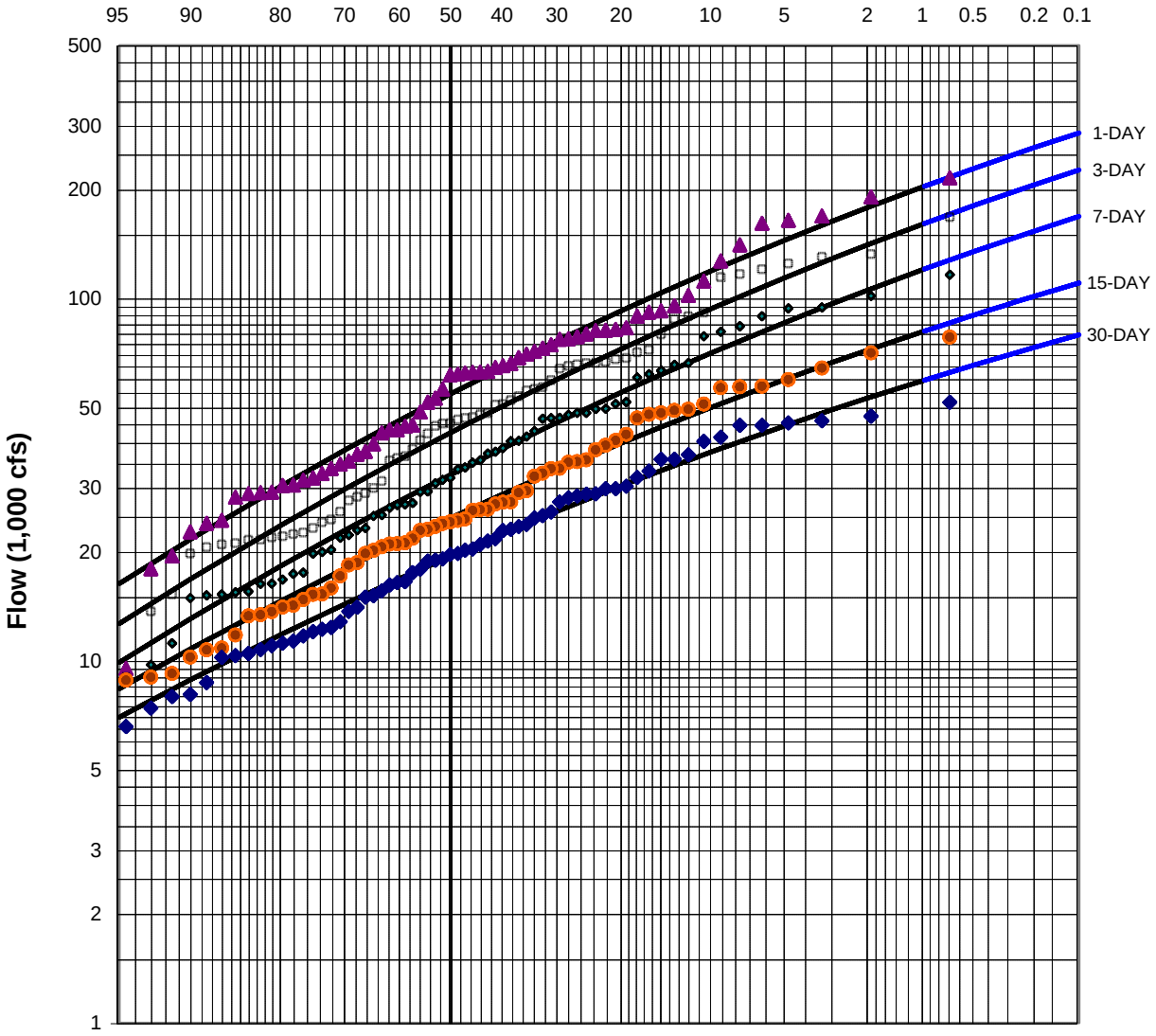
UNREGULATED FREQUENCY CURVES

Unregulated frequency curves are listed in order by basin as shown below.

SACRAMENTO RIVER BASIN

SAN JOAQUIN RIVER BASIN

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	4.721	0.290	-0.4
3-day	4.614	0.292	-0.4
7-day	4.498	0.287	-0.4
15-day	4.380	0.261	-0.4
30-day	4.275	0.246	-0.4

NOTES:

1. Equivalent years of record after correlation with Bend Bridge (1892-1998) is 98 years.
2. Adjusted USGS gage 11370000 to account for daily change in storage at upstream reservoirs (potential channel, out-of-channel, or storage losses neglected).
3. Median plotting positions.
4. Drainage area: 6,421 sq. mi.
5. Period of record: 1932-1998.

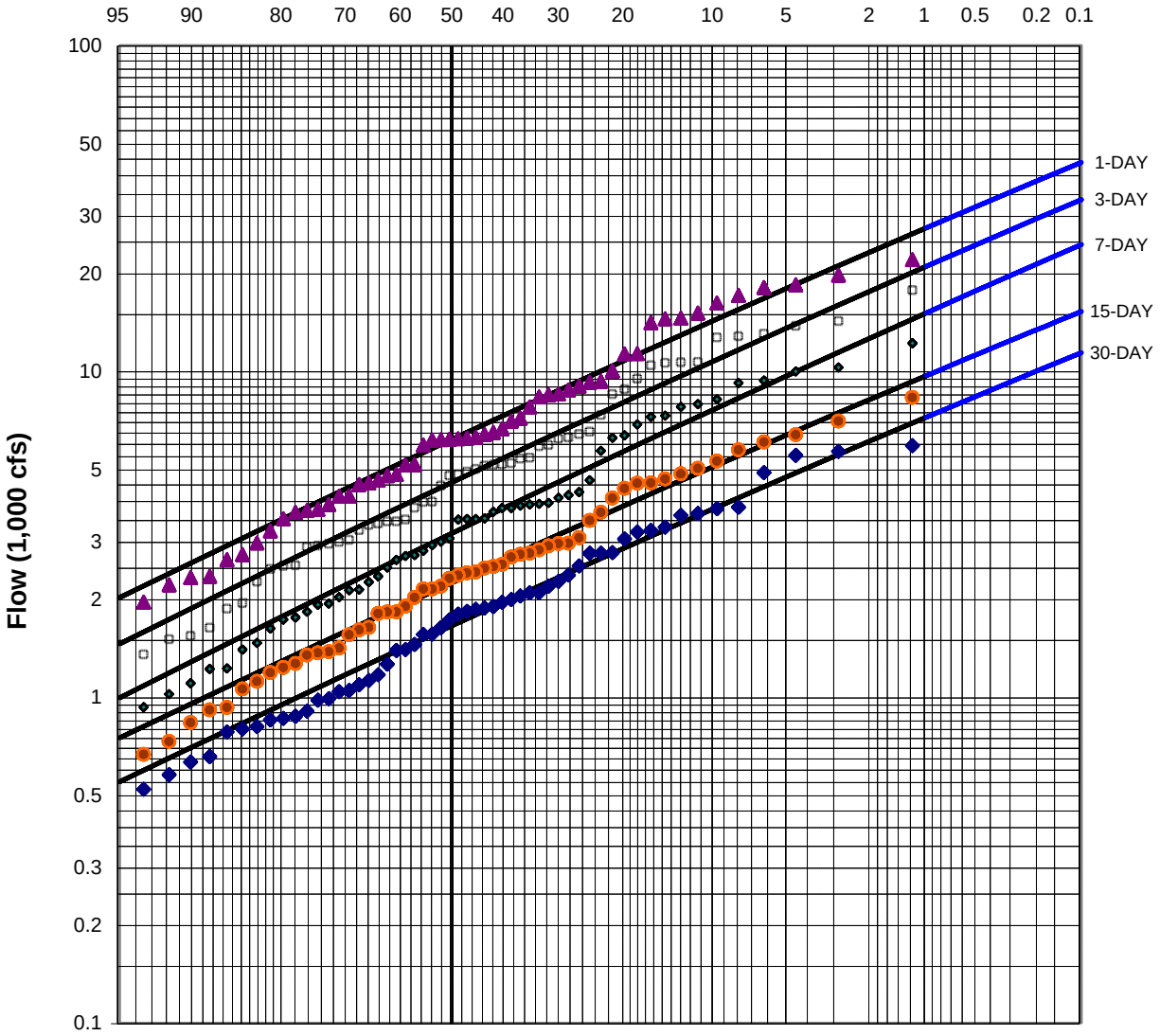
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SACRAMENTO RIVER AT SHASTA DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.789	0.289	-0.1
3-day	3.657	0.295	-0.1
7-day	3.501	0.301	-0.1
15-day	3.349	0.283	-0.1
30-day	3.217	0.285	-0.1

NOTES:

1. Adjusted for change in storage at Whiskeytown Lake, transbasin diversions from Trinity River to Whiskeytown Lake, and diversions to the Sacramento River at Keswick Reservoir.
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: 228 sq. mi.
5. Period of record: 1941-1998.
6. USGS Station 11372000.

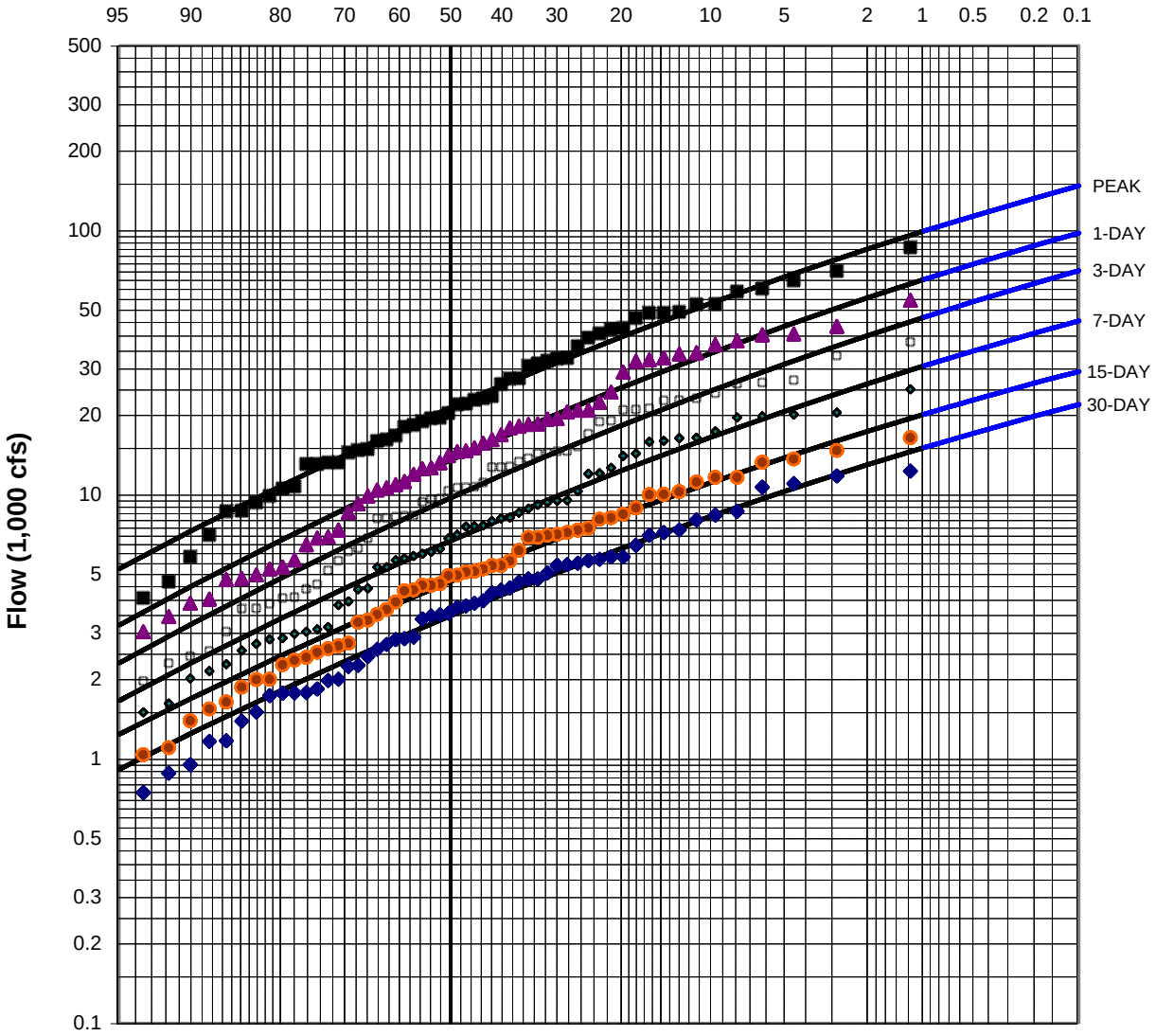
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
CLEAR CREEK NEAR IGO
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.310	0.338	-0.4
1-day	4.111	0.346	-0.4
3-day	3.968	0.346	-0.4
7-day	3.806	0.335	-0.4
15-day	3.653	0.320	-0.4
30-day	3.523	0.322	-0.4

NOTES:

1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 927 sq. mi.
4. Period of record: 1941-1998.
5. USGS Station 11376000.

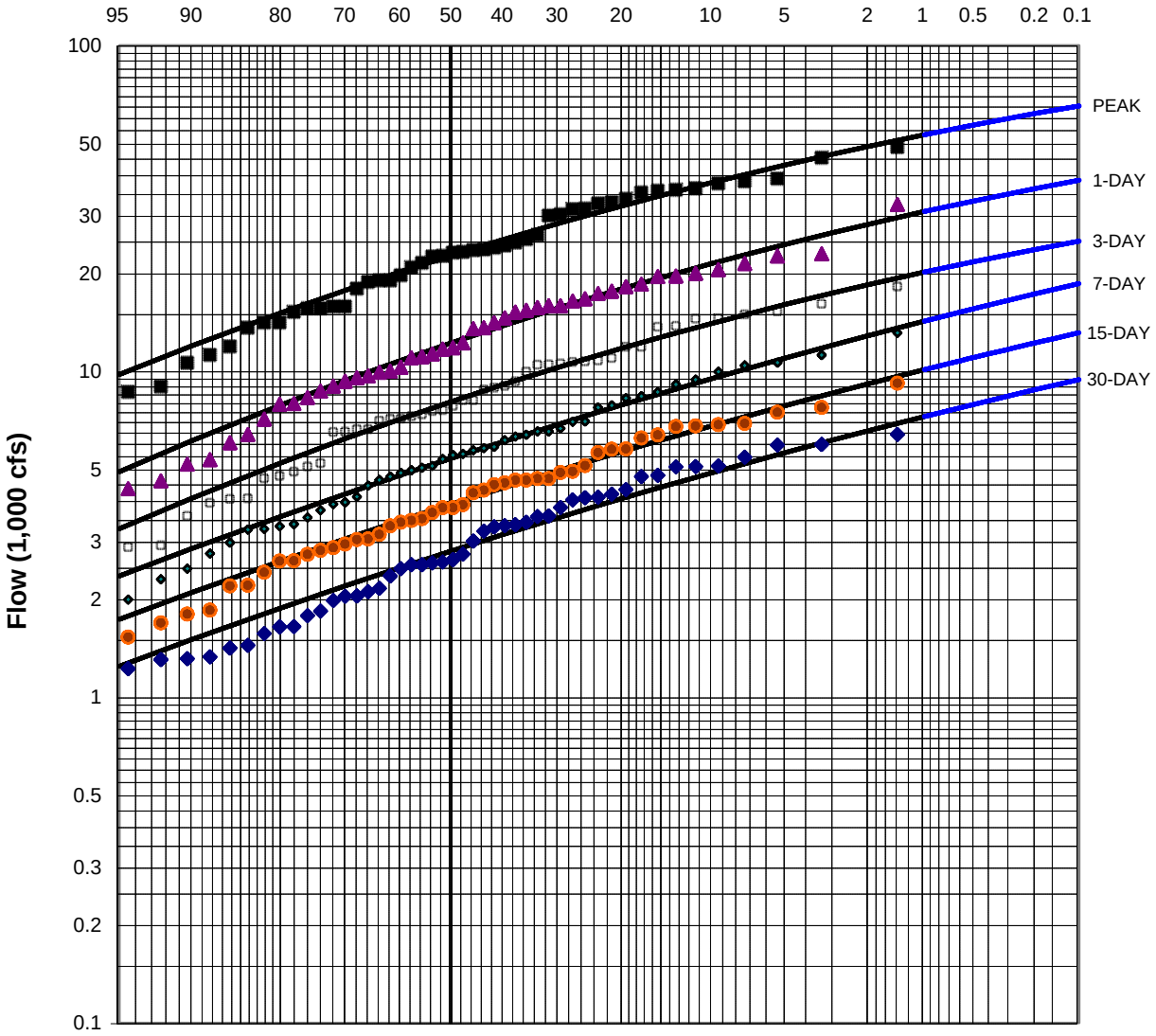
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
COTTONWOOD CREEK NEAR COTTONWOOD
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.340	0.197	-0.5
1-day	4.071	0.214	-0.5
3-day	3.891	0.211	-0.5
7-day	3.724	0.204	-0.3
15-day	3.584	0.200	-0.3
30-day	3.440	0.200	-0.3

NOTES:

1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 425 sq. mi.
4. Period of record: 1950-1998.
5. USGS Station 11374000.

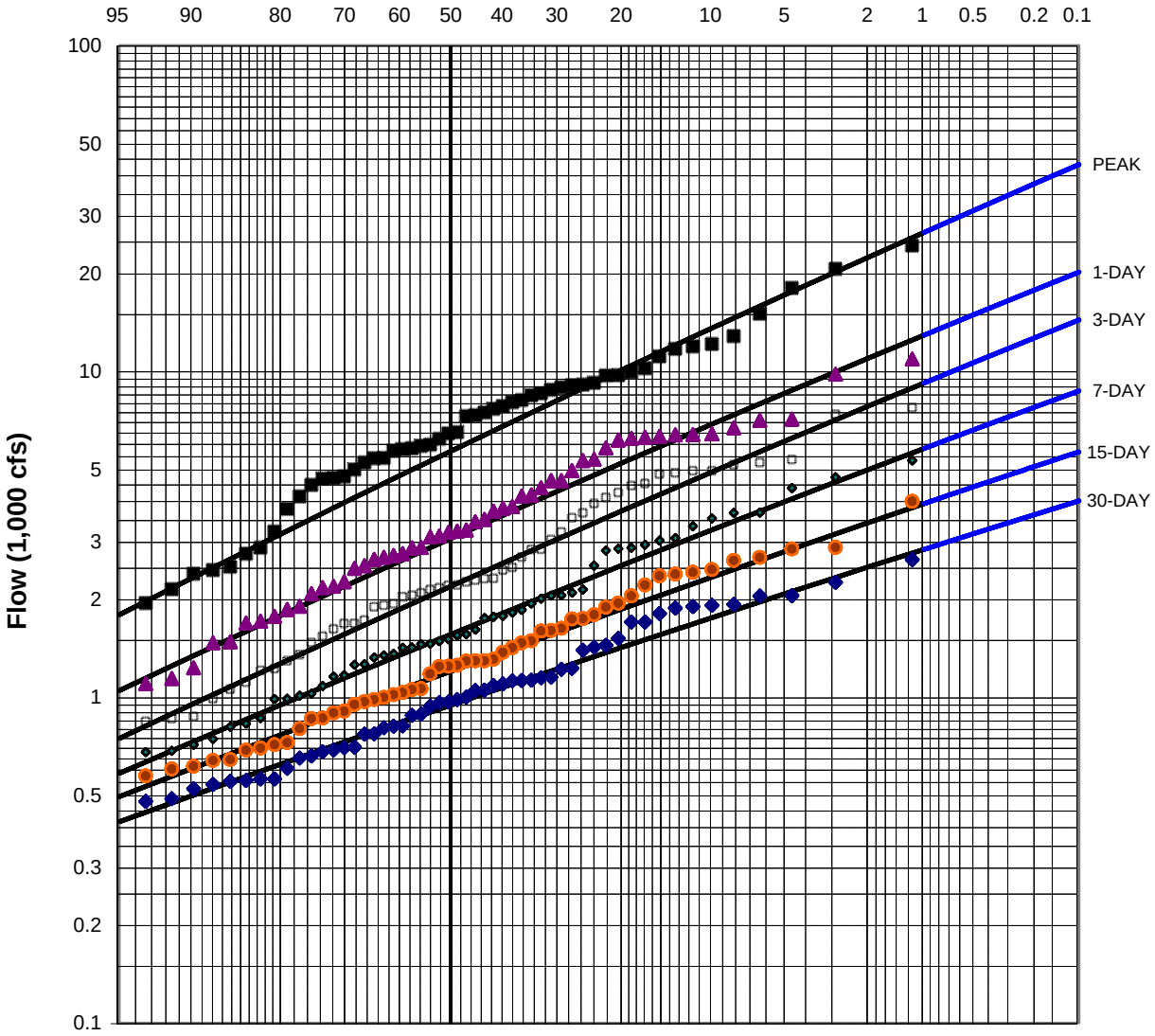
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
COW CREEK NEAR MILLVILLE
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.753	0.299	-0.1
1-day	3.485	0.278	-0.1
3-day	3.338	0.278	-0.1
7-day	3.191	0.254	-0.1
15-day	3.078	0.229	-0.1
30-day	2.974	0.213	-0.1

NOTES:

1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 357 sq. mi.
4. Period of record: 1941-1996.
5. USGS Station 11376500.

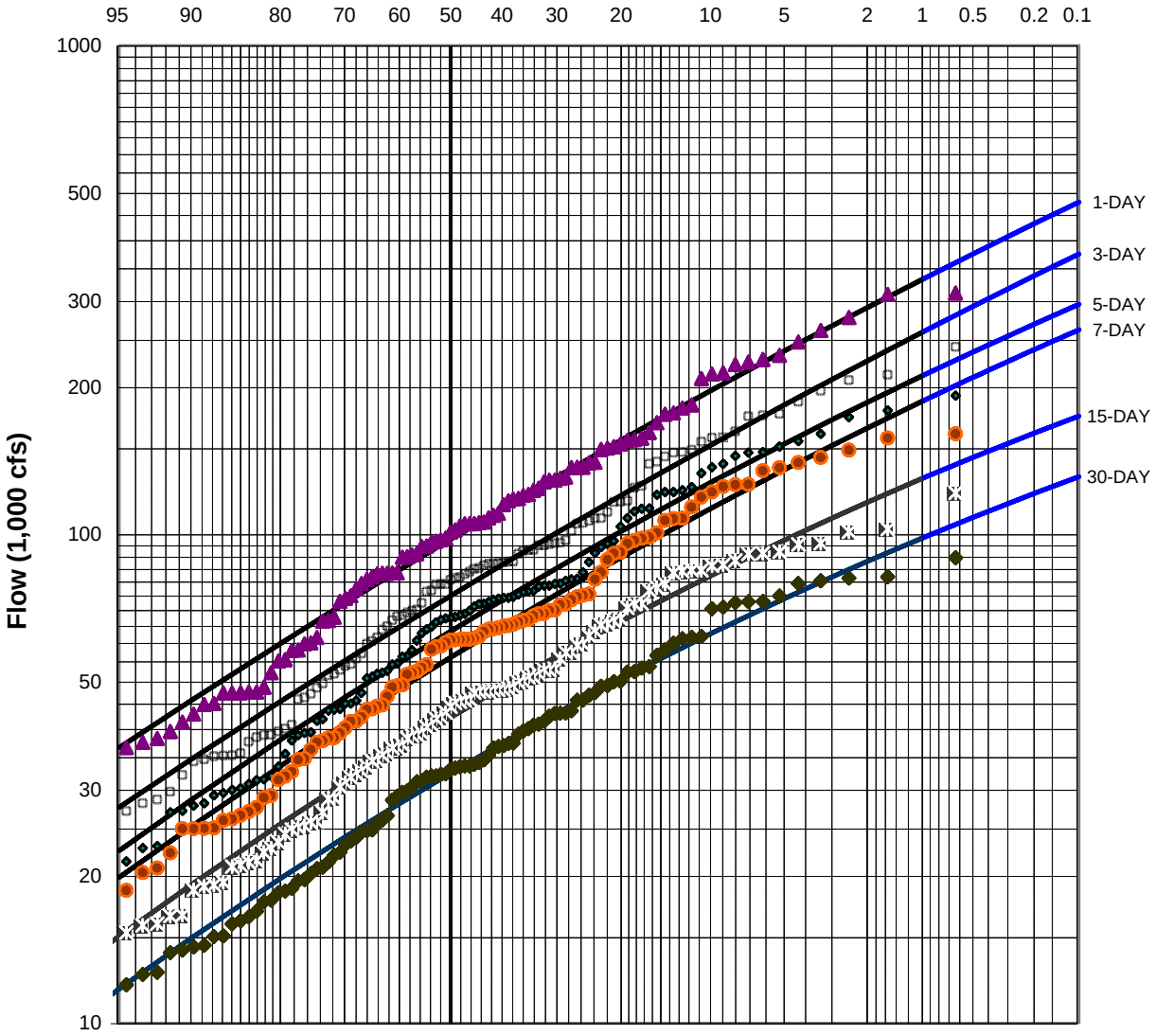
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
BATTLE CR BELOW COLEMAN FISH HATCHERY
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	4.984	0.247	-0.2
3-day	4.868	0.251	-0.2
5-day	4.791	0.254	-0.3
7-day	4.738	0.255	-0.3
15-day	4.612	0.248	-0.4
30-day	4.498	0.244	-0.4

NOTES:

1. Adjusted USGS gage 11377100 to account for daily change in storage at Shasta Lake and Whiskeytown Reservoir (potential channel, out-of-channel, or storage losses neglected).
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: 8,900 sq. mi.
5. Period of record: 1893-1998.

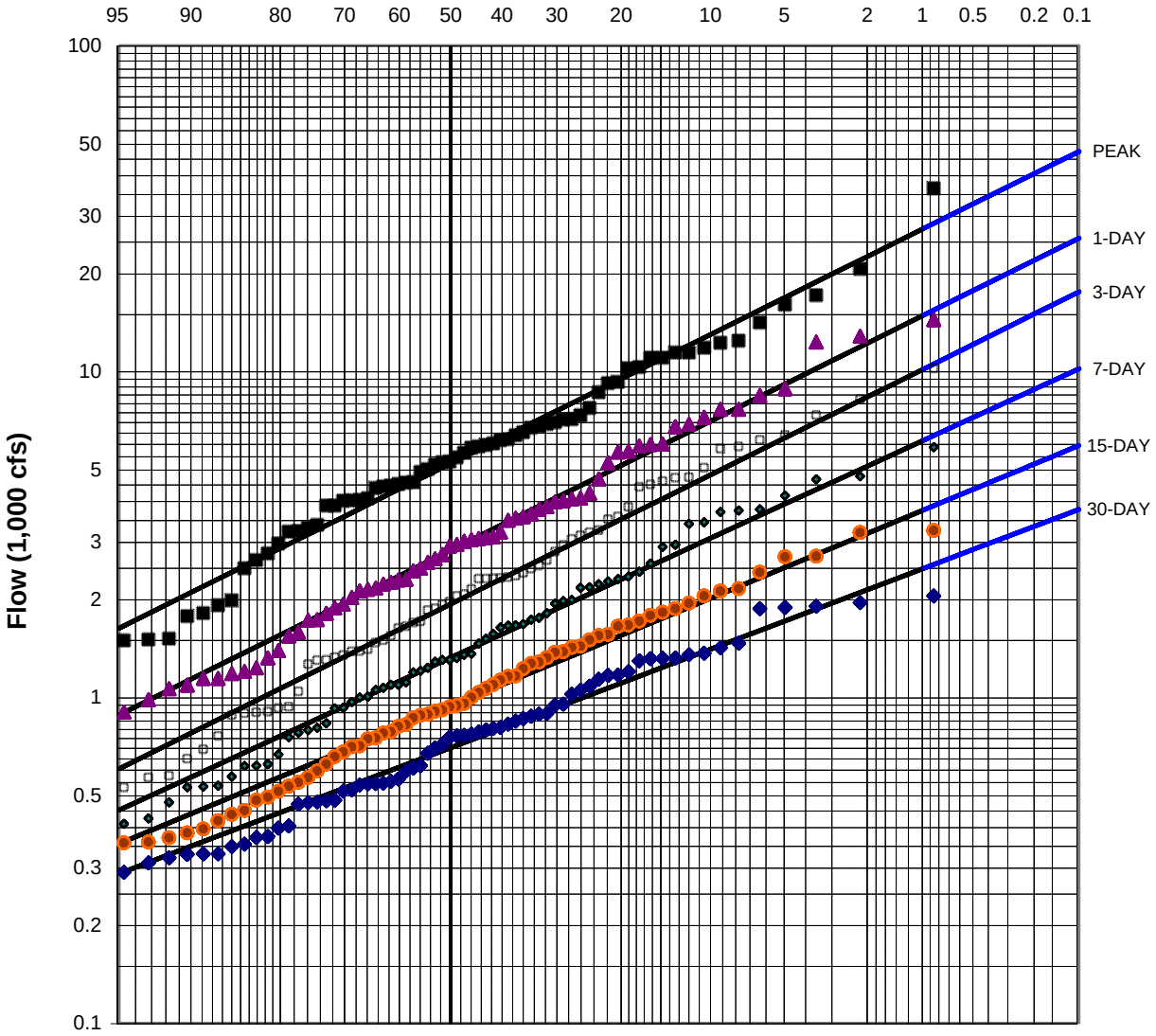
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SACRAMENTO RIVER AT BEND BRIDGE
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.720	0.309	0.0
1-day	3.454	0.309	0.0
3-day	3.289	0.309	0.0
7-day	3.124	0.286	0.0
15-day	2.975	0.258	0.0
30-day	2.847	0.236	0.0

NOTES:

1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 131 sq. mi.
4. Period of record: 1929-1998.
5. USGS Station 11381500.

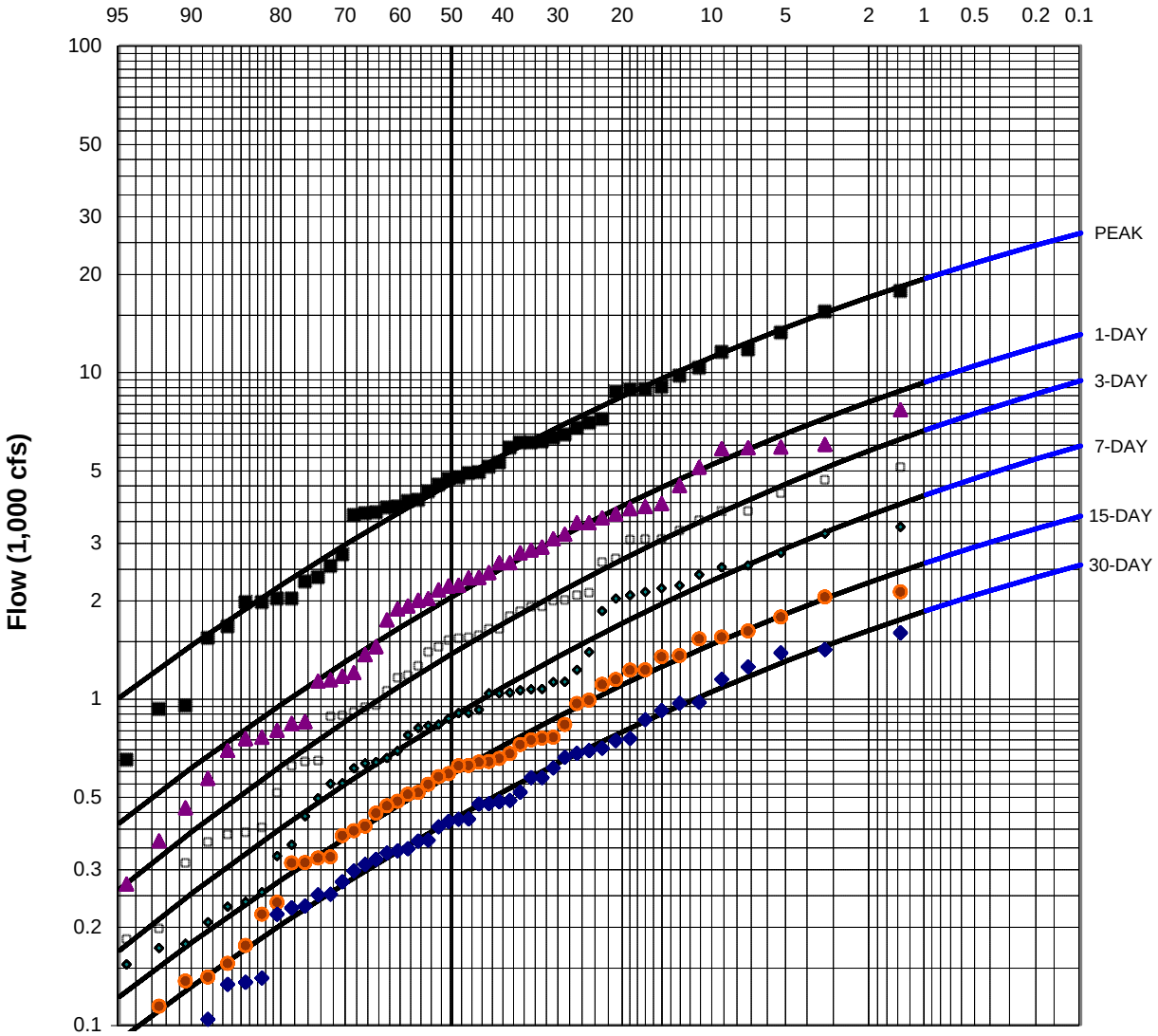
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
MILL CREEK NEAR LOS MOLINOS
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.629	0.349	-0.6
1-day	3.278	0.367	-0.6
3-day	3.102	0.382	-0.6
7-day	2.909	0.379	-0.6
15-day	2.735	0.361	-0.6
30-day	2.595	0.357	-0.6

NOTES:

1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 92.4 sq. mi.
4. Period of record: 1948-1998.
5. USGS Station 11379500.

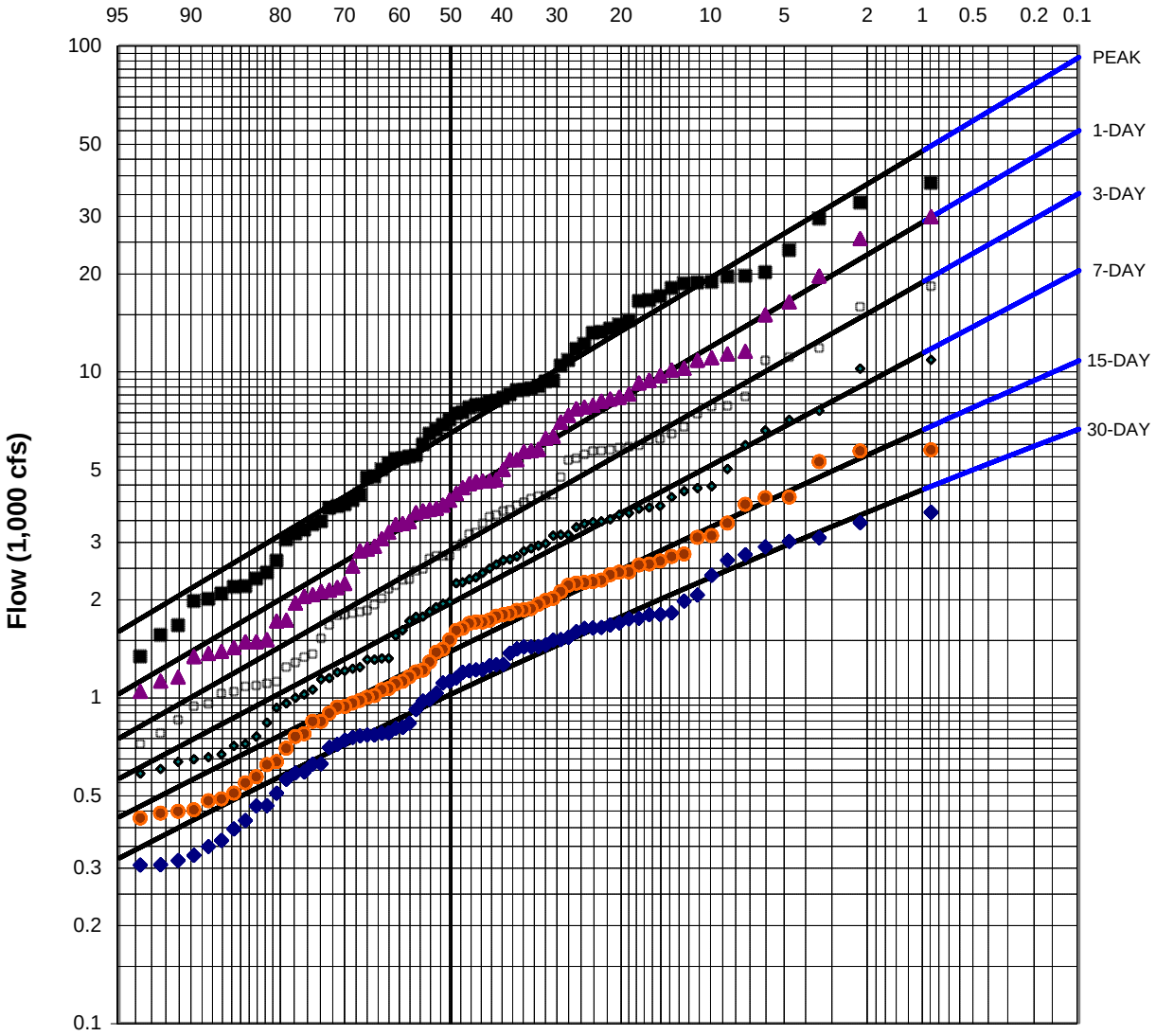
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
ELDER CREEK NEAR PASKENTA
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.814	0.372	0.0
1-day	3.611	0.365	0.0
3-day	3.455	0.353	0.0
7-day	3.292	0.329	0.0
15-day	3.139	0.303	-0.1
30-day	3.002	0.292	-0.2

NOTES:

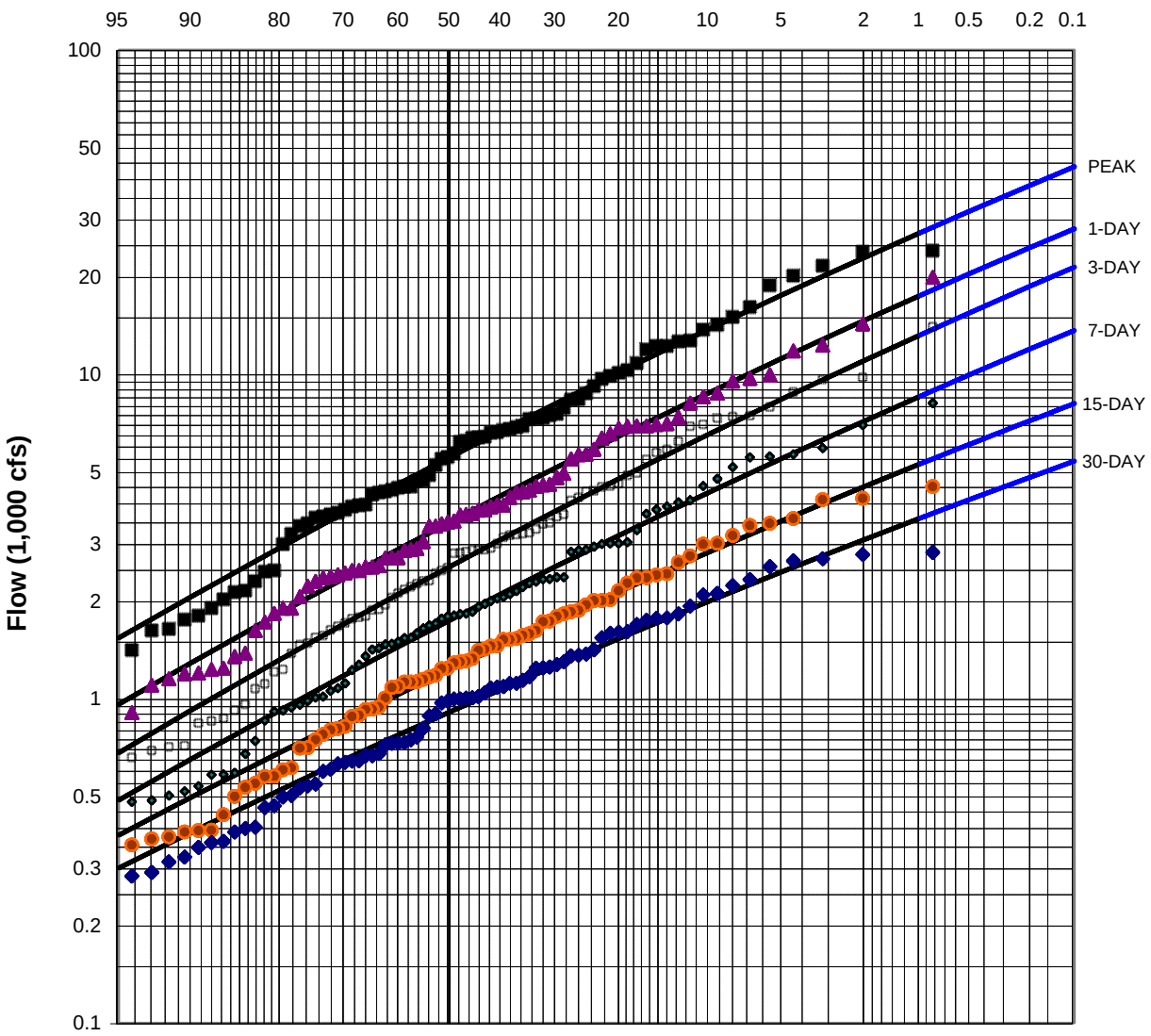
1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 203 sq. mi.
4. Period of record: 1921-1996.
5. USGS Station 11382000.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
THOMES CREEK AT PASKENTA
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.735	0.322	-0.2
1-day	3.535	0.325	-0.2
3-day	3.398	0.332	-0.2
7-day	3.233	0.321	-0.2
15-day	3.081	0.295	-0.2
30-day	2.951	0.278	-0.2

NOTES:

1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 208 sq. mi.
4. Period of record: 1912-15, 1921-1998.
5. USGS Station 11383500.

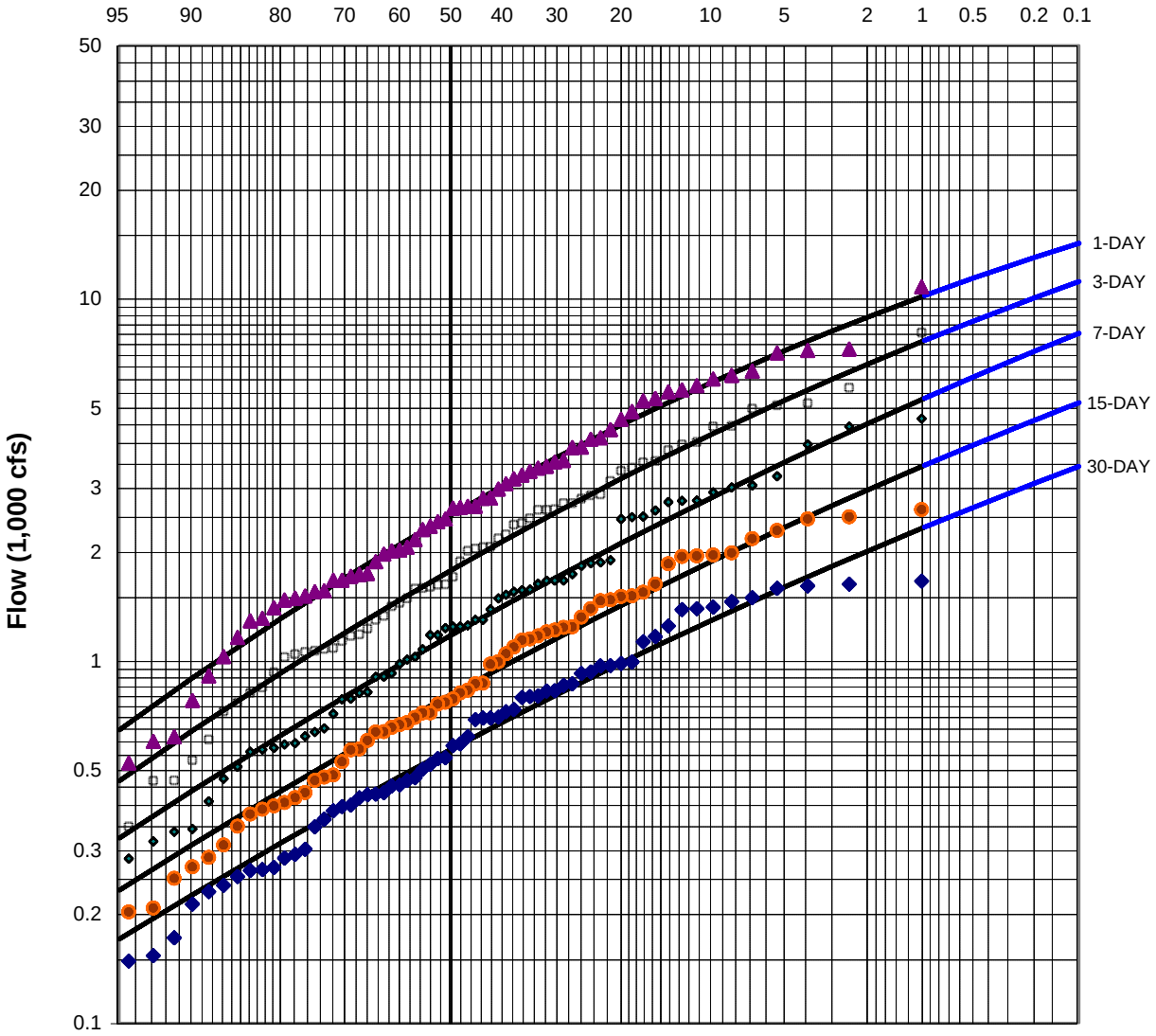
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
DEER CREEK NEAR VINA
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.379	0.321	-0.5
3-day	3.231	0.321	-0.4
7-day	3.057	0.317	-0.3
15-day	2.895	0.306	-0.3
30-day	2.744	0.297	-0.3

NOTES:

1. USGS gage 11384000 discontinued in 1986. 1987-1998 record computed by adding 3 DWR gages - Big Chico Cr @ Chico, Lindo Creek channel and Mud Creek diversion storage losses.
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: 72.4 sq. mi.
5. Period of record: 1931-1998.

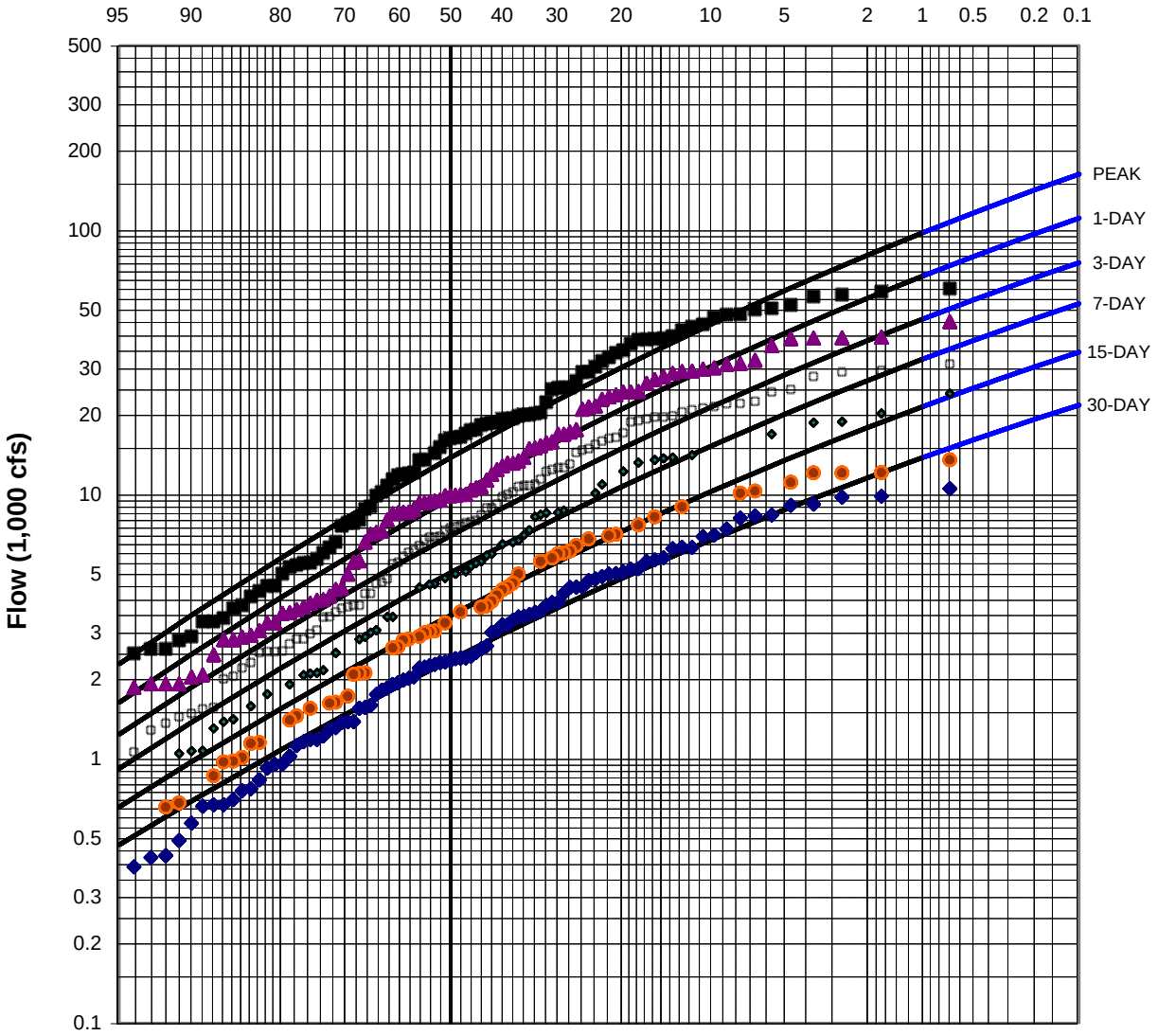
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
BIG CHICO CREEK NEAR CHICO
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.115	0.432	-0.4
1-day	3.961	0.427	-0.4
3-day	3.821	0.416	-0.4
7-day	3.681	0.410	-0.4
15-day	3.520	0.401	-0.4
30-day	3.353	0.388	-0.4

NOTES:

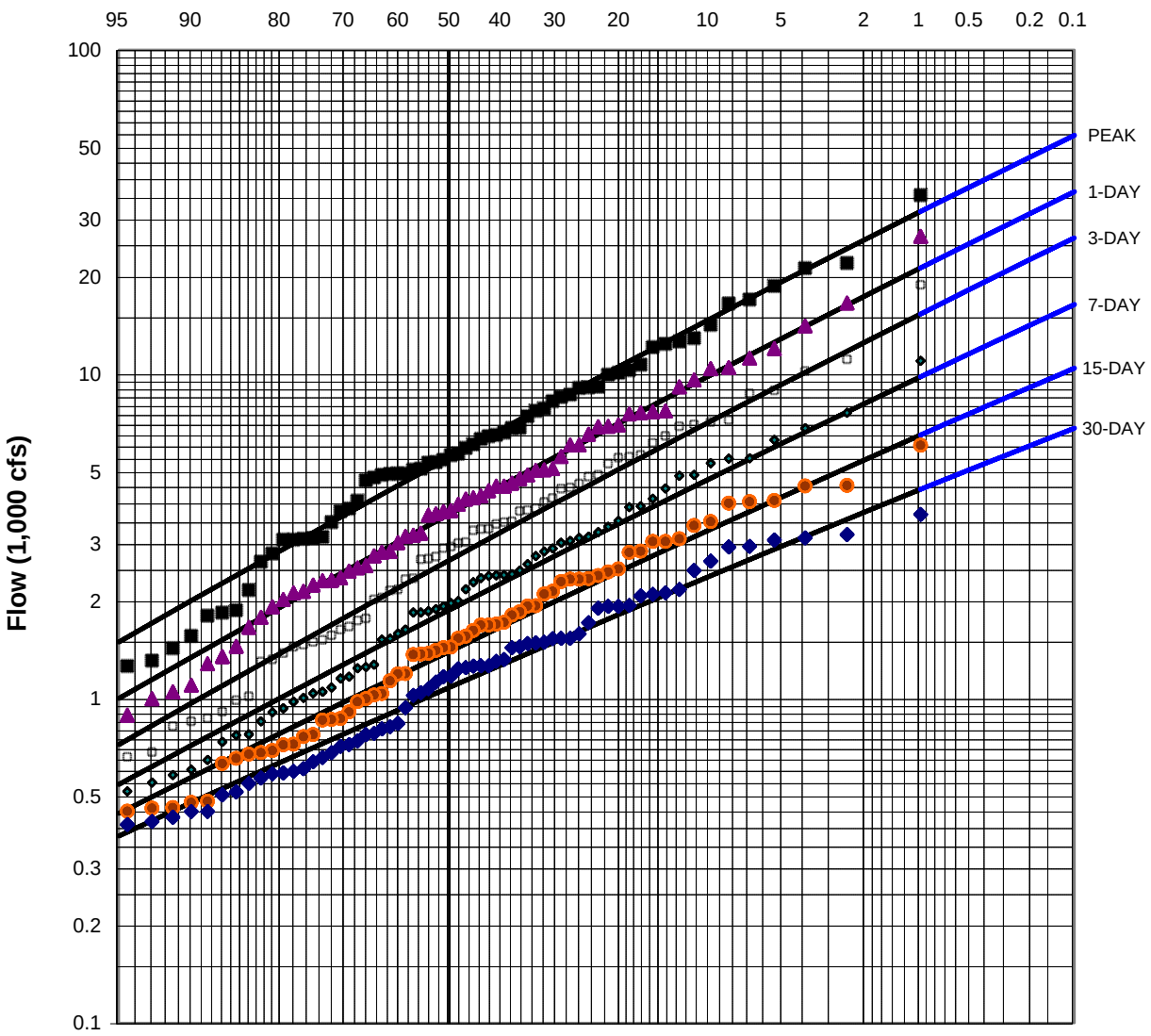
1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 740 sq. mi.
4. Period of record: 1901-1998.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
STONY CREEK AT BLACK BUTTE DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.740	0.338	-0.1
1-day	3.566	0.338	-0.1
3-day	3.424	0.338	-0.1
7-day	3.271	0.320	-0.1
15-day	3.143	0.297	-0.1
30-day	3.032	0.272	-0.1

NOTES:

1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 147 sq. mi.
4. Period of record: 1931-1997.
5. USGS Station 11390000.

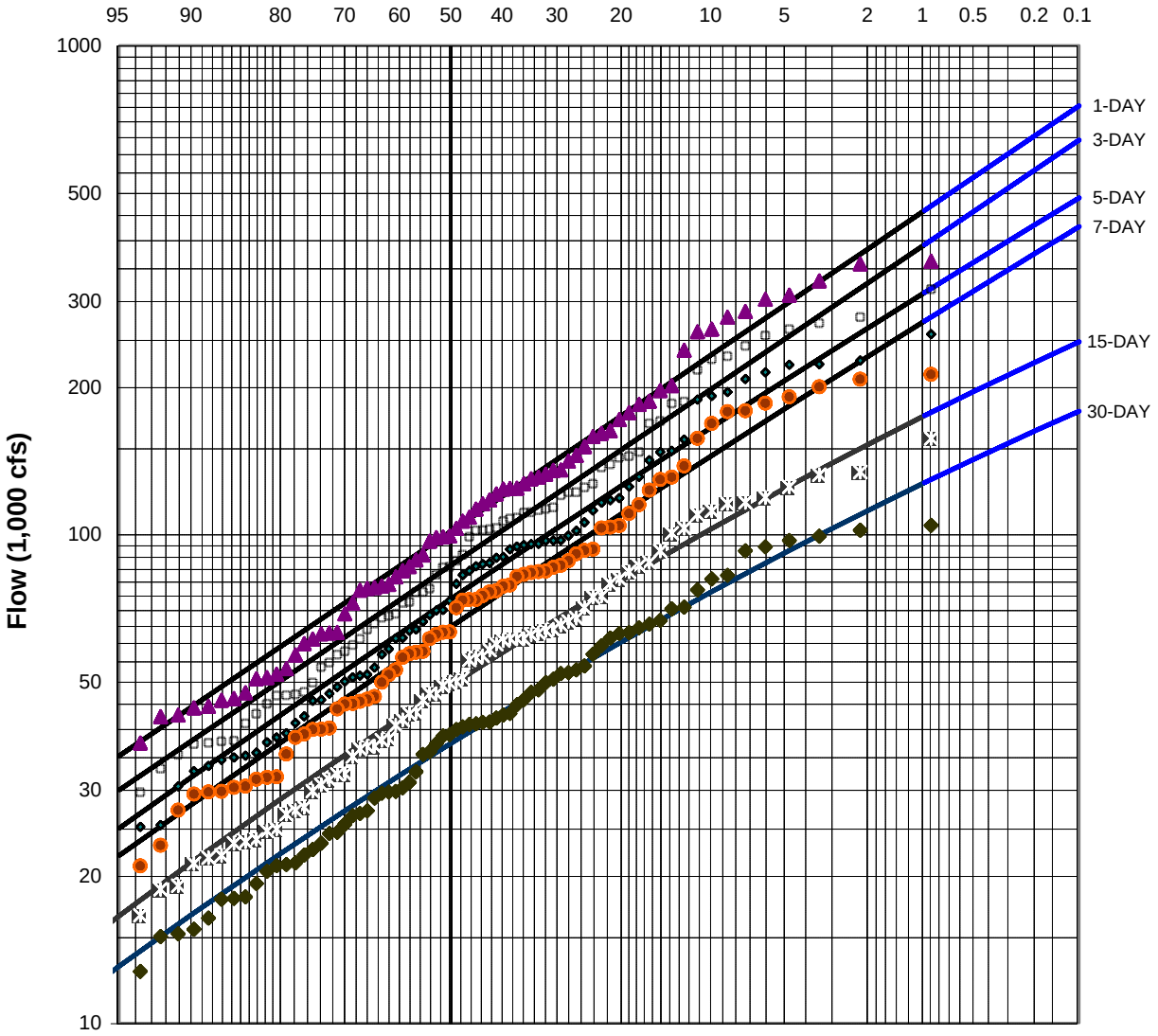
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
BUTTE CREEK NEAR CHICO
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	5.009	0.281	0.0
3-day	4.939	0.281	0.0
5-day	4.866	0.279	-0.1
7-day	4.809	0.278	-0.1
15-day	4.680	0.267	-0.3
30-day	4.562	0.258	-0.3

NOTES:

1. Adjusted USGS gage 11388700 to account for daily change in storage at upstream reservoirs (potential channel, out-of-channel, or storage losses neglected).
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: approx. 12,050 sq. mi.
5. Period of record: 1922-1997.

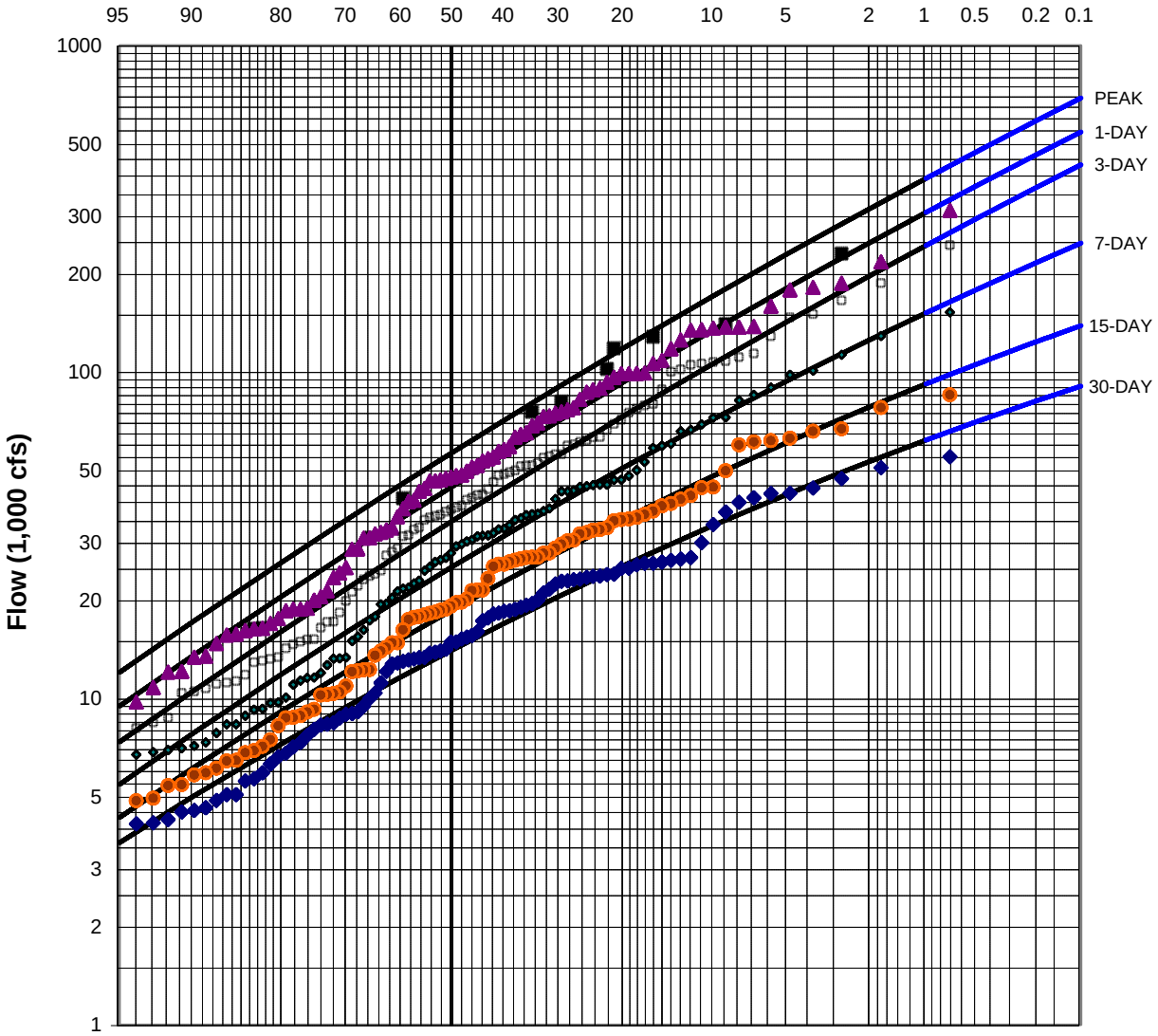
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SACRAMENTO RIVER AT ORD FERRY (LATITUDE)
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.743	0.390	-0.2
1-day	4.639	0.390	-0.2
3-day	4.533	0.392	-0.2
7-day	4.387	0.377	-0.3
15-day	4.250	0.351	-0.4
30-day	4.129	0.326	-0.4

NOTES:

1. Median plotting positions.
2. Peak data available for 11 years of record.
3. Drainage area: 3,624 sq. mi.
4. Period of record: 1901-1997.

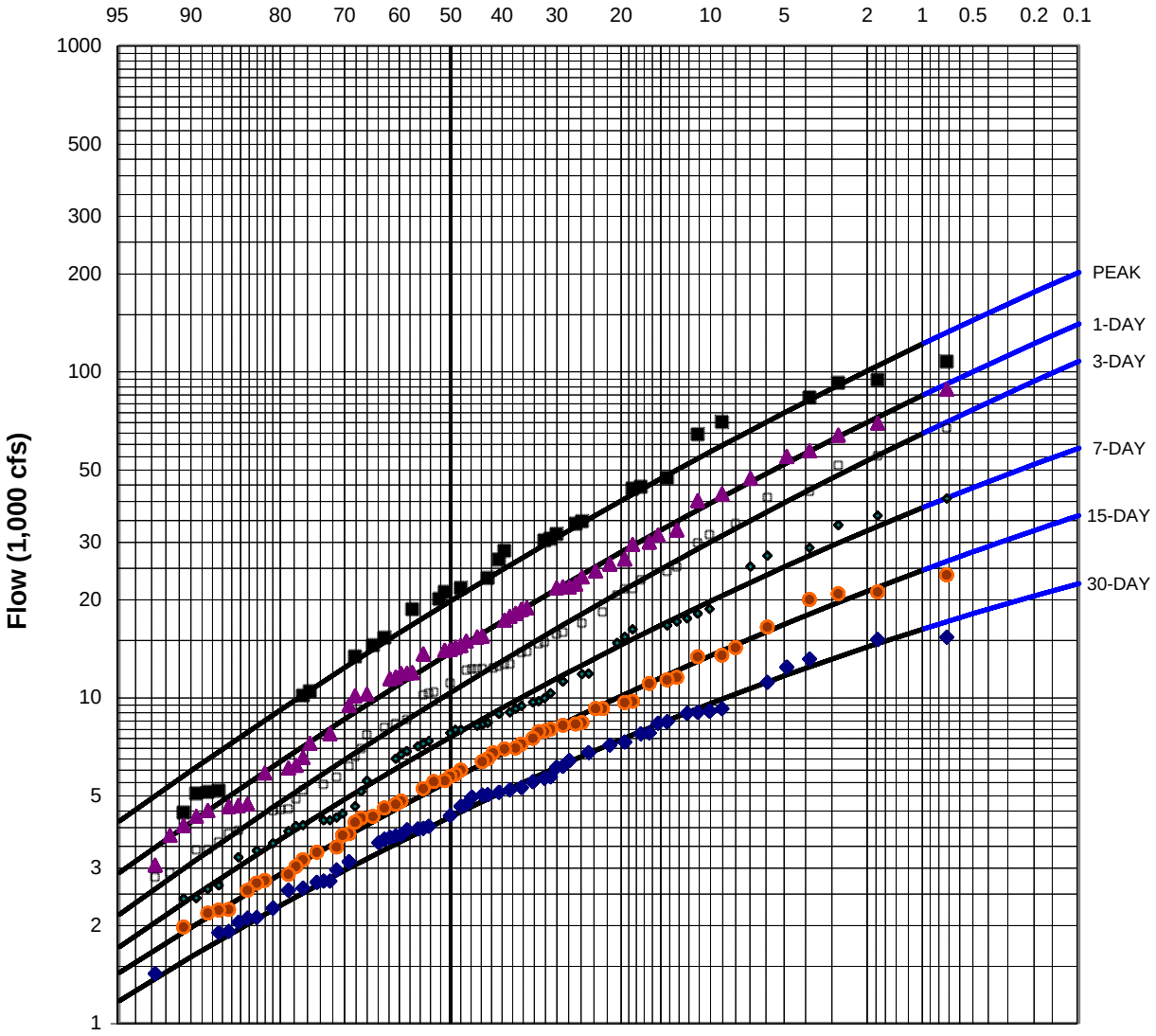
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
FEATHER RIVER AT OROVILLE DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.280	0.383	-0.3
1-day	4.122	0.383	-0.3
3-day	3.999	0.386	-0.3
7-day	3.858	0.357	-0.4
15-day	3.727	0.327	-0.4
30-day	3.611	0.306	-0.5

NOTES:

1. Statistics adjusted based on correlation with Yuba River near Marysville station (94 years).
2. Median plotting positions.
3. Drainage Area: 489 sq. mi.
4. Period of record: 1938-1997.

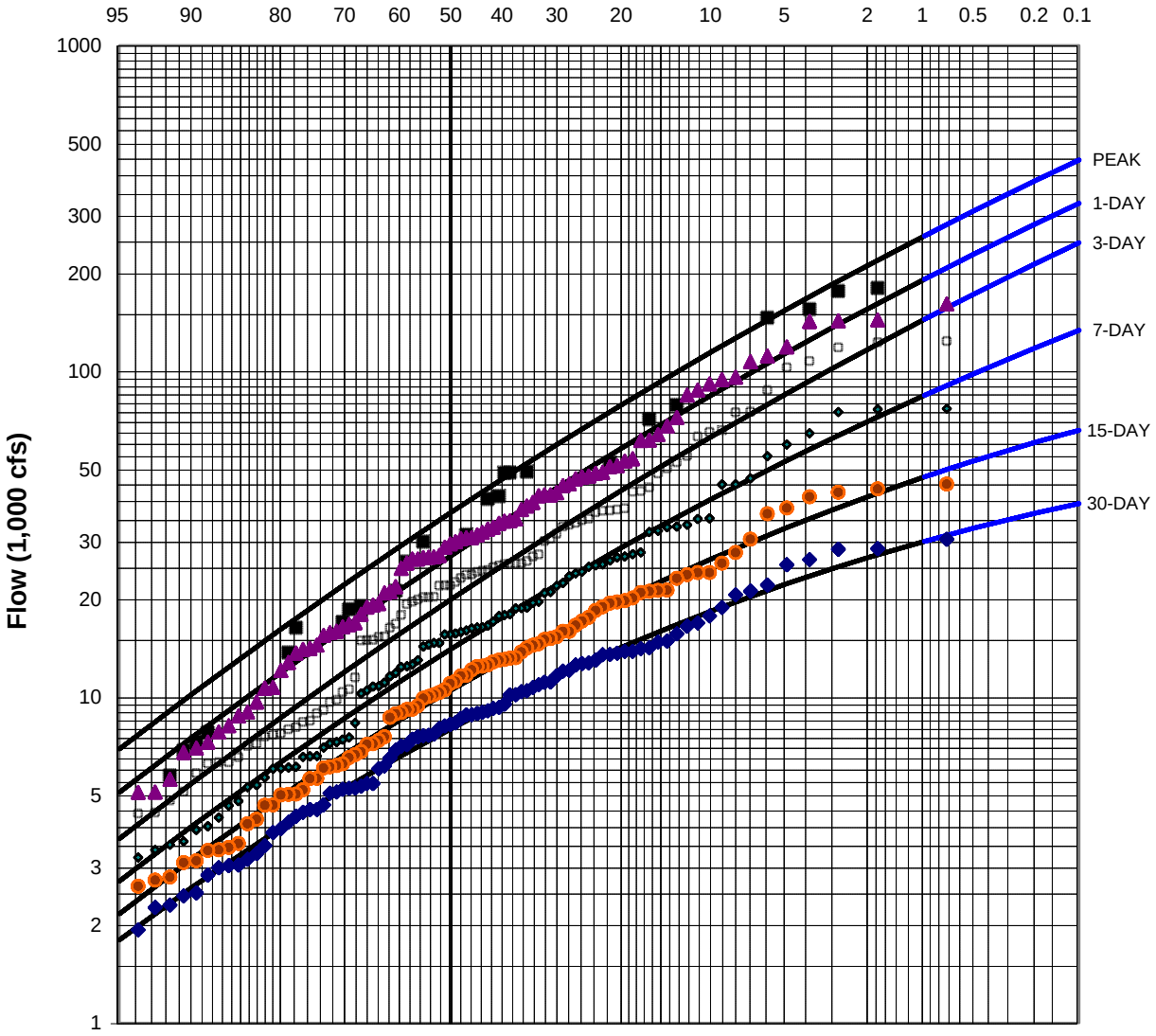
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
NORTH YUBA AT NEW BULLARDS BAR DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.550	0.411	-0.3
1-day	4.417	0.411	-0.3
3-day	4.283	0.416	-0.3
7-day	4.125	0.394	-0.4
15-day	3.989	0.364	-0.6
30-day	3.867	0.337	-0.7

NOTES:

1. Median plotting positions.
2. Peak data available for 25 years of record.
3. Drainage area: 1,339 sq. mi.
4. Period of record: 1904-1997.

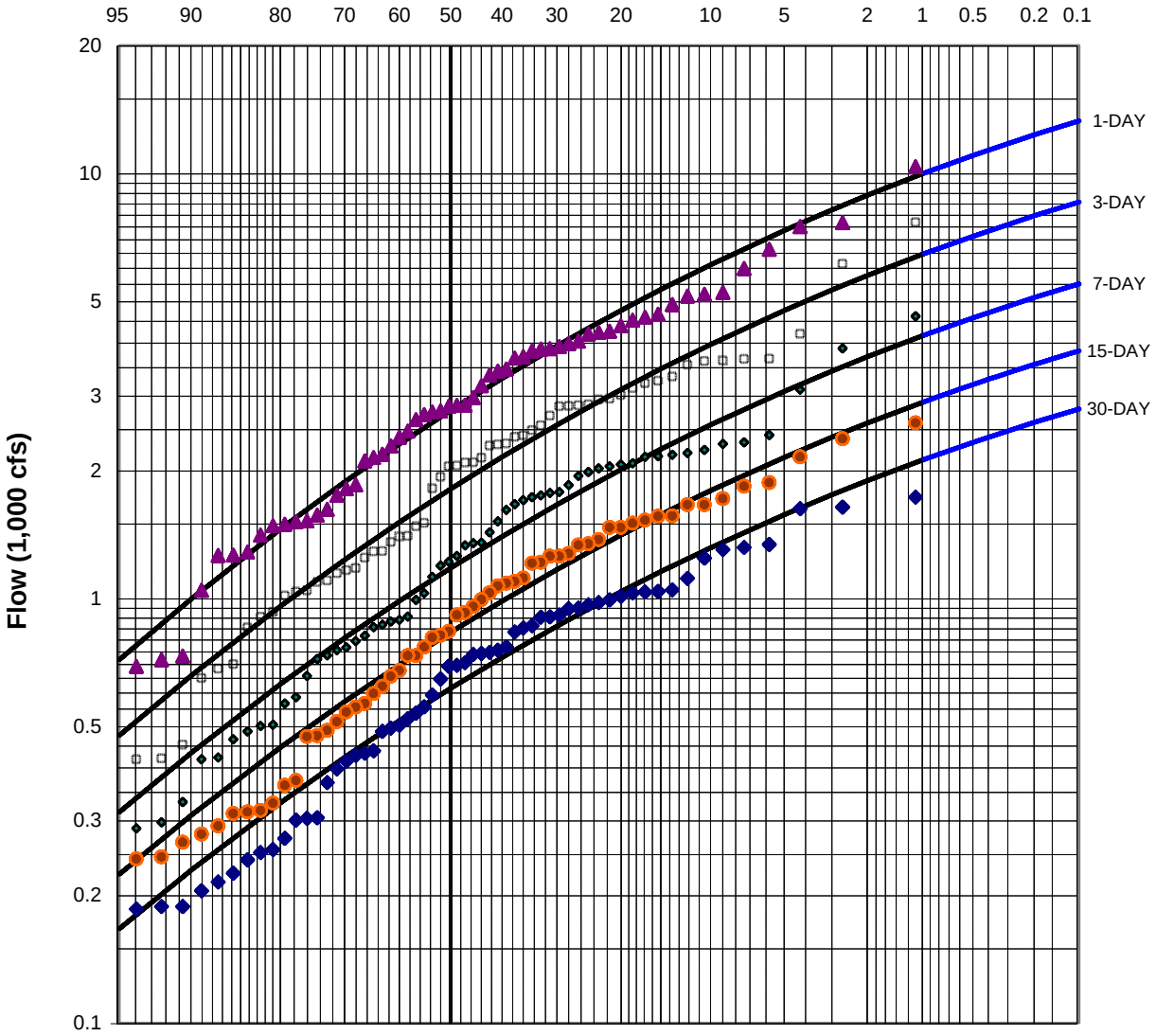
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
YUBA RIVER NEAR MARYSVILLE
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.414	0.311	-0.6
3-day	3.230	0.308	-0.6
7-day	3.044	0.305	-0.6
15-day	2.893	0.302	-0.6
30-day	2.761	0.300	-0.6

NOTES:

1. Adjusted USGS gage 11418500 to account for daily change in storage at upstream reservoir (potential channel, out-of-channel, or storage losses neglected).
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: 84.6 sq. mi.
5. Period of record: 1936-1997.

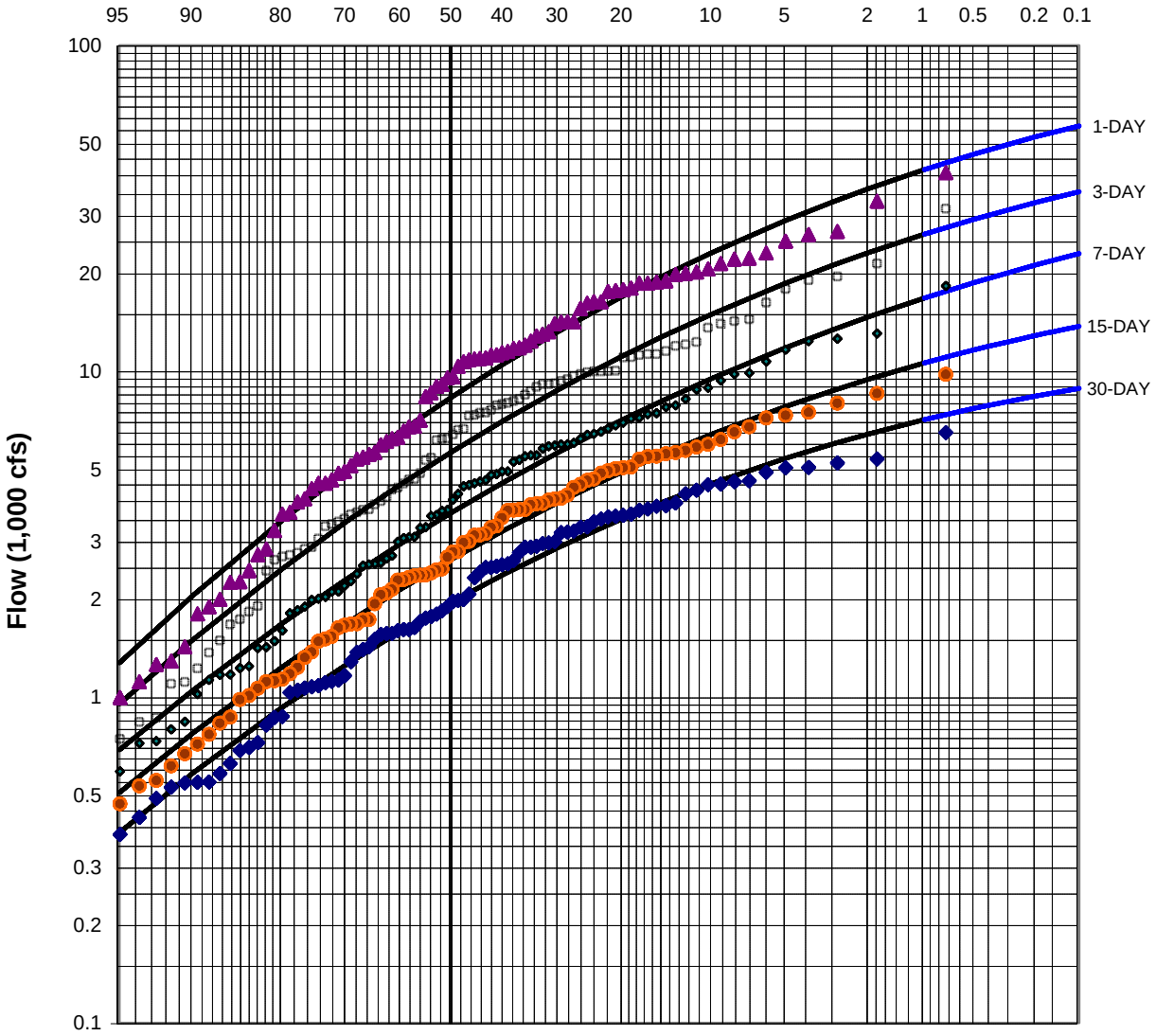
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
DEER CREEK NEAR SMARTVILLE
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.872	0.420	-0.7
3-day	3.707	0.399	-0.7
7-day	3.527	0.380	-0.7
15-day	3.379	0.367	-0.8
30-day	3.244	0.357	-0.9

NOTES:

1. Adjusted USGS gage 11424000 to account for daily change in storage at upstream reservoirs (potential channel, out-of-channel, or storage losses neglected).
2. Statistics adusted based on correlation with Van Trent (1906-27) and Yuba R at Smartville (1928).
3. Median plotting positions.
4. Drainage area: 292 sq. mi.
5. Period of record: 1906-1998.

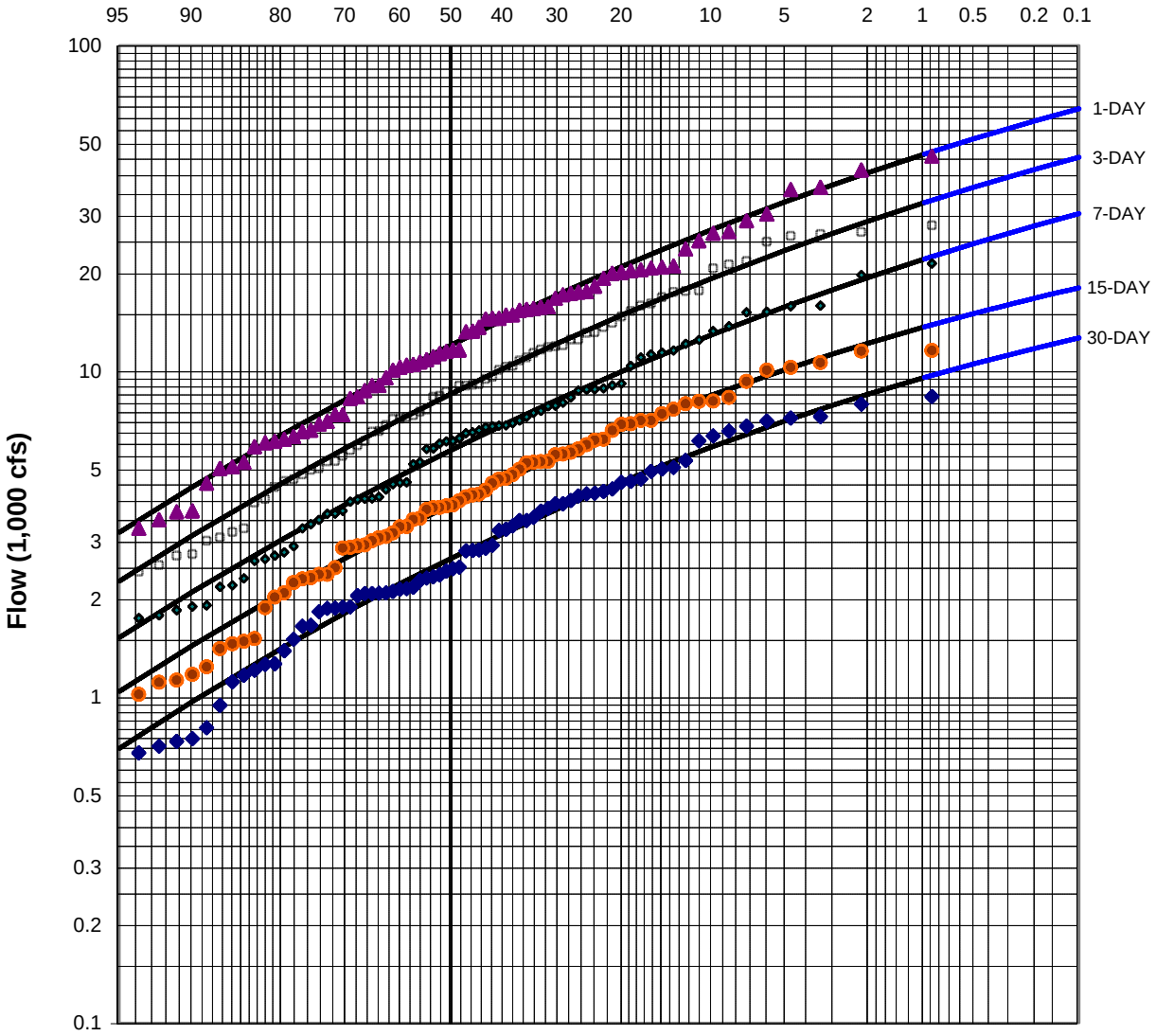
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
BEAR RIVER NEAR WHEATLAND
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	4.057	0.311	-0.5
3-day	3.908	0.311	-0.5
7-day	3.735	0.311	-0.5
15-day	3.563	0.304	-0.6
30-day	3.398	0.309	-0.6

NOTES:

1. WY 1977 censored as low outlier.
2. Median plotting positions.
3. Drainage area: 528 sq. mi.
4. Period of record: 1922-1998.

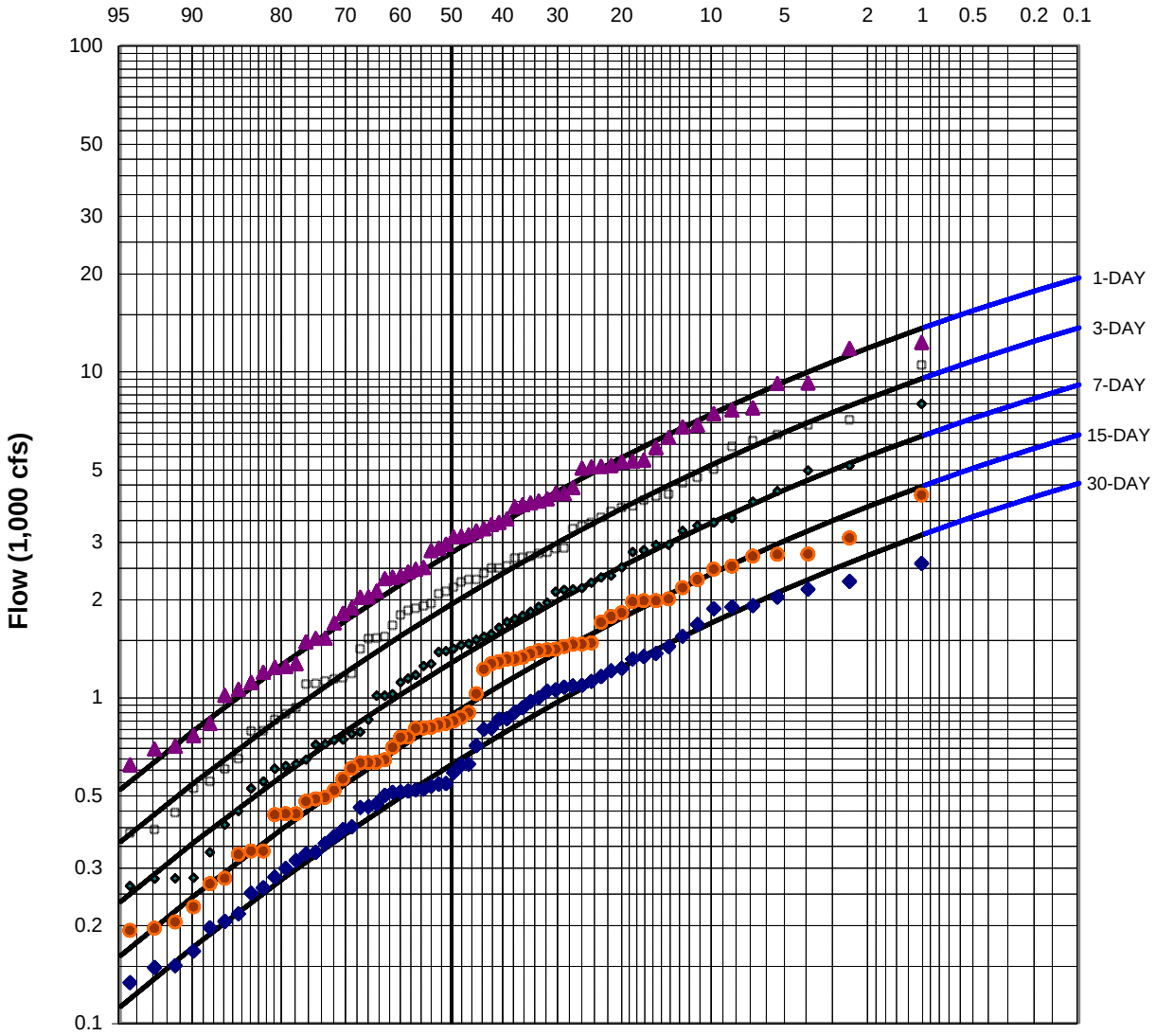
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
CACHE CREEK AT CLEAR LAKE
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.409	0.385	-0.6
3-day	3.251	0.387	-0.6
7-day	3.071	0.389	-0.6
15-day	2.911	0.392	-0.6
30-day	2.758	0.394	-0.6

NOTES:

1. WY 1931-1974 taken as ratio from record of NF Cache at Lower Lake stream gage.
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: 121 sq. mi.
5. Period of record: 1931-1999.

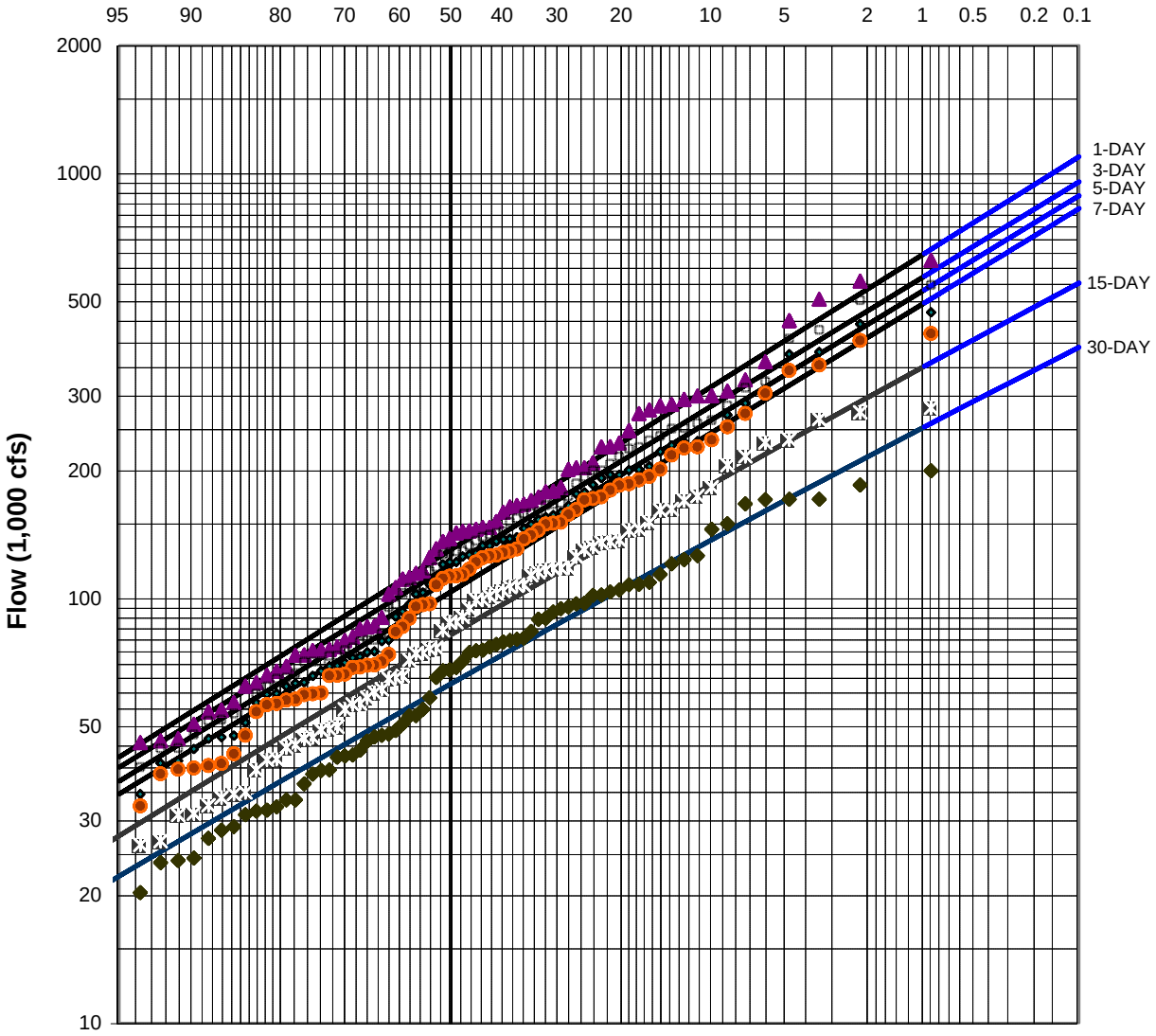
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
NF CACHE CREEK AT INDIAN VALLEY DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	5.117	0.298	0.0
3-day	5.081	0.291	0.0
5-day	5.048	0.291	0.0
7-day	5.018	0.291	0.0
15-day	4.912	0.281	-0.1
30-day	4.796	0.269	-0.2

NOTES:

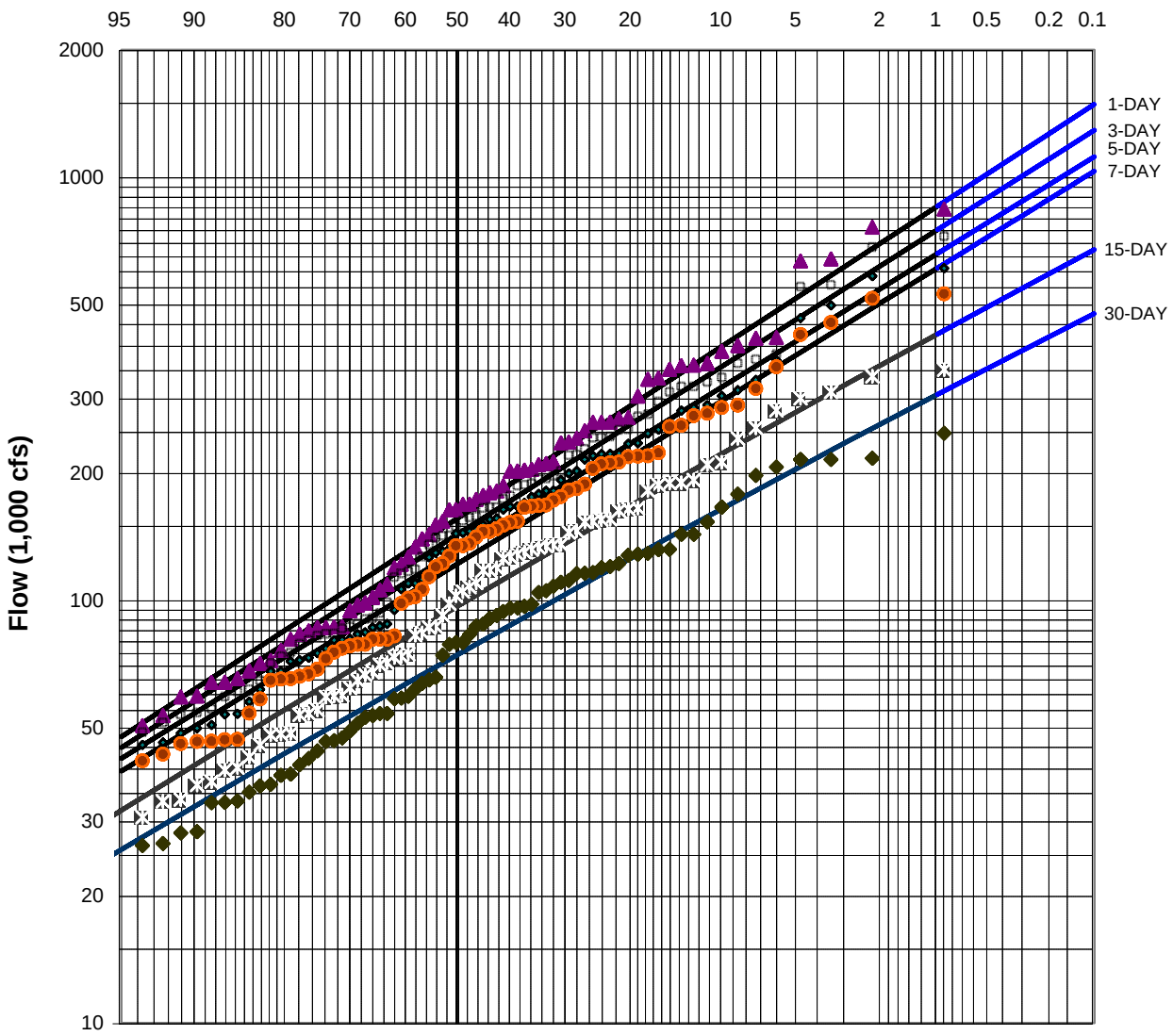
1. Adjusted USGS gage 11425500 to account for daily change in storage at upstream reservoirs (potential channel, out-of-channel, or storage losses neglected).
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: approx. 21,251 sq. mi.
5. Period of record: 1922-1997.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SACRAMENTO RIVER AT VERONA (LATITUDE)
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	5.196	0.316	0.0
3-day	5.158	0.308	0.0
5-day	5.120	0.301	0.0
7-day	5.088	0.300	0.0
15-day	4.983	0.287	-0.1
30-day	4.869	0.274	-0.2

NOTES:

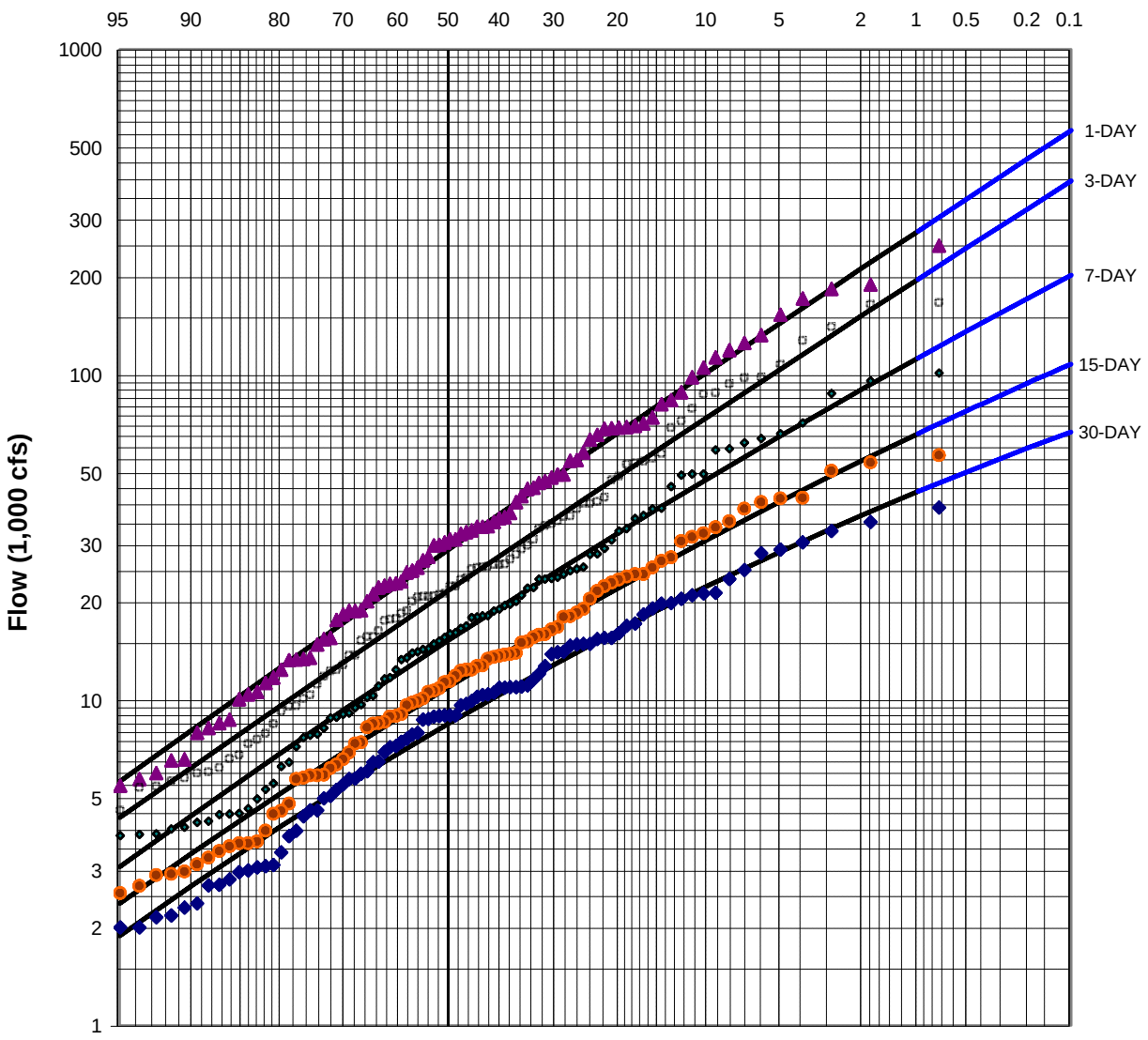
1. Adjusted USGS gage 11447500 to account for daily change in storage at upstream reservoirs (potential channel, out-of-channel, or storage losses neglected).
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: approx. 26,150 sq. mi.
5. Period of record: 1922-1997.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SACRAMENTO RIVER AT SACRAMENTO (LATITUDE)
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	4.462	0.429	-0.1
3-day	4.336	0.419	-0.1
7-day	4.173	0.403	-0.2
15-day	4.025	0.377	-0.3
30-day	3.907	0.361	-0.4

NOTES:

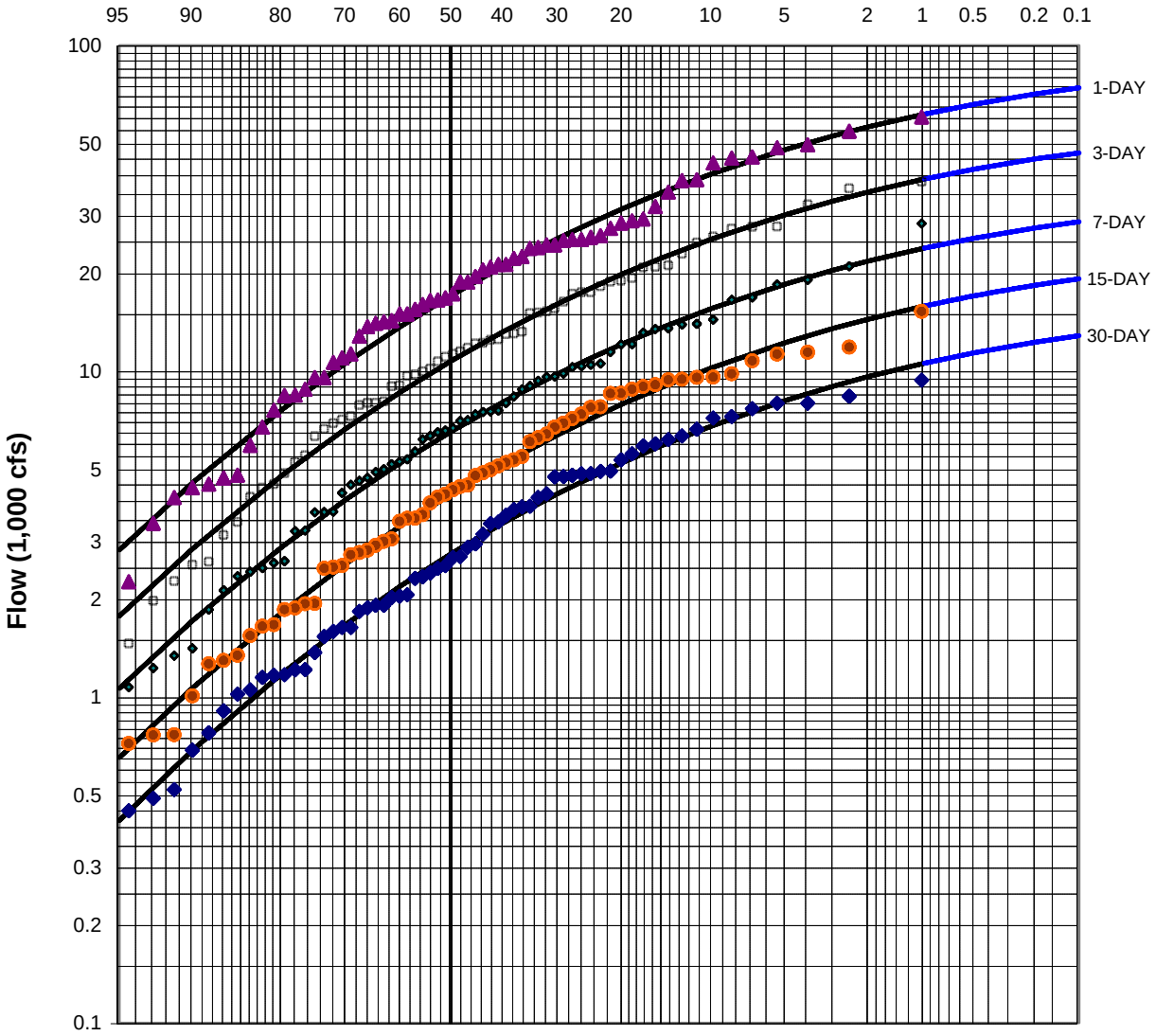
1. Adjusted USGS gage 11446500 to account for daily change in storage at upstream reservoirs (potential channel, out-of-channel, or storage losses neglected).
2. Median plotting positions.
3. Drainage area: 1,888 sq. mi.
4. Period of record: 1905-1997.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
AMERICAN RIVER AT FAIR OAKS
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	4.173	0.385	-1.0
3-day	3.972	0.386	-1.0
7-day	3.755	0.389	-1.0
15-day	3.562	0.399	-1.0
30-day	3.378	0.404	-1.0

NOTES:

1. Adjusted USGS gage 11454000 to account for daily change in storage at Lake Berryessa (potential channel, out-of-channel, or storage losses neglected).
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: 566 sq. mi.
5. Period of record: 1931-1998.

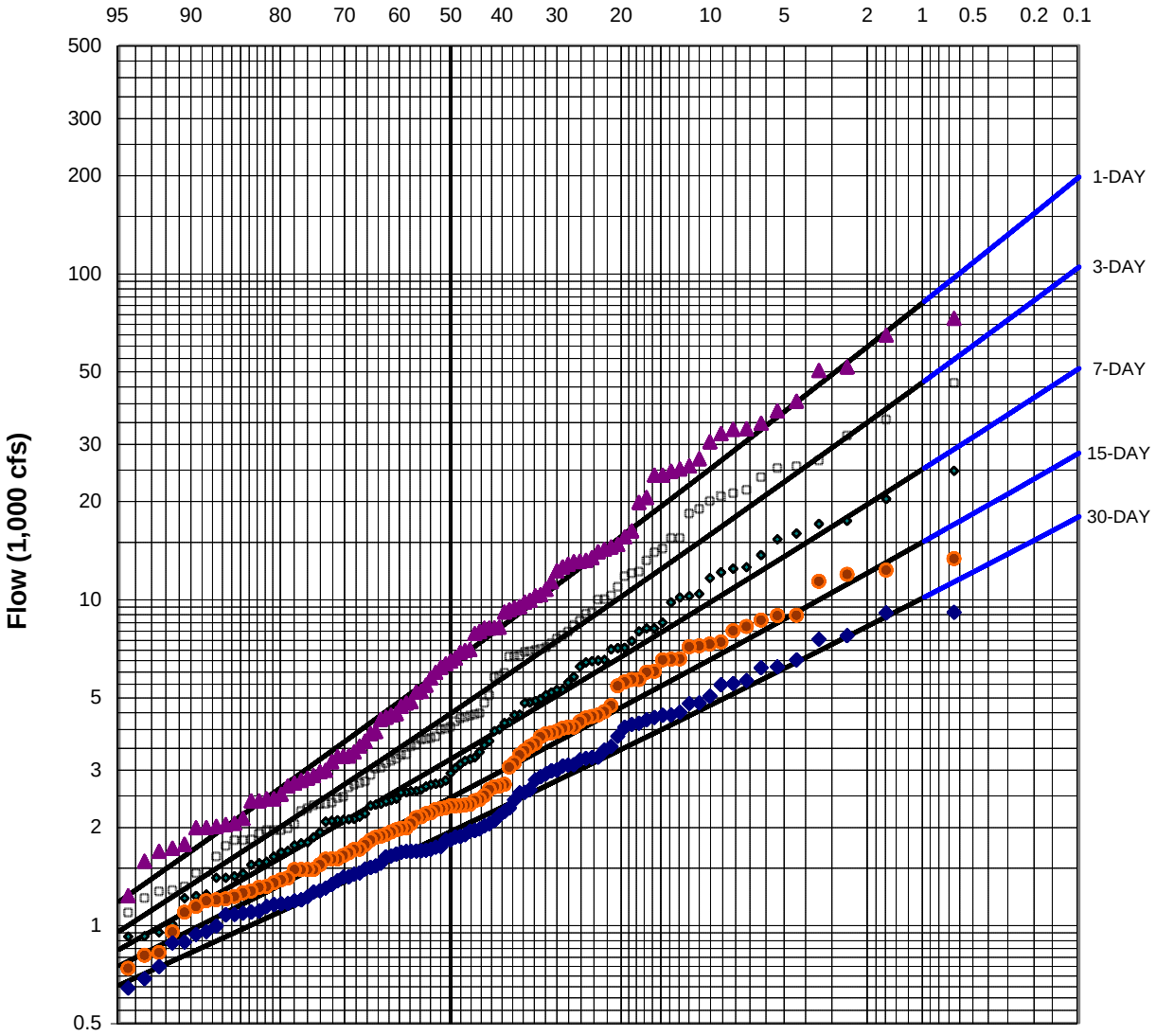
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SACRAMENTO RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
PUTAH CREEK NEAR WINTERS
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.813	0.458	0.1
3-day	3.660	0.420	0.1
7-day	3.519	0.368	0.1
15-day	3.399	0.324	0.1
30-day	3.294	0.296	0.1

NOTES:

1. Record correlated with Kings River at Piedra prior to 1954.
2. Median plotting positions.
3. Drainage area: 1,542 sq. mi.
4. Period of record: 1896-1999.

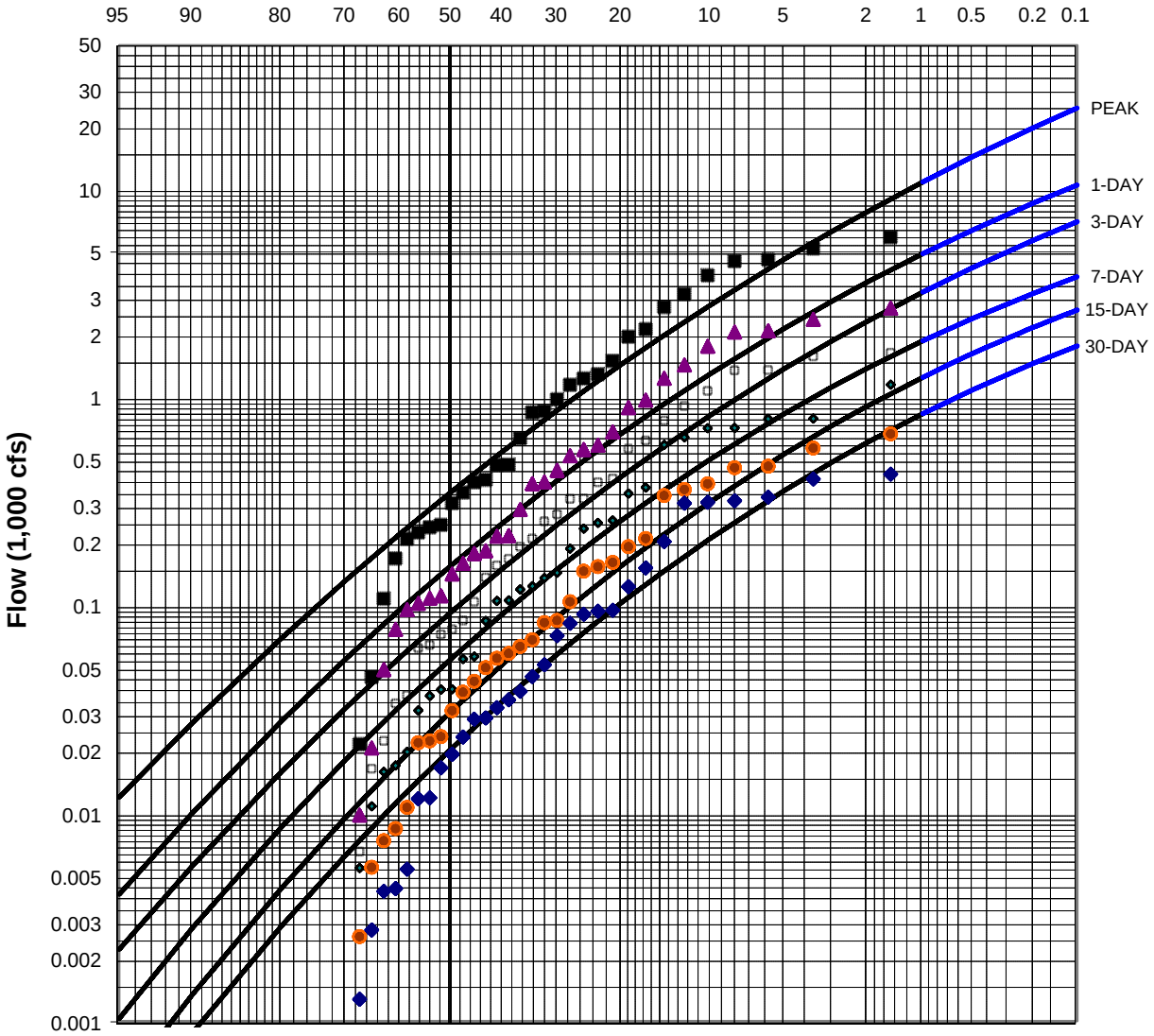
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
KINGS RIVER AT PINE FLAT DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	2.491	0.792	-0.5
1-day	2.121	0.836	-0.6
3-day	1.895	0.858	-0.6
7-day	1.652	0.897	-0.7
15-day	1.394	0.943	-0.7
30-day	1.214	0.946	-0.7

NOTES:

1. Data not available for 1991 to 1994 while dam was being rebuilt and raised.
2. 14 out of 45 data values for each duration are zero years, which are censored.
3. Median plotting positions.
4. Drainage area: 81.7 sq. mi.
5. Period of record: 1949-1997.

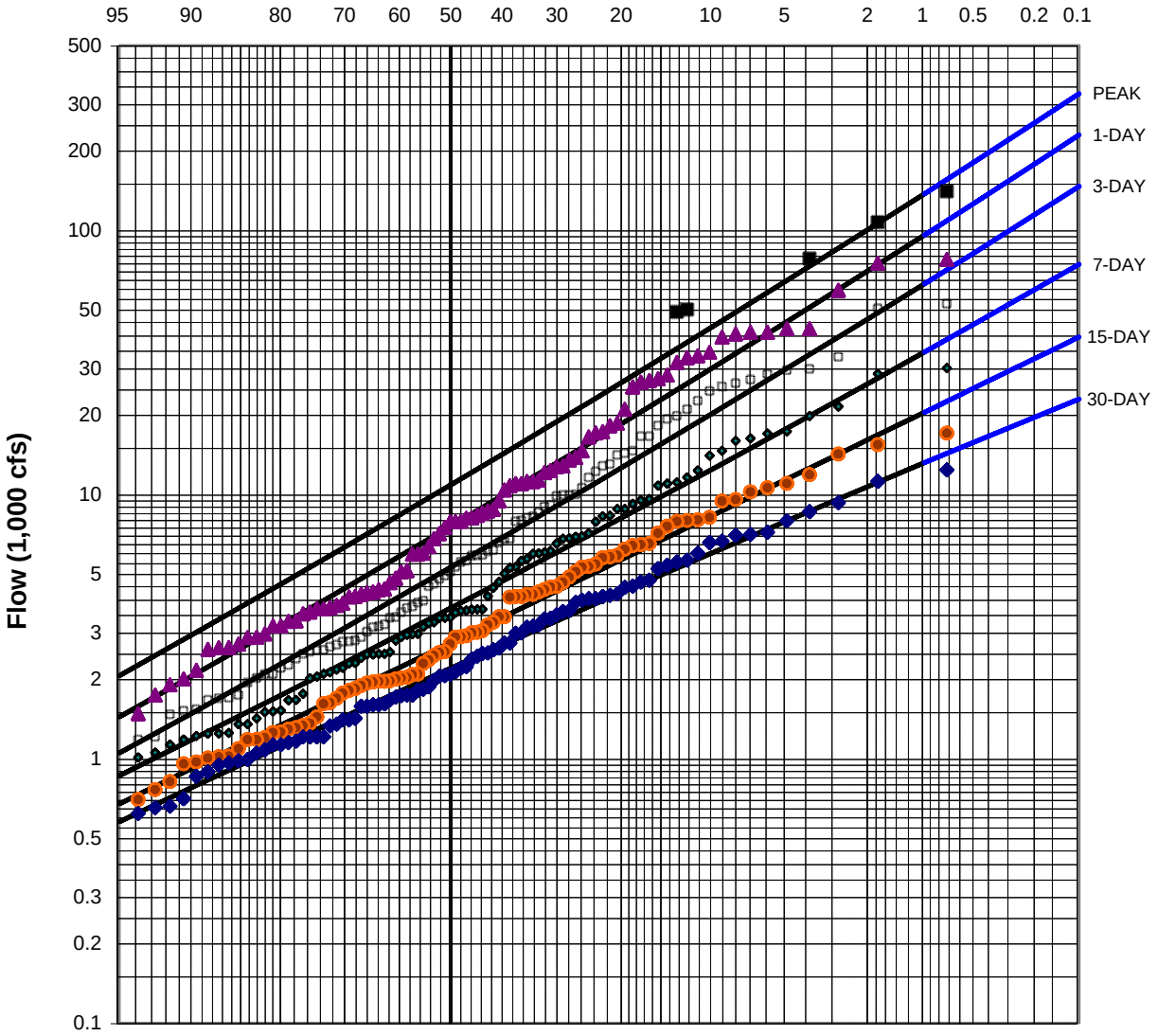
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
BIG DRY CREEK AT BIG DRY CREEK DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.048	0.454	0.1
1-day	3.892	0.454	0.1
3-day	3.736	0.442	0.1
7-day	3.581	0.399	0.1
15-day	3.443	0.373	0.0
30-day	3.340	0.346	-0.1

NOTES:

1. Median plotting positions.
2. Drainage area: 1,676 sq. mi.
3. Period of record: 1904-1997.

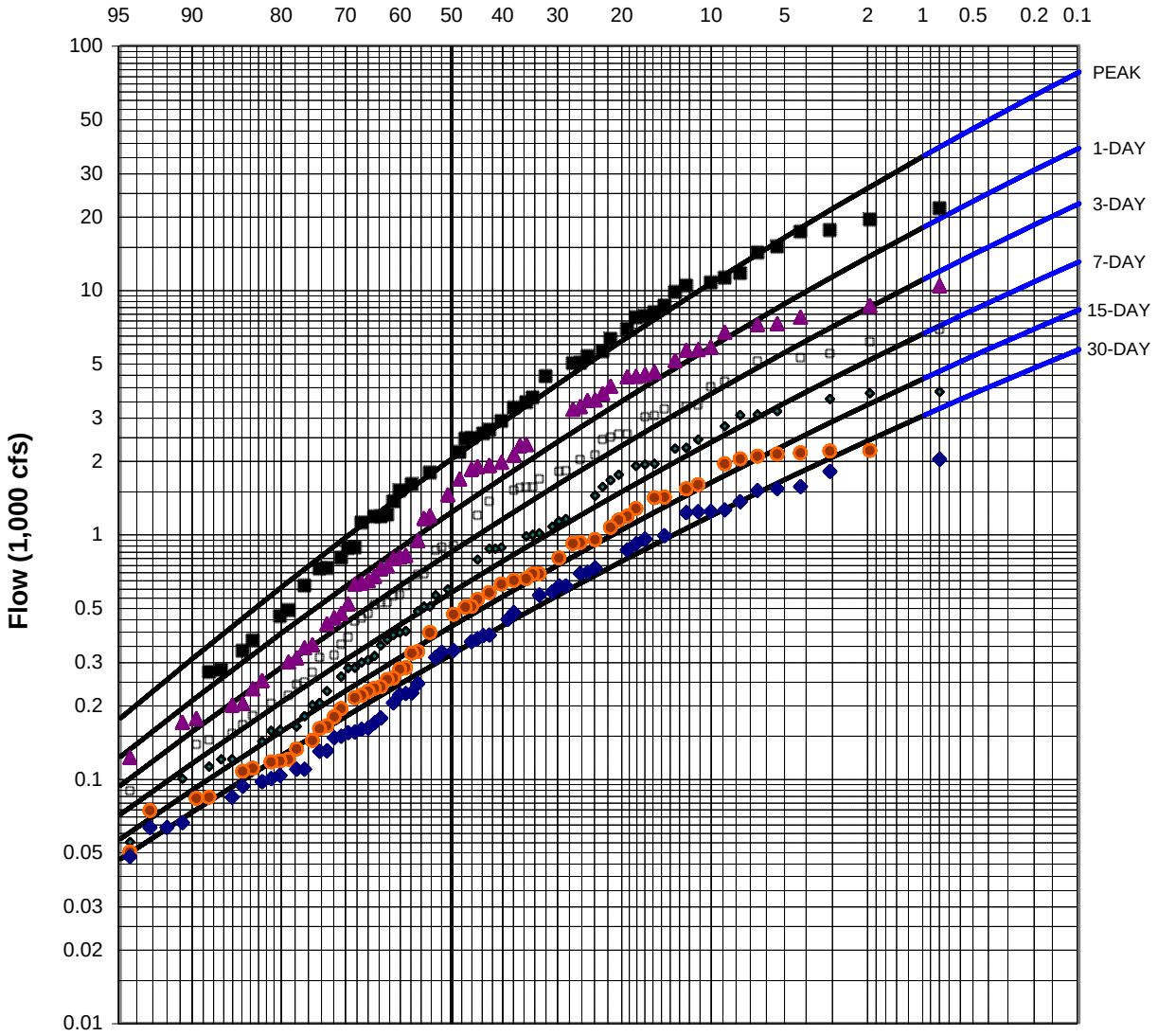
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SAN JOAQUIN RIVER AT FRIANT DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.067	0.566	-0.3
3-day	2.906	0.541	-0.3
7-day	2.741	0.514	-0.3
15-day	2.603	0.492	-0.3
30-day	2.489	0.474	-0.3

NOTES:

1. Statistics adjusted based on correlation with Fresno R near Knowles (1912, 1916-1990).
2. Median plotting positions.
3. Drainage area: 234 sq. mi.
4. Period of record: 1912, 1916-1999.

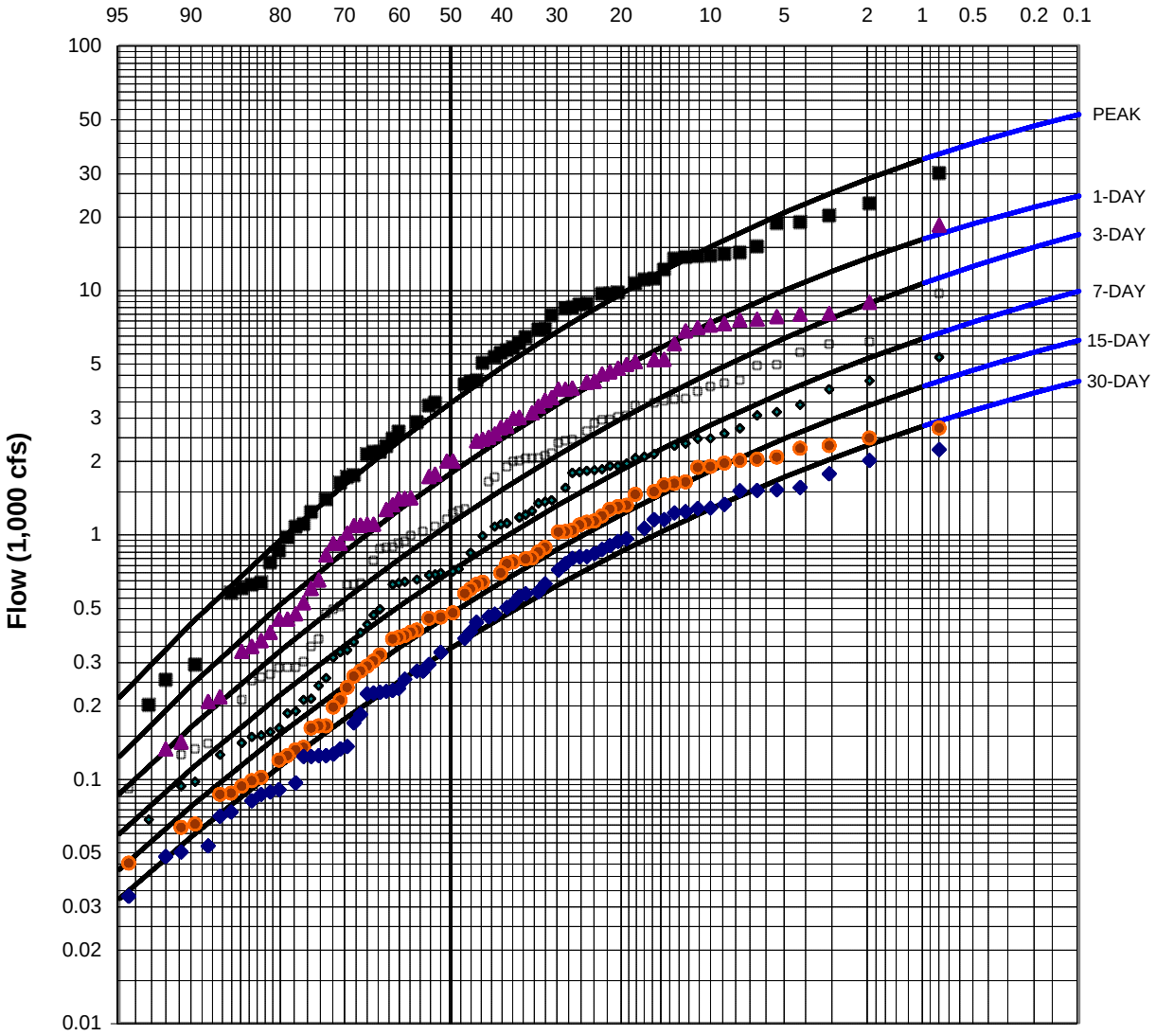
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
FRESNO RIVER AT HIDDEN DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.463	0.616	-0.8
1-day	3.178	0.592	-0.8
3-day	2.984	0.576	-0.7
7-day	2.789	0.559	-0.7
15-day	2.618	0.545	-0.7
30-day	2.477	0.533	-0.7

NOTES:

1. Statistics adjusted based on correlation with Fresno River (1912, 1916-1999).
2. Median plotting positions.
3. Drainage area: 235 sq. mi.
4. Period of record: 1912, 1916-1999.

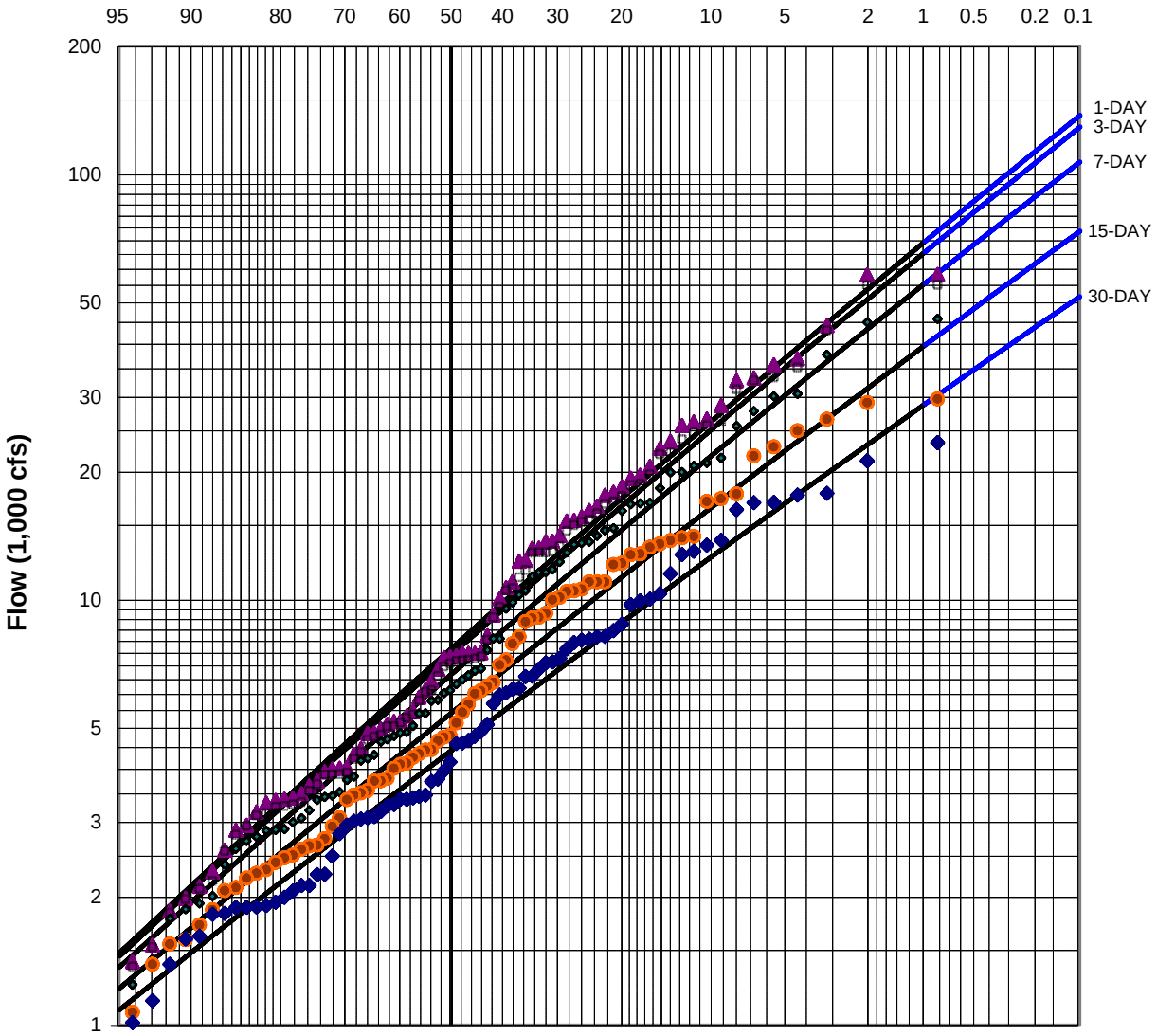
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
CHOWCHILLA RIVER AT BUCHANAN DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.882	0.426	-0.1
3-day	3.867	0.422	-0.1
7-day	3.821	0.410	-0.1
15-day	3.730	0.385	-0.1
30-day	3.642	0.363	-0.1

NOTES:

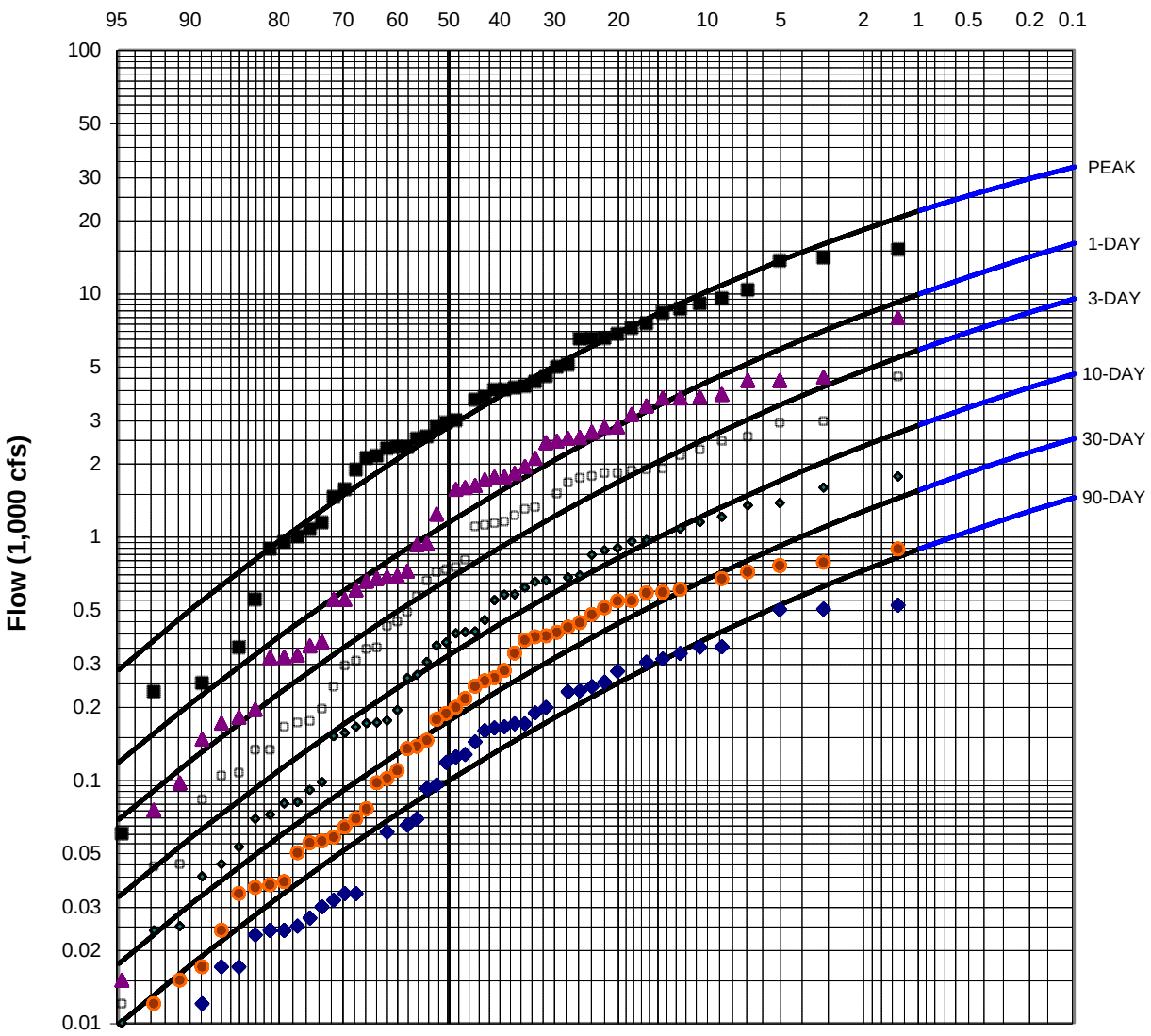
1. No overbank flow.
2. Includes flows in both San Joaquin River and the Eastside Bypass.
3. Median plotting positions.
4. Drainage area: approx. 6,900 sq. mi.
5. Period of record: 1917-1998.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SAN JOAQUIN RIVER AT EL NIDO
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.397	0.520	-0.7
1-day	3.012	0.523	-0.6
3-day	2.780	0.525	-0.6
10-day	2.466	0.527	-0.6
30-day	2.195	0.529	-0.6
90-day	1.949	0.531	-0.6

NOTES:

1. Median plotting positions.
2. Drainage area: 107 sq. mi.
3. Period of record: 1949-2000.

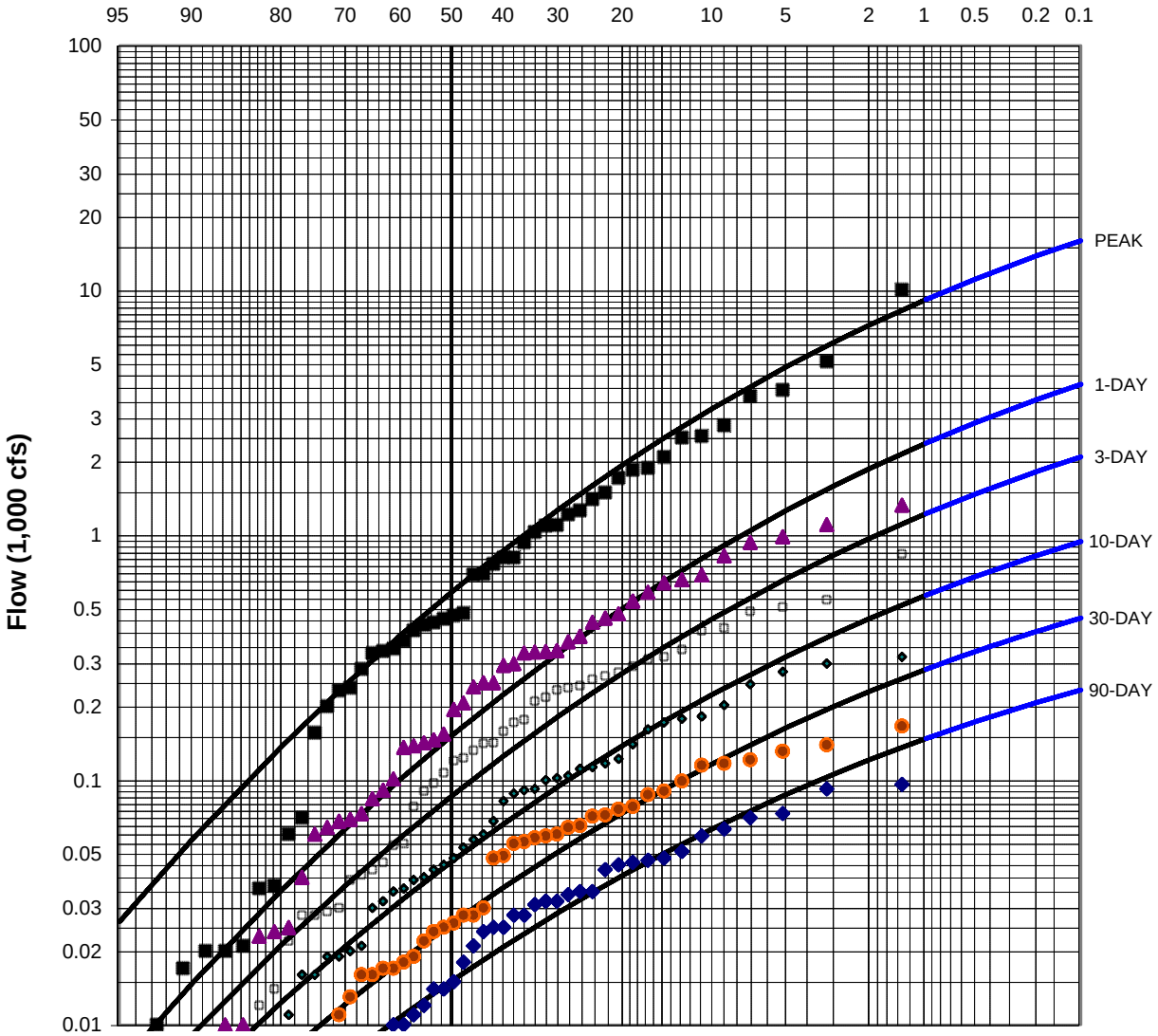
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
MARIPOSA CREEK AT MARIPOSA DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	2.693	0.700	-0.7
1-day	2.107	0.700	-0.7
3-day	1.864	0.675	-0.7
10-day	1.600	0.637	-0.7
30-day	1.350	0.608	-0.7
90-day	1.118	0.580	-0.7

NOTES:

1. Median plotting positions.
2. Drainage area: 25.6 sq. mi.
3. Period of record: 1950-2000.

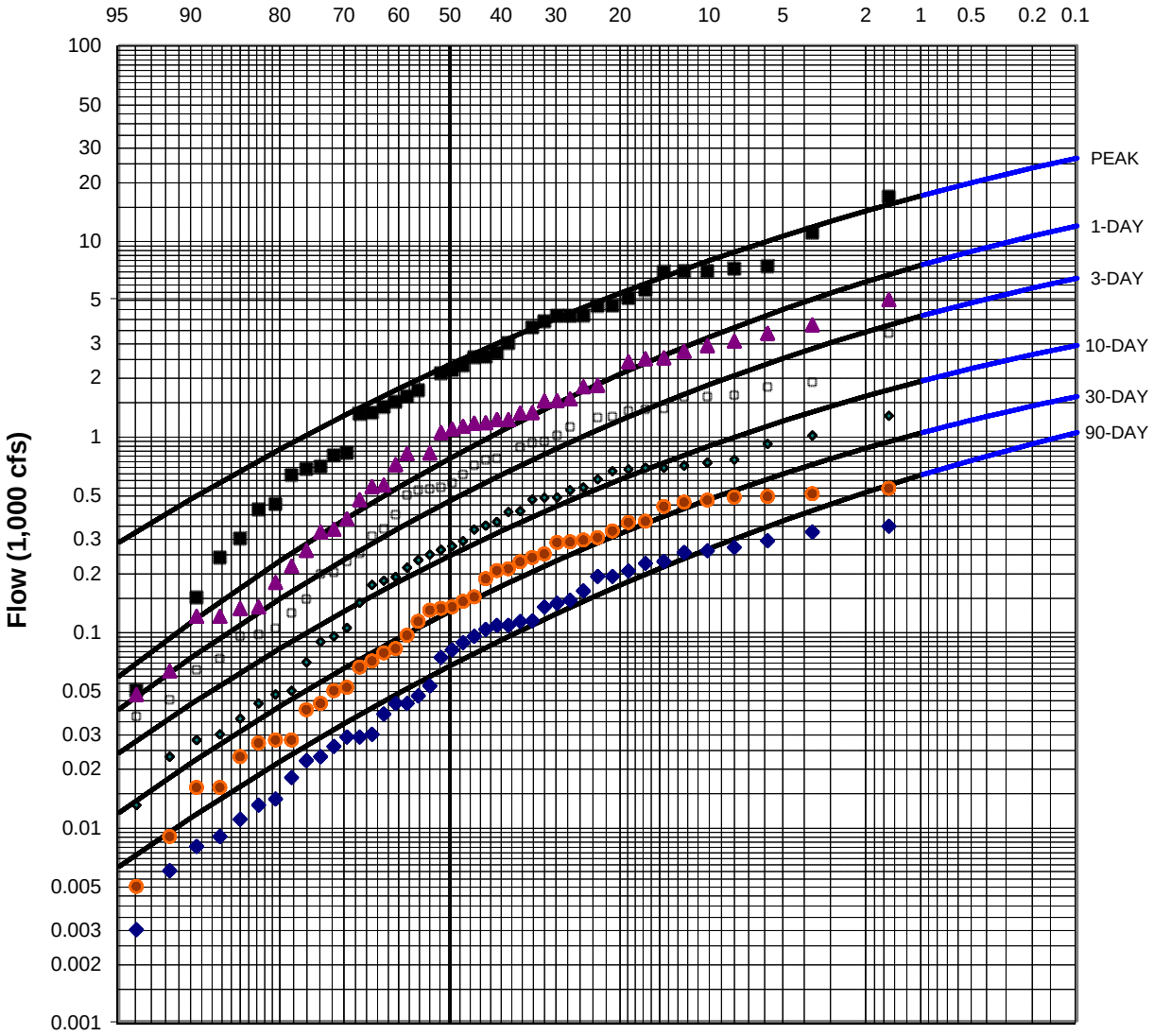
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
OWENS CREEK AT OWENS DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.325	0.482	-0.6
1-day	2.827	0.580	-0.7
3-day	2.612	0.555	-0.7
10-day	2.334	0.524	-0.7
30-day	2.049	0.536	-0.7
90-day	1.778	0.544	-0.6

NOTES:

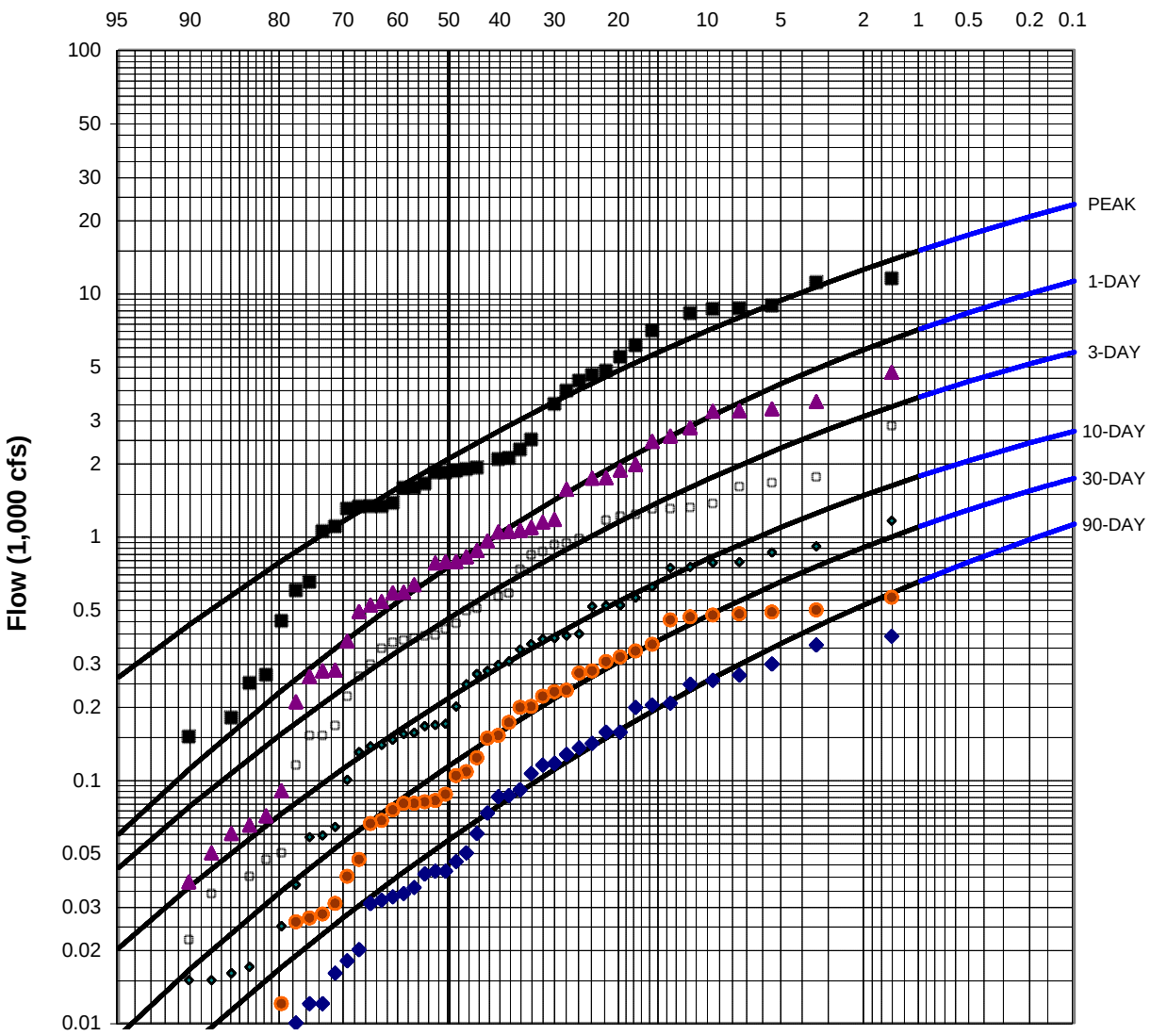
1. Median plotting positions.
2. Drainage area: 72.1 sq. mi.
3. Period of record: 1955-1999.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
BEAR CREEK AT BEAR DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.278	0.477	-0.6
1-day	2.816	0.572	-0.7
3-day	2.608	0.533	-0.7
10-day	2.280	0.534	-0.7
30-day	1.996	0.577	-0.7
90-day	1.700	0.592	-0.6

NOTES:

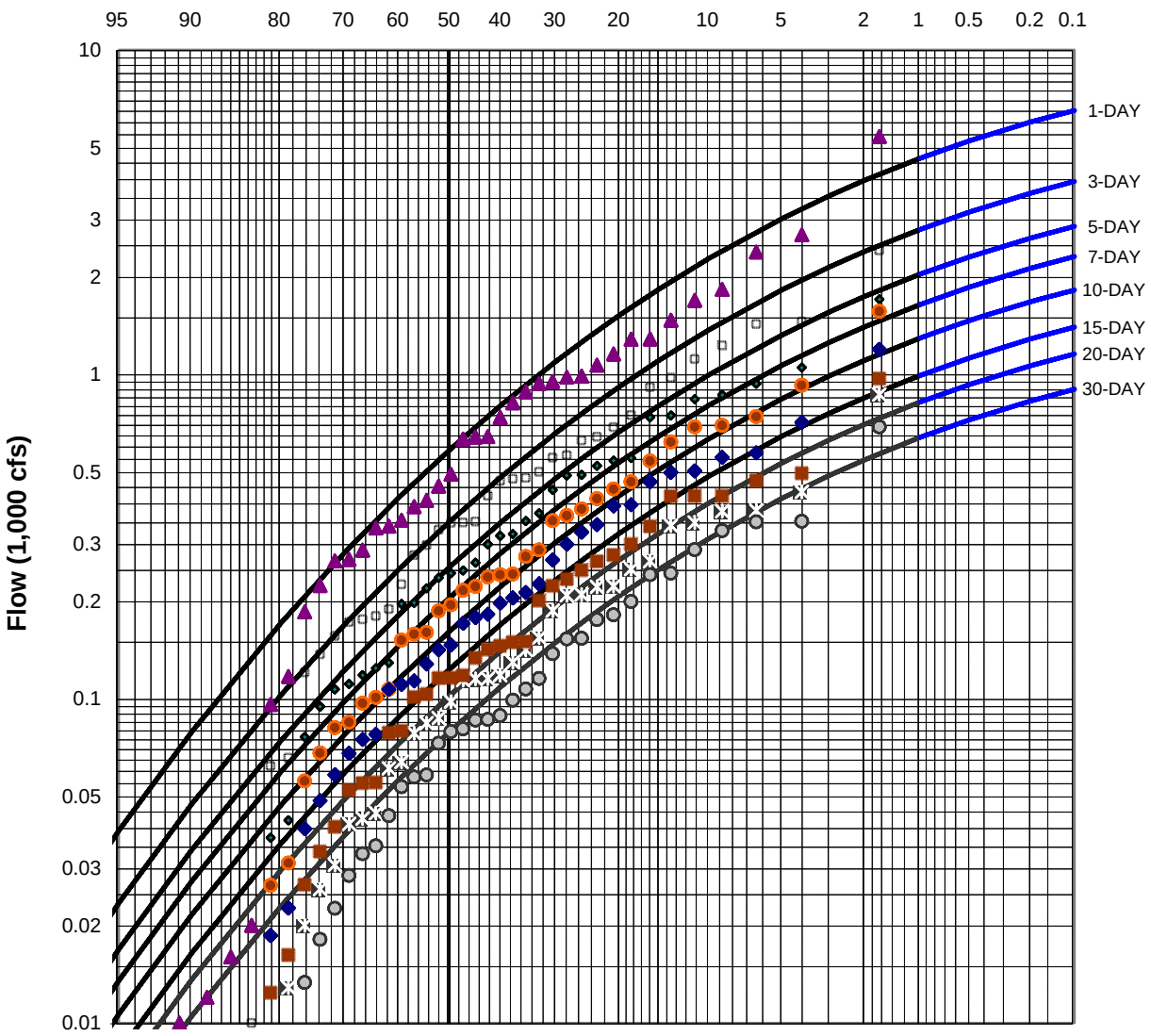
1. Median plotting positions.
2. Drainage area: 73.8 sq. mi.
3. Period of record: 1952-1999.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
BURNS CREEK AT BURNS DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	2.684	0.588	-0.9
3-day	2.463	0.589	-0.9
5-day	2.323	0.590	-0.9
7-day	2.228	0.591	-0.9
10-day	2.125	0.591	-0.9
15-day	2.008	0.592	-0.9
20-day	1.926	0.592	-0.9
30-day	1.815	0.593	-0.9

NOTES:

1. WY 1961, 1964, and 1968 censored as low outliers.
2. Median plotting positions.
3. Drainage area: 159 sq. mi.
4. Period of record: 1959-1999.

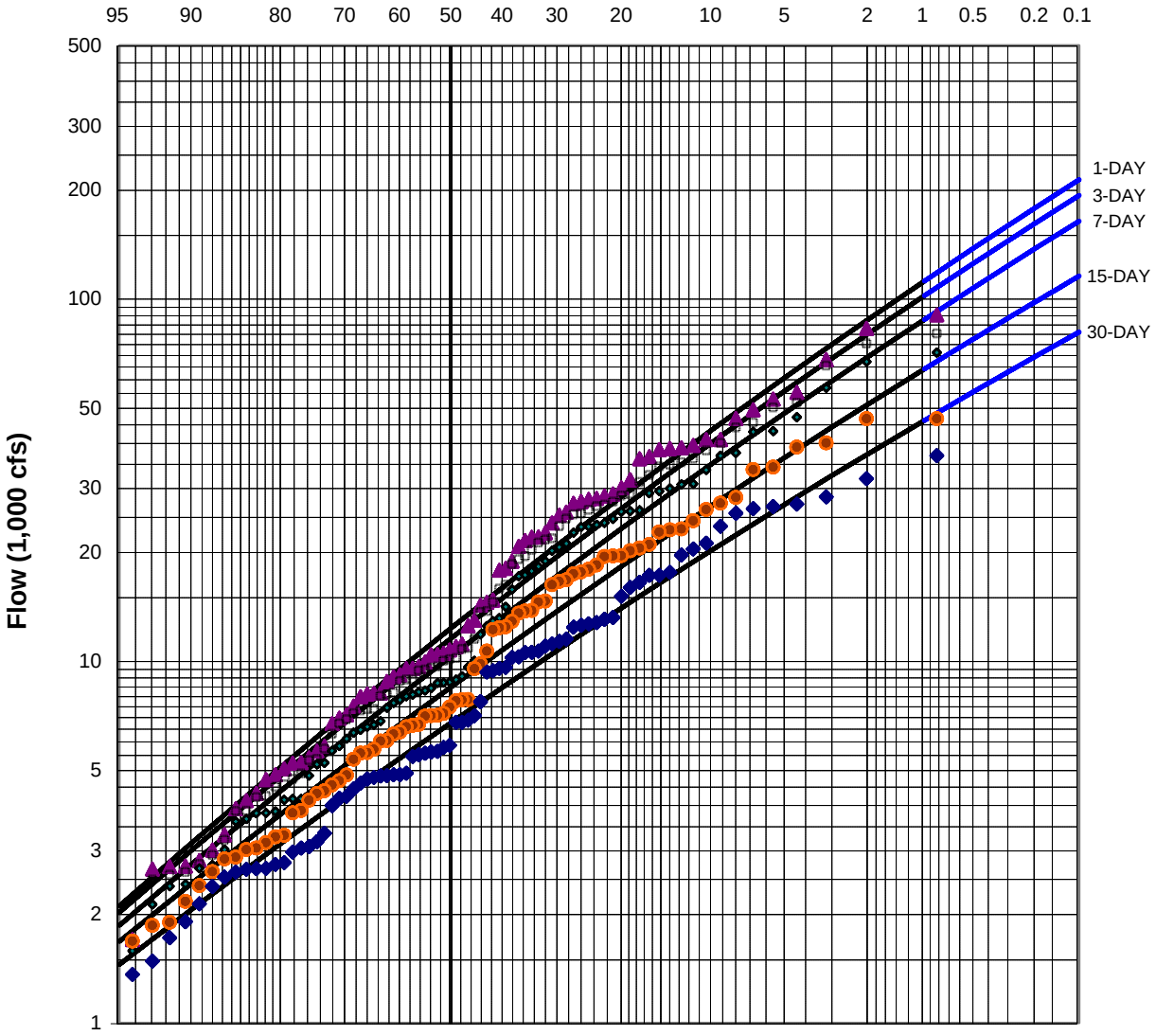
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
LOS BANOS CREEK AT LOS BANOS DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	4.079	0.445	-0.2
3-day	4.052	0.439	-0.2
7-day	4.002	0.431	-0.2
15-day	3.918	0.407	-0.2
30-day	3.820	0.387	-0.2

NOTES:

1. No overbank flow.
2. Median plotting positions.
3. Drainage area: 9,520 sq. mi.
4. Period of record: 1917-1998.

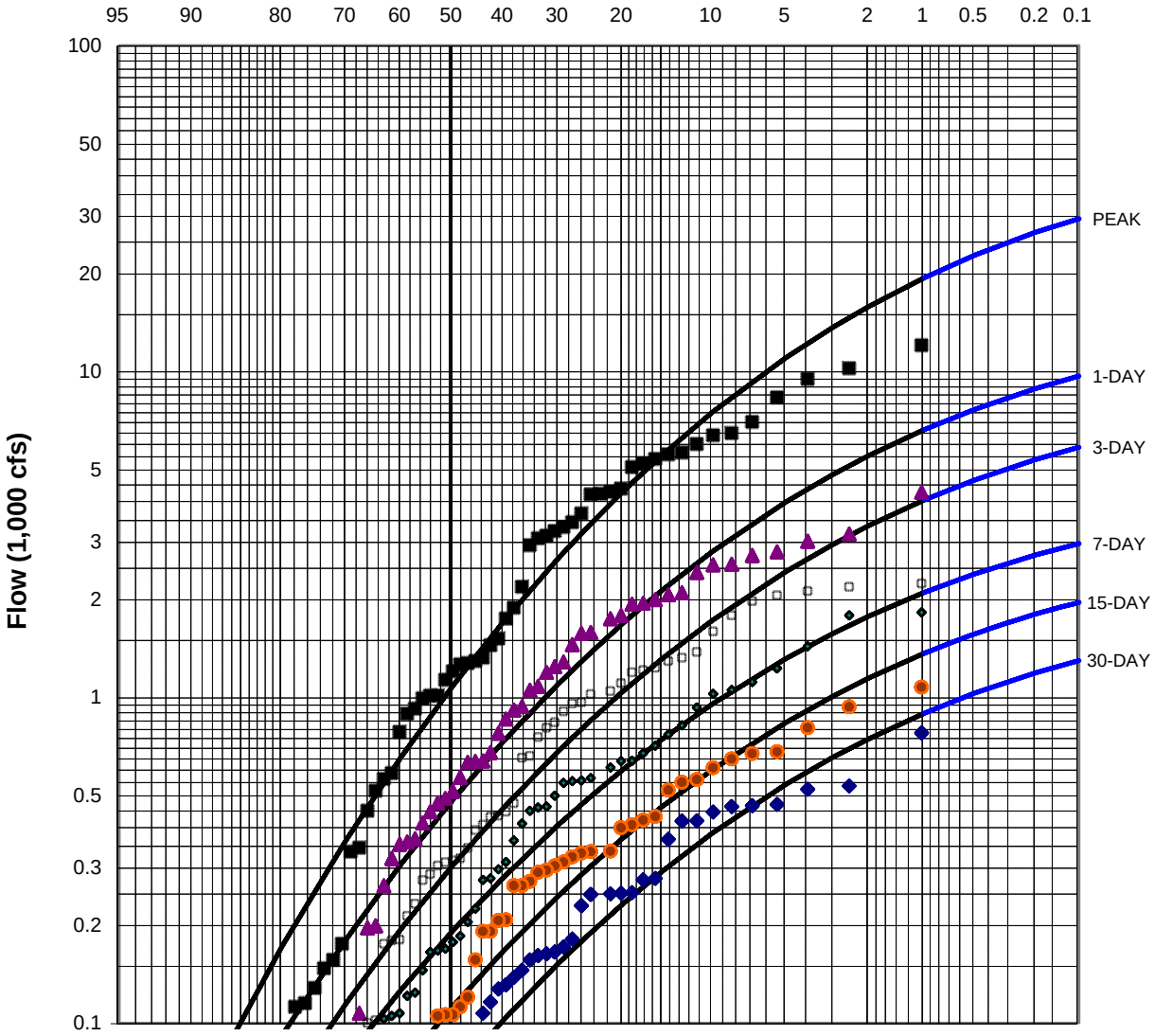
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SAN JOAQUIN RIVER NEAR NEWMAN
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	2.894	0.871	-1.0
1-day	2.558	0.789	-1.0
3-day	2.358	0.779	-1.0
7-day	2.167	0.721	-1.0
15-day	1.929	0.753	-1.0
30-day	1.708	0.776	-1.0

NOTES:

1. Ten zero years in record censored.
2. Median plotting positions.
3. Drainage area: 134 sq. mi.
4. Period of record: 1932-1998.
5. USGS Station 11274500.

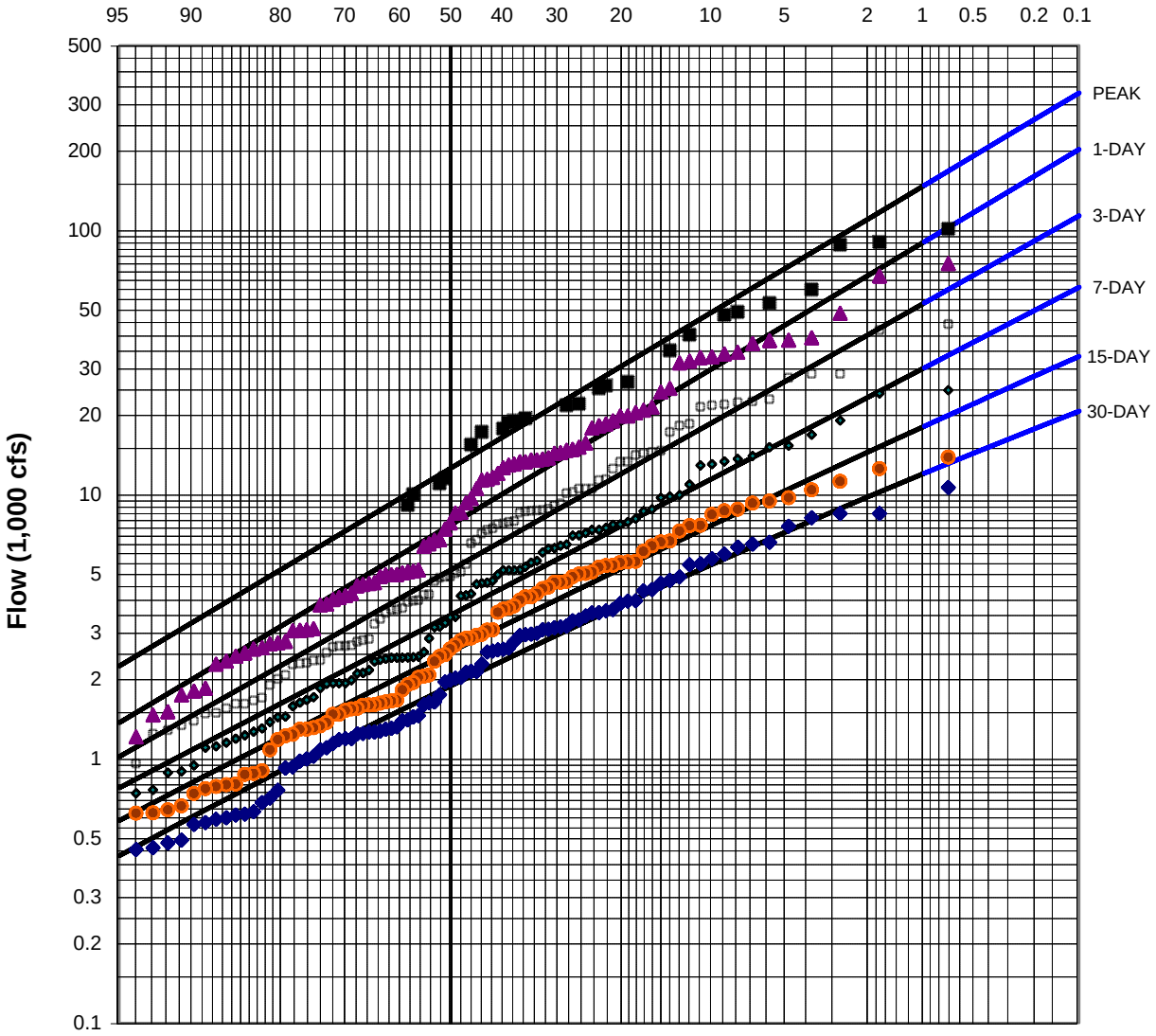
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
ORESTIMBA CREEK NEAR NEWMAN
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.104	0.458	0.0
1-day	3.890	0.458	0.0
3-day	3.719	0.432	0.0
7-day	3.548	0.400	0.0
15-day	3.402	0.380	-0.1
30-day	3.267	0.373	-0.2

NOTES:

1. 1977 event censored as low outlier.
2. Median plotting positions.
3. Drainage area: 1,037 sq. mi.
4. Period of record: 1902-1997.

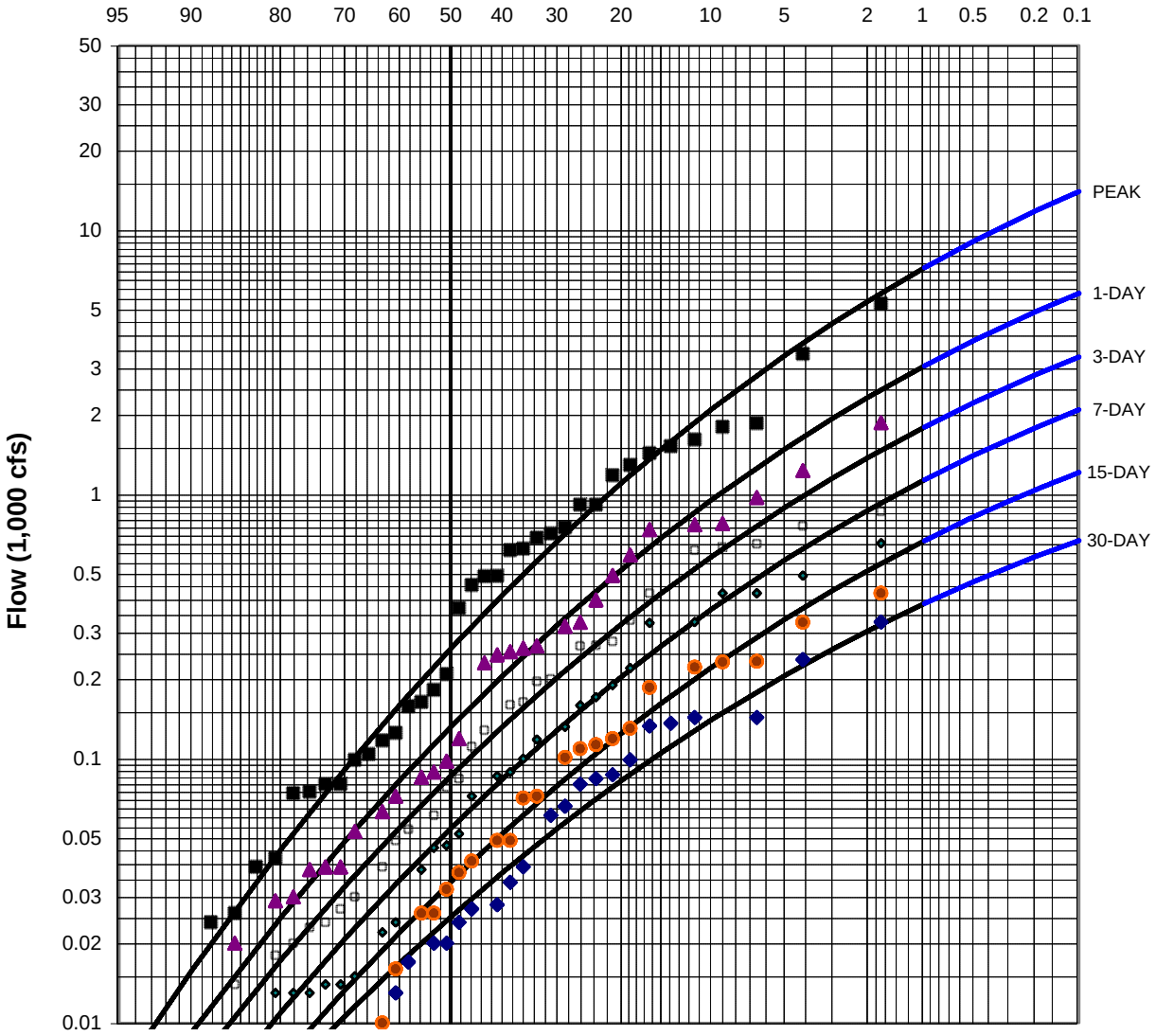
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
MERCED RIVER AT NEW EXCHEQUER DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	2.328	0.843	-0.7
1-day	2.036	0.800	-0.7
3-day	1.854	0.773	-0.7
7-day	1.655	0.772	-0.7
15-day	1.455	0.755	-0.7
30-day	1.329	0.694	-0.7

NOTES:

1. Median plotting positions.
2. Drainage area: 72.6 sq. mi.
3. Period of record: 1959-1997.

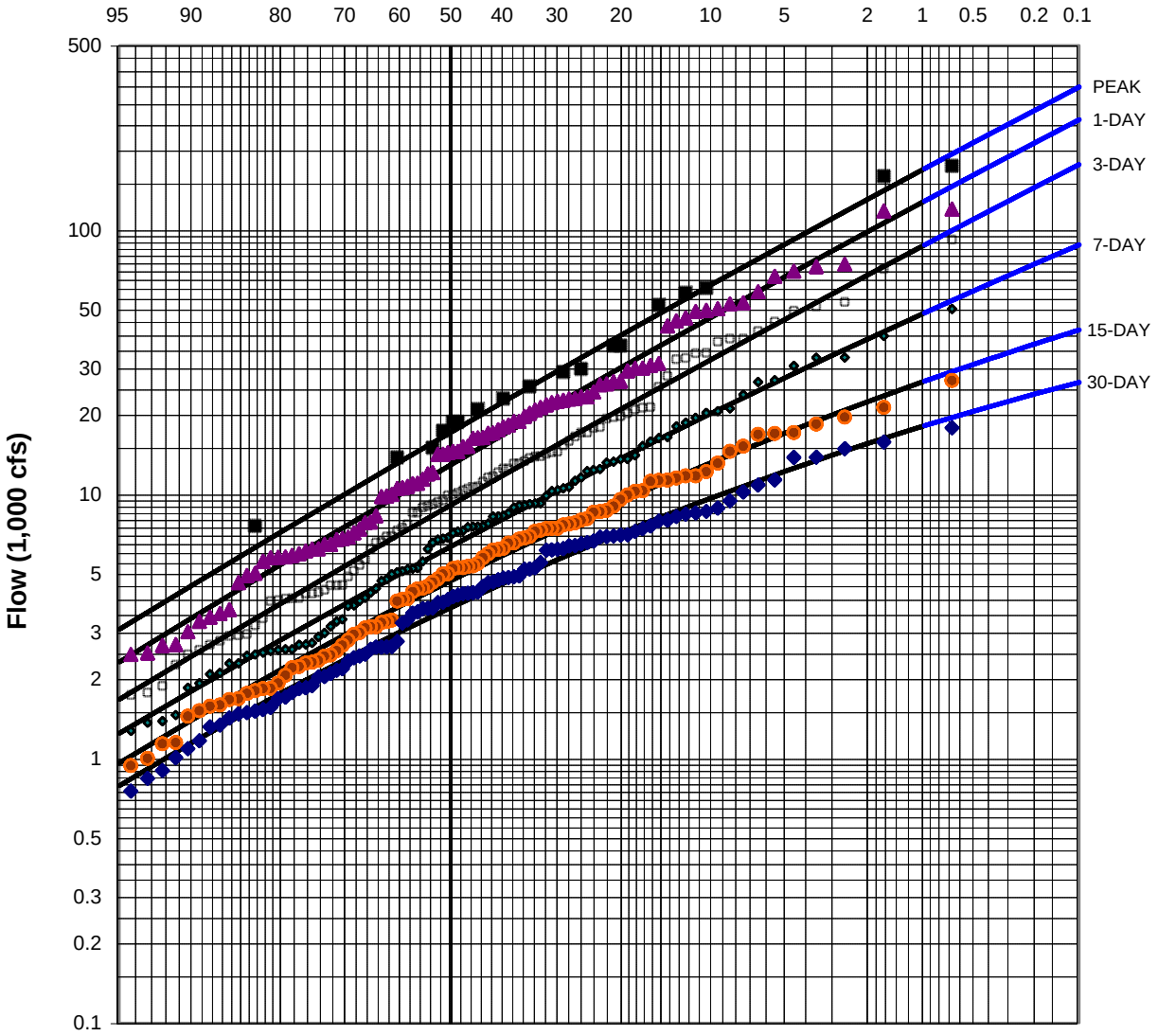
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
DEL PUERTO CREEK NEAR PATTERSON
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	4.232	0.444	-0.1
1-day	4.109	0.444	-0.1
3-day	3.957	0.438	-0.1
7-day	3.793	0.410	-0.2
15-day	3.652	0.382	-0.4
30-day	3.545	0.365	-0.5

NOTES:

1. Median plotting positions.
2. Drainage area: 1,533 sq. mi.
3. Period of record: 1897-1997.

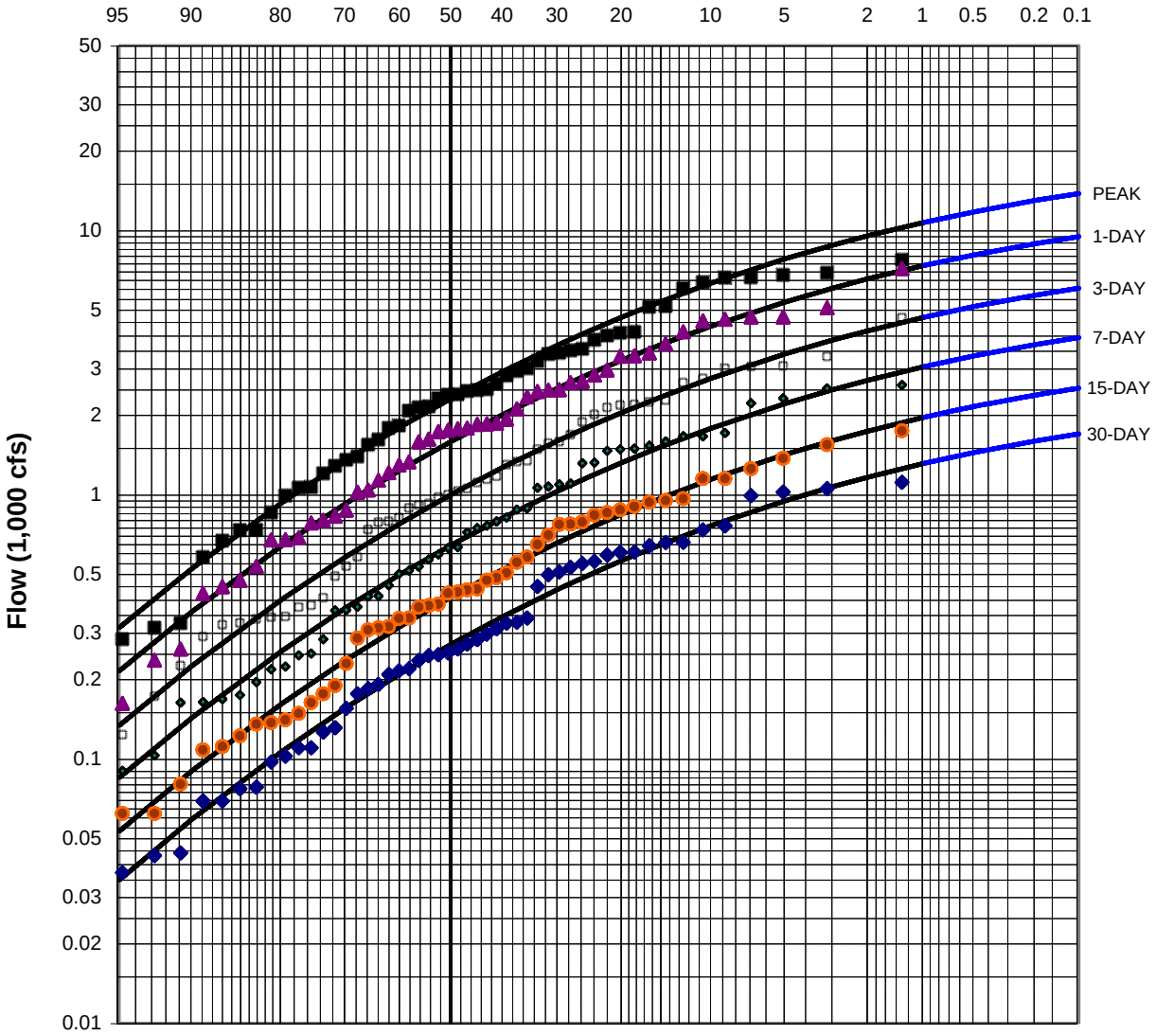
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
TUOLUMNE RIVER AT DON PEDRO DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.303	0.435	-0.9
1-day	3.140	0.435	-0.9
3-day	2.939	0.438	-0.9
7-day	2.747	0.441	-0.9
15-day	2.550	0.444	-0.9
30-day	2.371	0.447	-0.9

NOTES:

1. Median plotting positions.
2. Drainage area: 192 sq. mi.
3. Period of record: 1945-1997.

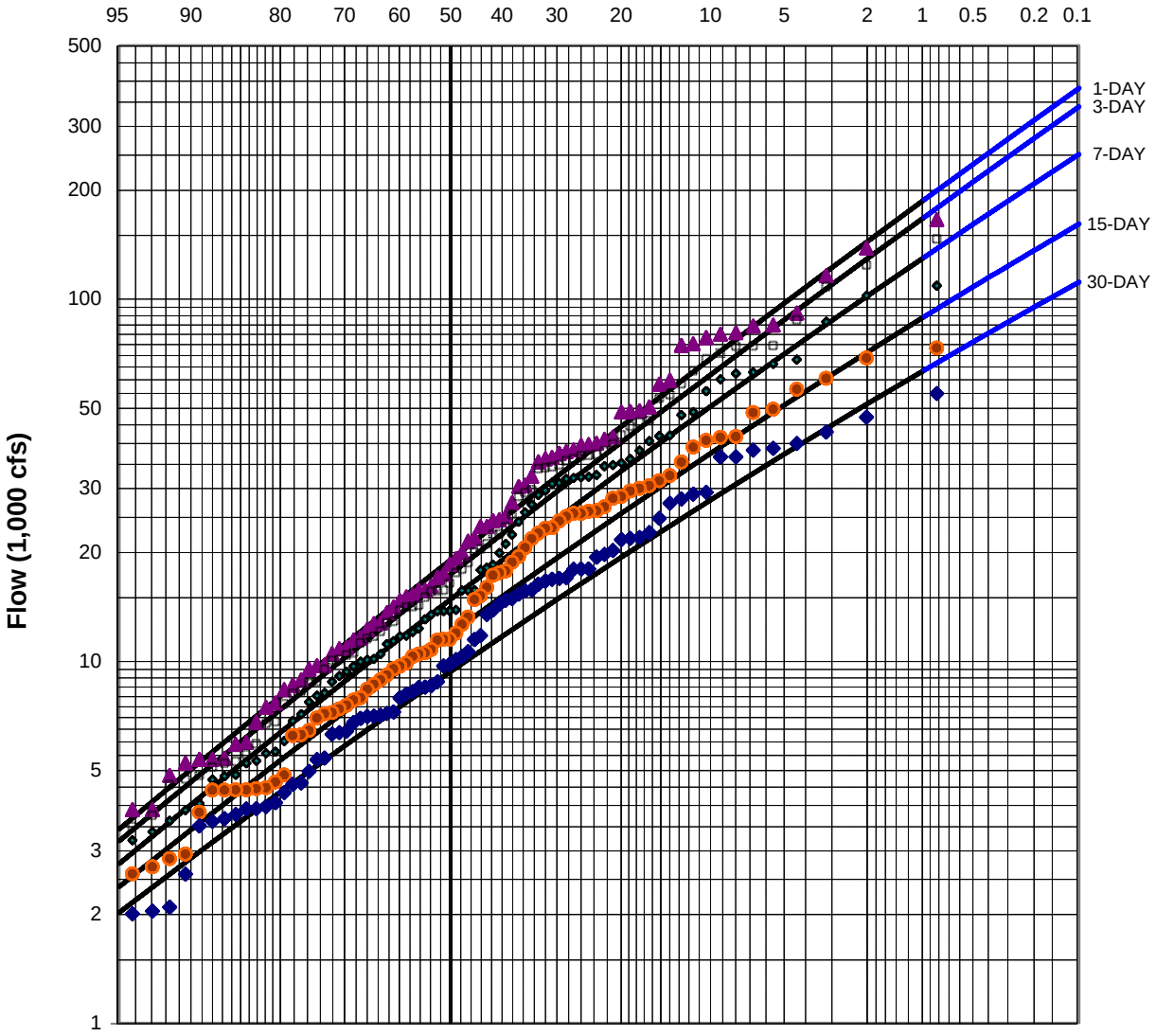
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
DRY CREEK NEAR MODESTO
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	4.276	0.443	-0.1
3-day	4.237	0.439	-0.1
7-day	4.164	0.429	-0.2
15-day	4.066	0.406	-0.2
30-day	3.962	0.386	-0.2

NOTES:

1. No overbank flow.
2. Median plotting positions.
3. Drainage area: approx. 12,400 sq. mi.
4. Period of record: 1917-1998.

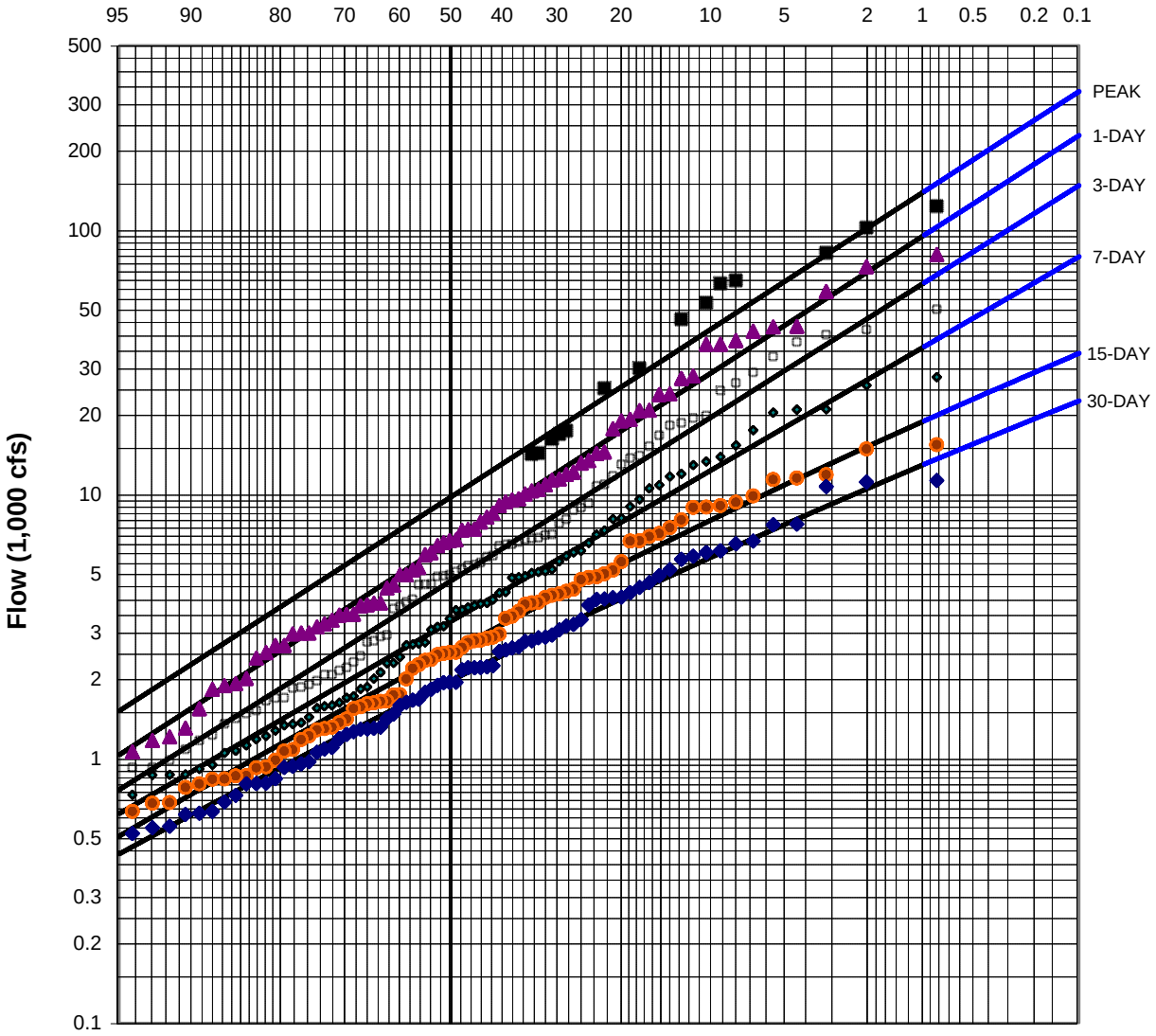
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SAN JOAQUIN RIVER AT MAZE ROAD BRIDGE
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.995	0.495	0.0
1-day	3.829	0.495	0.0
3-day	3.677	0.483	0.0
7-day	3.524	0.445	0.0
15-day	3.396	0.405	-0.2
30-day	3.286	0.380	-0.2

NOTES:

1. Median plotting positions.
2. Drainage area: 904 sq. mi.
3. Period of record: 1916-1997.

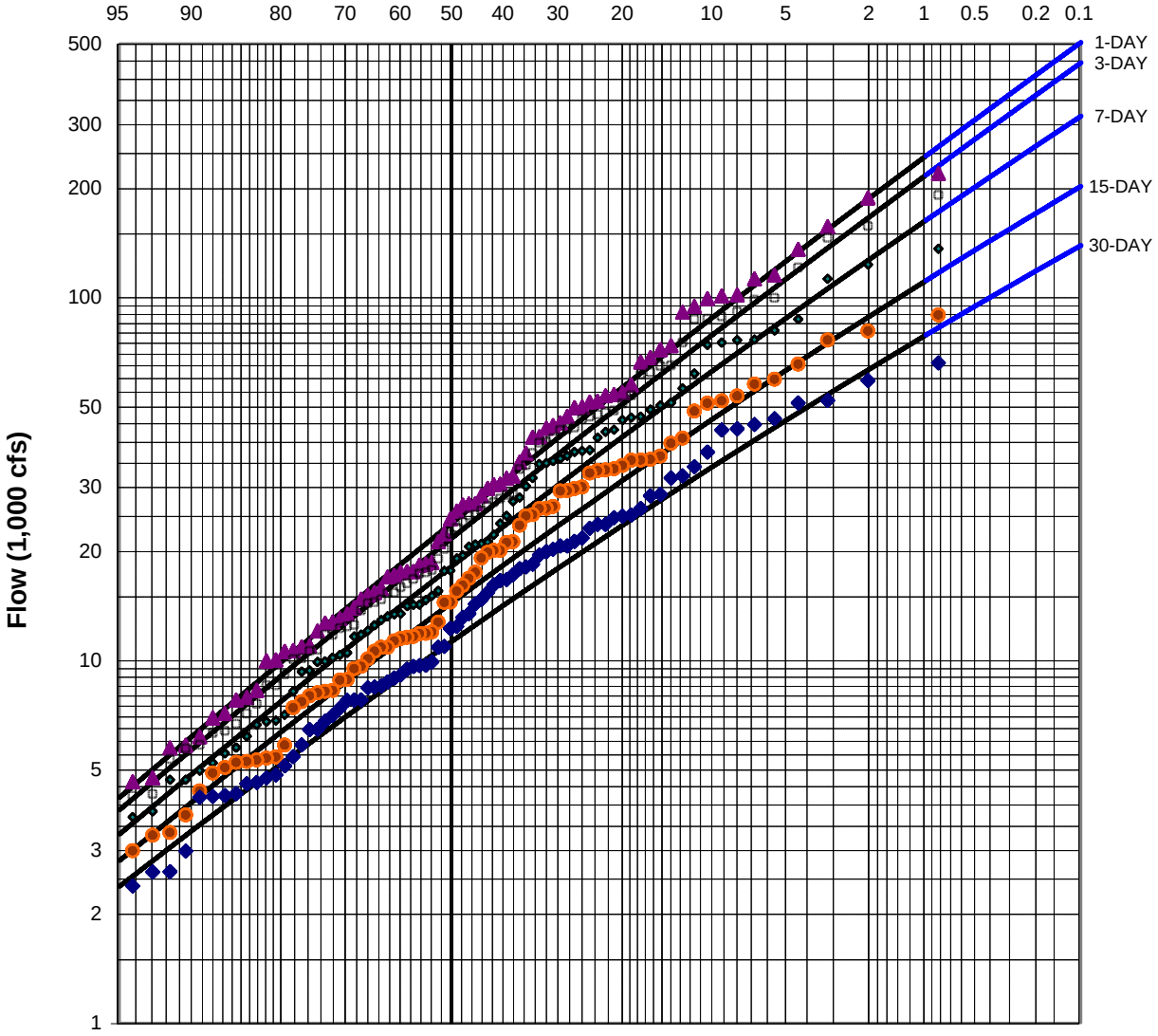
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
STANISLAUS RIVER AT NEW MELONES DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	4.375	0.450	-0.1
3-day	4.333	0.445	-0.1
7-day	4.251	0.433	-0.2
15-day	4.148	0.412	-0.2
30-day	4.042	0.392	-0.2

NOTES:

1. No overbank flow.
2. Median plotting positions.
3. Drainage area: 13,536 sq. mi.
4. Period of record: 1917-1998.

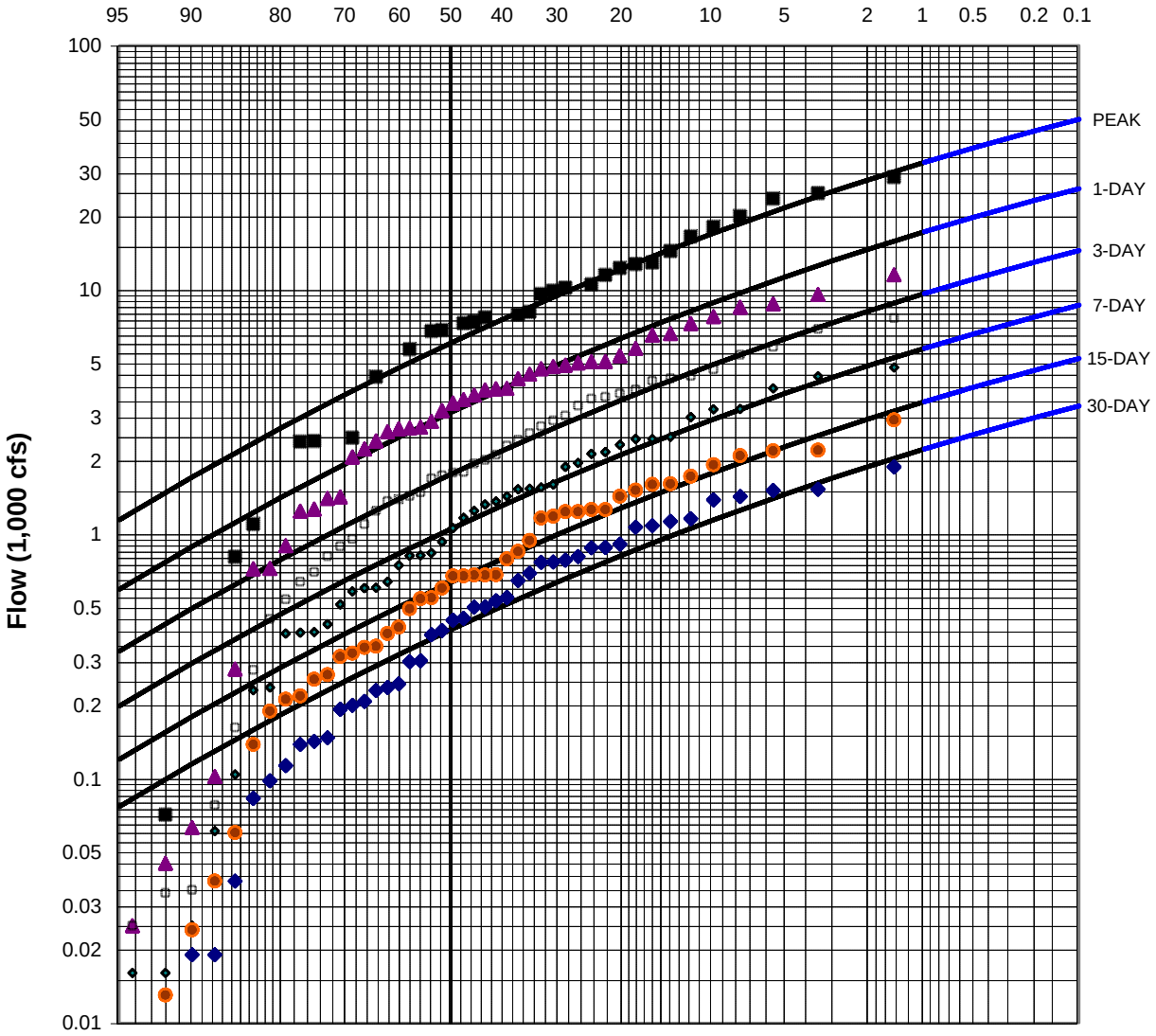
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
SAN JOAQUIN RIVER NEAR VERNALIS
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.754	0.392	-0.5
1-day	3.470	0.392	-0.5
3-day	3.216	0.392	-0.5
7-day	2.993	0.392	-0.5
15-day	2.775	0.392	-0.5
30-day	2.581	0.392	-0.5

NOTES:

1. Six lowest non-zero points censored.
2. Median plotting positions.
3. Drainage area: 212 sq. mi.
4. Period of record: 1951-1998.

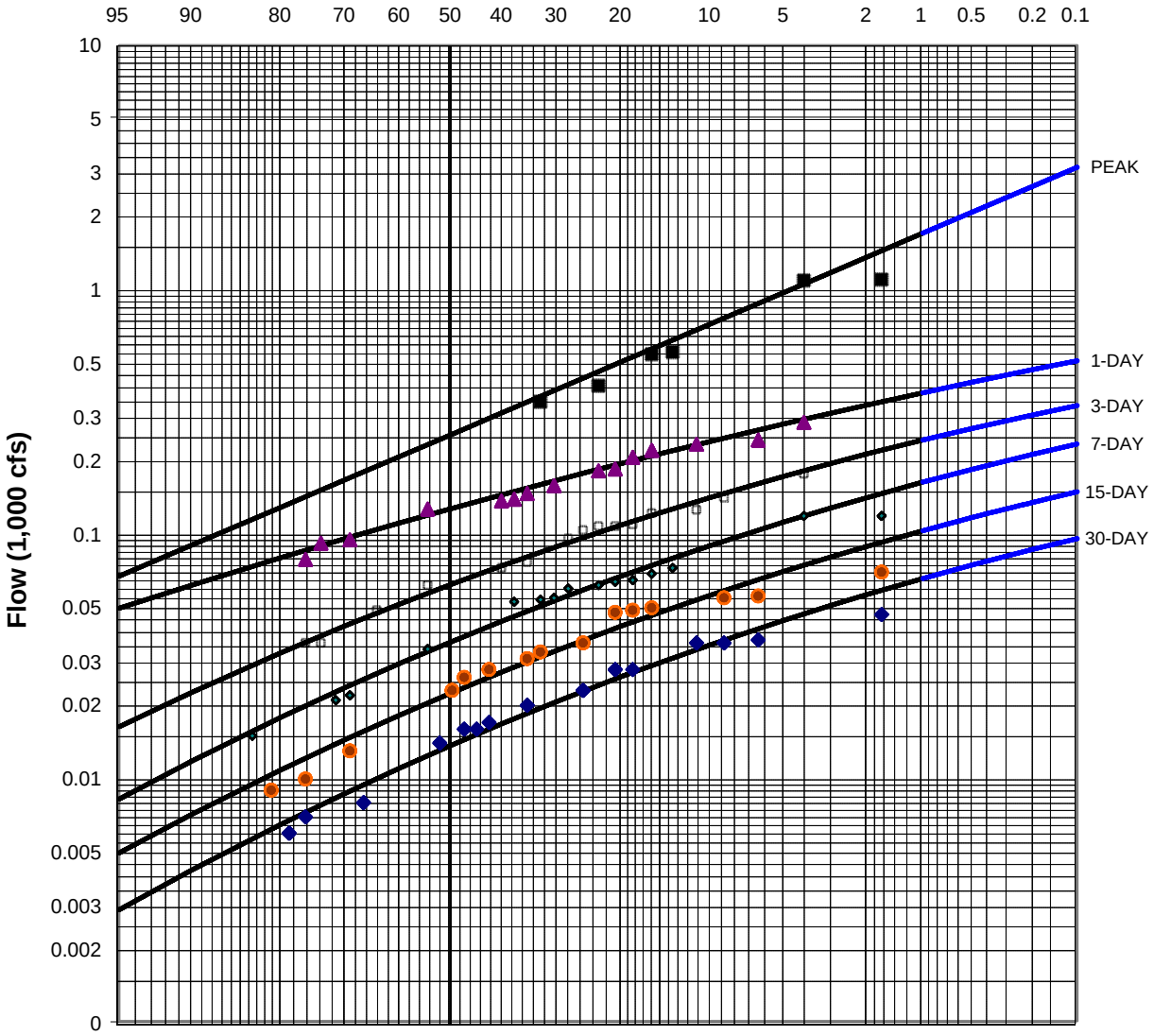
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
LITTLEJOHN CREEK AT FARMINGTON DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	2.410	0.353	0.0
1-day	2.095	0.230	-0.3
3-day	1.771	0.314	-0.5
7-day	1.534	0.347	-0.5
15-day	1.324	0.353	-0.5
30-day	1.109	0.363	-0.5

NOTES:

1. Station correlated with Littlejohn Cr at Farmington Dam w/ 6 censored low water years.
2. Median plotting positions.
3. Drainage area: 8.25 sq. mi.
4. Period of record: 1980-1998.

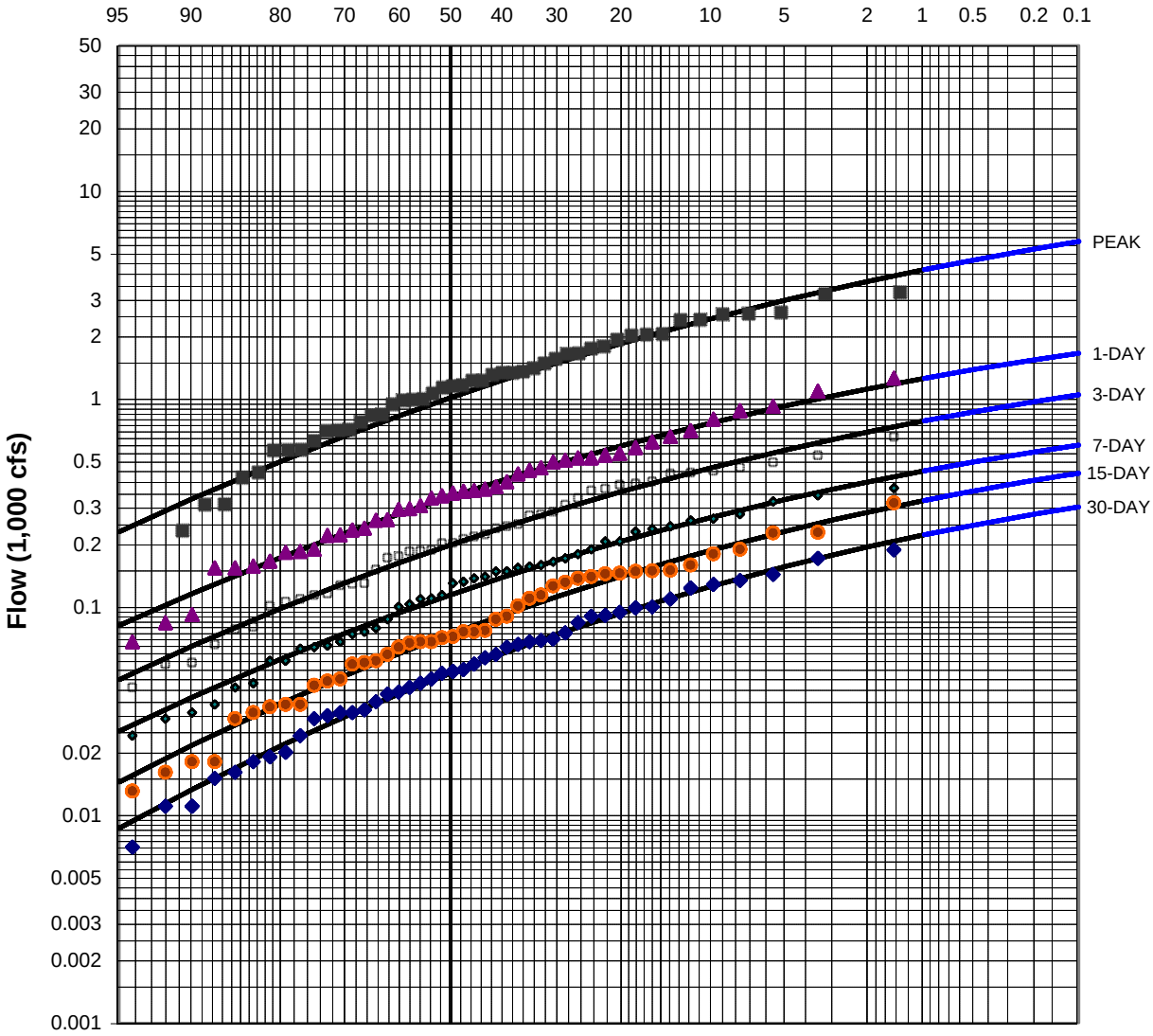
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
DUCK CREEK NEAR FARMINGTON
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	2.976	0.342	-0.6
1-day	2.498	0.325	-0.7
3-day	2.265	0.340	-0.7
7-day	2.024	0.343	-0.7
15-day	1.832	0.372	-0.7
30-day	1.641	0.388	-0.7

NOTES:

1. WY 1961 point censored as low outlier.
2. Median plotting positions.
3. Drainage area: 21 sq. mi.
4. Period of record: 1929-1969, 1991-1993, 1996-2000.

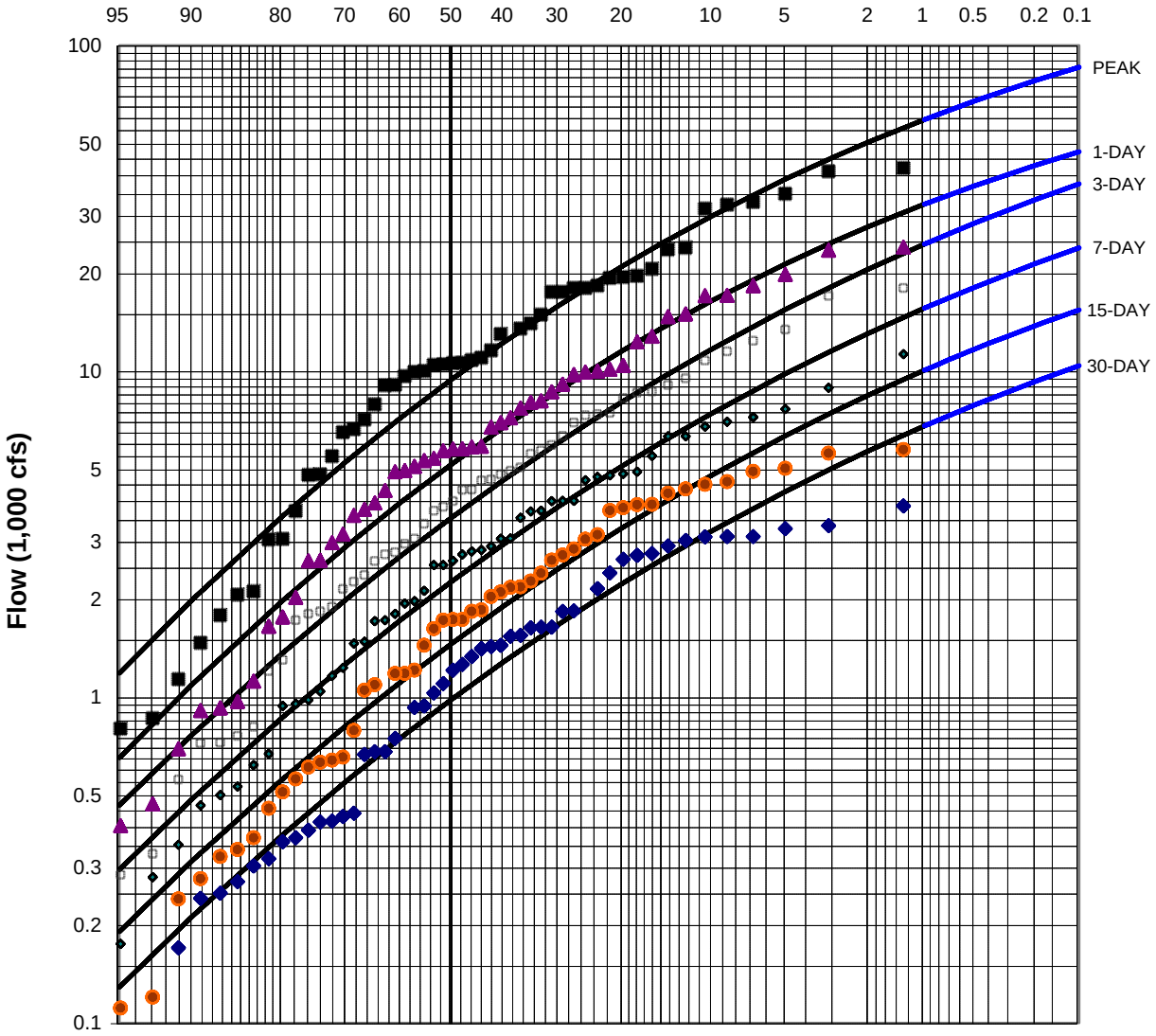
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
COSGROVE CREEK NEAR VALLEY SPRINGS
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
peak	3.924	0.468	-0.7
1-day	3.664	0.468	-0.7
3-day	3.508	0.468	-0.6
7-day	3.311	0.468	-0.6
15-day	3.121	0.468	-0.6
30-day	2.950	0.468	-0.6

NOTES:

1. Data set derived from Calaveras R at Jenny Lind (60 yrs), New Hogan inflow (33 yrs), and intermittent records of stage with storage and outflow relationships for Hogan Dam.
2. Median plotting positions.
3. Drainage area: 363 sq. mi.
4. Period of record: 1930-1997.

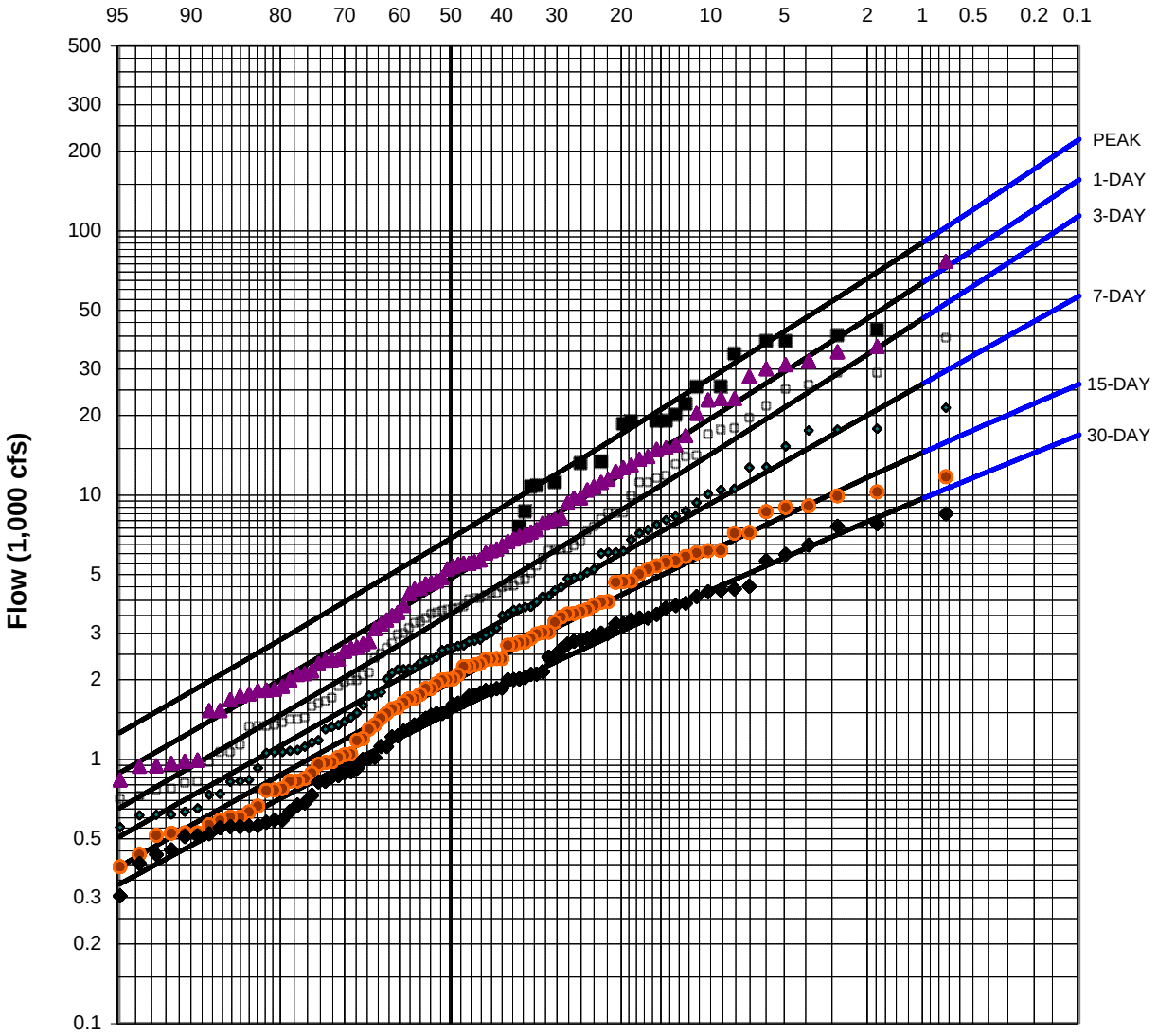
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
CALAVERAS RIVER AT NEW HOGAN DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
Peak	3.846	0.463	0.1
1-day	3.694	0.463	0.1
3-day	3.560	0.462	0.1
7-day	3.416	0.432	0.0
15-day	3.279	0.405	-0.2
30-day	3.166	0.377	-0.2

NOTES:

1. Median plotting positions.
2. Drainage area: 677 sq. mi.
3. Period of record: 1901-1997.

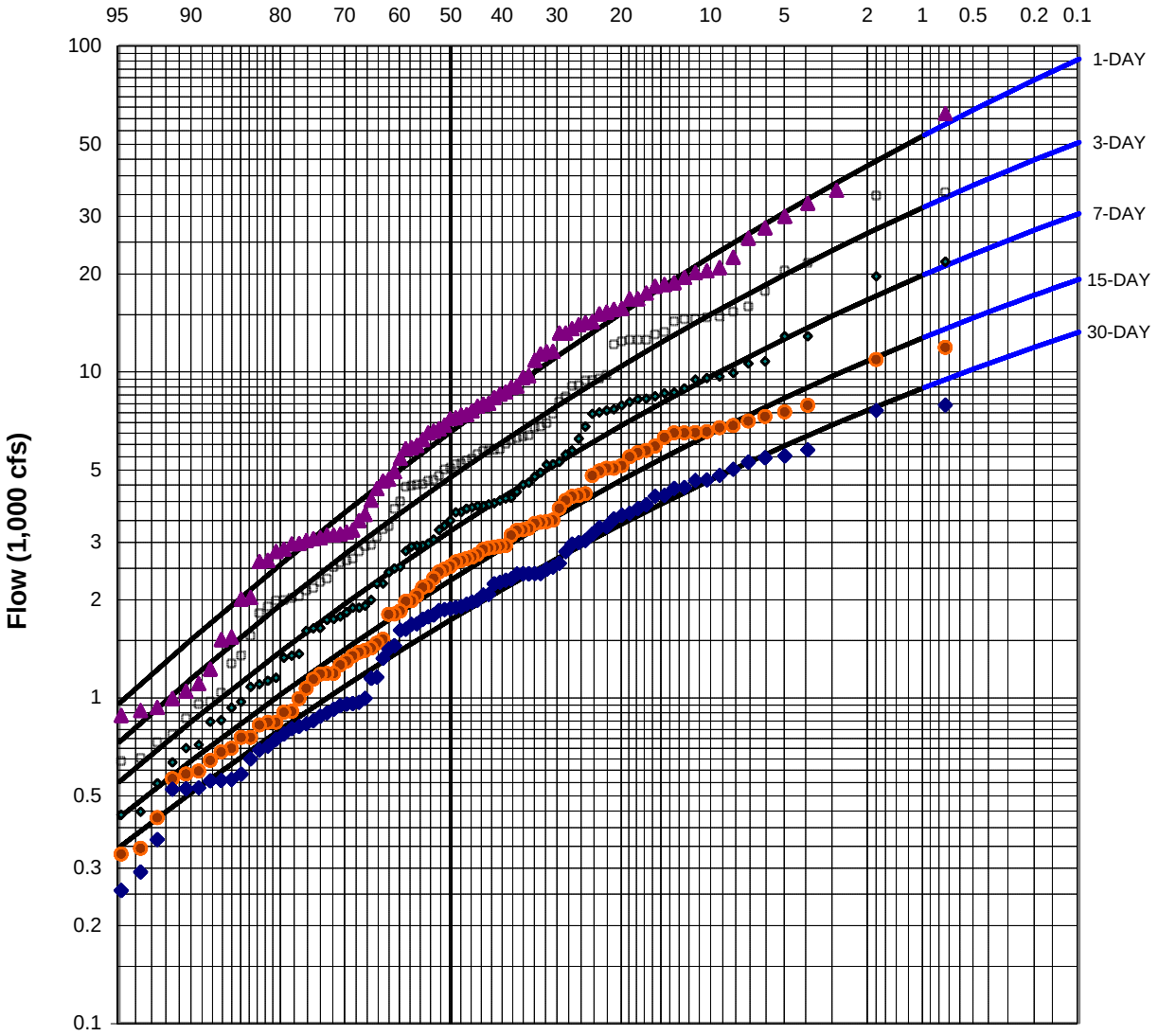
SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
MOKELUMNE RIVER AT CAMANCHE DAM
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

Percent Chance Exceedence



ADOPTED STATISTICS:

	Mean	Std.Dev.	Skew
1-day	3.788	0.461	-0.4
3-day	3.643	0.440	-0.5
7-day	3.480	0.417	-0.5
15-day	3.331	0.395	-0.5
30-day	3.210	0.378	-0.5

NOTES:

1. Adjusted USGS gage 11335000 to account for daily change in storage at upstream reservoir (potential channel, out-of-channel, storage losses neglected).
2. WY 1977 censored as low outlier.
3. Median plotting positions.
4. Drainage area: 536 sq. mi.
5. Period of record: 1907-1998.

SACRAMENTO-SAN JOAQUIN COMPREHENSIVE STUDY
SAN JOAQUIN RIVER BASIN, CALIFORNIA

RAIN FLOOD FREQUENCY CURVES
COSUMNES RIVER AT MICHIGAN BAR
UNREGULATED CONDITIONS

U.S ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

01-Sep-00

ATTACHMENT B.3

HISTORIC FLOOD EVENT MATRICES

SACRAMENTO RIVER BASIN

SAN JOAQUIN RIVER BASIN

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TABLE B.3
Return Periods for 19 Historic Storm Events
Sacramento River Basin

TABLE B.3a - 1 DAY DURATION

SAC RIVER	No.*	Index Point	1997 Freq	1986 Freq	1965 Freq	1956 Freq	1970 Freq	1974 Freq	1938 Freq	1940 Freq	1942 Freq	1951 Freq	1958 Freq	1967 Freq	1969 Freq	1978 Freq	1980 Freq	1982 Freq	1983 Freq	1995 Freq	1998 Freq
	1	Sac Rvr-Shasta	0.8%	8%	2%	6%	3%	1.0%	17%	3%	33%	100%	33%	50%	20%	33%	50%	50%	20%	17%	25%
WESTSIDE	2	Clear Cr - Igo	5%	25%	7%	10%	17%	3%			25%	100%	10%	50%	50%	50%	100%	100%	4%	20%	11%
	3	Cottonwood Cr	13%	8%	6%	8%	13%	2%			33%	100%	10%	100%	50%	50%	50%	100%	5%	20%	11%
EASTSIDE	4	Cow Creek	25%	10%	20%	50%	20%	7%				100%	100%	100%	100%	100%	50%	100%	14%	50%	17%
	5	Battle Creek	1.0%	11%	9%	25%	3%	2%			9%	100%	100%	100%	13%	100%	20%	33%	13%	20%	100%
	44	Bend Bridge	1.5%	8%	3%	7%	4%	1.4%	6%	3%	13%	100%	20%	100%	33%	50%	50%	100%	8%	20%	25%
	7	Elder Creek	14%	7%	3%	20%	20%	7%				100%	7%	100%	50%	50%	50%	100%	7%	11%	25%
WESTSIDE	8	Thomes Creek	20%	1.5%	0.9%	5%	11%	3%	14%	13%	50%	100%	25%	100%	25%	100%	6%	100%	33%	13%	
	11	Stony Cr @ Black Butte	11%	7%	6%	14%	17%	13%	20%	20%	50%	100%	33%	100%	33%	33%	20%	50%	10%	13%	11%
	6	Mill Cr - Molinos	1.1%	6%	1.7%	11%	6%	8%	2%	8%	17%	100%	100%	50%	11%	100%	14%	33%	25%	20%	33%
EASTSIDE	9	Deer Cr - Vina	0.6%	4%	2%	8%	7%	10%	100%	4%	17%	100%	100%	100%	7%	50%	17%	20%	14%	14%	17%
	10	Big Chico Cr	0.7%	5%	5%	17%	9%	25%	13%	8%	14%	100%	100%	50%	9%	100%	33%	17%	20%		
	45	Lat-Ord Ferry	3%	5%	3%	6%	4%	3%	9%	6%	17%	100%	17%	50%	20%	33%	25%	50%	8%	5%	
	12	Butte Cr-Chico	<1%	4%	2%	6%	13%	25%	7%	8%	17%	50%	50%	50%	9%	50%	25%	20%	25%	20%	20%
EASTSIDE	13	Feather-Oroville	1.0%	3%	5%	5%	13%	25%	7%	11%	20%	33%	50%	100%	10%	100%	10%	20%	33%	10%	
	16	Yuba-Marysville	2%	3%	3%	3%	9%	33%	11%	25%	33%	20%	100%	100%	11%	100%	9%	20%	50%	25%	
	17	Bear-Wheatland	3%	1.4%	33%	11%	20%	50%	50%	25%	33%	20%	50%	50%	17%	50%	17%	50%	50%	25%	50%
	46	Lat-Verona	1.1%	1.8%	4%	3%	9%	13%	13%	13%	20%	33%	20%	50%	11%	50%	11%	25%	17%	13%	
EASTSIDE	20	American	1.3%	3%	3%	3%	13%	33%	14%	25%	50%	6%	100%	100%	14%	100%	7%	20%	50%	20%	33%
WESTSIDE	18	Cache Cr-Clear Lk inflow	1.4%	7%	4%	10%	20%	20%	2%	8%	13%	100%	50%	100%	25%	50%	25%	33%	10%	14%	20%
	47	Lat-Sacramento	1.1%	1.5%	3%	3%	10%	14%	14%	14%	25%	25%	25%	50%	13%	50%	9%	25%	20%	13%	

TABLE B.3b - 3 DAY DURATION

SAC RIVER	No.*	Index Point	1997 Freq	1986 Freq	1965 Freq	1956 Freq	1970 Freq	1974 Freq	1938 Freq	1940 Freq	1942 Freq	1951 Freq	1958 Freq	1967 Freq	1969 Freq	1978 Freq	1980 Freq	1982 Freq	1983 Freq	1995 Freq	1998 Freq
	1	Sac Rvr-Shasta	0.8%	5%	4%	4%	2%	3%	20%	4%	20%	100%	33%	50%	20%	33%	33%	50%	11%	10%	20%
WESTSIDE	2	Clear Cr - Igo	4%	17%	10%	10%	17%	6%			25%	100%	11%	50%	50%	33%	100%	100%	2%	14%	6%
	3	Cottonwood Cr	13%	8%	8%	14%	13%	4%			25%	100%	14%	100%	50%	50%	50%	100%	3%	17%	11%
EASTSIDE	4	Cow Creek	8%	11%	33%	50%	8%	2%				100%	50%	100%	33%	50%	25%	100%	11%	25%	25%
	5	Battle Creek	1.1%	8%	8%	20%	2%	3%			14%	100%	50%	100%	8%	100%	17%	50%	13%	13%	17%
	44	Bend Bridge	1.5%	6%	5%	6%	3%	3%	11%	4%	13%	100%	25%	100%	25%	50%	50%	50%	6%	13%	20%
	7	Elder Creek	13%	9%	5%	14%	20%	11%				100%	6%	100%	33%	50%	33%	100%	3%	13%	14%
WESTSIDE	8	Thomes Creek	17%	1.8%	1.1%	5%	9%	4%	13%	11%	33%	100%	20%	100%	20%	50%	5%	100%	25%	17%	
	11	Stony Cr @ Black Butte	9%	6%	6%	17%	14%	14%	20%	17%	33%	100%	25%	50%	25%	33%	20%	50%	5%	8%	11%
	6	Mill Cr - Molinos	1.0%	6%	2%	9%	5%	6%	3%	5%	25%	50%	50%	50%	11%	50%	13%	33%	20%	14%	33%
EASTSIDE	9	Deer Cr - Vina	0.8%	4%	3%	7%	8%	8%	100%	3%	20%	100%	100%	100%	8%	50%	14%	25%	13%	8%	25%
	10	Big Chico Cr	0.8%	6%	6%	14%	9%	17%	14%	6%	17%	100%	100%	50%	9%	50%	25%	20%	13%		20%
	45	Lat-Ord Ferry	2%	5%	4%	7%	4%	4%	13%	6%	14%	100%	20%	50%	20%	33%	25%	50%	7%	11%	
	12	Butte Cr-Chico	<1%	4%	3%	6%	11%	14%	10%	6%	20%	100%	50%	100%	10%	50%	17%	20%	17%	13%	25%
EASTSIDE	13	Feather-Oroville	1.0%	2%	3%	5%	10%	20%	10%	10%	25%	33%	50%	100%	11%	100%	10%	20%	25%	8%	
	16	Yuba-Marysville	2%	1.8%	2%	3%	10%	33%	17%	20%	33%	14%	50%	100%	11%	100%	7%	20%	33%	20%	
	17	Bear-Wheatland	4%	0.4%	33%	5%	20%	50%	50%	20%	33%	17%	100%	50%	11%	100%	14%	33%	33%	20%	100%
	46	Lat-Verona	1.2%	1.6%	3%	3%	8%	10%	17%	14%	20%	33%	20%	50%	13%	50%	13%	25%	14%	11%	
EASTSIDE	20	American	1.6%	1.6%	2%	3%	11%	33%	20%	20%	33%	5%	100%	100%	11%	100%	6%	17%	50%	17%	50%
WESTSIDE	18	Cache Cr-Clear Lk inflow	3%	3%	3%	13%	17%	17%	7%	4%	14%	100%	50%	50%	25%	50%	20%	50%	8%	7%	13%
	47	Lat-Sacramento	1.1%	1.4%	3%	3%	8%	13%	17%	14%	20%	20%	25%	50%	13%	50%	10%	25%	20%	13%	

* - Numbers 1-43 are Tributary Frequency Points, Numbers 44-51 are Mainstem Index Points

TABLE B.3 (CONT.)
Return Periods for 19 Historic Storm Events
Sacramento River Basin

TABLE B.3c - 7 DAY DURATION

SAC RIVER	No.*	Index Point	1997 Freq	1986 Freq	1965 Freq	1956 Freq	1970 Freq	1974 Freq	1938 Freq	1940 Freq	1942 Freq	1951 Freq	1958 Freq	1967 Freq	1969 Freq	1978 Freq	1980 Freq	1982 Freq	1983 Freq	1995 Freq	1998 Freq
	1	Sac Rvr-Shasta	1.2%	3%	6%	4%	2%	3%	25%	7%	17%	100%	25%	50%	25%	33%	25%	50%	13%	5%	13%
WESTSIDE	2	Clear Cr - Igo	6%	11%	17%	10%	13%	8%			20%	100%	9%	100%	50%	33%	100%	100%	2%	9%	4%
	3	Cottonwood Cr	14%	6%	10%	11%	9%	6%			20%	100%	10%	100%	50%	50%	50%	100%	3%	11%	5%
EASTSIDE	4	Cow Creek	11%	6%	25%	25%	5%	1.8%				100%	33%	100%	17%	50%	20%	100%	7%	10%	17%
	5	Battle Creek	1.7%	3%	7%	13%	1.6%	3%			14%	100%	33%	100%	8%	100%	17%	50%	13%	9%	100%
	44	Bend Bridge	2%	4%	7%	5%	3%	3%	20%	8%	13%	100%	17%	100%	33%	50%	33%	50%	7%	7%	10%
	7	Elder Creek	13%	3%	8%	11%	13%	13%				100%	6%	100%	33%	50%	50%	100%	3%	10%	9%
WESTSIDE	8	Thomes Creek	17%	1.5%	1.2%	5%	6%	4%	20%	14%	33%	100%	14%	100%	20%	50%	7%	50%	20%	11%	
	11	Stony Cr @ Black Butte	13%	3%	8%	20%	13%	17%	33%	25%	33%	100%	20%	50%	33%	33%	25%	50%	6%	10%	6%
	6	Mill Cr - Molinos	1.3%	3%	3%	6%	4%	6%	6%	8%	20%	50%	33%	50%	11%	50%	13%	33%	20%	11%	25%
EASTSIDE	9	Deer Cr - Vina	1.2%	2%	4%	5%	6%	8%	100%	5%	20%	100%	33%	100%	9%	50%	14%	25%	13%	7%	14%
	10	Big Chico Cr	1.8%	3%	10%	8%	7%	17%	25%	9%	14%	100%	50%	50%	10%	50%	25%	25%	10%		
	45	Lat-Ord Ferry	3%	3%	5%	5%	3%	4%	20%	8%	13%	100%	17%	50%	25%	33%	25%	50%	6%	7%	
	12	Butte Cr-Chico	<1%	3%	4%	5%	8%	11%	17%	7%	17%	50%	33%	50%	10%	50%	13%	20%	14%	7%	17%
EASTSIDE	13	Feather-Oroville	1.0%	1.9%	3%	4%	7%	14%	14%	13%	25%	33%	33%	100%	11%	50%	10%	20%	25%	7%	
	16	Yuba-Marysville	1.4%	1.6%	1.6%	3%	8%	25%	25%	20%	33%	17%	50%	100%	10%	100%	8%	20%	33%	17%	
	17	Bear-Wheatland	4%	0.5%	20%	5%	17%	50%	100%	25%	25%	20%	100%	50%	8%	100%	14%	33%	33%	20%	100%
	46	Lat-Verona	2%	2%	3%	4%	6%	9%	20%	11%	17%	50%	20%	50%	13%	50%	14%	25%	13%	9%	
EASTSIDE	20	American	2%	1.4%	2%	4%	9%	25%	20%	25%	33%	6%	50%	50%	9%	100%	5%	20%	33%	14%	33%
WESTSIDE	18	Cache Cr-Clear Lk inflow	6%	1.2%	5%	8%	13%	20%	17%	9%	14%	100%	33%	50%	25%	33%	20%	25%	5%	7%	6%
	47	Lat-Sacramento	1.7%	1.9%	3%	4%	6%	11%	20%	13%	20%	33%	20%	50%	13%	50%	11%	25%	14%	9%	

TABLE B.3d - 15 DAY DURATION

SAC RIVER	No.*	Index Point	1997 Freq	1986 Freq	1965 Freq	1956 Freq	1970 Freq	1974 Freq	1938 Freq	1940 Freq	1942 Freq	1951 Freq	1958 Freq	1967 Freq	1969 Freq	1978 Freq	1980 Freq	1982 Freq	1983 Freq	1995 Freq	1998 Freq
	1	Sac Rvr-Shasta	3%	4%	10%	6%	1.2%	6%				100%	11%	50%	25%	50%	33%	33%	6%	5%	11%
WESTSIDE	2	Clear Cr - Igo	10%	14%	20%	13%	9%	11%			14%	100%	5%	100%	33%	6%	100%	50%	1.9%	8%	4%
	3	Cottonwood Cr	20%	9%	13%	17%	6%	10%			20%	100%	5%	100%	33%	13%	50%	100%	3%	9%	4%
EASTSIDE	4	Cow Creek	25%	9%	20%	25%	2%	7%				100%	20%	100%	50%	25%	33%	100%	6%	10%	10%
	5	Battle Creek	4%	5%	7%	11%	1.0%	5%			9%	100%	20%	100%	8%	33%	25%	50%	9%	8%	9%
	44	Bend Bridge	6%	6%	13%	8%	1.6%	7%	33%	17%	9%	100%	7%	100%	25%	50%	50%	50%	4%	7%	8%
	7	Elder Creek	9%	6%	13%	17%	8%	17%				100%	3%	100%	33%	17%	50%	100%	4%	14%	6%
WESTSIDE	8	Thomes Creek	20%	1.8%	1.8%	7%	3%	6%	33%	20%	25%	100%	6%	100%	20%	20%	11%	50%	13%	9%	
	11	Stony Cr @ Black Butte	20%	6%	11%	25%	8%	20%	50%	33%	33%	100%	13%	100%	33%	14%	33%	50%	7%	11%	7%
	6	Mill Cr - Molinos	1.9%	4%	4%	6%	2%	9%	11%	13%	14%	50%	20%	50%	13%	25%	17%	33%	14%	10%	25%
EASTSIDE	9	Deer Cr - Vina	2%	3%	5%	5%	3%	11%	50%	8%	13%	100%	20%	50%	9%	11%	20%	20%	20%	6%	17%
	10	Big Chico Cr	4%	5%	17%	9%	3%	20%	50%	17%	11%	100%	25%	50%	14%	25%	33%	20%	9%		
	45	Lat-Ord Ferry	5%	4%	8%	8%	1.8%	7%	33%	14%	10%	100%	7%	100%	17%	50%	33%	50%	4%	6%	
	12	Butte Cr-Chico	1.4%	4%	6%	6%	4%	14%	25%	13%	13%	100%	20%	100%	11%	25%	20%	20%	9%	6%	14%
EASTSIDE	13	Feather-Oroville	1.4%	2%	4%	5%	4%	17%	25%	17%	17%	50%	25%	100%	13%	100%	14%	20%	13%	5%	
	16	Yuba-Marysville	1.3%	1.7%	1.7%	3%	3%	25%	50%	33%	20%	25%	33%	100%	9%	50%	11%	20%	17%	13%	
	17	Bear-Wheatland	6%	1.6%	20%	7%	11%	50%	100%	33%	25%	33%	50%	50%	8%	25%	20%	14%	17%	11%	100%
	46	Lat-Verona	3%	3%	5%	5%	3%	10%	25%	14%	14%	50%	13%	100%	13%	50%	20%	25%	7%	6%	
EASTSIDE	20	American	3%	2%	3%	5%	6%	25%	50%	25%	17%	10%	50%	100%	9%	100%	7%	17%	17%	10%	33%
WESTSIDE	18	Cache Cr-Clear Lk inflow	13%	3%	5%	13%	5%	25%	33%	17%	13%	100%	17%	100%	17%	50%	33%	25%	8%	8%	6%
	47	Lat-Sacramento	3%	2%	4%	5%	3%	13%	25%	14%	14%	50%	14%	100%	11%	50%	17%	25%	8%	7%	

* - Numbers 1-43 are Tributary Frequency Points, Numbers 44-51 are Mainstem Index Points

TABLE B.3 (CONT.)
Return Periods for 19 Historic Storm Events
Sacramento River Basin

TABLE B.3e - 30 DAY DURATION

SAC RIVER	No.*	Index Point	1997 Freq	1986 Freq	1965 Freq	1956 Freq	1970 Freq	1974 Freq	1938 Freq	1940 Freq	1942 Freq	1951 Freq	1958 Freq	1967 Freq	1969 Freq	1978 Freq	1980 Freq	1982 Freq	1983 Freq	1995 Freq	1998 Freq
	1	Sac Rvr-Shasta	5%	4%	11%	5%	2%	11%	20%		13%	100%	5%	50%	20%	17%	50%	25%	5%	7%	8%
WESTSIDE	2	Clear Cr - Igo	14%	14%	20%	10%	11%	17%			17%	100%	3%	100%	25%	10%	100%	50%	2%	13%	3%
	3	Cottonwood Cr	25%	11%	17%	14%	10%	14%			25%	100%	4%	100%	25%	20%	50%	50%	3%	13%	3%
EASTSIDE	4	Cow Creek	17%	6%	17%	8%	4%	8%				100%	11%	100%	20%	33%	20%	100%	4%	13%	2%
	5	Battle Creek	4%	3%	8%	6%	1.6%	8%			13%	50%	17%	50%	8%	33%	20%	33%	8%	13%	7%
	44	Bend Bridge	11%	6%	13%	6%	3%	11%	33%	20%	13%	100%	4%	100%	20%	50%	50%	33%	3%	10%	5%
WESTSIDE	7	Elder Creek	20%	8%	13%	14%	13%	20%				100%	2%	100%	25%	17%	50%	100%	4%	14%	6%
	8	Thomes Creek	17%	2%	3%	5%	4%	7%	25%	20%	33%	100%	4%	100%	25%	25%	20%	33%	9%	11%	
	11	Stony Cr @ Black Butte	14%	7%	10%	20%	9%	25%	33%	33%	33%	100%	9%	100%	20%	14%	33%	50%	5%	13%	4%
EASTSIDE	6	Mill Cr - Molinos	3%	3%	4%	4%	3%	11%	13%	17%	20%	33%	14%	50%	10%	33%	20%	25%	11%	25%	14%
	9	Deer Cr - Vina	3%	3%	4%	3%	4%	14%	25%	14%	14%	50%	17%	50%	10%	33%	25%	20%	7%	7%	11%
	10	Big Chico Cr	4%	7%	8%	5%	5%	25%	50%	20%	13%	100%	14%	100%	9%	25%	33%	20%	8%	5%	8%
	45	Lat-Ord Ferry	8%	4%	8%	5%	3%	10%	33%	17%	13%	100%	4%	100%	17%	14%	33%	33%	3%	8%	
EASTSIDE	12	Butte Cr-Chico	2%	5%	4%	4%	5%	17%	33%	17%	13%	50%	14%	100%	9%	33%	25%	17%	8%	5%	11%
	13	Feather-Oroville	2%	1.8%	4%	5%	5%	20%	33%	20%	20%	25%	20%	100%	14%	33%	25%	17%	10%	6%	
	16	Yuba-Marysville	1.4%	1.0%	1.4%	2%	5%	25%	50%	33%	25%	7%	25%	100%	10%	50%	20%	17%	13%	14%	
	17	Bear-Wheatland	6%	2%	13%	5%	17%	33%	100%	33%	33%	17%	50%	100%	8%	33%	25%	14%	14%	14%	100%
	46	Lat-Verona	5%	2%	5%	5%	3%	14%	33%	20%	14%	33%	8%	100%	13%	25%	25%	20%	5%	8%	
EASTSIDE	20	American	3%	1.6%	3%	5%	9%	25%	50%	25%	20%	4%	33%	100%	13%	50%	13%	14%	14%	11%	25%
WESTSIDE	18	Cache Cr-Clear Lk inflow	9%	5%	5%	6%	8%	33%	33%	20%	17%	50%	7%	100%	14%	17%	25%	25%	5%	14%	2%
	47	Lat-Sacramento	4%	2%	4%	5%	4%	14%	33%	20%	14%	25%	10%	100%	13%	25%	25%	20%	5%	8%	

* - Numbers 1-43 are Tributary Frequency Points, Numbers 44-51 are Mainstem Index Points

TABLE B.3 (CONT.)
Return Periods for 15 Historic Storm Events
San Joaquin River Basin

TABLE B.3f - 1 DAY DURATION

SJQ RIVER	No.*	Index Point	1997 Freq	1986 Freq	1956 Freq	1951 Freq	1982 Freq	Jan-69 Freq	1940 Freq	1965 Freq	1967 Freq	Feb-69 Freq	1978 Freq	1980 Freq	1983 Freq	1995 Freq	1998 Freq
	24	SJRvr-Friant	2%	8%	2%	6%	3%	10%	50%	13%	6%	25%	25%	9%	25%	6%	33%
	23	Big Dry Creek	10%	5%	5%	100%	25%	8%			50%	4%	7%	33%	14%	3%	13%
EASTSIDE	22	Kings - Pine Flat (1999)	3%	10%	1%	3%	3%	4%	50%	20%	1.7%	25%	20%	6%	33%	9%	50%
	25	Fresno R - Hidden	6%	10%	4%	13%	10%	9%	33%	50%	17%	7%	17%	20%	11%	5%	25%
	26	Chowchilla - Buchanan	8%	11%	1%	14%	25%	13%	50%	33%	25%	11%	20%	33%	13%	8%	25%
	48	SJRvr - Latitude El Nido	1%	3%	2%	10%	5%	7%	33%	14%	11%	14%	17%	7%	13%	5%	25%
EASTSIDE	29	Bear Cr at Bear Res.	17%	33%	3%	25%	33%	20%	50%	50%	33%	20%	33%	50%	20%	17%	17%
	34	Merced Rvr - Exchequer	2%	9%	2%	5%	6%	8%	33%	8%	25%	33%	25%	9%	20%	7%	25%
	49	SJRvr-Newman	3%	4%	2%	8%	9%	8%	33%	13%	20%	14%	20%	11%	13%	7%	20%
WESTSIDE	32	Orestimba Cr - Newman	20%	13%	11%	50%	25%	20%	33%	100%	50%	25%	25%	33%	14%	7%	6%
EASTSIDE	35	Tuolumne Rvr - Don Pedro	1%	8%	1%	5%	8%	9%	33%	4%	20%	50%	50%	7%	25%	10%	25%
	36	Dry Creek near Modesto	17%	17%	1%	100%	8%	9%		33%	50%	25%	33%	33%	33%	6%	9%
	50	SJRvr - Maze Rd Bridge	1%	3%	2%	5%	8%	8%	25%	8%	25%	25%	33%	6%	14%	6%	25%
EASTSIDE	37	Stanislaus Rvr - Melones	2%	5%	1%	3%	9%	13%	33%	5%	33%	50%	50%	6%	33%	13%	33%
	51	SJRvr - Vernalis	1%	3%	2%	4%	8%	9%	25%	6%	25%	25%	33%	6%	17%	8%	25%
	38	Littlejohn Cr/Farmington	14%	8%												33%	5%
EASTSIDE	41	Calaveras Rvr - New Hogan	10%	4%	25%	50%	25%	13%		17%	50%	50%	50%	33%	25%	25%	9%
	42	Mokelumne Rvr - Camanche	0%	5%	3%	4%		14%		3%				4%	20%	17%	
	43	Cosumnes R - Michigan Bar	0%	3%	4%	17%	25%	13%		5%				13%	14%	14%	20%

TABLE B.3g - 3 DAY DURATION

SJQ RIVER	No.*	Index Point	1997 Freq	1986 Freq	1956 Freq	1951 Freq	1982 Freq	Jan-69 Freq	1940 Freq	1965 Freq	1967 Freq	Feb-69 Freq	1978 Freq	1980 Freq	1983 Freq	1995 Freq	1998 Freq
	48	SJRvr-Friant	1.5%	5%	1.6%	7%	4%	8%	50%	11%	9%	25%	25%	6%	20%	6%	33%
	23	Big Dry Creek	9%	4%	5%	50%	25%	5%			50%	5%	7%	50%	10%	4%	13%
EASTSIDE	22	Kings - Pine Flat (1999)	2.0%	6%	1.0%	4%	3%	4%	33%	17%	3%	25%	20%	4%	25%	7%	50%
	25	Fresno R - Hidden	5%	6%	3%	25%	13%	9%	25%	33%	25%	6%	14%	20%	8%	4%	25%
	26	Chowchilla - Buchanan	7%	6%	1.5%	13%	20%	10%	33%	33%	33%	9%	17%	25%	13%	6%	25%
	49	SJRvr - Latitude El Nido	1.4%	3%	1.5%	10%	5%	7%	33%	14%	13%	14%	17%	7%	13%	5%	25%
EASTSIDE	29	Bear Cr at Bear Res.	17%	17%	3%	20%	33%	14%	50%	33%	50%	14%	25%	33%	20%	11%	20%
	34	Merced Rvr - Exchequer	2%	5%	1.9%	4%	7%	8%	33%	7%	25%	33%	33%	8%	14%	7%	25%
	50	SJRvr-Newman	2%	4%	1.9%	8%	8%	7%	25%	13%	20%	14%	20%	10%	11%	6%	20%
WESTSIDE	32	Orestimba Cr - Newman	14%	7%	13%	50%	33%	17%	25%	100%	50%	20%	25%	33%	8%	7%	5%
EASTSIDE	35	Tuolumne Rvr - Don Pedro	0.9%	4%	1.8%	4%	8%	9%	33%	4%	25%	50%	50%	5%	25%	9%	25%
	36	Dry Creek near Modesto	20%	10%	1.1%	100%	17%	5%		33%	50%	20%	33%	20%	17%	8%	9%
	51	SJRvr - Maze Rd Bridge	1.2%	3%	1.8%	5%	8%	8%	25%	8%	25%	20%	25%	7%	13%	7%	25%
EASTSIDE	37	Stanislaus Rvr - Melones	1.7%	1.1%	3%	3%	10%	10%	25%	4%	33%	50%	50%	5%	25%	11%	33%
	52	SJRvr - Vernalis	1.1%	3%	1.9%	4%	8%	8%	25%	6%	33%	25%	33%	6%	14%	7%	25%
	38	Littlejohn Cr/Farmington	14%	3%												20%	8%
EASTSIDE	41	Calaveras Rvr - New Hogan	13%	4%	17%	33%	33%	14%		17%	100%	50%	50%	25%	25%	17%	20%
	42	Mokelumne Rvr - Camanche	0.7%	2%	2%	2%		13%		2%				3%	20%	13%	
	43	Cosumnes R - Michigan Bar	0.8%	0.8%	4%	9%	20%	11%		5%				11%	14%	14%	25%

* - Numbers 1-43 are Tributary Index Points, Numbers 44-51 are Mainstem Index Points

TABLE B.3 (CONT.)
Return Periods for 15 Historic Storm Events
San Joaquin River Basin

TABLE B.3h - 7 DAY DURATION

SJQ RIVER	No.*	Index Point	1997 Freq	1986 Freq	1956 Freq	1951 Freq	1982 Freq	Jan-69 Freq	1940 Freq	1965 Freq	1967 Freq	Feb-69 Freq	1978 Freq	1980 Freq	1983 Freq	1995 Freq	1998 Freq
	24	SJRvr-Friant	1.4%	3%	1.6%	8%	4%	6%	33%	11%	13%	25%	25%	6%	17%	6%	33%
	23	Big Dry Creek	9%	3%	7%	50%	33%	7%			50%	6%	7%	50%	9%	6%	11%
EASTSIDE	22	Kings - Pine Flat (1999)	1.9%	3%	1.1%	5%	3%	3%	33%	14%	3%	20%	20%	4%	20%	7%	33%
	25	Fresno R - Hidden	5%	4%	4%	33%	14%	6%	25%	33%	33%	6%	10%	25%	8%	6%	20%
	26	Chowchilla - Buchanan	6%	4%	2%	20%	20%	7%	33%	25%	50%	8%	13%	25%	11%	8%	17%
	48	SJRvr - Latitude El Nido	1.5%	3%	1.6%	11%	5%	5%	25%	14%	14%	13%	17%	8%	11%	6%	25%
EASTSIDE	29	Bear Cr at Bear Res.	17%	17%	4%	33%	33%	13%	50%	33%	50%	14%	20%	33%	20%	10%	17%
	34	Merced Rvr - Exchequer	2%	4%	2%	6%	8%	7%	33%	8%	33%	25%	25%	8%	14%	9%	20%
	49	SJRvr-Newman	2%	4%	1.9%	9%	7%	6%	25%	13%	20%	14%	17%	9%	11%	7%	20%
WESTSIDE	32	Orestimba Cr - Newman	20%	4%	14%	50%	25%	14%	20%	100%	100%	14%	20%	25%	8%	9%	2%
EASTSIDE	35	Tuolumne Rvr - Don Pedro	0.9%	3%	1.9%	3%	8%	7%	33%	4%	33%	50%	50%	5%	20%	10%	25%
	36	Dry Creek near Modesto	25%	13%	3%	100%	20%	3%		25%	100%	20%	25%	13%	14%	17%	3%
	50	SJRvr - Maze Rd Bridge	1.1%	2%	1.4%	5%	6%	5%	25%	8%	25%	17%	20%	7%	11%	6%	20%
EASTSIDE	37	Stanislaus Rvr - Melones	1.9%	2%	4%	4%	9%	8%	25%	4%	33%	50%	50%	5%	20%	11%	25%
	51	SJRvr - Vernalis	1.4%	3%	1.9%	5%	7%	6%	25%	7%	25%	20%	25%	7%	13%	7%	20%
	38	Littlejohn Cr/Farmington	14%	3%												25%	3%
EASTSIDE	41	Calaveras Rvr - New Hogan	14%	3%	11%	25%	33%	11%		17%	100%	50%	50%	20%	20%	20%	13%
	42	Mokelumne Rvr - Camanche	1.1%	2.0%	3%	1.9%		10%		1.9%				4%	20%	11%	
	43	Cosumnes R - Michigan Bar	1.2%	0.8%	5%	11%	20%	8%		5%				10%	17%	14%	20%

TABLE B.3i - 15 DAY DURATION

SJQ RIVER	No.*	Index Point	1997 Freq	1986 Freq	1956 Freq	1951 Freq	1982 Freq	Jan-69 Freq	1940 Freq	1965 Freq	1967 Freq	Feb-69 Freq	1978 Freq	1980 Freq	1983 Freq	1995 Freq	1998 Freq
	48	SJRvr-Friant	1.7%	3%	2%	11%	4%	4%	33%	13%	17%	25%	25%	8%	10%	5%	33%
	23	Big Dry Creek	10%	3%	10%	50%	20%	7%			50%	7%	9%	50%	9%	4%	11%
EASTSIDE	22	Kings - Pine Flat (1999)	2%	2%	1.5%	8%	3%	1.9%	25%	14%	5%	20%	20%	5%	13%	5%	33%
	25	Fresno R - Hidden	7%	6%	6%	50%	11%	6%	33%	33%	50%	6%	13%	33%	7%	6%	20%
	26	Chowchilla - Buchanan	6%	6%	4%	33%	13%	7%	33%	20%	50%	7%	13%	33%	8%	8%	14%
	49	SJRvr - Latitude El Nido	1.7%	3%	1.9%	14%	4%	3%	33%	17%	20%	13%	17%	10%	8%	5%	25%
EASTSIDE	29	Bear Cr at Bear Res.	14%	20%	9%	50%	20%	13%	50%	33%	50%	14%	20%	50%	17%	10%	17%
	34	Merced Rvr - Exchequer	3%	5%	4%	9%	8%	6%	33%	8%	33%	25%	33%	11%	11%	8%	20%
	50	SJRvr-Newman	2%	4%	2%	13%	6%	4%	33%	14%	25%	13%	20%	11%	9%	6%	17%
WESTSIDE	32	Orestimba Cr - Newman	20%	6%	20%	50%	20%	11%	25%	50%	50%	14%	25%	33%	10%	9%	2%
EASTSIDE	35	Tuolumne Rvr - Don Pedro	1.0%	3%	2%	5%	9%	5%	33%	5%	33%	50%	50%	7%	13%	8%	25%
	36	Dry Creek near Modesto	33%	17%	4%	100%	20%	2%		20%	100%	13%	33%	14%	10%	10%	3%
	51	SJRvr - Maze Rd Bridge	1.5%	3%	2.0%	8%	6%	4%	33%	10%	33%	17%	25%	9%	9%	6%	17%
EASTSIDE	37	Stanislaus Rvr - Melones	2.0%	2%	5%	4%	8%	8%	25%	4%	50%	33%	50%	6%	11%	8%	25%
	52	SJRvr - Vernalis	1.6%	3%	2%	8%	6%	5%	33%	8%	33%	20%	25%	8%	9%	6%	20%
	38	Littlejohn Cr/Farmington	13%	6%												13%	2%
EASTSIDE	41	Calaveras Rvr - New Hogan	11%	7%	14%	33%	17%	11%		14%	100%	25%	50%	25%	17%	14%	13%
	42	Mokelumne Rvr - Camanche	2%	3%	5%	4%		13%		3%				7%	14%	10%	
	43	Cosumnes R - Michigan Bar	2%	1.5%	8%	17%	17%	8%		6%				14%	9%	9%	20%

* - Numbers 1-43 are Tributary Index Points, Numbers 44-51 are Mainstem Index Points

TABLE B.3 (CONT.)
Return Periods for 15 Historic Storm Events
San Joaquin River Basin

TABLE B.3j - 30 DAY DURATION

SJQ RIVER	No.*	Index Point	1997 Freq	1986 Freq	1956 Freq	1951 Freq	1982 Freq	Jan-69 Freq	1940 Freq	1965 Freq	1967 Freq	Feb-69 Freq	1978 Freq	1980 Freq	1983 Freq	1995 Freq	1998 Freq
	24	SJRvr-Friant	1.2%	1.8%	3%	5%	4%	6%	33%	14%	25%	13%	17%	11%	7%	4%	25%
	23	Big Dry Creek	7%	4%	14%	50%	17%	9%			50%	7%	7%	50%	5%	6%	9%
EASTSIDE	22	Kings - Pine Flat (1999)	1.4%	1.5%	3%	4%	3%	3%	25%	17%	9%	20%	13%	7%	7%	4%	25%
	25	Fresno R - Hidden	3%	6%	10%	33%	10%	6%	33%	33%	50%	7%	10%	33%	4%	8%	14%
	26	Chowchilla - Buchanan	6%	6%	7%	20%	10%	7%	33%	25%	50%	7%	11%	50%	5%	9%	11%
	48	SJRvr - Latitude El Nido	1.5%	2%	4%	8%	4%	5%	33%	17%	25%	13%	13%	14%	5%	5%	17%
EASTSIDE	29	Bear Cr at Bear Res.	17%	17%	11%	25%	17%	13%	50%	25%	50%	13%	17%	50%	8%	13%	13%
	34	Merced Rvr - Exchequer	1.7%	3%	5%	4%	7%	6%	33%	9%	50%	20%	20%	14%	7%	8%	17%
	49	SJRvr-Newman	1.6%	3%	4%	7%	5%	5%	33%	13%	33%	13%	14%	17%	5%	5%	14%
WESTSIDE	32	Orestimba Cr - Newman	8%	6%	25%	50%	25%	9%	33%	50%	50%	11%	20%	50%	9%	13%	2%
EASTSIDE	35	Tuolumne Rvr - Don Pedro	1.5%	2%	3%	1.9%	9%	8%	33%	7%	50%	33%	33%	13%	11%	9%	25%
	36	Dry Creek near Modesto	13%	14%	3%	25%	25%	4%		20%	50%	17%	25%	25%	6%	11%	3%
	50	SJRvr - Maze Rd Bridge	1.1%	2%	3%	4%	4%	5%	33%	9%	33%	17%	20%	14%	5%	5%	14%
EASTSIDE	37	Stanislaus Rvr - Melones	2.0%	2%	5%	1.6%	8%	9%	33%	5%	50%	20%	25%	10%	9%	8%	25%
	51	SJRvr - Vernalis	1.5%	2%	4%	3%	5%	6%	33%	8%	33%	20%	20%	13%	6%	6%	17%
	38	Littlejohn Cr/Farmington	11%	5%												20%	3%
EASTSIDE	41	Calaveras Rvr - New Hogan	11%	8%	13%	20%	17%	11%		14%	100%	25%	33%	33%	11%	17%	13%
	42	Mokelumne Rvr - Camanche	2%	2%	5%	1.8%		13%		4%				11%	10%	10%	
	43	Cosumnes R - Michigan Bar	2%	1.8%	7%	8%	13%	10%		6%				17%	6%	10%	17%

* - Numbers 1-43 are Tributary Index Points, Numbers 44-51 are Mainstem Index Points

ATTACHMENT B.4

SYNTHETIC FLOOD CENTERINGS

MAINSTEM FLOOD CENTERING

TRIBUTARY-SPECIFIC FLOOD CENTERING

ATTACHMENT B.4

SYNTHETIC FLOOD RUNOFF CENTERING

INTRODUCTION

This attachment describes the application of the flood patterns used for the seven synthetic exceedence frequency flood runoff centerings, as discussed in the Synthetic Flood Runoff Centering section of Chapter III – Hydrologic Analysis. Flood patterns are discussed for:

- Development of mainstem flood runoff centerings - using the annual 1-percent chance exceedence frequency flood runoff patterns of the Sacramento Basin tributaries to the latitude of Sacramento index point as the example, and
- Development of tributary flood runoff centerings - using the annual 1-percent chance exceedence frequency flood runoff patterns of the San Joaquin Basin tributaries in development of the flood runoff centering for the Tuolumne River.

MAINSTEM FLOOD RUNOFF CENTERING

Background

The reasoning behind the development of particular flood patterns, of the tributary streams that contribute flows that pass through a mainstem Sacramento River Basin index point is described in this section of Attachment B.4. The example provided is the development of a 1-percent chance exceedence frequency flood runoff centering at the latitude of Sacramento index point. Flood patterns used for sub-divisions of the Sacramento Basin are discussed in the following paragraphs.

The tributary flood patterns for a mainstem Sacramento River runoff centering are based on the historic trends displayed in Table B.3, a-e, "Exceedence Frequencies for 19 Historic Storm Events, Sacramento River Basin." Historic patterns considered were for: (1) the largest floods over the entire basin, occurring in water years 1956, 1965, 1970, 1974, 1986 and 1997; (2) the average of the exceedence frequencies for 16 basin floods for each tributary. Averages for 16 floods were used - rather than all 19 floods in Table A.3, because natural flow data for 3 of the 19 floods were unavailable for several tributaries and mainstem index points. The 3-, 7- and 15-day duration exceedence frequencies developed for each tributary were averaged from the historic flood patterns in Table B.3. The 1- and 30-day durations for the floods were not used for determining the flood patterns. The 1-day durations cover a midnight-to-midnight period, not the maximum 24- hours, and the 30-day duration usually includes two weeks of lower flows extending beyond the historic flood wave.

Shasta (Sacramento River above Shasta Dam)

Floods occurring above Shasta tend to produce flows more extreme than those taking place on the downstream tributaries between Shasta and the Bend Bridge index point. This trend appears in the 6 major floods as well as the 16-flood average. For the synthetic 1 percent chance exceedence frequency mainstem flood pattern developed for the Latitude of Sacramento, the

resultant Shasta flood exceedence frequency developed results in a concurrent 1.50 percent chance exceedence event. Similar comparisons indicate the concurrent contributions of the Westside and Eastside tributaries during this simulated event (Shasta to Bend Bridge) to have a 2.11 and 1.75 percent chance exceedence respectively.

Tributaries from Shasta to Bend Bridge

Tributaries to the Sacramento River downstream of Shasta Dam to the Bend Bridge index point were categorized into Eastside (Cow and Battle Creeks) and Westside (Clear and Cottonwood Creeks) contributions. Historic patterns indicate storms have centered both on the west and east sides of the basin between Shasta Dam and Bend Bridge, however, the overall 16-flood average is higher on the east side due to orographic effects and that the average elevations of the Eastside tributaries are higher. In development of the mainstem flood patterns, the Westside tributaries are treated as a unit because each maintains the same exceedence frequency. For storm runoff events in this basin, concurrent with a 1 percent chance exceedence event at the latitude of Sacramento, the annual chance exceedence frequency of the Westside tributaries is slightly more frequent in occurrence than those representing the Eastside tributaries (i.e., 2.11 and 1.75 respectively).

Tributaries from Bend Bridge to Ord Ferry

Tributaries to the Sacramento River downstream of Bend Bridge to the Ord Ferry index location were also categorized into Eastside (Mill, Deer, Big Chico, and Butte Creeks) and Westside (Elder, Thomes, and Stony Creeks) contributing units. Though Butte Creek does not drain directly into the Sacramento River; it is geographically and orographically similar in characteristic to its neighboring basins on the eastside and is included in this category. The flood runoff patterns of tributaries below Bend Bridge are similar to those patterns developed for the tributaries above Bend Bridge, Eastside versus Westside. During simulation of an annual 1 percent chance exceedence event centered at the latitude of Sacramento, the concurrent annual percent chance exceedence event developed to represent Westside tributaries occurs in a slightly greater frequency than those prepared to represent the Eastside tributaries (i.e., 1.75 and 1.62 respectively).

Feather, Yuba and Bear Rivers

The flood runoff pattern developed to characterize the Yuba River system (including North Yuba River at New Bullards Bar and Deer Creek near Smartville) is treated as a single unit and is represented with the same flood-runoff pattern. Major floods of record in these basins had varying impact; the annual chance exceedence of the 1997 flood event on the Feather River was a less frequently occurring event (extreme), the 1986 flood was centered over Bear River, and the annual chance exceedences of the 1956 and 1965 storm events on the Yuba River were higher than concurrent events in neighboring basins. The 16-flood average pattern was used for mainstem flood events equal to or greater in magnitude than the annual 1-percent chance exceedence frequency event. Exceedence frequencies representative of the Yuba River flood are slightly more extreme (occurring less frequently) than those characterizing floods on the Feather River, having annual percent chance exceedences of 1.24 and 1.32 respectively. For historic floods centered over the Feather and Yuba Rivers, the pattern for the Bear River has been somewhat smaller with the concurrent event developed, occurring in greater frequency. The

exceedence frequencies of the Bear River flood pattern are represented by a concurrent annual 1.40 percent chance exceedence event for flood events equal or greater in magnitude than a 1-percent chance exceedence frequency event.

American River

The 16-flood pattern average is the same for the American and Feather Rivers, with the Yuba River unit being slightly higher. For 1-percent chance exceedence frequency events and events occurring less frequently, the same pattern is used for the American and Feather River basins.

Cache and Putah Creeks

The Westside valley tributaries to the Yolo Bypass were treated as a single contributing unit (including North Fork Cache Creek above the Indian Valley Dam). For the larger historic floods, the patterns are higher over the American River watershed than they are over the Westside Cache/Putah unit. For flood runoff centerings occurring as or less frequently than a 1-percent chance exceedence event, the exceedence frequencies of the Cache and Putah Creeks Westside unit annual percent chance exceedences are 2.34.

TRIBUTARY FLOOD RUNOFF CENTERING

Background

This section of Attachment B.4 describes the reasoning behind the development of the flood-runoff patterns used to represent tributary contributions to the mainstem of a river basin with the main flood centering being on a tributary. The specific example used is the 1-percent chance exceedence frequency flood runoff centering on the Tuolumne River, tributary to the San Joaquin River. Concurrent flood patterns used for specific sub-divisions of the San Joaquin River basin are described in the following paragraphs. The runoff patterns of storm-runoff centerings developed for tributaries to the mainstem San Joaquin River are based on the trends displayed in Tables B.3f through B.3j, "Exceedence Frequencies for 15 Historic Storm Events, San Joaquin River Basin." The historic patterns considered were those of the largest floods that had impacted the entire basin, occurring in water years 1951, 1956, 1969 (January), 1982, 1986, and 1997. Patterns for 9 smaller floods were also considered, particularly the pattern for water year 1965 (December 1964). The 3-, 7-, and 15-day duration periods were averaged for each tributary from the historic flood patterns in Table B.3. The 1-day and 30-day durations for each flood were not used in determining the flood patterns. The San Joaquin basin differs from the Sacramento Basin in that it has 6 major eastside tributaries, each with similar characteristics: the Kings River, the Upper San Joaquin River (above Friant), the Merced River, the Tuolumne River, the Stanislaus River, and the Mokelumne River.

In general, the adjustments made to the historic storm patterns are based on historic relationships of concurrent floods on other tributaries in the San Joaquin basin to a specific flood on the Tuolumne River. Adjustments assume a proportional relationship between the exceedence frequency of a simultaneous events occurring on a tributary of interest and a specific exceedence event centered on the Tuolumne River; the tributary concurrent event is several times more frequent than the specific (less frequent) event on the Tuolumne River. Important in this

analysis, is that the proportion between the concurrent event and the specific event, is a proportion of their of exceedences, not of their flood volumes. Exceedences for tributaries existing on the fringe of the study boundary (i.e., distant from the Tuolumne River) are represented by proportions of 10 to 1; the concurrent events are ten times more likely to occur on those other tributaries than the specific event will happen on the Tuolumne River.

Tuolumne River

The 1997 flood represented an annual 0.91percent chance exceedence event centered on the Tuolumne River basin, and was used as a starting point for development of the flood patterns. The 1997 flood pattern was also used in the development of storm-runoff centerings for tributaries immediately adjacent to the Tuolumne River.

Major Tributaries South of Tuolumne River (from North to South)

Merced River - With the 1997 flood centered on the Tuolumne River (an annual 0.91 percent chance exceedence event), the concurrent flood on the adjacent Merced River basin was a 2.13-percent chance exceedence event. When the 0.91-percent chance exceedence event occurring on the Tuolumne River is adjusted to a 1-percent chance exceedence event, the Merced River concurrent flood is, in turn, adjusted in magnitude to that of a 2.38-percent chance exceedence event. This relationship between concurrent and specific floods on the Merced and Tuolumne Rivers was utilized to develop the flood-runoff patterns for the 10-percent through the 0.2-percent chance exceedence flood runoff event centerings on the Tuolumne River.

Upper San Joaquin River (above Friant) - The 1997 flood event had separate centerings on the Tuolumne River, the San Joaquin River above Friant Dam, and on the Mokelumne-Cosumnes River systems, making the 1997 flood pattern impractical to use south of the Merced River. Accordingly, other flood patterns were examined to find a pattern that centered on a single major San Joaquin tributary and had clearly discernable concurrent floods on the other 5 major tributaries. The water year 1965 (flood event of December 1964) flood pattern featured an annual 2.08 percent chance exceedence frequency on the Mokelumne River, with concurrent floods on the major tributaries diminishing in direct proportion to their distance from the Mokelumne River basin. A variation of the December 1964 flood pattern, with the Mokelumne centering and a concurrent flood two major basins south, was used to develop the concurrent runoff events on Upper San Joaquin River above Friant with the centerings on the Tuolumne River. The proportion of Upper San Joaquin River concurrent flood to Tuolumne River centering is 3.7; the Upper San Joaquin concurrent events are 3.7 times more frequent than the Tuolumne River specific centerings.

Kings River - For most of the San Joaquin basin floods in Table B.3, the Kings River experienced more extreme, less frequent events than did the Upper San Joaquin River. For a flood-runoff centering north of the Upper San Joaquin, a concurrent flood on the Kings River should be a more frequent event than a concurrent Upper San Joaquin River flood, because the Kings River is more distant from the flood center. Of the major floods, only during the 1997 event was the Kings River flood more frequent than the Upper San Joaquin flood. For the 1997 event, the Kings River annual chance exceedence concurrent storm was 1.25 times more frequent than the concurrent storm on the Upper San Joaquin River. For the Tuolumne River flood centering, the proportion used between the Kings River and the Upper San Joaquin concurrent

floods is 1.25; for the 3.7-percent chance exceedence event on the Upper San Joaquin, the Kings River concurrent event has a 4.630-percent chance exceedence.

Major Tributaries North of Tuolumne River (from South to North)

Stanislaus River – For the 1997 flood centering on the Tuolumne River, the concurrent flood on the Stanislaus River basin is 2.04 times as frequent an event; this is the proportion used for the concurrent flood series, 10 percent through 0.2 percent chance exceedence frequency, on the Stanislaus River for the Tuolumne River centerings.

Mokelumne River - The 1997 flood event, with centerings on both the Tuolumne and Mokelumne basins, was not used to pattern the Mokelumne River concurrent events. A variation of the 1965 flood centering pattern on the Mokelumne River was shifted south to the Tuolumne basin in order to develop a concurrent flood pattern for the Mokelumne River basin. The proportion used for the Mokelumne River concurrent events to the Tuolumne River centerings is 2.44.

Smaller San Joaquin Basin Tributaries

Big Dry Creek – Historically, when large floods occur on the major San Joaquin tributaries, flows on the smaller, lower elevation tributaries are usually only minor events. For the 1997 flood event, the Big Dry Creek event was about 10 times more frequent than the Tuolumne River centering. The 1997 pattern was used for the concurrent events on Big Dry Creek for the annual 10-percent to 0.2-percent chance exceedence events on the Tuolumne River.

Fresno/Chowchilla Rivers - The Fresno and Chowchilla Rivers were treated as a unit for flood centerings because they are side-by-side, nearly the same in size, with similar geographic features and similar return periods for the historic San Joaquin basin flood patterns in Table B.3. The Fresno and Chowchilla River flows have only a minor impact on the Tuolumne River floodplain, so the concurrent floods on the Fresno and Chowchilla Rivers are 10 times as frequent as the annual 10- to 0.25-percent chance exceedence events on the Tuolumne River.

Merced Stream Group (Mariposa, Owens, Bear and Burns Creeks) - The lower-elevation streams of the Merced Stream Group generally contribute little to the larger San Joaquin floods. The concurrent events on these streams are 10 times as frequent as the annual 10- to 0.2-percent chance exceedence centerings on the Tuolumne River.

Westside San Joaquin Tributaries (Los Banos, Orestimba and Del Puerto Creeks) - The Westside streams usually do not contribute much flow to the larger flood events in the San Joaquin basin. The concurrent events on the Westside streams are 10 times as frequent as the annual 10- to 0.2-percent chance exceedence centerings on the Tuolumne River.

Dry Creek near Modesto - While the 1997 flood was a 0.91-percent chance exceedence frequency event on the Tuolumne River above Don Pedro, the concurrent storm over the local area downstream (Dry Creek near Modesto) was only a 25-percent chance exceedence frequency event. As with the Westside tributaries, extremely high flows on the low-elevation Tuolumne River tributary do not generally occur concurrently with high flows on the upper Tuolumne River. For the Tuolumne River runoff centering, the concurrent flows for Dry Creek near Modesto are 10 times as frequent for the annual 10- to 0.2-percent chance exceedence events.

Littlejohn Creek and Duck Creek - The 1997 flood was a more frequent than a 10-percent chance exceedence event on the lower-elevation Littlejohn Creek. For the Tuolumne River flood runoff centerings, the concurrent flows for Littlejohn and Duck Creeks are 10 times as frequent for the annual 10- to 0.2-percent chance exceedence events.

Calaveras River and Cosgrove Creek - The 1997 flood was more frequent than 10-percent chance exceedence frequency event on the Calaveras River. For the Tuolumne River flood runoff centerings, the concurrent flows for Calaveras River and Cosgrove Creek are 10 times as frequent for the annual 10- to 0.2-percent chance exceedence events.

Cosumnes River - Table A.3 was checked for historic events centered on the Mokelumne River with concurrent flood events on the Cosumnes River. This frequency relationship between the Cosumnes and Mokelumne Rivers was averaged for such historic flood events that were found. The average for such events results in the Cosumnes river concurrent storms being 1.7 times more frequent than the events on the adjacent Mokelumne River. The proportion of 1.7 was used between Cosumnes River and Mokelumne River concurrent events to the Tuolumne River centerings for the annual 10- to 0.2-percent chance exceedence events.

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TABLE B.4-1
Synthetic Storm Centerings for
Mainstem Index Points in the Sacramento & San Joaquin River Basins

TABLE B.4-1a
Sacramento River Mainstem at Latitude of Ord Ferry

Index Point	Index No.	Percent Chance Exceedence 50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	1	82.08	16.91	5.71	2.41	1.25	0.65	0.28
Clear Creek at Whiskeytown	2	61.56	15.04	9.03	5.61	2.92	1.52	0.65
Cow Creek near Millville	4	61.56	13.53	8.02	3.89	2.02	1.05	0.45
Cottonwood Creek near Cottonwood	3	61.56	15.04	9.03	5.61	2.92	1.52	0.65
Battle Creek below Coleman FH	5	61.56	13.53	8.02	3.89	2.02	1.05	0.45
Mill Creek near Los Molinos	6	87.94	15.03	7.22	5.94	3.10	1.61	0.69
Elder Creek near Paskenta	7	87.94	19.33	12.50	10.10	5.26	2.74	1.17
Thomes Creek at Paskenta	8	87.94	19.33	12.50	10.10	5.26	2.74	1.17
Deer Creek near Vina	9	87.94	15.03	7.22	5.94	3.10	1.61	0.69
Big Chico Creek near Chico	10	87.94	15.03	7.22	5.94	3.10	1.61	0.69
Stony Creek at Black Butte	11	87.94	19.33	12.50	10.10	5.26	2.74	1.17
Butte Creek near Chico	12	87.94	15.03	10.20	8.42	4.39	2.28	0.97
Feather River at Oroville	13	87.94	19.33	9.62	8.42	4.39	2.28	0.97
Yuba River at New Bullards Bar	14	87.94	19.33	11.76	9.18	4.78	2.49	1.06
Yuba River at Englebright		87.94	19.33	11.76	9.18	4.78	2.49	1.06
Deer Creek near Smartsville	15	87.94	19.33	11.76	9.18	4.78	2.49	1.06
Bear River near Wheatland	17	87.94	19.33	12.03	10.10	5.26	2.74	1.17
Cache Creek at Clear Lake	18	87.94	19.33	18.05	12.63	6.58	3.42	1.46
North Fork Cache Creek at Indian Valley	19	87.94	19.33	18.05	12.63	6.58	3.42	1.46
American River at Folsom	20	87.94	19.33	14.29	12.63	6.58	3.42	1.46
Putah Creek at Berryessa	21	87.94	19.33	18.05	12.63	6.58	3.42	1.46

TABLE B.4-1b
Sacramento River Mainstem at Latitude of Sacramento

Index Point	Index No.	Percent Chance Exceedence 50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	1	84.42	17.03	8.09	4.41	2.21	1.13	0.44
Clear Creek at Whiskeytown	2	80.91	17.03	10.79	6.47	3.24	1.66	0.65
Cow Creek near Millville	4	80.91	16.18	9.71	5.39	2.70	1.38	0.60
Cottonwood Creek near Cottonwood	3	80.91	17.03	10.79	6.47	3.24	1.66	0.65
Battle Creek below Coleman FH	5	80.91	16.18	9.71	5.39	2.70	1.38	0.60
Mill Creek near Los Molinos	6	88.26	16.18	9.71	4.22	2.35	1.23	0.51
Elder Creek near Paskenta	7	88.26	19.42	10.79	4.85	2.70	1.38	0.58
Thomes Creek at Paskenta	8	88.26	19.42	10.79	4.85	2.70	1.38	0.58
Deer Creek near Vina	9	88.26	16.18	9.71	4.22	2.35	1.23	0.51
Big Chico Creek near Chico	10	88.26	16.18	9.71	4.22	2.35	1.23	0.51
Stony Creek at Black Butte	11	88.26	19.42	10.79	4.85	2.70	1.38	0.58
Butte Creek near Chico	12	66.70	13.63	6.08	2.75	1.38	0.71	0.30
Feather River at Oroville	13	53.60	11.78	4.42	2.41	1.20	0.62	0.24
Yuba River at New Bullards Bar	14	55.09	12.52	4.86	2.10	1.05	0.54	0.21
Yuba River at Englebright		55.09	12.52	4.86	2.10	1.05	0.54	0.21
Deer Creek near Smartsville	15	55.12	12.52	4.86	2.10	1.05	0.54	0.21
Bear River near Wheatland	17	53.60	11.13	4.42	2.10	1.05	0.54	0.21
Cache Creek at Clear Lake	18	52.19	12.52	6.95	4.45	2.22	1.14	0.45
North Fork Cache Creek at Indian Valley	19	52.19	12.52	6.95	4.45	2.22	1.14	0.45
American River at Folsom	20	55.09	12.52	4.86	2.51	1.26	0.64	0.25
Putah Creek at Berryessa	21	52.19	12.52	6.95	4.45	2.22	1.14	0.45

TABLE B.4-1 (cont)
Synthetic Storm Centerings for
Mainstem Index Points in the Sacramento & San Joaquin River Basins

TABLE B.4-1c
San Joaquin River Mainstem at Latitude of El Nido

Index Point	Index No.	Percent Chance Exceedence						
		50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	1	60.61	12.09	4.83	2.31	1.21	0.65	0.29
San Joaquin River at Friant	2	60.61	12.09	4.83	2.42	1.26	0.68	0.30
Big Dry Creek at BDC Dam	3	59.17	13.44	6.25	4.03	2.11	1.14	0.50
Fresno River at Hidden	4	55.87	10.99	5.32	3.30	1.72	0.94	0.41
Chowchilla River at Buchanan	5	55.87	10.99	5.32	3.30	1.72	0.94	0.41
Mariposa Creek at Mariposa	6	90.91	22.17	8.85	8.26	4.31	2.34	1.02
Owens Creek at Owens	7	90.91	22.17	8.85	8.26	4.31	2.34	1.02
Bear Creek at Bear	8	90.91	22.17	8.85	8.26	4.31	2.34	1.02
Burns Creek at Burns	9	90.91	22.17	8.85	8.26	4.31	2.34	1.02
Los Banos Creek at Los Banos	10	102.04	27.25	8.85	10.20	5.78	3.14	1.37
Merced River at Exchequer	11	81.97	17.73	8.85	3.80	2.22	1.20	0.53
Orestimba Creek near Newmar	12	102.04	27.25	8.85	10.20	5.78	3.14	1.37
Del Puerto Creek near Patterson	13	102.04	27.25	8.85	10.20	5.78	3.14	1.37
Tuolumne River at Don Pedro	14	88.50	21.28	10.64	4.10	2.31	1.26	0.55
Dry Creek near Modesto	15	88.50	23.64	17.86	8.20	4.63	2.51	1.10
Stanislaus River at New Melones	16	88.50	21.28	13.33	4.42	2.36	1.28	0.56
Littlejohn Creek at Farmington	17	106.38	26.60	17.86	11.11	5.92	3.20	1.40
Duck Creek at Duck Creek gage	18	106.38	26.60	17.86	11.11	5.92	3.20	1.40
Calaveras River at New Hogan	19	106.38	26.60	17.86	11.11	5.92	3.20	1.40
Cosgrove Creek near New Hogar	20	106.38	26.60	17.86	11.11	5.92	3.20	1.40
Mokelumne River at Camanche	21	88.50	21.28	13.33	4.42	2.36	1.28	0.56
Cosumnes River at Michigan Bar	22	106.38	26.60	16.67	5.56	2.96	1.60	0.70

TABLE B.4-1d
San Joaquin River Mainstem at Latitude of Newman

Index Point	Index No.	Percent Chance Exceedence						
		50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	1	83.33	16.03	6.17	2.68	1.42	0.76	0.35
San Joaquin River at Friant	2	83.33	16.03	6.17	2.68	1.49	0.80	0.36
Big Dry Creek at BDC Dam	3	76.92	17.81	7.75	4.46	2.48	1.33	0.60
Fresno River at Hidden	4	62.50	14.57	6.62	3.83	2.03	1.09	0.49
Chowchilla River at Buchanan	5	62.50	14.57	6.62	3.83	2.03	1.09	0.49
Mariposa Creek at Mariposa	6	65.36	14.14	9.43	7.63	4.07	2.18	0.99
Owens Creek at Owens	7	65.36	14.14	9.43	7.63	4.07	2.18	0.99
Bear Creek at Bear	8	65.36	14.14	9.43	7.63	4.07	2.18	0.99
Burns Creek at Burns	9	65.36	14.14	9.43	7.63	4.07	2.18	0.99
Los Banos Creek at Los Banos	10	90.50	20.57	8.40	7.19	3.52	1.89	0.86
Merced River at Exchequer	11	58.82	11.31	4.63	2.13	1.04	0.56	0.25
Orestimba Creek near Newmar	12	90.50	20.57	8.40	7.19	3.52	1.89	0.86
Del Puerto Creek near Patterson	13	90.50	20.57	8.40	7.19	3.52	1.89	0.86
Tuolumne River at Don Pedro	14	68.40	15.29	6.25	2.88	1.41	0.76	0.34
Dry Creek near Modesto	15	68.40	19.11	10.42	5.75	2.82	1.51	0.68
Stanislaus River at New Melones	16	97.71	21.84	8.93	4.12	2.01	1.08	0.49
Littlejohn Creek at Farmington	17	100.00	31.20	17.86	10.29	5.02	2.70	1.22
Duck Creek at Duck Creek gage	18	100.00	31.20	17.86	10.29	5.02	2.70	1.22
Calaveras River at New Hogan	19	100.00	31.20	17.86	10.29	5.02	2.70	1.22
Cosgrove Creek near New Hogar	20	100.00	31.20	17.86	10.29	5.02	2.70	1.22
Mokelumne River at Camanche	21	97.71	21.84	8.93	4.12	2.01	1.08	0.49
Cosumnes River at Michigan Bar	22	100.00	27.30	11.16	5.15	2.51	1.35	0.61

TABLE B.4-1 (cont)
Synthetic Storm Centerings for
Mainstem Index Points in the Sacramento & San Joaquin River Basins

TABLE B.4-1e
San Joaquin River Mainstem at Latitude of Vernalis

Index Point	Index No.	Percent Chance Exceedence 50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	1	88.65	19.14	7.44	3.29	1.74	0.92	0.40
San Joaquin River at Friant	2	88.65	19.14	7.44	3.29	1.82	0.96	0.42
Big Dry Creek at BDC Dam	3	81.83	21.27	9.30	5.49	3.04	1.61	0.69
Fresno River at Hidden	4	66.49	17.40	8.00	4.71	2.48	1.31	0.57
Chowchilla River at Buchanan	5	66.49	17.40	8.00	4.71	2.48	1.31	0.57
Mariposa Creek at Mariposa	6	73.88	15.48	7.44	9.41	4.96	2.62	1.13
Owens Creek at Owens	7	73.88	15.48	7.44	9.41	4.96	2.62	1.13
Bear Creek at Bear	8	73.88	15.48	7.44	9.41	4.96	2.62	1.13
Burns Creek at Burns	9	73.88	15.48	7.44	9.41	4.96	2.62	1.13
Los Banos Creek at Los Banos	10	83.11	19.05	8.01	5.78	3.02	1.53	0.64
Merced River at Exchequer	11	66.49	12.38	5.21	2.47	1.26	0.67	0.29
Orestimba Creek near Newman	12	83.11	19.05	8.01	5.78	3.02	1.53	0.64
Del Puerto Creek near Patterson	13	83.11	19.05	8.01	5.78	3.02	1.53	0.64
Tuolumne River at Don Pedro	14	59.10	11.70	4.73	2.31	1.21	0.61	0.26
Dry Creek near Modesto	15	59.10	13.00	7.89	4.63	2.42	1.23	0.51
Stanislaus River at New Melones	16	62.58	12.38	4.96	2.31	1.22	0.62	0.26
Littlejohn Creek at Farmington	17	72.18	15.48	6.61	5.78	3.05	1.55	0.65
Duck Creek at Duck Creek gage	18	72.18	15.48	6.61	5.78	3.05	1.55	0.65
Calaveras River at New Hogan	19	72.18	15.48	6.61	5.78	3.05	1.55	0.65
Cosgrove Creek near New Hogan	20	72.18	15.48	6.61	5.78	3.05	1.55	0.65
Mokelumne River at Camanche	21	62.58	12.38	4.96	2.31	1.22	0.62	0.26
Cosumnes River at Michigan Bar	22	72.18	15.48	6.20	2.89	1.53	0.77	0.32

TABLE B.4-2a
Tributary-Specific Synthetic Flood Centerings
Stony Creek

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	125.00	25.00	10.00	5.00	2.50	1.25	0.50
Clear Creekat Whiskeytown	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Cow Creek near Millville	83.33	16.67	6.67	3.33	1.67	0.83	0.33
Cottonwood Cr nr Cottonwood	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Battle Creek below Coleman FH	83.33	16.67	6.67	3.33	1.67	0.83	0.33
Mill Creek near Los Molinos	83.33	16.67	6.67	3.33	1.67	0.83	0.33
Elder Creek near Paskenta	55.56	11.11	4.44	2.22	1.11	0.56	0.22
Thomes Creek at Paskenta	55.56	11.11	4.44	2.22	1.11	0.56	0.22
Deer Creek near Vina	83.33	16.67	6.67	3.33	1.67	0.83	0.33
Big Chico Creek near Chico	83.33	16.67	6.67	3.33	1.67	0.83	0.33
Stony Creek at Black Butte	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Butte Creek near Chico	83.33	16.67	6.67	3.33	1.67	0.83	0.33
FeatheRiver River at Oroville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Yuba River at NBB	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Yuba River at Englebright	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Deer Creek near Smartsville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear River near Wheatland	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cache Creek at Clear Lake	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cache Creek at Indian Valley	100.00	100.00	50.00	20.00	10.00	5.00	2.00
American River at Folsom	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Putah Creek at Berryessa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Spare	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:
1. The historic 19-storm matrix does not contain any events with a strong centering on Stony Creek.
2. Assume other westside streams between Bend Bridge and Ord Ferry experience frequencies equal to 90% of Stony.
3. Assume westside tributaries north of Bend Bridge respond at 80% of Stony's return period.
4. Assume all eastside streams respond at 60% of Stony's return period.
5. Assume Shasta experiences a flood equal to 40% of Stony's return period.

TABLE B.4-2b
Tributary-Specific Synthetic Flood Centerings
Shasta to Ord Ferry

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Clear Creek at Whiskeytown	100.00	50.00	18.18	9.09	4.55	2.27	0.91
Cow Creek near Millville	100.00	33.33	14.81	7.41	3.70	1.85	0.74
Cottonwood Cr nr Cottonwood	100.00	50.00	18.18	9.09	4.55	2.27	0.91
Battle Creek below Coleman FH	100.00	33.33	14.81	7.41	3.70	1.85	0.74
Mill Creek near Los Molinos	50.00	16.67	6.25	3.13	1.56	0.78	0.31
Elder Creek near Paskenta	50.00	50.00	16.67	8.33	4.17	2.08	0.83
Thomes Creek at Paskenta	50.00	50.00	16.67	8.33	4.17	2.08	0.83
Deer Creek near Vina	50.00	16.67	6.25	3.13	1.56	0.78	0.31
Big Chico Creek near Chico	50.00	16.67	6.25	3.13	1.56	0.78	0.31
Stony Creek at Black Butte	50.00	50.00	16.67	8.33	4.17	2.08	0.83
Butte Creek near Chico	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Feather River River at Oroville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Yuba River at NBB	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Yuba River at Englebright	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Deer Creek near Smartsville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear River near Wheatland	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cache Creek at Clear Lake	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cache Creek at Indian Valley	100.00	100.00	50.00	20.00	10.00	5.00	2.00
American River at Folsom	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Putah Creek at Berryessa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Spare	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:

1. Tributaries below Shasta are equal to a fixed percentage of the Shasta return period based on the 1997 and 1956 historic events.
2. Individual percentages are set for east and westside tributaries above and below Bend Bridge.
3. All other tributaries are assumed to contribute at a constant frequency below the proposed return periods for each system in the mainstem centerings.

TABLE B.4-2c
Tributary-Specific Synthetic Flood Centerings
Butte Creek

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Clear Creek at Whiskeytown	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cow Creek near Millville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cottonwood Cr nr Cottonwood	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Battle Creek below Coleman FH	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mill Creek near Los Molinos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Elder Creek near Paskenta	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Thomes Creek at Paskenta	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Deer Creek near Vina	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Big Chico Creek near Chico	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stony Creek at Black Butte	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Butte Creek near Chico	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Feather River at Oroville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Yuba River at NBB	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Yuba River at Englebright	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Deer Creek near Smartsville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear River near Wheatland	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cache Creek at Clear Lake	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cache Creek at Indian Valley	100.00	100.00	50.00	20.00	10.00	5.00	2.00
American River at Folsom	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Putah Creek at Berryessa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Spare	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:
1. Butte Creek is relatively isolated from other major tributaries in the Sac Basin.
2. Butte Creek is a minor tributary compared to system flows in the Butte Basin and at Verona.
3. Basin was assessed independently to provide only information necessary to delineate Butte's tributary floodplains.
4. All other tributaries assumed to contribute at a constant frequency below the proposed return periods for each system in the mainstem centerings.

TABLE B.4-2d
Tributary-Specific Synthetic Flood Centerings
Feather River

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	80.65	16.13	6.45	3.23	1.61	0.81	0.32
Clear Creek at Whiskeytown	384.62	76.92	30.77	15.38	7.69	3.85	1.54
Cow Creek near Millville	142.86	28.57	11.43	5.71	2.86	1.43	0.57
Cottonwood Cr nr Cottonwood	384.62	76.92	30.77	15.38	7.69	3.85	1.54
Battle Creek below Coleman FH	142.86	28.57	11.43	5.71	2.86	1.43	0.57
Mill Creek near Los Molinos	60.24	12.05	4.82	2.41	1.20	0.60	0.24
Elder Creek near Paskenta	625.00	125.00	50.00	25.00	12.50	6.25	2.50
Thomes Creek at Paskenta	625.00	125.00	50.00	25.00	12.50	6.25	2.50
Deer Creek near Vina	60.24	12.05	4.82	2.41	1.20	0.60	0.24
Big Chico Creek near Chico	60.24	12.05	4.82	2.41	1.20	0.60	0.24
Stony Creek at Black Butte	625.00	125.00	50.00	25.00	12.50	6.25	2.50
Butte Creek near Chico	60.24	12.05	4.82	2.41	1.20	0.60	0.24
Feather River at Oroville	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Yuba River at NBB	64.10	12.82	5.13	2.56	1.28	0.64	0.26
Yuba River at Englebright	64.10	12.82	5.13	2.56	1.28	0.64	0.26
Deer Creek near Smartsville	166.67	33.33	13.33	6.67	3.33	1.67	0.67
Bear River near Wheatland	166.67	33.33	13.33	6.67	3.33	1.67	0.67
Cache Creek at Clear Lake	250.00	50.00	20.00	10.00	5.00	2.50	1.00
Cache Creek at Indian Valley	250.00	50.00	20.00	10.00	5.00	2.50	1.00
American River at Folsom	89.29	17.86	7.14	3.57	1.79	0.89	0.36
Putah Creek at Berryessa	250.00	50.00	20.00	10.00	5.00	2.50	1.00
Spare	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:

1. Feather River centering patterned after the 1997 event, which displayed a strong response on the Feather.
2. All other tributaries are assumed to contribute proportionately according to the 1997 event.
3. Shasta flows in 1997 were too high to be considered typical of a Feather River Centering. Therefore, the ratio from the 1986 event was used to relate Shasta to Feather for this tributary specific centering.

TABLE B.4-2e
Tributary-Specific Synthetic Flood Centerings
Yuba River

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	135.14	27.03	10.81	5.41	2.70	1.35	0.54
Clear Creek at Whiskeytown	312.50	62.50	25.00	12.50	6.25	3.13	1.25
Cow Creek near Millville	312.50	62.50	25.00	12.50	6.25	3.13	1.25
Cottonwood Cr nr Cottonwood	312.50	62.50	25.00	12.50	6.25	3.13	1.25
Battle Creek below Coleman FH	312.50	62.50	25.00	12.50	6.25	3.13	1.25
Mill Creek near Los Molinos	104.17	20.83	8.33	4.17	2.08	1.04	0.42
Elder Creek near Paskenta	79.37	15.87	6.35	3.17	1.59	0.79	0.32
Thomes Creek at Paskenta	79.37	15.87	6.35	3.17	1.59	0.79	0.32
Deer Creek near Vina	104.17	20.83	8.33	4.17	2.08	1.04	0.42
Big Chico Creek near Chico	104.17	20.83	8.33	4.17	2.08	1.04	0.42
Stony Creek at Black Butte	79.37	15.87	6.35	3.17	1.59	0.79	0.32
Butte Creek near Chico	104.17	20.83	8.33	4.17	2.08	1.04	0.42
Feather River at Oroville	92.59	18.52	7.41	3.70	1.85	0.93	0.37
Yuba River at NBB	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Yuba River at Englebright	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Deer Creek near Smartsville	125.00	25.00	10.00	5.00	2.50	1.25	0.50
Bear River near Wheatland	125.00	25.00	10.00	5.00	2.50	1.25	0.50
Cache Creek at Clear Lake	111.11	22.22	8.89	4.44	2.22	1.11	0.44
Cache Creek at Indian Valley	111.11	22.22	8.89	4.44	2.22	1.11	0.44
American River at Folsom	66.67	13.33	5.33	2.67	1.33	0.67	0.27
Putah Creek at Berryessa	111.11	22.22	8.89	4.44	2.22	1.11	0.44
Spare	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes:
1. Yuba River centering patterned after the 1965 event, which displayed a strong response on the Yuba.
2. All other tributaries assumed to contribute proportionately according to the 1965 event.
3. The Bear River return period is unusually small in comparison with Yuba and American Basins.
4. Bear River flow was 40% of the Yuba in 1997 flood; this ratio is more typical of other centerings for the Feather-Yuba-Bear system. Therefore, the 1997 percentage for the Bear was used.

TABLE B.4-2f
Tributary-Specific Synthetic Flood Centerings
Bear River

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	172.41	34.48	13.79	6.90	3.45	1.72	0.69
Clear Creek at Whiskeytown	555.56	111.11	44.44	22.22	11.11	5.56	2.22
Cow Creek near Millville	312.50	62.50	25.00	12.50	6.25	3.13	1.25
Cottonwood Cr nr Cottonwood	555.56	111.11	44.44	22.22	11.11	5.56	2.22
Battle Creek below Coleman FH	312.50	62.50	25.00	12.50	6.25	3.13	1.25
Mill Creek near Los Molinos	172.41	34.48	13.79	6.90	3.45	1.72	0.69
Elder Creek near Paskenta	161.29	32.26	12.90	6.45	3.23	1.61	0.65
Thomes Creek at Paskenta	161.29	32.26	12.90	6.45	3.23	1.61	0.65
Deer Creek near Vina	172.41	34.48	13.79	6.90	3.45	1.72	0.69
Big Chico Creek near Chico	172.41	34.48	13.79	6.90	3.45	1.72	0.69
Stony Creek at Black Butte	161.29	32.26	12.90	6.45	3.23	1.61	0.65
Butte Creek near Chico	172.41	34.48	13.79	6.90	3.45	1.72	0.69
Feather River at Oroville	106.38	21.28	8.51	4.26	2.13	1.06	0.43
Yuba River at NBB	87.72	17.54	7.02	3.51	1.75	0.88	0.35
Yuba River at Englebright	87.72	17.54	7.02	3.51	1.75	0.88	0.35
Deer Creek near Smartsville	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Bear River near Wheatland	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Cache Creek at Clear Lake	125.00	25.00	10.00	5.00	2.50	1.25	0.50
Cache Creek at Indian Valley	125.00	25.00	10.00	5.00	2.50	1.25	0.50
American River at Folsom	89.29	17.86	7.14	3.57	1.79	0.89	0.36
Putah Creek at Berryessa	125.00	25.00	10.00	5.00	2.50	1.25	0.50
Spare	0	0	0	0	0	0	0

Notes:
1. Bear River centering patterned on the 1986 event, which displayed a strong response on the Bear.

TABLE B.4-2g
Tributary-Specific Synthetic Flood Centerings
American River

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	250.00	50.00	20.00	10.00	5.00	2.50	1.00
Clear Ceek at Whiskeytown	555.56	111.11	44.44	22.22	11.11	5.56	2.22
Cow Creek near Millville	178.57	35.71	14.29	7.14	3.57	1.79	0.71
Cottonwood Cr nr Cottonwood	555.56	111.11	44.44	22.22	11.11	5.56	2.22
Battle Creek below Coleman FH	178.57	35.71	14.29	7.14	3.57	1.79	0.71
Mill Creek near Los Molinos	121.95	24.39	9.76	4.88	2.44	1.22	0.49
Elder Creek near Paskenta	138.89	27.78	11.11	5.56	2.78	1.39	0.56
Thomes Creek at Paskenta	138.89	27.78	11.11	5.56	2.78	1.39	0.56
Deer Creek near Vina	121.95	24.39	9.76	4.88	2.44	1.22	0.49
Big Chico Creek near Chico	138.89	27.78	11.11	5.56	2.78	1.39	0.56
Stony Creek at Black Butte	121.95	24.39	9.76	4.88	2.44	1.22	0.49
Butte Creek near Chico	138.89	27.78	11.11	5.56	2.78	1.39	0.56
Feather River at Oroville	92.59	18.52	7.41	3.70	1.85	0.93	0.37
Yuba River at NBB	69.44	13.89	5.56	2.78	1.39	0.69	0.28
Yuba River at Englebright	69.44	13.89	5.56	2.78	1.39	0.69	0.28
Deer Creek near Smartsville	116.28	23.26	9.30	4.65	2.33	1.16	0.47
Bear River near Wheatland	116.28	23.26	9.30	4.65	2.33	1.16	0.47
Cache Creek at Clear Lake	192.31	38.46	15.38	7.69	3.85	1.92	0.77
Cache Creek at Indian Valley	192.31	38.46	15.38	7.69	3.85	1.92	0.77
American River at Folsom	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Putah Creek at Berryessa	192.31	38.46	15.38	7.69	3.85	1.92	0.77
Spare	0	0	0	0	0	0	0

Notes:
1. American River centering patterned on the 1980 event.
2. All other tributaries assumed to contribute proportionately according to the 1980 event.
3. Generally, and on the American, the 1980 event was not especially large but it did display a centering on the American River.

TABLE B.4-2h
Tributary-Specific Synthetic Flood Centerings
Cache and Putah Creeks

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Sacramento River at Shasta	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Clear Creek at Whiskeytown	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cow Creek near Millville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cottonwood Cr nr Cottonwood	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Battle Creek below Coleman FH	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mill Creek near Los Molinos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Elder Creek near Paskenta	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Thomes Creek at Paskenta	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Deer Creek near Vina	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Big Chico Creek near Chico	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stony Creek at Black Butte	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Butte Creek near Chico	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Feather River at Oroville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Yuba River at NBB	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Yuba River at Englebright	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Deer Creek near Smartsville	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear River near Wheatland	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cache Creek at Clear Lake	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Cache Creek at Indian Valley	50.00	10.00	4.00	2.00	1.00	0.50	0.20
American River at Folsom	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Putah Creek at Berryessa	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Spare	0	0	0	0	0	0	0

Notes:

1. Cache and Putah flow directly into the Yolo Bypass; flow magnitudes in the bypass are so high that a centering on Cache and Putah should not be shaping the flood regime in the bypass.
2. Generally, and on Cache and Putah, the 1983 and the 1995 events were not especially large but both displayed a bias towards the westside tributaries of the Sacramento Basin.
3. Because the 1983 and 1995 events were distributed throughout the basin, coincident frequencies remained high for several tributaries.
4. In order to prevent a centering on Cache and Putah from producing a large system-wide floodplain, a consistent baseline flood was used for all other tributaries

TABLE B.4-2i
Tributary-Specific Synthetic Flood Centerings
Pine Flat

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings Riverat Pine Flat	50.00	10.00	4.00	2.00	1.00	0.50	0.20
San Joaquin River at Friant	77.77	15.55	6.22	3.11	1.56	0.78	0.31
Big Dry Creek at BDC Dam	100.00	80.31	32.13	16.06	8.03	4.02	1.61
Fresno River at Hidden	180.22	36.04	14.42	7.21	3.60	1.80	0.72
Chowchilla River at Buchanan	180.22	36.04	14.42	7.21	3.60	1.80	0.72
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:
1. Big Dry Creek frequency is equal to 1/6 of the return period at Friant Dam.
2. Littlejohn/Farmington & westside streams had higher % of rainfall during 1998 storm.
3. All other tributaries are assumed to contribute at a constant frequency below the proposed return periods for each system in the mainstem centerings.
4. Below El Nido, baseline flooding (10%) was used.

TABLE B.4-2j
Tributary-Specific Synthetic Flood Centerings
San Joaquin River at Friant

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	50.00	12.50	5.00	2.50	1.25	0.63	0.25
San Joaquin River at Friant	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Big Dry Creek at BDC Dam	100.00	60.18	24.07	12.04	6.02	3.01	1.20
Fresno River at Hidden	179.94	35.99	14.40	7.20	3.60	1.80	0.72
Chowchilla River at Buchanan	187.86	37.57	15.03	7.51	3.76	1.88	0.75
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:
1. Big Dry Creek frequency is equal to 1/6 of the return period at Friant Dam.
2. Pine Flat frequency is equal to 80% of the return period at Friant Dam (based on 1997).
3. All other tributaries are assumed to contribute at a constant frequency below the proposed return periods for each system in the mainstem centerings.
4. Baseline flows used downstream of Chowchilla (10%).

TABLE B.4-2k
Tributary-Specific Synthetic Flood Centerings
Fresno River at Hidden

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	52.08	20.83	10.42	5.21	2.60	1.04
San Joaquin River at Friant	100.00	41.67	16.67	8.33	4.17	2.08	0.83
Big Dry Creek at BDC Dam	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Fresno River at Hidden	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Chowchilla River at Buchanan	65.79	13.16	5.26	2.63	1.32	0.66	0.26
Mariposa Creek at Mariposa	100.00	23.81	9.52	4.76	2.38	1.19	0.48
Owens Creek at Owens	100.00	23.81	9.52	4.76	2.38	1.19	0.48
Bear Creek at Bear	100.00	23.81	9.52	4.76	2.38	1.19	0.48
Burns Creek at Burns	100.00	23.81	9.52	4.76	2.38	1.19	0.48
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	45.45	18.18	9.09	4.55	2.27	0.91
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:

1. February 1969 pattern is used for Fresno/Chowchilla centering.
2. February 1969 pattern also used for SJR/Friant, Merced Streams & Merced/Exchequer (based on 1980 and 1956).
3. Kings/Pine Flat is 80% of San Joaquin/Friant (based on 1997).
4. Chowchilla is 76% of Fresno.
5. All other tributaries are assumed to contribute at baseline conditions (10%).
6. Big Dry Creek return set at 80% of Fresno due to high instance of correlation in historic storm matrix.

TABLE B.4-2l
Tributary-Specific Synthetic Flood Centerings
Chowchilla River at Buchanan

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	52.08	20.83	10.42	5.21	2.60	1.04
San Joaquin River at Friant	100.00	41.67	16.67	8.33	4.17	2.08	0.83
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	65.79	13.16	5.26	2.63	1.32	0.66	0.26
Chowchilla River at Buchanan	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Mariposa Creek at Mariposa	100.00	23.81	10.53	5.26	2.63	1.32	0.53
Owens Creek at Owens	100.00	23.81	10.53	5.26	2.63	1.32	0.53
Bear Creek at Bear	100.00	23.81	10.53	5.26	2.63	1.32	0.53
Burns Creek at Burns	100.00	23.81	10.53	5.26	2.63	1.32	0.53
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	45.45	18.18	9.09	4.55	2.27	0.91
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:
1. February 1969 pattern is used for Fresno/Chowchilla centering.
2. February 1969 pattern also used for SJR/Friant, Merced Streams & Merced/Exchequer (based on 1980 and 1956).
3. Kings/Pine Flat is 80% of SJR/Friant (based on 1997)
4. Fresno is 76% of Chowchilla
5. All other tributaries are assumed to contribute at baseline conditions (10%).

TABLE B.4-2m
Tributary-Specific Synthetic Flood Centerings
Merced Stream Group

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	100.00	50.00	20.00	10.00	5.00	2.00
San Joaquin River at Friant	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Owens Creek at Owens	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Bear Creek at Bear	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Burns Creek at Burns	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:

1. Pattern assumes that rare events on the Merced Stream Group will be caused by powerful, but isolated thunderstorm events which do not produce enough system-wide volume to shape the mainstem floodplains.
2. Frequencies on all other tributaries are reduced to 1/10 of the hypotheticals on the Merced Stream Group to reduce their overall impact on the basin while maintaining a realistic base flood flow.
3. All other tributaries are assumed to contribute at a constant frequency below the proposed return periods for each system in the mainstem centerings.

TABLE B.4-2n
Tributary-Specific Synthetic Flood Centerings
West Side Streams

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	100.00	50.00	20.00	10.00	5.00	2.00
San Joaquin River at Friant	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Merced River at Exchequer	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Orestimba Creek near Newman	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Del Puerto Creek near Patterson	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Tuolumne River at Don Pedro	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Dry Creek near Modesto	50.00	13.33	5.33	2.67	1.33	0.67	0.27
Stanislaus River at New Melones	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:

1. Pattern assumes that rare events on the Westside will be caused by powerful, but isolated thunderstorm events or coastal range storms which do not produce enough system-wide volume to shape the mainstem floodplains.
2. Frequencies on all other tributaries are reduced to 1/10 of the hypotheticals on the westside streams to reduce their overall impact on the basin, while maintaining a realistic base flood flow.
3. Dry Creek on the Tuolumne River set equal to 75% of the westside frequencies.
4. This centering is supported by a 1998 flood event in the San Joaquin basin.
5. All other tributaries are assumed to contribute at a constant frequency below the proposed return periods for each system in the mainstem centerings.

TABLE B.4-2o
Tributary-Specific Synthetic Flood Centerings
Merced River at Exchequer

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	29.41	11.76	5.88	2.94	1.47	0.59
San Joaquin River at Friant	100.00	23.81	9.52	4.76	2.38	1.19	0.48
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	18.52	7.41	3.70	1.85	0.93	0.37
Chowchilla River at Buchanan	100.00	18.52	7.41	3.70	1.85	0.93	0.37
Mariposa Creek at Mariposa	100.00	34.48	13.79	6.90	3.45	1.72	0.69
Owens Creek at Owens	100.00	34.48	13.79	6.90	3.45	1.72	0.69
Bear Creek at Bear	100.00	34.48	13.79	6.90	3.45	1.72	0.69
Burns Creek at Burns	100.00	34.48	13.79	6.90	3.45	1.72	0.69
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	20.41	8.16	4.08	2.04	1.02	0.41
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	24.39	9.76	4.88	2.44	1.22	0.49
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	37.04	14.81	7.41	3.70	1.85	0.74
Cosumnes River at Michigan Bar	100.00	62.50	25.00	12.50	6.25	3.13	1.25

Notes:

1. Merced River centering patterned after 1982 storm over Merced Streams & Fresno/Chowchilla.
2. Concurrent storms on major rivers south & north of Merced are ramped down using 1965 pattern.
3. Kings/Pine Flat is 80% of SJR/Friant (based on 1997)
4. Cosumnes is 59 % of Mokelumne
5. All other tributaries are assumed to contribute at baseline conditions (10%).

TABLE B.4-2p
Tributary-Specific Synthetic Flood Centerings
Tuolumne River at Don Pedro

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	46.30	18.52	9.26	4.63	2.31	0.93
San Joaquin River at Friant	100.00	37.04	14.81	7.41	3.70	1.85	0.74
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	23.81	9.52	4.76	2.38	1.19	0.48
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	20.41	8.16	4.08	2.04	1.02	0.41
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	24.39	9.76	4.88	2.44	1.22	0.49
Cosumnes River at Michigan Bar	100.00	41.67	16.67	8.33	4.17	2.08	0.83

Notes:
1. Tuolumne at Don Pedro centering was largest during the 1997 storm.
2. Merced and Stanislaus Rivers also patterned after 1997 storm.
3. Larger centerings over Mokelumne/Cosumnes & SanJoaquin/Kings in 1997 are not realistic to use for Tuolumne centering.
4. Concurrent storms on major rivers south of Merced & north of Stanislaus are ramped down using 1965 pattern.
5. Kings/Pine Flat is 80% of SanJoaquin/Friant (based on 1997).
6. Cosumnes is 59 % of Mokelumne.
7. All other tributaries are assumed to contribute at baseline conditions (10%).

TABLE B.4-2q
Tributary-Specific Synthetic Flood Centerings
Dry Creek near Modesto

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	100.00	50.00	20.00	10.00	5.00	2.00
San Joaquin River at Friant	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Merced River at Exchequer	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Orestimba Creek near Newman	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Del Puerto Creek near Patterson	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Tuolumne River at Don Pedro	100.00	64.94	25.97	12.99	6.49	3.25	1.30
Dry Creek near Modesto	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Stanislaus River at New Melones	100.00	71.43	28.57	14.29	7.14	3.57	1.43
Littlejohn Creek at Farmington	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Duck Creek at Duck Creek gage	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:

1. Dry Creek near Modesto centering patterned after 1998 storm.
2. Littlejohn/Farmington & westside streams had higher % of rainfall during 1998 storm.
3. Higher return periods at Farmington & westside streams were lowered to 80%.
4. 1998 storm ratio of Tuolumne to Dry Creek & Stanislaus to Dry Creek used for Tuolumne & Stanislaus.
5. Cosumnes is 59 % of Mokelumne.
6. All other tributaries are assumed to contribute at baseline conditions (10%).

TABLE B.4-2r
Tributary-Specific Synthetic Flood Centerings
Stanislaus River at New Melones

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	46.30	18.52	9.26	4.63	2.31	0.93
San Joaquin River at Friant	100.00	37.04	14.81	7.41	3.70	1.85	0.74
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	27.78	11.11	5.56	2.78	1.39	0.56
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	23.81	9.52	4.76	2.38	1.19	0.48
Dry Creek near Modesto	100.00	76.92	30.77	15.38	7.69	3.85	1.54
Stanislaus River at New Melones	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Littlejohn Creek at Farmington	100.00	20.41	8.16	4.08	2.04	1.02	0.41
Duck Creek at Duck Creekgage	100.00	20.41	8.16	4.08	2.04	1.02	0.41
Calaveras River at New Hogan	100.00	25.64	10.26	5.13	2.56	1.28	0.51
Cosgrove Creek near New Hogan	100.00	25.64	10.26	5.13	2.56	1.28	0.51
Mokelumne River at Camanche	100.00	20.41	8.16	4.08	2.04	1.02	0.41
Cosumnes River at Michigan Bar	100.00	34.48	13.79	6.90	3.45	1.72	0.69

Notes:
1. Stanislaus at New Melones centering patterned after 1986 storm.
2. Tuolumne, Merced River, Dry Creek, Littlejohn, Calaveras also patterned after 1986 storm.
3. Concurrent storms on major rivers south of Merced & north of Stanislaus are ramped down using 1965 Mokel pattern.
4. Kings/Pine Flat is 80% of SanJoaquin/Friant (based on 1997).
5. Cosumnes is 59 % of Mokelumne.
6. All other tributaries are assumed to contribute at baseline conditions (10%).

TABLE B.4-2s
Tributary-Specific Synthetic Flood Centerings
Littlejohn Creek at Farmington

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	100.00	50.00	20.00	10.00	5.00	2.00
San Joaquin River at Friant	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Merced River at Exchequer	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Orestimba Creek near Newman	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Del Puerto Creek near Patterson	62.50	12.50	5.00	2.50	1.25	0.63	0.25
Tuolumne River at Don Pedro	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Dry Creek near Modesto	60.24	12.05	4.82	2.41	1.20	0.60	0.24
Stanislaus River at New Melones	100.00	83.33	33.33	16.67	8.33	4.17	1.67
Littlejohn Creek at Farmington	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Duck Creek at Duck Creek gage	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Calaveras River at New Hogan	100.00	45.45	18.18	9.09	4.55	2.27	0.91
Cosgrove Creek near New Hogan	100.00	45.45	18.18	9.09	4.55	2.27	0.91
Mokelumne River at Camanche	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:
1. Littlejohn centering patterned after 1998 storm.
2. Dry Creek nr Modesto & Westside Tributaries also had higher % of rainfall during 1998 storm.
3. Atypical high centering on the westside was lowered to 80%.
4. 1998 pattern used for Calaveras & Stanislaus.
5. All other tributaries are assumed to contribute at baseline conditions (10%).

TABLE B.4-2t
Tributary-Specific Synthetic Flood Centerings
Calaveras River at New Hogan

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	100.00	50.00	20.00	10.00	5.00	2.00
San Joaquin River at Friant	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	66.67	13.33	5.33	2.67	1.33	0.67	0.27
Merced River at Exchequer	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Orestimba Creek near Newman	66.67	13.33	5.33	2.67	1.33	0.67	0.27
Del Puerto Creek near Patterson	66.67	13.33	5.33	2.67	1.33	0.67	0.27
Tuolumne River at Don Pedro	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Dry Creek near Modesto	100.00	24.39	9.76	4.88	2.44	1.22	0.49
Stanislaus River at New Melones	100.00	83.33	33.33	16.67	8.33	4.17	1.67
Littlejohn Creek at Farmington	55.56	11.11	4.44	2.22	1.11	0.56	0.22
Duck Creek at Duck Creek gage	55.56	11.11	4.44	2.22	1.11	0.56	0.22
Calaveras River at New Hogan	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Cosgrove Creek near New Hogan	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Mokelumne River at Camanche	100.00	83.33	33.33	16.67	8.33	4.17	1.67
Cosumnes River at Michigan Bar	100.00	100.00	50.00	20.00	10.00	5.00	2.00

Notes:
1. A distinct, historic pattern could not be found for centerings on the Calaveras River.
2. In lieu of a pattern, used 75% for Westside, 90% for Farmington, 41% for Dry Creek nr Modesto.
3. 12% used for Mokelumne & Stanislaus Rivers.
4. All other tributaries are assumed to contribute at baseline conditions (10%).

TABLE B.4-2u
Tributary-Specific Synthetic Flood Centerings
Mokelumne River at Camanche

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	69.44	27.78	13.89	6.94	3.47	1.39
San Joaquin River at Friant	100.00	55.56	22.22	11.11	5.56	2.78	1.11
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	37.04	14.81	7.41	3.70	1.85	0.74
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	20.41	8.16	4.08	2.04	1.02	0.41
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	19.61	7.84	3.92	1.96	0.98	0.39
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	50.00	10.00	4.00	2.00	1.00	0.50	0.20
Cosumnes River at Michigan Bar	50.00	23.81	9.52	4.76	2.38	1.19	0.48

Notes:
1. Mokelumne River at Camanche centering patterned after December 1964 storm (~50-year on Mokelumne).
2. December 1964 concurrent pattern used for major eastside tributaries.
3. Kings/Pine Flat is 80% of SanJoaquin/Friant (based on 1997); Big Dry Creek is 1/6 of SanJoaquin/Friant.
4. 1997, 1951, 1980 had relatively larger centerings over other major eastside tributaries, but were not used for patterns.
5. All other tributaries are assumed to contribute at baseline conditions (10%).

TABLE B.4-2v
Tributary-Specific Synthetic Flood Centerings
Cosumnes River at Michigan Bar

Index Point	Percent Chance Exceedence						
	50%	10%	4%	2%	1%	0.5%	0.2%
Kings River at Pine Flat	100.00	89.29	35.71	17.86	8.93	4.46	1.79
San Joaquin River at Friant	100.00	71.43	28.57	14.29	7.14	3.57	1.43
Big Dry Creek at BDC Dam	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Fresno River at Hidden	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Chowchilla River at Buchanan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mariposa Creek at Mariposa	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Owens Creek at Owens	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Bear Creek at Bear	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Burns Creek at Burns	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Los Banos Creek at Los Banos	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Merced River at Exchequer	100.00	55.56	22.22	11.11	5.56	2.78	1.11
Orestimba Creek near Newman	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Del Puerto Creek near Patterson	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Tuolumne River at Don Pedro	100.00	37.04	14.81	7.41	3.70	1.85	0.74
Dry Creek near Modesto	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Stanislaus River at New Melones	100.00	20.41	8.16	4.08	2.04	1.02	0.41
Littlejohn Creek at Farmington	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Duck Creek at Duck Creek gage	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Calaveras River at New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Cosgrove Creek near New Hogan	100.00	100.00	50.00	20.00	10.00	5.00	2.00
Mokelumne River at Camanche	92.59	18.52	7.41	3.70	1.85	0.93	0.37
Cosumnes River at Michigan Bar	50.00	10.00	4.00	2.00	1.00	0.50	0.20

Notes:
1. Cosumnes River displayed a large centering for the 1997 & 1986 floods; however, other eastside tributaries had larger concurrent storms.
2. The Cosumnes centering should not have larger concurrencies over eastside tributaries than the Mokelumne centering.
3. Mokelumne 1965 pattern used for Cosumnes centering; shifted one basin to the north.
4. Mokel/Cosumes relation from 1986 storm (Mokel is 54% of Cosumnes) used.
5. Kings/Pine Flat is 80% of SanJoaquin/Friant (based on 1997).
6. All other tributaries are assumed to contribute at baseline conditions.

ATTACHMENT B.5

COMPUTED AND ADOPTED STATISTICS

COMPUTED STATISTICS

Computed statistics presented herein, are defined as the last set of statistics calculated prior to final smoothing and adoption. These values reflect all adjustments made to data sets, including correlations with nearby records, removal of outliers, and censoring of low flows (not identified as outliers; performed only at Bear (34), Burns (35), Littlejohn (46), and Duck (47) creeks) that were negatively impacting frequency estimates. Adjustments made to individual data sets are noted on the frequency curves in Attachment B.2. Raw data sets (pre-adjustment) for the 1-, 3-, 7-, 15-, and 30-day average maximum flows are tabulated in Attachment B.6. All statistics are based on unregulated conditions. Equivalent years of record are provided parenthetically after table titles and are listed by duration where needed.

MAINSTEM LOCATIONS

Statistic sets for mainstem locations at Ord Ferry (14), Verona (22), Sacramento (23), El Nido (31), Newman (37), Maze Road (43), and Vernalis (45) are based on data computed by routing unregulated flow records at upstream tributaries to mainstem locations. All routings were conservative (routings were simulated with indefinitely large channels); no flow was lost in overbank areas during transit. This procedure was not intended to reflect the natural dynamics of the Central Valley, where large flood flows often discharge to out-of-bank areas and are lost or greatly attenuated. Statistics for mainstem locations are related to this procedure and are different than those expected under natural conditions.

CONTRIBUTIONS FROM OTHER STUDIES

Several rain flood frequency curves prepared in support of other studies were incorporated directly into the Synthetic Hydrology analysis for the Sacramento and San Joaquin River Basins Comprehensive Study. Data and statistic sets, produced in those studies, are tabulated herein. Questions and comments should be directed to the original studies. Sources of curve information (if not produced by the Comprehensive Study) follow:

1. American River Project: American River at Fair Oaks (24).
2. FEMA Flood Hazard Mitigation Studies: Feather River at Oroville (15); North Yuba River at New Bullards Bar (16); Yuba River at Marysville (17); San Joaquin River at Friant Dam (28); Merced River at New Exchequer Dam (39); Tuolumne River at Don Pedro Dam (41); Stanislaus River at New Melones (44); Mokelumne River at Camanche Dam (50).

3. Merced Stream Groups Project: Mariposa Creek at Mariposa Dam (32); Owens Creek at Owens Dam (33); Bear Creek at Bear Dam (34); and Burns Creek at Burns Dam (35).
4. West Stanislaus Feasibility Study: Orestimba Creek near Newman (38); Del Puerto Creek near Patterson (40)

TABLE B.5-1

SACRAMENTO RIVER AT SHASTA DAM (N = 95, 98, 100, 100, AND 98)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.721	0.290	-0.564	4.721	0.290	-0.4
3-day	4.614	0.292	-0.478	4.614	0.292	-0.4
7-day	4.498	0.287	-0.416	4.498	0.287	-0.4
15-day	4.380	0.261	-0.351	4.380	0.261	-0.4
30-day	4.275	0.246	-0.365	4.275	0.246	-0.4
N = Length of period of record						

TABLE B.5-2

CLEAR CREEK NEAR IGO (N = 58)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.789	0.289	-0.050	3.789	0.289	-0.1
3-day	3.657	0.295	-0.053	3.657	0.295	-0.1
7-day	3.501	0.301	-0.058	3.501	0.301	-0.1
15-day	3.349	0.283	-0.062	3.349	0.283	-0.1
30-day	3.217	0.285	-0.066	3.217	0.285	-0.1
N = Length of period of record						

TABLE B.5-3

COTTONWOOD CREEK NEAR COTTONWOOD (N = 57)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.111	0.346	-0.319	4.111	0.346	-0.4
3-day	3.968	0.347	-0.402	3.968	0.346	-0.4
7-day	3.806	0.335	-0.252	3.806	0.335	-0.4
15-day	3.653	0.320	-0.370	3.653	0.320	-0.4
30-day	3.523	0.322	-0.374	3.523	0.322	-0.4
N = Length of period of record						

TABLE B.5-4
COW CREEK NEAR MILLVILLE (N = 49)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.071	0.214	-0.508	4.071	0.214	-0.5
3-day	3.891	0.211	-0.457	3.891	0.211	-0.5
7-day	3.724	0.204	-0.309	3.724	0.204	-0.3
15-day	3.584	0.197	-0.273	3.584	0.200	-0.3
30-day	3.441	0.215	-0.206	3.440	0.200	-0.3
N = Length of period of record						

TABLE B.5-5
BATTLE CREEK BELOW COLEMAN HATCHERY (N = 72, 75, 76, 77, AND 78)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.485	0.278	-0.142	3.485	0.278	-0.1
3-day	3.338	0.279	-0.039	3.338	0.278	-0.1
7-day	3.191	0.254	0.063	3.191	0.254	-0.1
15-day	3.078	0.229	0.141	3.078	0.229	-0.1
30-day	2.974	0.213	0.213	2.974	0.213	-0.1
N = Length of period of record						

TABLE B.5-6
SACRAMENTO RIVER AT BEND BRIDGE (N = 106)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.984	0.247	-0.190	4.984	0.247	-0.2
3-day	4.868	0.251	-0.280	4.868	0.251	-0.2
7-day	4.738	0.255	-0.342	4.738	0.255	-0.3
15-day	4.612	0.248	-0.427	4.612	0.248	-0.4
30-day	4.498	0.244	-0.324	4.498	0.244	-0.4
N = Length of period of record						

TABLE B.5-7

MILL CREEK NEAR LOS MOLINOS (N = 80, 81, 82, 82, AND 82)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.454	0.299	-0.005	3.454	0.309	0.0
3-day	3.289	0.309	0.001	3.289	0.309	0.0
7-day	3.124	0.286	0.008	3.124	0.286	0.0
15-day	2.975	0.258	0.014	2.975	0.258	0.0
30-day	2.847	0.236	0.019	2.847	0.236	0.0
N = Length of period of record						

TABLE B.5-8

ELDER CREEK NEAR PASKENTA (N = 50)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.278	0.367	-0.719	3.278	0.367	-0.6
3-day	3.102	0.382	-0.668	3.102	0.382	-0.6
7-day	2.909	0.379	-0.449	2.909	0.379	-0.6
15-day	2.735	0.361	-0.552	2.735	0.361	-0.6
30-day	2.595	0.356	-0.600	2.595	0.357	-0.6
N = Length of period of record						

TABLE B.5-9

THOMES CREEK AT PASKENTA (N = 76)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.611	0.365	0.035	3.611	0.365	0.0
3-day	3.455	0.353	0.034	3.455	0.353	0.0
7-day	3.292	0.329	0.004	3.292	0.329	0.0
15-day	3.139	0.303	-0.114	3.139	0.303	-0.1
30-day	3.002	0.292	-0.282	3.002	0.292	-0.2
N = Length of period of record						

TABLE B.5-10
DEER CREEK NEAR VINA (N = 82)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.535	0.315	-0.169	3.535	0.325	-0.2
3-day	3.398	0.332	-0.168	3.398	0.332	-0.2
7-day	3.233	0.321	-0.167	3.233	0.321	-0.2
15-day	3.081	0.295	-0.166	3.081	0.295	-0.2
30-day	2.951	0.278	-0.165	2.951	0.278	-0.2
N = Length of period of record						

TABLE B.5-11
BIG CHICO CREEK NEAR CHICO (N = 67)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.379	0.321	-0.590	3.379	0.321	-0.5
3-day	3.231	0.321	-0.418	3.231	0.321	-0.4
7-day	3.057	0.317	-0.259	3.057	0.317	-0.3
15-day	2.895	0.306	-0.305	2.895	0.306	-0.3
30-day	2.744	0.297	-0.344	2.744	0.297	-0.3
N = Length of period of record						

TABLE B.5-12
STONY CREEK AT BLACK BUTTE DAM (N = 98)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.961	0.415	-0.350	3.961	0.427	-0.4
3-day	3.821	0.416	-0.398	3.821	0.416	-0.4
7-day	3.677	0.382	-0.212	3.681	0.410	-0.4
15-day	3.490	0.395	-0.446	3.520	0.401	-0.4
30-day	3.353	0.388	-0.346	3.353	0.388	-0.4
N = Length of period of record						

TABLE B.5-13

BUTTE CREEK NEAR CHICO (N = 80, 81, 81, 82, AND 82)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.566	0.326	-0.131	3.566	0.338	-0.1
3-day	3.424	0.333	-0.102	3.424	0.338	-0.1
7-day	3.273	0.320	-0.071	3.271	0.320	-0.1
15-day	3.143	0.297	-0.044	3.143	0.297	-0.1
30-day	3.032	0.272	-0.021	3.032	0.272	-0.1
N = Length of period of record						

TABLE B.5-14

SACRAMENTO RIVER AT ORD FERRY (LATITUDE) (N = 76)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	5.009	0.277	0.065	5.009	0.281	0.0
3-day	4.935	0.281	-0.030	4.939	0.281	0.0
7-day	4.809	0.278	-0.114	4.809	0.278	-0.1
15-day	4.680	0.267	-0.251	4.680	0.267	-0.3
30-day	4.562	0.258	-0.251	4.562	0.258	-0.3
N = Length of period of record						

TABLE B.5-15

FEATHER RIVER AT OROVILLE DAM (N = 96)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.639	0.390	-0.258	4.639	0.390	-0.2
3-day	4.533	0.392	-0.230	4.533	0.392	-0.2
7-day	4.387	0.377	-0.252	4.387	0.377	-0.3
15-day	4.250	0.351	-0.359	4.250	0.351	-0.4
30-day	4.129	0.326	-0.429	4.129	0.326	-0.4
N = Length of period of record						

TABLE B.5-16

NORTH YUBA AT NEW BULLARDS BAR DAM (N = 91, 92, 92, 91, AND 90)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.122	0.383	-0.270	4.122	0.383	-0.3
3-day	3.999	0.386	-0.320	3.999	0.386	-0.3
7-day	3.858	0.357	-0.378	3.858	0.357	-0.4
15-day	3.727	0.327	-0.431	3.727	0.327	-0.4
30-day	3.611	0.306	-0.478	3.611	0.306	-0.5
N = Length of period of record						

TABLE B.5-17

YUBA RIVER NEAR MARYSVILLE (N = 94)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.417	0.411	-0.384	4.417	0.411	-0.3
3-day	4.283	0.416	-0.321	4.283	0.416	-0.3
7-day	4.125	0.394	-0.428	4.125	0.394	-0.4
15-day	3.989	0.364	-0.560	3.989	0.364	-0.6
30-day	3.867	0.337	-0.658	3.867	0.337	-0.7
N = Length of period of record						

TABLE B.5-18

DEER CREEK NEAR SMARTVILLE (N = 62)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.414	0.300	-0.850	3.414	0.311	-0.6
3-day	3.230	0.312	-0.689	3.230	0.308	-0.6
7-day	3.044	0.312	-0.597	3.044	0.305	-0.6
15-day	2.893	0.304	-0.528	2.893	0.302	-0.6
30-day	2.761	0.289	-0.495	2.761	0.300	-0.6
N = Length of period of record						

TABLE B.5-19
BEAR RIVER NEAR WHEATLAND (N = 93)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.872	0.420	-0.748	3.872	0.420	-0.7
3-day	3.707	0.399	-0.733	3.707	0.399	-0.7
7-day	3.527	0.380	-0.670	3.527	0.380	-0.7
15-day	3.379	0.367	-0.771	3.379	0.367	-0.8
30-day	3.244	0.357	-0.857	3.244	0.357	-0.9
N = Length of period of record						

TABLE B.5-20
CACHE CREEK AT CLEAR LAKE (N = 77)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.057	0.294	-0.326	4.057	0.311	-0.5
3-day	3.908	0.311	-0.502	3.908	0.311	-0.5
7-day	3.735	0.311	-0.508	3.735	0.311	-0.5
15-day	3.563	0.304	-0.644	3.563	0.304	-0.6
30-day	3.398	0.309	-0.598	3.398	0.309	-0.6
N = Length of period of record						

TABLE B.5-21
NORTH FORK CACHE CREEK AT INDIAN VALLEY DAM (N = 69)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.409	0.385	-0.610	3.409	0.385	-0.6
3-day	3.251	0.387	-0.602	3.251	0.387	-0.6
7-day	3.071	0.389	-0.593	3.071	0.389	-0.6
15-day	2.911	0.392	-0.585	2.911	0.392	-0.6
30-day	2.758	0.394	-0.577	2.758	0.394	-0.6
N = Length of period of record						

TABLE B.5-22
SACRAMENTO RIVER AT VERONA (LATITUDE) (N = 76)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	5.117	0.298	0.080	5.117	0.298	0.0
3-day	5.081	0.291	0.040	5.081	0.291	0.0
7-day	5.018	0.291	-0.049	5.018	0.291	0.0
15-day	4.912	0.281	-0.105	4.912	0.281	-0.1
30-day	4.796	0.269	-0.178	4.796	0.269	-0.2
N = Length of period of record						

TABLE B.5-23
SACRAMENTO RIVER AT SACRAMENTO (LATITUDE) (N =76)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	5.196	0.316	0.096	5.196	0.316	0.0
3-day	5.158	0.308	0.069	5.158	0.308	0.0
7-day	5.088	0.300	-0.002	5.088	0.300	0.0
15-day	4.983	0.287	-0.079	4.983	0.287	-0.1
30-day	4.869	0.274	-0.158	4.869	0.274	-0.2
N = Length of period of record						

TABLE B.5-24
AMERICAN RIVER AT FAIR OAKS (N = 93)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.462	0.429	-0.187	4.462	0.429	-0.1
3-day	4.336	0.419	-0.062	4.336	0.419	-0.1
7-day	4.173	0.403	-0.159	4.173	0.403	-0.2
15-day	4.025	0.377	-0.294	4.025	0.377	-0.3
30-day	3.907	0.361	-0.438	3.907	0.361	-0.4
N = Length of period of record						

TABLE B.5-25
PUTAH CREEK NEAR WINTERS (N = 68)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.173	0.385	-0.986	4.173	0.385	-1.0
3-day	3.972	0.386	-0.974	3.972	0.386	-1.0
7-day	3.755	0.389	-0.921	3.755	0.389	-1.0
15-day	3.562	0.399	-0.960	3.562	0.399	-1.0
30-day	3.378	0.404	-0.937	3.378	0.404	-1.0
N = Length of period of record						

TABLE B.5-26
KINGS RIVER AT PINE FLAT DAM (N = 104)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.824	0.457	0.135	3.813	0.458	0.1
3-day	3.672	0.419	0.224	3.660	0.420	0.1
7-day	3.531	0.367	0.192	3.519	0.368	0.1
15-day	3.411	0.324	0.162	3.399	0.324	0.1
30-day	3.306	0.296	0.059	3.294	0.296	0.1
N = Length of period of record						

TABLE B.5-27
BIG DRY CREEK AT BIG DRY CREEK DAM (N = 45)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.514	0.608	-0.457	2.121	0.836	-0.6
3-day	2.300	0.622	-0.399	1.895	0.858	-0.6
7-day	2.084	0.622	-0.276	1.652	0.897	-0.7
15-day	1.852	0.638	-0.384	1.394	0.943	-0.7
30-day	1.652	0.684	-0.414	1.214	0.946	-0.7
N = Length of period of record						

TABLE B.5-28

SAN JOAQUIN RIVER AT FRIANT DAM (N = 94)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.892	0.454	0.100	3.892	0.454	0.1
3-day	3.736	0.442	0.200	3.736	0.442	0.1
7-day	3.581	0.399	0.100	3.581	0.399	0.1
15-day	3.443	0.373	0.000	3.443	0.373	0.0
30-day	3.340	0.346	-0.100	3.340	0.346	-0.1
N = Length of period of record						

TABLE B.5-29

FRESNO RIVER AT HIDDEN DAM (N = 84, 85, 85, 85, AND 85)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.067	0.566	-0.337	3.067	0.566	-0.3
3-day	2.906	0.541	-0.340	2.906	0.541	-0.3
7-day	2.741	0.514	-0.343	2.741	0.514	-0.3
15-day	2.603	0.492	-0.345	2.603	0.492	-0.3
30-day	2.489	0.474	-0.348	2.489	0.474	-0.3
N = Length of period of record						

TABLE B.5-30

CHOWCHILLA RIVER AT BUCHANAN DAM (N = 85)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.178	0.592	-0.746	3.178	0.592	-0.8
3-day	2.984	0.576	-0.703	2.984	0.576	-0.7
7-day	2.789	0.559	-0.659	2.789	0.559	-0.7
15-day	2.618	0.545	-0.621	2.618	0.545	-0.7
30-day	2.477	0.533	-0.590	2.477	0.533	-0.7
N = Length of period of record						

TABLE B.5-31
SAN JOAQUIN RIVER AT EL NIDO (N = 82)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.882	0.426	-0.002	3.882	0.426	-0.1
3-day	3.867	0.422	-0.010	3.867	0.422	-0.1
7-day	3.821	0.410	-0.037	3.821	0.410	-0.1
15-day	3.730	0.385	-0.084	3.730	0.385	-0.1
30-day	3.642	0.363	-0.070	3.642	0.363	-0.1
N = Length of period of record						

TABLE B.5-32
MARIPOSA CREEK AT MARIPOSA DAM (N = 52)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.012	0.523	-0.614	3.012	0.523	-0.6
3-day	2.780	0.525	-0.557	2.780	0.525	-0.6
7-day	---	---	---	2.571	0.526	-0.6
15-day	---	---	---	2.398	0.528	-0.6
30-day	2.195	0.529	-0.416	2.195	0.529	-0.6
N = Length of period of record						

TABLE B.5-33
OWENS CREEK AT OWENS DAM (N = 51)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.107	0.701	-0.791	2.107	0.700	-0.7
3-day	1.864	0.675	-0.691	1.864	0.675	-0.7
7-day	---	---	---	1.688	0.650	-0.7
15-day	---	---	---	1.538	0.630	-0.7
30-day	1.350	0.608	-0.616	1.350	0.608	-0.7
N = Length of period of record						

TABLE B.5-34
BEAR CREEK AT BEAR DAM (N = 45)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.827	0.580	-0.732	2.827	0.580	-0.7
3-day	2.612	0.555	-0.630	2.612	0.555	-0.7
7-day	---	---	---	2.427	0.534	-0.7
15-day	---	---	---	2.263	0.527	-0.7
30-day	2.049	0.536	-0.667	2.049	0.536	-0.7
N = Length of period of record						

TABLE B.5-35
BURNS CREEK AT BURNS DAM (N = 48)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.816	0.572	-0.731	2.816	0.572	-0.7
3-day	2.608	0.533	-0.798	2.608	0.533	-0.7
7-day	---	---	---	2.389	0.534	-0.7
15-day	---	---	---	2.209	0.545	-0.7
30-day	1.996	0.577	-0.708	1.996	0.577	-0.7
N = Length of period of record						

TABLE B.5-36
LOS BANOS CREEK AT LOS BANOS DAM (N = 41)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.684	0.584	-1.178	2.684	0.588	-0.9
3-day	2.463	0.592	-1.349	2.463	0.589	-0.9
7-day	2.228	0.588	-1.089	2.228	0.591	-0.9
15-day	2.008	0.591	-0.945	2.008	0.592	-0.9
30-day	1.815	0.593	-0.710	1.815	0.593	-0.9
N = Length of period of record						

TABLE B.5-37
SAN JOAQUIN RIVER AT NEWMAN (N = 82)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.079	0.445	-0.201	4.079	0.445	-0.2
3-day	4.052	0.439	-0.186	4.052	0.439	-0.2
7-day	4.002	0.431	-0.141	4.002	0.431	-0.2
15-day	3.918	0.407	-0.175	3.918	0.407	-0.2
30-day	3.820	0.387	-0.138	3.820	0.387	-0.2
N = Length of period of record						

TABLE B.5-38
ORESTIMBA CREEK NEAR NEWMAN (N = 65)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.558	0.789	-1.118	2.558	0.789	-1.0
3-day	2.358	0.779	-1.091	2.358	0.779	-1.0
7-day	2.167	0.721	-0.805	2.167	0.721	-1.0
15-day	1.929	0.753	-0.877	1.929	0.753	-1.0
30-day	1.708	0.776	-0.790	1.708	0.776	-1.0
N = Length of period of record						

TABLE B.5-39
MERCED RIVER AT NEW EXCHEQUER DAM (N = 96)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.890	0.458	-0.086	3.890	0.458	0.0
3-day	3.719	0.432	-0.014	3.719	0.432	0.0
7-day	3.548	0.400	-0.015	3.548	0.400	0.0
15-day	3.402	0.380	-0.131	3.402	0.380	-0.1
30-day	3.267	0.373	-0.188	3.267	0.373	-0.2
N = Length of period of record						

TABLE B.5-40
DEL PUERTO CREEK NEAR PATTERSON (N = 33)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.038	0.794	-0.717	2.036	0.800	-0.7
3-day	1.854	0.773	-0.675	1.854	0.773	-0.7
7-day	1.655	0.772	-0.546	1.655	0.772	-0.7
15-day	1.455	0.755	-0.423	1.455	0.755	-0.7
30-day	1.329	0.694	-0.248	1.329	0.694	-0.7
N = Length of period of record						

TABLE B.5-41
TUOLUMNE RIVER AT DON PEDRO DAM (N = 101)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.109	0.444	-0.190	4.109	0.444	-0.1
3-day	3.957	0.438	-0.132	3.957	0.438	-0.1
7-day	3.793	0.410	-0.180	3.793	0.410	-0.2
15-day	3.652	0.382	-0.375	3.652	0.382	-0.4
30-day	3.545	0.365	-0.520	3.545	0.365	-0.5
N = Length of period of record						

TABLE B.5-42
DRY CREEK NEAR MODESTO (N = 52)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.140	0.433	-0.925	3.140	0.435	-0.9
3-day	2.939	0.441	-0.867	2.939	0.438	-0.9
7-day	2.747	0.441	-0.812	2.747	0.441	-0.9
15-day	2.550	0.444	-0.756	2.550	0.444	-0.9
30-day	2.371	0.448	-0.705	2.371	0.447	-0.9
N = Length of period of record						

TABLE B.5-43

SAN JOAQUIN RIVER AT MAZE ROAD BRIDGE (N = 82)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.276	0.443	-0.088	4.276	0.443	-0.1
3-day	4.237	0.439	-0.099	4.237	0.439	-0.1
7-day	4.164	0.429	-0.124	4.164	0.429	-0.2
15-day	4.066	0.406	-0.184	4.066	0.406	-0.2
30-day	3.962	0.386	-0.170	3.962	0.386	-0.2
N = Length of period of record						

TABLE B.5-44

STANISLAUS RIVER AT NEW MELONES DAM (N = 82)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.829	0.495	-0.014	3.829	0.495	0.0
3-day	3.677	0.483	0.042	3.677	0.483	0.0
7-day	3.524	0.445	0.028	3.524	0.445	0.0
15-day	3.396	0.405	-0.146	3.396	0.405	-0.2
30-day	3.286	0.380	-0.183	3.286	0.380	-0.2
N = Length of period of record						

TABLE B.5-45

SAN JOAQUIN RIVER AT VERNALIS (N = 82)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	4.375	0.450	-0.056	4.375	0.450	-0.1
3-day	4.333	0.445	-0.071	4.333	0.445	-0.1
7-day	4.251	0.433	-0.108	4.251	0.433	-0.2
15-day	4.148	0.412	-0.223	4.148	0.412	-0.2
30-day	4.042	0.392	-0.217	4.042	0.392	-0.2
N = Length of period of record						

TABLE B.5-46
LITTLEJOHN CREEK AT FARMINGTON DAM (N = 47)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.470	0.342	0.713	3.470	0.392	-0.5
3-day	3.216	0.392	0.591	3.216	0.392	-0.5
7-day	2.993	0.393	0.359	2.993	0.392	-0.5
15-day	2.775	0.389	0.339	2.775	0.392	-0.5
30-day	2.581	0.424	0.455	2.581	0.392	-0.5
N = Length of period of record						

TABLE B.5-47
DUCK CREEK NEAR FARMINGTON (N = 47)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.095	0.230	0.339	2.095	0.230	-0.3
3-day	1.771	0.314	0.690	1.771	0.314	-0.5
7-day	1.534	0.347	0.719	1.534	0.347	-0.5
15-day	1.324	0.353	0.801	1.324	0.353	-0.5
30-day	1.109	0.363	0.524	1.109	0.363	-0.5
N = Length of period of record						

TABLE B.5-48
COSGROVE CREEK NEAR VALLEY SPRINGS (N = 48)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	2.498	0.325	-0.572	2.498	0.325	-0.7
3-day	2.265	0.340	-0.756	2.265	0.340	-0.7
7-day	2.024	0.343	-0.605	2.024	0.343	-0.7
15-day	1.832	0.372	-0.648	1.832	0.372	-0.7
30-day	1.641	0.388	-0.710	1.641	0.388	-0.7
N = Length of period of record						

TABLE B.5-49
CALAVERAS RIVER AT NEW HOGAN DAM (N = 53)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.664	0.480	-0.884	3.664	0.468	-0.7
3-day	3.508	0.468	-0.824	3.508	0.468	-0.6
7-day	3.311	0.454	-0.800	3.311	0.468	-0.6
15-day	3.121	0.476	-0.785	3.121	0.468	-0.6
30-day	2.950	0.464	-0.702	2.950	0.468	-0.6
N = Length of period of record						

TABLE B.5-50
MOKELUMNE RIVER AT CAMANCHE DAM (N = 93)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.694	0.463	0.067	3.694	0.463	0.1
3-day	3.560	0.462	0.067	3.560	0.462	0.1
7-day	3.416	0.432	0.008	3.416	0.432	0.0
15-day	3.279	0.405	-0.168	3.279	0.405	-0.2
30-day	3.166	0.377	-0.223	3.166	0.377	-0.2
N = Length of period of record						

TABLE B.5-51
COSUMNES RIVER AT MICHIGAN BAR (N = 91)

Curve	Computed Statistics			Adopted Statistics		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
1-day	3.788	0.461	-0.443	3.788	0.461	-0.4
3-day	3.643	0.440	-0.451	3.643	0.440	-0.5
7-day	3.480	0.417	-0.461	3.480	0.417	-0.5
15-day	3.331	0.395	-0.470	3.331	0.395	-0.5
30-day	3.210	0.378	-0.477	3.210	0.378	-0.5
N = Length of period of record						

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ATTACHMENT B.6

UNREGULATED RAIN FLOOD FLOWS

DESCRIPTION OF DATA

The following tables contain data points of the systematic record for each frequency curve developed for each gage location. These data points were used in the computation of statistics (Attachment B.5) during construction of unregulated rain flood frequency curves (Attachment B.2). Italicized data indicate portions of the systematic record that were based on nearby gages (for more information, refer to Attachment B.1 and to the notes on frequency curves in Attachment B.2). Prior to statistical analyses, data was adjusted to remove the influence of reservoir regulation and snowmelt as needed.

REMOVAL OF RESERVOIR INFLUENCES

Unregulated time series for all tributaries were prepared by adjusting regulated time series at tributary locations of interest according to the daily changes in storage at upstream reservoirs. For example, the unregulated time series for the Sacramento River at Shasta Dam (the only point on the Sacramento River which qualifies as a tributary location) was computed by translating daily changes in storage at Lake Britton, McCloud Reservoir, Pit River Reservoirs #6 and #7, and Lake Shasta to flow rates, routing these flows to the dam site, and adding the routed flows to the gaged outflow from Shasta Dam. This process eliminated the influence of reservoir regulation and was repeated for all tributary locations with upstream reservoirs.

COMPUTATION OF DURATION MAXIMA

Average maximum flows were computed for 1-, 3-, 7-, 15-, and 30-day durations using a moving average. Dates correspond to the start day of the time interval.

SCREENING OF SNOWMELT-DRIVEN FLOWS

Maxima driven by snowmelt were screened from the data sets prior to statistical analysis. When a maximum was identified as a snowmelt event, it was replaced by the largest rain flood flow within that water year.

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TABLE B.6-1

SACRAMENTO RIVER AT SHASTA DAM

ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1930	---	---	---	---	---	---	---	---	---	---
1931	---	---	---	---	---	---	---	---	---	---
1932	27-DEC	34,921	26-DEC	22,582	24-DEC	16,310	22-DEC	10,846	23-DEC	7,396
1933	28-MAR	19,476	28-MAR	15,231	13-MAR	11,186	16-MAR	9,211	12-MAR	8,070
1934	2-JAN	24,437	1-JAN	20,565	29-DEC	16,755	29-DEC	10,238	12-DEC	6,577
1935	8-APR	44,755	7-APR	31,303	4-APR	23,254	4-APR	18,368	3-APR	13,677
1936	22-FEB	53,145	21-FEB	42,396	19-FEB	29,223	15-FEB	21,021	13-FEB	14,065
1937	13-MAR	29,107	12-MAR	21,893	12-MAR	15,249	12-MAR	14,068	9-MAR	11,186
1938	11-DEC	102,046	11-DEC	66,373	10-DEC	40,438	13-MAR	29,428	28-FEB	22,892
1939	13-MAR	37,858	12-MAR	24,518	12-MAR	17,388	12-MAR	13,658	9-MAR	10,738
1940	28-FEB	161,435	27-FEB	124,798	26-FEB	78,654	25-FEB	46,733	3-FEB	32,058
1941	4-APR	71,408	24-JAN	56,918	21-DEC	49,557	18-DEC	33,907	8-FEB	28,151
1942	6-FEB	79,872	4-FEB	72,091	2-FEB	61,792	25-JAN	51,064	23-JAN	35,975
1943	23-JAN	44,393	22-JAN	38,460	21-JAN	29,328	21-JAN	24,152	21-JAN	17,867
1944	21-NOV	6,771	20-NOV	6,062	28-JUL	5,431	17-JUL	5,390	17-JUL	5,312
1945	30-JUL	9,519	28-JUL	9,009	26-JUL	8,838	23-JUL	8,844	16-JUL	8,697
1946	4-JAN	28,300	4-JAN	27,667	4-JAN	27,257	1-JAN	23,047	30-DEC	19,083
1947	12-FEB	33,936	12-FEB	22,362	11-FEB	15,550	2-MAR	14,737	12-FEB	12,201
1948	7-JAN	62,689	6-JAN	47,019	4-JAN	31,575	9-APR	20,972	8-APR	19,646
1949	19-MAR	42,520	17-MAR	40,650	16-MAR	32,000	10-MAR	24,389	1-MAR	18,847
1950	23-JAN	29,204	22-JAN	21,571	18-JAN	16,325	19-MAR	13,405	19-MAR	12,358
1951	29-OCT	51,803	28-OCT	44,486	8-FEB	26,901	4-FEB	23,934	17-JAN	18,935
1952	27-DEC	77,184	27-DEC	51,099	26-DEC	35,205	29-MAR	26,161	26-MAR	23,055
1953	9-JAN	81,549	8-JAN	53,740	8-JAN	49,649	8-JAN	42,152	27-DEC	28,503
1954	17-JAN	61,599	16-JAN	46,796	12-FEB	34,189	16-JAN	24,625	16-JAN	21,717
1955	6-DEC	31,992	5-DEC	22,075	20-APR	17,521	20-APR	14,214	19-APR	11,697
1956	22-DEC	140,880	21-DEC	120,420	19-DEC	89,374	18-DEC	57,285	19-DEC	44,692
1957	24-FEB	77,415	24-FEB	65,148	23-FEB	46,767	23-FEB	32,322	22-FEB	24,771
1958	24-FEB	83,075	24-FEB	66,814	14-FEB	51,220	12-FEB	49,076	29-JAN	45,382
1959	12-JAN	64,496	10-JAN	48,267	8-JAN	37,731	5-JAN	23,465	14-FEB	16,179
1960	8-FEB	65,202	7-FEB	45,158	6-FEB	30,936	1-FEB	22,897	25-JAN	16,437
1961	31-JAN	43,389	10-FEB	29,997	9-FEB	25,250	31-JAN	20,612	29-JAN	16,516
1962	13-FEB	70,179	13-FEB	55,696	9-FEB	48,336	7-FEB	35,303	7-FEB	23,790
1963	14-APR	61,885	13-APR	50,947	9-APR	43,057	5-APR	38,179	27-MAR	30,307
1964	20-JAN	62,888	20-JAN	36,653	19-JAN	22,907	19-JAN	15,273	17-JAN	10,997
1965	22-DEC	169,171	21-DEC	116,668	21-DEC	80,997	19-DEC	49,487	20-DEC	37,043
1966	4-JAN	37,155	4-JAN	35,738	4-JAN	25,095	8-MAR	18,660	8-MAR	15,612
1967	29-JAN	62,545	29-JAN	52,369	28-JAN	38,623	27-JAN	26,213	16-MAR	20,341
1968	23-FEB	48,582	21-FEB	46,354	20-FEB	37,318	17-FEB	27,368	17-FEB	20,210
1969	21-JAN	91,765	20-JAN	71,054	20-JAN	48,327	13-JAN	35,438	20-JAN	29,825
1970	23-JAN	164,653	22-JAN	132,556	21-JAN	101,673	14-JAN	78,169	9-JAN	51,732
1971	26-MAR	62,285	26-MAR	45,241	25-MAR	35,771	23-MAR	25,973	12-MAR	20,939
1972	17-DEC	43,390	28-FEB	28,985	28-FEB	26,996	27-FEB	21,749	23-FEB	17,519
1973	16-JAN	74,532	16-JAN	59,509	13-JAN	40,370	11-JAN	27,064	15-JAN	21,399
1974	16-JAN	190,847	15-JAN	130,231	15-JAN	93,868	13-JAN	56,723	27-DEC	36,002
1975	19-MAR	56,295	18-MAR	47,843	18-MAR	33,798	17-MAR	27,426	2-MAR	23,479
1976	29-FEB	22,709	28-FEB	19,768	28-FEB	19,768	28-FEB	19,768	28-FEB	19,768
1977	29-SEP	8,340	28-SEP	6,357	16-SEP	4,866	16-SEP	4,672	19-FEB	4,078
1978	16-JAN	95,610	14-JAN	87,853	14-JAN	65,614	5-JAN	48,365	9-JAN	33,370
1979	13-FEB	30,570	13-FEB	21,120	13-FEB	15,156	13-FEB	13,300	13-FEB	12,017

TABLE B.6-1

SACRAMENTO RIVER AT SHASTA DAM

ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1980	18-FEB	89,540	17-FEB	79,573	17-FEB	60,529	16-FEB	40,582	16-FEB	28,913
1981	28-JAN	30,480	25-MAR	21,590	21-MAR	20,234	19-MAR	15,877	4-MAR	12,821
1982	19-DEC	81,790	19-DEC	67,977	11-APR	46,570	2-APR	33,988	30-MAR	27,414
1983	13-MAR	92,570	1-MAR	89,360	28-FEB	66,384	28-FEB	57,011	27-FEB	44,685
1984	11-DEC	66,160	9-DEC	56,313	7-DEC	41,586	6-DEC	29,120	6-DEC	25,156
1985	12-NOV	23,980	11-NOV	20,927	10-NOV	14,906	10-NOV	11,772	7-NOV	10,336
1986	17-FEB	126,980	17-FEB	114,637	15-FEB	94,387	14-FEB	64,289	14-FEB	47,281
1987	13-MAR	39,673	12-MAR	36,248	11-MAR	26,465	5-MAR	21,138	3-MAR	15,120
1988	6-DEC	32,897	9-DEC	23,237	5-DEC	21,855	1-DEC	17,132	30-NOV	11,321
1989	9-MAR	72,974	9-MAR	65,736	8-MAR	46,829	8-MAR	32,954	6-MAR	25,727
1990	27-MAY	31,487	27-MAY	25,809	27-MAY	19,958	22-MAY	15,234	20-MAY	10,477
1991	4-MAR	28,971	3-MAR	24,108	2-MAR	15,440	1-MAR	10,711	3-MAR	10,212
1992	20-FEB	35,598	19-FEB	28,333	15-FEB	22,239	10-FEB	20,168	10-FEB	14,986
1993	17-MAR	82,188	17-MAR	66,330	17-MAR	47,807	15-MAR	39,296	10-MAR	28,852
1994	24-JAN	17,942	23-JAN	13,677	22-JAN	9,757	17-FEB	9,014	17-FEB	7,957
1995	9-JAN	111,630	9-MAR	91,398	8-JAN	83,780	9-MAR	59,674	9-MAR	41,460
1996	21-FEB	68,733	19-FEB	63,990	17-FEB	51,838	17-FEB	35,858	5-FEB	29,856
1997	1-JAN	215,623	31-DEC	167,767	29-DEC	116,377	27-DEC	70,709	8-DEC	45,969
1998	3-FEB	78,535	6-FEB	68,423	2-FEB	63,224	1-FEB	47,840	12-JAN	40,297
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-2

CLEAR CREEK NEAR IGO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1940	---	---	---	---	---	---	---	---	---	---
1941	1-MAR	15,100	28-FEB	10,650	28-FEB	7,311	30-MAR	4,542	6-FEB	3,657
1942	4-FEB	9,010	4-FEB	7,343	2-FEB	5,694	24-JAN	4,534	23-JAN	3,057
1943	21-JAN	2,330	21-JAN	2,260	21-JAN	1,624	21-JAN	1,365	21-JAN	978
1944	3-FEB	2,350	2-FEB	1,504	1-FEB	932	1-FEB	599	1-FEB	439
1945	2-FEB	3,240	1-FEB	3,033	31-JAN	2,350	31-JAN	1,636	31-JAN	1,091
1946	27-DEC	8,350	27-DEC	5,883	24-DEC	3,919	22-DEC	2,741	21-DEC	1,796
1947	12-FEB	2,640	3-MAR	1,540	3-MAR	1,021	2-MAR	835	11-FEB	632
1948	7-JAN	3,690	6-JAN	2,890	5-JAN	1,755	3-APR	1,118	3-APR	1,039
1949	18-MAR	6,150	18-MAR	5,223	16-MAR	3,704	10-MAR	2,829	2-MAR	2,042
1950	6-FEB	1,470	5-FEB	1,074	5-FEB	733	5-FEB	591	19-MAR	522
1951	5-FEB	3,530	28-OCT	2,953	4-FEB	2,136	4-FEB	1,806	17-JAN	1,451
1952	27-DEC	5,160	1-FEB	3,807	31-JAN	2,637	24-JAN	2,020	20-JAN	1,561
1953	9-JAN	4,630	18-JAN	3,970	17-JAN	3,071	8-JAN	2,959	27-DEC	2,189
1954	17-JAN	6,170	16-JAN	4,457	12-FEB	2,930	16-JAN	2,366	16-JAN	1,952
1955	6-DEC	2,970	5-DEC	1,867	5-DEC	1,219	20-APR	913	20-APR	657
1956	22-DEC	14,500	21-DEC	10,670	19-DEC	7,767	18-DEC	4,666	19-DEC	3,782
1957	24-FEB	9,240	24-FEB	6,213	23-FEB	4,254	23-FEB	2,553	23-FEB	1,860
1958	19-FEB	14,100	18-FEB	10,430	18-FEB	7,920	12-FEB	6,378	29-JAN	5,673
1959	16-FEB	6,500	16-FEB	4,817	7-JAN	3,531	14-FEB	2,145	14-FEB	1,399
1960	8-FEB	5,170	8-FEB	3,503	5-FEB	2,253	1-FEB	1,606	25-JAN	1,048
1961	31-JAN	3,770	31-JAN	2,470	9-FEB	1,727	30-JAN	1,554	29-JAN	1,171
1962	13-FEB	6,660	13-FEB	5,010	12-FEB	3,523	8-FEB	2,514	8-FEB	1,877
1963	14-APR	6,210	14-APR	5,387	12-APR	3,804	6-APR	2,765	27-MAR	2,088
1964	20-JAN	6,393	20-JAN	3,408	19-JAN	1,922	19-JAN	1,232	19-JAN	850
1965	22-DEC	16,209	21-DEC	10,608	21-DEC	6,357	19-DEC	3,693	21-DEC	2,777
1966	14-NOV	4,133	13-NOV	3,458	13-NOV	2,710	13-NOV	1,824	12-NOV	1,125
1967	4-DEC	5,932	29-JAN	4,784	28-JAN	3,503	26-JAN	2,313	16-MAR	1,724
1968	22-FEB	3,898	21-FEB	3,458	19-FEB	2,728	16-FEB	1,901	2-FEB	1,262
1969	11-FEB	7,035	11-FEB	4,917	9-FEB	3,901	12-JAN	2,908	19-JAN	2,370
1970	23-JAN	11,327	22-JAN	8,506	21-JAN	6,865	14-JAN	5,302	9-JAN	3,611
1971	16-JAN	6,231	16-JAN	5,169	15-JAN	3,804	15-JAN	2,407	15-JAN	1,632
1972	23-JAN	1,958	22-JAN	1,632	28-FEB	1,399	28-FEB	1,059	27-FEB	811
1973	16-JAN	7,770	16-JAN	5,937	15-JAN	3,941	11-JAN	2,689	5-FEB	2,267
1974	16-JAN	21,982	15-JAN	13,026	15-JAN	8,194	13-JAN	4,842	27-DEC	3,213
1975	8-MAR	8,759	7-MAR	6,408	7-MAR	4,085	7-MAR	3,481	7-MAR	2,762
1976	26-FEB	2,211	8-APR	1,318	7-APR	1,103	7-APR	731	25-FEB	470
1977	15-MAR	439	9-MAY	290	8-MAY	224	22-JUL	197	7-JUL	190
1978	16-JAN	17,075	14-JAN	13,769	14-JAN	9,365	8-JAN	6,059	9-JAN	3,829
1979	27-MAR	4,785	27-MAR	3,249	27-MAR	1,936	26-MAR	1,189	7-MAR	874
1980	17-FEB	11,313	17-FEB	9,479	17-FEB	6,244	16-FEB	4,076	16-FEB	2,766
1981	28-JAN	7,180	27-JAN	3,976	22-JAN	2,812	22-JAN	1,822	22-JAN	1,391
1982	19-DEC	9,318	19-DEC	6,262	18-DEC	3,871	13-DEC	2,489	13-FEB	1,993
1983	2-MAR	19,714	1-MAR	17,735	27-FEB	12,196	27-FEB	8,303	27-FEB	5,913
1984	11-DEC	8,476	9-DEC	6,523	9-DEC	4,629	6-DEC	2,965	7-DEC	2,525
1985	12-NOV	3,735	11-NOV	2,917	10-NOV	1,826	10-NOV	1,269	10-NOV	989
1986	17-FEB	10,026	15-FEB	8,794	14-FEB	7,238	13-FEB	4,371	29-JAN	3,244
1987	5-MAR	4,140	5-MAR	2,537	5-MAR	1,466	5-MAR	1,377	3-MAR	906
1988	6-DEC	4,497	4-DEC	2,528	4-DEC	2,130	2-DEC	1,413	30-NOV	861
1989	10-MAR	6,176	9-MAR	5,425	8-MAR	3,516	6-MAR	2,420	5-MAR	1,896
1990	27-MAY	4,817	27-MAY	3,373	27-MAY	2,027	22-MAY	1,346	20-MAY	797

TABLE B.6-2

CLEAR CREEK NEAR IGO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1991	3-MAR	2,737	2-MAR	1,942	20-MAR	1,224	18-MAR	929	2-MAR	781
1992	12-FEB	6,280	12-FEB	5,133	10-FEB	4,171	10-FEB	3,082	10-FEB	2,091
1993	20-JAN	8,528	20-JAN	5,174	19-JAN	2,995	16-MAR	2,146	9-MAR	1,557
1994	24-JAN	1,589	23-JAN	1,352	23-JAN	892	17-FEB	666	23-JAN	577
1995	9-JAN	18,418	8-JAN	12,679	8-JAN	9,989	7-JAN	5,733	7-JAN	4,887
1996	12-DEC	4,545	29-FEB	2,989	17-FEB	2,499	17-FEB	2,189	4-FEB	1,830
1997	1-JAN	18,075	30-DEC	14,250	29-DEC	9,198	28-DEC	5,032	8-DEC	3,321
1998	7-FEB	14,556	6-FEB	12,809	3-FEB	10,263	1-FEB	7,022	27-JAN	5,519
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-3

COTTONWOOD CREEK NEAR COTTONWOOD
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1940	---	---	---	---	---	---	---	---	---	---
1941	1-MAR	29,000	28-FEB	22,700	27-FEB	15,946	23-FEB	9,964	6-FEB	8,616
1942	6-FEB	20,800	4-FEB	16,967	2-FEB	12,037	24-JAN	8,418	23-JAN	5,683
1943	21-JAN	18,500	21-JAN	15,167	21-JAN	8,817	21-JAN	5,595	21-JAN	3,502
1944	3-FEB	3,870	3-FEB	2,297	2-FEB	1,473	31-JAN	970	2-FEB	743
1945	2-FEB	6,440	1-FEB	6,080	31-JAN	3,937	31-JAN	2,736	31-JAN	1,770
1946	27-DEC	14,600	27-DEC	12,667	23-DEC	9,329	22-DEC	7,463	21-DEC	4,783
1947	12-FEB	10,400	12-FEB	5,603	12-FEB	2,968	3-MAR	1,996	12-FEB	1,733
1948	7-JAN	4,810	6-JAN	4,047	14-APR	2,827	9-APR	2,264	8-APR	1,973
1949	19-MAR	15,000	18-MAR	10,667	17-MAR	7,029	10-MAR	5,368	2-MAR	3,876
1950	6-FEB	6,910	5-FEB	4,387	4-FEB	2,860	4-FEB	1,863	19-JAN	1,501
1951	22-JAN	11,900	22-JAN	9,623	21-JAN	6,233	22-JAN	4,524	18-JAN	3,786
1952	27-DEC	24,400	27-DEC	14,583	27-DEC	7,913	27-DEC	4,523	27-DEC	4,342
1953	7-DEC	12,500	18-JAN	10,603	17-JAN	7,574	9-JAN	7,046	26-DEC	5,422
1954	28-JAN	14,500	28-JAN	9,580	28-JAN	5,847	17-JAN	5,109	17-JAN	4,234
1955	15-NOV	4,020	18-JAN	2,550	4-DEC	2,016	2-DEC	1,544	15-NOV	1,167
1956	22-DEC	36,900	21-DEC	20,943	18-DEC	15,837	18-DEC	8,878	19-DEC	7,329
1957	24-FEB	10,900	24-FEB	8,300	23-FEB	5,309	23-FEB	3,669	23-FEB	2,593
1958	19-FEB	34,400	18-FEB	20,900	19-FEB	16,344	12-FEB	13,626	29-JAN	10,661
1959	16-FEB	14,000	16-FEB	8,123	15-FEB	5,301	15-FEB	3,344	15-FEB	2,232
1960	8-FEB	19,400	7-FEB	12,683	5-FEB	7,550	1-FEB	4,921	28-JAN	2,818
1961	2-FEB	9,870	31-JAN	8,227	29-JAN	5,719	30-JAN	4,347	29-JAN	2,846
1962	15-FEB	11,200	13-FEB	8,287	13-FEB	5,957	8-FEB	3,915	9-FEB	2,877
1963	1-FEB	12,600	31-JAN	9,347	31-JAN	5,639	31-JAN	4,586	27-MAR	3,465
1964	21-JAN	4,760	20-JAN	3,690	20-JAN	2,142	20-JAN	1,390	20-JAN	947
1965	22-DEC	40,200	22-DEC	27,033	21-DEC	16,384	22-DEC	10,245	21-DEC	6,991
1966	5-JAN	9,200	4-JAN	6,813	4-JAN	4,404	4-JAN	2,670	4-JAN	1,775
1967	29-JAN	15,600	29-JAN	13,300	26-JAN	10,279	21-JAN	7,157	20-JAN	4,417
1968	20-FEB	13,200	20-FEB	10,307	19-FEB	8,176	17-FEB	5,220	29-JAN	3,554
1969	13-JAN	18,400	12-JAN	13,683	11-JAN	7,640	12-JAN	7,327	12-JAN	5,491
1970	24-JAN	31,900	22-JAN	22,633	21-JAN	17,291	14-JAN	13,234	9-JAN	8,341
1971	16-JAN	16,800	16-JAN	14,333	16-JAN	9,147	15-JAN	5,369	11-JAN	3,375
1972	23-JAN	3,450	3-MAR	2,443	29-FEB	2,279	28-FEB	1,636	26-FEB	1,163
1973	16-JAN	16,100	16-JAN	12,750	11-JAN	9,506	11-JAN	6,863	11-JAN	5,037
1974	16-JAN	54,300	15-JAN	33,500	15-JAN	20,087	14-JAN	11,137	27-DEC	7,165
1975	13-FEB	17,800	12-FEB	11,067	19-MAR	8,534	17-MAR	6,861	7-MAR	5,621
1976	27-FEB	2,250	27-FEB	1,887	26-FEB	1,617	26-FEB	1,099	26-FEB	705
1977	17-MAR	576	16-MAR	398	16-MAR	272	1-MAY	220	16-MAR	178
1978	16-JAN	22,300	14-JAN	18,967	14-JAN	14,291	5-JAN	9,993	9-JAN	6,409
1979	15-JAN	5,320	20-FEB	3,850	18-FEB	3,143	13-FEB	2,604	13-FEB	1,995
1980	18-FEB	20,800	17-FEB	18,833	17-FEB	12,591	16-FEB	8,044	16-FEB	5,385
1981	28-JAN	18,100	27-JAN	10,613	22-JAN	6,816	22-JAN	4,313	22-JAN	3,743
1982	19-DEC	34,000	19-DEC	21,160	18-DEC	11,944	18-DEC	6,997	13-DEC	4,778
1983	1-MAR	43,300	1-MAR	37,667	27-FEB	24,973	27-FEB	16,379	25-FEB	11,747
1984	25-DEC	19,300	25-DEC	14,267	24-DEC	9,477	18-DEC	6,129	7-DEC	5,803
1985	13-NOV	5,650	12-NOV	4,563	11-NOV	3,090	11-NOV	2,416	11-NOV	2,257
1986	17-FEB	38,100	17-FEB	26,467	14-FEB	19,743	13-FEB	11,581	14-FEB	7,997
1987	13-MAR	5,220	12-MAR	3,700	12-MAR	2,566	5-MAR	1,992	4-MAR	1,388
1988	4-JAN	7,340	3-JAN	4,080	4-JAN	3,023	3-JAN	2,525	3-JAN	1,834

TABLE B.6-3

COTTONWOOD CREEK NEAR COTTONWOOD
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1989	10-MAR	6,840	9-MAR	6,250	8-MAR	4,374	6-MAR	3,279	6-MAR	2,702
1990	28-MAY	3,020	28-MAY	1,967	8-JAN	1,497	8-JAN	1,034	8-JAN	656
1991	18-MAR	4,960	18-MAR	3,023	18-MAR	2,719	17-MAR	2,357	3-MAR	1,779
1992	12-FEB	8,560	15-MAR	5,157	11-FEB	3,816	11-FEB	3,513	11-FEB	2,436
1993	20-JAN	20,500	20-JAN	14,550	20-JAN	8,106	14-JAN	4,936	20-JAN	3,960
1994	20-FEB	2,440	20-FEB	1,797	17-FEB	1,337	17-FEB	999	7-FEB	881
1995	9-JAN	40,500	8-JAN	26,167	8-JAN	19,557	7-JAN	11,596	7-JAN	10,991
1996	5-FEB	10,600	4-FEB	8,103	4-FEB	6,076	27-JAN	5,087	16-JAN	4,661
1997	1-JAN	32,300	31-DEC	23,067	30-DEC	13,977	27-DEC	8,162	30-DEC	5,800
1998	3-FEB	32,900	6-FEB	24,133	3-FEB	20,386	3-FEB	14,657	26-JAN	12,249
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-4

COW CREEK NEAR MILLVILLE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1950	6-FEB	11,300	4-FEB	10,483	4-FEB	5,527	4-FEB	3,043	17-JAN	2,640
1951	14-DEC	9,540	4-FEB	6,507	3-DEC	4,113	3-DEC	3,484	10-JAN	2,548
1952	27-DEC	32,500	27-DEC	16,090	26-DEC	8,636	26-DEC	4,678	27-DEC	4,086
1953	10-DEC	8,310	17-JAN	7,277	17-JAN	5,056	7-JAN	4,626	26-DEC	3,595
1954	9-MAR	7,930	9-MAR	4,693	22-JAN	3,344	16-JAN	2,814	22-JAN	2,039
1955	15-NOV	8,680	14-NOV	3,946	4-DEC	2,759	2-DEC	1,849	12-NOV	1,414
1956	15-JAN	22,600	14-JAN	14,527	14-JAN	8,379	13-JAN	6,375	18-DEC	5,094
1957	4-MAR	5,360	4-MAR	5,100	3-MAR	3,279	23-FEB	2,947	21-FEB	2,155
1958	12-FEB	12,200	12-FEB	7,543	12-FEB	6,377	12-FEB	5,631	28-JAN	4,795
1959	16-FEB	15,200	16-FEB	7,153	16-FEB	4,967	15-FEB	2,869	25-JAN	1,834
1960	8-FEB	11,100	7-FEB	8,150	4-FEB	4,753	28-JAN	3,353	22-JAN	2,105
1961	1-DEC	16,400	1-DEC	7,130	9-FEB	4,454	29-JAN	3,526	29-JAN	2,355
1962	1-DEC	11,000	13-FEB	7,050	9-FEB	5,117	7-FEB	3,439	7-FEB	2,581
1963	12-OCT	14,100	6-APR	9,963	5-APR	6,300	5-APR	4,680	27-MAR	3,330
1964	20-JAN	6,040	19-JAN	4,073	19-JAN	2,478	17-JAN	1,526	17-JAN	913
1965	22-DEC	18,200	4-JAN	10,567	21-DEC	7,021	22-DEC	5,778	19-DEC	4,195
1966	5-JAN	17,300	4-JAN	11,883	3-JAN	6,139	28-DEC	3,684	25-DEC	2,043
1967	21-JAN	17,600	20-JAN	9,300	26-JAN	6,681	20-JAN	5,757	20-JAN	3,230
1968	15-JAN	9,320	21-FEB	6,630	17-FEB	5,860	17-FEB	3,811	29-JAN	2,595
1969	13-JAN	20,000	11-JAN	15,243	11-JAN	8,269	11-JAN	6,844	11-JAN	4,746
1970	19-DEC	20,500	19-DEC	14,933	21-JAN	11,203	13-JAN	9,187	9-JAN	5,960
1971	16-JAN	15,700	16-JAN	8,890	28-NOV	5,579	25-NOV	4,317	24-NOV	3,009
1972	29-FEB	4,610	21-JAN	3,597	26-FEB	2,976	23-FEB	2,417	23-FEB	1,646
1973	16-JAN	13,600	16-JAN	9,017	11-JAN	6,539	9-JAN	4,928	9-JAN	3,437
1974	15-JAN	22,900	15-JAN	18,200	13-JAN	13,093	12-JAN	7,482	27-DEC	5,086
1975	13-FEB	11,800	12-FEB	7,823	19-MAR	5,374	16-MAR	3,889	8-MAR	2,477
1976	29-FEB	10,000	28-FEB	6,520	27-FEB	3,910	26-FEB	2,202	16-FEB	1,303
1977	3-JAN	376	2-JAN	272	31-DEC	182	30-DEC	137	24-FEB	120
1978	9-JAN	16,700	9-JAN	8,777	9-JAN	7,001	5-JAN	5,131	9-JAN	3,578
1979	14-FEB	10,300	13-FEB	7,370	13-FEB	4,640	13-FEB	3,810	13-FEB	2,546
1980	24-DEC	15,900	13-JAN	10,473	12-JAN	7,856	9-JAN	4,626	23-DEC	4,028
1981	27-JAN	7,130	27-JAN	4,913	20-MAR	3,557	15-MAR	2,616	4-MAR	1,779
1982	16-NOV	19,500	15-NOV	10,797	13-FEB	6,530	18-DEC	4,881	9-DEC	3,817
1983	1-MAR	19,600	1-MAR	13,680	25-FEB	10,413	27-FEB	7,743	6-FEB	5,936
1984	25-DEC	15,400	24-DEC	11,887	24-DEC	7,746	24-DEC	4,480	3-DEC	4,103
1985	24-NOV	6,390	11-NOV	2,887	24-NOV	2,299	11-NOV	1,797	8-NOV	1,441
1986	17-FEB	21,400	17-FEB	13,777	14-FEB	10,624	12-FEB	6,907	12-FEB	5,442
1987	12-MAR	11,700	12-MAR	8,143	11-MAR	4,877	5-MAR	3,058	13-FEB	1,980
1988	4-JAN	7,960	3-JAN	4,767	3-JAN	3,744	3-JAN	2,740	3-JAN	1,643
1989	9-MAR	9,680	9-MAR	7,590	5-MAR	5,717	5-MAR	4,228	2-MAR	3,381
1990	8-JAN	9,010	7-JAN	5,223	7-JAN	3,396	7-JAN	2,191	7-JAN	1,312
1991	4-MAR	4,360	24-MAR	2,920	23-MAR	1,768	12-MAR	1,458	2-MAR	1,222
1992	19-FEB	5,190	19-FEB	4,050	16-FEB	3,267	11-FEB	2,620	10-FEB	1,565
1993	20-JAN	13,500	20-JAN	10,677	16-JAN	5,803	8-JAN	4,545	28-DEC	3,355
1994	10-FEB	3,380	19-FEB	2,523	17-FEB	1,991	7-FEB	1,687	6-FEB	1,329
1995	14-MAR	14,600	13-MAR	10,717	9-MAR	9,426	9-MAR	6,797	7-JAN	5,117
1996	4-FEB	9,930	4-FEB	6,627	18-FEB	3,956	16-JAN	3,153	16-JAN	2,747
1997	2-JAN	15,900	31-DEC	14,500	29-DEC	9,317	26-DEC	5,484	30-DEC	4,266
1998	3-FEB	18,500	1-FEB	10,983	12-JAN	9,111	1-FEB	6,766	10-JAN	6,403

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TABLE B.6-5

BATTLE CREEK BELOW COLEMAN FISH HATCHERY
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1940	---	---	---	---	---	---	---	---	---	---
1941	10-FEB	6,150	10-FEB	4,943	9-FEB	2,937	10-FEB	2,042	8-FEB	1,806
1942	6-FEB	7,140	5-FEB	4,237	2-FEB	2,853	24-JAN	2,413	23-JAN	1,701
1943	21-JAN	5,320	21-JAN	4,523	21-JAN	2,871	20-JAN	1,940	22-FEB	1,422
1944	3-FEB	948	2-FEB	756	2-FEB	570	30-JAN	479	24-APR	431
1945	14-FEB	1,770	1-FEB	1,207	1-FEB	987	1-FEB	906	31-JAN	699
1946	22-DEC	2,690	21-DEC	2,313	21-DEC	1,937	21-DEC	1,594	21-DEC	1,099
1947	2-APR	2,170	1-APR	1,537	1-APR	1,026	29-MAR	725	23-MAR	551
1948	23-MAR	3,800	23-MAR	2,163	10-APR	1,456	14-APR	1,251	8-APR	1,127
1949	11-MAR	2,080	10-MAR	1,619	10-MAR	1,011	10-MAR	857	2-MAR	679
1950	4-FEB	4,620	4-FEB	3,207	4-FEB	1,762	3-FEB	1,061	17-JAN	886
1951	22-JAN	3,120	21-JAN	2,200	3-DEC	1,454	3-DEC	1,292	16-NOV	962
1952	27-DEC	6,270	27-DEC	3,677	26-DEC	2,054	26-DEC	1,241	27-DEC	1,121
1953	19-MAY	2,190	18-JAN	1,680	9-JAN	1,484	7-JAN	1,372	26-DEC	1,048
1954	9-MAR	2,480	9-MAR	1,680	12-FEB	1,323	8-MAR	982	3-APR	878
1955	15-NOV	1,230	2-DEC	842	3-DEC	678	1-DEC	573	11-NOV	477
1956	15-JAN	5,820	14-JAN	4,830	14-JAN	3,077	13-JAN	2,385	18-DEC	2,043
1957	19-MAY	2,870	24-FEB	2,050	24-FEB	1,421	24-FEB	1,292	23-FEB	965
1958	24-FEB	4,390	24-FEB	3,040	19-FEB	2,136	12-FEB	1,889	29-JAN	1,515
1959	16-FEB	3,720	16-FEB	2,030	16-FEB	1,503	15-FEB	968	15-FEB	688
1960	7-FEB	2,880	7-FEB	2,137	7-FEB	1,256	1-FEB	894	22-JAN	604
1961	1-DEC	4,960	1-DEC	2,208	25-NOV	1,262	31-JAN	997	29-JAN	772
1962	1-DEC	3,260	13-FEB	1,890	12-FEB	1,416	8-FEB	1,054	8-FEB	815
1963	12-OCT	4,140	12-OCT	2,843	30-JAN	1,851	6-APR	1,487	6-APR	1,125
1964	20-JAN	1,900	20-JAN	1,222	20-JAN	829	18-JAN	601	18-JAN	473
1965	22-DEC	7,080	22-DEC	5,160	21-DEC	3,677	22-DEC	2,627	21-DEC	1,876
1966	5-JAN	939	4-FEB	754	1-FEB	607	30-MAR	561	28-MAR	523
1967	21-JAN	3,200	29-JAN	2,310	26-JAN	1,774	21-JAN	1,466	16-MAY	999
1968	15-JAN	3,450	14-JAN	2,497	19-FEB	1,816	17-FEB	1,289	17-FEB	982
1969	21-JAN	6,310	19-JAN	5,357	19-JAN	3,537	12-JAN	2,684	12-JAN	1,924
1970	24-JAN	9,800	22-JAN	7,723	21-JAN	5,317	14-JAN	3,986	9-JAN	2,639
1971	28-NOV	4,180	28-NOV	2,687	28-NOV	2,046	27-NOV	1,626	25-NOV	1,225
1972	3-MAR	1,710	3-MAR	1,292	28-FEB	1,169	26-FEB	950	26-FEB	805
1973	16-JAN	3,510	16-JAN	2,453	11-JAN	1,746	9-JAN	1,417	9-JAN	1,084
1974	16-JAN	10,900	15-JAN	7,373	15-JAN	4,729	12-JAN	2,877	28-DEC	1,910
1975	13-FEB	2,720	12-FEB	1,913	8-FEB	1,546	1-FEB	1,244	1-FEB	937
1976	29-FEB	1,860	29-FEB	1,350	28-FEB	989	27-FEB	714	27-FEB	561
1977	3-JAN	496	2-JAN	402	2-JAN	322	1-JAN	286	1-JAN	270
1978	4-MAR	3,840	14-JAN	2,837	2-MAR	2,004	5-JAN	1,599	4-MAR	1,146
1979	14-FEB	2,650	13-FEB	1,723	13-FEB	1,358	13-FEB	1,032	13-FEB	814
1980	13-JAN	5,370	12-JAN	4,100	12-JAN	2,814	11-JAN	1,791	23-DEC	1,392
1981	27-JAN	2,530	27-JAN	1,933	26-JAN	1,156	21-JAN	800	23-JAN	702
1982	16-NOV	6,380	15-NOV	3,550	13-NOV	2,092	14-NOV	1,736	9-DEC	1,216
1983	1-MAR	6,390	1-MAR	4,457	27-FEB	3,021	28-FEB	2,351	25-FEB	1,894
1984	25-DEC	6,220	24-DEC	4,870	24-DEC	3,346	24-DEC	2,205	9-DEC	1,698
1985	11-DEC	1,690	10-DEC	1,109	10-DEC	810	11-NOV	687	12-NOV	650
1986	17-FEB	6,700	17-FEB	5,237	14-FEB	4,379	12-FEB	2,848	12-FEB	2,252
1987	12-MAR	2,760	12-MAR	2,087	11-MAR	1,343	5-MAR	1,016	5-MAR	769
1988	4-JAN	2,260	3-JAN	1,470	3-JAN	1,081	3-JAN	862	3-JAN	660

TABLE B.6-5

BATTLE CREEK BELOW COLEMAN FISH HATCHERY
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1989	9-MAR	4,620	9-MAR	3,927	8-MAR	2,533	6-MAR	1,740	5-MAR	1,441
1990	13-JAN	1,100	23-OCT	858	12-JAN	743	7-JAN	639	7-JAN	488
1991	4-MAR	1,470	3-MAR	988	23-MAR	684	13-MAR	612	3-MAR	555
1992	12-FEB	1,480	11-FEB	1,056	10-FEB	862	10-FEB	697	10-FEB	539
1993	19-FEB	3,100	18-FEB	2,283	17-FEB	1,610	13-JAN	1,305	15-MAR	1,050
1994	7-FEB	1,140	18-FEB	872	17-FEB	714	7-FEB	643	7-FEB	561
1995	29-APR	6,430	8-JAN	4,950	8-JAN	3,679	7-JAN	2,464	7-JAN	2,048
1996	4-FEB	3,230	4-FEB	2,257	18-FEB	1,559	17-FEB	1,178	27-JAN	1,152
1997	---	---	---	---	---	---	---	---	---	---
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-6

SACRAMENTO RIVER AT BEND BRIDGE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1890	---	---	---	---	---	---	---	---	---	---
1891	---	---	---	---	---	---	---	---	---	---
1892	---	---	---	---	---	---	---	---	---	---
1893	24-DEC	156,000	24-DEC	154,667	23-DEC	119,057	23-DEC	71,927	11-MAR	48,864
1894	15-JAN	150,000	15-JAN	87,000	15-JAN	54,014	14-JAN	39,247	14-JAN	28,550
1895	22-JAN	117,000	21-JAN	87,533	18-JAN	60,693	12-JAN	50,003	30-DEC	40,886
1896	27-JAN	128,000	18-JAN	106,467	17-JAN	97,100	16-JAN	84,380	15-JAN	52,230
1897	15-DEC	90,000	4-FEB	78,933	1-FEB	68,771	29-JAN	50,960	29-JAN	36,513
1898	28-FEB	37,500	27-FEB	27,133	25-FEB	20,729	24-FEB	15,827	6-FEB	14,093
1899	25-MAR	83,400	24-MAR	64,833	23-MAR	44,429	16-MAR	32,787	15-MAR	23,170
1900	8-MAR	123,000	1-JAN	84,800	1-JAN	64,971	1-JAN	46,007	30-DEC	30,400
1901	20-FEB	102,000	20-FEB	81,667	20-FEB	74,429	19-FEB	57,413	16-FEB	39,997
1902	24-FEB	151,000	24-FEB	148,667	22-FEB	106,643	12-FEB	83,960	8-FEB	74,780
1903	25-JAN	131,000	25-JAN	94,900	23-JAN	68,714	22-JAN	45,380	8-MAR	33,574
1904	16-FEB	177,000	8-MAR	111,033	15-MAR	91,857	7-MAR	88,287	22-FEB	81,267
1905	23-JAN	108,000	23-JAN	83,767	21-JAN	63,157	22-JAN	51,073	14-JAN	40,693
1906	31-MAR	137,000	30-MAR	87,767	25-MAR	75,429	22-MAR	61,967	12-MAR	45,713
1907	20-MAR	184,000	19-MAR	157,667	18-MAR	126,371	17-MAR	83,420	17-MAR	61,463
1908	9-FEB	83,300	8-FEB	53,767	5-FEB	42,286	1-FEB	33,440	14-JAN	29,857
1909	3-FEB	232,000	2-FEB	162,333	16-JAN	136,786	14-JAN	101,093	8-JAN	89,437
1910	9-DEC	90,800	24-FEB	59,633	24-FEB	46,557	24-FEB	38,260	24-FEB	33,210
1911	7-MAR	130,000	6-MAR	85,233	5-MAR	60,900	5-MAR	42,240	5-MAR	35,343
1912	26-JAN	55,000	25-JAN	40,767	25-JAN	27,043	6-MAR	19,407	29-APR	15,957
1913	18-JAN	58,000	14-JAN	45,900	14-JAN	41,457	13-JAN	26,960	13-JAN	19,533
1914	21-FEB	153,000	31-DEC	139,333	31-DEC	100,600	14-JAN	76,733	31-DEC	70,393
1915	2-FEB	228,000	1-FEB	146,867	29-JAN	95,629	28-JAN	70,687	28-JAN	56,530
1916	11-FEB	91,300	23-JAN	76,267	6-FEB	64,800	5-FEB	51,773	23-JAN	43,013
1917	25-FEB	176,000	24-FEB	107,933	24-FEB	61,729	22-FEB	36,480	22-FEB	23,545
1918	19-MAR	52,100	18-MAR	35,633	18-MAR	26,600	18-MAR	24,387	18-MAR	19,657
1919	11-FEB	118,000	9-FEB	92,767	9-FEB	60,829	7-FEB	40,813	7-FEB	33,387
1920	16-APR	28,500	15-APR	25,167	15-APR	18,657	9-APR	15,301	22-MAR	11,968
1921	19-NOV	104,000	18-NOV	79,000	25-JAN	58,114	17-JAN	47,580	17-JAN	37,290
1922	20-FEB	47,500	19-FEB	38,800	19-FEB	31,429	17-FEB	25,280	9-FEB	18,861
1923	28-DEC	36,600	6-APR	29,733	5-APR	25,014	3-APR	19,133	2-APR	14,421
1924	8-FEB	47,300	7-FEB	28,167	7-FEB	17,567	28-JAN	11,819	27-JAN	8,985
1925	12-FEB	115,000	11-FEB	97,233	8-FEB	71,600	3-FEB	57,300	31-JAN	43,100
1926	5-FEB	82,900	4-FEB	66,700	3-FEB	48,929	29-JAN	37,127	29-JAN	29,097
1927	21-FEB	137,000	20-FEB	101,600	18-FEB	80,857	16-FEB	59,187	3-FEB	45,730
1928	27-MAR	140,000	26-MAR	92,900	24-MAR	65,386	24-MAR	47,980	23-MAR	32,997
1929	4-FEB	57,800	3-FEB	38,400	2-FEB	25,957	29-JAN	16,549	28-JAN	11,260
1930	16-DEC	73,900	14-DEC	60,400	12-DEC	43,729	22-FEB	28,727	20-FEB	22,350
1931	23-JAN	31,500	23-JAN	19,810	22-JAN	12,650	12-MAR	9,299	23-JAN	8,074
1932	27-DEC	80,800	26-DEC	51,800	24-DEC	37,486	22-DEC	24,851	23-DEC	16,931
1933	28-MAR	44,800	28-MAR	34,633	13-MAR	24,957	16-MAR	21,513	12-MAR	18,468
1934	2-JAN	55,400	1-JAN	47,100	29-DEC	38,300	29-DEC	23,412	12-DEC	15,030
1935	8-APR	98,200	7-APR	70,100	5-APR	52,371	4-APR	41,867	3-APR	31,300
1936	22-FEB	120,000	21-FEB	95,767	19-FEB	66,529	15-FEB	47,667	13-FEB	32,023
1937	13-MAR	66,600	12-MAR	49,467	12-MAR	34,714	12-MAR	32,333	10-MAR	25,543
1938	11-DEC	225,000	11-DEC	147,133	10-DEC	91,286	13-MAR	67,120	28-FEB	52,313

TABLE B.6-6

SACRAMENTO RIVER AT BEND BRIDGE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1939	13-MAR	38,200	13-MAR	28,633	13-MAR	20,300	13-MAR	15,980	9-MAR	12,690
1940	28-FEB	261,000	27-FEB	196,333	27-FEB	121,986	25-FEB	72,100	4-FEB	49,877
1941	1-MAR	129,000	28-FEB	105,100	21-DEC	88,700	18-DEC	59,607	8-FEB	53,590
1942	6-FEB	181,000	5-FEB	140,667	2-FEB	107,614	25-JAN	84,420	23-JAN	57,993
1943	23-JAN	105,000	21-JAN	95,433	21-JAN	66,114	21-JAN	48,287	21-JAN	32,330
1944	3-FEB	28,300	2-FEB	17,767	1-FEB	11,176	1-FEB	8,563	2-FEB	6,957
1945	1-FEB	79,279	1-FEB	67,872	31-JAN	48,608	31-JAN	35,641	24-JAN	24,821
1946	28-DEC	129,003	27-DEC	116,480	3-JAN	83,581	27-DEC	65,124	22-DEC	42,411
1947	12-FEB	61,450	12-FEB	40,005	11-FEB	25,045	3-MAR	21,313	12-FEB	17,820
1948	29-APR	81,783	29-APR	63,822	28-APR	43,882	26-APR	31,759	14-APR	29,615
1949	11-MAR	67,633	10-MAR	61,433	10-MAR	49,101	10-MAR	43,148	2-MAR	32,019
1950	6-FEB	59,877	4-FEB	46,333	4-FEB	31,974	4-FEB	22,347	17-JAN	20,212
1951	14-DEC	72,806	14-DEC	54,167	14-DEC	41,368	5-FEB	36,581	22-JAN	31,169
1952	27-DEC	161,458	27-DEC	105,406	6-FEB	64,352	1-FEB	38,712	24-JAN	32,278
1953	17-JAN	105,078	20-JAN	80,554	17-JAN	69,758	11-JAN	65,607	30-DEC	47,372
1954	28-JAN	105,805	17-FEB	68,208	14-FEB	51,646	20-JAN	40,278	23-JAN	34,093
1955	6-DEC	48,666	5-DEC	34,279	4-DEC	26,150	2-DEC	18,707	30-JUN	15,068
1956	15-JAN	222,405	14-JAN	176,274	12-JAN	134,691	7-JAN	86,218	22-DEC	72,719
1957	5-MAR	89,678	4-MAR	87,041	1-MAR	59,963	24-FEB	45,155	24-FEB	34,505
1958	19-FEB	157,216	19-FEB	117,072	19-FEB	98,577	12-FEB	91,404	31-JAN	79,203
1959	16-FEB	96,200	16-FEB	69,140	16-FEB	51,972	15-FEB	34,320	28-JAN	23,967
1960	8-FEB	120,569	7-FEB	81,330	7-FEB	53,320	1-FEB	38,804	22-JAN	26,550
1961	1-DEC	83,170	1-DEC	51,437	9-FEB	39,158	9-FEB	34,533	30-JAN	26,033
1962	15-FEB	100,997	13-FEB	91,086	13-FEB	71,915	9-FEB	52,668	9-FEB	36,910
1963	14-APR	94,630	14-APR	76,641	11-APR	60,778	6-APR	55,599	6-APR	43,510
1964	21-JAN	83,171	20-JAN	55,721	20-JAN	34,536	20-JAN	22,752	19-JAN	16,475
1965	22-DEC	277,313	22-DEC	186,654	22-DEC	125,082	22-DEC	77,666	22-DEC	59,841
1966	5-JAN	94,352	4-JAN	69,695	4-JAN	44,699	4-JAN	28,859	29-DEC	20,816
1967	31-JAN	96,792	30-JAN	86,276	29-JAN	64,082	26-JAN	47,939	21-JAN	33,802
1968	25-FEB	77,296	25-FEB	72,337	23-FEB	58,796	17-FEB	44,361	17-FEB	31,841
1969	22-JAN	140,348	22-JAN	107,686	22-JAN	74,897	19-JAN	63,329	21-JAN	49,994
1970	27-JAN	247,073	23-JAN	206,491	22-JAN	157,221	20-JAN	121,413	14-JAN	81,762
1971	4-DEC	109,181	4-DEC	82,814	4-DEC	60,917	28-NOV	45,656	25-NOV	33,571
1972	3-MAR	47,311	3-MAR	39,466	3-MAR	37,756	3-MAR	30,399	23-FEB	24,721
1973	18-JAN	124,290	18-JAN	92,405	16-JAN	63,897	11-JAN	47,652	16-JAN	36,782
1974	1-APR	311,537	30-MAR	211,917	29-MAR	148,425	15-JAN	91,107	7-JAN	61,088
1975	19-MAR	105,619	19-MAR	79,028	19-MAR	58,990	14-MAR	48,072	7-MAR	38,966
1976	29-FEB	39,489	28-FEB	32,145	26-FEB	27,585	5-JUN	19,035	5-JUN	14,300
1977	1-JUL	11,516	30-JUN	9,765	26-JUN	8,122	24-JUN	7,515	25-JUN	7,302
1978	16-JAN	169,060	15-JAN	144,144	8-MAR	107,764	3-MAR	79,160	3-MAR	53,238
1979	15-JAN	47,399	14-JAN	38,889	11-JAN	28,898	13-FEB	25,746	1-JUL	20,676
1980	19-FEB	136,951	19-FEB	125,512	18-FEB	97,966	18-FEB	66,472	17-FEB	48,958
1981	28-JAN	74,874	27-JAN	52,773	21-MAR	36,249	21-MAR	25,787	4-JUL	21,338
1982	19-DEC	155,633	20-FEB	116,277	16-FEB	73,388	16-FEB	52,740	13-DEC	41,430
1983	1-MAR	208,203	1-MAR	174,333	1-MAR	126,249	1-MAR	102,398	25-FEB	80,312
1984	25-DEC	118,326	25-DEC	96,121	21-DEC	69,879	13-DEC	48,775	7-DEC	46,796
1985	24-NOV	41,253	24-NOV	35,237	22-NOV	24,961	14-NOV	20,879	13-NOV	18,597
1986	17-FEB	213,974	17-FEB	175,038	17-FEB	143,404	15-FEB	95,854	15-FEB	72,435
1987	13-MAR	66,352	12-MAR	57,008	11-MAR	40,156	7-JUL	31,015	2-JUL	22,026
1988	4-JAN	47,567	3-JAN	37,610	4-JAN	32,663	18-JUL	25,115	4-JUL	17,712

TABLE B.6-6

SACRAMENTO RIVER AT BEND BRIDGE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1989	9-MAR	105,012	9-MAR	94,852	6-MAR	66,897	5-MAR	47,386	18-JUL	37,333
1990	8-JAN	42,846	7-JAN	35,127	8-JAN	29,187	3-AUG	21,041	24-JUL	13,926
1991	4-MAR	45,087	3-MAR	35,258	21-MAR	22,277	9-JUL	16,635	7-JUL	16,172
1992	16-MAR	59,668	16-MAR	48,467	15-FEB	38,241	11-FEB	35,291	10-FEB	24,539
1993	24-MAR	110,303	24-MAR	87,224	23-MAR	61,200	17-MAR	53,045	16-MAR	39,528
1994	24-JAN	25,932	24-JAN	19,790	17-FEB	16,514	17-FEB	14,233	6-FEB	12,565
1995	15-MAR	212,565	14-MAR	157,513	13-MAR	140,091	9-MAR	92,088	9-MAR	70,939
1996	24-FEB	97,329	24-FEB	87,940	20-FEB	67,989	19-FEB	49,767	13-FEB	42,951
1997	1-JAN	309,419	31-DEC	241,491	30-DEC	160,307	30-DEC	95,254	29-DEC	61,707
1998	3-FEB	149,049	5-FEB	124,322	2-FEB	113,538	1-FEB	86,580	26-JAN	72,821
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TABLE B.6-7

MILL CREEK NEAR LOS MOLINOS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1925	---	---	---	---	---	---	---	---	---	---
1926	---	---	---	---	---	---	---	---	---	---
1927	---	---	---	---	---	---	---	---	---	---
1928	---	---	---	---	---	---	---	---	---	---
1929	3-FEB	965	2-FEB	719	2-FEB	473	10-MAY	304	22-APR	292
1930	15-DEC	4,080	14-DEC	2,403	12-DEC	1,564	10-DEC	942	10-DEC	592
1931	23-JAN	1,200	22-JAN	647	22-JAN	379	11-MAR	300	11-MAR	236
1932	27-DEC	2,160	26-DEC	1,385	23-DEC	1,067	21-DEC	783	21-DEC	480
1933	28-MAR	662	30-MAY	480	26-MAY	424	27-MAY	370	20-MAY	330
1934	29-DEC	1,730	29-DEC	1,297	29-DEC	966	29-DEC	548	12-DEC	371
1935	4-JAN	2,300	7-APR	1,470	4-APR	1,090	4-APR	903	3-APR	759
1936	21-FEB	2,660	21-FEB	1,923	10-JAN	1,317	12-FEB	1,091	12-FEB	716
1937	4-FEB	1,540	4-FEB	902	21-MAR	667	11-MAR	592	1-MAY	519
1938	11-DEC	12,300	10-DEC	7,337	10-DEC	3,734	10-DEC	1,939	16-NOV	1,317
1939	3-DEC	594	8-MAR	453	20-MAR	359	18-MAR	338	8-MAR	329
1940	27-FEB	7,640	27-FEB	6,153	26-FEB	3,441	25-FEB	1,869	3-FEB	1,196
1941	11-FEB	5,980	10-FEB	4,727	8-FEB	2,568	8-FEB	1,544	8-FEB	1,313
1942	6-FEB	5,690	5-FEB	3,253	2-FEB	2,263	24-JAN	1,781	22-JAN	1,166
1943	23-JAN	3,770	21-JAN	3,057	21-JAN	1,971	21-JAN	1,267	22-FEB	826
1944	4-MAR	1,720	3-MAR	893	29-FEB	616	28-FEB	449	29-APR	373
1945	5-FEB	1,580	1-FEB	1,263	1-FEB	1,052	1-FEB	775	31-JAN	543
1946	27-DEC	3,100	27-DEC	2,320	21-DEC	1,807	21-DEC	1,431	21-DEC	891
1947	12-FEB	2,590	11-FEB	1,380	11-FEB	805	10-FEB	482	11-FEB	396
1948	23-MAR	3,650	23-MAR	2,042	23-MAR	1,090	15-APR	863	8-APR	769
1949	11-MAR	1,810	10-MAR	1,300	10-MAR	778	2-MAR	622	2-MAR	476
1950	4-FEB	3,210	4-FEB	2,360	4-FEB	1,283	3-FEB	744	17-JAN	605
1951	22-JAN	2,120	19-NOV	1,541	16-NOV	1,190	3-DEC	998	16-NOV	843
1952	1-DEC	3,040	1-FEB	2,333	31-JAN	1,511	24-JAN	1,127	27-APR	858
1953	9-JAN	5,240	8-JAN	3,203	8-JAN	2,303	7-JAN	1,664	26-DEC	1,079
1954	5-APR	2,290	4-APR	1,870	4-APR	1,229	4-APR	884	4-APR	763
1955	15-NOV	1,060	9-DEC	566	4-DEC	529	7-MAY	436	2-MAY	402
1956	22-DEC	6,770	21-DEC	5,057	19-DEC	3,771	18-DEC	2,415	19-DEC	1,883
1957	24-FEB	3,840	24-FEB	2,630	23-FEB	1,660	23-FEB	1,162	22-FEB	807
1958	24-FEB	3,580	24-FEB	2,533	19-FEB	1,673	12-FEB	1,557	29-JAN	1,291
1959	16-FEB	2,740	16-FEB	1,960	16-FEB	1,299	15-FEB	812	14-FEB	551
1960	8-FEB	3,070	8-FEB	1,707	7-FEB	1,004	1-FEB	703	22-JAN	474
1961	31-JAN	2,220	31-JAN	1,493	31-JAN	924	31-JAN	822	30-JAN	561
1962	13-FEB	2,250	13-FEB	2,147	9-FEB	1,656	7-FEB	1,060	8-FEB	697
1963	12-OCT	7,220	12-OCT	4,713	11-OCT	2,424	30-JAN	1,319	27-MAR	952
1964	20-JAN	2,020	20-JAN	1,327	20-JAN	792	20-JAN	513	19-JAN	348
1965	22-DEC	12,800	21-DEC	8,200	21-DEC	4,759	21-DEC	2,694	19-DEC	1,869
1966	4-JAN	1,140	4-JAN	881	4-JAN	570	30-MAR	532	29-MAR	469
1967	29-JAN	3,090	29-JAN	2,790	27-JAN	1,753	21-JAN	1,281	8-MAY	887
1968	15-JAN	2,440	20-FEB	1,650	19-FEB	1,348	17-FEB	914	29-JAN	672
1969	21-JAN	6,880	20-JAN	4,603	20-JAN	2,936	12-JAN	2,153	12-JAN	1,416
1970	23-JAN	8,840	22-JAN	6,363	21-JAN	4,154	13-JAN	3,195	9-JAN	1,949
1971	28-NOV	3,540	28-NOV	2,313	28-NOV	1,729	27-NOV	1,223	25-NOV	802
1972	3-MAR	1,180	3-MAR	934	28-FEB	831	28-FEB	657	25-FEB	542
1973	16-JAN	3,490	16-JAN	2,477	12-JAN	1,634	9-JAN	1,156	9-JAN	793
1974	15-JAN	7,640	15-JAN	5,877	14-JAN	3,696	12-JAN	2,114	27-DEC	1,364

TABLE B.6-7

MILL CREEK NEAR LOS MOLINOS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1975	13-FEB	2,490	12-FEB	1,627	8-FEB	1,299	1-FEB	879	10-MAY	753
1976	29-FEB	1,230	28-FEB	898	27-FEB	623	26-FEB	417	26-FEB	310
1977	3-JAN	171	2-JAN	149	2-JAN	117	14-FEB	104	9-FEB	101
1978	16-JAN	3,980	14-JAN	2,930	14-JAN	1,936	5-JAN	1,497	23-DEC	946
1979	14-FEB	2,140	13-FEB	1,401	13-FEB	997	13-FEB	708	13-FEB	544
1980	13-JAN	5,960	12-JAN	4,493	12-JAN	2,889	10-JAN	1,651	23-DEC	1,168
1981	27-JAN	1,930	27-JAN	1,693	23-JAN	1,109	20-JAN	679	23-JAN	514
1982	16-NOV	5,900	15-NOV	3,833	13-NOV	2,223	13-NOV	1,708	13-NOV	1,050
1983	1-MAR	4,670	1-MAR	3,510	27-FEB	2,344	28-FEB	1,819	27-FEB	1,348
1984	25-DEC	4,050	24-DEC	3,133	24-DEC	2,172	24-DEC	1,378	8-DEC	1,133
1985	8-FEB	899	11-NOV	574	11-NOV	408	3-APR	383	24-MAR	330
1986	17-FEB	8,440	15-FEB	5,780	14-FEB	4,663	12-FEB	2,704	12-FEB	1,900
1987	12-MAR	3,010	12-MAR	2,310	12-MAR	1,357	5-MAR	934	5-MAR	616
1988	4-JAN	1,390	3-JAN	925	3-JAN	615	3-JAN	492	3-JAN	354
1989	11-MAR	4,220	9-MAR	3,577	8-MAR	2,167	6-MAR	1,372	6-MAR	1,022
1990	23-OCT	1,140	13-JAN	691	27-MAY	531	27-MAY	394	20-MAY	290
1991	4-MAR	1,880	3-MAR	1,345	2-MAR	753	2-MAR	567	2-MAR	482
1992	12-FEB	1,320	11-FEB	1,040	11-FEB	928	10-FEB	749	10-FEB	537
1993	19-FEB	2,910	20-JAN	1,847	17-MAR	1,203	13-JAN	1,031	14-MAR	782
1994	14-DEC	982	13-DEC	528	8-DEC	475	7-FEB	357	7-FEB	322
1995	9-JAN	5,650	8-JAN	4,417	8-JAN	3,404	7-JAN	2,042	7-JAN	1,463
1996	21-FEB	2,940	19-FEB	2,070	18-FEB	1,461	16-FEB	955	4-FEB	874
1997	1-JAN	14,400	31-DEC	10,200	29-DEC	5,843	26-DEC	3,243	29-DEC	2,045
1998	3-FEB	4,000	2-FEB	2,310	2-FEB	1,986	26-JAN	1,421	11-JAN	1,311
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-8

ELDER CREEK NEAR PASKENTA
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1945	---	---	---	---	---	---	---	---	---	---
1946	---	---	---	---	---	---	---	---	---	---
1947	---	---	---	---	---	---	---	---	---	---
1948	---	---	---	---	---	---	---	---	---	---
1949	10-MAR	2,000	10-MAR	1,507	10-MAR	902	9-MAR	677	2-MAR	483
1950	5-FEB	462	4-FEB	383	4-FEB	230	4-FEB	154	18-JAN	135
1951	21-JAN	1,360	21-JAN	880	21-JAN	550	21-JAN	393	18-JAN	341
1952	1-FEB	3,180	1-FEB	1,632	1-FEB	868	24-JAN	484	11-JAN	427
1953	9-JAN	1,880	7-JAN	1,177	7-JAN	811	7-JAN	638	1-JAN	438
1954	17-JAN	2,150	16-JAN	1,437	16-JAN	771	16-JAN	754	16-JAN	571
1955	21-APR	798	21-APR	402	21-APR	255	20-APR	175	20-APR	133
1956	21-FEB	3,870	20-FEB	3,077	20-FEB	2,215	13-JAN	1,222	1-JAN	918
1957	24-FEB	2,850	23-FEB	1,992	23-FEB	1,040	23-FEB	575	23-FEB	365
1958	19-FEB	5,880	18-FEB	4,250	18-FEB	2,792	12-FEB	2,044	29-JAN	1,587
1959	16-FEB	1,920	15-FEB	1,157	14-FEB	657	14-FEB	380	14-FEB	251
1960	8-FEB	3,080	7-FEB	2,070	5-FEB	1,069	1-FEB	654	24-JAN	368
1961	2-FEB	1,200	31-JAN	887	29-JAN	638	29-JAN	445	26-JAN	296
1962	13-FEB	1,440	13-FEB	940	9-FEB	611	7-FEB	406	8-FEB	321
1963	31-JAN	2,600	31-JAN	1,527	30-JAN	825	31-JAN	759	30-JAN	474
1964	20-JAN	693	20-JAN	363	20-JAN	206	20-JAN	140	20-JAN	95
1965	5-JAN	7,650	5-JAN	4,673	3-JAN	2,522	8-APR	1,351	8-APR	971
1966	4-JAN	2,220	4-JAN	1,633	4-JAN	902	3-JAN	504	3-JAN	307
1967	29-JAN	2,600	29-JAN	1,910	26-JAN	1,387	20-JAN	987	20-JAN	612
1968	14-JAN	1,130	19-FEB	908	17-FEB	690	16-FEB	468	29-JAN	336
1969	20-JAN	2,340	19-JAN	1,847	19-JAN	1,125	12-JAN	964	19-JAN	678
1970	23-JAN	3,810	22-JAN	2,683	21-JAN	2,119	14-JAN	1,608	9-JAN	965
1971	26-MAR	1,740	16-JAN	1,387	15-JAN	924	15-JAN	545	15-JAN	346
1972	23-JAN	270	28-FEB	197	28-FEB	172	28-FEB	136	26-FEB	104
1973	16-JAN	2,020	16-JAN	1,538	12-JAN	1,058	11-JAN	746	11-JAN	571
1974	16-JAN	5,860	15-JAN	3,513	14-JAN	2,173	13-JAN	1,218	1-JAN	709
1975	7-MAR	3,670	7-MAR	1,908	7-MAR	1,066	7-MAR	832	7-MAR	660
1976	8-APR	200	8-APR	140	8-APR	101	8-APR	67	7-APR	48
1977	16-MAR	214	16-MAR	104	16-MAR	60	15-MAR	41	15-MAR	30
1978	14-JAN	3,570	14-JAN	3,073	13-JAN	2,023	4-JAN	1,338	9-JAN	860
1979	27-MAR	2,350	27-MAR	1,054	27-MAR	548	21-MAR	327	6-MAR	227
1980	17-FEB	3,450	17-FEB	2,613	16-FEB	1,853	16-FEB	1,102	15-FEB	703
1981	28-JAN	2,430	27-JAN	1,559	22-JAN	1,122	22-JAN	623	22-JAN	426
1982	15-FEB	2,790	14-FEB	1,787	14-FEB	1,036	15-FEB	621	14-FEB	420
1983	2-MAR	6,000	28-FEB	5,107	27-FEB	3,350	27-FEB	2,117	25-FEB	1,411
1984	1-JAN	2,910	1-JAN	2,105	1-JAN	1,223	1-JAN	722	1-JAN	692
1985	8-FEB	850	8-FEB	513	8-FEB	329	1-APR	237	25-MAR	218
1986	17-FEB	5,820	16-FEB	3,747	14-FEB	3,199	13-FEB	1,771	14-FEB	1,144
1987	5-MAR	760	12-MAR	389	12-MAR	238	5-MAR	217	13-FEB	140
1988	4-JAN	1,170	3-JAN	640	3-JAN	494	3-JAN	324	3-JAN	231
1989	9-MAR	754	9-MAR	644	6-MAR	435	6-MAR	314	5-MAR	274
1990	27-MAY	569	27-MAY	313	27-MAY	177	27-MAY	99	7-JAN	57
1991	4-MAR	838	3-MAR	621	17-MAR	356	17-MAR	313	3-MAR	250
1992	15-MAR	2,210	10-FEB	1,256	10-FEB	831	10-FEB	588	10-FEB	404
1993	20-JAN	3,950	20-JAN	2,000	19-JAN	1,037	13-JAN	640	20-JAN	516

TABLE B.6-8

ELDER CREEK NEAR PASKENTA
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1994	7-FEB	366	6-FEB	183	17-FEB	153	7-FEB	114	6-FEB	99
1995	9-JAN	5,110	8-JAN	3,743	8-JAN	2,552	8-JAN	1,521	7-JAN	1,377
1996	5-FEB	1,140	4-FEB	954	4-FEB	632	19-FEB	514	4-FEB	475
1997	1-JAN	4,480	1-JAN	3,267	1-JAN	2,068	1-JAN	1,140	1-JAN	754
1998	7-FEB	3,450	5-FEB	3,060	2-FEB	2,393	1-FEB	1,541	26-JAN	1,249
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-9

THOMES CREEK AT PASKENTA
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1920	---	---	---	---	---	---	---	---	---	---
1921	1-JAN	6,980	1-JAN	3,160	1-JAN	2,234	24-DEC	1,683	1-NOV	1,500
1922	27-DEC	4,020	17-FEB	1,843	27-DEC	1,234	23-APR	1,052	3-APR	985
1923	28-DEC	3,790	27-DEC	2,287	27-DEC	1,764	25-DEC	1,208	25-DEC	801
1924	7-FEB	1,380	7-FEB	938	2-FEB	666	1-FEB	450	31-JAN	306
1925	5-FEB	10,100	4-FEB	7,817	3-FEB	4,283	30-JAN	2,611	26-JAN	1,628
1926	4-FEB	9,200	4-FEB	4,730	2-FEB	2,802	29-JAN	1,769	29-JAN	1,118
1927	21-FEB	7,680	19-FEB	5,687	18-FEB	4,109	18-FEB	2,556	16-FEB	1,794
1928	26-MAR	8,100	25-MAR	5,733	25-MAR	3,443	23-MAR	2,258	22-MAR	1,447
1929	25-DEC	1,420	3-FEB	775	25-DEC	471	25-DEC	349	25-DEC	220
1930	14-DEC	3,680	13-DEC	2,710	10-DEC	1,886	10-DEC	1,154	10-DEC	623
1931	23-JAN	2,040	22-JAN	1,077	18-MAR	633	12-MAR	425	22-JAN	293
1932	19-MAR	1,360	18-MAR	1,025	18-MAR	756	11-MAR	633	26-FEB	585
1933	4-APR	930	3-APR	851	2-APR	718	2-APR	545	1-APR	463
1934	28-MAR	1,330	28-MAR	1,039	29-DEC	644	26-DEC	403	29-DEC	303
1935	8-APR	2,230	7-APR	1,780	3-APR	1,314	3-APR	1,118	1-APR	916
1936	15-JAN	6,220	14-JAN	4,150	10-JAN	2,859	12-FEB	1,722	12-FEB	1,214
1937	14-APR	1,940	13-APR	1,790	13-APR	1,221	13-APR	977	13-APR	775
1938	11-DEC	9,700	10-DEC	7,407	10-DEC	3,863	10-DEC	1,979	23-MAR	1,662
1939	3-DEC	1,040	19-MAR	689	17-MAR	654	13-MAR	569	12-MAR	418
1940	27-FEB	10,800	27-FEB	7,787	26-FEB	4,433	25-FEB	2,543	3-FEB	1,734
1941	28-FEB	7,860	28-FEB	6,200	27-FEB	3,820	27-FEB	2,413	6-FEB	1,969
1942	6-FEB	4,650	4-FEB	3,570	2-FEB	2,629	24-JAN	2,107	22-JAN	1,430
1943	21-JAN	10,200	21-JAN	5,920	21-JAN	3,127	21-JAN	1,789	21-JAN	1,192
1944	10-MAR	820	9-MAR	644	9-MAR	474	9-MAR	397	9-MAR	315
1945	8-FEB	1,480	8-FEB	1,235	5-FEB	996	1-FEB	893	31-JAN	589
1946	28-DEC	5,760	27-DEC	5,337	24-DEC	3,151	22-DEC	2,285	21-DEC	1,427
1947	12-FEB	3,200	11-FEB	1,662	11-FEB	957	10-MAR	620	3-MAR	464
1948	7-JAN	3,390	5-JAN	2,657	2-JAN	1,712	2-JAN	998	14-APR	764
1949	18-MAR	1,480	18-MAR	1,327	11-APR	1,144	7-APR	1,011	18-MAR	806
1950	19-MAR	2,130	19-MAR	1,513	17-MAR	1,302	17-MAR	932	17-MAR	760
1951	4-FEB	4,390	4-FEB	3,407	4-FEB	2,250	22-JAN	1,602	18-JAN	1,404
1952	1-FEB	5,360	1-FEB	3,723	31-JAN	2,404	31-JAN	1,624	25-MAR	1,363
1953	9-JAN	7,750	9-JAN	4,173	8-JAN	3,323	8-JAN	2,699	8-JAN	1,745
1954	9-MAR	4,210	28-JAN	2,710	28-JAN	1,829	23-JAN	1,371	23-JAN	1,260
1955	15-NOV	1,500	15-NOV	717	5-MAY	602	1-MAY	487	24-APR	394
1956	22-DEC	16,300	21-DEC	11,050	19-DEC	7,091	18-DEC	3,901	19-DEC	2,891
1957	24-FEB	5,660	24-FEB	4,060	23-FEB	2,553	23-FEB	1,698	22-FEB	1,106
1958	24-FEB	8,320	24-FEB	5,693	14-FEB	4,376	12-FEB	4,110	29-JAN	3,005
1959	12-JAN	3,060	10-JAN	1,810	8-JAN	1,314	8-JAN	771	8-JAN	559
1960	8-FEB	11,300	7-FEB	6,743	7-FEB	3,402	1-FEB	1,867	7-FEB	1,211
1961	31-JAN	2,900	31-JAN	2,007	30-JAN	1,303	31-JAN	1,062	26-JAN	751
1962	8-APR	1,120	6-APR	1,100	3-APR	1,055	29-MAR	957	26-MAR	764
1963	31-JAN	8,210	31-JAN	6,153	31-JAN	3,457	31-JAN	2,422	30-JAN	1,425
1964	23-NOV	1,720	23-NOV	954	23-NOV	583	14-NOV	440	20-JAN	348
1965	22-DEC	29,800	22-DEC	18,233	21-DEC	10,841	21-DEC	5,690	21-DEC	3,434
1966	6-JAN	2,840	4-JAN	2,440	4-JAN	1,544	28-MAR	1,194	22-MAR	972
1967	29-JAN	5,700	28-JAN	3,757	26-JAN	2,483	21-JAN	1,805	20-JAN	1,256
1968	14-JAN	4,510	19-FEB	3,873	19-FEB	2,960	17-FEB	1,844	2-FEB	1,205

TABLE B.6-9

THOMES CREEK AT PASKENTA
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1969	20-JAN	7,320	19-JAN	5,553	19-JAN	3,511	12-JAN	2,743	13-APR	2,057
1970	23-JAN	11,500	22-JAN	8,357	21-JAN	6,581	14-JAN	5,279	9-JAN	3,083
1971	17-JAN	6,310	16-JAN	5,397	16-JAN	3,626	16-JAN	2,245	15-JAN	1,525
1972	3-MAR	2,810	2-MAR	2,147	28-FEB	1,933	28-FEB	1,498	26-FEB	1,028
1973	16-JAN	4,990	16-JAN	3,193	12-JAN	2,646	11-JAN	1,698	11-JAN	1,143
1974	16-JAN	19,600	15-JAN	11,780	14-JAN	7,554	13-JAN	4,092	25-DEC	2,631
1975	25-MAR	4,610	25-MAR	2,960	19-MAR	2,327	18-MAR	1,925	2-MAR	1,588
1976	26-FEB	1,150	26-FEB	1,084	26-FEB	834	26-FEB	508	26-FEB	363
1977	16-MAR	164	6-APR	108	5-APR	100	27-MAR	91	16-MAR	64
1978	16-JAN	4,600	14-JAN	4,130	13-JAN	3,151	5-JAN	2,374	9-JAN	1,689
1979	13-FEB	2,060	13-FEB	1,276	6-MAR	927	5-MAR	757	5-MAR	624
1980	13-JAN	14,900	12-JAN	10,797	12-JAN	5,934	11-JAN	3,131	10-JAN	1,812
1981	14-FEB	3,880	13-FEB	2,473	13-FEB	1,768	12-FEB	1,097	22-JAN	832
1982	19-DEC	8,500	14-FEB	5,857	14-FEB	3,783	13-FEB	2,235	13-FEB	1,495
1983	26-JAN	9,390	26-JAN	5,820	27-FEB	3,670	28-FEB	3,087	17-FEB	2,363
1984	25-DEC	4,580	25-DEC	3,620	24-DEC	2,914	24-DEC	2,009	7-DEC	1,789
1985	13-NOV	2,110	11-NOV	1,823	10-NOV	1,135	11-NOV	842	10-NOV	737
1986	17-FEB	25,500	17-FEB	15,770	14-FEB	10,187	13-FEB	5,731	13-FEB	3,693
1987	13-FEB	2,520	12-MAR	1,920	12-MAR	1,204	3-MAR	936	13-FEB	701
1988	10-DEC	3,760	9-DEC	2,200	6-DEC	1,603	2-DEC	1,282	1-DEC	776
1989	9-MAR	3,410	9-MAR	2,710	6-MAR	1,963	6-MAR	1,401	6-MAR	1,249
1990	8-JAN	2,170	7-JAN	1,114	7-JAN	708	23-MAY	480	24-FEB	306
1991	4-MAR	3,730	3-MAR	2,300	3-MAR	1,191	3-MAR	696	3-MAR	507
1992	15-MAR	1,710	20-FEB	1,353	20-FEB	1,019	12-FEB	842	19-FEB	716
1993	20-JAN	5,350	17-MAR	3,963	14-MAR	2,699	11-MAR	2,200	6-MAR	1,625
1994	5-MAR	712	5-MAR	634	2-MAR	537	1-MAR	446	19-FEB	327
1995	9-MAR	11,000	9-MAR	6,423	9-MAR	5,006	9-MAR	3,419	8-JAN	2,735
1996	12-DEC	3,450	19-FEB	2,903	16-FEB	2,300	7-FEB	1,852	25-JAN	1,635
1997	---	---	---	---	---	---	---	---	---	---
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-10

DEER CREEK NEAR VINA
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1910	---	---	---	---	---	---	---	---	---	---
1911	---	---	---	---	---	---	---	---	---	---
1912	6-MAR	1,240	6-MAR	710	6-MAR	480	6-MAR	392	30-APR	325
1913	18-JAN	2,480	17-JAN	1,229	14-JAN	940	13-JAN	576	1-APR	531
1914	31-DEC	6,920	31-DEC	4,873	30-DEC	2,997	14-JAN	2,358	30-DEC	2,089
1915	2-FEB	5,480	1-FEB	3,187	28-JAN	2,269	28-JAN	1,620	28-JAN	1,354
1916	---	---	---	---	---	---	---	---	---	---
1917	---	---	---	---	---	---	---	---	---	---
1918	---	---	---	---	---	---	---	---	---	---
1919	---	---	---	---	---	---	---	---	---	---
1920	---	---	---	---	---	---	---	---	---	---
1921	17-JAN	3,820	17-JAN	3,003	16-JAN	2,001	16-JAN	1,823	16-JAN	1,297
1922	26-FEB	1,620	19-FEB	1,483	20-FEB	1,417	16-FEB	1,304	16-FEB	897
1923	27-DEC	2,300	27-DEC	2,260	25-DEC	1,537	25-DEC	881	9-DEC	677
1924	8-FEB	1,900	8-FEB	922	7-FEB	518	7-FEB	339	7-FEB	284
1925	4-FEB	2,720	4-FEB	2,170	4-FEB	1,469	3-FEB	1,088	3-FEB	810
1926	8-APR	3,700	7-APR	2,437	5-APR	1,794	5-APR	1,145	29-JAN	720
1927	3-FEB	3,400	16-FEB	2,310	16-FEB	2,146	14-FEB	1,562	3-FEB	1,241
1928	26-MAR	8,150	25-MAR	6,203	24-MAR	3,909	22-MAR	2,268	21-MAR	1,359
1929	3-FEB	1,350	3-FEB	959	2-FEB	584	30-JAN	350	28-JAN	231
1930	15-DEC	4,800	14-DEC	2,837	11-DEC	1,919	10-DEC	1,126	20-FEB	732
1931	23-JAN	810	11-MAR	536	11-MAR	369	11-MAR	354	10-MAR	253
1932	27-DEC	2,900	26-DEC	1,763	26-DEC	1,272	21-DEC	888	22-DEC	539
1933	28-MAR	905	28-MAR	658	28-MAR	486	27-MAR	388	12-MAR	363
1934	30-DEC	2,440	29-DEC	1,797	29-DEC	1,352	29-DEC	747	12-DEC	497
1935	8-APR	2,720	7-APR	2,047	4-APR	1,539	4-APR	1,297	3-APR	1,077
1936	21-FEB	3,400	21-FEB	2,803	18-FEB	1,829	12-FEB	1,522	12-FEB	1,003
1937	12-MAR	1,720	12-MAR	1,208	21-MAR	857	11-MAR	774	11-MAR	667
1938	11-DEC	13,700	10-DEC	7,920	10-DEC	4,089	31-JAN	2,405	1-FEB	1,606
1939	3-DEC	514	8-MAR	448	21-MAR	388	13-MAR	369	8-MAR	348
1940	28-FEB	12,300	27-FEB	9,773	26-FEB	5,547	26-FEB	3,010	3-FEB	1,825
1941	11-FEB	6,350	10-FEB	4,963	9-FEB	3,009	8-FEB	1,872	8-FEB	1,743
1942	6-FEB	7,040	5-FEB	4,523	2-FEB	3,306	24-JAN	2,633	22-JAN	1,766
1943	23-JAN	4,320	21-JAN	3,633	21-JAN	2,367	21-JAN	1,585	5-MAR	1,115
1944	4-MAR	2,060	3-MAR	1,110	29-FEB	741	28-FEB	548	28-FEB	398
1945	5-FEB	2,480	1-FEB	1,883	1-FEB	1,592	1-FEB	1,082	31-JAN	729
1946	27-DEC	3,460	27-DEC	2,877	21-DEC	2,333	21-DEC	1,850	21-DEC	1,139
1947	12-FEB	3,050	12-FEB	1,671	11-FEB	958	9-FEB	575	11-FEB	467
1948	23-MAR	3,810	23-MAR	2,305	14-APR	1,499	9-APR	1,235	9-APR	1,115
1949	11-MAR	2,380	10-MAR	1,710	10-MAR	1,057	10-MAR	820	2-MAR	629
1950	4-FEB	3,950	4-FEB	3,200	4-FEB	1,764	4-FEB	1,005	17-JAN	747
1951	22-JAN	2,860	19-NOV	1,943	16-NOV	1,475	3-DEC	1,179	16-NOV	998
1952	1-FEB	4,340	1-FEB	3,480	31-JAN	2,101	24-JAN	1,522	24-JAN	1,168
1953	9-JAN	7,000	8-JAN	4,167	8-JAN	2,943	7-JAN	2,151	26-DEC	1,414
1954	17-JAN	3,950	4-APR	2,873	4-APR	1,959	4-APR	1,329	9-MAR	1,044
1955	21-APR	1,230	20-APR	852	20-APR	675	20-APR	533	18-APR	461
1956	22-DEC	9,720	22-DEC	7,397	19-DEC	5,580	18-DEC	3,590	19-DEC	2,698
1957	24-FEB	4,950	24-FEB	3,247	23-FEB	2,034	23-FEB	1,452	23-FEB	1,014
1958	25-FEB	4,520	24-FEB	3,697	20-FEB	2,370	12-FEB	2,002	29-JAN	1,694

TABLE B.6-10

DEER CREEK NEAR VINA
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1959	16-FEB	4,170	16-FEB	2,910	15-FEB	1,853	14-FEB	1,125	14-FEB	728
1960	8-FEB	4,390	7-FEB	2,530	7-FEB	1,430	1-FEB	928	22-JAN	597
1961	1-DEC	2,550	31-JAN	1,563	31-JAN	1,007	31-JAN	926	30-JAN	636
1962	15-FEB	3,500	13-FEB	3,227	9-FEB	2,337	8-FEB	1,530	8-FEB	1,005
1963	12-OCT	6,910	12-OCT	5,740	11-OCT	2,879	6-APR	1,794	27-MAR	1,373
1964	20-JAN	2,710	20-JAN	1,628	20-JAN	920	20-JAN	603	19-JAN	401
1965	22-DEC	14,300	21-DEC	9,627	21-DEC	5,927	22-DEC	3,470	20-DEC	2,554
1966	4-JAN	1,830	4-JAN	1,466	4-JAN	913	28-DEC	612	28-MAR	503
1967	29-JAN	3,900	29-JAN	3,450	28-JAN	2,296	21-JAN	1,734	20-JAN	1,085
1968	15-JAN	2,410	20-FEB	2,213	20-FEB	1,824	17-FEB	1,241	17-FEB	884
1969	21-JAN	9,970	20-JAN	6,997	20-JAN	4,520	13-JAN	3,180	12-JAN	2,110
1970	23-JAN	8,740	22-JAN	7,317	21-JAN	5,174	13-JAN	4,143	9-JAN	2,656
1971	26-MAR	3,680	26-MAR	2,483	24-MAR	1,803	28-NOV	1,286	23-MAR	970
1972	29-FEB	1,200	3-MAR	1,072	28-FEB	984	28-FEB	799	26-FEB	642
1973	16-JAN	4,580	16-JAN	3,327	13-JAN	2,058	9-JAN	1,421	12-JAN	997
1974	30-MAR	8,520	15-JAN	6,913	15-JAN	4,759	13-JAN	2,749	28-DEC	1,773
1975	13-FEB	2,880	12-FEB	2,113	8-FEB	1,705	1-FEB	1,124	3-MAR	982
1976	29-FEB	1,150	28-FEB	841	27-FEB	582	27-FEB	393	26-FEB	291
1977	3-JAN	173	2-JAN	147	21-FEB	119	15-MAR	115	13-MAR	112
1978	16-JAN	5,870	14-JAN	4,367	14-JAN	2,863	5-JAN	2,018	14-JAN	1,252
1979	14-FEB	2,360	13-FEB	1,544	13-FEB	1,078	13-FEB	809	13-FEB	641
1980	13-JAN	6,820	12-JAN	5,460	17-FEB	3,826	17-FEB	2,354	16-FEB	1,539
1981	28-JAN	2,220	27-JAN	1,780	23-JAN	1,115	22-JAN	705	23-JAN	545
1982	11-APR	6,550	11-APR	4,497	11-APR	3,013	10-APR	2,004	30-MAR	1,589
1983	1-MAR	7,360	1-MAR	5,860	27-FEB	4,024	28-FEB	2,990	27-FEB	2,232
1984	25-DEC	5,650	25-DEC	4,353	24-DEC	3,039	24-DEC	1,947	8-DEC	1,604
1985	8-FEB	1,100	12-NOV	692	24-NOV	537	13-NOV	438	3-NOV	388
1986	17-FEB	11,800	17-FEB	8,820	14-FEB	6,976	13-FEB	4,109	14-FEB	2,824
1987	12-MAR	3,530	12-MAR	2,813	12-MAR	1,683	5-MAR	1,166	5-MAR	762
1988	4-JAN	1,380	3-JAN	870	3-JAN	590	3-JAN	499	28-DEC	360
1989	11-MAR	5,670	9-MAR	4,603	8-MAR	2,838	6-MAR	1,724	6-MAR	1,273
1990	23-OCT	1,190	13-JAN	716	12-JAN	503	8-JAN	375	25-FEB	283
1991	4-MAR	2,570	3-MAR	1,877	2-MAR	1,015	2-MAR	703	3-MAR	605
1992	12-FEB	1,900	11-FEB	1,378	11-FEB	1,225	10-FEB	941	10-FEB	667
1993	19-FEB	3,730	20-JAN	2,877	20-JAN	1,647	17-MAR	1,408	15-MAR	1,088
1994	7-FEB	864	7-FEB	533	17-FEB	381	7-FEB	342	7-FEB	314
1995	9-JAN	9,530	8-JAN	7,450	8-JAN	5,660	9-MAR	3,415	7-JAN	2,327
1996	21-FEB	4,560	20-FEB	3,140	18-FEB	2,209	17-FEB	1,449	4-FEB	1,242
1997	1-JAN	19,900	31-DEC	14,010	29-DEC	8,150	26-DEC	4,504	29-DEC	2,783
1998	3-FEB	6,920	3-FEB	4,080	2-FEB	3,716	1-FEB	2,424	12-JAN	1,929
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-11

BIG CHICO CREEK NEAR CHICO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1930	---	---	---	---	---	---	---	---	---	---
1931	---	---	---	---	---	---	---	---	---	---
1932	24-DEC	1,730	26-DEC	1,297	24-DEC	1,024	22-DEC	718	23-DEC	418
1933	28-MAR	616	28-MAR	467	12-MAR	409	8-MAR	286	3-MAR	253
1934	30-DEC	1,560	30-DEC	1,133	29-DEC	785	29-DEC	418	12-DEC	265
1935	8-APR	2,060	7-APR	1,587	4-APR	1,074	4-APR	768	26-MAR	539
1936	21-FEB	3,080	21-FEB	2,233	16-FEB	1,552	12-FEB	1,240	12-FEB	733
1937	12-MAR	1,310	12-MAR	1,023	10-MAR	650	11-MAR	571	11-MAR	475
1938	11-DEC	5,530	10-DEC	3,557	7-FEB	2,501	1-FEB	1,947	1-FEB	1,247
1939	13-MAR	300	13-MAR	250	8-MAR	227	8-MAR	195	7-MAR	142
1940	27-FEB	6,310	27-FEB	5,073	26-FEB	2,915	25-FEB	1,546	3-FEB	969
1941	4-APR	3,440	10-FEB	2,473	31-MAR	1,664	17-DEC	1,090	8-FEB	982
1942	6-FEB	5,220	5-FEB	3,530	2-FEB	2,493	24-JAN	1,853	22-JAN	1,165
1943	23-JAN	2,980	21-JAN	2,397	21-JAN	1,631	21-JAN	1,170	21-JAN	695
1944	4-MAR	1,740	4-MAR	928	4-MAR	561	29-FEB	406	22-FEB	269
1945	5-FEB	2,020	1-FEB	1,703	1-FEB	1,387	1-FEB	829	31-JAN	501
1946	27-DEC	3,180	26-DEC	2,177	22-DEC	1,734	21-DEC	1,215	21-DEC	723
1947	12-FEB	2,010	12-FEB	1,044	10-FEB	569	9-FEB	310	12-FEB	264
1948	23-MAR	2,350	23-MAR	1,625	23-MAR	902	9-APR	602	23-MAR	589
1949	11-MAR	1,550	10-MAR	1,078	10-MAR	713	10-MAR	568	2-MAR	427
1950	5-FEB	2,160	4-FEB	2,063	4-FEB	1,177	4-FEB	698	17-JAN	453
1951	22-JAN	1,670	22-JAN	1,171	18-JAN	924	16-JAN	655	17-JAN	617
1952	1-FEB	3,570	1-FEB	2,620	31-JAN	1,567	7-MAR	1,201	7-MAR	922
1953	9-JAN	4,350	8-JAN	2,800	7-JAN	1,869	7-JAN	1,319	27-DEC	863
1954	17-JAN	2,670	16-JAN	1,600	12-FEB	1,253	12-FEB	759	12-FEB	517
1955	21-APR	908	21-APR	725	21-APR	509	20-APR	349	18-APR	230
1956	22-FEB	5,750	21-FEB	4,013	19-DEC	3,050	18-DEC	1,985	19-DEC	1,627
1957	24-FEB	2,670	24-FEB	1,581	23-FEB	1,008	23-FEB	666	22-FEB	451
1958	21-MAR	2,640	21-MAR	2,060	21-MAR	1,488	21-MAR	1,393	29-JAN	1,128
1959	16-FEB	2,420	16-FEB	1,880	16-FEB	1,231	15-FEB	718	11-FEB	432
1960	8-FEB	2,300	7-FEB	1,413	5-FEB	814	1-FEB	526	22-JAN	348
1961	31-JAN	1,290	31-JAN	766	30-JAN	473	31-JAN	433	30-JAN	292
1962	13-FEB	2,810	13-FEB	2,373	10-FEB	1,571	8-FEB	1,045	8-FEB	694
1963	12-OCT	3,330	12-OCT	2,607	11-OCT	1,298	6-APR	993	27-MAR	797
1964	20-JAN	1,670	20-JAN	1,084	19-JAN	587	19-JAN	377	18-JAN	240
1965	22-DEC	7,190	21-DEC	4,967	21-DEC	2,771	22-DEC	1,627	20-DEC	1,385
1966	5-JAN	1,970	4-JAN	1,330	4-JAN	782	28-DEC	467	25-DEC	285
1967	21-JAN	4,130	29-JAN	2,877	28-JAN	1,859	21-JAN	1,509	20-JAN	855
1968	20-FEB	1,400	20-FEB	1,225	17-FEB	980	11-FEB	636	29-JAN	467
1969	21-JAN	6,140	20-JAN	4,447	20-JAN	2,745	12-JAN	2,172	12-JAN	1,391
1970	24-JAN	6,000	23-JAN	4,433	21-JAN	3,233	13-JAN	2,612	9-JAN	1,607
1971	26-MAR	2,460	26-MAR	1,485	28-NOV	1,177	28-NOV	863	28-NOV	536
1972	23-JAN	522	28-FEB	348	25-FEB	317	23-FEB	251	6-FEB	172
1973	16-JAN	3,540	16-JAN	2,607	12-JAN	1,667	9-JAN	1,148	12-JAN	800
1974	30-MAR	5,300	29-MAR	3,810	28-MAR	2,600	27-MAR	1,503	8-MAR	992
1975	13-FEB	2,650	12-FEB	1,620	8-FEB	1,297	18-MAR	867	7-MAR	699
1976	1-MAR	376	29-FEB	320	27-FEB	213	26-FEB	142	15-FEB	99
1977	3-JAN	119	2-JAN	85	30-DEC	55	15-MAR	45	1-MAR	38
1978	16-JAN	3,890	15-JAN	2,860	14-JAN	1,827	5-JAN	1,235	6-FEB	824

TABLE B.6-11

BIG CHICO CREEK NEAR CHICO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1979	14-FEB	1,490	13-FEB	844	13-FEB	575	13-FEB	483	13-FEB	396
1980	19-FEB	4,090	18-FEB	3,407	17-FEB	2,461	16-FEB	1,463	16-FEB	931
1981	28-JAN	1,510	27-JAN	1,066	24-JAN	635	23-JAN	397	23-JAN	301
1982	11-APR	4,880	11-APR	3,133	10-APR	1,896	31-MAR	1,473	30-MAR	967
1983	1-MAR	4,640	1-MAR	3,957	27-FEB	2,761	28-FEB	1,958	27-FEB	1,454
1984	25-DEC	3,880	25-DEC	2,720	24-DEC	1,663	24-DEC	979	7-DEC	791
1985	8-FEB	1,160	8-FEB	606	8-FEB	343	8-FEB	208	8-NOV	148
1986	17-FEB	7,070	15-FEB	5,137	14-FEB	3,954	12-FEB	2,288	13-FEB	1,491
1987	13-MAR	1,876	12-MAR	1,445	12-MAR	904	5-MAR	636	5-MAR	400
1988	4-JAN	1,027	4-JAN	814	4-JAN	592	23-DEC	477	23-DEC	385
1989	11-MAR	2,805	9-MAR	2,038	8-MAR	1,241	2-MAR	784	2-MAR	583
1990	13-JAN	599	13-JAN	466	13-JAN	284	26-FEB	202	16-FEB	153
1991	4-MAR	1,472	3-MAR	1,182	2-MAR	618	2-MAR	389	3-MAR	365
1992	20-FEB	1,712	19-FEB	1,056	15-FEB	819	11-FEB	674	10-FEB	428
1993	20-JAN	3,254	20-JAN	2,724	20-JAN	1,522	10-JAN	1,140	1-JAN	825
1994	7-FEB	776	7-FEB	531	7-FEB	337	7-FEB	269	6-FEB	213
1995	9-JAN	7,250	8-JAN	5,674	8-JAN	4,435	7-JAN	2,495	7-JAN	1,583
1996	21-FEB	3,401	20-FEB	2,011	19-FEB	1,241	20-FEB	815	4-FEB	688
1997	1-JAN	10,770	31-DEC	8,046	29-DEC	4,658	27-DEC	2,463	29-DEC	1,659
1998	3-FEB	5,590	6-FEB	3,342	3-FEB	3,007	2-FEB	1,937	27-JAN	1,405
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-12

STONY CREEK AT BLACK BUTTE DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1900	---	---	---	---	---	---	---	---	---	---
1901	19-FEB	9,370	19-FEB	6,890	---	---	---	---	13-FEB	2,220
1902	24-FEB	23,400	24-FEB	19,000	---	---	---	---	10-FEB	6,300
1903	9-NOV	7,260	9-NOV	4,650	---	---	---	---	9-NOV	2,400
1904	24-FEB	24,400	22-FEB	14,900	---	---	---	---	16-FEB	6,230
1905	1-FEB	8,010	1-FEB	5,460	---	---	---	---	14-JAN	3,010
1906	18-JAN	24,400	16-JAN	19,800	---	---	---	---	2-MAR	3,440
1907	18-MAR	29,200	18-MAR	22,000	---	---	---	---	17-MAR	5,020
1908	9-FEB	8,570	9-FEB	4,600	---	---	---	---	20-JAN	1,850
1909	2-FEB	32,200	13-JAN	20,500	---	---	---	---	8-JAN	9,190
1910	21-MAR	9,880	21-MAR	6,400	---	---	---	---	1-MAR	2,390
1911	6-MAR	17,600	6-MAR	12,600	---	---	---	---	2-MAR	4,720
1912	26-JAN	1,660	26-JAN	920	---	---	---	---	1-MAY	360
1913	---	3,980	---	3,700	---	---	---	---	---	2,200
1914	---	31,000	---	21,200	---	---	---	---	---	9,090
1915	---	39,000	---	22,500	---	---	---	---	---	10,500
1916	---	28,700	---	21,500	---	---	---	---	---	7,390
1917	---	4,990	---	3,800	---	---	---	---	---	670
1918	---	1,510	---	880	---	---	---	---	---	770
1919	---	8,770	---	7,460	---	---	---	---	---	1,560
1920	---	1,860	---	1,440	---	---	---	---	---	390
1921	---	15,300	---	9,190	---	---	---	---	---	3,460
1922	---	2,820	---	2,520	---	---	---	---	---	1,180
1923	---	4,430	---	2,540	---	---	---	---	---	830
1924	---	1,920	---	1,060	---	---	---	---	---	320
1925	---	17,200	---	13,000	---	---	---	---	---	3,610
1926	---	8,520	---	7,530	---	---	---	---	---	2,440
1927	---	16,900	---	10,700	---	---	---	---	---	4,450
1928	---	13,800	---	9,790	---	---	---	---	---	2,320
1929	---	2,820	---	2,050	---	---	---	---	---	490
1930	---	4,130	---	2,840	---	---	---	---	---	1,180
1931	---	1,920	---	1,360	---	---	---	---	---	370
1932	---	9,270	---	5,530	---	---	---	---	---	1,380
1933	---	700	---	700	---	---	---	---	---	570
1934	---	5,540	---	3,800	---	---	---	---	---	920
1935	---	2,470	---	2,200	---	---	---	---	---	1,370
1936	---	8,470	---	5,820	---	---	---	---	---	2,270
1937	---	6,600	---	3,430	---	---	---	---	---	1,220
1938	---	39,100	---	17,100	---	---	---	---	---	3,340
1939	---	1,920	---	800	---	---	---	---	---	320
1940	---	36,500	---	24,400	---	---	---	---	---	4,890
1941	---	31,300	---	24,900	---	---	---	---	---	8,130
1942	---	24,500	---	16,400	---	---	---	---	---	5,580
1943	---	15,700	---	14,400	---	---	---	---	---	3,210
1944	2-FEB	2,930	3-MAR	2,000	---	---	---	---	22-FEB	700
1945	1-FEB	3,870	1-FEB	3,750	---	---	---	---	30-JAN	1,290
1946	28-DEC	12,800	27-DEC	10,200	---	---	---	---	20-DEC	3,580
1947	12-FEB	3,550	11-FEB	2,550	---	---	---	---	11-FEB	950
1948	15-APR	3,570	15-APR	2,840	---	---	---	---	8-APR	1,160

TABLE B.6-12

STONY CREEK AT BLACK BUTTE DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1949	11-MAR	10,600	10-MAR	8,870	---	---	---	---	3-MAR	2,600
1950	5-FEB	3,260	4-FEB	3,060	---	---	---	---	17-JAN	1,120
1951	22-JAN	9,920	22-JAN	6,890	---	---	---	---	18-JAN	2,520
1952	2-FEB	10,400	1-FEB	7,590	---	---	---	---	12-JAN	3,510
1953	10-JAN	11,300	9-JAN	8,880	---	---	---	---	26-DEC	4,230
1954	17-JAN	9,450	16-JAN	6,040	---	---	---	---	16-JAN	2,250
1955	6-DEC	2,040	5-DEC	1,540	---	---	---	---	14-NOV	670
1956	22-DEC	21,000	21-DEC	14,700	---	---	---	---	18-DEC	4,990
1957	24-FEB	9,900	23-FEB	7,790	---	---	---	---	22-FEB	2,041
1958	19-FEB	23,800	24-FEB	15,900	---	---	---	---	1-FEB	8,340
1959	16-FEB	12,400	15-FEB	7,850	---	---	---	---	13-FEB	1,910
1960	8-FEB	15,800	8-FEB	12,400	---	---	---	---	24-JAN	2,400
1961	2-FEB	4,000	31-JAN	3,590	---	---	---	---	26-JAN	1,590
1962	15-FEB	8,560	13-FEB	6,750	---	---	---	---	9-FEB	2,310
1963	1-FEB	16,900	31-JAN	12,200	---	---	---	---	30-JAN	3,060
1964	21-JAN	2,890	20-JAN	2,310	20-JAN	1,438	20-JAN	982	19-JAN	660
1965	23-DEC	38,800	22-DEC	29,400	21-DEC	16,937	22-DEC	9,675	21-DEC	6,920
1966	5-JAN	13,100	4-JAN	10,000	4-JAN	5,877	3-JAN	3,268	4-JAN	1,980
1967	29-JAN	13,100	29-JAN	10,800	26-JAN	8,267	20-JAN	6,558	20-JAN	3,890
1968	20-FEB	9,300	19-FEB	7,300	17-FEB	5,318	16-FEB	3,561	29-JAN	2,670
1969	21-JAN	14,900	20-JAN	12,600	19-JAN	8,103	12-JAN	6,845	19-JAN	5,090
1970	24-JAN	27,200	23-JAN	18,800	21-JAN	13,573	14-JAN	10,941	9-JAN	7,020
1971	17-JAN	11,900	16-JAN	10,800	15-JAN	6,554	11-JAN	3,732	10-JAN	2,340
1972	23-JAN	3,660	22-JAN	2,540	28-FEB	1,914	25-FEB	1,445	21-FEB	1,020
1973	7-FEB	15,000	16-JAN	11,400	12-JAN	8,376	10-JAN	5,917	11-JAN	4,780
1974	16-JAN	27,900	15-JAN	19,600	14-JAN	12,030	12-JAN	7,023	27-DEC	4,440
1975	7-MAR	10,700	7-MAR	7,960	8-FEB	5,757	17-MAR	4,463	6-MAR	3,800
1976	27-FEB	1,330	27-FEB	1,280	26-FEB	1,094	26-FEB	680	25-FEB	430
1977	16-MAR	340	16-MAR	280	15-MAR	205	15-MAR	163	3-MAR	100
1978	16-JAN	22,900	14-JAN	19,300	13-JAN	13,047	5-JAN	8,832	13-JAN	5,760
1979	27-MAR	5,610	27-MAR	3,440	13-FEB	2,125	13-FEB	1,735	13-FEB	1,380
1980	13-JAN	21,600	17-FEB	19,600	16-FEB	13,851	16-FEB	8,171	16-FEB	5,210
1981	28-JAN	10,000	27-JAN	6,950	22-JAN	4,908	22-JAN	2,843	22-JAN	2,010
1982	20-DEC	13,400	19-DEC	10,900	18-DEC	6,473	18-DEC	4,340	18-DEC	3,210
1983	1-MAR	30,100	28-FEB	27,900	27-FEB	18,639	27-FEB	12,089	25-FEB	6,300
1984	25-DEC	26,300	24-DEC	16,300	24-DEC	10,029	23-DEC	6,058	3-DEC	5,230
1985	28-NOV	3,750	27-NOV	2,970	23-NOV	2,020	21-NOV	1,606	12-NOV	1,310
1986	17-FEB	39,300	17-FEB	29,000	14-FEB	23,048	12-FEB	12,964	14-FEB	8,280
1987	13-MAR	3,268	3-DEC	2,721	12-MAR	1,753	5-MAR	1,399	13-FEB	954
1988	1-APR	9,539	1-MAR	6,161	3-JAN	3,438	3-JAN	2,620	1-MAR	1,937
1989	3-NOV	4,376	3-SEP	4,211	6-MAR	2,827	6-MAR	2,099	3-MAY	1,751
1990	13-JAN	2,076	1-DEC	1,480	8-JAN	1,046	8-JAN	655	1-AUG	423
1991	3-APR	7,080	3-MAR	4,789	2-MAR	2,511	17-MAR	1,634	3-MAR	1,551
1992	2-DEC	7,192	2-NOV	4,216	10-FEB	3,065	10-FEB	2,648	2-OCT	1,816
1993	20-JAN	21,429	20-JAN	15,464	18-JAN	8,683	13-JAN	6,003	14-JAN	4,451
1994	2-JUL	3,057	2-JUN	1,562	17-FEB	1,069	6-FEB	861	2-JUN	755
1995	1-SEP	44,984	1-AUG	31,113	8-JAN	20,197	4-JAN	12,059	1-JUN	9,846
1996	2-APR	9,981	2-APR	8,353	31-JAN	5,491	24-JAN	4,614	24-JAN	3,906
1997	1-JAN	29,246	31-DEC	22,048	29-DEC	13,696	26-DEC	7,649	29-DEC	5,647
1998	2-MAR	29,811	2-MAY	20,891	2-FEB	18,816	2-FEB	12,067	26-JAN	9,769
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-13

BUTTE CREEK NEAR CHICO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1930	---	---	---	---	---	---	---	---	---	---
1931	23-JAN	1,000	23-JAN	601	11-MAR	420	11-MAR	390	11-MAR	313
1932	24-DEC	2,360	26-DEC	1,467	26-DEC	1,252	23-DEC	979	23-DEC	658
1933	28-MAR	890	28-MAR	684	28-MAR	552	27-MAR	450	12-MAR	431
1934	30-DEC	2,140	30-DEC	1,740	29-DEC	1,274	29-DEC	775	7-FEB	590
1935	8-APR	4,120	7-APR	3,303	4-APR	2,284	3-APR	1,810	3-APR	1,445
1936	21-FEB	5,580	21-FEB	4,153	17-FEB	2,841	12-FEB	2,331	11-FEB	1,530
1937	12-MAR	1,920	12-MAR	1,497	13-APR	1,170	11-MAR	1,000	21-MAR	938
1938	11-DEC	11,200	10-DEC	7,113	10-DEC	3,917	1-FEB	2,823	2-FEB	1,925
1939	3-DEC	624	25-MAR	473	21-MAR	463	13-MAR	460	8-MAR	418
1940	27-FEB	10,500	27-FEB	8,920	26-FEB	5,503	25-FEB	3,108	4-FEB	1,901
1941	11-FEB	6,530	10-FEB	5,567	9-FEB	3,534	8-FEB	2,345	8-FEB	2,098
1942	6-FEB	7,600	5-FEB	5,303	2-FEB	3,893	24-JAN	3,049	22-JAN	2,169
1943	21-JAN	4,210	21-JAN	3,500	21-JAN	2,480	21-JAN	1,929	21-JAN	1,259
1944	4-MAR	2,470	4-MAR	1,380	29-FEB	935	29-FEB	720	28-FEB	547
1945	5-FEB	3,240	1-FEB	2,943	1-FEB	2,406	1-FEB	1,622	31-JAN	1,074
1946	27-DEC	4,890	27-DEC	3,810	22-DEC	3,026	21-DEC	2,296	21-DEC	1,479
1947	12-FEB	3,160	12-FEB	1,768	10-FEB	1,039	29-MAR	674	10-MAR	586
1948	23-MAR	2,760	23-MAR	2,047	14-APR	1,523	9-APR	1,409	9-APR	1,262
1949	11-MAR	2,120	10-MAR	1,517	10-MAR	1,050	10-MAR	909	2-MAR	712
1950	6-FEB	3,800	4-FEB	3,453	4-FEB	2,001	4-FEB	1,192	17-JAN	807
1951	22-JAN	2,840	19-NOV	2,023	16-NOV	1,631	3-DEC	1,373	18-JAN	1,247
1952	1-FEB	5,120	1-FEB	3,783	31-JAN	2,399	24-JAN	1,852	24-JAN	1,436
1953	9-JAN	6,890	8-JAN	4,433	7-JAN	3,129	7-JAN	2,332	30-DEC	1,584
1954	5-APR	3,980	4-APR	3,017	4-APR	2,173	4-APR	1,558	3-APR	1,262
1955	21-APR	1,280	21-APR	988	20-APR	776	20-APR	631	20-APR	596
1956	22-DEC	12,000	21-DEC	8,723	19-DEC	6,279	18-DEC	4,003	19-DEC	3,202
1957	24-FEB	4,160	24-FEB	2,910	23-FEB	1,969	23-FEB	1,435	23-FEB	1,043
1958	25-FEB	4,520	24-FEB	3,863	19-FEB	2,754	12-FEB	2,508	29-JAN	2,120
1959	16-FEB	3,190	16-FEB	2,687	16-FEB	1,860	16-FEB	1,193	15-FEB	839
1960	8-FEB	4,520	7-FEB	2,700	7-FEB	1,589	1-FEB	1,036	5-MAR	782
1961	31-JAN	2,020	31-JAN	1,302	9-FEB	908	31-JAN	858	30-JAN	639
1962	15-FEB	3,710	13-FEB	3,327	9-FEB	2,390	8-FEB	1,686	8-FEB	1,168
1963	31-JAN	7,710	12-OCT	5,533	30-JAN	2,904	6-APR	1,931	27-MAR	1,533
1964	20-JAN	2,240	20-JAN	1,666	19-JAN	980	19-JAN	681	18-JAN	505
1965	22-DEC	16,600	21-DEC	11,120	21-DEC	6,826	22-DEC	4,049	20-DEC	3,128
1966	5-JAN	2,320	4-JAN	1,633	4-JAN	1,082	5-APR	763	29-MAR	681
1967	21-JAN	5,080	29-JAN	4,473	28-JAN	3,060	21-JAN	2,395	20-JAN	1,533
1968	21-FEB	2,570	20-FEB	2,347	17-FEB	1,846	17-FEB	1,368	17-FEB	1,023
1969	21-JAN	10,400	20-JAN	7,223	20-JAN	4,866	13-JAN	3,510	19-JAN	2,483
1970	24-JAN	9,140	22-JAN	6,913	21-JAN	5,323	13-JAN	4,517	9-JAN	2,934
1971	26-MAR	4,380	25-MAR	2,740	24-MAR	1,924	23-MAR	1,379	12-MAR	1,123
1972	6-APR	1,050	5-APR	824	28-FEB	773	25-FEB	691	24-FEB	608
1973	16-JAN	4,770	16-JAN	3,517	12-JAN	2,352	9-JAN	1,717	12-JAN	1,303
1974	30-MAR	9,600	29-MAR	7,000	28-MAR	4,894	26-MAR	3,048	11-MAR	2,075
1975	13-FEB	3,680	19-MAR	2,170	19-MAR	1,846	18-MAR	1,441	7-MAR	1,235
1976	29-FEB	768	29-FEB	662	27-FEB	518	27-FEB	405	27-FEB	336
1977	3-JAN	307	2-JAN	226	9-MAY	165	1-MAY	147	1-MAY	135
1978	16-JAN	6,050	4-MAR	4,837	3-MAR	3,260	5-JAN	2,140	7-FEB	1,486
1979	14-FEB	2,530	13-FEB	1,444	13-FEB	1,007	13-FEB	868	13-FEB	741

TABLE B.6-13

BUTTE CREEK NEAR CHICO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1980	19-FEB	7,550	18-FEB	6,137	17-FEB	4,443	16-FEB	2,845	16-FEB	1,924
1981	28-JAN	1,660	27-JAN	1,320	21-MAR	852	19-MAR	723	16-MAR	569
1982	11-APR	6,980	11-APR	4,890	11-APR	3,386	31-MAR	2,454	30-MAR	1,936
1983	13-MAR	6,910	1-MAR	5,640	27-FEB	4,130	28-FEB	3,414	27-FEB	2,653
1984	25-DEC	6,060	25-DEC	4,597	24-DEC	3,157	24-DEC	2,101	9-DEC	1,714
1985	8-FEB	1,780	7-FEB	1,017	7-FEB	648	2-APR	478	25-MAR	449
1986	17-FEB	14,100	17-FEB	10,230	14-FEB	7,610	13-FEB	4,545	13-FEB	3,085
1987	12-MAR	2,830	12-MAR	2,333	12-MAR	1,531	5-MAR	1,134	5-MAR	818
1988	2-DEC	1,450	4-JAN	913	6-DEC	736	4-JAN	654	3-JAN	516
1989	11-MAR	5,050	9-MAR	4,033	8-MAR	2,599	6-MAR	1,686	6-MAR	1,319
1990	13-JAN	1,100	13-JAN	869	12-JAN	604	27-FEB	461	26-FEB	409
1991	4-MAR	3,030	3-MAR	2,157	1-MAR	1,241	1-MAR	862	2-MAR	722
1992	20-FEB	2,310	19-FEB	1,567	15-FEB	1,154	11-FEB	1,025	10-FEB	774
1993	20-JAN	3,780	20-JAN	3,033	18-FEB	1,887	13-JAN	1,534	14-MAR	1,173
1994	7-FEB	1,350	7-FEB	851	6-FEB	581	7-FEB	483	7-FEB	449
1995	14-JAN	7,660	9-MAR	6,450	9-JAN	5,491	9-MAR	4,077	9-MAR	2,944
1996	21-FEB	4,620	20-FEB	3,333	19-FEB	2,423	19-FEB	1,695	4-FEB	1,491
1997	1-JAN	26,600	31-DEC	18,866	29-DEC	11,007	26-DEC	6,037	29-DEC	3,701
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-14

SACRAMENTO RIVER AT ORD FERRY (LATITUDE)
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1920	---	---	---	---	---	---	---	---	---	---
1921	---	---	---	---	---	---	---	---	---	---
1922	20-FEB	50,649	19-FEB	46,810	20-FEB	38,345	17-FEB	32,352	10-FEB	23,330
1923	29-DEC	47,404	28-DEC	37,771	28-DEC	30,484	5-APR	23,466	2-APR	17,976
1924	9-FEB	44,139	8-FEB	33,137	7-FEB	20,955	2-FEB	14,335	28-JAN	10,868
1925	13-FEB	112,636	12-FEB	102,923	8-FEB	78,714	4-FEB	70,760	3-FEB	51,880
1926	5-FEB	102,770	4-FEB	85,669	3-FEB	62,943	30-JAN	47,136	29-JAN	35,861
1927	22-FEB	151,141	21-FEB	126,769	18-FEB	104,082	16-FEB	74,722	3-FEB	56,847
1928	28-MAR	145,008	26-MAR	124,606	25-MAR	91,105	24-MAR	63,911	23-MAR	42,935
1929	5-FEB	50,923	3-FEB	42,897	2-FEB	29,393	30-JAN	18,767	29-JAN	12,741
1930	16-DEC	90,595	15-DEC	77,295	12-DEC	56,899	11-DEC	35,059	20-FEB	26,535
1931	24-JAN	33,882	23-JAN	24,802	23-JAN	15,843	12-MAR	11,916	23-JAN	9,737
1932	28-DEC	77,816	27-DEC	59,323	24-DEC	43,885	22-DEC	29,816	23-DEC	20,422
1933	29-MAR	44,472	28-MAR	35,362	28-MAR	27,222	17-MAR	23,753	12-MAR	21,262
1934	2-JAN	60,988	1-JAN	53,410	30-DEC	44,912	29-DEC	27,637	13-DEC	17,896
1935	9-APR	98,477	8-APR	82,641	5-APR	63,086	5-APR	50,780	4-APR	38,638
1936	23-FEB	126,904	22-FEB	113,311	19-FEB	82,679	15-FEB	59,576	13-FEB	40,334
1937	13-MAR	62,480	13-MAR	54,569	12-MAR	39,871	12-MAR	36,814	11-MAR	29,775
1938	12-DEC	237,917	11-DEC	184,910	10-DEC	114,872	13-MAR	81,106	1-MAR	64,316
1939	14-MAR	37,401	13-MAR	29,618	13-MAR	23,094	13-MAR	19,082	9-MAR	15,207
1940	29-FEB	285,386	28-FEB	242,642	27-FEB	156,952	26-FEB	92,463	5-FEB	62,902
1941	2-MAR	160,902	1-MAR	144,223	28-FEB	110,241	24-FEB	74,451	8-FEB	70,300
1942	7-FEB	196,691	5-FEB	168,498	3-FEB	130,829	26-JAN	102,927	23-JAN	70,885
1943	22-JAN	130,716	22-JAN	121,774	21-JAN	84,032	21-JAN	61,117	21-JAN	40,792
1944	4-FEB	27,703	3-FEB	21,291	2-FEB	14,149	1-FEB	10,872	2-FEB	8,727
1945	2-FEB	81,775	2-FEB	72,611	1-FEB	57,515	1-FEB	42,864	31-JAN	29,670
1946	28-DEC	158,425	28-DEC	136,947	24-DEC	103,269	23-DEC	79,252	21-DEC	52,078
1947	13-FEB	68,711	12-FEB	49,684	12-FEB	31,791	3-MAR	24,732	12-FEB	21,092
1948	8-JAN	84,266	6-JAN	72,369	5-JAN	51,540	10-APR	38,191	9-APR	35,431
1949	20-MAR	72,233	18-MAR	68,054	17-MAR	55,918	10-MAR	49,576	2-MAR	37,308
1950	6-FEB	62,759	5-FEB	57,558	4-FEB	38,987	4-FEB	27,200	18-JAN	24,393
1951	6-FEB	77,450	5-FEB	67,481	5-FEB	52,787	4-FEB	45,743	18-JAN	39,828
1952	28-DEC	162,760	27-DEC	121,859	27-DEC	76,553	25-JAN	49,930	25-JAN	41,263
1953	10-JAN	129,812	9-JAN	102,306	9-JAN	93,149	8-JAN	83,784	28-DEC	59,154
1954	18-JAN	96,813	17-JAN	76,084	13-FEB	62,349	17-JAN	47,111	17-JAN	41,202
1955	7-DEC	45,754	6-DEC	37,180	5-DEC	29,662	21-APR	21,763	18-APR	18,100
1956	23-DEC	278,019	22-DEC	231,167	19-DEC	177,964	19-DEC	111,635	19-DEC	92,435
1957	25-FEB	117,465	25-FEB	106,307	23-FEB	76,149	24-FEB	55,951	23-FEB	42,063
1958	25-FEB	184,326	24-FEB	147,254	19-FEB	123,067	13-FEB	116,174	30-JAN	98,956
1959	17-FEB	99,126	16-FEB	75,973	8-JAN	61,077	15-FEB	40,615	14-FEB	28,844
1960	9-FEB	140,968	8-FEB	110,637	6-FEB	70,659	1-FEB	48,999	23-JAN	32,667
1961	2-DEC	76,835	31-JAN	60,994	10-FEB	45,025	31-JAN	41,673	30-JAN	31,079
1962	14-FEB	108,348	14-FEB	101,772	10-FEB	83,464	8-FEB	61,077	8-FEB	42,647
1963	1-FEB	124,080	1-FEB	98,781	31-JAN	73,481	6-APR	67,331	28-MAR	52,783
1964	21-JAN	85,854	20-JAN	63,787	20-JAN	40,088	19-JAN	26,757	18-JAN	19,295
1965	23-DEC	357,217	22-DEC	278,010	21-DEC	178,745	22-DEC	109,707	20-DEC	82,299
1966	6-JAN	98,690	5-JAN	85,521	4-JAN	57,334	29-DEC	36,356	28-DEC	24,557
1967	30-JAN	123,725	30-JAN	110,853	28-JAN	86,309	21-JAN	65,152	20-JAN	44,758
1968	23-FEB	88,559	21-FEB	88,226	20-FEB	74,804	17-FEB	55,323	17-FEB	38,873

TABLE B.6-14

SACRAMENTO RIVER AT ORD FERRY (LATITUDE)
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1969	21-JAN	171,557	20-JAN	143,393	20-JAN	102,865	13-JAN	86,164	20-JAN	65,489
1970	24-JAN	308,488	23-JAN	262,530	22-JAN	200,052	14-JAN	157,047	10-JAN	104,256
1971	17-JAN	124,274	16-JAN	101,841	16-JAN	78,282	28-NOV	56,332	25-NOV	40,895
1972	23-JAN	53,029	29-FEB	46,980	29-FEB	45,502	28-FEB	36,833	24-FEB	29,499
1973	17-JAN	132,688	17-JAN	111,940	13-JAN	85,408	11-JAN	62,767	12-JAN	47,984
1974	17-JAN	329,673	16-JAN	270,025	15-JAN	190,784	13-JAN	115,584	28-DEC	76,866
1975	14-FEB	106,322	19-MAR	90,690	19-MAR	73,481	18-MAR	60,587	7-MAR	49,703
1976	1-MAR	42,345	29-FEB	37,376	27-FEB	31,499	26-FEB	22,031	26-FEB	16,398
1977	20-SEP	11,326	19-SEP	9,887	10-MAY	8,709	11-MAY	8,035	12-MAY	7,767
1978	16-JAN	201,405	15-JAN	186,647	14-JAN	137,831	6-JAN	100,382	10-JAN	66,568
1979	14-FEB	59,726	14-FEB	46,705	14-FEB	35,451	13-FEB	31,456	13-FEB	25,516
1980	19-FEB	187,137	18-FEB	170,191	17-FEB	129,362	17-FEB	87,550	17-FEB	62,571
1981	29-JAN	78,919	28-JAN	65,674	23-JAN	46,495	22-JAN	32,224	22-JAN	27,181
1982	20-DEC	177,266	19-DEC	138,876	19-DEC	92,569	19-DEC	66,289	14-FEB	50,436
1983	2-MAR	259,634	1-MAR	227,921	28-FEB	168,259	28-FEB	132,193	27-FEB	101,945
1984	26-DEC	135,332	10-DEC	120,038	8-DEC	88,169	24-DEC	62,244	7-DEC	61,258
1985	13-NOV	46,146	12-NOV	40,986	11-NOV	29,781	11-NOV	24,931	12-NOV	22,635
1986	18-FEB	302,395	17-FEB	254,616	15-FEB	207,417	14-FEB	133,952	14-FEB	97,078
1987	13-MAR	78,306	13-MAR	68,701	12-MAR	49,768	5-MAR	37,866	3-MAR	26,813
1988	11-DEC	51,736	9-DEC	44,929	6-DEC	39,838	2-DEC	30,710	3-JAN	22,056
1989	10-MAR	120,979	10-MAR	112,504	8-MAR	81,911	7-MAR	57,986	6-MAR	45,857
1990	28-MAY	42,672	28-MAY	37,653	27-MAY	31,893	23-MAY	23,310	22-MAY	15,545
1991	5-MAR	56,646	4-MAR	47,511	3-MAR	30,333	3-MAR	21,184	3-MAR	20,967
1992	21-FEB	62,935	20-FEB	56,624	12-FEB	45,926	11-FEB	43,225	11-FEB	30,285
1993	21-JAN	135,134	21-JAN	108,026	18-MAR	73,235	16-MAR	63,510	12-MAR	47,493
1994	25-JAN	26,627	24-JAN	21,981	17-FEB	19,211	18-FEB	16,606	7-FEB	15,030
1995	10-JAN	262,936	9-JAN	216,849	9-JAN	185,283	9-MAR	118,848	8-JAN	94,172
1996	21-FEB	115,384	20-FEB	107,612	18-FEB	83,823	17-FEB	61,084	5-FEB	53,737
1997	1-JAN	362,120	31-DEC	316,836	30-DEC	212,279	27-DEC	124,983	30-DEC	80,989
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-15

FEATHER RIVER AT OROVILLE DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1900	---	---	---	---	---	---	---	---	---	---
1901	---	---	---	---	---	---	---	---	---	---
1902	7-APR	38,100	5-APR	35,770	24-FEB	29,190	15-FEB	23,280	7-FEB	19,000
1903	30-MAR	93,000	30-MAR	66,330	30-MAR	44,610	30-MAR	30,470	14-MAR	19,290
1904	24-FEB	106,000	18-MAR	88,330	22-FEB	66,410	16-FEB	49,740	22-FEB	47,070
1905	30-DEC	68,400	30-DEC	38,430	30-DEC	21,680	17-MAR	18,020	12-MAR	15,220
1906	18-JAN	96,300	18-JAN	69,170	16-JAN	46,660	23-MAR	35,250	10-MAR	24,990
1907	19-MAR	187,000	18-MAR	150,330	18-MAR	100,970	17-MAR	62,610	1-MAR	37,250
1908	3-FEB	16,300	2-FEB	14,900	20-JAN	11,590	20-JAN	10,340	14-JAN	8,970
1909	16-JAN	137,000	14-JAN	128,670	14-JAN	89,470	8-JAN	61,570	3-JAN	41,190
1910	9-DEC	31,000	20-MAR	28,100	19-MAR	24,600	10-MAR	20,130	25-FEB	18,540
1911	31-JAN	75,400	5-APR	51,700	2-APR	44,470	29-MAR	36,600	17-MAR	26,460
1912	26-JAN	16,400	26-JAN	11,170	26-JAN	6,940	19-JAN	4,940	6-MAR	4,250
1913	18-JAN	10,800	18-JAN	8,100	14-JAN	6,730	13-JAN	4,860	13-JAN	3,740
1914	31-DEC	88,110	31-DEC	74,890	31-DEC	46,690	31-DEC	28,850	31-DEC	26,160
1915	2-FEB	44,010	1-FEB	31,620	29-JAN	20,330	28-JAN	16,210	28-JAN	14,150
1916	20-MAR	43,090	20-MAR	38,920	18-MAR	31,580	12-MAR	25,350	27-FEB	19,980
1917	25-FEB	73,110	24-FEB	49,860	22-FEB	30,210	21-FEB	18,760	31-MAR	17,300
1918	26-MAR	28,570	26-MAR	24,620	25-MAR	19,480	19-MAR	14,800	20-MAR	13,110
1919	11-FEB	46,330	10-FEB	32,870	9-FEB	21,290	7-FEB	13,540	7-FEB	10,000
1920	16-APR	21,380	15-APR	18,300	14-APR	13,230	8-APR	10,280	27-MAR	7,700
1921	19-NOV	51,790	18-NOV	35,220	17-JAN	22,490	17-JAN	17,430	4-JAN	13,850
1922	19-FEB	25,150	19-FEB	19,870	19-FEB	13,250	18-FEB	10,910	18-FEB	8,330
1923	13-DEC	16,130	12-DEC	13,380	10-DEC	9,670	6-DEC	6,910	6-DEC	6,290
1924	8-FEB	32,790	7-FEB	22,120	7-FEB	12,650	2-FEB	7,470	27-JAN	5,070
1925	6-FEB	51,080	4-FEB	43,680	4-FEB	29,660	3-FEB	18,600	3-FEB	12,970
1926	8-APR	46,650	7-APR	40,530	5-APR	32,110	5-APR	21,480	27-MAR	13,960
1927	21-FEB	82,290	21-FEB	61,850	17-FEB	45,150	16-FEB	32,730	16-FEB	23,100
1928	26-MAR	125,170	25-MAR	110,880	23-MAR	72,650	17-MAR	39,530	2-MAR	22,850
1929	4-FEB	12,050	3-FEB	8,720	2-FEB	6,130	30-JAN	3,970	1-FEB	2,890
1930	15-DEC	77,700	13-DEC	61,070	11-DEC	44,990	10-DEC	26,490	10-DEC	15,400
1931	19-MAR	9,730	18-MAR	8,430	18-MAR	6,840	11-MAR	5,830	1-MAR	4,150
1932	20-MAR	18,570	19-MAR	16,470	19-MAR	13,340	19-MAR	12,230	10-MAR	10,380
1933	29-MAR	7,910	28-MAR	7,170	12-MAR	5,450	16-MAR	4,710	2-MAR	4,130
1934	29-MAR	16,970	28-MAR	12,890	28-MAR	9,720	26-MAR	7,130	7-FEB	5,910
1935	8-APR	53,310	7-APR	41,120	4-APR	31,330	4-APR	26,980	3-APR	23,170
1936	22-FEB	57,070	21-FEB	48,630	20-FEB	33,110	12-FEB	25,750	12-FEB	18,710
1937	12-MAR	15,620	12-MAR	14,230	11-MAR	11,340	11-MAR	10,450	12-MAR	9,100
1938	11-DEC	158,980	10-DEC	106,120	10-DEC	60,210	10-DEC	32,840	2-MAR	22,420
1939	3-DEC	6,270	3-DEC	4,810	1-DEC	3,990	29-NOV	3,490	25-NOV	2,700
1940	30-MAR	134,760	27-FEB	107,910	27-MAR	65,740	26-MAR	41,730	14-MAR	25,930
1941	11-FEB	73,310	10-FEB	55,130	10-FEB	36,670	10-FEB	25,750	9-FEB	23,480
1942	6-FEB	89,120	5-FEB	60,030	3-FEB	43,030	25-JAN	37,490	23-JAN	25,610
1943	23-JAN	65,060	21-JAN	62,960	21-JAN	43,050	21-JAN	29,630	21-JAN	19,510
1944	4-MAR	18,740	4-MAR	11,800	29-FEB	8,330	25-FEB	6,110	9-FEB	4,620
1945	2-FEB	47,630	2-FEB	36,180	1-FEB	27,890	1-FEB	19,620	31-JAN	13,330
1946	29-DEC	46,420	27-DEC	42,110	24-DEC	33,960	22-DEC	27,070	21-DEC	17,630
1947	12-FEB	32,260	12-FEB	24,040	12-FEB	14,980	10-FEB	9,260	12-FEB	8,420
1948	17-APR	33,320	16-APR	27,410	16-APR	22,960	15-APR	19,710	5-APR	15,990
1949	11-MAR	13,490	11-MAR	11,080	17-MAR	8,330	10-MAR	8,240	2-MAR	7,090

TABLE B.6-15

FEATHER RIVER AT OROVILLE DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1950	6-FEB	40,460	5-FEB	31,320	4-FEB	21,840	4-FEB	13,970	17-JAN	11,140
1951	21-NOV	69,880	19-NOV	52,630	17-NOV	36,420	3-DEC	26,750	18-NOV	23,940
1952	2-FEB	47,150	1-FEB	37,260	1-FEB	25,240	31-JAN	17,810	24-JAN	14,890
1953	9-JAN	98,850	9-JAN	59,430	9-JAN	43,290	8-JAN	32,160	7-JAN	21,040
1954	10-MAR	48,140	9-MAR	41,930	9-MAR	26,910	8-MAR	17,690	13-MAR	13,760
1955	15-NOV	8,350	6-DEC	6,800	3-DEC	5,590	2-DEC	4,370	15-NOV	3,530
1956	23-DEC	181,530	22-DEC	146,910	20-DEC	97,980	19-DEC	61,040	19-DEC	42,400
1957	24-FEB	63,110	24-FEB	55,940	23-FEB	36,820	23-FEB	26,190	23-FEB	18,110
1958	25-FEB	76,630	24-FEB	55,930	22-FEB	37,440	13-FEB	31,880	3-FEB	25,030
1959	17-FEB	28,720	16-FEB	23,700	16-FEB	17,830	16-FEB	12,060	16-FEB	9,470
1960	8-FEB	99,130	8-FEB	54,540	7-FEB	31,500	2-FEB	18,210	8-FEB	12,840
1961	31-JAN	15,720	31-JAN	13,020	31-JAN	9,240	31-JAN	9,070	30-JAN	6,800
1962	10-FEB	36,020	13-FEB	28,790	9-FEB	26,180	8-FEB	19,160	8-FEB	13,310
1963	1-FEB	136,200	31-JAN	100,060	31-JAN	59,310	31-JAN	34,950	30-JAN	21,610
1964	21-JAN	20,470	20-JAN	15,180	19-JAN	9,290	19-JAN	6,460	18-JAN	4,870
1965	23-DEC	178,550	22-DEC	165,390	21-DEC	112,930	21-DEC	65,710	21-DEC	44,070
1966	5-JAN	13,370	5-JAN	10,490	5-JAN	7,830	29-DEC	5,910	25-DEC	4,530
1967	30-JAN	54,280	29-JAN	51,440	28-JAN	35,220	21-JAN	27,070	21-JAN	18,240
1968	21-FEB	40,150	21-FEB	36,520	20-FEB	30,550	17-FEB	21,360	17-FEB	15,550
1969	21-JAN	137,080	20-JAN	101,840	20-JAN	69,030	19-JAN	44,370	13-JAN	29,960
1970	24-JAN	117,680	22-JAN	105,110	21-JAN	81,780	14-JAN	66,970	9-JAN	42,490
1971	26-MAR	64,380	26-MAR	45,990	24-MAR	32,910	17-MAR	21,460	2-MAR	14,890
1972	29-FEB	19,990	3-MAR	17,170	29-FEB	16,200	28-FEB	14,320	23-FEB	12,090
1973	16-JAN	48,340	16-JAN	37,850	12-JAN	26,550	11-JAN	18,340	12-JAN	13,200
1974	30-MAR	108,250	29-MAR	79,750	28-MAR	58,470	26-MAR	38,830	12-MAR	26,960
1975	13-FEB	31,920	25-MAR	23,140	20-MAR	17,320	18-MAR	14,790	7-MAR	12,730
1976	29-FEB	12,080	29-FEB	10,380	28-FEB	7,330	27-FEB	5,410	28-FEB	4,490
1977	21-FEB	4,290	21-FEB	3,090	21-FEB	2,180	20-FEB	1,670	19-FEB	1,550
1978	16-JAN	54,950	15-JAN	48,220	14-JAN	35,660	5-JAN	27,840	27-DEC	18,480
1979	14-FEB	23,410	13-FEB	15,130	13-FEB	11,000	13-FEB	8,730	14-FEB	8,040
1980	13-JAN	137,620	12-JAN	107,100	12-JAN	72,480	11-JAN	40,670	31-DEC	23,640
1981	14-FEB	18,860	27-JAN	14,620	14-FEB	11,570	13-FEB	8,850	27-JAN	7,330
1982	20-DEC	98,900	19-DEC	77,110	15-FEB	48,030	13-NOV	35,800	23-NOV	24,000
1983	13-MAR	98,770	13-MAR	71,350	11-MAR	49,960	1-MAR	44,140	26-FEB	34,080
1984	25-DEC	74,710	25-DEC	63,170	25-DEC	45,160	24-DEC	30,350	9-DEC	23,660
1985	8-FEB	17,550	8-FEB	10,720	24-NOV	7,040	20-NOV	5,440	7-NOV	5,070
1986	17-FEB	217,020	17-FEB	187,010	15-FEB	128,860	13-FEB	77,780	14-FEB	54,930
1987	13-FEB	30,980	12-MAR	21,210	12-MAR	15,480	5-MAR	12,130	5-MAR	8,690
1988	2-DEC	18,756	1-DEC	13,203	6-DEC	10,067	1-DEC	8,719	1-DEC	5,666
1989	10-MAR	86,723	9-MAR	78,935	8-MAR	53,028	7-MAR	33,309	7-MAR	25,926
1990	13-JAN	14,726	13-JAN	11,285	27-MAY	8,838	17-MAR	6,812	2-MAR	6,619
1991	4-MAR	49,728	3-MAR	33,361	2-MAR	19,416	1-MAR	12,240	3-MAR	8,940
1992	20-FEB	24,208	20-FEB	17,127	19-FEB	11,969	11-FEB	10,224	11-FEB	8,277
1993	18-MAR	59,057	17-MAR	51,622	13-MAR	40,788	13-MAR	35,430	13-MAR	26,716
1994	6-MAR	9,457	5-MAR	7,963	5-MAR	7,151	3-MAR	6,431	17-FEB	5,584
1995	10-MAR	134,188	9-MAR	113,783	9-MAR	84,965	9-MAR	59,758	9-MAR	39,814
1996	5-FEB	57,809	19-FEB	49,308	18-FEB	38,219	14-FEB	27,785	4-FEB	22,903
1997	1-JAN	312,893	31-DEC	244,485	29-DEC	152,096	27-DEC	85,085	29-DEC	50,868
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-16

NORTH YUBA RIVER AT NEW BULLARDS BAR DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1935	---	---	---	---	---	---	---	---	---	---
1936	---	---	---	---	---	---	---	---	---	---
1937	---	---	---	---	---	---	---	---	---	---
1938	---	---	---	---	---	---	---	---	---	---
1939	---	---	---	---	---	---	---	---	---	---
1940	---	---	---	---	---	---	---	---	---	---
1941	10-FEB	14,400	10-FEB	12,593	10-FEB	8,219	10-FEB	5,965	9-FEB	5,191
1942	6-FEB	21,800	5-FEB	14,567	3-FEB	10,267	25-JAN	9,623	25-JAN	6,394
1943	21-JAN	22,200	21-JAN	18,233	21-JAN	11,804	21-JAN	8,191	21-JAN	5,281
1944	8-MAY	4,610	4-MAR	4,513	29-FEB	4,274	29-FEB	3,803	28-FEB	3,126
1945	2-FEB	18,600	1-FEB	12,633	1-FEB	8,329	1-FEB	5,697	1-FEB	4,011
1946	29-DEC	15,300	28-DEC	12,443	24-DEC	9,934	22-DEC	7,851	22-DEC	5,007
1947	12-FEB	10,100	13-FEB	6,937	12-FEB	4,024	12-FEB	2,736	12-FEB	2,700
1948	17-APR	11,500	17-APR	8,290	17-APR	6,674	16-APR	5,494	5-APR	4,686
1949	23-APR	4,690	3-MAR	4,533	11-MAR	4,390	3-MAR	4,131	3-MAR	3,575
1950	6-FEB	10,200	5-FEB	7,667	4-FEB	5,136	4-FEB	4,298	17-JAN	3,939
1951	21-NOV	29,900	19-NOV	25,067	18-NOV	16,144	3-DEC	9,203	18-NOV	8,922
1952	2-FEB	15,400	1-FEB	10,153	1-FEB	7,071	25-JAN	6,927	25-JAN	6,747
1953	9-JAN	25,600	9-JAN	13,787	9-JAN	9,710	9-JAN	7,829	7-JAN	5,104
1954	9-MAR	18,100	9-MAR	12,220	9-MAR	7,329	9-MAR	4,565	9-MAR	3,955
1955	9-MAY	4,650	1-JAN	4,473	4-FEB	4,189	3-DEC	3,459	4-DEC	2,949
1956	23-DEC	57,000	22-DEC	42,733	20-DEC	27,171	19-DEC	16,381	19-DEC	11,089
1957	24-FEB	17,200	24-FEB	14,733	23-FEB	9,633	23-FEB	7,177	22-FEB	4,926
1958	25-FEB	18,800	24-FEB	13,677	30-MAR	9,221	12-FEB	8,267	30-JAN	6,139
1959	17-FEB	6,170	17-FEB	5,397	16-FEB	4,050	16-FEB	2,682	10-FEB	2,105
1960	8-FEB	32,600	8-FEB	16,863	7-FEB	9,384	2-FEB	5,229	8-FEB	3,746
1961	10-FEB	3,050	10-FEB	2,800	10-FEB	2,407	1-FEB	2,170	31-JAN	1,909
1962	10-FEB	11,800	9-FEB	8,527	10-FEB	7,207	9-FEB	4,798	9-FEB	3,709
1963	1-FEB	42,000	31-JAN	31,500	31-JAN	17,080	31-JAN	9,704	30-JAN	5,690
1964	15-NOV	5,850	20-JAN	3,407	20-JAN	2,414	15-NOV	2,219	4-NOV	1,893
1965	22-DEC	63,700	22-DEC	51,400	21-DEC	33,729	21-DEC	19,905	21-DEC	13,089
1966	11-APR	4,040	5-JAN	3,813	5-JAN	3,229	29-DEC	3,021	5-JAN	2,722
1967	29-JAN	13,941	29-JAN	12,205	28-JAN	7,929	21-JAN	6,733	21-JAN	5,501
1968	21-FEB	11,845	20-FEB	10,268	20-FEB	8,175	17-FEB	5,534	17-FEB	3,661
1969	27-JAN	17,700	20-JAN	15,800	20-JAN	11,160	19-JAN	8,355	19-JAN	7,127
1970	17-JAN	46,928	22-JAN	34,082	21-JAN	28,694	14-JAN	20,732	10-JAN	12,357
1971	26-MAR	14,862	26-MAR	11,021	24-MAR	7,925	24-MAR	5,786	4-MAR	4,626
1972	23-JAN	7,729	24-FEB	5,180	24-FEB	4,623	24-FEB	4,255	23-FEB	3,784
1973	16-JAN	13,977	16-JAN	10,373	12-JAN	8,891	11-JAN	6,460	12-JAN	5,629
1974	30-MAR	26,505	29-MAR	20,569	28-MAR	16,591	27-MAR	10,997	27-DEC	7,717
1975	25-MAR	11,379	25-MAR	8,073	21-MAR	6,827	18-MAR	6,333	7-MAR	6,089
1976	29-FEB	3,765	29-FEB	2,891	29-FEB	1,964	28-FEB	1,425	28-FEB	1,191
1977	22-FEB	1,235	21-FEB	840	21-FEB	768	20-FEB	661	21-FEB	577
1978	15-JAN	13,582	15-JAN	12,270	14-JAN	8,974	5-JAN	6,973	28-DEC	5,019
1979	11-JAN	7,217	11-JAN	5,672	11-JAN	5,537	18-FEB	4,682	14-FEB	4,326
1980	13-JAN	54,730	12-JAN	40,938	12-JAN	25,145	10-JAN	14,180	31-DEC	8,409
1981	28-JAN	6,523	27-JAN	4,865	27-JAN	3,563	13-FEB	2,855	28-FEB	2,249
1982	20-DEC	40,076	19-DEC	29,709	19-DEC	17,439	19-DEC	13,429	14-DEC	9,060
1983	13-MAR	31,428	13-MAR	21,504	12-MAR	15,291	1-MAR	11,479	26-FEB	9,209
1984	25-DEC	24,338	25-DEC	22,909	25-DEC	18,633	24-DEC	11,287	9-DEC	8,310

TABLE B.6-16

NORTH YUBA RIVER AT NEW BULLARDS BAR DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1985	8-FEB	6,056	8-FEB	3,591	7-FEB	3,382	7-FEB	3,337	7-FEB	2,722
1986	17-FEB	69,273	17-FEB	54,947	15-FEB	36,041	13-FEB	21,029	13-FEB	15,256
1987	13-FEB	11,885	13-FEB	6,556	11-FEB	3,881	5-MAR	2,551	13-FEB	2,096
1988	10-DEC	4,491	9-DEC	3,899	6-DEC	2,578	1-DEC	1,969	3-JAN	1,418
1989	10-MAR	23,377	9-MAR	21,459	8-MAR	14,671	6-MAR	9,218	8-MAR	7,760
1990	3-MAR	4,312	3-MAR	3,395	2-MAR	2,641	26-FEB	2,229	27-FEB	2,037
1991	4-MAR	21,656	3-MAR	12,082	2-MAR	6,475	1-MAR	3,763	3-MAR	2,591
1992	20-FEB	9,439	20-FEB	6,136	19-FEB	4,188	12-FEB	3,165	11-FEB	2,557
1993	22-JAN	14,230	20-JAN	12,190	20-JAN	7,756	13-JAN	7,476	13-JAN	3,910
1994	8-DEC	2,566	8-DEC	1,686	8-DEC	1,222	8-DEC	977	8-DEC	692
1995	14-JAN	29,405	9-MAR	24,291	9-MAR	18,031	9-MAR	13,292	9-MAR	8,969
1996	5-FEB	21,784	4-FEB	15,609	17-FEB	11,758	11-FEB	7,959	27-JAN	7,279
1997	1-JAN	87,988	31-DEC	66,951	29-DEC	40,739	26-DEC	23,701	10-DEC	15,026
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-17

YUBA RIVER NEAR MARYSVILLE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1900	---	---	---	---	---	---	---	---	---	---
1901	---	---	---	---	---	---	---	---	---	---
1902	---	---	---	---	---	---	---	---	---	---
1903	---	---	---	---	---	---	---	---	---	---
1904	22-FEB	63,986	22-FEB	52,537	22-FEB	33,384	16-FEB	27,750	16-FEB	21,137
1905	30-DEC	19,153	30-DEC	14,980	19-MAR	11,579	18-MAR	10,026	13-MAR	8,609
1906	18-JAN	51,360	17-JAN	34,918	13-JAN	25,084	22-MAR	19,581	12-MAR	14,751
1907	19-MAR	107,000	18-MAR	87,383	17-MAR	54,799	17-MAR	30,524	1-MAR	18,850
1908	20-APR	8,999	20-JAN	8,086	20-JAN	6,555	14-JAN	5,029	14-JAN	3,943
1909	15-JAN	118,770	14-JAN	102,720	14-JAN	59,599	8-JAN	41,174	3-JAN	25,473
1910	21-NOV	39,590	21-NOV	25,288	20-NOV	17,754	20-NOV	12,537	20-NOV	10,156
1911	31-JAN	41,730	30-JAN	33,348	29-JAN	24,243	24-JAN	18,918	20-JAN	12,971
1912	6-MAR	8,175	6-MAR	5,118	5-MAR	3,218	6-MAR	2,567	6-MAR	2,261
1913	6-NOV	10,700	6-NOV	7,180	14-JAN	5,376	13-JAN	3,395	13-JAN	2,508
1914	31-DEC	48,899	31-DEC	37,343	31-DEC	23,999	31-DEC	14,416	31-DEC	13,795
1915	2-FEB	26,536	11-FEB	22,042	31-JAN	12,967	28-JAN	9,146	31-JAN	8,233
1916	3-JAN	26,857	19-MAR	22,006	18-MAR	16,013	11-MAR	12,409	21-FEB	10,451
1917	25-FEB	41,516	24-FEB	30,602	21-FEB	21,018	20-FEB	12,806	20-FEB	8,014
1918	6-FEB	14,017	26-MAR	9,113	25-MAR	7,404	19-MAR	6,650	19-MAR	6,144
1919	11-FEB	31,458	9-FEB	26,144	7-FEB	16,388	6-FEB	9,904	7-FEB	7,545
1920	15-APR	20,865	14-APR	15,322	14-APR	10,248	8-APR	7,183	21-MAR	5,213
1921	18-JAN	26,536	17-JAN	17,869	17-JAN	11,849	17-JAN	9,182	30-DEC	7,137
1922	19-FEB	19,367	19-FEB	14,916	19-FEB	10,767	18-FEB	8,876	9-FEB	6,497
1923	13-DEC	29,960	12-DEC	20,259	10-DEC	12,592	6-DEC	7,365	6-DEC	5,433
1924	8-FEB	10,657	7-FEB	6,538	6-FEB	4,268	6-FEB	2,798	27-JAN	1,931
1925	6-FEB	41,730	4-FEB	35,239	4-FEB	23,506	3-FEB	14,562	3-FEB	9,503
1926	4-FEB	24,824	3-FEB	19,296	5-APR	14,460	5-APR	10,326	5-APR	6,872
1927	21-FEB	53,842	20-FEB	33,825	16-FEB	27,830	15-FEB	19,755	3-FEB	13,813
1928	26-MAR	87,706	25-MAR	74,798	23-MAR	44,925	17-MAR	24,073	2-MAR	13,497
1929	4-FEB	4,965	4-FEB	3,313	2-FEB	2,534	2-FEB	1,790	29-JAN	1,374
1930	13-DEC	21,043	12-DEC	16,328	10-DEC	12,436	10-DEC	7,545	10-DEC	4,520
1931	19-MAR	5,116	18-MAR	4,421	18-MAR	3,398	11-MAR	2,624	1-MAR	1,852
1932	24-DEC	14,440	27-DEC	9,803	23-DEC	8,334	22-DEC	6,052	23-DEC	4,130
1933	28-MAR	5,059	28-MAR	4,392	28-MAR	3,524	28-MAR	3,144	28-MAR	2,846
1934	29-MAR	14,113	29-MAR	8,929	28-MAR	6,044	27-MAR	4,218	19-MAR	3,181
1935	8-APR	30,873	8-APR	19,923	4-APR	14,673	3-APR	12,970	3-APR	10,914
1936	22-FEB	32,049	21-FEB	23,787	20-FEB	16,571	12-FEB	15,111	12-FEB	10,394
1937	14-FEB	15,453	13-FEB	9,649	12-FEB	6,079	11-MAR	5,618	12-MAR	5,242
1938	11-DEC	84,421	10-DEC	50,340	10-DEC	26,254	12-MAR	15,301	1-MAR	12,103
1939	5-JAN	2,507	5-JAN	1,503	6-FEB	1,142	30-JAN	954	30-JAN	866
1940	30-MAR	67,923	27-FEB	48,525	26-MAR	33,817	26-MAR	21,079	14-MAR	12,734
1941	11-FEB	29,521	10-FEB	24,393	10-FEB	16,247	10-FEB	12,122	9-FEB	10,696
1942	6-FEB	46,777	5-FEB	31,686	3-FEB	22,379	25-JAN	20,921	25-JAN	13,508
1943	21-JAN	47,399	21-JAN	42,675	21-JAN	26,811	21-JAN	18,455	21-JAN	11,614
1944	4-MAR	12,782	4-MAR	7,727	29-FEB	7,007	29-FEB	6,233	28-FEB	5,260
1945	2-FEB	37,577	1-FEB	27,410	1-FEB	17,857	1-FEB	11,654	1-FEB	7,607
1946	29-DEC	26,829	28-DEC	24,216	24-DEC	20,887	22-DEC	17,093	22-DEC	11,095
1947	13-FEB	16,407	13-FEB	11,473	12-FEB	7,210	12-FEB	5,190	12-FEB	5,064
1948	17-APR	16,714	17-APR	14,933	17-APR	12,374	16-APR	10,170	5-APR	8,808
1949	3-MAR	7,816	3-MAR	7,662	11-MAR	7,511	3-MAR	7,151	3-MAR	6,024

TABLE B.6-17

YUBA RIVER NEAR MARYSVILLE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1950	5-FEB	25,823	5-FEB	22,523	4-FEB	14,658	4-FEB	8,963	17-JAN	7,422
1951	21-NOV	61,410	19-NOV	54,944	18-NOV	32,399	3-DEC	23,118	18-NOV	20,625
1952	2-FEB	32,773	1-FEB	20,307	1-FEB	15,577	25-JAN	15,025	25-JAN	14,167
1953	9-JAN	34,683	9-JAN	24,513	9-JAN	18,818	9-JAN	15,908	7-JAN	10,148
1954	10-MAR	34,162	9-MAR	25,629	9-MAR	16,366	9-MAR	10,517	9-MAR	8,333
1955	2-JAN	6,761	1-JAN	6,302	4-FEB	6,025	3-DEC	5,008	4-DEC	4,426
1956	23-DEC	142,880	22-DEC	107,438	20-DEC	64,561	19-DEC	37,993	19-DEC	26,423
1957	25-FEB	34,733	24-FEB	25,050	23-FEB	15,844	23-FEB	13,192	22-FEB	9,231
1958	25-FEB	38,615	24-FEB	25,757	30-MAR	18,698	12-FEB	15,905	30-JAN	12,534
1959	17-FEB	17,980	17-FEB	15,317	16-FEB	10,468	16-FEB	6,513	10-FEB	4,674
1960	8-FEB	72,042	8-FEB	37,630	7-FEB	19,619	2-FEB	11,009	8-FEB	7,698
1961	10-FEB	5,594	10-FEB	4,811	10-FEB	3,609	1-FEB	3,456	31-JAN	3,051
1962	10-FEB	50,990	9-FEB	25,580	10-FEB	21,936	9-FEB	13,747	9-FEB	8,971
1963	1-FEB	111,422	31-JAN	65,974	31-JAN	35,160	31-JAN	19,424	30-JAN	11,126
1964	15-NOV	13,663	20-JAN	7,085	20-JAN	4,639	15-NOV	3,553	4-NOV	3,037
1965	23-DEC	143,847	22-DEC	118,205	21-DEC	74,916	21-DEC	42,531	21-DEC	28,504
1966	5-JAN	6,976	5-JAN	6,252	5-JAN	5,288	29-DEC	5,033	5-JAN	4,311
1967	22-JAN	30,804	29-JAN	26,998	28-JAN	17,981	21-JAN	14,145	21-JAN	9,282
1968	20-FEB	21,817	20-FEB	19,605	20-FEB	15,577	17-FEB	11,178	17-FEB	7,633
1969	21-JAN	45,095	20-JAN	36,917	20-JAN	27,428	19-JAN	21,221	19-JAN	16,485
1970	22-JAN	94,157	22-JAN	63,025	21-JAN	44,980	14-JAN	36,518	10-JAN	22,087
1971	26-MAR	28,821	26-MAR	21,959	24-MAR	14,298	24-MAR	9,397	4-MAR	7,057
1972	25-FEB	9,648	24-FEB	7,570	24-FEB	6,587	24-FEB	6,164	23-FEB	5,323
1973	12-JAN	33,224	16-JAN	23,193	12-JAN	19,461	11-JAN	13,026	12-JAN	9,073
1974	30-MAR	47,754	29-MAR	34,255	28-MAR	26,977	27-MAR	17,540	27-DEC	12,667
1975	25-MAR	26,915	25-MAR	16,788	21-MAR	11,069	18-MAR	8,666	7-MAR	8,152
1976	26-OCT	5,102	29-FEB	3,962	29-FEB	2,787	28-FEB	2,009	28-FEB	1,647
1977	22-FEB	1,863	21-FEB	1,316	21-FEB	871	20-FEB	710	21-FEB	610
1978	5-MAR	27,215	15-JAN	23,739	14-JAN	17,055	5-JAN	13,138	28-DEC	8,819
1979	11-JAN	15,938	11-JAN	8,384	11-JAN	6,592	18-FEB	5,627	14-FEB	5,424
1980	13-JAN	91,464	12-JAN	75,178	12-JAN	46,886	10-JAN	25,760	31-DEC	14,836
1981	28-JAN	12,065	27-JAN	8,455	27-JAN	5,661	13-FEB	4,658	28-FEB	3,499
1982	20-DEC	95,776	19-DEC	65,051	19-DEC	35,316	19-DEC	23,744	14-DEC	15,631
1983	13-MAR	61,238	13-MAR	37,935	12-MAR	25,377	1-MAR	21,278	26-FEB	16,871
1984	25-DEC	48,632	25-DEC	44,005	25-DEC	32,126	24-DEC	20,117	9-DEC	14,062
1985	8-FEB	15,774	8-FEB	7,965	7-FEB	4,797	7-FEB	4,654	7-FEB	3,840
1986	17-FEB	142,262	17-FEB	122,522	15-FEB	76,328	13-FEB	43,546	13-FEB	30,504
1987	13-FEB	18,858	13-FEB	10,356	11-FEB	6,113	5-MAR	4,082	13-FEB	3,311
1988	10-DEC	7,276	9-DEC	5,837	6-DEC	3,912	3-JAN	3,102	3-JAN	2,301
1989	10-MAR	42,363	9-MAR	37,290	8-MAR	25,508	6-MAR	16,583	6-MAR	13,627
1990	13-JAN	8,750	13-JAN	6,305	8-JAN	4,016	27-FEB	3,382	26-FEB	2,991
1991	4-MAR	35,275	3-MAR	20,237	2-MAR	10,797	2-MAR	6,797	3-MAR	5,107
1992	20-FEB	16,931	20-FEB	10,561	15-FEB	7,281	12-FEB	6,105	11-FEB	4,512
1993	22-JAN	30,622	20-JAN	25,667	20-JAN	15,651	17-MAR	11,617	14-MAR	8,895
1994	6-MAR	4,087	5-MAR	3,629	5-MAR	3,097	27-FEB	2,739	17-FEB	2,452
1995	14-JAN	52,966	9-MAR	42,830	9-MAR	33,243	9-MAR	24,079	29-APR	17,752
1996	5-FEB	44,587	4-FEB	30,107	17-FEB	18,748	14-FEB	12,431	25-JAN	12,012
1997	1-JAN	160,810	31-DEC	123,607	30-DEC	76,734	26-DEC	44,983	29-DEC	28,409
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-18

DEER CREEK NEAR SMARTVILLE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1935	---	---	---	---	---	---	---	---	---	---
1936	13-FEB	3,670	12-FEB	3,247	11-FEB	2,305	12-FEB	1,659	11-FEB	965
1937	4-FEB	4,510	4-FEB	3,120	2-FEB	1,614	2-FEB	1,094	12-MAR	691
1938	11-DEC	6,620	10-DEC	3,657	8-FEB	2,326	31-JAN	1,833	2-FEB	1,301
1939	9-MAR	1,520	8-MAR	903	8-MAR	485	8-MAR	278	7-MAR	188
1940	30-MAR	5,140	27-FEB	3,543	25-FEB	2,157	26-MAR	1,208	13-FEB	768
1941	4-APR	2,280	10-FEB	1,813	9-FEB	1,121	9-FEB	834	9-FEB	740
1942	6-FEB	3,860	4-FEB	3,003	3-FEB	1,980	25-JAN	1,525	23-JAN	990
1943	21-JAN	5,240	21-JAN	3,320	21-JAN	1,939	20-JAN	1,466	20-JAN	912
1944	4-MAR	2,840	3-MAR	1,355	28-FEB	991	22-FEB	620	21-FEB	426
1945	1-FEB	3,350	1-FEB	2,857	1-FEB	1,701	1-FEB	1,028	31-JAN	645
1946	22-DEC	2,760	21-DEC	2,050	22-DEC	1,846	21-DEC	1,372	21-DEC	850
1947	12-FEB	2,180	12-FEB	1,014	12-FEB	503	2-MAR	362	12-FEB	303
1948	24-MAR	1,260	23-MAR	648	2-JAN	421	3-APR	316	24-MAR	272
1949	3-MAR	2,705	2-MAR	1,475	2-MAR	754	2-MAR	554	11-FEB	368
1950	4-FEB	3,705	4-FEB	2,286	4-FEB	1,257	4-FEB	766	16-JAN	705
1951	20-NOV	3,976	18-NOV	2,934	16-NOV	1,745	3-DEC	1,084	18-NOV	1,009
1952	12-JAN	3,464	12-JAN	2,298	11-JAN	1,729	12-JAN	1,254	11-JAN	1,036
1953	19-MAR	1,480	7-JAN	1,035	7-JAN	855	7-JAN	732	5-JAN	591
1954	17-JAN	2,142	16-JAN	1,177	12-FEB	733	16-JAN	472	9-MAR	413
1955	9-DEC	731	31-DEC	417	15-JAN	287	15-JAN	200	31-DEC	185
1956	23-DEC	5,971	22-DEC	4,190	19-DEC	3,093	18-DEC	2,148	19-DEC	1,637
1957	18-MAY	1,810	18-MAY	1,289	18-MAY	792	21-FEB	511	21-FEB	396
1958	2-APR	3,909	1-APR	3,202	30-MAR	2,149	21-MAR	1,466	14-MAR	1,028
1959	18-FEB	1,569	16-FEB	1,396	16-FEB	881	10-FEB	675	30-JAN	437
1960	8-FEB	4,657	7-FEB	2,486	5-FEB	1,346	1-FEB	808	7-FEB	554
1961	26-NOV	717	9-FEB	420	9-FEB	269	15-MAR	246	6-MAR	177
1962	10-FEB	4,251	9-FEB	2,835	9-FEB	2,196	8-FEB	1,342	8-FEB	944
1963	13-OCT	7,491	12-OCT	3,657	30-JAN	1,769	30-JAN	956	27-MAR	695
1964	21-JAN	1,493	20-JAN	1,243	19-JAN	765	19-JAN	488	8-JAN	304
1965	22-DEC	5,195	21-DEC	3,614	21-DEC	2,232	21-DEC	1,714	19-DEC	1,338
1966	5-JAN	1,512	4-JAN	927	30-DEC	564	25-DEC	475	24-DEC	300
1967	21-JAN	4,188	20-JAN	2,312	20-JAN	1,352	20-JAN	1,214	19-JAN	746
1968	30-JAN	1,746	19-FEB	1,144	17-FEB	816	13-FEB	539	30-JAN	485
1969	20-JAN	4,381	19-JAN	3,621	20-JAN	2,419	13-JAN	1,870	11-JAN	1,316
1970	21-JAN	4,028	21-JAN	2,415	21-JAN	2,043	14-JAN	1,560	5-JAN	1,045
1971	26-MAR	2,630	25-MAR	1,502	25-MAR	889	28-NOV	565	1-DEC	494
1972	25-DEC	1,044	24-DEC	682	22-DEC	500	22-DEC	291	4-FEB	215
1973	16-JAN	2,965	16-JAN	1,929	11-JAN	1,429	9-JAN	1,114	9-JAN	831
1974	2-MAR	2,470	30-MAR	2,087	28-MAR	1,664	27-MAR	1,068	27-DEC	754
1975	25-MAR	2,391	24-MAR	1,401	21-MAR	1,026	1-FEB	817	8-MAR	536
1976	29-FEB	243	29-FEB	189	18-NOV	134	10-NOV	119	1-NOV	109
1977	3-JAN	251	21-FEB	138	21-FEB	88	14-FEB	58	30-JAN	44
1978	5-JAN	3,424	14-JAN	2,394	13-JAN	1,516	4-JAN	1,255	2-JAN	976
1979	11-JAN	1,849	28-FEB	1,041	18-FEB	866	16-FEB	731	13-FEB	520
1980	19-FEB	4,220	19-FEB	2,830	17-FEB	2,020	15-FEB	1,332	15-FEB	947
1981	27-JAN	1,284	27-JAN	1,099	27-JAN	584	23-JAN	329	2-MAR	242
1982	20-DEC	3,861	15-FEB	2,687	30-MAR	1,778	31-MAR	1,499	28-MAR	1,033
1983	13-MAR	4,583	12-MAR	2,549	23-JAN	2,062	28-FEB	1,558	26-FEB	1,243
1984	25-DEC	3,818	25-DEC	2,844	24-DEC	2,078	23-DEC	1,272	9-DEC	902

TABLE B.6-18

DEER CREEK NEAR SMARTVILLE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1985	8-FEB	3,160	7-FEB	1,288	7-FEB	656	7-FEB	372	7-FEB	256
1986	17-FEB	10,372	17-FEB	7,659	15-FEB	4,609	13-FEB	2,585	15-FEB	1,728
1987	13-FEB	1,407	13-FEB	700	11-FEB	417	5-MAR	311	13-FEB	252
1988	16-JAN	645	15-JAN	452	11-JAN	331	3-JAN	314	28-DEC	225
1989	10-MAR	2,829	9-MAR	2,042	6-MAR	1,219	2-MAR	924	2-MAR	904
1990	13-JAN	1,263	12-JAN	852	12-JAN	465	7-JAN	266	17-FEB	205
1991	4-MAR	2,103	24-MAR	1,163	23-MAR	719	13-MAR	596	1-MAR	502
1992	12-FEB	1,618	14-FEB	1,091	11-FEB	905	10-FEB	654	10-FEB	431
1993	20-JAN	2,846	20-JAN	2,083	16-JAN	1,191	8-JAN	911	28-DEC	736
1994	7-FEB	691	18-FEB	376	17-FEB	296	7-FEB	243	7-FEB	188
1995	10-JAN	4,910	8-JAN	2,946	8-JAN	2,174	9-MAR	1,659	4-JAN	1,113
1996	5-FEB	2,740	4-FEB	2,140	19-FEB	1,331	24-JAN	993	24-JAN	861
1997	2-JAN	7,650	31-DEC	6,116	29-DEC	3,868	21-DEC	2,374	29-DEC	1,624
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-19

BEAR RIVER NEAR WHEATLAND
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1905	---	---	---	---	---	---	---	---	---	---
1906	31-MAR	18,616	18-JAN	11,017	13-JAN	8,212	22-MAR	5,079	12-MAR	3,453
1907	19-MAR	26,832	17-MAR	17,888	17-MAR	13,040	17-MAR	7,981	17-MAR	4,894
1908	31-DEC	2,444	20-JAN	1,903	20-JAN	1,422	20-JAN	1,064	14-JAN	871
1909	14-JAN	26,312	14-JAN	21,389	14-JAN	12,363	8-JAN	8,548	8-JAN	5,376
1910	9-DEC	10,358	8-DEC	4,524	7-DEC	2,387	1-DEC	1,482	7-DEC	1,126
1911	31-JAN	23,088	29-JAN	13,971	25-JAN	8,787	20-JAN	6,745	12-JAN	4,613
1912	30-APR	1,425	30-APR	1,097	29-APR	797	6-MAR	554	10-APR	427
1913	18-JAN	5,377	16-JAN	2,727	14-JAN	2,192	13-JAN	1,178	13-JAN	685
1914	31-DEC	17,680	31-DEC	11,523	22-JAN	6,815	14-JAN	5,488	31-DEC	4,579
1915	12-MAY	13,208	11-MAY	7,304	10-MAY	4,471	1-FEB	3,743	1-FEB	3,199
1916	3-JAN	20,176	3-JAN	9,131	5-FEB	4,924	25-JAN	4,073	14-JAN	3,744
1917	24-FEB	11,232	24-FEB	8,469	20-FEB	6,429	20-FEB	3,760	20-FEB	2,321
1918	19-MAR	5,127	11-MAR	2,701	19-MAR	1,601	11-MAR	1,532	8-MAR	1,065
1919	11-FEB	20,592	9-FEB	11,034	7-FEB	5,965	7-FEB	3,351	7-FEB	2,776
1920	15-APR	7,072	15-APR	3,637	15-APR	1,847	9-APR	1,011	21-MAR	820
1921	18-JAN	16,328	18-JAN	8,209	18-JAN	4,594	18-JAN	3,551	17-JAN	2,499
1922	9-FEB	16,328	9-FEB	9,318	8-FEB	4,535	9-FEB	4,020	9-FEB	2,957
1923	13-DEC	21,424	12-DEC	9,981	10-DEC	5,518	6-DEC	3,003	10-DEC	1,966
1924	9-FEB	790	9-FEB	407	9-FEB	228	28-JAN	161	27-JAN	119
1925	6-FEB	11,752	4-FEB	6,607	4-FEB	3,751	4-FEB	2,282	4-FEB	1,707
1926	4-FEB	5,450	3-FEB	4,333	31-JAN	2,995	31-JAN	2,351	29-JAN	1,747
1927	21-FEB	25,064	20-FEB	12,303	16-FEB	9,879	15-FEB	5,710	3-FEB	3,640
1928	---	18,960	---	16,240	---	9,799	---	5,850	---	3,780
1929	---	1,114	---	743	---	568	---	470	---	379
1930	5-MAR	9,110	4-MAR	6,217	4-MAR	3,729	4-MAR	2,329	22-FEB	1,636
1931	17-NOV	1,260	19-FEB	839	14-FEB	733	14-FEB	615	17-NOV	529
1932	28-DEC	5,640	27-DEC	3,897	6-FEB	2,667	31-JAN	1,679	17-JAN	1,032
1933	28-MAR	997	28-MAR	662	25-JAN	421	16-MAR	291	25-JAN	228
1934	1-JAN	2,850	1-JAN	1,827	30-DEC	1,244	30-DEC	868	10-DEC	701
1935	8-APR	14,200	7-APR	7,853	4-APR	4,434	4-APR	3,135	21-MAR	2,069
1936	14-FEB	10,900	12-FEB	9,800	12-FEB	7,151	11-FEB	5,621	11-FEB	3,321
1937	5-FEB	5,550	5-FEB	4,670	21-MAR	3,099	4-FEB	2,363	12-MAR	1,612
1938	11-FEB	10,700	10-FEB	7,470	9-FEB	5,969	1-FEB	4,497	2-FEB	3,209
1939	9-MAR	2,250	9-MAR	1,733	9-MAR	1,130	9-MAR	768	7-MAR	549
1940	30-MAR	15,600	27-FEB	11,290	25-FEB	6,516	21-FEB	3,763	7-FEB	2,562
1941	12-FEB	6,210	11-FEB	4,863	10-FEB	3,321	10-FEB	2,788	9-FEB	2,501
1942	6-FEB	11,800	4-FEB	8,693	3-FEB	5,883	25-JAN	4,616	24-JAN	2,904
1943	10-MAR	11,200	21-JAN	10,007	21-JAN	6,207	21-JAN	4,671	21-JAN	2,883
1944	4-MAR	6,550	4-MAR	3,753	29-FEB	2,562	29-FEB	1,633	22-FEB	1,116
1945	2-FEB	9,540	1-FEB	7,917	1-FEB	4,830	1-FEB	2,977	1-FEB	1,895
1946	22-DEC	9,630	22-DEC	6,190	22-DEC	5,520	22-DEC	3,925	21-DEC	2,550
1947	10-MAR	4,640	10-MAR	2,887	9-MAR	1,810	3-MAR	1,376	3-MAR	1,083
1948	10-APR	4,530	9-APR	2,850	6-APR	2,006	9-APR	1,729	5-APR	1,555
1949	3-MAR	6,750	3-MAR	4,387	2-MAR	2,579	2-MAR	2,140	2-MAR	1,565
1950	6-FEB	6,780	4-FEB	6,147	4-FEB	3,596	28-JAN	2,085	17-JAN	1,838
1951	21-NOV	17,800	19-NOV	12,087	18-NOV	6,953	3-DEC	4,054	18-NOV	3,854
1952	15-JAN	11,500	1-FEB	8,000	30-JAN	4,929	24-JAN	4,165	12-JAN	3,573
1953	20-JAN	4,060	19-JAN	3,770	18-JAN	2,717	9-JAN	2,402	7-JAN	1,610
1954	14-FEB	4,360	9-MAR	3,060	13-FEB	2,110	9-MAR	1,659	9-MAR	1,427

TABLE B.6-19

BEAR RIVER NEAR WHEATLAND
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1955	1-JAN	2,260	9-DEC	1,491	9-DEC	1,020	10-JAN	717	31-DEC	583
1956	23-DEC	22,100	22-DEC	19,033	20-DEC	11,657	19-DEC	7,179	19-DEC	5,225
1957	19-MAY	6,280	18-MAY	3,990	18-MAY	2,551	23-FEB	2,062	23-FEB	1,568
1958	3-APR	11,400	1-APR	9,920	30-MAR	7,427	22-MAR	5,049	15-MAR	3,613
1959	18-FEB	3,690	17-FEB	3,453	16-FEB	2,529	11-FEB	1,724	11-FEB	1,108
1960	8-FEB	18,800	8-FEB	9,163	7-FEB	4,634	2-FEB	2,458	25-JAN	1,398
1961	25-MAR	983	25-MAR	864	25-MAR	722	18-MAR	453	18-MAR	296
1962	10-FEB	14,000	9-FEB	7,443	10-FEB	6,381	9-FEB	3,892	9-FEB	2,521
1963	13-OCT	20,000	13-OCT	11,270	12-OCT	5,487	31-JAN	3,178	28-MAR	2,416
1964	22-JAN	622	22-JAN	596	22-JAN	591	22-JAN	534	22-JAN	489
1965	6-JAN	12,358	5-JAN	9,990	3-JAN	7,192	24-DEC	5,466	20-DEC	4,499
1966	29-DEC	1,288	19-MAR	1,224	18-MAR	1,174	10-MAR	1,135	26-FEB	1,049
1967	21-JAN	10,951	21-JAN	7,605	27-JAN	5,338	21-JAN	4,859	20-JAN	2,998
1968	20-FEB	6,092	20-FEB	4,648	19-FEB	3,307	17-FEB	2,295	19-FEB	1,766
1969	20-JAN	18,609	20-JAN	14,439	20-JAN	10,726	13-JAN	7,484	13-JAN	5,055
1970	21-JAN	17,590	21-JAN	11,207	16-JAN	7,860	14-JAN	6,513	9-JAN	4,203
1971	3-DEC	8,364	2-DEC	6,643	30-NOV	4,207	26-NOV	2,790	25-NOV	1,797
1972	25-FEB	3,964	24-FEB	2,768	24-FEB	2,031	24-FEB	1,673	23-FEB	1,372
1973	12-JAN	14,151	11-JAN	9,438	11-JAN	7,389	10-JAN	4,946	10-JAN	3,517
1974	30-MAR	8,589	30-MAR	7,335	28-MAR	5,785	27-MAR	3,918	27-DEC	3,232
1975	13-FEB	8,985	24-MAR	5,328	21-MAR	3,619	2-FEB	2,688	7-MAR	1,992
1976	1-NOV	1,995	1-NOV	1,368	1-NOV	1,172	26-OCT	1,115	26-OCT	1,074
1977	9-NOV	750	9-NOV	717	10-MAR	562	7-MAR	388	23-FEB	244
1978	17-JAN	10,841	16-JAN	9,119	13-JAN	6,026	5-JAN	5,027	23-DEC	3,585
1979	1-MAR	14,198	21-FEB	5,425	18-FEB	3,095	18-FEB	2,473	14-FEB	1,978
1980	14-JAN	19,800	12-JAN	13,587	12-JAN	8,890	15-FEB	5,363	15-FEB	3,865
1981	29-JAN	3,644	27-JAN	3,343	24-JAN	1,985	15-MAR	1,506	26-FEB	1,163
1982	20-DEC	22,257	19-DEC	14,241	18-DEC	7,752	31-MAR	5,956	28-MAR	4,310
1983	13-MAR	18,001	21-DEC	9,661	11-MAR	5,927	28-FEB	5,574	25-FEB	4,483
1984	25-DEC	12,023	25-DEC	10,032	25-DEC	6,667	24-DEC	4,399	9-DEC	3,332
1985	8-FEB	5,953	7-FEB	4,108	4-FEB	2,105	5-NOV	1,324	2-NOV	1,284
1986	17-FEB	40,696	17-FEB	31,545	15-FEB	18,283	13-FEB	9,770	14-FEB	6,480
1987	13-FEB	2,735	13-FEB	2,442	11-FEB	1,415	6-MAR	983	13-FEB	625
1988	18-JAN	1,891	16-JAN	1,672	12-JAN	1,227	4-JAN	1,122	29-DEC	724
1989	11-MAR	12,989	10-MAR	8,089	7-MAR	4,806	2-MAR	3,313	2-MAR	2,970
1990	14-JAN	3,244	13-JAN	2,635	13-JAN	1,485	5-JAN	832	11-JAN	548
1991	25-MAR	4,533	25-MAR	3,689	24-MAR	2,270	13-MAR	1,933	2-MAR	1,602
1992	20-FEB	4,862	20-FEB	3,394	15-FEB	3,074	11-FEB	2,367	11-FEB	1,505
1993	22-JAN	12,833	20-JAN	8,953	17-JAN	5,271	9-JAN	3,737	29-DEC	2,627
1994	8-FEB	1,801	8-FEB	1,113	18-FEB	841	8-FEB	669	7-FEB	545
1995	11-JAN	16,182	9-JAN	11,958	9-JAN	9,359	9-MAR	6,168	3-MAR	3,939
1996	5-FEB	10,974	4-FEB	6,390	19-FEB	4,036	24-JAN	3,144	24-JAN	2,886
1997	2-JAN	33,242	31-DEC	19,519	27-DEC	12,588	20-DEC	7,319	5-DEC	5,067
1998	---	4,924	---	3,525	---	1,897	---	1,233	---	866
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-20

CACHE CREEK AT CLEAR LAKE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1920	---	---	---	---	---	---	---	---	---	---
1921	---	---	---	---	---	---	---	---	---	---
1922	20-FEB	6,298	9-FEB	4,974	18-FEB	3,296	9-FEB	2,877	9-FEB	2,078
1923	10-DEC	5,096	9-DEC	3,955	8-DEC	2,782	9-DEC	2,305	8-DEC	1,886
1924	7-FEB	3,057	7-FEB	2,718	5-FEB	1,747	26-JAN	1,018	23-JAN	706
1925	12-FEB	14,452	11-FEB	11,024	8-FEB	7,449	4-FEB	5,250	4-FEB	3,485
1926	4-FEB	10,450	31-JAN	7,517	31-JAN	6,807	31-JAN	4,168	28-JAN	2,814
1927	16-FEB	13,267	16-FEB	10,782	16-FEB	9,055	9-FEB	5,231	26-JAN	3,796
1928	27-MAR	17,363	26-MAR	9,035	23-MAR	5,773	23-MAR	3,818	20-MAR	2,083
1929	4-FEB	6,180	2-FEB	3,090	30-JAN	1,913	28-JAN	1,127	26-JAN	674
1930	15-DEC	9,057	14-DEC	5,720	11-DEC	4,036	20-FEB	2,930	19-FEB	1,892
1931	13-JAN	3,057	11-JAN	1,699	9-JAN	874	9-JAN	679	25-DEC	442
1932	26-DEC	20,126	25-DEC	13,116	23-DEC	6,921	23-DEC	4,116	22-DEC	2,436
1933	27-JAN	5,032	26-JAN	3,019	27-JAN	2,311	19-JAN	1,481	20-JAN	944
1934	30-DEC	6,038	30-DEC	4,051	27-DEC	3,497	27-DEC	2,026	11-DEC	1,503
1935	14-JAN	10,300	14-JAN	6,523	9-JAN	4,334	7-JAN	3,329	2-JAN	2,087
1936	18-FEB	10,849	12-FEB	7,145	12-FEB	6,727	12-FEB	5,632	11-FEB	3,247
1937	5-FEB	15,482	4-FEB	7,231	2-FEB	4,073	1-FEB	3,502	1-FEB	2,046
1938	12-DEC	41,519	10-DEC	21,780	10-DEC	11,014	1-FEB	8,313	21-JAN	4,922
1939	22-OCT	3,708	1-DEC	1,373	7-FEB	979	30-JAN	718	21-JAN	497
1940	28-FEB	28,946	27-FEB	24,968	27-FEB	13,285	17-FEB	7,406	4-FEB	4,561
1941	24-DEC	13,646	24-DEC	11,839	22-DEC	9,158	18-DEC	5,547	22-DEC	4,347
1942	6-FEB	25,106	5-FEB	16,869	2-FEB	11,248	24-JAN	7,943	22-JAN	5,061
1943	22-JAN	23,694	21-JAN	21,276	21-JAN	12,472	21-JAN	7,641	21-JAN	4,280
1944	5-MAR	7,348	4-MAR	5,921	1-MAR	3,727	1-MAR	2,089	8-FEB	1,264
1945	3-FEB	8,258	2-FEB	6,547	31-JAN	5,259	31-JAN	3,082	31-JAN	1,661
1946	28-DEC	10,499	27-DEC	9,095	22-DEC	8,010	22-DEC	5,944	21-DEC	3,479
1947	12-FEB	8,723	12-FEB	5,288	11-FEB	2,617	3-MAR	1,512	12-FEB	1,388
1948	23-MAR	6,087	23-MAR	4,409	10-APR	2,900	4-APR	2,495	23-MAR	2,080
1949	11-MAR	9,555	10-MAR	7,131	10-MAR	4,558	9-MAR	4,003	23-FEB	2,828
1950	7-FEB	6,596	5-FEB	5,491	4-FEB	4,117	2-FEB	2,377	14-JAN	1,877
1951	4-DEC	15,399	3-DEC	8,687	18-JAN	5,994	3-DEC	3,762	16-JAN	2,859
1952	14-JAN	11,616	14-JAN	9,033	11-JAN	6,578	11-JAN	4,660	7-JAN	3,919
1953	7-DEC	11,333	7-JAN	9,131	7-JAN	6,825	6-JAN	5,563	25-DEC	4,141
1954	17-JAN	14,867	16-JAN	10,088	16-JAN	5,797	16-JAN	3,532	16-JAN	2,320
1955	2-DEC	3,296	1-DEC	2,747	1-DEC	2,178	1-DEC	1,458	1-DEC	805
1956	22-DEC	26,863	21-DEC	17,502	18-DEC	13,731	18-DEC	8,073	18-DEC	6,781
1957	24-FEB	15,714	24-FEB	9,603	22-FEB	6,094	21-FEB	3,809	20-FEB	2,503
1958	25-FEB	20,329	24-FEB	13,172	31-MAR	8,314	12-FEB	7,066	29-JAN	6,552
1959	17-FEB	11,085	15-FEB	9,459	14-FEB	6,771	9-FEB	3,884	9-FEB	2,143
1960	8-FEB	14,535	7-FEB	11,374	7-FEB	6,226	1-FEB	3,856	21-JAN	2,340
1961	1-DEC	10,072	1-DEC	4,595	29-JAN	2,655	30-JAN	2,324	25-JAN	1,649
1962	14-FEB	13,217	13-FEB	11,648	12-FEB	7,810	8-FEB	4,809	8-FEB	3,558
1963	1-FEB	20,842	30-JAN	13,655	29-JAN	7,552	30-JAN	4,531	26-MAR	2,812
1964	21-JAN	7,351	20-JAN	6,107	20-JAN	3,655	19-JAN	2,246	18-JAN	1,210
1965	22-DEC	36,049	21-DEC	26,009	21-DEC	15,839	22-DEC	10,630	20-DEC	7,257
1966	4-JAN	16,724	4-JAN	12,014	3-JAN	6,450	25-DEC	4,195	24-DEC	2,367
1967	20-JAN	15,748	20-JAN	10,301	20-JAN	7,240	20-JAN	6,176	20-JAN	3,274
1968	29-JAN	14,535	29-JAN	8,392	28-JAN	5,190	28-JAN	2,907	28-JAN	2,478
1969	21-JAN	17,560	20-JAN	12,506	20-JAN	8,734	13-JAN	7,055	13-JAN	5,324

TABLE B.6-20

CACHE CREEK AT CLEAR LAKE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1970	24-JAN	20,728	22-JAN	16,136	21-JAN	12,136	13-JAN	10,262	5-JAN	6,325
1971	4-DEC	15,574	3-DEC	10,374	1-DEC	6,495	27-NOV	4,311	27-NOV	2,922
1972	26-DEC	3,505	25-DEC	2,543	21-DEC	1,849	20-DEC	1,111	4-FEB	731
1973	17-JAN	17,176	17-JAN	14,056	12-JAN	8,807	8-JAN	6,891	9-JAN	4,589
1974	17-JAN	19,998	16-JAN	15,891	14-JAN	10,368	10-JAN	5,777	23-DEC	3,720
1975	13-FEB	11,512	12-FEB	8,349	19-MAR	7,054	1-FEB	5,002	2-MAR	3,350
1976	2-MAR	1,839	7-APR	1,103	7-APR	829	6-APR	540	20-MAR	366
1977	25-DEC	5	24-DEC	4	24-DEC	2	24-DEC	2	24-DEC	1
1978	17-JAN	19,278	15-JAN	17,629	14-JAN	11,588	11-JAN	6,571	14-JAN	5,015
1979	21-FEB	5,867	21-FEB	5,037	18-FEB	3,974	16-FEB	3,107	12-FEB	2,109
1980	19-FEB	18,242	18-FEB	15,286	17-FEB	11,407	16-FEB	6,862	14-FEB	4,224
1981	28-JAN	9,037	27-JAN	7,630	26-JAN	4,547	20-JAN	2,863	22-JAN	1,828
1982	5-JAN	17,502	31-MAR	12,506	30-MAR	8,790	29-MAR	6,139	25-MAR	4,015
1983	3-MAR	26,520	1-MAR	20,677	27-FEB	15,892	24-FEB	9,302	26-FEB	7,033
1984	25-DEC	21,055	25-DEC	14,722	25-DEC	8,851	22-DEC	5,292	4-DEC	4,669
1985	8-FEB	5,250	8-FEB	3,291	26-MAR	1,896	8-NOV	1,237	11-NOV	1,167
1986	17-FEB	30,349	16-FEB	26,727	14-FEB	21,394	12-FEB	11,521	14-FEB	7,178
1987	13-MAR	6,878	12-MAR	4,658	12-MAR	2,717	5-MAR	1,878	13-FEB	1,260
1988	4-JAN	11,589	4-JAN	7,324	3-JAN	4,504	3-JAN	3,334	28-DEC	2,174
1989	11-MAR	7,020	10-MAR	5,303	8-MAR	3,395	6-MAR	3,014	3-MAR	2,149
1990	14-JAN	4,530	13-JAN	3,213	8-JAN	1,783	7-JAN	1,174	7-JAN	745
1991	4-MAR	8,333	3-MAR	6,831	2-MAR	3,652	3-MAR	2,377	2-MAR	2,277
1992	12-FEB	6,525	11-FEB	4,825	11-FEB	4,063	10-FEB	3,188	9-FEB	1,871
1993	21-JAN	14,898	20-JAN	11,931	18-FEB	7,836	10-JAN	5,280	28-DEC	4,206
1994	7-FEB	3,726	18-FEB	2,426	17-FEB	2,201	16-FEB	1,407	24-JAN	1,114
1995	9-JAN	36,677	8-JAN	28,047	8-JAN	19,744	4-JAN	11,571	4-JAN	7,932
1996	5-FEB	10,676	20-FEB	8,659	19-FEB	6,098	19-FEB	4,688	25-JAN	3,918
1997	1-JAN	45,670	31-DEC	26,344	29-DEC	15,160	22-DEC	8,095	30-DEC	6,111
1998	3-FEB	20,469	6-FEB	17,695	3-FEB	15,232	27-JAN	10,080	26-JAN	8,355
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-21

NORTH FORK CACHE CREEK AT INDIAN VALLEY DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1930	---	---	---	---	---	---	---	---	---	---
1931	---	*519*	---	*290*	---	*164*	---	*94*	---	*66*
1932	---	*5,047*	---	*2,757*	---	*1,562*	---	*896*	---	*532*
1933	---	*706*	---	*392*	---	*279*	---	*195*	---	*150*
1934	---	*1,240*	---	*852*	---	*614*	---	*337*	---	*216*
1935	---	*761*	---	*647*	---	*524*	---	*438*	---	*330*
1936	---	*2,352*	---	*1,936*	---	*1,408*	---	*1,322*	---	*797*
1937	---	*2,309*	---	*1,100*	---	*551*	---	*492*	---	*315*
1938	---	*5,833*	---	*4,196*	---	*2,786*	---	*2,296*	---	*1,430*
1939	---	*211*	---	*128*	---	*99*	---	*82*	---	*59*
1940	---	*7,614*	---	*5,870*	---	*3,235*	---	*1,697*	---	*1,053*
1941	---	*3,150*	---	*2,401*	---	*1,891*	---	*1,265*	---	*1,081*
1942	---	*5,348*	---	*4,130*	---	*2,826*	---	*1,813*	---	*1,203*
1943	---	*5,274*	---	*3,819*	---	*2,160*	---	*1,386*	---	*803*
1944	---	*2,867*	---	*1,404*	---	*782*	---	*478*	---	*280*
1945	---	*1,689*	---	*1,510*	---	*1,168*	---	*700*	---	*400*
1946	---	*4,065*	---	*2,863*	---	*2,131*	---	*1,395*	---	*859*
1947	---	*1,056*	---	*551*	---	*334*	---	*267*	---	*205*
1948	---	*1,013*	---	*788*	---	*624*	---	*517*	---	*392*
1949	---	*1,879*	---	*1,533*	---	*1,009*	---	*752*	---	*519*
1950	---	*1,480*	---	*1,146*	---	*714*	---	*438*	---	*334*
1951	---	*3,236*	---	*2,108*	---	*1,445*	---	*866*	---	*709*
1952	---	*3,285*	---	*2,673*	---	*1,631*	---	*1,308*	---	*1,043*
1953	---	*3,518*	---	*2,292*	---	*1,700*	---	*1,283*	---	*969*
1954	---	*3,893*	---	*2,172*	---	*1,110*	---	*801*	---	*512*
1955	---	*620*	---	*383*	---	*278*	---	*204*	---	*133*
1956	---	*6,754*	---	*4,542*	---	*3,355*	---	*2,000*	---	*1,669*
1957	---	*2,818*	---	*1,905*	---	*1,246*	---	*806*	---	*540*
1958	---	*3,997*	---	*3,287*	---	*2,328*	---	*2,166*	---	*1,868*
1959	---	*2,468*	---	*1,844*	---	*1,140*	---	*642*	---	*373*
1960	---	*4,212*	---	*2,783*	---	*1,499*	---	*844*	---	*514*
1961	---	*1,234*	---	*601*	---	*406*	---	*337*	---	*250*
1962	---	*2,419*	---	*2,257*	---	*1,384*	---	*829*	---	*618*
1963	---	*3,942*	---	*2,524*	---	*1,375*	---	*821*	---	*623*
1964	---	*1,111*	---	*787*	---	*447*	---	*278*	---	*166*
1965	---	*9,210*	---	*6,388*	---	*3,980*	---	*2,522*	---	*1,892*
1966	---	*4,212*	---	*3,354*	---	*1,778*	---	*1,024*	---	*586*
1967	---	*5,084*	---	*2,683*	---	*2,104*	---	*1,767*	---	*994*
1968	---	*1,517*	---	*1,095*	---	*853*	---	*560*	---	*543*
1969	---	*3,438*	---	*2,294*	---	*1,534*	---	*1,401*	---	*1,087*
1970	---	*5,108*	---	*3,860*	---	*2,932*	---	*2,468*	---	*1,536*
1971	---	*2,947*	---	*2,075*	---	*1,265*	---	*753*	---	*510*
1972	---	*537*	---	*323*	---	*217*	---	*192*	---	*148*
1973	---	*3,113*	---	*2,489*	---	*1,826*	---	*1,307*	---	*927*
1974	---	*5,293*	---	*3,428*	---	*2,247*	---	*1,358*	---	*854*
1975	24-MAR	2,116	24-MAR	1,870	20-MAR	1,457	16-MAR	1,217	6-MAR	897
1976	30-OCT	321	3-AUG	253	2-AUG	168	25-FEB	109	10-FEB	67
1977	---	0	---	0	---	0	---	0	---	0
1978	19-JAN	5,143	17-JAN	3,714	15-JAN	2,929	7-JAN	1,962	13-JAN	1,360
1979	21-FEB	1,191	20-FEB	889	17-FEB	741	15-FEB	628	12-FEB	461

TABLE B.6-21

NORTH FORK CACHE CREEK AT INDIAN VALLEY DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1980	12-JAN	9,172	12-JAN	6,113	12-JAN	3,432	16-FEB	1,974	15-FEB	1,308
1981	27-JAN	2,496	26-JAN	1,787	22-JAN	1,021	20-JAN	629	20-JAN	470
1982	12-APR	3,835	10-APR	2,853	30-MAR	2,496	30-MAR	1,975	29-MAR	1,225
1983	26-JAN	7,725	28-FEB	4,724	28-FEB	3,544	27-FEB	2,703	26-FEB	2,025
1984	25-DEC	4,396	24-DEC	3,560	23-DEC	2,359	23-DEC	1,451	5-DEC	1,330
1985	7-FEB	1,809	7-FEB	1,119	7-FEB	603	7-FEB	329	10-NOV	260
1986	17-FEB	11,740	16-FEB	10,454	14-FEB	7,934	12-FEB	4,171	12-FEB	2,570
1987	12-MAR	2,026	12-MAR	1,136	10-MAR	643	4-MAR	435	12-FEB	298
1988	3-JAN	2,332	3-JAN	1,661	3-JAN	1,011	3-JAN	803	2-JAN	521
1989	10-MAR	1,513	9-MAR	1,181	8-MAR	717	9-MAR	631	4-MAR	499
1990	13-JAN	693	12-JAN	442	12-JAN	263	7-JAN	172	7-JAN	118
1991	4-MAR	2,032	2-MAR	1,517	2-MAR	772	2-MAR	487	2-MAR	458
1992	19-FEB	1,268	18-FEB	928	14-FEB	738	10-FEB	604	10-FEB	355
1993	20-JAN	7,410	20-JAN	4,022	20-JAN	2,143	13-JAN	1,453	29-DEC	1,073
1994	6-FEB	830	6-FEB	524	5-FEB	277	6-FEB	227	5-FEB	196
1995	9-JAN	6,838	9-JAN	6,838	7-JAN	5,130	4-JAN	3,078	4-JAN	2,142
1996	4-FEB	3,384	19-FEB	2,487	18-FEB	1,735	19-FEB	1,429	4-FEB	1,118
1997	1-JAN	12,271	30-DEC	7,093	29-DEC	4,962	26-DEC	2,740	29-DEC	1,909
1998	2-FEB	6,265	5-FEB	5,002	2-FEB	4,286	26-JAN	2,744	26-JAN	2,262
1999	8-FEB	3,105	7-FEB	2,703	6-FEB	1,948	6-FEB	1,466	6-FEB	1,155

TABLE B.6-22

SACRAMENTO RIVER AT VERONA (LATITUDE)
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1920	---	---	---	---	---	---	---	---	---	---
1921	---	---	---	---	---	---	---	---	---	---
1922	21-FEB	85,627	20-FEB	79,629	20-FEB	69,400	19-FEB	59,881	9-FEB	43,868
1923	14-DEC	75,737	7-APR	61,907	6-APR	57,810	5-APR	49,218	3-APR	38,531
1924	9-FEB	63,206	8-FEB	53,464	7-FEB	39,767	4-FEB	26,270	28-JAN	19,169
1925	7-FEB	151,398	6-FEB	143,639	5-FEB	124,349	5-FEB	107,463	4-FEB	79,463
1926	6-FEB	110,912	5-FEB	106,298	4-FEB	96,523	1-FEB	76,436	30-JAN	58,243
1927	22-FEB	227,284	22-FEB	199,742	21-FEB	173,125	17-FEB	137,030	4-FEB	101,697
1928	27-MAR	277,182	26-MAR	250,293	26-MAR	200,874	24-MAR	144,438	23-MAR	95,422
1929	6-FEB	54,558	5-FEB	51,717	3-FEB	40,785	1-FEB	26,789	30-JAN	18,432
1930	17-DEC	135,970	15-DEC	126,679	13-DEC	111,294	11-DEC	75,831	11-DEC	46,090
1931	25-JAN	35,393	24-JAN	30,932	19-MAR	24,774	13-MAR	22,213	5-MAR	16,919
1932	29-DEC	79,449	28-DEC	73,047	27-DEC	65,749	24-DEC	48,833	24-DEC	33,485
1933	31-MAR	46,142	30-MAR	44,296	29-MAR	38,568	28-MAR	32,542	13-MAR	30,903
1934	3-JAN	73,407	2-JAN	70,874	31-DEC	65,687	30-DEC	41,820	9-FEB	28,436
1935	9-APR	146,604	8-APR	129,287	8-APR	113,630	7-APR	99,004	4-APR	80,041
1936	23-FEB	166,270	23-FEB	151,011	22-FEB	137,689	15-FEB	107,043	13-FEB	77,753
1937	15-MAR	67,286	14-MAR	66,555	13-MAR	59,846	13-MAR	56,480	12-MAR	48,814
1938	12-DEC	283,664	11-DEC	224,830	11-DEC	189,615	17-MAR	131,927	3-MAR	107,518
1939	16-MAR	38,643	15-MAR	36,180	15-MAR	32,397	15-MAR	30,916	14-MAR	27,208
1940	29-FEB	285,379	28-FEB	251,094	28-FEB	235,746	27-FEB	162,085	9-FEB	104,498
1941	12-FEB	178,070	12-FEB	166,345	11-FEB	150,735	10-FEB	114,964	10-FEB	113,668
1942	7-FEB	231,965	7-FEB	215,241	6-FEB	193,052	28-JAN	161,088	24-JAN	120,462
1943	23-JAN	182,192	23-JAN	167,281	22-JAN	150,126	22-JAN	117,629	21-JAN	78,790
1944	5-MAR	45,666	4-MAR	40,002	2-MAR	31,245	1-MAR	25,498	29-FEB	20,253
1945	4-FEB	111,769	3-FEB	105,512	3-FEB	95,524	2-FEB	74,228	1-FEB	52,910
1946	30-DEC	178,454	29-DEC	173,559	27-DEC	157,226	23-DEC	130,113	22-DEC	89,111
1947	14-FEB	90,063	13-FEB	76,458	13-FEB	57,514	4-MAR	41,667	13-FEB	36,545
1948	18-APR	102,141	17-APR	96,657	17-APR	85,686	11-APR	74,052	10-APR	67,798
1949	22-MAR	76,715	21-MAR	75,348	19-MAR	69,576	12-MAR	65,529	3-MAR	52,749
1950	7-FEB	116,144	6-FEB	106,748	5-FEB	83,310	5-FEB	56,208	18-JAN	47,859
1951	21-NOV	165,196	20-NOV	157,930	18-NOV	112,652	5-DEC	99,112	19-NOV	83,433
1952	3-FEB	144,083	30-DEC	128,767	2-FEB	112,561	26-JAN	87,872	25-JAN	74,366
1953	11-JAN	172,930	10-JAN	153,926	10-JAN	149,312	10-JAN	135,936	1-JAN	97,273
1954	11-MAR	138,258	10-MAR	118,223	10-MAR	96,924	9-MAR	71,577	14-FEB	65,008
1955	24-APR	46,689	23-APR	44,385	22-APR	39,519	22-APR	33,947	17-APR	31,697
1956	24-DEC	505,088	23-DEC	427,717	22-DEC	343,152	20-DEC	232,121	21-DEC	170,849
1957	26-FEB	159,209	25-FEB	142,120	25-FEB	127,871	25-FEB	101,137	24-FEB	75,344
1958	26-FEB	226,965	25-FEB	207,117	21-FEB	184,205	16-FEB	169,821	3-FEB	145,231
1959	19-FEB	105,910	18-FEB	102,627	17-FEB	89,607	17-FEB	64,559	16-FEB	47,119
1960	9-FEB	202,696	8-FEB	159,420	8-FEB	125,981	3-FEB	84,000	26-JAN	54,732
1961	13-FEB	65,752	2-FEB	64,929	11-FEB	59,517	2-FEB	54,701	31-JAN	42,501
1962	16-FEB	145,142	15-FEB	139,452	14-FEB	125,644	10-FEB	102,702	10-FEB	71,036
1963	2-FEB	298,829	1-FEB	234,972	1-FEB	171,452	7-APR	117,418	29-MAR	92,686
1964	22-JAN	75,385	22-JAN	70,791	21-JAN	56,487	20-JAN	39,423	20-JAN	28,996
1965	24-DEC	449,941	23-DEC	407,811	23-DEC	353,479	22-DEC	236,073	21-DEC	170,584
1966	9-JAN	81,079	7-JAN	78,972	6-JAN	68,708	31-DEC	46,983	25-FEB	33,503
1967	1-FEB	169,768	31-JAN	165,427	30-JAN	144,358	22-JAN	113,347	21-JAN	80,445
1968	25-FEB	130,680	23-FEB	128,041	21-FEB	121,626	19-FEB	94,518	19-FEB	67,455
1969	22-JAN	299,432	21-JAN	262,081	21-JAN	225,596	15-JAN	173,860	20-JAN	125,953

TABLE B.6-22

SACRAMENTO RIVER AT VERONA (LATITUDE)
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1970	23-JAN	326,251	23-JAN	312,605	23-JAN	303,421	17-JAN	263,934	11-JAN	184,509
1971	28-MAR	142,332	27-MAR	132,768	26-MAR	116,913	25-MAR	87,703	14-MAR	68,696
1972	5-MAR	75,287	4-MAR	73,140	1-MAR	68,794	29-FEB	60,983	25-FEB	50,580
1973	18-JAN	146,620	17-JAN	140,875	16-JAN	130,561	12-JAN	104,089	13-JAN	76,704
1974	21-JAN	293,476	19-JAN	283,753	17-JAN	252,948	15-JAN	182,371	29-DEC	123,122
1975	26-MAR	124,609	25-MAR	115,987	22-MAR	107,545	19-MAR	90,310	8-MAR	75,175
1976	2-MAR	54,053	1-MAR	51,407	29-FEB	42,968	27-FEB	31,093	27-FEB	24,126
1977	13-MAY	12,934	13-MAY	12,777	11-MAY	12,047	11-MAY	10,920	5-MAY	10,397
1978	18-JAN	202,736	18-JAN	199,652	16-JAN	185,814	10-JAN	145,516	30-DEC	101,493
1979	16-FEB	69,135	15-FEB	64,557	15-FEB	56,141	14-FEB	49,858	14-FEB	42,726
1980	14-JAN	307,206	13-JAN	257,882	13-JAN	217,129	18-FEB	150,683	17-FEB	107,706
1981	30-JAN	73,594	29-JAN	70,924	27-JAN	59,220	20-MAR	46,696	24-JAN	39,394
1982	21-DEC	271,883	20-DEC	226,528	20-DEC	179,378	19-DEC	135,171	1-APR	103,296
1983	14-MAR	248,115	5-MAR	240,645	2-MAR	226,886	2-MAR	205,804	28-FEB	166,602
1984	27-DEC	200,974	26-DEC	186,020	26-DEC	170,384	25-DEC	125,223	9-DEC	108,929
1985	15-NOV	50,465	14-NOV	47,729	12-NOV	40,355	13-NOV	34,628	12-NOV	32,236
1986	19-FEB	557,567	18-FEB	502,530	17-FEB	403,959	15-FEB	280,548	15-FEB	199,228
1987	14-MAR	84,551	14-MAR	82,475	13-MAR	73,702	6-MAR	58,303	5-MAR	42,200
1988	12-DEC	62,126	10-DEC	59,557	7-DEC	54,040	2-DEC	44,476	4-JAN	31,517
1989	11-MAR	208,370	11-MAR	192,886	10-MAR	161,597	8-MAR	117,776	8-MAR	94,394
1990	1-JUN	56,785	31-MAY	53,646	29-MAY	47,537	24-MAY	34,893	28-FEB	23,829
1991	5-MAR	114,395	4-MAR	95,214	3-MAR	66,203	3-MAR	45,191	4-MAR	39,271
1992	21-FEB	85,954	21-FEB	79,715	16-FEB	70,916	13-FEB	64,897	12-FEB	47,529
1993	23-JAN	143,539	22-JAN	136,351	19-MAR	128,944	17-MAR	116,422	16-MAR	89,510
1994	22-FEB	31,423	20-FEB	30,722	18-FEB	28,452	19-FEB	25,948	18-FEB	24,436
1995	15-JAN	359,959	14-JAN	323,609	11-JAN	271,694	10-MAR	215,791	10-MAR	149,582
1996	22-FEB	163,972	21-FEB	158,489	20-FEB	140,804	18-FEB	106,244	5-FEB	96,991
1997	2-JAN	623,858	1-JAN	545,624	1-JAN	419,191	28-DEC	273,838	30-DEC	170,882
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-23

SACRAMENTO RIVER AT SACRAMENTO (LATITUDE)
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1920	---	---	---	---	---	---	---	---	---	---
1921	---	---	---	---	---	---	---	---	---	---
1922	21-FEB	108,900	20-FEB	98,801	20-FEB	82,225	18-FEB	71,136	9-FEB	53,300
1923	14-DEC	105,563	13-DEC	86,598	6-APR	72,775	6-APR	62,045	5-APR	49,019
1924	9-FEB	70,887	9-FEB	61,472	7-FEB	45,726	4-FEB	30,188	28-JAN	21,986
1925	7-FEB	209,223	6-FEB	186,376	6-FEB	152,442	5-FEB	128,308	4-FEB	93,955
1926	6-FEB	126,264	5-FEB	118,301	4-FEB	105,945	1-FEB	86,135	30-JAN	65,656
1927	22-FEB	263,054	22-FEB	241,954	20-FEB	204,573	17-FEB	162,962	4-FEB	119,957
1928	27-MAR	359,257	26-MAR	335,793	25-MAR	258,737	24-MAR	181,964	23-MAR	119,260
1929	5-FEB	65,297	5-FEB	59,124	3-FEB	46,757	1-FEB	30,635	31-JAN	21,056
1930	17-DEC	142,826	15-DEC	135,291	13-DEC	119,848	11-DEC	82,612	21-FEB	52,771
1931	25-JAN	37,708	20-MAR	33,496	19-MAR	29,228	13-MAR	25,633	5-MAR	19,508
1932	28-DEC	97,419	28-DEC	90,196	27-DEC	80,752	24-DEC	59,613	24-DEC	40,823
1933	31-MAR	50,466	30-MAR	48,730	30-MAR	43,228	28-MAR	37,191	13-MAR	35,145
1934	2-JAN	86,500	1-JAN	82,435	31-DEC	75,217	30-DEC	48,230	9-FEB	33,204
1935	9-APR	180,978	8-APR	156,952	8-APR	134,450	8-APR	117,601	4-APR	95,702
1936	23-FEB	212,013	23-FEB	188,916	22-FEB	166,663	15-FEB	131,730	12-FEB	96,685
1937	14-MAR	76,060	14-MAR	75,014	22-MAR	68,686	13-MAR	67,554	12-MAR	58,634
1938	12-DEC	334,909	11-DEC	274,870	11-DEC	218,266	16-MAR	155,084	3-MAR	127,540
1939	16-MAR	42,010	15-MAR	39,283	15-MAR	36,841	15-MAR	36,565	14-MAR	33,149
1940	29-FEB	351,481	28-FEB	310,621	28-FEB	272,801	27-FEB	189,189	9-FEB	121,955
1941	13-FEB	203,741	12-FEB	193,782	11-FEB	172,176	10-FEB	133,051	10-FEB	131,571
1942	8-FEB	268,442	7-FEB	252,561	6-FEB	223,006	28-JAN	189,419	24-JAN	143,114
1943	23-JAN	251,225	22-JAN	220,519	22-JAN	187,807	21-JAN	145,971	21-JAN	97,656
1944	5-MAR	63,825	4-MAR	54,151	1-MAR	41,677	1-MAR	33,434	29-FEB	26,269
1945	3-FEB	163,286	3-FEB	140,265	2-FEB	122,016	2-FEB	91,953	1-FEB	64,742
1946	30-DEC	210,336	29-DEC	201,804	27-DEC	183,195	23-DEC	153,453	22-DEC	105,201
1947	14-FEB	101,570	13-FEB	88,007	13-FEB	66,012	4-MAR	48,393	13-FEB	42,221
1948	19-APR	119,309	18-APR	113,367	17-APR	100,909	11-APR	86,536	10-APR	79,386
1949	23-MAR	84,516	21-MAR	83,144	19-MAR	77,864	12-MAR	74,552	3-MAR	61,571
1950	7-FEB	139,616	6-FEB	126,718	5-FEB	98,261	5-FEB	66,581	18-JAN	58,433
1951	21-NOV	263,643	20-NOV	253,334	18-NOV	175,662	4-DEC	129,763	19-NOV	115,459
1952	3-FEB	173,207	3-FEB	153,972	2-FEB	134,384	26-JAN	107,273	25-JAN	90,482
1953	11-JAN	201,781	10-JAN	176,376	10-JAN	167,164	10-JAN	153,134	1-JAN	110,100
1954	11-MAR	163,602	10-MAR	141,915	10-MAR	113,421	9-MAR	83,563	14-FEB	74,048
1955	24-APR	53,307	23-APR	51,368	22-APR	46,300	22-APR	40,174	17-APR	38,778
1956	24-DEC	640,589	23-DEC	551,291	22-DEC	424,157	20-DEC	281,041	21-DEC	206,491
1957	26-FEB	186,378	25-FEB	165,051	25-FEB	145,074	25-FEB	117,729	24-FEB	87,653
1958	26-FEB	262,889	25-FEB	242,193	22-FEB	209,905	16-FEB	192,345	3-FEB	165,823
1959	19-FEB	121,682	18-FEB	116,880	17-FEB	101,842	16-FEB	73,574	16-FEB	53,940
1960	9-FEB	241,281	9-FEB	196,697	8-FEB	150,215	3-FEB	97,971	26-JAN	63,605
1961	13-FEB	72,054	12-FEB	70,941	11-FEB	65,040	2-FEB	59,366	31-JAN	46,305
1962	16-FEB	168,497	15-FEB	165,910	11-FEB	145,276	10-FEB	119,211	10-FEB	82,967
1963	2-FEB	387,825	1-FEB	319,899	1-FEB	218,885	31-JAN	144,460	29-MAR	107,761
1964	22-JAN	86,064	22-JAN	80,563	21-JAN	64,556	20-JAN	45,466	20-JAN	33,478
1965	24-DEC	633,854	23-DEC	556,204	23-DEC	453,149	22-DEC	300,036	21-DEC	214,932
1966	9-JAN	86,171	7-JAN	85,721	5-JAN	76,890	30-DEC	55,003	26-DEC	38,539
1967	1-FEB	203,095	31-JAN	193,447	30-JAN	167,680	22-JAN	135,243	21-JAN	95,777
1968	22-FEB	150,527	22-FEB	148,954	21-FEB	141,039	19-FEB	109,896	19-FEB	78,569
1969	22-JAN	362,848	21-JAN	327,987	21-JAN	276,344	15-JAN	211,975	20-JAN	152,941

TABLE B.6-23

SACRAMENTO RIVER AT SACRAMENTO (LATITUDE)
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1970	23-JAN	400,159	22-JAN	381,536	22-JAN	355,894	17-JAN	310,407	11-JAN	216,499
1971	28-MAR	168,251	27-MAR	157,991	26-MAR	136,107	25-MAR	102,258	14-MAR	79,348
1972	5-MAR	86,408	4-MAR	83,336	2-MAR	78,573	29-FEB	70,333	25-FEB	59,252
1973	18-JAN	179,517	17-JAN	173,529	16-JAN	153,445	12-JAN	126,533	13-JAN	91,952
1974	20-JAN	332,776	20-JAN	320,034	17-JAN	288,771	15-JAN	209,019	29-DEC	143,013
1975	26-MAR	153,398	25-MAR	142,042	22-MAR	127,056	19-MAR	104,685	8-MAR	86,776
1976	2-MAR	59,005	1-MAR	55,249	29-FEB	46,347	28-FEB	33,778	27-FEB	26,566
1977	14-MAY	14,681	13-MAY	14,430	12-MAY	13,618	12-MAY	12,460	6-MAY	11,878
1978	18-JAN	235,151	18-JAN	227,574	16-JAN	211,022	10-JAN	164,081	30-DEC	115,761
1979	16-FEB	80,808	15-FEB	73,661	15-FEB	65,165	15-FEB	59,024	15-FEB	51,041
1980	14-JAN	415,979	13-JAN	362,852	13-JAN	285,012	12-JAN	187,171	17-FEB	128,919
1981	30-JAN	83,005	29-JAN	78,824	27-JAN	66,819	20-MAR	53,931	24-JAN	44,001
1982	21-DEC	358,428	20-DEC	294,742	20-DEC	219,382	19-DEC	165,152	31-MAR	128,358
1983	14-MAR	303,317	13-MAR	272,021	3-MAR	257,296	2-MAR	241,242	28-FEB	197,001
1984	27-DEC	270,070	26-DEC	243,718	26-DEC	211,812	24-DEC	155,275	9-DEC	131,714
1985	9-FEB	59,280	14-NOV	53,593	26-NOV	46,841	4-APR	42,580	12-NOV	36,673
1986	19-FEB	760,955	18-FEB	683,529	17-FEB	516,991	15-FEB	350,707	15-FEB	248,178
1987	15-MAR	94,485	14-MAR	90,671	13-MAR	80,760	7-MAR	64,512	5-MAR	47,192
1988	12-DEC	68,042	11-DEC	64,484	8-DEC	58,334	3-DEC	48,074	4-JAN	36,375
1989	12-MAR	236,570	11-MAR	219,939	10-MAR	181,855	8-MAR	134,970	8-MAR	111,232
1990	1-JUN	63,973	31-MAY	60,800	29-MAY	54,016	24-MAY	39,692	1-MAR	28,308
1991	6-MAR	133,610	5-MAR	115,611	3-MAR	78,603	3-MAR	53,540	4-MAR	46,547
1992	22-FEB	98,455	21-FEB	93,165	17-FEB	80,751	13-FEB	73,188	12-FEB	53,957
1993	23-JAN	176,753	22-JAN	165,796	20-MAR	147,236	17-MAR	134,159	16-MAR	104,133
1994	7-MAR	35,540	20-FEB	34,644	19-FEB	32,255	21-FEB	29,579	18-FEB	28,140
1995	15-JAN	417,100	14-JAN	370,613	11-JAN	316,455	10-MAR	255,298	10-MAR	177,943
1996	6-FEB	201,804	21-FEB	187,156	20-FEB	165,526	19-FEB	125,540	5-FEB	116,201
1997	3-JAN	840,418	2-JAN	725,215	1-JAN	529,930	28-DEC	338,490	30-DEC	215,034
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-24

AMERICAN RIVER AT FAIR OAKS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1905	19-MAR	21,200	19-MAR	13,690	19-MAR	10,308	17-MAR	8,547	4-MAR	6,433
1906	19-JAN	44,500	17-JAN	36,700	14-JAN	23,854	22-MAR	18,560	7-MAR	15,386
1907	19-MAR	105,000	19-MAR	87,833	17-MAR	65,914	17-MAR	41,847	1-MAR	25,081
1908	23-JAN	6,570	22-JAN	6,183	21-JAN	4,974	21-JAN	3,666	27-DEC	2,956
1909	14-JAN	98,000	14-JAN	87,167	14-JAN	59,114	12-JAN	41,520	14-JAN	28,949
1910	2-DEC	47,000	1-DEC	23,713	30-DEC	18,157	21-NOV	13,649	21-NOV	10,991
1911	31-JAN	69,100	30-JAN	57,300	29-JAN	36,100	24-JAN	25,493	11-JAN	19,139
1912	7-MAR	4,490	6-MAR	3,263	6-MAR	2,653	6-MAR	2,320	20-FEB	1,633
1913	7-NOV	8,210	6-NOV	6,597	6-NOV	4,023	15-JAN	2,468	15-JAN	1,868
1914	1-JAN	57,700	24-JAN	41,933	22-JAN	33,571	14-JAN	22,391	31-DEC	18,323
1915	2-FEB	23,100	1-FEB	17,800	1-FEB	11,066	31-JAN	9,937	1-FEB	8,975
1916	20-MAR	33,200	20-MAR	25,633	18-MAR	19,028	4-FEB	11,428	7-FEB	10,935
1917	25-FEB	37,600	24-FEB	27,033	21-FEB	22,200	19-FEB	13,758	20-FEB	8,948
1918	12-MAR	11,300	11-MAR	7,567	11-MAR	5,557	11-MAR	5,867	11-MAR	4,992
1919	11-FEB	45,000	10-FEB	26,067	10-FEB	14,890	9-FEB	9,031	9-FEB	7,429
1920	16-APR	18,800	15-APR	12,833	15-APR	9,486	10-APR	7,345	22-MAR	5,724
1921	18-JAN	32,800	18-JAN	22,400	18-JAN	14,086	18-JAN	10,867	5-MAR	8,877
1922	20-FEB	22,200	18-FEB	17,533	18-FEB	11,699	18-FEB	8,890	9-FEB	7,224
1923	13-DEC	29,800	12-DEC	23,433	11-DEC	15,964	31-MAR	10,573	15-MAR	6,932
1924	8-FEB	10,600	7-FEB	7,357	7-FEB	4,490	7-FEB	2,913	6-FEB	1,996
1925	6-FEB	68,200	5-FEB	40,233	5-FEB	24,323	5-FEB	15,867	5-FEB	10,887
1926	6-APR	22,700	6-APR	18,467	5-APR	14,346	29-MAR	8,447	14-MAR	5,949
1927	21-FEB	48,200	21-FEB	38,667	18-FEB	29,257	15-FEB	20,482	15-FEB	14,049
1928	25-MAR	119,000	25-MAR	98,167	24-MAR	58,686	23-MAR	33,980	23-MAR	21,349
1929	4-FEB	14,800	4-FEB	7,893	3-FEB	4,469	2-FEB	2,679	2-FEB	1,778
1930	5-MAR	18,800	4-MAR	13,703	4-MAR	9,033	4-MAR	6,162	18-FEB	4,581
1931	19-MAR	7,920	19-MAR	5,390	18-MAR	4,240	12-MAR	3,124	2-MAR	2,179
1932	7-FEB	18,900	7-FEB	16,333	6-FEB	12,381	31-JAN	8,229	31-JAN	5,740
1933	17-MAR	4,960	17-MAR	3,743	13-MAR	3,160	17-MAR	2,889	2-MAR	2,371
1934	2-JAN	13,300	1-JAN	10,367	30-DEC	7,203	29-DEC	4,472	29-DEC	2,994
1935	8-APR	49,300	8-APR	29,133	4-APR	19,486	8-APR	16,453	3-APR	13,835
1936	22-FEB	46,400	22-FEB	34,367	21-FEB	23,486	12-FEB	21,653	12-FEB	14,822
1937	14-FEB	22,500	5-FEB	17,733	20-MAR	11,600	12-MAR	8,945	12-MAR	7,919
1938	11-DEC	81,100	10-DEC	47,467	10-DEC	24,997	1-FEB	13,515	1-FEB	10,403
1939	9-MAR	8,500	9-MAR	5,647	9-MAR	3,889	1-MAR	2,543	14-FEB	2,000
1940	30-MAR	69,600	30-MAR	53,533	27-MAR	38,628	26-MAR	24,367	26-MAR	16,880
1941	11-FEB	26,900	11-FEB	21,267	10-FEB	15,208	10-FEB	11,861	10-FEB	10,921
1942	27-JAN	54,600	26-JAN	40,267	25-JAN	28,029	25-JAN	23,436	24-JAN	15,510
1943	22-JAN	73,800	21-JAN	52,967	21-JAN	33,114	6-MAR	22,925	6-MAR	16,024
1944	4-MAR	12,400	4-MAR	9,227	29-FEB	7,851	29-FEB	5,756	29-FEB	4,382
1945	2-FEB	70,900	2-FEB	40,733	1-FEB	23,661	1-FEB	14,983	1-FEB	9,738
1946	22-DEC	32,400	28-DEC	25,533	22-DEC	22,086	22-DEC	18,041	21-DEC	11,576
1947	13-FEB	20,100	12-FEB	12,410	12-FEB	7,654	10-MAR	5,867	10-MAR	5,297
1948	17-APR	17,600	17-APR	15,233	17-APR	13,300	16-APR	11,336	17-APR	10,547
1949	3-MAR	25,500	3-MAR	15,647	2-MAR	9,109	3-MAR	7,415	2-MAR	6,035
1950	6-FEB	22,800	22-JAN	20,067	18-JAN	13,923	17-JAN	9,811	17-JAN	8,948
1951	21-NOV	132,000	19-NOV	107,500	18-NOV	61,757	18-NOV	31,688	18-NOV	30,557
1952	2-FEB	30,500	2-FEB	20,800	12-JAN	16,593	12-JAN	12,749	12-JAN	12,008
1953	28-APR	27,600	27-APR	20,867	24-APR	15,571	23-APR	12,411	22-APR	10,350
1954	10-MAR	36,500	9-MAR	26,100	9-MAR	16,126	9-MAR	10,651	9-MAR	8,919

TABLE B.6-24

AMERICAN RIVER AT FAIR OAKS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1955	2-JAN	8,710	1-JAN	6,777	4-DEC	4,443	3-DEC	3,277	31-DEC	2,694
1956	23-DEC	189,070	24-DEC	127,449	21-DEC	70,984	19-DEC	40,608	19-DEC	28,223
1957	25-FEB	31,116	24-FEB	21,042	23-FEB	14,303	24-FEB	13,393	22-FEB	9,654
1958	3-APR	42,302	1-APR	33,635	30-MAR	25,279	21-MAR	19,005	16-MAR	14,870
1959	17-FEB	15,394	17-FEB	12,261	16-FEB	8,854	16-FEB	5,875	16-FEB	4,586
1960	8-FEB	63,013	8-FEB	34,801	8-FEB	18,197	2-FEB	10,095	8-FEB	7,154
1961	11-FEB	5,953	10-FEB	5,760	10-FEB	4,064	1-FEB	2,970	31-JAN	2,297
1962	10-FEB	35,215	14-FEB	20,717	10-FEB	19,671	9-FEB	12,694	9-FEB	8,754
1963	1-FEB	152,613	31-JAN	93,881	31-JAN	49,107	31-JAN	26,738	30-JAN	15,499
1964	21-JAN	13,395	20-JAN	9,560	19-JAN	6,447	19-JAN	4,553	18-JAN	3,403
1965	23-DEC	183,240	22-DEC	140,339	21-DEC	87,659	21-DEC	50,574	20-DEC	33,106
1966	29-DEC	5,717	29-DEC	5,433	28-DEC	3,828	28-DEC	3,626	25-DEC	2,701
1967	17-MAR	36,196	16-MAR	29,825	16-MAR	20,067	16-MAR	13,855	16-MAR	10,941
1968	21-FEB	24,696	20-FEB	22,340	20-FEB	17,941	18-FEB	12,405	17-FEB	8,708
1969	21-JAN	83,525	20-JAN	71,861	20-JAN	49,450	19-JAN	32,443	19-JAN	21,017
1970	22-JAN	88,314	21-JAN	68,755	17-JAN	49,561	14-JAN	38,627	10-JAN	23,500
1971	26-MAR	34,046	26-MAR	25,337	26-MAR	16,883	25-MAR	12,269	24-MAR	9,915
1972	4-MAR	10,045	4-MAR	9,585	4-MAR	8,824	4-MAR	8,471	25-FEB	7,823
1973	12-JAN	49,291	12-JAN	31,181	12-JAN	25,659	9-JAN	16,753	12-JAN	11,074
1974	17-JAN	40,629	17-JAN	35,519	15-JAN	28,112	13-JAN	18,103	27-DEC	14,662
1975	25-MAR	30,035	25-MAR	20,825	22-MAR	13,481	21-MAR	9,621	7-MAR	7,604
1976	27-OCT	10,389	26-OCT	5,969	26-OCT	3,656	27-OCT	2,449	26-OCT	2,151
1977	22-FEB	1,717	22-FEB	1,548	19-FEB	951	18-FEB	754	20-FEB	646
1978	17-JAN	31,169	15-JAN	25,753	14-JAN	18,781	5-JAN	13,962	28-DEC	10,212
1979	12-JAN	18,300	11-JAN	15,617	11-JAN	9,677	15-FEB	6,876	16-FEB	6,475
1980	14-JAN	124,914	13-JAN	97,777	12-JAN	63,759	10-JAN	35,358	31-DEC	20,411
1981	26-MAR	15,530	25-MAR	11,168	22-MAR	7,778	14-MAR	5,704	27-FEB	3,971
1982	16-FEB	113,126	15-FEB	78,853	15-FEB	45,266	14-FEB	27,422	14-FEB	19,741
1983	13-MAR	68,789	13-MAR	48,642	12-MAR	31,051	1-MAR	24,339	26-FEB	19,820
1984	26-DEC	65,184	25-DEC	54,043	25-DEC	36,951	24-DEC	23,892	10-DEC	17,196
1985	8-FEB	13,473	8-FEB	8,445	8-FEB	5,307	8-FEB	3,554	8-FEB	3,065
1986	18-FEB	171,000	17-FEB	166,000	15-FEB	101,000	14-FEB	56,400	14-FEB	39,100
1987	14-FEB	11,700	13-FEB	10,100	12-FEB	6,240	5-MAR	4,800	13-FEB	3,810
1988	17-JAN	5,450	16-JAN	4,460	11-JAN	3,860	4-JAN	3,630	4-JAN	2,810
1989	25-MAR	34,000	9-MAR	26,200	8-MAR	21,000	7-MAR	15,100	8-MAR	14,900
1990	4-MAR	6,510	3-MAR	6,020	2-MAR	4,640	26-FEB	3,960	15-FEB	3,080
1991	5-MAR	25,000	4-MAR	18,800	2-MAR	10,200	2-MAR	6,570	2-MAR	5,500
1992	20-FEB	13,266	20-FEB	11,813	19-FEB	8,191	15-FEB	6,335	12-FEB	5,078
1993	22-JAN	34,244	21-JAN	28,018	20-JAN	17,988	15-MAR	15,583	14-MAR	12,707
1994	20-APR	4,801	19-APR	4,573	16-APR	4,208	15-APR	3,438	29-MAR	3,115
1995	11-MAR	68,260	10-MAR	55,301	10-MAR	38,877	9-MAR	30,706	3-MAR	21,213
1996	7-FEB	54,410	5-FEB	36,621	4-FEB	23,569	4-FEB	15,885	4-FEB	14,032
1997	2-JAN	248,921	1-JAN	164,252	30-DEC	95,715	27-DEC	53,692	30-DEC	35,299
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-25

PUTAH CREEK NEAR WINTERS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1930	---	---	---	---	---	---	---	---	---	---
1931	23-JAN	2,260	23-JAN	1,371	23-JAN	720	23-JAN	389	6-JAN	256
1932	27-DEC	25,200	27-DEC	12,467	24-DEC	7,041	23-DEC	4,192	23-DEC	2,403
1933	27-JAN	4,100	27-JAN	3,447	25-JAN	2,348	22-JAN	1,344	21-JAN	776
1934	30-DEC	8,810	30-DEC	5,520	29-DEC	3,690	29-DEC	1,932	13-DEC	1,215
1935	14-JAN	15,000	6-MAR	7,270	1-MAR	4,997	4-JAN	3,531	30-DEC	2,061
1936	21-FEB	14,200	21-FEB	11,060	17-FEB	7,530	12-FEB	6,737	11-FEB	3,837
1937	5-FEB	15,000	4-FEB	9,990	2-FEB	5,369	2-FEB	4,427	29-JAN	2,530
1938	11-DEC	29,300	10-DEC	18,807	8-FEB	11,463	1-FEB	9,819	1-FEB	6,331
1939	9-MAR	1,140	9-MAR	800	9-MAR	604	8-MAR	390	8-MAR	244
1940	27-FEB	54,500	27-FEB	38,133	26-FEB	18,471	17-FEB	9,451	14-FEB	5,576
1941	4-APR	18,800	9-FEB	13,233	21-DEC	9,841	18-DEC	6,078	14-JAN	4,928
1942	6-FEB	38,700	4-FEB	22,900	2-FEB	13,981	24-JAN	9,398	23-JAN	5,898
1943	21-JAN	38,500	21-JAN	20,900	21-JAN	10,473	20-JAN	6,243	20-JAN	3,444
1944	4-MAR	16,800	4-MAR	7,987	29-FEB	4,710	22-FEB	2,735	20-FEB	1,636
1945	1-FEB	13,700	1-FEB	10,183	31-JAN	6,333	31-JAN	3,462	31-JAN	1,880
1946	27-DEC	11,000	21-DEC	8,000	21-DEC	7,571	21-DEC	4,978	20-DEC	2,883
1947	12-FEB	9,560	12-FEB	4,860	12-FEB	2,427	11-FEB	1,264	12-FEB	1,170
1948	24-MAR	4,500	9-APR	2,550	9-APR	1,856	4-APR	1,543	23-MAR	1,211
1949	11-MAR	11,300	10-MAR	7,873	10-MAR	4,480	10-MAR	3,056	23-FEB	2,022
1950	4-FEB	12,800	4-FEB	9,667	4-FEB	5,181	4-FEB	2,826	14-JAN	2,037
1951	3-DEC	15,500	3-DEC	9,053	3-DEC	5,274	3-DEC	4,106	17-NOV	2,696
1952	14-JAN	14,300	12-JAN	10,717	12-JAN	8,359	12-JAN	6,414	11-JAN	4,741
1953	9-JAN	23,800	8-JAN	12,207	7-JAN	7,986	7-JAN	5,119	26-DEC	3,609
1954	17-JAN	19,500	16-JAN	8,083	13-FEB	4,230	12-FEB	2,481	17-JAN	1,832
1955	6-DEC	2,040	21-APR	1,459	2-DEC	1,072	2-DEC	766	15-NOV	520
1956	22-DEC	35,500	22-DEC	27,800	19-DEC	19,057	19-DEC	10,762	19-DEC	7,257
1957	24-FEB	8,434	23-FEB	6,930	21-FEB	4,611	21-FEB	2,529	21-FEB	1,532
1958	24-FEB	27,446	24-FEB	15,062	30-MAR	9,616	12-FEB	7,740	29-JAN	6,171
1959	16-FEB	16,464	16-FEB	12,518	15-FEB	6,685	10-FEB	3,536	10-FEB	1,910
1960	8-FEB	25,338	8-FEB	12,164	5-FEB	6,577	31-JAN	3,945	21-JAN	2,340
1961	31-JAN	7,593	29-JAN	4,391	29-JAN	2,612	29-JAN	1,667	25-JAN	1,148
1962	13-FEB	17,276	13-FEB	15,576	9-FEB	8,794	7-FEB	5,342	8-FEB	3,765
1963	31-JAN	48,516	30-JAN	27,386	30-JAN	13,124	30-JAN	7,391	29-JAN	4,100
1964	20-JAN	10,639	20-JAN	7,105	19-JAN	3,700	19-JAN	1,935	19-JAN	1,020
1965	22-DEC	43,595	21-DEC	25,867	21-DEC	13,483	22-DEC	9,597	19-DEC	6,636
1966	5-JAN	20,844	4-JAN	15,243	4-JAN	7,365	28-DEC	4,478	24-DEC	2,482
1967	21-JAN	49,537	20-JAN	20,799	20-JAN	12,087	20-JAN	9,083	20-JAN	4,936
1968	29-JAN	21,242	29-JAN	11,318	29-JAN	5,673	29-JAN	2,921	29-JAN	2,312
1969	13-JAN	21,266	19-JAN	17,457	19-JAN	10,286	12-JAN	8,554	18-JAN	5,985
1970	21-JAN	24,451	21-JAN	19,303	21-JAN	13,928	13-JAN	11,428	9-JAN	7,177
1971	4-DEC	18,783	2-DEC	13,043	28-NOV	9,013	27-NOV	5,242	27-NOV	3,407
1972	5-FEB	3,417	5-FEB	1,976	22-DEC	1,411	19-DEC	764	22-JAN	489
1973	16-JAN	26,046	16-JAN	16,356	12-JAN	10,356	8-JAN	7,152	9-JAN	4,749
1974	30-MAR	16,545	29-MAR	11,808	28-MAR	7,498	27-MAR	4,325	1-MAR	3,163
1975	6-OCT	20,460	12-FEB	8,991	8-FEB	7,078	1-FEB	4,783	31-JAN	2,680
1976	29-FEB	1,207	29-FEB	678	28-FEB	349	26-FEB	201	12-FEB	121
1977	15-MAR	1,140	15-MAR	488	15-MAR	267	11-MAR	154	20-FEB	99
1978	16-JAN	31,975	14-JAN	21,110	13-JAN	12,105	5-JAN	8,543	14-JAN	4,842
1979	15-JAN	6,731	20-FEB	5,261	16-FEB	3,707	13-FEB	3,005	12-FEB	1,913

TABLE B.6-25

PUTAH CREEK NEAR WINTERS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1980	17-FEB	23,958	17-FEB	18,939	16-FEB	13,533	16-FEB	7,774	15-FEB	4,786
1981	27-JAN	14,025	27-JAN	9,766	27-JAN	4,902	22-JAN	2,778	21-JAN	1,635
1982	19-DEC	25,369	19-DEC	15,113	30-MAR	10,549	30-MAR	8,799	29-MAR	5,339
1983	26-JAN	28,523	28-FEB	24,819	25-FEB	16,833	27-FEB	11,285	25-FEB	8,372
1984	25-DEC	24,445	24-DEC	17,467	24-DEC	9,629	23-DEC	5,469	3-DEC	4,202
1985	8-FEB	16,039	7-FEB	6,652	7-FEB	3,232	7-FEB	1,648	7-FEB	907
1986	17-FEB	60,330	16-FEB	36,372	14-FEB	28,393	12-FEB	15,259	14-FEB	9,389
1987	13-FEB	8,446	12-FEB	4,119	12-FEB	2,127	3-MAR	1,296	12-FEB	1,052
1988	4-JAN	9,561	3-JAN	6,309	3-JAN	3,246	3-JAN	2,502	28-DEC	1,590
1989	11-MAR	5,928	9-MAR	4,506	8-MAR	2,581	8-MAR	1,875	2-MAR	1,370
1990	13-JAN	4,799	12-JAN	2,601	12-JAN	1,339	7-JAN	720	7-JAN	448
1991	4-MAR	25,765	3-MAR	12,996	2-MAR	6,175	2-MAR	3,630	2-MAR	2,952
1992	20-FEB	4,711	19-FEB	3,141	14-FEB	2,489	10-FEB	1,855	10-FEB	1,167
1993	20-JAN	28,922	20-JAN	17,266	15-JAN	9,335	12-JAN	6,923	28-DEC	4,854
1994	7-FEB	4,390	6-FEB	2,270	5-FEB	1,227	7-FEB	1,007	6-FEB	687
1995	9-MAR	45,076	8-JAN	32,458	8-JAN	20,998	4-JAN	11,856	4-JAN	7,978
1996	4-FEB	22,501	4-FEB	11,498	31-JAN	6,488	24-JAN	4,877	24-JAN	3,851
1997	1-JAN	45,429	30-DEC	27,743	28-DEC	16,555	26-DEC	8,979	30-DEC	7,670
1998	7-FEB	22,213	5-FEB	18,208	2-FEB	14,388	2-FEB	9,565	29-JAN	7,972
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-26

KINGS RIVER AT PINE FLAT DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1895	---	---	---	---	---	---	---	---	---	---
1896	21-JAN	8,140	20-JAN	4,213	18-JAN	3,561	18-JAN	2,315	29-FEB	1,685
1897	7-MAR	4,270	6-MAR	3,333	6-MAR	2,440	26-FEB	1,980	2-MAR	1,938
1898	8-DEC	8,140	8-DEC	3,717	8-DEC	2,074	24-NOV	1,375	21-NOV	1,155
1899	25-MAR	24,000	24-MAR	12,127	23-MAR	7,070	17-MAR	4,008	2-MAR	2,416
1900	3-JAN	13,400	3-JAN	6,967	30-DEC	4,161	30-DEC	2,699	16-DEC	2,012
1901	7-JAN	33,200	6-JAN	20,667	5-JAN	12,066	5-JAN	6,505	18-FEB	4,040
1902	2-MAR	4,450	2-MAR	2,640	26-FEB	2,196	26-FEB	1,870	25-FEB	1,517
1903	28-JAN	12,200	27-JAN	5,753	27-JAN	3,260	27-JAN	2,047	2-MAR	1,499
1904	23-MAR	7,840	23-MAR	4,427	23-MAR	3,666	17-MAR	3,141	2-MAR	2,225
1905	11-OCT	3,920	11-OCT	3,533	6-OCT	3,187	2-OCT	2,601	25-SEP	2,130
1906	19-JAN	24,000	15-MAR	13,900	12-MAR	10,363	12-MAR	7,979	---	5,502
1907	21-MAR	9,780	20-MAR	9,007	20-MAR	8,117	17-MAR	5,992	2-MAR	4,120
1908	29-FEB	2,400	19-MAR	2,327	19-MAR	2,321	15-MAR	2,129	29-FEB	1,647
1909	14-JAN	19,800	13-JAN	11,740	13-JAN	6,506	13-JAN	5,653	14-JAN	4,159
1910	1-JAN	14,700	31-DEC	8,570	31-DEC	5,270	31-DEC	3,320	31-DEC	2,967
1911	31-JAN	20,500	30-JAN	15,377	29-JAN	10,210	24-JAN	6,535	2-MAR	4,485
1912	13-MAR	888	13-MAR	795	25-MAR	752	6-MAR	726	2-MAR	683
1913	31-MAR	1,220	29-MAR	937	25-MAR	761	17-MAR	686	2-MAR	639
1914	26-JAN	30,400	25-JAN	21,100	22-JAN	12,393	18-JAN	7,267	13-JAN	4,405
1915	9-FEB	6,990	9-FEB	4,300	20-MAR	2,723	17-MAR	2,323	2-MAR	1,628
1916	17-JAN	14,200	17-JAN	10,887	24-JAN	7,084	17-JAN	6,549	17-JAN	4,796
1917	22-FEB	9,400	21-FEB	8,317	20-FEB	6,200	20-FEB	3,927	20-FEB	2,551
1918	19-MAR	6,330	19-MAR	3,787	19-MAR	2,706	11-MAR	2,404	2-MAR	1,949
1919	2-OCT	10,300	30-SEP	6,673	30-SEP	3,983	29-SEP	2,288	29-SEP	1,432
1920	2-MAR	5,180	1-MAR	3,187	21-MAR	2,351	17-MAR	1,818	1-MAR	1,688
1921	14-MAR	3,300	13-MAR	3,033	13-MAR	2,659	3-MAR	2,270	2-MAR	2,163
1922	2-JAN	5,960	10-FEB	3,700	27-DEC	2,776	20-DEC	2,331	20-DEC	1,694
1923	13-DEC	4,400	13-DEC	3,130	11-DEC	2,151	17-MAR	1,706	2-MAR	1,330
1924	27-MAR	545	29-SEP	486	26-SEP	439	17-SEP	419	4-SEP	366
1925	29-MAR	2,400	28-MAR	2,233	25-MAR	2,086	17-MAR	1,702	2-MAR	1,401
1926	14-FEB	2,980	13-FEB	1,818	25-MAR	1,621	17-MAR	1,346	2-MAR	1,103
1927	18-FEB	9,260	18-FEB	6,707	15-FEB	5,767	15-FEB	4,513	15-FEB	3,263
1928	25-MAR	6,580	25-MAR	5,800	24-MAR	4,184	17-MAR	2,663	2-MAR	1,680
1929	22-MAR	1,570	22-MAR	1,440	22-MAR	1,208	17-MAR	1,137	2-MAR	953
1930	23-FEB	2,820	28-MAR	2,347	25-MAR	2,097	17-MAR	1,477	2-MAR	1,186
1931	25-MAR	945	23-MAR	882	21-MAR	769	17-MAR	638	2-MAR	510
1932	28-DEC	11,300	7-FEB	9,093	6-FEB	6,386	1-FEB	4,045	1-FEB	2,788
1933	29-JAN	1,720	21-MAR	1,277	17-MAR	1,239	9-MAR	1,185	2-MAR	1,074
1934	13-DEC	4,690	13-DEC	2,450	25-MAR	2,094	17-MAR	1,894	2-MAR	1,616
1935	6-FEB	2,440	6-FEB	2,277	25-MAR	1,790	17-MAR	1,530	2-MAR	1,366
1936	23-FEB	10,700	22-FEB	7,727	22-FEB	4,794	12-FEB	4,405	11-FEB	3,207
1937	6-FEB	25,600	5-FEB	15,390	5-FEB	8,463	5-FEB	7,179	5-FEB	4,775
1938	11-DEC	37,800	10-DEC	19,963	10-DEC	10,099	2-MAR	8,229	1-MAR	6,185
1939	27-MAR	3,290	26-MAR	3,017	23-MAR	2,600	17-MAR	2,257	2-MAR	1,546
1940	26-FEB	8,160	26-FEB	5,933	25-FEB	5,070	23-FEB	3,883	23-FEB	2,904
1941	12-FEB	9,480	10-FEB	6,877	9-FEB	5,259	9-FEB	3,855	9-FEB	3,522
1942	30-DEC	3,390	11-MAR	2,883	11-MAR	2,546	11-MAR	2,205	2-MAR	1,818
1943	22-JAN	16,200	21-JAN	14,267	21-JAN	8,123	9-MAR	5,653	2-MAR	4,331
1944	22-FEB	3,170	4-MAR	2,350	29-FEB	1,755	29-FEB	1,593	1-MAR	1,483

TABLE B.6-26

KINGS RIVER AT PINE FLAT DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1945	2-FEB	32,200	1-FEB	18,300	1-FEB	9,773	1-FEB	5,563	1-FEB	3,436
1946	30-OCT	7,960	30-OCT	4,460	22-DEC	3,394	22-DEC	2,423	2-MAR	1,822
1947	23-NOV	8,190	23-NOV	4,800	20-NOV	3,116	23-NOV	2,143	20-NOV	1,704
1948	25-MAR	1,230	24-MAR	1,047	24-MAR	916	17-MAR	735	2-MAR	507
1949	11-MAR	2,050	11-MAR	1,312	11-MAR	1,004	11-MAR	951	2-MAR	886
1950	6-FEB	4,800	5-FEB	3,740	5-FEB	2,411	5-FEB	1,661	5-FEB	1,444
1951	19-NOV	51,600	18-NOV	25,200	18-NOV	13,643	18-NOV	7,383	18-NOV	6,504
1952	25-JAN	13,000	25-JAN	7,930	24-JAN	4,807	15-JAN	3,775	29-DEC	2,980
1953	14-JAN	2,870	14-JAN	2,037	13-JAN	1,561	8-JAN	1,392	8-JAN	1,162
1954	9-MAR	6,179	9-MAR	3,977	9-MAR	2,573	9-MAR	1,975	2-MAR	1,738
1955	17-FEB	3,863	17-FEB	2,470	16-FEB	1,670	16-FEB	1,252	16-FEB	1,085
1956	23-DEC	72,589	23-DEC	46,058	22-DEC	24,764	22-DEC	13,291	22-DEC	7,721
1957	25-FEB	2,771	23-FEB	1,952	23-FEB	1,689	23-FEB	1,477	12-FEB	1,219
1958	16-MAR	6,946	15-MAR	5,058	16-MAR	4,414	15-MAR	3,522	25-FEB	2,541
1959	16-FEB	5,441	16-FEB	4,052	16-FEB	2,550	16-FEB	1,760	16-FEB	1,729
1960	9-FEB	2,437	8-FEB	1,905	25-MAR	1,546	17-MAR	1,222	2-MAR	880
1961	2-DEC	2,122	1-DEC	1,267	23-MAR	923	17-MAR	822	2-MAR	639
1962	10-FEB	10,236	9-FEB	9,954	9-FEB	6,475	8-FEB	4,315	8-FEB	2,848
1963	1-FEB	34,611	31-JAN	23,674	30-JAN	12,508	30-JAN	7,134	30-JAN	4,253
1964	15-NOV	2,953	15-NOV	1,747	15-NOV	1,395	15-NOV	1,193	6-NOV	993
1965	24-DEC	15,519	23-DEC	12,001	23-DEC	7,960	23-DEC	5,405	23-DEC	3,794
1966	24-NOV	4,335	23-NOV	3,564	25-MAR	2,691	17-MAR	2,189	2-MAR	1,679
1967	6-DEC	64,564	5-DEC	31,693	5-DEC	15,895	2-DEC	8,604	28-NOV	5,031
1968	31-MAR	2,007	29-MAR	1,825	20-FEB	1,393	20-FEB	1,302	17-FEB	1,193
1969	25-JAN	40,513	25-JAN	25,563	19-JAN	17,388	18-JAN	12,269	18-JAN	7,525
1970	16-JAN	13,978	16-JAN	7,561	14-JAN	4,401	14-JAN	3,049	10-JAN	2,091
1971	27-MAR	2,034	29-MAR	1,817	25-MAR	1,530	17-MAR	1,269	2-MAR	1,095
1972	20-MAR	2,720	18-MAR	2,691	16-MAR	2,567	9-MAR	2,316	2-MAR	1,890
1973	18-JAN	5,727	16-JAN	4,387	16-JAN	3,029	16-JAN	1,929	28-FEB	1,865
1974	2-MAR	6,442	2-MAR	4,342	1-MAR	3,218	17-MAR	2,650	2-MAR	2,600
1975	25-MAR	4,840	25-MAR	3,237	22-MAR	2,393	16-MAR	1,853	2-MAR	1,669
1976	27-OCT	1,768	11-OCT	1,208	26-OCT	949	17-MAR	806	1-MAR	744
1977	2-OCT	1,110	1-OCT	1,091	30-SEP	920	30-SEP	681	11-SEP	490
1978	9-FEB	14,458	9-FEB	10,244	9-FEB	7,016	2-MAR	4,706	9-FEB	4,394
1979	12-JAN	5,205	11-JAN	4,003	25-MAR	2,920	6-MAR	2,340	2-SEP	2,284
1980	13-JAN	33,283	12-JAN	26,626	11-JAN	15,236	10-JAN	8,888	15-FEB	5,619
1981	26-MAR	2,518	25-MAR	1,976	20-MAR	1,858	17-MAR	1,590	2-MAR	1,138
1982	16-FEB	13,142	16-FEB	7,099	15-FEB	4,864	15-FEB	3,598	16-FEB	3,269
1983	22-DEC	24,682	22-DEC	13,115	---	7,422	---	5,950	26-FEB	5,450
1984	25-DEC	12,797	25-DEC	9,981	25-DEC	6,444	24-DEC	4,360	9-DEC	3,076
1985	27-MAR	2,667	27-MAR	2,374	25-MAR	1,923	17-MAR	1,478	2-MAR	1,271
1986	18-FEB	25,060	17-FEB	21,602	13-FEB	17,012	13-FEB	11,311	13-FEB	9,057
1987	13-FEB	3,665	13-FEB	1,950	5-MAR	1,227	5-MAR	1,093	2-MAR	934
1988	5-JAN	6,853	5-JAN	3,320	25-MAR	2,115	17-MAR	1,594	2-MAR	1,296
1989	8-MAR	3,286	7-MAR	2,728	7-MAR	2,338	2-MAR	1,955	2-MAR	1,862
1990	26-MAR	1,991	25-MAR	1,951	22-MAR	1,779	17-MAR	1,479	2-MAR	1,159
1991	4-MAR	13,078	4-MAR	7,312	4-MAR	3,935	4-MAR	2,490	2-MAR	2,041
1992	15-FEB	1,986	13-FEB	1,621	11-FEB	1,438	11-FEB	1,200	11-FEB	1,075
1993	14-JAN	12,540	14-JAN	7,030	13-JAN	5,157	17-MAR	4,043	2-MAR	3,091
1994	31-MAR	1,680	29-MAR	1,453	16-MAR	1,410	17-MAR	1,310	2-MAR	1,262
1995	10-MAR	26,970	10-MAR	18,874	9-MAR	11,604	10-MAR	8,910	2-MAR	6,157

TABLE B.6-26

KINGS RIVER AT PINE FLAT DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1996	5-FEB	9,915	19-FEB	6,907	19-FEB	4,932	19-FEB	3,419	5-FEB	3,243
1997	2-JAN	50,217	2-JAN	35,498	1-JAN	20,253	30-DEC	11,896	30-DEC	9,091
1998	25-MAR	9,125	24-MAR	6,662	24-MAR	5,538	17-MAR	4,204	2-FEB	3,101
1999	9-FEB	3,533	8-FEB	2,757	7-FEB	2,109	7-FEB	1,632	20-JAN	1,403

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TABLE B.6-27

BIG DRY CREEK AT BIG DRY CREEK DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1945	---	---	---	---	---	---	---	---	---	---
1946	---	---	---	---	---	---	---	---	---	---
1947	---	---	---	---	---	---	---	---	---	---
1948	---	---	---	---	---	---	---	---	---	---
1949	26-MAR	21	24-MAR	17	24-MAR	11	17-MAR	6	2-MAR	3
1950	---	0	---	0	---	0	---	0	---	0
1951	5-DEC	294	4-DEC	158	4-DEC	86	4-DEC	51	19-NOV	29
1952	16-MAR	906	15-MAR	575	15-MAR	375	11-MAR	213	2-MAR	125
1953	15-JAN	104	14-JAN	66	9-JAN	37	7-JAN	32	7-JAN	20
1954	---	0	---	0	---	0	---	0	---	0
1955	1-MAR	78	1-MAR	34	1-MAR	20	1-MAR	11	16-FEB	6
1956	24-DEC	2,094	23-DEC	1,368	22-DEC	722	23-DEC	367	22-DEC	206
1957	---	0	---	0	---	0	---	0	---	0
1958	22-MAR	693	21-MAR	397	17-MAR	238	15-MAR	149	22-FEB	96
1959	17-FEB	97	17-FEB	63	16-FEB	40	16-FEB	22	8-FEB	12
1960	---	0	---	0	---	0	---	0	---	0
1961	---	0	---	0	---	0	---	0	---	0
1962	11-FEB	599	10-FEB	413	10-FEB	261	10-FEB	164	10-FEB	96
1963	11-FEB	110	10-FEB	74	10-FEB	32	29-JAN	24	18-JAN	12
1964	---	0	---	0	---	0	---	0	---	0
1965	6-JAN	219	6-JAN	194	5-JAN	107	2-JAN	60	4-JAN	39
1966	---	0	---	0	---	0	---	0	---	0
1967	31-JAN	220	13-MAR	138	13-MAR	107	12-MAR	57	2-MAR	33
1968	---	0	---	0	---	0	---	0	---	0
1969	25-FEB	2,407	24-FEB	1,374	23-FEB	805	18-FEB	474	15-FEB	315
1970	17-JAN	533	16-JAN	279	15-JAN	138	9-JAN	64	16-JAN	36
1971	22-DEC	144	21-DEC	78	21-DEC	40	20-DEC	23	21-DEC	17
1972	---	0	---	0	---	0	---	0	---	0
1973	12-FEB	571	11-FEB	331	11-FEB	191	7-FEB	106	11-FEB	84
1974	4-MAR	186	3-MAR	106	1-MAR	56	8-JAN	44	7-JAN	24
1975	26-MAR	162	25-MAR	86	22-MAR	58	13-MAR	39	2-MAR	29
1976	---	0	---	0	---	0	---	0	---	0
1977	---	0	---	0	---	0	---	0	---	0
1978	10-FEB	1,787	9-FEB	1,091	8-FEB	726	8-FEB	391	8-FEB	323
1979	29-MAR	392	29-MAR	257	25-MAR	126	21-FEB	69	1-MAR	46
1980	20-FEB	1,452	18-FEB	629	18-FEB	351	19-FEB	194	14-FEB	154
1981	21-MAR	50	20-MAR	23	21-MAR	17	13-MAR	9	26-FEB	4
1982	19-MAR	454	18-MAR	330	15-MAR	254	15-MAR	156	2-MAR	92
1983	23-DEC	987	2-MAR	786	25-JAN	654	26-JAN	467	26-FEB	412
1984	29-DEC	181	29-DEC	170	25-DEC	146	24-DEC	84	3-DEC	53
1985	29-MAR	113	27-MAR	38	23-MAR	16	15-MAR	8	28-FEB	4
1986	18-FEB	2,126	17-FEB	1,598	16-FEB	1,170	11-FEB	678	16-FEB	435
1987	21-MAR	10	19-MAR	7	15-MAR	6	7-MAR	3	20-FEB	1
1988	---	0	---	0	---	0	---	0	---	0
1989	---	0	---	0	---	0	---	0	---	0
1990	---	0	---	0	---	0	---	0	---	0
1991	---	957	---	621	---	369	---	215	---	140
1992	---	192	---	122	---	74	---	44	---	28
1993	---	10,060	---	6,290	---	3,857	---	2,357	---	1,508
1994	---	5	---	3	---	2	---	1	---	0

TABLE B.6-27

BIG DRY CREEK AT BIG DRY CREEK DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1995	11-MAR	2,727	10-MAR	1,663	10-MAR	801	10-MAR	579	2-MAR	337
1996	5-FEB	398	20-FEB	213	19-FEB	121	20-FEB	86	20-FEB	73
1997	3-JAN	1,257	1-JAN	922	30-DEC	600	30-DEC	343	30-DEC	318
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-28

SAN JOAQUIN RIVER AT FRIANT DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1900	---	---	---	---	---	---	---	---	---	---
1901	---	---	---	---	---	---	---	---	---	---
1902	---	---	---	---	---	---	---	---	---	---
1903	---	---	---	---	---	---	---	---	---	---
1904	---	8,500	---	2,700	---	2,043	---	1,611	---	1,329
1905	---	7,500	---	5,100	---	3,629	---	2,710	---	2,135
1906	---	21,000	---	13,000	---	6,900	---	5,100	---	3,600
1907	---	11,000	---	9,000	---	6,032	---	4,272	---	3,207
1908	---	2,000	---	1,536	---	1,220	---	1,006	---	858
1909	---	27,000	---	16,600	---	9,500	---	8,000	---	5,552
1910	---	28,300	---	16,600	---	9,600	---	5,800	---	4,200
1911	31-JAN	41,000	30-JAN	29,800	29-JAN	17,300	25-JAN	10,600	25-JAN	6,570
1912	6-MAR	3,180	6-MAR	2,020	5-MAR	1,350	6-MAR	1,180	2-MAR	964
1913	31-MAR	1,190	29-MAR	913	25-MAR	746	17-MAR	681	2-MAR	620
1914	26-JAN	27,400	25-JAN	18,200	23-JAN	11,100	18-JAN	7,130	13-JAN	4,660
1915	29-MAR	4,270	24-MAR	3,580	24-MAR	3,410	17-MAR	2,910	2-MAR	2,060
1916	18-JAN	12,300	20-MAR	9,940	18-MAR	7,870	11-MAR	6,520	2-MAR	5,630
1917	21-FEB	12,100	21-FEB	9,950	20-FEB	7,120	20-FEB	4,450	20-FEB	2,990
1918	19-MAR	7,890	19-MAR	5,310	19-MAR	3,670	8-MAR	3,280	2-MAR	2,620
1919	2-OCT	11,200	30-SEP	8,160	30-SEP	5,320	29-SEP	3,050	29-SEP	1,870
1920	2-MAR	5,090	2-MAR	3,170	21-MAR	2,210	17-MAR	1,770	2-MAR	1,740
1921	14-MAR	4,360	13-MAR	3,710	13-MAR	3,280	2-MAR	2,990	2-MAR	2,740
1922	2-JAN	6,340	10-FEB	3,760	27-DEC	2,960	21-DEC	2,540	9-FEB	1,740
1923	14-DEC	4,640	13-DEC	3,960	12-DEC	2,800	17-MAR	2,030	2-MAR	1,580
1924	27-MAR	1,030	27-MAR	772	25-MAR	637	26-SEP	487	24-SEP	422
1925	6-FEB	4,120	6-FEB	3,430	6-FEB	2,490	17-MAR	1,960	2-MAR	1,600
1926	14-FEB	3,690	13-FEB	2,390	25-MAR	2,170	17-MAR	1,890	2-MAR	1,580
1927	27-NOV	6,800	17-FEB	4,920	19-FEB	4,670	15-FEB	4,180	15-FEB	3,140
1928	25-MAR	11,000	25-MAR	10,000	24-MAR	6,790	17-MAR	4,080	2-MAR	2,500
1929	11-MAR	2,630	10-MAR	1,700	23-MAR	1,350	17-MAR	1,260	2-MAR	1,080
1930	23-FEB	2,880	29-MAR	1,740	25-MAR	1,180	17-MAR	1,090	2-MAR	1,050
1931	23-MAR	1,370	23-MAR	1,210	20-MAR	1,010	16-MAR	818	2-MAR	651
1932	7-FEB	14,600	7-FEB	10,600	6-FEB	6,810	1-FEB	4,110	6-FEB	2,980
1933	13-MAR	2,160	12-MAR	1,670	12-MAR	1,500	10-MAR	1,360	2-MAR	1,210
1934	13-DEC	3,530	13-DEC	2,580	25-MAR	1,510	17-MAR	1,020	2-MAR	993
1935	7-FEB	3,800	6-FEB	3,220	5-FEB	2,480	17-MAR	1,950	2-MAR	1,830
1936	22-FEB	10,400	22-FEB	8,560	22-FEB	5,280	12-FEB	4,860	12-FEB	3,640
1937	6-FEB	18,600	5-FEB	12,200	5-FEB	6,940	5-FEB	6,450	5-FEB	4,490
1938	11-DEC	40,500	11-DEC	24,600	10-DEC	12,300	1-MAR	9,550	1-MAR	7,180
1939	27-MAR	1,480	26-MAR	1,070	23-MAR	840	17-MAR	700	2-MAR	660
1940	31-MAR	9,470	27-MAR	6,780	25-MAR	6,110	17-MAR	4,180	28-FEB	3,380
1941	12-FEB	11,300	10-FEB	7,970	10-FEB	5,690	10-FEB	4,360	9-FEB	4,030
1942	28-JAN	5,940	26-JAN	4,790	25-JAN	3,640	25-JAN	3,200	23-JAN	2,440
1943	22-JAN	17,100	21-JAN	14,600	21-JAN	8,810	21-JAN	5,440	2-MAR	4,440
1944	5-MAR	3,730	5-MAR	2,770	5-MAR	2,530	1-MAR	1,960	1-MAR	1,810
1945	2-FEB	34,500	1-FEB	19,800	1-FEB	10,800	1-FEB	6,400	1-FEB	4,100
1946	22-DEC	10,800	22-DEC	6,570	21-DEC	5,020	21-DEC	3,440	21-DEC	2,380
1947	23-NOV	8,140	23-NOV	4,490	19-NOV	3,250	17-MAR	2,020	19-NOV	1,670
1948	24-MAR	1,740	24-MAR	1,470	24-MAR	1,250	17-MAR	970	2-MAR	706
1949	4-MAR	3,310	3-MAR	2,090	2-MAR	1,420	3-MAR	1,290	2-MAR	1,210

TABLE B.6-28

SAN JOAQUIN RIVER AT FRIANT DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1950	6-FEB	5,990	5-FEB	4,590	4-FEB	2,940	4-FEB	2,000	4-FEB	1,730
1951	19-NOV	42,400	18-NOV	25,600	18-NOV	14,600	18-NOV	7,970	18-NOV	7,950
1952	25-JAN	11,200	28-DEC	6,800	25-MAR	3,420	15-MAR	1,840	2-MAR	1,350
1953	14-JAN	3,870	13-JAN	2,800	9-JAN	2,120	7-JAN	1,810	7-JAN	1,400
1954	9-MAR	7,910	9-MAR	5,550	8-MAR	3,400	9-MAR	2,520	2-MAR	2,050
1955	17-FEB	2,970	17-FEB	2,090	25-MAR	1,670	17-MAR	1,310	2-MAR	1,210
1956	23-DEC	75,000	23-DEC	50,600	22-DEC	28,600	22-DEC	15,400	22-DEC	9,310
1957	25-FEB	4,250	23-FEB	3,140	23-FEB	2,480	23-FEB	2,090	22-FEB	1,710
1958	22-MAR	13,500	21-MAR	8,270	16-MAR	5,950	15-MAR	5,330	25-FEB	3,900
1959	16-FEB	7,930	16-FEB	5,890	15-FEB	3,660	16-FEB	2,450	16-FEB	2,200
1960	9-FEB	3,320	26-MAR	2,880	25-MAR	2,410	17-MAR	1,970	2-MAR	1,420
1961	2-DEC	2,710	1-DEC	1,940	22-MAR	1,130	17-MAR	763	2-MAR	595
1962	10-FEB	13,800	9-FEB	12,800	9-FEB	8,300	8-FEB	5,300	8-FEB	3,500
1963	1-FEB	41,000	31-JAN	27,200	30-JAN	14,000	30-JAN	7,900	30-JAN	4,730
1964	15-NOV	4,090	15-NOV	2,260	15-NOV	1,760	15-NOV	1,440	5-NOV	1,130
1965	23-DEC	25,500	23-DEC	19,300	23-DEC	11,600	23-DEC	7,570	22-DEC	5,240
1966	23-NOV	7,110	23-NOV	5,880	22-NOV	3,570	14-NOV	3,010	2-MAR	2,080
1967	6-DEC	42,400	5-DEC	21,000	2-DEC	11,000	28-NOV	6,200	2-MAR	4,030
1968	20-FEB	3,590	20-FEB	2,780	20-FEB	2,290	17-FEB	1,930	17-FEB	1,600
1969	25-JAN	33,000	19-JAN	22,600	19-JAN	17,000	18-JAN	10,200	18-JAN	6,650
1970	16-JAN	16,500	16-JAN	9,100	16-JAN	5,600	14-JAN	4,100	9-JAN	2,740
1971	27-MAR	3,690	26-MAR	2,200	25-MAR	2,010	17-MAR	1,690	2-MAR	1,400
1972	22-DEC	4,190	19-MAR	3,020	16-MAR	2,490	8-MAR	1,630	2-MAR	1,130
1973	11-FEB	8,670	10-FEB	6,140	9-FEB	4,120	6-FEB	2,890	7-FEB	2,510
1974	2-MAR	8,790	1-MAR	6,090	1-MAR	4,430	1-MAR	3,440	1-MAR	3,390
1975	25-MAR	5,947	25-MAR	3,890	22-MAR	2,964	16-MAR	2,362	1-MAR	2,228
1976	11-OCT	2,596	26-OCT	1,691	26-OCT	1,244	17-MAR	957	29-FEB	892
1977	2-OCT	898	1-OCT	793	1-OCT	627	21-SEP	458	10-SEP	339
1978	4-MAR	17,252	3-MAR	11,578	2-MAR	8,272	2-MAR	5,879	2-MAR	5,392
1979	28-MAR	8,330	27-MAR	5,860	25-MAR	3,670	16-MAR	2,880	1-MAR	2,580
1980	14-JAN	31,600	12-JAN	28,500	11-JAN	16,300	10-JAN	9,420	15-FEB	5,990
1981	19-MAR	3,180	19-MAR	2,570	19-MAR	2,300	17-MAR	1,180	2-MAR	1,150
1982	16-FEB	59,300	15-FEB	33,100	15-FEB	19,800	15-FEB	11,000	15-FEB	7,000
1983	22-DEC	26,600	22-DEC	14,300	1-MAR	9,220	1-MAR	8,180	27-FEB	7,060
1984	25-DEC	18,185	25-DEC	14,078	25-DEC	8,809	24-DEC	5,759	9-DEC	3,977
1985	27-MAR	2,635	26-MAR	1,518	25-MAR	1,246	17-MAR	1,198	2-MAR	1,166
1986	19-FEB	33,515	17-FEB	29,537	14-FEB	21,495	13-FEB	14,204	13-FEB	11,187
1987	13-FEB	4,827	13-FEB	2,536	5-MAR	1,522	5-MAR	417	2-MAR	355
1988	5-JAN	5,151	5-JAN	2,647	25-MAR	1,662	17-MAR	1,256	29-FEB	981
1989	8-MAR	4,382	7-MAR	3,409	7-MAR	2,884	2-MAR	2,292	2-MAR	1,612
1990	26-MAR	1,260	24-MAR	1,066	22-MAR	750	17-MAR	550	2-MAR	445
1991	4-MAR	8,146	4-MAR	5,612	1-MAR	3,152	4-MAR	2,075	2-MAR	1,974
1992	13-FEB	2,872	11-FEB	2,494	10-FEB	2,093	10-FEB	1,333	10-FEB	1,208
1993	14-JAN	12,748	13-JAN	7,900	21-MAR	5,990	17-MAR	4,646	2-MAR	3,168
1994	17-FEB	1,904	29-MAR	1,181	14-MAR	1,054	5-MAR	1,015	2-MAR	946
1995	10-MAR	39,333	10-MAR	26,335	9-MAR	15,955	9-MAR	11,852	2-MAR	8,606
1996	20-FEB	12,822	19-FEB	9,860	19-FEB	6,515	19-FEB	4,477	5-FEB	4,148
1997	2-JAN	77,467	1-JAN	52,603	30-DEC	30,011	30-DEC	17,031	30-DEC	12,392
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-29

FRESNO RIVER AT HIDDEN DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1940	---	---	---	---	---	---	---	---	---	---
1941	---	---	---	---	---	---	---	---	---	---
1942	29-DEC	1,680	29-DEC	1,362	28-DEC	872	28-DEC	505	25-JAN	373
1943	10-MAR	2,300	9-MAR	1,683	9-MAR	1,129	6-MAR	923	2-MAR	689
1944	22-FEB	1,190	4-MAR	688	29-FEB	594	22-FEB	469	22-FEB	329
1945	2-FEB	4,610	1-FEB	3,020	1-FEB	1,663	1-FEB	915	1-FEB	613
1946	30-MAR	1,840	29-MAR	901	22-DEC	505	22-DEC	326	22-DEC	245
1947	27-DEC	794	26-DEC	473	26-DEC	283	25-DEC	160	6-DEC	109
1948	10-APR	1,450	25-MAR	859	24-MAR	505	17-MAR	330	2-MAR	220
1949	4-MAR	942	4-MAR	514	3-MAR	298	3-MAR	227	2-MAR	176
1950	6-FEB	807	5-FEB	685	5-FEB	395	5-FEB	234	17-JAN	155
1951	19-NOV	5,130	19-NOV	2,016	3-DEC	1,075	3-DEC	646	18-NOV	563
1952	25-JAN	3,760	15-MAR	2,493	15-MAR	1,931	15-MAR	1,270	2-MAR	861
1953	14-JAN	819	14-JAN	525	13-JAN	351	8-JAN	284	30-DEC	224
1954	14-FEB	455	24-MAR	313	21-MAR	284	17-MAR	254	2-MAR	173
1955	8-MAY	312	18-JAN	248	16-JAN	200	16-JAN	164	17-FEB	147
1956	23-DEC	10,400	23-DEC	6,867	22-DEC	3,825	22-DEC	2,081	22-DEC	1,223
1957	19-MAY	672	24-FEB	441	24-FEB	305	24-FEB	214	24-FEB	159
1958	3-APR	6,700	22-MAR	4,003	16-MAR	3,086	15-MAR	1,941	2-MAR	1,535
1959	17-FEB	630	16-FEB	453	16-FEB	317	11-FEB	219	11-FEB	161
1960	9-FEB	430	9-FEB	354	9-FEB	204	2-FEB	132	2-FEB	97
1961	2-DEC	122	2-DEC	89	2-DEC	55	17-MAR	50	26-JAN	48
1962	11-FEB	4,430	10-FEB	3,373	10-FEB	2,255	9-FEB	1,408	9-FEB	912
1963	1-FEB	3,540	31-JAN	2,109	31-JAN	1,009	31-JAN	625	31-JAN	384
1964	21-NOV	200	20-NOV	153	20-NOV	120	16-NOV	107	16-NOV	100
1965	7-JAN	1,970	6-JAN	1,546	4-JAN	995	24-DEC	799	23-DEC	613
1966	30-DEC	625	30-DEC	565	29-DEC	370	29-DEC	237	26-DEC	154
1967	6-DEC	4,030	5-DEC	2,440	3-DEC	2,237	12-MAR	1,593	2-MAR	1,257
1968	21-FEB	233	20-FEB	181	18-FEB	157	17-FEB	120	18-FEB	109
1969	24-FEB	7,250	24-FEB	5,100	21-JAN	3,190	19-JAN	2,201	19-JAN	1,510
1970	16-JAN	2,330	16-JAN	1,555	15-JAN	872	15-JAN	539	10-JAN	334
1971	27-MAR	252	27-MAR	203	13-JAN	162	12-JAN	143	21-DEC	129
1972	26-DEC	300	26-DEC	243	23-DEC	180	23-DEC	118	6-FEB	84
1973	11-FEB	4,500	10-FEB	2,567	10-FEB	1,563	7-FEB	951	10-FEB	698
1974	2-APR	3,240	2-MAR	1,512	2-MAR	881	2-MAR	576	2-MAR	386
1975	26-MAR	740	25-MAR	558	22-MAR	483	14-MAR	395	2-MAR	363
1976	1-MAR	176	1-MAR	138	1-MAR	100	1-MAR	74	9-FEB	63
1977	3-JAN	43	2-JAN	27	30-DEC	24	28-DEC	21	30-DEC	18
1978	4-MAR	4,403	9-FEB	3,056	9-FEB	2,434	6-FEB	1,417	7-FEB	1,239
1979	28-MAR	2,104	21-FEB	1,193	21-FEB	786	20-FEB	658	19-FEB	478
1980	14-JAN	3,524	19-FEB	2,566	17-FEB	1,752	15-FEB	1,064	15-FEB	954
1981	20-MAR	473	19-MAR	320	20-MAR	228	17-MAR	179	2-MAR	130
1982	11-APR	5,698	15-FEB	3,256	14-MAR	1,903	14-MAR	1,532	2-MAR	1,235
1983	27-JAN	5,665	1-MAR	4,218	1-MAR	2,760	1-MAR	2,029	27-FEB	1,806
1984	27-DEC	1,910	25-DEC	1,814	25-DEC	1,152	25-DEC	687	10-DEC	448
1985	28-MAR	519	27-MAR	379	25-MAR	261	17-MAR	193	2-MAR	149
1986	18-FEB	5,817	17-FEB	5,261	15-FEB	3,776	13-FEB	2,127	15-FEB	1,565
1987	13-FEB	343	13-FEB	272	12-FEB	158	5-MAR	117	2-MAR	92
1988	20-APR	203	1-MAR	138	29-FEB	97	28-FEB	68	27-FEB	50
1989	3-MAR	353	2-MAR	219	25-MAR	112	2-MAR	84	2-MAR	63

TABLE B.6-29

FRESNO RIVER AT HIDDEN DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1990	14-JAN	78	4-MAR	54	22-MAR	52	16-MAR	46	2-MAR	44
1991	19-MAR	1,161	25-MAR	885	19-MAR	562	17-MAR	503	2-MAR	313
1992	13-FEB	647	13-FEB	525	12-FEB	401	11-FEB	254	11-FEB	169
1993	14-JAN	7,203	14-JAN	3,330	13-JAN	1,940	8-JAN	1,182	7-JAN	728
1994	18-FEB	170	18-FEB	166	17-FEB	120	17-FEB	83	8-FEB	65
1995	11-MAR	8,611	10-MAR	6,124	9-MAR	3,071	10-MAR	2,187	2-MAR	1,359
1996	20-FEB	1,888	20-FEB	1,555	20-FEB	980	20-FEB	686	19-FEB	580
1997	2-JAN	7,718	1-JAN	5,476	30-DEC	3,577	22-DEC	2,151	30-DEC	2,023
1998	25-MAR	3,327	2-FEB	1,807	3-FEB	1,439	3-FEB	1,141	2-FEB	985
1999	9-FEB	722	8-FEB	615	8-FEB	386	8-FEB	280	20-JAN	223

TABLE B.6-30

CHOWCHILLA RIVER AT BUCHANAN DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1920	---	---	---	---	---	---	---	---	---	---
1921	---	---	---	---	---	---	---	---	---	---
1922	11-FEB	3,620	9-FEB	2,050	9-FEB	1,202	9-FEB	1,090	9-FEB	756
1923	10-APR	1,990	23-JAN	1,246	23-JAN	720	22-JAN	458	17-JAN	328
1924	---	---	---	---	---	---	---	---	---	---
1925	---	---	---	---	---	---	---	---	---	---
1926	---	---	---	---	---	---	---	---	---	---
1927	---	---	---	---	---	---	---	---	---	---
1928	---	---	---	---	---	---	---	---	---	---
1929	---	---	---	---	---	---	---	---	---	---
1930	---	---	---	---	---	---	---	---	---	---
1931	3-JAN	98	3-JAN	52	15-FEB	36	14-FEB	25	14-FEB	18
1932	28-DEC	4,520	6-FEB	3,023	6-FEB	2,125	31-JAN	1,589	31-JAN	959
1933	30-JAN	331	28-JAN	260	25-JAN	185	19-JAN	124	23-JAN	96
1934	23-FEB	1,010	23-FEB	506	20-FEB	329	19-FEB	209	16-FEB	124
1935	8-APR	2,980	15-JAN	1,709	5-JAN	1,073	5-JAN	797	5-JAN	581
1936	23-FEB	3,530	12-FEB	2,943	11-FEB	2,299	11-FEB	1,951	2-FEB	1,276
1937	6-FEB	8,890	5-FEB	4,930	5-FEB	2,461	5-FEB	1,888	5-FEB	1,147
1938	11-FEB	7,760	11-FEB	3,833	9-FEB	2,464	1-MAR	2,000	1-MAR	2,000
1939	10-MAR	525	10-MAR	301	9-MAR	189	3-FEB	134	2-MAR	132
1940	26-JAN	3,340	27-FEB	1,887	26-FEB	1,243	23-FEB	844	8-JAN	626
1941	12-FEB	5,080	10-FEB	2,847	9-FEB	1,900	9-FEB	1,263	9-FEB	1,146
1942	29-DEC	2,730	28-DEC	1,987	28-DEC	1,169	28-DEC	622	28-DEC	399
1943	10-MAR	2,760	9-MAR	2,040	6-MAR	1,378	5-MAR	1,037	23-FEB	714
1944	4-MAR	1,260	4-MAR	872	29-FEB	684	22-FEB	452	21-FEB	293
1945	2-FEB	5,200	1-FEB	3,567	1-FEB	1,943	1-FEB	1,023	1-FEB	570
1946	30-MAR	1,990	29-MAR	1,075	22-DEC	632	22-DEC	384	21-DEC	234
1947	23-NOV	649	27-DEC	347	20-NOV	212	10-FEB	119	10-FEB	88
1948	10-APR	2,490	24-MAR	1,149	24-MAR	680	17-MAR	405	2-MAR	275
1949	4-MAR	1,760	3-MAR	881	3-MAR	466	3-MAR	302	2-MAR	224
1950	6-FEB	1,720	5-FEB	1,267	4-FEB	704	29-JAN	378	17-JAN	255
1951	19-NOV	6,000	18-NOV	4,017	18-NOV	1,829	18-NOV	881	18-NOV	865
1952	25-JAN	4,950	25-JAN	2,434	15-MAR	1,780	15-MAR	1,188	2-MAR	832
1953	14-JAN	1,090	14-JAN	622	13-JAN	362	7-JAN	275	30-DEC	222
1954	14-FEB	914	13-FEB	473	21-MAR	313	17-MAR	261	2-MAR	183
1955	2-JAN	448	1-JAN	267	1-JAN	140	1-JAN	98	1-JAN	81
1956	23-DEC	18,400	22-DEC	9,653	22-DEC	5,301	20-DEC	2,713	22-DEC	1,516
1957	25-FEB	600	24-FEB	372	24-FEB	240	24-FEB	164	24-FEB	123
1958	3-APR	7,250	15-MAR	4,263	16-MAR	3,066	15-MAR	1,876	2-MAR	1,507
1959	16-FEB	914	16-FEB	621	11-FEB	427	11-FEB	288	9-FEB	169
1960	10-FEB	1,100	9-FEB	781	9-FEB	395	2-FEB	236	2-FEB	135
1961	2-DEC	122	2-DEC	70	2-DEC	39	16-MAR	33	2-MAR	24
1962	10-FEB	4,620	9-FEB	3,583	9-FEB	2,347	9-FEB	1,454	9-FEB	898
1963	1-FEB	4,190	31-JAN	2,934	31-JAN	1,338	31-JAN	757	30-JAN	459
1964	20-NOV	397	20-NOV	251	20-NOV	150	15-NOV	101	15-NOV	70
1965	23-DEC	3,130	23-DEC	2,142	23-DEC	1,548	23-DEC	1,132	23-DEC	809
1966	30-DEC	1,400	30-DEC	1,026	29-DEC	639	29-DEC	372	29-DEC	224
1967	6-DEC	3,920	5-DEC	2,043	12-MAR	1,844	12-MAR	1,296	2-MAR	1,057
1968	18-FEB	207	18-FEB	139	17-FEB	125	17-FEB	86	18-FEB	73
1969	24-FEB	7,010	24-FEB	4,893	19-JAN	3,384	19-JAN	2,245	19-JAN	1,503

TABLE B.6-30

CHOWCHILLA RIVER AT BUCHANAN DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1970	16-JAN	4,230	16-JAN	2,096	15-JAN	1,097	14-JAN	635	10-JAN	374
1971	22-DEC	348	21-DEC	285	17-DEC	210	17-DEC	164	17-DEC	126
1972	6-FEB	367	26-DEC	210	23-DEC	148	23-DEC	87	22-DEC	53
1973	11-FEB	5,160	11-FEB	3,057	10-FEB	1,798	7-FEB	1,019	10-FEB	808
1974	2-APR	3,960	2-MAR	1,998	2-MAR	1,107	2-MAR	694	2-MAR	471
1975	10-FEB	1,320	9-FEB	917	22-MAR	651	2-FEB	572	2-MAR	436
1976	1-MAR	216	1-MAR	132	1-MAR	97	1-MAR	65	9-FEB	50
1977	3-JAN	27	2-JAN	24	2-JAN	17	27-DEC	11	29-DEC	8
1978	9-FEB	4,784	9-FEB	3,356	8-FEB	2,580	6-FEB	1,612	6-FEB	1,237
1979	28-MAR	2,410	21-FEB	1,639	20-FEB	983	19-FEB	791	14-FEB	556
1980	14-JAN	3,009	12-JAN	2,639	17-FEB	1,900	16-FEB	1,119	16-FEB	934
1981	29-JAN	1,084	28-JAN	629	28-JAN	336	22-JAN	196	22-JAN	124
1982	5-JAN	7,514	4-JAN	3,508	1-JAN	1,814	17-MAR	1,635	2-MAR	1,278
1983	22-DEC	7,167	1-MAR	4,147	27-FEB	2,712	27-JAN	2,027	27-FEB	1,766
1984	25-DEC	2,571	25-DEC	2,364	25-DEC	1,359	24-DEC	769	4-DEC	501
1985	9-FEB	822	8-FEB	492	8-FEB	258	8-FEB	161	2-MAR	123
1986	18-FEB	6,786	17-FEB	6,126	15-FEB	4,243	13-FEB	2,299	15-FEB	1,553
1987	13-FEB	450	13-FEB	285	11-FEB	155	5-MAR	131	13-FEB	88
1988	2-MAR	132	1-MAR	91	29-FEB	68	26-FEB	45	28-DEC	29
1989	26-MAR	472	25-MAR	284	25-MAR	161	17-MAR	93	2-MAR	86
1990	14-JAN	63	14-JAN	49	13-JAN	40	22-FEB	34	16-FEB	33
1991	19-MAR	1,408	18-MAR	986	19-MAR	622	17-MAR	476	2-MAR	275
1992	15-FEB	1,392	13-FEB	935	12-FEB	694	11-FEB	397	11-FEB	229
1993	14-JAN	7,574	13-JAN	3,441	13-JAN	2,078	7-JAN	1,311	2-JAN	796
1994	19-FEB	141	18-FEB	125	17-FEB	93	17-FEB	63	7-FEB	48
1995	11-MAR	7,982	10-MAR	5,987	9-MAR	3,162	10-MAR	2,068	2-MAR	1,323
1996	5-FEB	2,442	4-FEB	1,221	19-FEB	837	20-FEB	597	19-FEB	521
1997	2-JAN	7,957	1-JAN	5,544	21-JAN	3,912	20-JAN	2,474	30-DEC	2,220
1998	25-MAR	3,920	7-FEB	2,406	3-FEB	2,047	2-FEB	1,490	2-FEB	1,221
1999	9-FEB	1,100	8-FEB	884	8-FEB	493	8-FEB	320	20-JAN	227

TABLE B.6-31

SAN JOAQUIN RIVER AT EL NIDO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1915	---	---	---	---	---	---	---	---	---	---
1916	---	---	---	---	---	---	---	---	---	---
1917	26-FEB	15,347	25-FEB	14,948	23-FEB	13,576	22-FEB	10,119	20-FEB	6,859
1918	21-MAR	8,218	21-MAR	8,037	20-MAR	7,599	14-MAR	7,013	10-MAR	6,193
1919	6-OCT	10,054	5-OCT	9,613	4-OCT	8,096	2-OCT	5,430	1-OCT	3,443
1920	28-MAR	5,094	27-MAR	5,032	25-MAR	4,854	22-MAR	4,432	5-MAR	3,951
1921	31-JAN	4,011	30-JAN	3,881	19-JAN	3,522	20-JAN	3,469	20-JAN	3,086
1922	13-FEB	7,475	13-FEB	7,192	12-FEB	6,794	12-FEB	6,383	10-FEB	5,085
1923	17-DEC	6,139	16-DEC	6,064	14-DEC	5,777	11-DEC	4,418	10-DEC	3,297
1924	3-OCT	1,168	2-OCT	1,162	30-SEP	1,150	29-SEP	1,069	21-SEP	1,011
1925	12-FEB	5,176	11-FEB	5,130	9-FEB	4,880	7-FEB	4,095	3-FEB	3,174
1926	16-FEB	3,393	16-FEB	3,269	15-FEB	3,062	14-FEB	2,406	30-JAN	1,884
1927	23-FEB	10,664	23-FEB	10,629	21-FEB	10,250	19-FEB	9,080	17-FEB	7,129
1928	29-MAR	13,685	28-MAR	12,897	28-MAR	11,325	27-MAR	8,876	14-MAR	5,963
1929	8-FEB	1,408	7-FEB	1,368	6-FEB	1,242	5-FEB	1,033	1-FEB	891
1930	28-FEB	2,945	27-FEB	2,931	25-FEB	2,706	25-FEB	2,468	12-FEB	1,819
1931	21-NOV	992	20-NOV	946	19-FEB	917	16-FEB	865	3-FEB	787
1932	11-FEB	15,650	10-FEB	15,208	8-FEB	13,465	6-FEB	9,976	27-JAN	6,594
1933	3-FEB	1,850	1-FEB	1,833	30-JAN	1,776	25-JAN	1,548	25-JAN	1,386
1934	18-DEC	3,409	17-DEC	3,296	16-DEC	2,767	2-JAN	2,066	15-DEC	1,992
1935	11-FEB	5,167	10-FEB	5,037	9-FEB	4,626	7-FEB	3,741	17-JAN	3,067
1936	25-FEB	13,191	24-FEB	12,880	23-FEB	11,575	15-FEB	10,994	13-FEB	8,444
1937	10-FEB	16,194	8-FEB	15,951	7-FEB	14,550	7-FEB	13,952	6-FEB	10,322
1938	15-DEC	26,169	14-DEC	23,796	4-MAR	19,929	2-MAR	17,703	15-FEB	13,426
1939	10-FEB	1,985	9-FEB	1,974	9-FEB	1,930	8-FEB	1,862	5-FEB	1,828
1940	2-MAR	13,220	1-MAR	12,896	29-FEB	11,763	27-FEB	9,277	29-FEB	7,092
1941	14-FEB	15,305	13-FEB	14,499	13-FEB	12,899	12-FEB	10,475	11-FEB	9,923
1942	31-JAN	7,475	30-JAN	7,215	28-JAN	6,483	29-JAN	5,999	26-JAN	4,898
1943	26-JAN	17,605	25-JAN	16,788	24-JAN	14,114	23-JAN	10,436	23-JAN	7,275
1944	8-MAR	4,849	8-MAR	4,809	5-MAR	4,688	1-MAR	4,247	1-MAR	3,784
1945	5-FEB	23,575	4-FEB	21,976	3-FEB	18,260	2-FEB	12,155	2-FEB	8,026
1946	27-DEC	9,200	26-DEC	9,074	25-DEC	8,089	24-DEC	6,255	23-DEC	4,586
1947	27-NOV	6,431	26-NOV	6,118	25-NOV	5,392	22-NOV	4,008	22-NOV	3,465
1948	5-NOV	1,082	4-NOV	1,052	3-NOV	973	26-OCT	848	14-OCT	799
1949	6-MAR	3,497	5-MAR	3,340	5-MAR	2,885	5-MAR	2,644	4-MAR	2,493
1950	9-FEB	5,895	8-FEB	5,790	7-FEB	5,406	6-FEB	4,122	6-FEB	3,388
1951	22-NOV	26,581	22-NOV	25,677	20-NOV	21,521	20-NOV	14,066	20-NOV	13,775
1952	27-JAN	11,012	27-JAN	10,502	26-JAN	9,523	17-JAN	7,871	15-JAN	6,602
1953	16-JAN	4,858	16-JAN	4,672	15-JAN	4,313	12-JAN	3,747	10-JAN	3,047
1954	13-MAR	6,857	13-MAR	6,606	12-MAR	5,805	12-MAR	4,790	11-MAR	4,660
1955	23-FEB	3,644	22-FEB	3,545	20-FEB	3,192	16-FEB	2,503	1-FEB	1,907
1956	27-DEC	58,182	26-DEC	54,753	25-DEC	45,688	23-DEC	29,037	23-DEC	17,764
1957	1-MAR	4,455	28-FEB	4,381	27-FEB	4,178	27-FEB	3,797	24-FEB	3,268
1958	5-APR	19,624	4-APR	18,738	3-APR	16,885	2-APR	13,508	3-APR	12,760
1959	20-FEB	7,332	20-FEB	7,165	18-FEB	6,328	17-FEB	4,647	18-FEB	4,144
1960	12-FEB	4,027	11-FEB	3,872	10-FEB	3,376	4-FEB	2,582	3-FEB	1,888
1961	5-DEC	2,290	5-DEC	2,178	3-DEC	1,871	29-NOV	1,386	14-NOV	1,139
1962	13-FEB	18,448	12-FEB	17,502	12-FEB	16,148	11-FEB	12,071	10-FEB	8,185
1963	4-FEB	28,613	3-FEB	26,300	2-FEB	20,956	1-FEB	13,758	1-FEB	8,754
1964	22-NOV	3,167	21-NOV	3,104	18-NOV	2,996	17-NOV	2,736	8-NOV	2,257

TABLE B.6-31

SAN JOAQUIN RIVER AT EL NIDO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1965	27-DEC	20,570	27-DEC	19,710	25-DEC	16,842	26-DEC	12,786	24-DEC	10,012
1966	27-NOV	7,312	26-NOV	6,961	25-NOV	6,119	19-NOV	5,129	17-NOV	3,732
1967	10-DEC	25,655	9-DEC	24,638	7-DEC	20,617	5-DEC	13,258	2-DEC	8,070
1968	24-FEB	3,998	24-FEB	3,917	23-FEB	3,761	22-FEB	3,381	21-FEB	3,012
1969	28-JAN	33,235	27-JAN	32,736	24-JAN	30,445	21-JAN	24,923	20-JAN	16,914
1970	20-JAN	12,293	19-JAN	11,726	17-JAN	10,480	16-JAN	8,167	13-JAN	5,690
1971	5-DEC	3,736	3-DEC	3,676	22-JAN	3,455	20-JAN	3,067	22-JAN	2,815
1972	29-DEC	4,327	28-DEC	4,213	26-DEC	3,834	24-DEC	2,927	24-DEC	2,124
1973	13-FEB	12,354	12-FEB	11,265	12-FEB	9,837	10-FEB	7,202	11-FEB	6,151
1974	23-JAN	7,478	22-JAN	7,342	20-JAN	6,876	17-JAN	5,678	3-JAN	4,771
1975	12-MAR	5,458	10-MAR	5,358	7-MAR	4,774	5-FEB	3,552	12-FEB	3,418
1976	2-NOV	2,114	31-OCT	2,088	30-OCT	2,008	28-OCT	1,717	13-OCT	1,615
1977	8-OCT	1,540	7-OCT	1,519	5-OCT	1,427	17-SEP	1,585	13-SEP	1,591
1978	14-FEB	19,292	13-FEB	18,588	11-FEB	16,735	4-MAR	12,725	11-FEB	11,491
1979	16-JAN	7,504	15-JAN	7,265	22-FEB	6,630	21-FEB	6,103	22-FEB	6,033
1980	17-JAN	32,748	16-JAN	31,199	15-JAN	25,586	13-JAN	16,993	18-FEB	12,985
1981	31-JAN	3,320	30-JAN	3,144	30-JAN	2,863	30-JAN	2,313	29-JAN	2,256
1982	15-APR	36,868	14-APR	35,140	13-APR	30,042	12-APR	22,842	1-APR	17,593
1983	4-MAR	22,654	3-MAR	22,147	2-MAR	19,914	2-MAR	17,239	1-MAR	16,263
1984	29-DEC	17,900	28-DEC	17,003	27-DEC	14,717	26-DEC	10,997	13-DEC	7,919
1985	1-DEC	2,865	1-DEC	2,798	29-NOV	2,591	10-FEB	2,268	28-JAN	1,892
1986	21-FEB	44,074	20-FEB	42,942	18-FEB	37,654	16-FEB	26,538	17-FEB	21,183
1987	17-FEB	3,372	16-FEB	3,254	15-FEB	2,869	2-MAR	2,102	15-FEB	2,062
1988	11-JAN	3,936	9-JAN	3,875	8-JAN	3,432	7-JAN	2,633	6-JAN	2,125
1989	14-MAR	5,319	12-MAR	5,271	11-MAR	5,040	8-MAR	4,332	24-FEB	3,386
1990	28-OCT	1,361	28-OCT	1,322	27-OCT	1,180	21-SEP	983	24-OCT	786
1991	8-MAR	7,375	8-MAR	7,070	6-MAR	6,017	20-MAR	4,745	7-MAR	4,601
1992	17-FEB	4,958	16-FEB	4,761	15-FEB	4,226	14-FEB	3,508	13-FEB	2,945
1993	16-JAN	16,585	15-JAN	15,411	15-JAN	13,669	12-JAN	11,004	7-JAN	7,655
1994	10-MAR	2,571	9-MAR	2,561	5-MAR	2,380	25-FEB	2,211	10-FEB	1,941
1995	13-MAR	35,626	12-MAR	33,287	11-MAR	27,733	12-MAR	21,746	11-MAR	16,900
1996	23-FEB	13,698	23-FEB	12,995	22-FEB	11,601	21-FEB	9,053	7-FEB	8,175
1997	6-JAN	58,024	5-JAN	54,873	3-JAN	44,847	31-DEC	29,631	2-JAN	23,360
1998	9-FEB	14,150	8-FEB	13,331	5-FEB	12,252	4-FEB	10,580	4-FEB	9,725
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-32

MARIPOSA CREEK AT MARIPOSA DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1945	---	---	---	---	---	---	---	---	---	---
1946	---	---	---	---	---	---	---	---	---	---
1947	---	---	---	---	---	---	---	---	---	---
1948	---	---	---	---	---	---	---	---	---	---
1949	---	683	---	447	---	---	---	---	---	97
1950	---	922	---	733	---	---	---	---	---	137
1951	---	2,820	---	1,823	---	---	---	---	---	386
1952	---	2,808	---	2,473	---	---	---	---	---	543
1953	---	551	---	308	---	---	---	---	---	109
1954	---	655	---	345	---	---	---	---	---	76
1955	---	355	---	174	---	---	---	---	---	58
1956	---	7,934	---	4,538	---	---	---	---	---	670
1957	---	318	---	133	---	---	---	---	---	37
1958	---	4,375	---	2,572	---	---	---	---	---	782
1959	---	688	---	295	---	---	---	---	---	64
1960	---	672	---	428	---	---	---	---	---	69
1961	---	13	---	12	---	---	---	---	---	7
1962	---	2,684	---	1,770	---	---	---	---	---	442
1963	---	1,940	---	1,320	---	---	---	---	---	215
1964	---	171	---	83	---	---	---	---	---	24
1965	---	1,754	---	1,220	---	---	---	---	---	423
1966	---	720	---	568	---	---	---	---	---	101
1967	---	1,709	---	802	---	---	---	---	---	375
1968	---	195	---	133	---	---	---	---	---	38
1969	---	4,521	---	2,934	---	---	---	---	---	758
1970	---	2,548	---	1,098	---	---	---	---	---	187
1971	---	369	---	241	---	---	---	---	---	55
1972	---	147	---	104	---	---	---	---	---	15
1973	---	3,180	---	1,668	---	---	---	---	---	390
1974	---	1,760	---	1,135	---	---	---	---	---	198
1975	---	1,817	---	1,114	---	---	---	---	---	262
1976	---	15	---	12	---	---	---	---	---	6
1977	---	0	---	0	---	---	---	---	---	0
1978	---	2,433	---	---	---	---	---	---	---	509
1979	---	1,619	---	1,150	---	---	---	---	---	331
1980	---	2,093	---	1,868	---	---	---	---	---	478
1981	---	---	---	172	---	---	---	---	---	36
1982	---	3,743	---	1,885	---	---	---	---	---	589
1983	---	3,711	---	1,822	---	---	---	---	---	---
1984	25-DEC	1,590	25-DEC	1,295	24-DEC	722	24-DEC	407	3-DEC	281
1985	8-FEB	551	7-FEB	350	3-FEB	220	26-JAN	168	11-JAN	134
1986	18-FEB	2,526	16-FEB	2,155	15-FEB	1,568	12-FEB	839	15-FEB	587
1987	13-FEB	325	13-MAR	165	13-MAR	105	5-MAR	84	6-MAR	56
1988	20-APR	97	20-APR	44	20-APR	31	17-APR	18	17-APR	12
1989	2-MAR	319	1-MAR	196	27-FEB	93	15-MAR	51	28-FEB	50
1990	17-JAN	75	17-FEB	45	17-FEB	30	17-FEB	20	17-FEB	17
1991	25-MAR	936	18-MAR	659	14-MAR	419	13-MAR	345	4-MAR	255
1992	15-FEB	1,237	15-FEB	715	11-FEB	435	11-FEB	263	11-FEB	145
1993	14-JAN	4,373	13-JAN	1,900	12-JAN	1,089	7-JAN	703	31-DEC	403
1994	20-FEB	181	18-FEB	107	18-FEB	66	8-FEB	49	8-FEB	34

TABLE B.6-32

MARIPOSA CREEK AT MARIPOSA DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1995	10-MAR	3,838	10-MAR	2,975	9-MAR	1,560	10-MAR	992	3-MAR	605
1996	5-FEB	1,561	4-FEB	748	31-JAN	435	24-JAN	292	5-FEB	242
1997	2-JAN	3,442	1-JAN	2,273	21-JAN	1,644	21-DEC	1,067	30-DEC	887
1998	15-JAN	3,708	2-FEB	1,740	2-FEB	1,337	2-FEB	900	27-JAN	715
1999	9-FEB	603	8-FEB	490	8-FEB	376	7-FEB	260	1-FEB	177
2000	14-FEB	2,468	12-FEB	1,500	---	---	---	---	12-FEB	544

TABLE B.6-33

OWENS CREEK AT OWENS DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1950	---	142	---	107	---	---	---	---	---	17
1951	---	330	---	210	---	---	---	---	---	55
1952	---	459	---	266	---	---	---	---	---	78
1953	---	206	---	120	---	---	---	---	---	28
1954	---	73	---	41	---	---	---	---	---	17
1955	---	60	---	39	---	---	---	---	---	11
1956	---	1,328	---	837	---	---	---	---	---	115
1957	---	23	---	14	---	---	---	---	---	5
1958	---	934	---	489	---	---	---	---	---	131
1959	---	40	---	28	---	---	---	---	---	16
1960	---	91	---	46	---	---	---	---	---	7
1961	---	8	---	6	---	---	---	---	---	2
1962	---	294	---	258	---	---	---	---	---	65
1963	---	101	---	55	---	---	---	---	---	18
1964	---	9	---	5	---	---	---	---	---	1
1965	---	333	---	176	---	---	---	---	---	59
1966	---	146	---	97	---	---	---	---	---	16
1967	---	240	---	123	---	---	---	---	---	58
1968	---	10	---	6	---	---	---	---	---	3
1969	---	1,105	---	544	---	---	---	---	---	139
1970	---	335	---	142	---	---	---	---	---	30
1971	---	69	---	43	---	---	---	---	---	7
1972	---	8	---	6	---	---	---	---	---	2
1973	---	638	---	291	---	---	---	---	---	72
1974	---	250	---	132	---	---	---	---	---	25
1975	---	338	---	233	---	---	---	---	---	56
1976	---	10	---	7	---	---	---	---	---	3
1977	---	0	---	0	---	---	---	---	---	0
1978	---	441	---	218	---	---	---	---	---	60
1979	---	250	---	158	---	---	---	---	---	49
1980	---	538	---	418	---	---	---	---	---	87
1981	---	154	---	29	---	---	---	---	---	9
1982	---	367	---	275	---	---	---	---	---	64
1983	---	687	---	341	---	---	---	---	---	166
1984	25-DEC	194	24-DEC	141	23-DEC	78	24-DEC	44	10-DEC	26
1985	8-FEB	64	8-FEB	28	8-FEB	14	4-FEB	8	8-FEB	5
1986	19-FEB	299	17-FEB	238	14-FEB	152	8-MAR	92	16-FEB	76
1987	13-FEB	25	13-FEB	12	11-FEB	8	3-FEB	6	7-FEB	5
1988	1-MAR	4	29-FEB	2	25-FEB	2	17-FEB	1	2-FEB	1
1989	25-MAR	68	25-MAR	30	25-MAR	21	25-MAR	17	2-MAR	13
1990	31-JAN	2	31-JAN	2	31-JAN	2	31-JAN	2	31-JAN	2
1991	25-MAR	136	25-MAR	90	20-MAR	52	18-MAR	40	18-MAR	23
1992	15-FEB	138	14-FEB	78	15-FEB	43	12-FEB	28	12-FEB	22
1993	14-JAN	987	13-JAN	407	13-JAN	215	7-JAN	125	1-JAN	71
1994	20-FEB	24	20-FEB	22	20-FEB	20	25-JAN	19	25-JAN	19
1995	10-MAR	657	10-MAR	509	9-MAR	276	9-MAR	169	9-MAR	99
1996	5-FEB	386	4-FEB	172	31-JAN	89	23-JAN	52	5-FEB	48
1997	2-JAN	584	1-JAN	311	21-JAN	223	22-DEC	150	30-DEC	121
1998	15-JAN	824	2-FEB	318	2-FEB	213	2-FEB	152	29-JAN	117
1999	10-FEB	84	8-FEB	54	9-FEB	36	9-FEB	32	9-FEB	28

TABLE B.6-33

OWENS CREEK AT OWENS DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
2000	14-FEB	477	12-FEB	243	---	---	---	---	12-FEB	90

TABLE B.6-34

BEAR CREEK AT BEAR DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1955	---	261	---	229	---	---	---	---	---	78
1956	---	5,000	---	3,367	---	---	---	---	---	542
1957	---	325	---	147	---	---	---	---	---	52
1958	---	3,070	---	1,587	---	---	---	---	---	493
1959	---	563	---	309	---	---	---	---	---	71
1960	---	717	---	501	---	---	---	---	---	82
1961	---	134	---	64	---	---	---	---	---	9
1962	---	1,314	---	1,116	---	---	---	---	---	288
1963	---	1,220	---	710	---	---	---	---	---	151
1964	---	132	---	95	---	---	---	---	---	16
1965	---	1,555	---	880	---	---	---	---	---	295
1966	---	553	---	397	---	---	---	---	---	66
1967	---	1,175	---	577	---	---	---	---	---	240
1968	---	120	---	73	---	---	---	---	---	28
1969	---	3,370	---	1,890	---	---	---	---	---	508
1970	---	1,794	---	940	---	---	---	---	---	143
1971	---	335	---	201	---	---	---	---	---	43
1972	---	120	---	97	---	---	---	---	---	23
1973	---	2,730	---	1,245	---	---	---	---	---	250
1974	---	1,220	---	771	---	---	---	---	---	132
1975	---	1,522	---	1,012	---	---	---	---	---	206
1976	---	48	---	45	---	---	---	---	---	16
1977	---	4	---	4	---	---	---	---	---	2
1978	---	1,324	---	---	---	---	---	---	---	303
1979	---	1,168	---	758	---	---	---	---	---	228
1980	---	1,826	---	1,621	---	---	---	---	---	328
1981	---	---	---	336	---	---	---	---	---	96
1982	---	2,525	---	1,375	---	---	---	---	---	367
1983	---	---	---	---	---	---	---	---	---	488
1984	25-DEC	1,048	23-DEC	928	23-DEC	539	23-DEC	298	3-DEC	187
1985	9-FEB	379	8-FEB	252	8-FEB	122	8-FEB	63	7-MAR	40
1986	16-FEB	1,516	16-FEB	1,387	13-FEB	906	13-FEB	477	15-FEB	362
1987	13-FEB	217	13-FEB	125	13-FEB	68	6-MAR	38	13-FEB	28
1988	18-JAN	63	17-JAN	37	16-JAN	18	6-JAN	9	30-DEC	5
1989	2-MAR	179	2-MAR	104	25-FEB	49	17-FEB	33	25-FEB	27
1990	18-FEB	26	18-FEB	19	17-FEB	10	9-FEB	5	13-FEB	3
1991	25-MAR	817	18-MAR	538	19-MAR	326	18-MAR	240	4-MAR	129
1992	15-FEB	821	15-FEB	530	12-FEB	360	10-FEB	195	10-FEB	113
1993	14-JAN	3,724	13-JAN	1,596	8-JAN	829	2-JAN	520	29-DEC	286
1994	8-FEB	475	8-FEB	198	6-FEB	95	8-FEB	83	25-JAN	50
1995	10-MAR	2,499	10-MAR	1,788	10-MAR	1,091	9-MAR	788	9-MAR	438
1996	5-FEB	1,089	4-FEB	547	19-FEB	332	25-JAN	235	25-JAN	210
1997	2-JAN	2,406	1-JAN	1,349	30-DEC	896	21-DEC	649	30-DEC	472
1998	15-JAN	2,914	15-JAN	1,262	2-FEB	850	2-FEB	595	12-JAN	460
1999	9-FEB	1,124	8-FEB	639	7-FEB	342	7-FEB	217	24-JAN	134

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TABLE B.6-35

BURNS CREEK AT BURNS DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1950	---	---	---	---	---	---	---	---	---	---
1951	---	---	---	---	---	---	---	---	---	---
1952	---	1,873	---	1,233	---	---	---	---	---	360
1953	---	633	---	393	---	---	---	---	---	108
1954	---	491	---	390	---	---	---	---	---	47
1955	---	522	---	347	---	---	---	---	---	80
1956	---	4,730	---	2,850	---	---	---	---	---	474
1957	---	90	---	50	---	---	---	---	---	12
1958	---	3,273	---	1,663	---	---	---	---	---	498
1959	---	60	---	---	---	---	---	---	---	6
1960	---	540	---	298	---	---	---	---	---	40
1961	---	71	---	40	---	---	---	---	---	3
1962	---	2,804	---	1,210	---	---	---	---	---	338
1963	---	266	---	220	---	---	---	---	---	68
1964	---	---	---	---	---	---	---	---	---	---
1965	---	1,742	---	840	---	---	---	---	---	233
1966	---	586	---	416	---	---	---	---	---	66
1967	---	825	---	507	---	---	---	---	---	200
1968	---	50	---	22	---	---	---	---	---	5
1969	---	2,591	---	1,300	---	---	---	---	---	466
1970	---	1,044	---	495	---	---	---	---	---	80
1971	---	371	---	167	---	---	---	---	---	31
1972	---	65	---	47	---	---	---	---	---	7
1973	---	3,290	---	1,315	---	---	---	---	---	319
1974	---	589	---	367	---	---	---	---	---	81
1975	---	1,172	---	867	---	---	---	---	---	148
1976	---	6	---	3	---	---	---	---	---	0
1977	---	0	---	0	---	---	---	---	---	0
1978	---	1,088	---	733	---	---	---	---	---	220
1979	---	958	---	---	---	---	---	---	---	198
1980	---	1,559	---	1,364	---	---	---	---	---	280
1981	---	---	---	266	---	---	---	---	---	82
1982	---	1,735	---	940	---	---	---	---	---	230
1983	---	---	---	---	---	---	---	---	---	453
1984	25-DEC	1,058	24-DEC	927	24-DEC	503	24-DEC	268	23-DEC	152
1985	9-FEB	209	8-FEB	152	8-FEB	77	8-FEB	44	8-FEB	27
1986	16-FEB	1,144	16-FEB	980	13-FEB	672	9-FEB	362	15-FEB	274
1987	6-MAR	282	5-MAR	152	5-MAR	74	5-MAR	49	5-MAR	28
1988	1-MAR	2	28-FEB	1	---	0	---	0	---	0
1989	25-MAR	281	25-MAR	115	25-MAR	52	2-MAR	26	28-FEB	26
1990	18-FEB	38	17-FEB	34	16-FEB	21	7-FEB	12	4-FEB	8
1991	25-MAR	787	24-MAR	439	19-MAR	325	18-MAR	213	18-MAR	123
1992	15-FEB	874	15-FEB	585	12-FEB	334	12-FEB	176	12-FEB	104
1993	14-JAN	3,347	12-JAN	1,600	12-JAN	998	7-JAN	792	6-FEB	562
1994	8-FEB	789	7-FEB	374	7-FEB	180	7-FEB	148	7-FEB	87
1995	10-MAR	1,972	10-MAR	1,295	23-JAN	751	9-MAR	481	5-JAN	306
1996	5-FEB	1,046	4-FEB	568	31-JAN	344	25-JAN	231	25-JAN	172
1997	2-JAN	2,460	22-JAN	1,166	22-JAN	996	21-JAN	580	30-DEC	489
1998	25-MAR	3,585	23-MAR	1,754	2-FEB	921	2-FEB	657	15-JAN	480
1999	9-FEB	777	8-FEB	382	7-FEB	188	7-FEB	129	27-JAN	75

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TABLE B.6-36

LOS BANOS CREEK AT LOS BANOS DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1955	---	---	---	---	---	---	---	---	---	---
1956	---	---	---	---	---	---	---	---	---	---
1957	---	---	---	---	---	---	---	---	---	---
1958	---	---	---	---	---	---	---	---	---	---
1959	21-FEB	340	21-FEB	172	17-FEB	97	12-FEB	55	3-FEB	28
1960	9-FEB	642	8-FEB	476	8-FEB	237	6-FEB	116	24-JAN	58
1961	---	0	---	0	---	0	---	0	---	0
1962	15-FEB	641	14-FEB	422	14-FEB	367	9-FEB	265	9-FEB	153
1963	1-FEB	883	31-JAN	349	31-JAN	158	31-JAN	103	30-JAN	57
1964	---	0	---	0	---	0	---	0	---	0
1965	7-JAN	336	27-DEC	277	23-DEC	216	24-DEC	150	23-DEC	99
1966	---	0	---	0	---	0	---	0	---	0
1967	6-DEC	1,067	5-DEC	469	25-JAN	242	24-JAN	149	1-APR	89
1968	16-APR	10	29-NOV	4	25-NOV	2	17-NOV	1	2-NOV	1
1969	25-FEB	2,381	24-FEB	1,226	24-FEB	739	19-JAN	420	20-JAN	288
1970	17-JAN	1,283	15-JAN	748	14-JAN	353	15-JAN	201	15-JAN	107
1971	14-JAN	287	19-DEC	225	18-DEC	160	18-DEC	101	18-DEC	73
1972	2-FEB	16	2-FEB	10	1-FEB	7	27-JAN	5	12-JAN	4
1973	12-FEB	1,156	11-FEB	912	11-FEB	540	5-FEB	277	17-JAN	181
1974	2-APR	950	2-APR	479	2-APR	241	28-DEC	142	22-DEC	86
1975	23-MAR	391	22-MAR	331	22-MAR	186	12-MAR	118	8-MAR	86
1976	30-OCT	12	7-FEB	6	8-FEB	5	5-FEB	3	2-FEB	3
1977	2-OCT	266	1-OCT	120	29-SEP	56	26-SEP	27	11-SEP	13
1978	9-FEB	1,827	8-FEB	1,454	8-FEB	925	7-FEB	495	17-JAN	329
1979	21-FEB	737	21-FEB	500	20-FEB	274	20-FEB	145	19-FEB	81
1980	21-FEB	979	12-JAN	687	16-FEB	443	16-FEB	249	16-FEB	153
1981	29-JAN	185	20-MAR	137	19-MAR	85	13-MAR	55	5-MAR	33
1982	16-FEB	1,286	15-FEB	553	29-MAR	287	29-MAR	223	17-MAR	138
1983	8-FEB	1,469	7-FEB	975	26-FEB	619	27-JAN	470	6-FEB	352
1984	25-DEC	492	25-DEC	351	25-DEC	222	24-DEC	133	3-DEC	115
1985	28-MAR	269	27-MAR	189	27-MAR	101	26-MAR	52	7-MAR	35
1986	8-MAR	937	8-MAR	641	10-MAR	414	8-MAR	340	15-FEB	241
1987	13-FEB	452	13-FEB	180	12-FEB	81	6-FEB	40	11-FEB	23
1988	18-JAN	96	17-JAN	66	17-JAN	31	14-JAN	16	27-DEC	10
1989	22-MAY	20	9-FEB	9	9-FEB	7	7-FEB	5	9-FEB	4
1990	23-SEP	117	23-SEP	62	19-SEP	27	11-SEP	12	27-AUG	6
1991	26-MAR	223	25-MAR	175	20-MAR	107	18-MAR	79	3-MAR	53
1992	16-FEB	409	15-FEB	297	12-FEB	151	11-FEB	79	11-FEB	44
1993	14-JAN	986	13-JAN	625	13-JAN	466	8-JAN	299	6-JAN	175
1994	20-FEB	355	18-FEB	156	14-FEB	68	18-FEB	34	5-FEB	18
1995	10-MAR	2,694	10-MAR	1,427	9-MAR	688	10-MAR	421	9-MAR	243
1996	31-JAN	816	19-FEB	563	19-FEB	384	19-FEB	233	25-JAN	199
1997	26-JAN	1,691	25-JAN	1,114	21-JAN	696	15-JAN	422	1-JAN	350
1998	3-FEB	5,409	2-FEB	2,409	2-FEB	1,561	2-FEB	970	29-JAN	688
1999	9-FEB	632	8-FEB	348	7-FEB	194	7-FEB	116	26-JAN	79

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TABLE B.6-37

SAN JOAQUIN RIVER AT NEWMAN
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1915	---	---	---	---	---	---	---	---	---	---
1916	---	---	---	---	---	---	---	---	---	---
1917	24-FEB	28,876	23-FEB	27,458	23-FEB	24,627	22-FEB	17,579	20-FEB	11,480
1918	21-MAR	17,990	20-MAR	15,804	20-MAR	12,875	13-MAR	12,180	8-MAR	10,520
1919	7-OCT	10,487	6-OCT	10,096	4-OCT	8,878	2-OCT	6,359	12-FEB	4,893
1920	24-MAR	8,764	23-MAR	8,069	23-MAR	7,409	22-MAR	6,632	5-MAR	5,624
1921	20-JAN	12,943	19-JAN	10,827	19-JAN	8,270	19-JAN	7,154	19-JAN	5,840
1922	13-FEB	17,769	12-FEB	16,222	11-FEB	13,126	11-FEB	12,339	10-FEB	9,383
1923	16-DEC	9,920	15-DEC	9,390	14-DEC	8,398	12-DEC	6,569	10-DEC	4,840
1924	3-OCT	1,450	2-OCT	1,448	1-OCT	1,424	30-SEP	1,373	25-SEP	1,284
1925	14-FEB	10,715	13-FEB	9,987	9-FEB	8,727	7-FEB	7,450	3-FEB	5,501
1926	16-FEB	8,108	15-FEB	7,293	14-FEB	5,822	13-FEB	4,376	30-JAN	3,337
1927	24-FEB	14,715	24-FEB	14,533	21-FEB	14,093	18-FEB	12,840	16-FEB	10,207
1928	29-MAR	20,709	28-MAR	20,231	27-MAR	18,202	26-MAR	14,616	14-MAR	9,582
1929	6-FEB	2,715	5-FEB	2,487	5-FEB	2,122	4-FEB	1,681	1-FEB	1,361
1930	7-MAR	5,030	6-MAR	4,715	3-MAR	4,128	25-FEB	3,861	12-FEB	2,769
1931	17-FEB	1,603	17-FEB	1,511	17-FEB	1,463	16-FEB	1,348	3-FEB	1,167
1932	10-FEB	25,728	9-FEB	25,352	8-FEB	22,578	3-FEB	16,570	27-JAN	11,137
1933	31-JAN	2,701	30-JAN	2,611	30-JAN	2,418	26-JAN	2,164	26-JAN	1,904
1934	3-JAN	4,844	2-JAN	4,200	2-JAN	3,799	1-JAN	3,041	15-DEC	2,671
1935	17-JAN	7,098	17-JAN	6,709	9-FEB	6,333	7-JAN	5,700	17-JAN	4,809
1936	25-FEB	27,552	24-FEB	25,481	23-FEB	21,059	14-FEB	20,477	12-FEB	15,054
1937	8-FEB	36,116	7-FEB	31,125	7-FEB	24,026	7-FEB	22,956	6-FEB	16,449
1938	13-FEB	36,647	12-FEB	32,560	4-MAR	29,422	2-MAR	27,225	13-FEB	21,124
1939	10-FEB	3,004	9-FEB	2,909	8-FEB	2,729	8-FEB	2,614	5-FEB	2,528
1940	1-MAR	21,955	29-FEB	21,202	28-FEB	18,825	26-FEB	14,534	28-FEB	10,640
1941	14-FEB	25,223	13-FEB	23,513	12-FEB	20,570	11-FEB	16,716	11-FEB	15,933
1942	31-DEC	12,508	30-DEC	11,483	30-DEC	9,993	28-JAN	9,501	26-JAN	7,711
1943	25-JAN	22,599	24-JAN	21,779	24-JAN	20,122	23-JAN	16,197	22-JAN	11,309
1944	6-MAR	9,634	5-MAR	8,791	2-MAR	8,049	1-MAR	7,050	1-MAR	5,757
1945	4-FEB	38,757	4-FEB	34,383	3-FEB	28,996	2-FEB	19,379	2-FEB	12,373
1946	27-DEC	14,507	26-DEC	13,637	24-DEC	12,464	23-DEC	9,799	22-DEC	7,056
1947	25-NOV	7,502	25-NOV	7,156	25-NOV	6,809	24-NOV	5,347	22-NOV	4,589
1948	6-NOV	1,378	5-NOV	1,360	3-NOV	1,271	27-OCT	1,104	16-OCT	1,050
1949	6-MAR	8,142	5-MAR	7,349	4-MAR	5,635	4-MAR	4,834	4-MAR	4,221
1950	8-FEB	10,406	7-FEB	9,634	7-FEB	8,200	5-FEB	6,270	6-FEB	4,843
1951	21-NOV	49,373	20-NOV	44,073	20-NOV	36,822	19-NOV	24,327	19-NOV	23,496
1952	27-JAN	21,981	26-JAN	19,410	26-JAN	15,728	16-JAN	13,520	14-JAN	10,995
1953	16-JAN	7,958	16-JAN	7,363	15-JAN	6,566	13-JAN	5,555	1-JAN	4,424
1954	15-MAR	8,139	13-MAR	7,994	12-MAR	7,648	11-MAR	7,024	11-MAR	6,758
1955	25-FEB	3,901	23-FEB	3,849	21-FEB	3,602	16-FEB	3,009	1-FEB	2,381
1956	25-DEC	90,129	25-DEC	80,078	24-DEC	70,943	23-DEC	46,572	23-DEC	28,350
1957	27-FEB	6,714	26-FEB	6,284	26-FEB	6,092	26-FEB	5,573	24-FEB	4,820
1958	5-APR	38,561	4-APR	35,306	3-APR	29,928	1-APR	22,661	17-MAR	19,584
1959	21-FEB	9,023	21-FEB	8,875	18-FEB	8,678	16-FEB	6,664	17-FEB	5,600
1960	11-FEB	9,141	10-FEB	8,163	10-FEB	6,443	5-FEB	4,535	3-FEB	3,167
1961	7-DEC	2,660	5-DEC	2,564	4-DEC	2,384	30-NOV	1,859	16-NOV	1,482
1962	17-FEB	28,485	16-FEB	26,680	12-FEB	26,049	10-FEB	19,496	10-FEB	13,016
1963	3-FEB	40,770	2-FEB	36,133	2-FEB	30,784	1-FEB	20,930	1-FEB	13,164
1964	22-NOV	4,699	21-NOV	4,485	20-NOV	4,155	17-NOV	3,798	8-NOV	3,069

TABLE B.6-37

SAN JOAQUIN RIVER AT NEWMAN
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1965	26-DEC	38,304	26-DEC	34,739	25-DEC	30,686	25-DEC	23,111	24-DEC	17,528
1966	27-NOV	11,107	26-NOV	10,772	25-NOV	9,591	19-NOV	7,744	18-NOV	5,437
1967	9-DEC	30,051	9-DEC	28,851	8-DEC	25,767	5-DEC	17,374	2-DEC	10,541
1968	25-FEB	5,400	24-FEB	5,352	23-FEB	5,171	21-FEB	4,662	21-FEB	4,172
1969	27-JAN	55,127	26-JAN	51,540	23-JAN	47,042	20-JAN	38,845	20-JAN	26,669
1970	18-JAN	21,476	18-JAN	19,065	17-JAN	17,243	16-JAN	13,721	15-JAN	9,306
1971	4-DEC	5,627	3-DEC	5,314	2-DEC	4,818	19-JAN	4,295	1-DEC	3,979
1972	28-DEC	5,808	27-DEC	5,721	26-DEC	5,226	23-DEC	4,123	23-DEC	2,963
1973	13-FEB	24,012	12-FEB	21,582	12-FEB	17,688	10-FEB	12,411	11-FEB	10,257
1974	23-JAN	9,527	22-JAN	9,455	20-JAN	9,056	16-JAN	7,815	2-JAN	6,766
1975	11-FEB	9,503	11-FEB	8,876	10-FEB	7,980	3-FEB	7,067	11-FEB	5,558
1976	1-NOV	2,808	1-NOV	2,743	29-OCT	2,672	27-OCT	2,394	14-OCT	2,131
1977	9-OCT	1,633	8-OCT	1,612	6-OCT	1,519	17-SEP	1,895	14-SEP	1,717
1978	15-FEB	28,083	13-FEB	26,939	10-FEB	25,910	8-FEB	19,472	10-FEB	17,192
1979	23-FEB	14,249	23-FEB	13,720	22-FEB	11,829	21-FEB	10,630	21-FEB	9,520
1980	15-JAN	40,803	15-JAN	39,917	14-JAN	37,479	13-JAN	26,155	18-FEB	20,346
1981	31-JAN	5,229	30-JAN	4,878	30-JAN	4,153	29-JAN	3,294	29-JAN	3,041
1982	13-APR	46,711	13-APR	45,393	12-APR	42,851	12-APR	34,255	1-APR	27,063
1983	3-MAR	39,308	3-MAR	38,029	2-MAR	33,640	2-MAR	28,222	1-MAR	26,313
1984	28-DEC	27,197	27-DEC	26,089	27-DEC	23,457	25-DEC	17,896	13-DEC	12,631
1985	10-FEB	5,210	9-FEB	4,552	9-FEB	3,793	9-FEB	3,261	28-JAN	2,665
1986	20-FEB	67,767	19-FEB	65,246	18-FEB	56,684	16-FEB	39,913	17-FEB	31,805
1987	15-FEB	4,110	15-FEB	3,843	10-MAR	3,656	2-MAR	2,835	15-FEB	2,737
1988	12-JAN	4,305	11-JAN	4,231	9-JAN	3,838	8-JAN	3,149	6-JAN	2,612
1989	14-MAR	6,943	13-MAR	6,897	11-MAR	6,657	8-MAR	6,002	24-FEB	4,714
1990	30-OCT	1,700	28-OCT	1,665	26-OCT	1,583	25-OCT	1,313	24-OCT	1,039
1991	27-MAR	10,947	26-MAR	10,172	22-MAR	8,698	20-MAR	7,803	6-MAR	6,858
1992	17-FEB	10,394	16-FEB	9,555	15-FEB	7,801	14-FEB	6,020	13-FEB	4,762
1993	16-JAN	31,634	15-JAN	28,535	14-JAN	23,440	12-JAN	18,365	7-JAN	12,749
1994	11-MAR	3,307	9-MAR	3,203	5-MAR	3,008	25-FEB	2,870	10-FEB	2,657
1995	12-MAR	52,800	12-MAR	50,028	11-MAR	43,024	11-MAR	33,706	10-MAR	25,545
1996	24-FEB	18,828	22-FEB	18,462	21-FEB	17,092	21-FEB	13,763	6-FEB	12,518
1997	4-JAN	82,737	3-JAN	75,080	3-JAN	66,890	31-DEC	46,594	2-JAN	36,827
1998	5-FEB	27,911	8-FEB	24,650	4-FEB	23,758	4-FEB	20,131	3-FEB	17,216
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-38

ORESTIMBA CREEK NEAR NEWMAN
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1930	---	---	---	---	---	---	---	---	---	---
1931	---	---	---	---	---	---	---	---	---	---
1932	---	---	---	---	---	---	---	---	---	---
1933	---	---	---	---	---	---	---	---	---	---
1934	1-JAN	199	1-JAN	100	30-DEC	50	23-DEC	23	8-DEC	12
1935	8-APR	634	8-APR	286	7-APR	145	7-APR	83	24-MAR	45
1936	13-FEB	630	13-FEB	406	12-FEB	312	12-FEB	264	12-FEB	145
1937	14-FEB	774	13-FEB	472	21-MAR	296	5-FEB	206	30-JAN	116
1938	11-FEB	1,780	10-FEB	1,214	9-FEB	929	1-FEB	680	3-FEB	468
1939	10-MAR	50	9-MAR	36	9-MAR	18	5-MAR	9	27-FEB	4
1940	28-FEB	1,240	27-FEB	963	26-FEB	545	23-FEB	290	3-FEB	163
1941	9-FEB	1,280	9-FEB	955	9-FEB	672	9-FEB	518	8-FEB	461
1942	25-JAN	677	24-JAN	445	24-JAN	278	24-JAN	207	24-JAN	131
1943	22-JAN	1,050	21-JAN	837	21-JAN	409	21-JAN	294	21-JAN	156
1944	29-FEB	856	29-FEB	433	29-FEB	275	21-FEB	191	20-FEB	107
1945	2-FEB	2,550	1-FEB	1,193	1-FEB	564	1-FEB	272	1-FEB	138
1946	25-DEC	354	23-DEC	180	23-DEC	105	23-DEC	58	23-DEC	32
1947	---	0	---	0	---	0	---	0	---	0
1948	---	0	---	0	---	0	---	0	---	0
1949	12-MAR	196	12-MAR	102	12-MAR	48	11-MAR	24	28-FEB	12
1950	5-FEB	98	5-FEB	78	5-FEB	42	5-FEB	22	23-JAN	11
1951	8-DEC	935	7-DEC	429	3-DEC	363	3-DEC	191	19-NOV	127
1952	12-JAN	1,450	12-JAN	903	12-JAN	636	12-JAN	430	12-JAN	250
1953	31-DEC	49	8-JAN	39	8-JAN	27	31-DEC	22	31-DEC	16
1954	---	0	---	0	---	0	---	0	---	0
1955	19-JAN	8	28-FEB	5	26-FEB	2	18-FEB	1	3-FEB	0
1956	23-DEC	3,170	23-DEC	1,593	23-DEC	768	23-DEC	419	23-DEC	248
1957	25-FEB	411	24-FEB	232	24-FEB	121	23-FEB	62	21-FEB	32
1958	3-APR	3,010	1-APR	1,966	1-APR	1,225	31-MAR	671	15-MAR	464
1959	16-FEB	1,570	16-FEB	805	16-FEB	555	15-FEB	303	11-FEB	161
1960	10-FEB	264	9-FEB	179	6-FEB	103	5-FEB	56	2-FEB	28
1961	---	0	---	0	---	0	---	0	---	0
1962	15-FEB	1,080	14-FEB	659	10-FEB	448	9-FEB	264	9-FEB	165
1963	1-FEB	2,090	31-JAN	1,225	31-JAN	552	31-JAN	332	31-JAN	181
1964	22-JAN	60	22-JAN	40	22-JAN	19	14-JAN	9	30-DEC	5
1965	6-JAN	359	6-JAN	274	3-JAN	177	28-DEC	112	28-DEC	66
1966	31-DEC	107	30-DEC	95	30-DEC	55	29-DEC	27	17-DEC	13
1967	24-JAN	1,580	24-JAN	753	24-JAN	461	22-JAN	323	22-JAN	171
1968	---	0	---	0	---	0	---	0	---	0
1969	25-JAN	2,060	25-JAN	1,323	20-JAN	818	19-JAN	558	19-JAN	416
1970	16-JAN	474	16-JAN	320	1-MAR	224	15-JAN	156	15-JAN	83
1971	21-DEC	320	20-DEC	175	19-DEC	107	19-DEC	60	19-DEC	45
1972	---	0	---	0	---	0	---	0	---	0
1973	11-FEB	914	11-FEB	651	7-FEB	498	6-FEB	337	6-FEB	229
1974	3-MAR	489	2-MAR	311	2-MAR	169	27-DEC	106	27-DEC	72
1975	8-MAR	514	7-MAR	304	7-MAR	167	8-MAR	120	7-MAR	79
1976	---	0	---	0	---	0	---	0	---	0
1977	---	0	---	0	---	0	---	0	---	0
1978	9-FEB	1,740	15-JAN	1,290	14-JAN	638	9-JAN	312	15-JAN	278
1979	21-FEB	568	21-FEB	390	21-FEB	204	14-FEB	106	14-FEB	58

TABLE B.6-38

ORESTIMBA CREEK NEAR NEWMAN
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1980	18-FEB	2,720	17-FEB	2,227	16-FEB	1,821	16-FEB	934	16-FEB	521
1981	22-MAR	71	21-MAR	52	19-MAR	32	19-MAR	22	15-MAR	13
1982	5-JAN	1,930	4-JAN	1,017	31-MAR	458	31-MAR	406	29-MAR	249
1983	1-MAR	2,560	28-FEB	2,053	26-FEB	1,113	27-FEB	607	6-FEB	417
1984	25-DEC	637	25-DEC	344	25-DEC	185	24-DEC	105	9-DEC	71
1985	9-FEB	30	9-FEB	18	27-MAR	11	26-MAR	6	7-MAR	5
1986	19-FEB	2,790	17-FEB	2,180	14-FEB	1,431	13-FEB	805	13-FEB	534
1987	6-MAR	77	6-MAR	38	5-MAR	20	5-MAR	10	13-FEB	6
1988	---	0	---	0	---	0	---	0	---	0
1989	---	0	---	0	---	0	---	0	---	0
1990	---	0	---	0	---	0	---	0	---	0
1991	25-MAR	445	25-MAR	315	24-MAR	165	18-MAR	90	4-MAR	60
1992	15-FEB	368	15-FEB	213	12-FEB	124	12-FEB	64	12-FEB	35
1993	13-JAN	1,990	13-JAN	1,103	13-JAN	709	13-JAN	397	13-JAN	251
1994	20-FEB	4	20-FEB	2	18-FEB	1	---	0	---	0
1995	10-MAR	4,260	10-MAR	2,115	10-MAR	1,023	10-MAR	646	9-MAR	366
1996	20-FEB	1,190	19-FEB	1,044	19-FEB	608	19-FEB	335	31-JAN	275
1997	2-JAN	1,940	1-JAN	1,376	22-JAN	1,051	20-JAN	547	1-JAN	444
1998	3-FEB	4,550	2-FEB	2,413	2-FEB	1,780	2-FEB	1,073	1-FEB	777
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-39

MERCED RIVER AT NEW EXCHEQUER DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1900	---	---	---	---	---	---	---	---	---	---
1901	---	---	---	---	---	---	---	---	---	---
1902	9-MAR	4,980	9-MAR	3,240	25-FEB	2,413	25-FEB	1,906	22-FEB	1,630
1903	28-JAN	12,000	27-JAN	8,810	26-JAN	7,341	17-MAR	5,580	2-MAR	4,723
1904	23-MAR	6,740	23-MAR	4,700	23-MAR	2,436	17-MAR	2,074	2-MAR	1,454
1905	19-MAR	8,500	19-MAR	4,870	17-MAR	3,440	13-MAR	2,434	2-MAR	1,743
1906	---	19,800	---	12,500	---	7,006	---	5,011	---	3,079
1907	19-MAR	24,400	19-MAR	18,200	19-MAR	12,997	17-MAR	8,400	2-MAR	4,614
1908	25-JAN	1,740	24-MAR	1,480	19-MAR	1,264	15-MAR	1,080	29-FEB	1,080
1909	14-JAN	20,400	13-JAN	13,300	13-JAN	6,980	13-JAN	6,610	14-JAN	4,870
1910	9-DEC	14,800	31-DEC	8,720	31-DEC	4,610	31-DEC	2,470	31-DEC	2,280
1911	30-JAN	37,200	30-JAN	28,600	29-JAN	15,100	24-JAN	9,440	2-MAR	5,940
1912	16-MAR	1,210	15-MAR	958	13-MAR	886	6-MAR	769	2-MAR	617
1913	31-MAR	810	29-MAR	620	25-MAR	526	17-MAR	442	2-MAR	366
1914	20-NOV	20,800	20-NOV	10,500	28-NOV	5,512	28-NOV	4,091	2-SEP	3,860
1915	---	10,500	---	6,730	---	5,167	---	3,975	---	2,030
1916	5-MAR	12,600	5-MAR	7,340	24-JAN	4,711	17-JAN	3,700	2-MAR	3,470
1917	22-FEB	18,500	21-FEB	14,100	20-FEB	9,720	20-FEB	5,300	20-FEB	3,130
1918	19-MAR	14,300	11-MAR	7,430	7-MAR	6,230	7-MAR	4,990	22-FEB	3,350
1919	11-FEB	4,960	10-FEB	2,680	30-SEP	1,630	23-FEB	1,290	26-FEB	1,190
1920	22-MAR	5,100	21-MAR	3,560	21-MAR	2,390	17-MAR	1,620	1-MAR	1,320
1921	18-JAN	13,000	18-JAN	7,850	18-JAN	4,200	18-JAN	2,950	18-JAN	2,140
1922	11-FEB	13,300	9-FEB	9,070	8-FEB	5,160	9-FEB	4,450	8-FEB	2,980
1923	24-JAN	4,510	23-JAN	3,660	23-JAN	2,410	23-JAN	1,650	23-JAN	1,270
1924	27-MAR	680	27-MAR	623	25-MAR	504	17-MAR	370	2-MAR	315
1925	6-FEB	9,280	6-FEB	5,030	6-FEB	4,130	5-FEB	2,690	6-FEB	1,950
1926	3-DEC	6,360	2-DEC	3,960	2-DEC	2,410	1-DEC	1,520	1-DEC	1,100
1927	---	8,560	---	5,440	---	4,147	---	2,852	---	2,550
1928	---	19,000	---	13,300	---	7,694	---	5,386	---	2,620
1929	---	2,440	---	1,610	---	1,149	---	800	---	760
1930	---	3,100	---	2,350	---	1,437	---	1,180	---	1,180
1931	25-MAR	1,130	23-MAR	943	21-MAR	762	17-MAR	596	2-MAR	460
1932	7-FEB	11,400	6-FEB	10,200	6-FEB	7,140	31-JAN	4,680	31-JAN	2,940
1933	17-MAR	2,600	17-MAR	1,550	17-MAR	1,100	11-MAR	872	2-MAR	710
1934	1-JAN	4,560	1-JAN	2,670	21-FEB	1,580	19-FEB	1,310	19-FEB	1,190
1935	5-JAN	4,230	7-MAR	2,670	5-JAN	2,110	5-JAN	1,820	2-MAR	1,400
1936	23-FEB	14,700	12-FEB	10,500	11-FEB	7,860	11-FEB	6,660	1-FEB	4,320
1937	6-FEB	25,200	5-FEB	14,600	5-FEB	7,340	5-FEB	6,380	5-FEB	3,960
1938	11-DEC	34,000	10-DEC	17,200	9-FEB	8,640	2-MAR	7,260	1-MAR	5,410
1939	27-MAR	2,630	26-MAR	2,360	22-MAR	1,930	17-MAR	1,600	2-MAR	1,140
1940	27-FEB	11,300	27-FEB	8,660	26-FEB	5,610	23-FEB	3,780	27-FEB	2,590
1941	27-DEC	13,600	27-DEC	7,920	9-FEB	5,160	9-FEB	3,670	9-FEB	3,570
1942	3-DEC	5,130	26-JAN	3,980	25-JAN	3,160	25-JAN	2,800	24-JAN	1,980
1943	23-JAN	13,500	21-JAN	11,300	5-MAR	7,470	5-MAR	5,510	2-MAR	3,950
1944	4-MAR	5,040	4-MAR	3,380	29-FEB	2,850	29-FEB	1,940	22-FEB	1,440
1945	2-FEB	33,000	1-FEB	18,500	1-FEB	9,820	1-FEB	5,370	1-FEB	3,150
1946	22-DEC	11,600	22-DEC	6,540	22-DEC	4,640	22-DEC	3,060	21-DEC	2,020
1947	23-NOV	4,890	23-NOV	2,840	20-NOV	1,980	20-NOV	1,220	2-MAR	1,020
1948	24-MAR	3,070	24-MAR	1,900	24-MAR	1,300	17-MAR	879	2-MAR	563
1949	4-MAR	4,960	3-MAR	3,910	2-MAR	2,160	3-MAR	1,640	2-MAR	1,300

TABLE B.6-39

MERCED RIVER AT NEW EXCHEQUER DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1950	6-FEB	5,180	5-FEB	4,170	3-FEB	2,410	28-JAN	1,470	17-JAN	1,260
1951	19-NOV	48,500	18-NOV	28,600	18-NOV	16,800	18-NOV	8,780	18-NOV	8,160
1952	25-JAN	13,300	15-JAN	7,750	12-JAN	4,960	12-JAN	4,210	29-DEC	2,960
1953	14-JAN	4,140	14-JAN	2,520	14-JAN	1,710	8-JAN	1,370	30-DEC	996
1954	10-MAR	4,640	9-MAR	3,710	9-MAR	2,330	9-MAR	2,050	2-MAR	1,640
1955	2-JAN	1,850	1-JAN	1,280	1-JAN	704	27-FEB	623	2-MAR	598
1956	23-DEC	74,800	22-DEC	41,800	22-DEC	24,100	22-DEC	12,500	22-DEC	7,570
1957	25-FEB	3,810	24-FEB	2,650	24-FEB	1,920	23-FEB	1,540	21-FEB	1,240
1958	16-MAR	19,800	15-MAR	11,400	16-MAR	8,100	15-MAR	5,080	25-FEB	4,360
1959	16-FEB	6,700	16-FEB	4,180	16-FEB	2,530	11-FEB	1,550	16-FEB	1,260
1960	9-FEB	4,000	8-FEB	2,770	8-FEB	2,100	17-MAR	1,470	2-MAR	980
1961	2-DEC	910	2-DEC	830	22-MAR	740	17-MAR	640	2-MAR	480
1962	10-FEB	12,900	9-FEB	10,500	9-FEB	7,670	9-FEB	4,870	9-FEB	3,180
1963	1-FEB	38,300	31-JAN	21,700	31-JAN	10,900	31-JAN	6,090	30-JAN	3,560
1964	15-NOV	2,720	15-NOV	1,610	15-NOV	1,190	15-NOV	900	6-NOV	630
1965	24-DEC	33,100	23-DEC	22,900	23-DEC	13,600	24-DEC	8,670	23-DEC	5,710
1966	24-NOV	6,500	24-NOV	4,830	23-NOV	3,140	16-NOV	2,330	15-NOV	1,390
1967	7-DEC	18,200	6-DEC	10,100	13-MAR	6,470	12-MAR	4,650	2-MAR	2,770
1968	21-FEB	2,280	20-FEB	2,000	20-FEB	1,670	17-FEB	1,330	17-FEB	931
1969	21-JAN	34,500	19-JAN	21,900	19-JAN	15,300	19-JAN	10,400	19-JAN	6,580
1970	16-JAN	15,600	16-JAN	8,530	16-JAN	6,030	14-JAN	4,400	10-JAN	2,920
1971	27-MAR	2,740	26-MAR	2,300	25-MAR	1,850	17-MAR	1,290	26-NOV	920
1972	22-DEC	2,780	25-DEC	2,270	22-DEC	1,930	8-MAR	1,590	2-MAR	1,290
1973	11-FEB	14,400	10-FEB	8,610	10-FEB	5,310	6-FEB	3,070	10-FEB	2,580
1974	2-MAR	7,400	1-MAR	5,100	1-MAR	3,420	1-MAR	2,600	1-MAR	2,140
1975	25-MAR	7,800	9-FEB	4,880	21-MAR	3,260	1-FEB	2,860	2-MAR	2,120
1976	27-OCT	1,800	26-OCT	1,240	26-OCT	895	26-OCT	662	29-FEB	492
1977	24-MAR	221	24-MAR	194	24-MAR	170	16-MAR	136	12-SEP	110
1978	9-FEB	15,100	8-FEB	8,690	7-FEB	6,390	5-FEB	4,090	6-FEB	3,660
1979	11-JAN	13,500	11-JAN	7,110	11-JAN	4,570	19-FEB	2,930	13-FEB	2,530
1980	13-JAN	31,413	12-JAN	21,458	11-JAN	13,337	10-JAN	7,642	15-FEB	5,457
1981	28-JAN	2,342	27-JAN	1,698	20-MAR	1,441	17-MAR	1,235	2-MAR	611
1982	15-FEB	39,147	15-FEB	22,504	14-FEB	13,961	14-FEB	9,705	15-FEB	8,473
1983	22-DEC	21,355	28-FEB	14,474	27-FEB	9,931	28-FEB	7,605	27-FEB	6,484
1984	25-DEC	17,797	25-DEC	14,328	24-DEC	8,790	24-DEC	5,545	9-DEC	3,630
1985	8-FEB	4,068	26-MAR	2,072	25-MAR	1,113	17-MAR	784	2-MAR	681
1986	17-FEB	31,917	17-FEB	27,601	14-FEB	19,009	12-FEB	11,182	12-FEB	8,473
1987	13-FEB	3,049	12-FEB	1,658	12-FEB	944	5-MAR	797	2-MAR	572
1988	27-MAR	1,461	26-MAR	1,389	25-MAR	1,224	17-MAR	737	1-MAR	453
1989	25-MAR	3,061	7-MAR	2,291	25-MAR	1,930	2-MAR	1,595	2-MAR	225
1990	26-MAR	1,504	25-MAR	1,488	22-MAR	1,375	17-MAR	346	2-MAR	312
1991	25-MAR	4,598	24-MAR	3,657	19-MAR	2,420	17-MAR	2,028	2-MAR	1,598
1992	15-FEB	3,847	13-FEB	2,808	11-FEB	2,363	11-FEB	1,663	11-FEB	1,243
1993	14-JAN	13,758	13-JAN	9,228	13-JAN	6,255	7-JAN	4,644	6-JAN	3,086
1994	7-FEB	2,514	7-FEB	1,335	7-FEB	725	7-FEB	621	2-MAR	589
1995	10-MAR	38,212	9-MAR	22,298	9-MAR	12,863	9-MAR	9,248	2-MAR	6,310
1996	19-FEB	9,645	19-FEB	7,718	19-FEB	5,174	19-FEB	3,574	4-FEB	3,320
1997	2-JAN	67,040	1-JAN	44,072	30-DEC	24,806	29-DEC	13,813	30-DEC	10,620

TABLE B.6-40

DEL PUERTO CREEK NEAR PATTERSON
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1965	---	---	---	---	---	---	---	---	---	---
1966	31-DEC	20	30-DEC	18	29-DEC	13	29-DEC	8	29-DEC	5
1967	22-JAN	247	22-JAN	164	22-JAN	100	22-JAN	72	21-JAN	39
1968	31-JAN	30	31-JAN	14	30-JAN	8	30-JAN	5	30-JAN	4
1969	24-FEB	399	24-FEB	268	24-FEB	190	15-FEB	130	6-FEB	99
1970	1-MAR	85	1-MAR	61	1-MAR	46	14-JAN	32	10-JAN	20
1971	21-DEC	63	21-DEC	39	19-DEC	24	19-DEC	16	29-NOV	13
1972	28-JAN	4	28-JAN	4	27-JAN	3	27-JAN	2	27-JAN	2
1973	11-FEB	267	11-FEB	196	6-FEB	159	6-FEB	113	6-FEB	80
1974	8-JAN	72	7-JAN	54	6-JAN	38	5-JAN	26	27-DEC	20
1975	8-MAR	119	7-MAR	84	7-MAR	52	7-MAR	37	7-MAR	28
1976	3-MAR	3	2-MAR	3	2-MAR	2	27-FEB	1	12-FEB	1
1977	2-OCT	5	2-OCT	2	28-SEP	1	20-SEP	1	---	0
1978	5-MAR	254	4-MAR	200	4-MAR	118	3-MAR	71	7-FEB	61
1979	21-FEB	89	21-FEB	78	21-FEB	47	20-FEB	26	14-FEB	17
1980	19-FEB	767	17-FEB	614	16-FEB	423	16-FEB	233	16-FEB	143
1981	29-JAN	38	28-JAN	23	27-JAN	13	27-JAN	8	16-MAR	6
1982	5-JAN	494	4-JAN	278	4-JAN	132	31-MAR	101	29-MAR	66
1983	1-MAR	973	28-FEB	760	28-FEB	492	28-FEB	328	26-FEB	237
1984	25-DEC	317	25-DEC	160	25-DEC	86	23-DEC	49	9-DEC	34
1985	28-MAR	39	27-MAR	24	27-MAR	14	26-MAR	8	7-MAR	6
1986	19-FEB	775	17-FEB	631	14-FEB	423	13-FEB	222	14-FEB	136
1987	13-FEB	53	13-FEB	27	12-FEB	14	11-FEB	8	13-FEB	7
1988	18-JAN	39	17-JAN	30	16-JAN	15	14-JAN	8	8-JAN	5
1989	3-MAR	1	10-MAR	1	7-MAR	1	3-MAR	1	2-MAR	1
1990	28-MAY	98	27-MAY	49	27-MAY	22	27-MAY	10	21-MAY	5
1991	25-MAR	230	25-MAR	128	24-MAR	72	18-MAR	41	4-MAR	24
1992	12-FEB	262	11-FEB	111	11-FEB	89	11-FEB	49	11-FEB	27
1993	13-JAN	590	13-JAN	334	13-JAN	220	18-FEB	119	8-FEB	84
1994	20-FEB	29	19-FEB	20	19-FEB	13	19-FEB	8	19-FEB	6
1995	23-JAN	1230	10-MAR	650	10-MAR	329	10-MAR	232	10-MAR	143
1996	20-FEB	328	19-FEB	267	19-FEB	171	19-FEB	109	31-JAN	87
1997	23-JAN	735	23-JAN	423	22-JAN	326	22-JAN	186	01-JAN	133
1998	03-FEB	1870	02-FEB	862	02-FEB	653	02-FEB	423	02-FEB	329
1999	---	---	---	---	---	---	---	---	---	---

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TABLE B.6-41

TUOLUMNE RIVER AT DON PEDRO DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1895	---	---	---	---	---	---	---	---	---	---
1896	---	---	---	---	---	---	---	---	---	---
1897	4-FEB	14,200	3-FEB	12,133	1-FEB	10,643	28-JAN	6,766	28-JAN	4,821
1898	8-DEC	3,540	8-DEC	2,793	8-DEC	2,089	25-FEB	1,578	21-NOV	1,320
1899	25-MAR	26,800	23-MAR	19,733	23-MAR	12,371	16-MAR	7,789	2-MAR	7,410
1900	3-JAN	14,200	3-JAN	8,923	3-JAN	5,576	21-DEC	4,779	13-DEC	4,474
1901	19-FEB	22,560	19-FEB	17,827	18-FEB	16,446	17-FEB	12,174	5-FEB	8,414
1902	27-FEB	12,088	26-FEB	9,954	25-FEB	7,120	25-FEB	6,831	24-FEB	5,279
1903	28-JAN	19,740	26-JAN	17,106	26-JAN	11,596	25-JAN	8,092	2-MAR	6,199
1904	20-MAR	16,365	23-FEB	11,162	23-FEB	8,911	17-MAR	7,443	23-FEB	6,951
1905	11-OCT	14,551	10-OCT	9,489	7-OCT	7,275	1-OCT	5,004	25-SEP	3,261
1906	---	26,200	---	21,400	---	13,203	---	10,308	---	8,616
1907	19-MAR	50,425	18-MAR	37,763	17-MAR	26,616	17-MAR	18,420	2-MAR	13,844
1908	17-MAR	2,704	16-MAR	2,579	15-MAR	2,478	14-MAR	2,208	2-MAR	1,839
1909	14-JAN	26,719	13-JAN	20,299	13-JAN	13,299	13-JAN	11,275	14-JAN	7,925
1910	9-DEC	20,900	9-DEC	10,330	21-NOV	6,790	21-NOV	5,470	20-NOV	4,746
1911	30-JAN	52,560	30-JAN	38,793	29-JAN	21,134	24-JAN	13,123	13-JAN	8,240
1912	7-MAR	1,730	6-MAR	1,390	13-MAR	1,199	6-MAR	1,138	2-MAR	1,007
1913	31-MAR	1,030	29-MAR	835	25-MAR	803	17-MAR	649	2-MAR	478
1914	25-JAN	31,300	25-JAN	21,267	22-JAN	14,047	17-JAN	9,566	1-JAN	6,878
1915	9-FEB	9,860	9-FEB	6,930	8-FEB	4,413	9-FEB	4,009	1-FEB	3,549
1916	20-MAR	17,100	20-MAR	12,507	18-MAR	9,176	10-MAR	7,411	27-FEB	6,652
1917	21-FEB	23,000	21-FEB	16,567	20-FEB	12,469	20-FEB	7,321	20-FEB	4,656
1918	12-MAR	15,200	11-MAR	9,353	7-MAR	7,550	7-MAR	5,949	2-MAR	4,915
1919	11-FEB	7,164	10-FEB	4,255	25-MAR	2,561	17-MAR	1,808	2-MAR	1,779
1920	2-MAR	9,813	22-MAR	5,659	21-MAR	3,960	17-MAR	2,950	2-MAR	2,640
1921	21-MAR	7,818	18-JAN	7,700	18-JAN	7,521	18-JAN	5,269	18-JAN	4,003
1922	20-FEB	10,744	19-FEB	7,293	18-FEB	5,227	10-FEB	4,488	8-FEB	3,353
1923	14-DEC	6,790	13-DEC	6,199	12-DEC	4,771	7-DEC	3,150	11-DEC	2,159
1924	9-FEB	2,512	8-FEB	1,884	8-FEB	1,369	8-FEB	940	8-FEB	753
1925	7-FEB	17,998	6-FEB	13,728	5-FEB	8,262	5-FEB	5,748	5-FEB	4,248
1926	14-FEB	6,109	13-FEB	4,039	12-FEB	2,989	17-MAR	2,229	2-MAR	1,852
1927	19-FEB	16,305	18-FEB	10,137	18-FEB	8,235	16-FEB	6,151	15-FEB	4,272
1928	25-MAR	43,351	25-MAR	32,769	24-MAR	18,120	17-MAR	11,192	2-MAR	7,588
1929	5-FEB	3,663	11-MAR	2,266	24-MAR	1,388	17-MAR	913	2-MAR	751
1930	6-MAR	5,781	5-MAR	4,033	25-MAR	2,741	17-MAR	2,350	2-MAR	2,101
1931	19-MAR	1,657	19-MAR	1,244	19-MAR	761	13-MAR	564	28-FEB	399
1932	7-FEB	22,947	7-FEB	15,890	6-FEB	10,362	31-JAN	6,552	1-FEB	4,164
1933	18-MAR	1,438	17-MAR	1,241	17-MAR	968	17-MAR	736	2-MAR	645
1934	31-MAR	6,225	29-MAR	4,348	25-MAR	2,577	17-MAR	1,685	2-MAR	1,339
1935	8-MAR	23,394	6-FEB	13,360	5-FEB	9,873	7-MAR	8,586	2-MAR	7,987
1936	23-FEB	21,838	22-FEB	14,433	22-FEB	9,249	12-FEB	8,542	12-FEB	6,144
1937	7-FEB	24,374	6-FEB	15,342	5-FEB	8,494	5-FEB	7,444	5-FEB	4,853
1938	12-DEC	74,421	11-DEC	38,855	10-DEC	19,507	10-DEC	9,948	1-MAR	7,023
1939	27-MAR	2,682	26-MAR	1,777	22-MAR	1,461	17-MAR	1,149	2-MAR	1,092
1940	31-MAR	29,357	29-MAR	17,143	25-MAR	13,603	17-MAR	9,025	2-MAR	6,498
1941	28-DEC	17,573	27-DEC	11,709	24-DEC	7,238	28-FEB	5,239	9-FEB	5,203
1942	3-DEC	22,722	3-DEC	10,505	24-JAN	6,559	25-JAN	5,364	23-JAN	3,706
1943	21-JAN	22,258	21-JAN	20,919	21-JAN	12,244	21-JAN	7,985	2-MAR	6,383
1944	29-FEB	6,466	29-FEB	3,982	29-FEB	3,157	29-FEB	2,683	29-FEB	2,342

TABLE B.6-41

TUOLUMNE RIVER AT DON PEDRO DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1945	2-FEB	45,420	1-FEB	28,029	1-FEB	15,244	1-FEB	8,683	1-FEB	5,219
1946	22-DEC	18,901	21-DEC	13,069	21-DEC	9,097	21-DEC	6,254	21-DEC	4,214
1947	23-NOV	8,308	23-NOV	4,531	19-NOV	3,305	17-MAR	2,557	2-MAR	2,407
1948	24-MAR	4,632	24-MAR	3,397	24-MAR	2,454	17-MAR	1,764	2-MAR	1,168
1949	3-MAR	6,465	3-MAR	4,542	2-MAR	2,696	3-MAR	2,296	2-MAR	2,040
1950	6-FEB	7,868	4-FEB	6,607	4-FEB	4,251	4-FEB	2,804	17-JAN	2,448
1951	19-NOV	66,959	18-NOV	53,387	18-NOV	32,877	17-NOV	16,855	18-NOV	15,772
1952	15-JAN	14,389	14-JAN	9,167	12-JAN	6,214	12-JAN	5,270	12-JAN	4,224
1953	14-JAN	5,752	13-JAN	4,212	9-JAN	3,798	8-JAN	3,338	7-JAN	2,484
1954	9-MAR	17,021	9-MAR	11,581	8-MAR	6,745	8-MAR	4,642	2-MAR	3,895
1955	1-JAN	4,938	1-JAN	2,913	16-FEB	1,855	16-FEB	1,448	15-FEB	1,424
1956	23-DEC	118,388	22-DEC	71,258	22-DEC	39,744	22-DEC	21,335	22-DEC	13,808
1957	5-MAR	5,592	5-MAR	4,892	5-MAR	3,786	27-FEB	3,150	13-FEB	2,655
1958	16-MAR	18,858	21-MAR	13,083	16-MAR	10,290	15-MAR	7,664	25-FEB	6,922
1959	16-FEB	11,009	16-FEB	8,534	16-FEB	5,199	16-FEB	3,271	16-FEB	2,651
1960	9-FEB	10,525	8-FEB	9,037	8-FEB	5,076	17-MAR	3,123	2-MAR	2,047
1961	12-FEB	2,476	23-MAR	1,740	21-MAR	1,274	17-MAR	1,003	2-MAR	841
1962	10-FEB	16,428	9-FEB	14,232	9-FEB	10,535	8-FEB	6,923	8-FEB	4,639
1963	1-FEB	70,014	31-JAN	41,515	30-JAN	20,679	31-JAN	11,323	30-JAN	6,565
1964	15-NOV	10,587	15-NOV	5,396	15-NOV	3,368	14-NOV	2,467	6-NOV	1,889
1965	23-DEC	72,693	23-DEC	51,489	22-DEC	30,648	22-DEC	17,107	22-DEC	11,341
1966	24-NOV	9,986	23-NOV	7,476	18-NOV	4,988	14-NOV	3,947	14-NOV	2,641
1967	6-DEC	29,992	16-MAR	17,958	16-MAR	11,251	12-MAR	7,713	2-MAR	6,166
1968	21-FEB	6,750	21-FEB	5,135	21-FEB	4,063	17-FEB	3,295	17-FEB	2,590
1969	21-JAN	49,794	19-JAN	34,217	20-JAN	23,802	19-JAN	17,002	13-JAN	10,850
1970	16-JAN	30,759	16-JAN	19,607	16-JAN	16,350	14-JAN	11,737	10-JAN	7,232
1971	26-NOV	7,402	26-MAR	6,565	25-MAR	5,127	17-MAR	4,286	25-NOV	3,906
1972	18-MAR	3,426	16-MAR	2,930	16-MAR	2,702	7-MAR	2,317	1-MAR	1,535
1973	11-FEB	14,544	10-FEB	10,649	10-FEB	6,847	7-FEB	4,405	10-FEB	3,692
1974	12-NOV	23,397	11-NOV	13,948	10-NOV	7,763	10-NOV	4,985	1-MAR	3,583
1975	25-MAR	11,003	25-MAR	6,963	22-MAR	5,262	13-MAR	4,031	2-MAR	3,717
1976	27-OCT	5,880	26-OCT	4,047	26-OCT	2,888	26-OCT	2,065	10-OCT	1,512
1977	21-FEB	1,398	21-FEB	855	21-FEB	666	15-MAR	466	21-FEB	350
1978	4-MAR	18,306	4-MAR	13,886	2-MAR	9,221	2-MAR	6,176	2-MAR	5,511
1979	11-JAN	20,280	11-JAN	12,493	11-JAN	7,547	8-JAN	4,385	14-FEB	4,104
1980	13-JAN	58,383	12-JAN	45,060	10-JAN	27,024	10-JAN	15,194	31-DEC	8,882
1981	29-JAN	5,972	27-JAN	4,532	20-MAR	2,595	17-MAR	1,674	2-MAR	1,560
1982	16-FEB	49,259	15-FEB	32,445	14-FEB	18,693	14-FEB	11,532	14-FEB	8,503
1983	1-MAR	26,020	1-MAR	19,311	27-FEB	13,576	28-FEB	11,735	27-FEB	9,457
1984	25-DEC	30,057	25-DEC	25,490	25-DEC	15,848	24-DEC	10,254	9-DEC	7,043
1985	8-FEB	5,803	27-MAR	2,960	25-MAR	2,108	17-MAR	1,596	2-MAR	1,479
1986	18-FEB	53,179	17-FEB	49,556	14-FEB	32,964	13-FEB	19,610	13-FEB	14,880
1987	13-FEB	6,879	13-FEB	3,948	11-FEB	2,289	5-MAR	1,927	2-MAR	1,493
1988	28-MAR	3,018	26-MAR	2,697	24-MAR	2,298	17-MAR	1,846	1-MAR	1,707
1989	8-MAR	11,952	8-MAR	9,905	7-MAR	7,603	7-MAR	5,329	2-MAR	4,870
1990	24-OCT	6,206	24-OCT	4,215	22-MAR	2,519	17-MAR	1,516	2-MAR	902
1991	5-MAR	11,409	4-MAR	8,537	3-MAR	4,705	3-MAR	3,000	2-MAR	2,774
1992	15-FEB	5,024	15-FEB	3,196	12-FEB	2,591	12-FEB	2,443	12-FEB	2,190
1993	14-JAN	15,172	24-MAR	10,699	23-MAR	8,300	17-MAR	7,243	2-MAR	6,230
1994	8-FEB	3,306	7-FEB	2,479	16-MAR	1,931	5-MAR	1,838	2-MAR	1,685
1995	10-MAR	46,631	10-MAR	34,282	9-MAR	20,342	9-MAR	14,557	2-MAR	10,215

TABLE B.6-41

TUOLUMNE RIVER AT DON PEDRO DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1996	5-FEB	21,319	5-FEB	14,517	4-FEB	9,059	5-FEB	6,533	5-FEB	6,388
1997	2-JAN	120,082	1-JAN	92,075	30-DEC	50,345	27-DEC	26,936	35429	17,871
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

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TABLE B.6-42

DRY CREEK NEAR MODESTO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1945	---	1,580	---	1,330	---	817	---	435	---	245
1946	---	874	---	580	---	364	---	286	---	184
1947	---	236	---	172	---	103	---	62	---	44
1948	---	535	---	290	---	164	---	108	---	97
1949	---	1,130	---	998	---	746	---	484	---	282
1950	---	1,930	---	911	---	453	---	384	---	296
1951	---	2,960	---	2,190	---	1,480	---	853	---	529
1952	---	2,480	---	1,580	---	1,100	---	834	---	605
1953	---	1,020	---	534	---	413	---	313	---	247
1954	---	260	---	225	---	174	---	135	---	110
1955	---	1,840	---	1,140	---	762	---	439	---	325
1956	---	7,160	---	4,660	---	2,590	---	1,540	---	1,050
1957	---	675	---	374	---	246	---	163	---	102
1958	---	3,350	---	3,000	---	2,210	---	1,250	---	1,020
1959	---	1,210	---	815	---	515	---	339	---	191
1960	---	1,040	---	791	---	411	---	229	---	131
1961	---	162	---	123	---	90	---	62	---	37
1962	---	2,680	---	1,880	---	1,490	---	873	---	548
1963	---	1,620	---	784	---	533	---	379	---	215
1964	---	779	---	406	---	223	---	122	---	69
1965	---	2,830	---	1,560	---	1,320	---	948	---	590
1966	---	1,290	---	976	---	500	---	316	---	176
1967	---	1,770	---	1,170	---	885	---	647	---	448
1968	---	423	---	343	---	218	---	140	---	126
1969	---	4,540	---	3,320	---	2,520	---	1,740	---	990
1970	---	1,730	---	1,340	---	718	---	505	---	310
1971	---	448	---	338	---	283	---	176	---	155
1972	---	473	---	345	---	250	---	137	---	78
1973	---	4,690	---	2,650	---	1,460	---	771	---	604
1974	---	1,850	---	1,050	---	593	---	423	---	260
1975	---	827	---	490	---	375	---	340	---	235
1976	---	---	---	---	---	---	---	---	---	---
1977	---	70	---	41	---	25	---	17	---	14
1978	---	2,490	---	1,680	---	1,070	---	578	---	496
1979	---	1,860	---	887	---	791	---	473	---	271
1980	---	2,650	---	2,180	---	1,710	---	963	---	509
1981	---	1,780	---	1,030	---	627	---	374	---	251
1982	---	4,600	---	2,270	---	1,310	---	786	---	557
1983	---	4,700	---	3,060	---	2,310	---	1,370	---	1,110
1984	---	3,330	---	2,130	---	1,090	---	702	---	328
1985	---	1,750	---	736	---	365	---	189	---	110
1986	---	3,430	---	2,750	---	1,660	---	899	---	733
1987	6-MAR	2,340	6-MAR	1,108	5-MAR	567	16-OCT	307	15-OCT	208
1988	18-JAN	672	18-JAN	326	17-JAN	163	11-JAN	80	27-DEC	43
1989	3-MAR	687	3-MAR	321	29-FEB	168	29-FEB	148	28-FEB	77
1990	6-MAR	134	18-FEB	88	19-APR	60	6-APR	25	6-MAR	23
1991	27-MAR	1,330	25-MAR	924	21-MAR	631	19-MAR	427	5-MAR	219
1992	13-FEB	2,450	13-FEB	1,482	12-FEB	1,059	11-FEB	553	11-FEB	340
1993	18-JAN	4,120	17-JAN	2,007	13-JAN	1,586	8-JAN	1,146	3-JAN	639
1994	9-FEB	798	8-FEB	380	8-FEB	195	8-FEB	111	25-JAN	69

TABLE B.6-42

DRY CREEK NEAR MODESTO
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1995	11-MAR	5,080	11-MAR	3,042	24-JAN	1,660	11-MAR	1,145	10-MAR	759
1996	22-FEB	2,110	20-FEB	1,295	1-FEB	875	25-JAN	770	25-JAN	659
1997	22-DEC	3,710	22-DEC	2,234	21-JAN	1,530	22-DEC	932	10-DEC	657
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-43

SAN JOAQUIN RIVER AT MAZE ROAD BRIDGE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1915	---	---	---	---	--	---	---	---	---	---
1916	---	---	---	---	--	---	---	---	---	---
1917	25-FEB	39,840	23-FEB	39,725	22-FEB	36,023	21-FEB	25,472	20-FEB	16,583
1918	14-MAR	24,381	13-MAR	22,368	9-MAR	18,066	9-MAR	17,676	8-MAR	15,585
1919	8-OCT	11,581	7-OCT	11,202	5-OCT	10,044	2-OCT	7,524	12-FEB	6,743
1920	24-MAR	14,071	23-MAR	12,829	23-MAR	11,103	22-MAR	9,656	3-MAR	8,215
1921	21-JAN	19,871	20-JAN	18,666	19-JAN	15,630	19-JAN	12,600	19-JAN	10,069
1922	13-FEB	23,475	12-FEB	22,331	10-FEB	18,416	11-FEB	17,478	10-FEB	13,413
1923	16-DEC	15,671	15-DEC	14,985	14-DEC	13,018	12-DEC	9,851	11-DEC	7,144
1924	10-FEB	3,109	9-FEB	2,808	9-FEB	2,457	9-FEB	2,090	25-SEP	1,901
1925	8-FEB	23,459	7-FEB	19,935	7-FEB	15,633	6-FEB	13,198	3-FEB	9,671
1926	16-FEB	12,224	15-FEB	11,498	14-FEB	9,318	12-FEB	6,946	30-JAN	5,390
1927	20-FEB	25,045	20-FEB	23,382	20-FEB	22,284	17-FEB	19,388	16-FEB	14,835
1928	27-MAR	50,175	26-MAR	44,377	26-MAR	34,678	25-MAR	25,914	14-MAR	16,779
1929	6-FEB	5,345	5-FEB	4,719	4-FEB	3,613	4-FEB	2,697	1-FEB	2,088
1930	7-MAR	9,707	6-MAR	8,759	5-MAR	7,126	25-FEB	6,216	12-FEB	4,601
1931	18-FEB	2,788	17-FEB	2,756	17-FEB	2,624	16-FEB	2,391	3-FEB	2,001
1932	9-FEB	38,215	9-FEB	37,109	8-FEB	32,163	3-FEB	23,217	27-JAN	15,277
1933	1-FEB	3,884	30-JAN	3,745	28-JAN	3,374	26-JAN	2,923	26-JAN	2,575
1934	4-JAN	8,571	3-JAN	7,602	2-JAN	6,001	1-JAN	4,623	15-DEC	3,955
1935	19-JAN	9,693	18-JAN	9,478	8-FEB	8,745	7-JAN	7,902	17-JAN	6,925
1936	25-FEB	41,532	24-FEB	37,906	14-FEB	30,776	14-FEB	29,891	13-FEB	21,884
1937	8-FEB	48,821	7-FEB	41,989	7-FEB	31,745	7-FEB	30,424	6-FEB	21,608
1938	13-DEC	74,308	12-DEC	58,174	12-DEC	41,740	2-MAR	35,359	12-FEB	27,986
1939	9-FEB	4,824	9-FEB	4,542	8-FEB	4,032	8-FEB	3,813	5-FEB	3,664
1940	1-MAR	35,442	29-FEB	33,893	28-FEB	28,649	25-FEB	21,735	28-FEB	16,272
1941	14-FEB	30,561	13-FEB	29,652	12-FEB	26,993	11-FEB	22,470	11-FEB	21,781
1942	29-JAN	19,125	28-JAN	17,895	27-JAN	15,654	27-JAN	14,763	25-JAN	11,723
1943	24-JAN	36,140	23-JAN	34,285	23-JAN	29,535	22-JAN	24,298	22-JAN	16,886
1944	6-MAR	13,588	5-MAR	12,726	2-MAR	11,685	1-MAR	10,271	1-MAR	8,453
1945	4-FEB	59,549	3-FEB	52,976	3-FEB	41,871	2-FEB	28,404	2-FEB	17,918
1946	24-DEC	21,805	23-DEC	20,344	23-DEC	19,842	22-DEC	15,942	22-DEC	11,433
1947	25-NOV	10,883	24-NOV	10,076	24-NOV	9,084	24-NOV	7,365	21-NOV	6,274
1948	10-JAN	3,882	9-JAN	3,417	8-JAN	2,588	27-OCT	1,987	16-OCT	1,910
1949	5-MAR	10,458	5-MAR	10,012	4-MAR	8,143	4-MAR	7,141	4-MAR	6,336
1950	8-FEB	14,673	7-FEB	13,787	6-FEB	11,722	5-FEB	9,130	5-FEB	7,223
1951	21-NOV	91,300	20-NOV	87,352	19-NOV	66,073	19-NOV	41,595	19-NOV	39,793
1952	27-JAN	27,332	26-JAN	25,320	25-JAN	21,027	16-JAN	18,697	13-JAN	15,674
1953	16-JAN	10,801	15-JAN	10,365	15-JAN	9,938	10-JAN	8,846	8-JAN	7,019
1954	11-MAR	18,472	10-MAR	16,353	10-MAR	13,405	10-MAR	11,451	10-MAR	10,599
1955	3-JAN	5,218	24-FEB	4,822	23-FEB	4,699	16-FEB	4,435	1-FEB	3,501
1956	25-DEC	137,746	24-DEC	123,794	24-DEC	101,799	23-DEC	68,505	23-DEC	42,773
1957	26-FEB	12,674	25-FEB	11,679	25-FEB	10,118	25-FEB	9,497	23-FEB	7,897
1958	5-APR	49,008	4-APR	46,065	3-APR	40,413	1-APR	31,384	17-MAR	27,192
1959	18-FEB	17,346	18-FEB	15,596	17-FEB	13,705	16-FEB	10,426	16-FEB	8,444
1960	10-FEB	15,186	10-FEB	14,220	9-FEB	11,338	7-FEB	7,782	2-FEB	5,335
1961	3-DEC	3,710	3-DEC	3,486	3-DEC	3,198	1-DEC	2,580	16-NOV	2,036
1962	17-FEB	39,312	16-FEB	36,867	12-FEB	34,421	10-FEB	26,576	10-FEB	17,891
1963	2-FEB	74,940	2-FEB	63,177	1-FEB	48,631	1-FEB	32,435	31-JAN	20,166
1964	16-NOV	9,490	16-NOV	8,116	16-NOV	6,820	15-NOV	6,245	7-NOV	4,950

TABLE B.6-43

SAN JOAQUIN RIVER AT MAZE ROAD BRIDGE
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1965	25-DEC	77,996	24-DEC	68,098	24-DEC	55,506	24-DEC	38,861	23-DEC	29,195
1966	25-NOV	16,065	25-NOV	15,526	24-NOV	13,738	19-NOV	11,398	17-NOV	8,098
1967	8-DEC	36,441	8-DEC	34,126	7-DEC	32,142	4-DEC	23,298	29-NOV	14,694
1968	22-FEB	11,421	21-FEB	10,500	21-FEB	9,656	20-FEB	8,333	20-FEB	7,013
1969	27-JAN	80,566	26-JAN	74,092	22-JAN	67,860	20-JAN	56,126	20-JAN	38,157
1970	18-JAN	39,530	17-JAN	34,692	17-JAN	32,569	16-JAN	25,843	14-JAN	16,952
1971	3-DEC	8,848	3-DEC	8,668	1-DEC	8,010	27-NOV	7,194	27-NOV	6,398
1972	29-DEC	8,323	28-DEC	8,242	26-DEC	7,694	24-DEC	6,417	23-DEC	4,551
1973	13-FEB	30,251	13-FEB	28,380	12-FEB	24,191	10-FEB	17,219	11-FEB	14,326
1974	13-NOV	21,407	12-NOV	17,499	18-JAN	13,820	16-JAN	11,910	29-DEC	10,264
1975	11-FEB	15,648	10-FEB	14,063	10-FEB	12,295	3-FEB	10,511	10-FEB	8,532
1976	28-OCT	6,772	28-OCT	5,899	27-OCT	5,210	27-OCT	4,461	12-OCT	3,601
1977	11-OCT	1,849	9-OCT	1,779	6-OCT	1,729	17-SEP	2,170	14-SEP	1,938
1978	6-MAR	37,813	6-MAR	36,150	5-MAR	31,920	4-MAR	25,000	10-FEB	22,579
1979	13-JAN	24,517	12-JAN	21,016	12-JAN	17,813	21-FEB	15,085	21-FEB	13,797
1980	15-JAN	84,077	14-JAN	73,921	14-JAN	59,823	12-JAN	41,319	17-FEB	28,816
1981	29-JAN	5,878	1-FEB	5,516	29-JAN	5,290	28-JAN	4,403	29-JAN	4,327
1982	13-APR	79,719	12-APR	70,630	12-APR	62,537	12-APR	49,408	1-APR	38,569
1983	3-MAR	58,028	2-MAR	54,205	2-MAR	47,666	2-MAR	40,557	1-MAR	36,546
1984	27-DEC	48,581	27-DEC	45,483	26-DEC	38,040	25-DEC	28,066	11-DEC	19,644
1985	10-FEB	7,447	9-FEB	6,709	9-FEB	5,557	9-FEB	4,837	13-NOV	3,900
1986	20-FEB	115,660	19-FEB	107,792	18-FEB	86,377	16-FEB	60,209	17-FEB	47,067
1987	15-FEB	7,642	14-FEB	6,780	14-FEB	5,605	2-MAR	4,395	14-FEB	4,058
1988	12-JAN	5,377	11-JAN	5,273	10-JAN	4,795	6-JAN	4,392	5-JAN	3,761
1989	10-MAR	17,021	9-MAR	15,662	8-MAR	13,713	8-MAR	11,471	24-FEB	8,759
1990	26-OCT	5,954	25-OCT	5,208	24-OCT	3,867	24-OCT	2,839	23-OCT	1,970
1991	7-MAR	14,999	26-MAR	14,103	25-MAR	12,000	20-MAR	10,741	6-MAR	9,764
1992	17-FEB	12,704	16-FEB	12,046	16-FEB	10,431	14-FEB	8,602	14-FEB	7,070
1993	16-JAN	37,393	15-JAN	35,633	14-JAN	30,994	13-JAN	25,477	8-JAN	17,906
1994	9-FEB	5,354	7-MAR	5,081	5-MAR	4,847	25-FEB	4,391	9-FEB	3,905
1995	12-MAR	84,516	11-MAR	73,778	11-MAR	62,073	11-MAR	48,420	10-MAR	36,573
1996	7-FEB	32,281	21-FEB	29,132	21-FEB	25,696	21-FEB	20,518	6-FEB	19,318
1997	4-JAN	165,109	3-JAN	146,146	2-JAN	108,575	31-DEC	72,987	1-JAN	54,670
1998	5-FEB	40,869	4-FEB	36,788	4-FEB	35,137	4-FEB	29,402	3-FEB	24,736
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-44

STANISLAUS RIVER AT NEW MELONES DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1915	---	---	---	---	---	---	---	---	---	---
1916	20-MAR	10,319	20-MAR	7,759	18-MAR	5,840	11-MAR	4,765	1-MAR	4,245
1917	21-FEB	12,161	21-FEB	9,264	20-FEB	7,299	20-FEB	4,376	20-FEB	2,780
1918	12-MAR	10,871	11-MAR	5,862	7-MAR	4,268	7-MAR	3,394	2-MAR	2,205
1919	11-FEB	4,542	10-FEB	2,448	25-MAR	1,434	17-MAR	986	10-FEB	956
1920	21-MAR	3,787	21-MAR	2,936	21-MAR	2,123	16-MAR	1,624	2-MAR	1,190
1921	18-JAN	10,042	18-JAN	6,854	17-JAN	3,883	18-JAN	2,855	2-MAR	2,222
1922	20-FEB	6,403	9-FEB	4,574	18-FEB	2,725	9-FEB	2,523	9-FEB	1,831
1923	12-DEC	5,288	12-DEC	4,562	10-DEC	2,687	22-JAN	1,741	17-JAN	1,302
1924	9-FEB	1,170	8-FEB	927	8-FEB	621	8-FEB	475	7-FEB	387
1925	6-FEB	14,280	5-FEB	8,046	5-FEB	4,899	5-FEB	3,461	5-FEB	2,546
1926	25-MAR	1,547	24-MAR	1,483	23-MAR	1,367	3-MAR	1,297	2-MAR	1,292
1927	22-FEB	6,725	21-FEB	5,379	18-FEB	4,861	15-FEB	3,836	15-FEB	2,868
1928	25-MAR	27,453	25-MAR	19,442	24-MAR	11,692	17-MAR	6,674	2-MAR	3,809
1929	31-MAR	1,891	29-MAR	1,227	25-MAR	947	17-MAR	803	2-MAR	686
1930	6-MAR	4,967	5-MAR	3,691	4-MAR	2,305	23-FEB	1,743	26-FEB	1,677
1931	18-NOV	1,041	17-NOV	923	20-MAR	866	17-MAR	678	2-MAR	505
1932	7-FEB	9,053	7-FEB	6,474	6-FEB	4,238	31-JAN	2,878	1-FEB	1,942
1933	18-MAR	964	16-MAR	754	17-MAR	713	13-MAR	631	2-MAR	521
1934	30-MAR	2,681	29-MAR	2,213	25-MAR	1,837	17-MAR	1,652	2-MAR	1,472
1935	8-MAR	10,433	7-MAR	7,044	7-MAR	5,578	8-MAR	5,160	2-MAR	3,220
1936	22-FEB	14,475	22-FEB	10,762	22-FEB	6,548	12-FEB	5,567	12-FEB	4,016
1937	7-FEB	7,392	5-FEB	5,422	4-FEB	3,169	5-FEB	2,807	1-MAR	1,937
1938	12-DEC	36,983	11-DEC	18,642	11-DEC	9,578	11-DEC	5,009	1-MAR	4,004
1939	27-MAR	1,208	26-MAR	926	23-MAR	730	17-MAR	616	2-MAR	548
1940	31-MAR	20,741	29-MAR	12,963	25-MAR	10,545	17-MAR	6,930	2-MAR	4,446
1941	2-MAR	5,928	1-MAR	5,519	1-MAR	3,854	1-MAR	2,961	10-FEB	2,576
1942	28-JAN	9,634	27-JAN	7,024	25-JAN	5,129	26-JAN	4,077	25-JAN	2,794
1943	10-MAR	20,796	22-JAN	14,021	6-MAR	8,989	5-MAR	6,648	2-MAR	5,187
1944	1-MAR	2,989	29-FEB	1,693	29-FEB	1,553	29-FEB	1,220	28-FEB	1,057
1945	3-FEB	18,982	2-FEB	13,729	2-FEB	8,063	2-FEB	4,876	1-FEB	3,071
1946	23-DEC	6,695	22-DEC	6,376	22-DEC	5,085	22-DEC	3,899	22-DEC	2,645
1947	24-NOV	3,342	10-MAR	2,158	25-MAR	1,631	11-MAR	1,570	2-MAR	1,317
1948	25-MAR	2,403	24-MAR	1,356	25-MAR	1,122	17-MAR	838	2-MAR	615
1949	4-MAR	3,510	4-MAR	1,698	3-MAR	1,185	4-MAR	1,068	2-MAR	973
1950	5-FEB	4,415	5-FEB	3,760	5-FEB	2,426	17-MAR	1,646	2-MAR	1,416
1951	19-NOV	58,648	19-NOV	42,046	19-NOV	20,981	19-NOV	11,879	19-NOV	11,291
1952	26-JAN	5,172	19-MAR	3,917	15-MAR	2,702	16-MAR	2,517	2-MAR	2,249
1953	15-JAN	2,519	14-JAN	2,079	15-JAN	1,723	10-JAN	1,612	8-JAN	1,296
1954	10-MAR	11,428	10-MAR	6,607	9-MAR	4,002	9-MAR	2,750	2-MAR	2,209
1955	2-JAN	2,684	1-JAN	1,656	25-MAR	1,051	17-MAR	835	2-MAR	808
1956	23-DEC	80,805	22-DEC	37,741	22-DEC	20,918	22-DEC	11,370	22-DEC	7,712
1957	6-MAR	3,886	24-FEB	2,900	4-MAR	2,295	24-FEB	2,197	22-FEB	1,634
1958	26-FEB	13,127	25-FEB	8,722	25-FEB	6,120	17-MAR	4,199	25-FEB	3,177
1959	10-MAR	1,924	11-FEB	1,420	15-MAR	1,338	7-MAR	1,317	2-MAR	1,266
1960	9-FEB	7,866	9-FEB	4,889	8-FEB	2,752	17-MAR	2,002	2-MAR	1,590
1961	24-MAR	1,003	23-MAR	713	22-MAR	585	17-MAR	427	2-MAR	325
1962	10-FEB	6,017	9-FEB	4,908	9-FEB	3,798	8-FEB	2,634	9-FEB	1,896
1963	1-FEB	38,248	31-JAN	24,748	31-JAN	13,318	31-JAN	8,003	30-JAN	4,638
1964	15-NOV	2,991	14-NOV	1,863	15-NOV	1,350	14-NOV	1,083	6-NOV	840

TABLE B.6-44

STANISLAUS RIVER AT NEW MELONES DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1965	24-DEC	43,062	23-DEC	33,254	22-DEC	20,380	22-DEC	11,513	22-DEC	7,669
1966	31-MAR	2,963	29-MAR	2,075	25-MAR	1,699	17-MAR	1,284	2-MAR	935
1967	17-MAR	13,422	16-MAR	10,889	16-MAR	7,057	16-MAR	4,143	2-MAR	2,622
1968	21-FEB	4,963	21-FEB	4,004	20-FEB	3,079	18-FEB	2,354	18-FEB	1,783
1969	21-JAN	23,881	20-JAN	19,856	20-JAN	13,880	19-JAN	8,935	19-JAN	6,026
1970	22-JAN	28,084	21-JAN	15,210	17-JAN	12,897	15-JAN	9,074	15-JAN	5,681
1971	27-MAR	7,323	27-MAR	5,098	25-MAR	3,649	17-MAR	2,370	2-MAR	1,665
1972	26-DEC	3,493	17-MAR	2,321	17-MAR	1,869	9-MAR	1,182	2-MAR	806
1973	12-FEB	11,335	12-FEB	5,797	12-FEB	3,656	12-JAN	2,502	12-FEB	2,165
1974	12-NOV	8,189	18-JAN	6,813	17-JAN	5,038	16-JAN	3,884	2-MAR	2,939
1975	25-MAR	7,383	25-MAR	4,964	22-MAR	3,385	16-MAR	2,474	2-MAR	1,942
1976	27-OCT	1,831	4-NOV	1,170	30-OCT	914	26-OCT	861	26-OCT	727
1977	21-FEB	287	21-FEB	245	28-SEP	209	20-SEP	171	5-SEP	153
1978	5-MAR	9,532	4-MAR	6,746	2-MAR	4,837	2-MAR	3,608	2-MAR	3,361
1979	11-JAN	9,375	11-JAN	5,203	11-JAN	3,151	15-MAR	2,266	19-FEB	2,214
1980	13-JAN	41,429	12-JAN	28,964	11-JAN	17,508	10-JAN	9,867	9-JAN	5,826
1981	25-MAR	3,521	25-MAR	2,764	20-MAR	2,007	17-MAR	1,546	2-MAR	1,087
1982	15-FEB	37,052	14-FEB	26,403	14-FEB	15,329	14-FEB	9,335	14-FEB	6,650
1983	13-MAR	17,730	13-MAR	11,740	27-FEB	8,133	28-FEB	7,476	26-FEB	6,108
1984	26-DEC	19,227	25-DEC	16,705	25-DEC	10,835	24-DEC	7,107	9-DEC	4,928
1985	8-FEB	3,870	8-FEB	1,972	23-MAR	1,217	17-MAR	930	2-MAR	927
1986	19-FEB	43,232	17-FEB	40,133	15-FEB	25,858	13-FEB	14,843	14-FEB	11,145
1987	13-FEB	3,234	13-FEB	1,849	10-FEB	1,279	5-MAR	924	2-MAR	804
1988	26-MAR	1,063	26-MAR	987	24-MAR	872	17-MAR	778	29-FEB	622
1989	8-MAR	6,570	8-MAR	4,551	7-MAR	3,733	7-MAR	2,793	2-MAR	2,880
1990	24-OCT	2,015	23-OCT	1,523	21-MAR	1,072	17-MAR	862	2-MAR	631
1991	4-MAR	3,818	3-MAR	2,791	1-MAR	1,592	17-MAR	1,367	2-MAR	1,103
1992	15-FEB	3,150	14-FEB	1,909	15-FEB	1,579	12-FEB	1,413	12-FEB	1,236
1993	22-JAN	8,479	24-MAR	6,471	21-MAR	5,204	17-MAR	4,851	2-MAR	4,059
1994	11-DEC	1,304	11-DEC	1,085	8-DEC	869	4-MAR	682	18-FEB	555
1995	10-MAR	24,027	10-MAR	18,226	9-MAR	11,953	9-MAR	8,911	2-MAR	6,498
1996	5-FEB	11,902	19-FEB	8,909	18-FEB	6,043	15-FEB	4,293	5-FEB	4,080
1997	2-JAN	72,865	1-JAN	50,089	30-DEC	27,780	27-DEC	15,396	30-DEC	10,694
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-45

SAN JOAQUIN RIVER AT VERNALIS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1915	---	---	---	---	---	---	---	---	---	---
1916	---	---	---	---	---	---	---	---	---	---
1917	24-FEB	49,671	23-FEB	48,035	22-FEB	43,111	21-FEB	29,987	20-FEB	19,480
1918	14-MAR	31,704	13-MAR	27,860	9-MAR	22,163	9-MAR	21,080	8-MAR	18,384
1919	13-FEB	13,962	12-FEB	12,227	5-OCT	10,331	12-FEB	7,960	12-FEB	7,741
1920	24-MAR	16,944	23-MAR	15,337	23-MAR	13,190	22-MAR	11,293	4-MAR	9,434
1921	21-JAN	25,762	20-JAN	23,991	19-JAN	19,423	19-JAN	15,477	19-JAN	12,373
1922	12-FEB	27,019	12-FEB	25,780	11-FEB	20,895	11-FEB	20,055	10-FEB	15,356
1923	15-DEC	18,255	15-DEC	17,719	13-DEC	15,498	12-DEC	11,625	11-DEC	8,491
1924	11-FEB	4,088	10-FEB	3,723	9-FEB	3,095	9-FEB	2,591	9-FEB	2,271
1925	8-FEB	32,098	7-FEB	27,231	7-FEB	20,530	6-FEB	16,775	3-FEB	12,216
1926	16-FEB	13,388	15-FEB	12,506	14-FEB	10,460	13-FEB	8,125	30-JAN	6,442
1927	21-FEB	30,409	20-FEB	28,495	20-FEB	27,375	18-FEB	23,497	17-FEB	17,865
1928	27-MAR	71,717	26-MAR	62,046	26-MAR	46,569	25-MAR	33,645	14-MAR	21,669
1929	6-FEB	7,126	5-FEB	6,379	4-FEB	4,680	3-FEB	3,292	1-FEB	2,605
1930	8-MAR	17,092	7-MAR	15,301	5-MAR	11,615	25-FEB	9,602	12-FEB	6,782
1931	18-FEB	3,567	17-FEB	3,424	17-FEB	3,193	16-FEB	2,860	3-FEB	2,383
1932	9-FEB	44,274	9-FEB	43,083	8-FEB	36,518	3-FEB	26,134	27-JAN	17,163
1933	1-FEB	4,393	31-JAN	4,223	28-JAN	3,829	26-JAN	3,346	26-JAN	2,978
1934	4-JAN	10,638	3-JAN	9,126	3-JAN	7,068	1-JAN	5,403	15-DEC	4,601
1935	19-JAN	10,889	19-JAN	10,596	8-FEB	9,886	8-JAN	8,844	18-JAN	7,763
1936	25-FEB	51,352	24-FEB	46,841	23-FEB	37,498	14-FEB	35,736	13-FEB	26,148
1937	9-FEB	53,485	8-FEB	47,483	7-FEB	34,721	7-FEB	33,274	6-FEB	23,656
1938	14-DEC	90,884	13-DEC	74,955	12-DEC	51,162	2-MAR	39,528	12-FEB	31,736
1939	10-FEB	5,725	9-FEB	5,330	8-FEB	4,682	9-FEB	4,361	5-FEB	4,211
1940	1-MAR	46,957	29-FEB	43,708	28-FEB	35,387	26-FEB	26,486	29-FEB	20,205
1941	14-FEB	35,081	13-FEB	33,551	12-FEB	30,167	11-FEB	25,147	11-FEB	24,660
1942	29-JAN	26,726	28-JAN	25,146	27-JAN	21,154	27-JAN	19,091	26-JAN	14,690
1943	24-JAN	51,684	23-JAN	46,032	23-JAN	37,660	22-JAN	29,680	22-JAN	20,639
1944	6-MAR	15,360	5-MAR	14,341	2-MAR	13,365	1-MAR	11,555	1-MAR	9,596
1945	4-FEB	73,574	4-FEB	64,617	3-FEB	50,278	2-FEB	33,368	2-FEB	21,228
1946	24-DEC	28,404	24-DEC	26,528	24-DEC	24,950	23-DEC	20,038	22-DEC	14,279
1947	25-NOV	12,640	25-NOV	11,718	24-NOV	10,149	22-NOV	8,189	21-NOV	7,036
1948	10-JAN	4,731	9-JAN	4,271	8-JAN	3,412	5-JAN	2,636	16-OCT	2,235
1949	6-MAR	12,743	5-MAR	11,724	4-MAR	9,370	4-MAR	8,249	4-MAR	7,369
1950	8-FEB	18,424	7-FEB	17,299	6-FEB	14,201	5-FEB	10,839	6-FEB	8,703
1951	21-NOV	135,447	20-NOV	120,755	19-NOV	86,949	19-NOV	53,433	19-NOV	51,857
1952	27-JAN	30,523	27-JAN	28,916	26-JAN	23,763	16-JAN	21,173	14-JAN	18,060
1953	16-JAN	13,007	16-JAN	12,384	16-JAN	11,743	11-JAN	10,565	9-JAN	8,416
1954	11-MAR	24,464	11-MAR	22,244	10-MAR	17,620	10-MAR	14,405	10-MAR	13,115
1955	3-JAN	6,938	3-JAN	6,296	19-FEB	5,737	16-FEB	5,249	1-FEB	4,184
1956	25-DEC	187,783	24-DEC	157,157	24-DEC	123,080	23-DEC	80,670	23-DEC	51,086
1957	27-FEB	15,755	26-FEB	14,700	25-FEB	12,473	25-FEB	11,835	23-FEB	9,654
1958	5-APR	57,307	4-APR	53,577	3-APR	46,841	2-APR	36,478	2-APR	32,198
1959	19-FEB	17,552	18-FEB	16,724	18-FEB	14,641	17-FEB	11,450	17-FEB	9,664
1960	11-FEB	21,182	10-FEB	19,011	9-FEB	14,229	7-FEB	9,476	3-FEB	6,433
1961	4-DEC	4,620	3-DEC	4,173	3-DEC	3,689	30-NOV	2,981	16-NOV	2,356
1962	17-FEB	43,541	16-FEB	40,889	12-FEB	37,926	10-FEB	29,293	10-FEB	19,896
1963	3-FEB	101,481	2-FEB	86,909	1-FEB	61,555	1-FEB	40,861	31-JAN	25,116
1964	17-NOV	12,023	16-NOV	10,114	16-NOV	8,192	16-NOV	7,385	7-NOV	5,837

TABLE B.6-45

SAN JOAQUIN RIVER AT VERNALIS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1965	25-DEC	114,976	24-DEC	98,320	24-DEC	76,129	24-DEC	51,043	23-DEC	37,416
1966	26-NOV	18,575	25-NOV	17,445	24-NOV	15,047	19-NOV	12,716	17-NOV	9,096
1967	8-DEC	45,069	8-DEC	40,037	7-DEC	35,940	4-DEC	26,193	29-NOV	16,652
1968	23-FEB	15,094	22-FEB	14,442	21-FEB	12,896	20-FEB	10,828	20-FEB	8,927
1969	28-JAN	94,377	27-JAN	87,061	22-JAN	80,954	21-JAN	65,413	20-JAN	44,586
1970	23-JAN	53,892	22-JAN	48,733	18-JAN	45,863	16-JAN	35,529	14-JAN	23,048
1971	21-JAN	10,944	4-DEC	10,675	1-DEC	9,924	27-NOV	8,804	27-NOV	7,751
1972	28-DEC	10,578	27-DEC	10,061	25-DEC	9,281	24-DEC	7,682	23-DEC	5,412
1973	14-FEB	37,167	13-FEB	34,406	12-FEB	28,053	10-FEB	19,799	11-FEB	16,563
1974	14-NOV	26,979	13-NOV	23,142	18-JAN	19,052	17-JAN	16,052	30-DEC	13,429
1975	11-FEB	17,557	11-FEB	16,286	10-FEB	14,079	4-FEB	11,815	11-FEB	9,887
1976	29-OCT	7,883	28-OCT	7,114	28-OCT	6,159	27-OCT	5,363	12-OCT	4,280
1977	7-OCT	1,971	10-OCT	1,882	6-OCT	1,854	17-SEP	2,392	14-SEP	2,108
1978	7-MAR	54,581	6-MAR	50,870	5-MAR	42,540	4-MAR	32,727	5-MAR	28,359
1979	13-JAN	29,752	12-JAN	25,014	12-JAN	20,821	21-FEB	17,432	21-FEB	16,131
1980	15-JAN	112,299	14-JAN	99,455	14-JAN	76,370	12-JAN	51,816	17-FEB	34,099
1981	30-JAN	8,261	29-JAN	7,571	29-JAN	6,631	28-JAN	5,301	28-JAN	5,111
1982	13-APR	99,074	13-APR	88,523	12-APR	75,037	12-APR	59,396	1-APR	46,229
1983	3-MAR	68,217	3-MAR	64,946	2-MAR	56,045	2-MAR	48,503	1-MAR	43,039
1984	28-DEC	66,338	27-DEC	61,293	26-DEC	48,954	25-DEC	35,556	12-DEC	24,931
1985	10-FEB	9,948	9-FEB	8,514	9-FEB	6,807	9-FEB	5,823	13-NOV	4,729
1986	20-FEB	156,608	19-FEB	145,768	18-FEB	112,263	16-FEB	76,149	17-FEB	58,951
1987	15-FEB	10,008	14-FEB	8,525	14-FEB	6,754	2-MAR	5,226	15-FEB	4,825
1988	12-JAN	5,832	12-JAN	5,705	11-JAN	5,203	6-JAN	4,883	5-JAN	4,235
1989	10-MAR	22,301	9-MAR	20,249	9-MAR	17,637	8-MAR	14,427	24-FEB	10,843
1990	26-OCT	7,765	25-OCT	6,672	25-OCT	4,961	24-OCT	3,739	23-OCT	2,611
1991	7-MAR	17,444	26-MAR	15,877	25-MAR	13,430	21-MAR	11,954	6-MAR	10,906
1992	17-FEB	14,729	17-FEB	13,706	16-FEB	12,043	14-FEB	10,081	14-FEB	8,391
1993	16-JAN	41,111	16-JAN	39,706	15-JAN	34,907	13-JAN	29,208	8-JAN	20,605
1994	10-FEB	6,146	8-MAR	5,844	5-MAR	5,528	25-FEB	5,055	9-FEB	4,566
1995	12-MAR	100,931	12-MAR	91,218	11-MAR	73,870	11-MAR	57,599	10-MAR	43,421
1996	7-FEB	41,235	21-FEB	37,175	21-FEB	31,769	21-FEB	24,978	6-FEB	23,625
1997	4-JAN	219,114	3-JAN	191,166	2-JAN	136,055	31-DEC	89,420	1-JAN	65,948
1998	5-FEB	49,871	4-FEB	43,225	4-FEB	41,023	4-FEB	34,357	3-FEB	28,622
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-46

LITTLEJOHN CREEK AT FARMINGTON DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1950	---	---	---	---	---	---	---	---	---	---
1951	---	---	---	---	---	---	---	---	---	---
1952	15-MAR	5,019	25-JAN	3,351	14-MAR	1,955	13-JAN	1,260	29-DEC	879
1953	14-JAN	725	13-JAN	450	14-JAN	398	7-JAN	316	30-DEC	199
1954	17-MAR	723	17-MAR	278	17-MAR	230	17-MAR	138	16-MAR	83
1955	1-JAN	3,556	16-JAN	1,945	15-JAN	1,245	7-JAN	682	1-JAN	504
1956	24-DEC	8,497	22-DEC	5,836	22-DEC	3,008	23-DEC	1,725	23-DEC	1,379
1957	5-MAR	2,232	4-MAR	954	5-MAR	428	3-MAR	218	1-MAR	113
1958	3-APR	7,272	1-APR	6,913	31-MAR	3,945	21-MAR	2,206	12-MAR	1,425
1959	16-FEB	1,419	16-FEB	812	15-FEB	601	11-FEB	416	11-FEB	244
1960	10-FEB	1,402	9-FEB	638	5-FEB	395	7-FEB	255	2-FEB	142
1961	2-FEB	102	2-FEB	78	2-FEB	61	1-FEB	38	17-JAN	19
1962	15-FEB	5,086	13-FEB	2,914	10-FEB	2,166	9-FEB	1,165	9-FEB	769
1963	13-FEB	3,205	12-FEB	1,434	10-FEB	838	7-APR	545	28-MAR	403
1964	22-JAN	898	11-JAN	542	7-JAN	236	8-JAN	189	24-DEC	98
1965	26-DEC	8,760	24-DEC	4,238	22-DEC	3,254	23-DEC	1,925	22-DEC	1,156
1966	30-JAN	2,071	29-DEC	1,246	27-DEC	583	30-JAN	392	29-JAN	229
1967	22-JAN	4,324	21-JAN	2,299	5-APR	1,553	7-APR	1,182	28-MAR	809
1968	21-FEB	1,241	20-FEB	699	16-FEB	392	17-FEB	211	17-FEB	147
1969	21-JAN	3,707	19-JAN	2,429	19-JAN	1,428	12-JAN	1,237	13-JAN	692
1970	21-JAN	3,953	14-JAN	1,692	15-JAN	819	7-JAN	602	23-DEC	301
1971	29-NOV	2,624	29-NOV	1,482	29-NOV	1,060	28-NOV	549	29-NOV	388
1972	25-DEC	1,267	25-DEC	891	25-DEC	515	25-DEC	266	24-DEC	138
1973	11-FEB	5,368	10-FEB	2,586	6-FEB	1,322	29-JAN	675	14-JAN	533
1974	2-MAR	4,749	1-MAR	1,741	25-FEB	746	17-FEB	348	1-MAR	207
1975	22-MAR	2,742	22-MAR	1,100	21-MAR	817	13-MAR	680	2-MAR	452
1976	11-SEP	10	23-AUG	4	5-SEP	2	23-AUG	1	19-AUG	1
1977	---	0	---	0	---	0	---	0	---	0
1978	9-FEB	3,447	7-FEB	2,760	7-FEB	1,534	31-JAN	850	6-FEB	783
1979	21-FEB	5,080	21-FEB	3,581	19-FEB	2,319	19-FEB	1,511	3-FEB	881
1980	12-JAN	4,921	12-JAN	3,899	11-JAN	2,449	6-JAN	1,260	10-JAN	646
1981	29-JAN	3,890	28-JAN	1,783	26-JAN	932	15-MAR	495	28-FEB	303
1982	31-MAR	6,522	15-FEB	4,434	31-DEC	2,498	29-MAR	1,427	14-MAR	1,083
1983	30-NOV	6,620	22-JAN	4,727	22-JAN	3,243	18-JAN	2,093	17-JAN	1,524
1984	25-DEC	5,755	24-DEC	3,764	22-DEC	1,883	18-DEC	941	3-DEC	551
1985	8-FEB	2,411	8-FEB	1,367	4-FEB	639	27-JAN	344	21-NOV	237
1986	19-FEB	9,555	17-FEB	7,662	14-FEB	4,420	10-FEB	2,195	15-FEB	1,510
1987	6-MAR	2,891	5-MAR	1,389	5-MAR	603	5-MAR	326	5-MAR	192
1988	18-JAN	63	18-JAN	34	17-JAN	16	9-JAN	8	25-DEC	4
1989	4-MAR	45	3-MAR	35	3-MAR	16	2-MAR	13	3-MAR	9
1990	16-APR	25	16-APR	25	15-APR	25	15-APR	24	21-FEB	19
1991	26-MAR	2,718	24-MAR	2,013	20-MAR	1,168	13-MAR	674	13-MAR	502
1992	15-FEB	4,517	13-FEB	2,115	11-FEB	1,363	11-FEB	681	11-FEB	444
1993	13-JAN	2,697	13-JAN	1,797	12-JAN	1,528	8-JAN	1,236	12-JAN	1,068
1994	20-FEB	281	20-FEB	162	19-FEB	104	18-FEB	60	7-FEB	38
1995	27-JAN	4,854	10-MAR	3,641	23-JAN	2,128	10-MAR	1,608	4-JAN	910
1996	21-FEB	3,941	20-FEB	3,054	19-FEB	1,599	17-FEB	792	25-JAN	767
1997	2-JAN	7,777	1-JAN	4,344	21-JAN	2,448	21-DEC	1,598	30-DEC	1,127
1998	3-FEB	11,528	6-FEB	5,414	2-FEB	4,808	2-FEB	2,933	12-JAN	1,886
1999	---	---	---	---	---	------	---	---	---	---

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TABLE B.6-47

DUCK CREEK NEAR FARMINGTON
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1980	12-JAN	137	12-JAN	104	12-JAN	65	5-JAN	33	21-DEC	17
1981	25-MAR	79	25-MAR	36	19-MAR	22	13-MAR	13	25-FEB	8
1982	15-FEB	207	15-FEB	108	30-DEC	64	23-DEC	36	23-DEC	23
1983	22-JAN	234	22-JAN	126	22-JAN	73	18-JAN	49	15-JAN	36
1984	24-DEC	158	23-DEC	109	21-DEC	54	11-NOV	26	13-NOV	14
1985	8-FEB	95	8-FEB	36	3-FEB	15	19-NOV	8	17-NOV	6
1986	17-FEB	243	17-FEB	177	13-FEB	119	5-FEB	56	14-FEB	37
1987	6-MAR	92	5-MAR	49	28-FEB	21	20-FEB	10	5-FEB	7
1988	17-JAN	51	16-JAN	21	12-JAN	9	3-JAN	4	19-DEC	2
1989	2-MAR	11	28-FEB	4	2-MAR	3	25-FEB	2	7-FEB	1
1990	5-MAR	29	4-MAR	13	27-FEB	5	19-FEB	3	4-FEB	2
1991	24-MAR	139	24-MAR	96	20-MAR	55	13-MAR	31	25-FEB	16
1992	15-FEB	147	14-FEB	62	10-FEB	53	6-FEB	28	6-FEB	16
1993	7-JAN	182	7-JAN	77	7-JAN	62	7-JAN	49	24-DEC	28
1994	20-FEB	35	18-FEB	15	15-FEB	7	6-FEB	4	22-JAN	2
1995	10-JAN	185	21-MAR	122	22-JAN	69	10-MAR	55	5-JAN	36
1996	4-FEB	127	19-FEB	73	17-FEB	34	24-JAN	23	24-JAN	20
1997	21-DEC	221	1-JAN	110	21-JAN	61	21-DEC	50	30-DEC	28
1998	3-FEB	287	2-FEB	141	2-FEB	113	1-FEB	70	10-JAN	47
1999	---	---	---	---	---	---	---	---	---	---

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TABLE B.6-48

COSGROVE CREEK NEAR VALLEY SPRINGS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1930	5-MAR	185	4-MAR	130	3-MAR	65	22-FEB	55	20-FEB	31
1931	19-FEB	47	19-FEB	19	14-FEB	14	14-FEB	7	14-FEB	4
1932	8-FEB	521	6-FEB	363	5-FEB	189	30-JAN	126	19-JAN	66
1933	27-JAN	68	27-JAN	54	24-JAN	35	23-JAN	18	23-JAN	11
1934	30-DEC	307	30-DEC	186	29-DEC	109	29-DEC	53	7-FEB	30
1935	8-APR	166	7-APR	78	3-APR	43	3-APR	34	3-APR	20
1936	22-FEB	1,090	21-FEB	657	19-FEB	343	11-FEB	316	1-FEB	171
1937	21-MAR	546	4-FEB	391	21-MAR	244	17-MAR	131	28-JAN	90
1938	11-FEB	879	10-FEB	495	9-FEB	279	31-JAN	228	1-FEB	134
1939	7-FEB	63	7-FEB	39	4-FEB	22	30-JAN	13	27-JAN	7
1940	27-FEB	378	30-MAR	241	23-FEB	159	17-FEB	87	3-FEB	53
1941	4-APR	234	4-APR	129	2-APR	79	31-MAR	45	6-FEB	43
1942	27-JAN	621	25-JAN	442	24-JAN	265	24-JAN	159	23-JAN	84
1943	5-MAR	584	5-MAR	370	5-MAR	230	24-FEB	144	22-FEB	94
1944	4-MAR	261	4-MAR	109	28-FEB	74	22-FEB	44	8-FEB	31
1945	2-FEB	368	1-FEB	275	1-FEB	140	1-FEB	72	1-FEB	39
1946	21-DEC	400	21-DEC	250	21-DEC	154	21-DEC	90	21-DEC	50
1947	10-MAR	154	12-FEB	66	12-FEB	31	10-FEB	16	12-FEB	15
1948	24-MAR	263	5-APR	114	5-APR	55	24-MAR	31	16-MAR	16
1949	3-MAR	333	3-MAR	151	2-MAR	76	2-MAR	54	26-FEB	41
1950	4-FEB	353	4-FEB	203	4-FEB	100	28-JAN	68	14-JAN	49
1951	18-NOV	705	7-DEC	450	3-DEC	321	3-DEC	180	18-NOV	143
1952	25-JAN	536	24-JAN	287	12-JAN	156	12-JAN	137	28-DEC	99
1953	18-JAN	154	18-JAN	106	17-JAN	63	7-JAN	42	30-DEC	29
1954	14-FEB	84	30-MAR	44	13-FEB	29	18-MAR	19	10-MAR	13
1955	18-JAN	296	18-JAN	188	15-JAN	130	15-JAN	67	1-JAN	48
1956	23-DEC	800	22-DEC	467	22-DEC	260	22-DEC	149	22-DEC	123
1957	5-MAR	436	4-MAR	223	4-MAR	114	28-FEB	64	23-FEB	35
1958	2-APR	363	1-APR	244	31-MAR	148	21-MAR	114	15-MAR	70
1959	16-FEB	222	16-FEB	175	16-FEB	103	10-FEB	71	10-FEB	38
1960	12-MAR	92	12-MAR	53	12-MAR	24	12-MAR	12	7-MAR	6
1961	17-MAR	7	16-MAR	4	16-MAR	3	15-MAR	2	6-MAR	1
1962	15-FEB	239	13-FEB	172	10-FEB	137	9-FEB	77	9-FEB	57
1963	7-APR	360	6-APR	185	6-APR	87	28-MAR	59	28-MAR	32
1964	21-JAN	189	21-JAN	127	19-JAN	64	18-JAN	33	17-JAN	18
1965	23-DEC	658	22-DEC	401	22-DEC	237	20-DEC	148	19-DEC	91
1966	30-JAN	183	30-JAN	80	30-JAN	41	30-JAN	34	30-JAN	19
1967	31-JAN	454	29-JAN	310	26-JAN	165	21-JAN	145	31-MAR	75
1968	30-JAN	157	20-FEB	101	17-FEB	55	17-FEB	29	30-JAN	24
1969	15-FEB	221	19-JAN	116	19-JAN	68	13-JAN	68	18-JAN	68
1970	---	---	---	---	---	---	---	---	---	---
1971	---	---	---	---	---	---	---	---	---	---
1972	---	---	---	---	---	---	---	---	---	---
1973	---	---	---	---	---	---	---	---	---	---
1974	---	---	---	---	---	---	---	---	---	---
1975	---	---	---	---	---	---	---	---	---	---
1976	---	---	---	---	---	---	---	---	---	---
1977	---	---	---	---	---	---	---	---	---	---
1978	---	---	---	---	---	---	---	---	---	---
1979	---	---	---	---	---	---	---	---	---	---

TABLE B.6-48

COSGROVE CREEK NEAR VALLEY SPRINGS
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1980	---	---	---	---	---	---	---	---	---	---
1981	---	---	---	---	---	---	---	---	---	---
1982	---	---	---	---	---	---	---	---	---	---
1983	---	---	---	---	---	---	---	---	---	---
1984	---	---	---	---	---	---	---	---	---	---
1985	---	---	---	---	---	---	---	---	---	---
1986	---	---	---	---	---	---	---	---	---	---
1987	---	---	---	---	---	---	---	---	---	---
1988	---	---	---	---	---	---	---	---	---	---
1989	---	---	---	---	---	---	---	---	---	---
1990	---	---	---	---	---	---	---	---	---	---
1991	24-MAR	497	24-MAR	333	20-MAR	179	13-MAR	101	1-MAR	59
1992	15-FEB	507	14-FEB	218	11-FEB	132	11-FEB	76	10-FEB	45
1993	13-JAN	466	7-JAN	212	7-JAN	171	13-JAN	150	7-JAN	128
1994	---	---	---	---	---	---	---	---	---	---
1995	---	---	---	---	---	---	---	---	---	---
1996	21-FEB	294	19-FEB	202	19-FEB	110	24-JAN	76	24-JAN	64
1997	21-DEC	922	21-DEC	437	21-DEC	206	21-DEC	189	9-DEC	109
1998	3-FEB	1,260	2-FEB	535	2-FEB	372	1-FEB	227	11-JAN	188
1999	7-FEB	342	7-FEB	278	7-FEB	148	7-FEB	110	7-FEB	69
2000	25-JAN	520	12-FEB	386	11-FEB	206	11-FEB	140	10-FEB	100
2001	---	---	---	---	---	---	---	---	---	---

TABLE B.6-49

CALAVERAS RIVER AT NEW HOGAN DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1930	25-JAN	5,700	15-MAR	3,730	14-MAR	1,800	---	---	---	---
1931	25-JAN	470	15-MAR	330	14-MAR	280	13-JAN	120	29-DEC	81
1932	13-JAN	6,950	14-JAN	4,620	14-JAN	2,800	7-JAN	1,830	30-DEC	1,030
1933	17-MAR	1,120	17-MAR	810	17-MAR	670	17-MAR	370	15-MAR	250
1934	17-MAR	2,630	17-MAR	1,800	17-MAR	1,160	17-MAR	640	15-MAR	390
1935	16-JAN	4,960	15-JAN	3,060	15-JAN	2,120	7-JAN	1,440	1-JAN	940
1936	22-DEC	18,300	23-DEC	11,500	22-DEC	6,320	23-DEC	5,600	23-DEC	3,110
1937	4-MAR	9,780	2-MAR	7,450	5-MAR	3,990	3-MAR	2,730	26-FEB	1,640
1938	1-APR	19,800	1-APR	12,400	31-MAR	7,230	21-MAR	5,030	12-MAR	2,760
1939	16-FEB	970	16-FEB	760	15-FEB	500	11-FEB	240	11-FEB	170
1940	9-FEB	10,000	7-FEB	6,960	5-FEB	4,000	7-FEB	1,850	1-FEB	1,210
1941	2-FEB	5,890	2-FEB	4,330	2-FEB	2,540	30-JAN	1,620	15-JAN	1,430
1942	13-FEB	9,940	13-FEB	6,330	10-FEB	4,000	9-FEB	3,050	---	---
1943	12-FEB	8,120	10-FEB	5,580	10-FEB	4,630	7-APR	3,150	28-MAR	2,150
1944	---	---	---	---	---	---	---	---	---	---
1945	---	---	---	---	---	---	---	---	---	---
1946	---	---	---	---	---	---	---	---	---	---
1947	---	---	---	---	---	---	---	---	---	---
1948	---	---	---	---	---	---	---	---	---	---
1949	---	---	---	---	---	---	---	---	---	---
1950	---	---	---	---	---	---	---	---	---	---
1951	---	---	---	---	---	---	---	---	---	---
1952	---	---	---	---	---	---	---	---	---	---
1953	---	---	---	---	---	---	---	---	---	---
1954	---	---	---	---	---	---	---	---	---	---
1955	---	---	---	---	---	---	---	---	---	---
1956	23-DEC	24,000	22-DEC	18,000	22-DEC	7,660	22-DEC	4,220	22-DEC	2,910
1957	6-MAR	4,300	5-MAR	2,740	1-MAR	1,460	24-FEB	1,050	23-FEB	680
1958	3-APR	15,000	3-APR	13,420	31-MAR	8,890	22-MAR	4,930	15-MAR	3,360
1959	11-FEB	3,610	17-FEB	2,780	16-FEB	1,710	9-FEB	1,210	9-FEB	680
1960	---	---	---	---	---	---	---	---	---	---
1961	---	---	---	---	---	---	---	---	---	---
1962	---	---	---	---	---	---	---	---	---	---
1963	---	---	---	---	---	---	---	---	---	---
1964	22-JAN	2,623	21-JAN	1,828	21-JAN	1,041	20-JAN	612	19-JAN	359
1965	23-DEC	12,789	22-DEC	8,666	22-DEC	5,504	23-DEC	3,902	19-DEC	2,722
1966	30-DEC	2,020	29-DEC	1,720	28-DEC	984	25-DEC	626	25-DEC	369
1967	22-JAN	6,738	21-JAN	3,991	18-APR	2,900	21-JAN	2,172	31-MAR	1,832
1968	21-FEB	1,647	20-FEB	1,301	17-FEB	938	16-FEB	560	17-FEB	435
1969	21-JAN	14,674	20-JAN	9,511	20-JAN	7,000	19-JAN	4,579	19-JAN	3,103
1970	21-JAN	7,200	14-JAN	5,072	16-JAN	3,548	14-JAN	2,852	10-JAN	1,642
1971	2-DEC	2,983	2-DEC	2,256	29-NOV	1,967	28-NOV	1,176	28-NOV	929
1972	25-DEC	4,922	25-DEC	2,366	22-DEC	1,486	21-DEC	791	18-DEC	434
1973	16-JAN	7,695	10-FEB	5,936	10-FEB	3,730	4-FEB	2,268	16-JAN	1,842
1974	2-MAR	9,124	1-MAR	4,946	1-MAR	2,738	1-MAR	1,722	1-MAR	1,101
1975	25-MAR	5,783	25-MAR	3,401	21-MAR	2,538	14-MAR	1,732	7-MAR	1,259
1976	2-MAR	240	1-MAR	176	29-FEB	128	28-FEB	91	13-FEB	74
1977	16-MAR	112	21-FEB	60	30-DEC	38	9-MAR	28	20-FEB	26
1978	5-MAR	5,770	4-MAR	4,322	14-JAN	2,622	5-JAN	1,734	6-FEB	1,329
1979	22-FEB	5,388	21-FEB	4,643	19-FEB	2,827	18-FEB	2,183	14-FEB	1,441

TABLE B.6-49

CALAVERAS RIVER AT NEW HOGAN DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1980	14-JAN	8,648	12-JAN	7,385	12-JAN	4,744	10-JAN	2,630	15-FEB	1,630
1981	29-JAN	3,160	28-JAN	2,148	27-JAN	1,229	22-JAN	654	4-MAR	414
1982	5-JAN	12,321	15-FEB	9,059	29-MAR	4,845	29-MAR	3,808	16-MAR	2,648
1983	13-MAR	10,433	28-FEB	7,318	27-FEB	4,913	28-FEB	3,738	26-FEB	3,108
1984	25-DEC	8,029	25-DEC	5,712	24-DEC	3,712	23-DEC	2,099	3-DEC	1,407
1985	8-FEB	3,769	8-FEB	1,892	8-FEB	953	8-FEB	511	6-MAR	416
1986	17-FEB	23,494	17-FEB	17,022	15-FEB	11,280	13-FEB	5,752	15-FEB	3,858
1987	6-MAR	1,761	5-MAR	1,201	5-MAR	619	5-MAR	455	5-MAR	303
1988	17-JAN	403	16-JAN	285	15-JAN	175	10-JAN	111	5-JAN	79
1989	25-MAR	927	25-MAR	725	24-MAR	465	2-MAR	324	2-MAR	319
1990	17-FEB	695	16-FEB	558	16-FEB	352	3-MAR	277	16-FEB	271
1991	26-MAR	3,939	24-MAR	2,955	22-MAR	1,721	17-MAR	1,091	3-MAR	666
1992	15-FEB	5,114	13-FEB	2,611	11-FEB	1,938	11-FEB	1,180	11-FEB	747
1993	13-JAN	5,317	13-JAN	3,831	13-JAN	3,063	7-JAN	2,398	29-DEC	1,538
1994	20-FEB	909	18-FEB	722	18-FEB	531	17-FEB	340	6-FEB	241
1995	11-MAR	10,146	10-MAR	8,592	9-MAR	4,792	10-MAR	3,896	3-MAR	2,406
1996	21-FEB	5,859	19-FEB	4,818	19-FEB	3,068	19-FEB	2,035	24-JAN	1,527
1997	1-JAN	17,047	1-JAN	10,775	30-DEC	6,317	21-DEC	4,494	30-DEC	3,287
1998	3-FEB	17,087	2-FEB	8,266	3-FEB	6,757	2-FEB	4,355	29-JAN	3,022
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-50

MOKELUMNE RIVER AT CAMANCHE DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1905	2-FEB	2,380	19-MAR	1,980	18-MAR	1,780	17-MAR	1,680	2-MAR	1,360
1906	31-MAR	8,160	24-MAR	6,150	25-MAR	5,070	17-MAR	3,660	2-MAR	2,800
1907	19-MAR	23,000	18-MAR	17,600	17-MAR	12,700	17-MAR	8,920	2-MAR	5,610
1908	22-JAN	960	22-JAN	810	21-JAN	730	14-JAN	600	14-JAN	510
1909	14-JAN	12,600	14-JAN	11,100	14-JAN	7,130	13-JAN	5,360	14-JAN	3,710
1910	21-NOV	7,200	19-MAR	5,040	19-MAR	4,120	12-MAR	3,000	1-MAR	2,420
1911	30-JAN	16,700	30-JAN	14,030	30-JAN	8,270	24-JAN	5,530	20-JAN	3,790
1912	7-MAR	940	7-MAR	760	7-MAR	550	1-MAR	390	15-FEB	290
1913	8-NOV	1,520	8-NOV	1,430	7-NOV	1,380	3-NOV	820	2-NOV	520
1914	26-JAN	11,100	25-JAN	7,550	22-JAN	5,970	18-JAN	3,920	1-JAN	2,780
1915	13-MAY	6,630	11-MAY	5,380	11-MAY	4,840	8-MAY	3,900	19-APR	2,980
1916	20-MAR	8,040	20-MAR	6,130	18-MAR	4,450	12-MAR	3,520	19-MAR	3,240
1917	25-FEB	6,400	24-FEB	4,500	21-FEB	3,910	21-FEB	2,390	21-FEB	1,620
1918	12-MAR	6,940	11-MAR	4,160	7-MAR	2,680	7-MAR	2,370	7-MAR	1,990
1919	11-FEB	7,060	10-FEB	3,710	9-FEB	2,000	9-FEB	1,190	10-FEB	1,010
1920	2-MAR	2,550	21-MAR	1,410	21-MAR	1,060	14-MAR	770	27-FEB	680
1921	18-JAN	7,350	18-JAN	4,510	18-JAN	2,620	18-JAN	2,000	25-FEB	1,770
1922	20-FEB	4,630	19-FEB	2,730	18-FEB	1,740	9-FEB	1,540	9-FEB	1,110
1923	6-APR	4,710	13-DEC	3,530	10-APR	2,780	6-APR	2,760	21-MAR	1,810
1924	9-FEB	990	8-FEB	820	8-FEB	520	8-FEB	380	28-JAN	280
1925	6-FEB	9,700	6-FEB	5,730	5-FEB	3,740	5-FEB	2,750	5-FEB	2,030
1926	8-APR	3,100	6-APR	2,630	6-APR	2,180	29-MAR	1,630	13-MAR	1,220
1927	22-FEB	4,840	21-FEB	4,050	18-FEB	3,520	15-FEB	2,700	15-FEB	2,000
1928	26-MAR	20,300	25-MAR	17,800	24-MAR	10,400	22-MAR	6,110	6-MAR	3,350
1929	5-FEB	980	23-FEB	723	3-FEB	501	3-FEB	319	3-FEB	232
1930	5-MAR	2,290	4-MAR	1,950	4-MAR	1,320	4-MAR	1,031	22-FEB	884
1931	19-MAR	936	18-MAR	770	18-MAR	649	19-MAR	522	12-MAR	557
1932	6-FEB	3,800	6-FEB	3,630	6-FEB	2,570	31-JAN	1,690	5-FEB	1,210
1933	17-MAR	726	16-MAR	675	12-MAR	615	9-MAR	524	2-FEB	452
1934	1-JAN	2,080	1-JAN	1,410	29-DEC	1,150	20-FEB	822	5-FEB	667
1935	8-APR	6,210	6-FEB	1,060	5-FEB	832	1-FEB	661	29-JAN	574
1936	22-FEB	15,000	22-FEB	9,890	21-FEB	6,040	12-FEB	4,670	12-FEB	3,240
1937	6-FEB	5,560	5-FEB	3,690	4-FEB	2,110	4-FEB	1,920	4-FEB	1,340
1938	11-DEC	23,000	10-DEC	13,900	10-DEC	7,330	9-DEC	3,790	9-DEC	2,080
1939	26-MAR	1,830	25-MAR	1,700	22-MAR	1,590	18-MAR	1,340	2-MAR	855
1940	31-MAR	10,700	30-MAR	8,510	27-MAR	6,750	25-MAR	4,650	12-MAR	2,980
1941	27-DEC	3,230	1-MAR	2,980	1-MAR	2,430	23-FEB	1,840	8-FEB	1,720
1942	27-JAN	10,400	26-JAN	7,300	24-JAN	4,890	25-JAN	3,600	24-JAN	2,450
1943	10-MAR	11,400	9-MAR	8,090	6-MAR	6,100	5-MAR	4,700	5-MAR	3,510
1944	4-MAR	2,150	4-MAR	1,340	29-FEB	1,070	1-APR	950	18-MAR	821
1945	2-FEB	12,900	2-FEB	8,520	1-FEB	5,210	1-FEB	3,280	31-JAN	2,090
1946	22-DEC	6,130	22-DEC	4,210	22-DEC	3,480	21-DEC	2,850	21-DEC	1,990
1947	23-NOV	1,810	10-MAR	1,370	9-MAR	1,060	10-MAR	1,040	9-MAR	1,000
1948	18-APR	2,640	21-APR	2,500	17-APR	2,370	17-APR	2,260	3-APR	1,810
1949	3-MAR	2,370	3-MAR	1,980	3-MAR	1,340	3-MAR	970	3-MAR	863
1950	6-FEB	3,580	4-FEB	3,120	4-FEB	2,200	4-FEB	1,480	17-JAN	1,270
1951	21-NOV	30,900	19-NOV	28,800	18-NOV	17,600	18-NOV	9,040	18-NOV	8,440
1952	25-JAN	4,590	24-JAN	3,300	1-FEB	2,310	24-JAN	2,230	24-JAN	1,840
1953	14-JAN	2,100	20-JAN	1,650	17-JAN	1,490	20-JAN	1,420	31-DEC	1,110
1954	10-MAR	5,490	9-MAR	4,450	8-MAR	2,790	8-MAR	1,980	2-MAR	1,480

TABLE B.6-50

MOKELUMNE RIVER AT CAMANCHE DAM
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1955	1-JAN	1,820	1-JAN	1,130	17-FEB	817	14-FEB	628	31-DEC	507
1956	23-DEC	34,700	22-DEC	26,000	22-DEC	15,200	20-DEC	8,600	22-DEC	5,930
1957	25-FEB	4,210	5-MAR	3,660	4-MAR	2,600	23-FEB	2,380	14-FEB	1,740
1958	3-APR	9,680	2-APR	6,630	1-APR	4,800	21-MAR	3,540	12-MAR	2,710
1959	16-FEB	2,720	16-FEB	2,400	16-FEB	1,730	16-FEB	1,170	16-FEB	992
1960	8-FEB	5,430	8-FEB	4,010	7-FEB	2,170	7-FEB	1,290	8-FEB	893
1961	11-FEB	718	11-FEB	639	22-MAR	610	17-MAR	523	1-MAR	401
1962	10-FEB	5,240	15-FEB	3,400	10-FEB	3,000	8-FEB	2,070	8-FEB	1,420
1963	1-FEB	29,900	31-JAN	19,500	30-JAN	10,500	30-JAN	5,820	30-JAN	3,400
1964	15-NOV	2,780	14-NOV	2,070	14-NOV	1,290	14-NOV	1,010	5-NOV	816
1965	23-DEC	36,200	22-DEC	28,800	22-DEC	17,700	20-DEC	9,870	20-DEC	6,430
1966	18-NOV	1,760	17-NOV	1,580	17-NOV	1,080	16-NOV	881	13-NOV	632
1967	17-MAR	7,790	16-MAR	6,400	16-MAR	4,330	13-MAR	2,960	26-FEB	1,850
1968	21-FEB	3,350	20-FEB	2,950	20-FEB	2,670	17-FEB	1,990	17-FEB	1,510
1969	21-JAN	15,400	20-JAN	11,100	20-JAN	8,660	19-JAN	5,610	19-JAN	3,870
1970	21-JAN	14,800	21-JAN	13,000	16-JAN	9,310	14-JAN	7,160	13-JAN	4,490
1971	26-MAR	5,340	26-MAR	4,050	25-MAR	2,930	17-MAR	1,840	2-MAR	1,290
1972	25-DEC	2,620	23-DEC	1,880	22-DEC	1,430	22-DEC	839	30-JAN	554
1973	12-JAN	4,430	16-JAN	3,570	12-JAN	3,120	9-JAN	2,230	12-JAN	1,600
1974	12-NOV	7,910	11-NOV	6,230	10-NOV	3,650	14-JAN	2,390	27-NOV	2,130
1975	25-MAR	4,380	25-MAR	3,260	22-MAR	2,350	20-MAR	1,750	5-MAR	1,460
1976	27-OCT	2,360	26-OCT	1,620	26-OCT	1,050	26-OCT	759	25-OCT	587
1977	2-JAN	456	22-FEB	266	24-MAR	208	17-MAR	167	1-MAR	140
1978	26-APR	6,010	26-APR	4,730	25-APR	3,750	26-APR	3,430	11-APR	2,850
1979	12-JAN	6,780	12-JAN	3,760	11-JAN	2,190	16-MAR	1,560	19-FEB	1,480
1980	13-JAN	31,924	12-JAN	21,620	12-JAN	12,633	10-JAN	7,119	10-JAN	4,109
1981	28-JAN	1,674	27-JAN	1,323	27-JAN	920	22-JAN	562	27-JAN	558
1982	16-FEB	22,777	15-FEB	16,919	14-FEB	10,007	14-FEB	6,132	14-FEB	4,340
1983	13-MAR	12,229	13-MAR	8,499	12-MAR	6,041	1-MAR	5,200	26-FEB	4,286
1984	25-DEC	13,559	25-DEC	11,538	25-DEC	7,674	24-DEC	4,989	10-DEC	3,407
1985	13-NOV	1,727	12-NOV	1,060	8-NOV	736	3-NOV	601	3-NOV	547
1986	17-FEB	27,878	17-FEB	25,020	15-FEB	17,436	14-FEB	10,197	14-FEB	7,734
1987	13-FEB	1,985	12-FEB	1,329	11-FEB	822	11-FEB	513	13-FEB	553
1988	7-MAR	830	29-FEB	704	1-MAR	629	26-FEB	583	1-MAR	587
1989	8-MAR	5,492	8-MAR	4,768	7-MAR	3,690	7-MAR	2,686	8-MAR	2,596
1990	24-OCT	1,880	24-OCT	972	24-OCT	613	22-OCT	384	21-OCT	302
1991	5-MAR	3,480	4-MAR	2,118	1-MAR	1,175	1-MAR	758	3-MAR	727
1992	22-FEB	1,520	20-FEB	1,325	20-FEB	1,112	21-FEB	965	21-FEB	919
1993	22-JAN	5,652	21-JAN	4,225	18-JAN	2,818	13-JAN	2,282	13-JAN	1,640
1994	11-FEB	670	17-FEB	435	17-FEB	423	17-FEB	434	11-FEB	434
1995	11-MAR	13,902	10-MAR	11,766	10-MAR	8,010	9-MAR	6,010	10-MAR	4,381
1996	5-FEB	9,279	5-FEB	6,220	18-FEB	4,100	5-FEB	3,004	5-FEB	2,922
1997	2-JAN	76,139	1-JAN	39,162	30-DEC	21,256	27-DEC	11,653	30-DEC	7,567
1998	---	---	---	---	---	---	---	---	---	---
1999	---	---	---	---	---	---	---	---	---	---

TABLE B.6-51

COSUMNES RIVER AT MICHIGAN BAR
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1905	---	---	---	---	---	---	---	---	---	---
1906	---	---	---	---	---	---	---	---	---	---
1907	---	---	---	---	---	---	---	---	---	---
1908	21-JAN	2,020	21-JAN	1,267	21-JAN	1,074	20-JAN	696	29-FEB	523
1909	14-JAN	20,800	13-JAN	12,333	13-JAN	7,571	13-JAN	6,474	14-JAN	4,394
1910	21-MAR	7,200	21-MAR	6,353	20-MAR	4,889	19-MAR	3,135	3-MAR	2,251
1911	31-JAN	22,400	29-JAN	17,607	29-JAN	10,706	20-JAN	7,489	12-JAN	5,425
1912	7-MAR	1,100	30-APR	967	30-APR	849	30-APR	751	30-APR	707
1913	19-JAN	1,220	17-JAN	952	15-JAN	841	14-APR	678	1-APR	646
1914	22-JAN	13,900	24-JAN	9,723	22-JAN	8,373	14-JAN	5,625	31-DEC	3,889
1915	2-FEB	5,920	9-FEB	4,767	10-MAY	2,909	30-JAN	2,624	31-JAN	2,067
1916	20-MAR	8,920	20-MAR	5,697	19-MAR	3,860	12-MAR	2,864	27-FEB	2,793
1917	22-FEB	13,500	21-FEB	9,483	21-FEB	7,393	20-FEB	4,207	20-FEB	2,574
1918	12-MAR	10,800	11-MAR	5,753	7-MAR	3,486	7-MAR	2,740	7-MAR	1,958
1919	11-FEB	13,100	10-FEB	7,403	9-FEB	3,861	9-FEB	2,168	9-FEB	1,763
1920	21-MAR	3,210	21-MAR	2,623	21-MAR	1,767	8-APR	1,177	21-MAR	1,141
1921	18-JAN	11,500	18-JAN	6,727	18-JAN	3,781	18-JAN	2,656	18-JAN	1,855
1922	9-FEB	7,970	9-FEB	5,710	18-FEB	3,257	9-FEB	2,903	9-FEB	1,928
1923	13-DEC	9,570	12-DEC	6,147	10-DEC	4,010	6-DEC	2,420	6-DEC	1,895
1924	8-FEB	910	8-FEB	637	7-FEB	435	7-FEB	281	27-JAN	204
1925	6-FEB	15,200	5-FEB	8,063	5-FEB	4,754	5-FEB	3,439	5-FEB	2,395
1926	12-FEB	2,950	12-FEB	2,503	5-APR	1,820	5-APR	1,255	1-FEB	894
1927	3-APR	8,630	2-APR	5,990	17-FEB	4,554	15-FEB	3,452	3-FEB	2,382
1928	25-MAR	17,400	25-MAR	14,633	24-MAR	8,853	24-MAR	5,461	23-MAR	3,337
1929	4-FEB	2,800	3-FEB	1,542	2-FEB	926	19-APR	561	5-APR	521
1930	5-MAR	4,360	4-MAR	3,273	4-MAR	1,989	4-MAR	1,289	4-MAR	963
1931	19-FEB	879	19-FEB	540	15-FEB	431	14-FEB	298	14-FEB	229
1932	6-FEB	7,340	6-FEB	5,740	6-FEB	4,074	31-JAN	2,597	30-JAN	1,605
1933	30-MAY	783	29-MAY	768	26-MAY	713	19-MAY	639	7-MAY	580
1934	1-JAN	4,920	1-JAN	2,927	29-DEC	1,881	29-DEC	1,063	13-DEC	689
1935	8-APR	11,300	7-APR	6,930	4-APR	5,169	3-APR	4,008	3-APR	2,981
1936	22-FEB	15,600	22-FEB	12,090	21-FEB	7,647	12-FEB	6,521	11-FEB	4,133
1937	6-FEB	7,800	5-FEB	5,563	21-MAR	4,089	20-MAR	2,881	18-MAR	2,227
1938	11-FEB	15,500	10-FEB	9,057	10-FEB	5,714	12-MAR	4,148	1-MAR	3,316
1939	9-MAR	1,500	9-MAR	1,032	9-MAR	630	25-MAR	592	9-MAR	554
1940	31-MAR	16,700	30-MAR	12,463	27-MAR	8,194	26-MAR	5,034	25-MAR	3,024
1941	2-MAR	4,600	2-MAR	3,777	1-MAR	2,807	21-FEB	2,047	9-FEB	1,981
1942	27-JAN	14,100	26-JAN	9,357	24-JAN	6,207	25-JAN	4,935	24-JAN	3,164
1943	10-MAR	18,700	9-MAR	14,433	6-MAR	9,623	5-MAR	6,471	5-MAR	4,159
1944	4-MAR	4,660	4-MAR	2,800	29-FEB	2,226	28-FEB	1,388	22-FEB	917
1945	2-FEB	13,100	2-FEB	9,013	1-FEB	5,259	1-FEB	3,259	1-FEB	2,058
1946	23-DEC	8,510	22-DEC	6,757	22-DEC	5,559	22-DEC	3,793	21-DEC	2,389
1947	10-MAR	2,610	10-MAR	1,977	10-MAR	1,319	4-MAR	903	10-MAR	812
1948	24-MAR	3,140	5-APR	2,160	18-APR	1,907	17-APR	1,794	3-APR	1,677
1949	3-MAR	9,010	3-MAR	4,610	2-MAR	2,507	2-MAR	1,797	2-MAR	1,405
1950	6-FEB	5,410	4-FEB	4,453	4-FEB	2,961	7-APR	1,834	24-MAR	1,616
1951	21-NOV	16,700	19-NOV	15,800	18-NOV	9,534	3-DEC	5,034	18-NOV	4,996
1952	12-JAN	8,300	14-JAN	5,190	12-JAN	4,487	12-JAN	3,405	12-JAN	2,945
1953	28-APR	2,630	27-APR	2,123	27-APR	1,627	10-JAN	1,372	7-JAN	991
1954	10-MAR	3,020	9-MAR	2,253	9-MAR	1,597	30-MAR	1,412	9-MAR	1,314

TABLE B.6-51

COSUMNES RIVER AT MICHIGAN BAR
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS
(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1955	1-JAN	3,160	1-JAN	2,040	31-DEC	1,121	22-APR	821	18-APR	769
1956	23-DEC	32,789	22-DEC	21,491	22-DEC	12,797	22-DEC	7,259	22-DEC	5,266
1957	5-MAR	6,544	5-MAR	4,480	4-MAR	3,043	24-FEB	2,515	23-FEB	1,786
1958	3-APR	20,090	1-APR	13,178	30-MAR	9,427	21-MAR	6,463	16-MAR	4,795
1959	17-FEB	2,847	17-FEB	2,585	16-FEB	1,879	11-FEB	1,182	11-FEB	828
1960	8-FEB	6,833	8-FEB	4,501	8-FEB	2,413	7-FEB	1,337	8-MAR	952
1961	25-MAR	470	25-MAR	407	23-MAR	365	23-MAR	329	15-MAR	291
1962	15-FEB	6,163	14-FEB	5,052	10-FEB	3,938	9-FEB	2,465	9-FEB	1,734
1963	1-FEB	27,560	31-JAN	14,232	31-JAN	7,472	31-JAN	4,123	28-MAR	2,502
1964	22-JAN	2,959	21-JAN	2,309	20-JAN	1,359	19-JAN	836	19-JAN	554
1965	23-DEC	29,883	22-DEC	20,379	22-DEC	12,814	23-DEC	7,864	20-DEC	5,738
1966	31-DEC	1,999	29-DEC	1,807	28-DEC	1,095	30-MAR	837	15-MAR	742
1967	22-JAN	7,148	16-MAR	5,326	27-JAN	3,821	21-JAN	3,295	13-MAR	2,391
1968	20-FEB	3,482	20-FEB	3,095	20-FEB	2,233	17-FEB	1,504	18-FEB	1,150
1969	21-JAN	19,384	20-JAN	14,719	20-JAN	10,568	19-JAN	7,028	19-JAN	4,623
1970	21-JAN	11,475	21-JAN	9,381	16-JAN	8,049	14-JAN	6,267	10-JAN	3,789
1971	26-MAR	5,786	26-MAR	4,412	26-MAR	2,895	25-MAR	1,966	23-MAR	1,439
1972	25-DEC	3,143	23-DEC	1,897	23-DEC	1,341	29-FEB	989	23-FEB	873
1973	12-JAN	9,692	16-JAN	6,241	12-JAN	5,189	9-JAN	3,492	12-JAN	2,395
1974	2-MAR	6,657	17-JAN	4,636	30-MAR	3,689	28-MAR	2,690	27-DEC	2,302
1975	25-MAR	7,361	25-MAR	4,985	22-MAR	3,357	22-MAR	2,313	8-MAR	1,882
1976	2-MAR	347	1-MAR	301	1-MAR	239	1-MAR	194	1-MAR	176
1977	23-FEB	170	22-FEB	138	22-FEB	98	22-FEB	68	22-FEB	61
1978	5-MAR	6,472	15-JAN	5,213	14-JAN	3,897	6-JAN	2,833	6-APR	1,867
1979	1-MAR	4,015	21-FEB	3,341	19-FEB	2,481	19-FEB	1,972	19-FEB	1,671
1980	14-JAN	20,311	12-JAN	14,453	12-JAN	9,885	10-JAN	5,713	15-FEB	3,666
1981	26-MAR	3,262	25-MAR	2,657	25-MAR	1,736	19-MAR	1,464	19-MAR	956
1982	16-FEB	25,608	15-FEB	15,219	15-FEB	8,620	31-MAR	5,884	28-MAR	4,369
1983	13-MAR	18,455	21-DEC	12,464	12-MAR	7,857	1-MAR	6,707	26-FEB	5,496
1984	26-DEC	14,218	25-DEC	12,485	24-DEC	8,236	24-DEC	5,130	10-DEC	3,521
1985	8-FEB	3,062	8-FEB	2,015	8-FEB	1,145	27-MAR	899	25-MAR	799
1986	17-FEB	35,933	17-FEB	34,595	15-FEB	21,685	13-FEB	11,837	15-FEB	7,868
1987	13-MAR	1,531	13-MAR	1,341	13-MAR	967	5-MAR	752	5-MAR	558
1988	17-JAN	991	16-JAN	727	12-JAN	445	5-JAN	343	4-JAN	255
1989	25-MAR	5,839	24-MAR	3,988	24-MAR	2,918	19-MAR	2,196	8-MAR	1,843
1990	5-MAR	1,044	4-MAR	860	3-MAR	697	3-MAR	580	3-MAR	526
1991	25-MAR	3,631	24-MAR	2,903	24-MAR	1,726	24-MAR	1,133	13-MAR	846
1992	15-FEB	3,083	15-FEB	1,982	15-FEB	1,624	12-FEB	1,181	12-FEB	942
1993	21-JAN	7,560	21-JAN	6,298	18-JAN	4,271	13-JAN	3,244	14-MAR	2,286
1994	18-FEB	929	18-FEB	649	17-FEB	544	17-FEB	426	17-FEB	366
1995	11-MAR	18,236	10-MAR	12,965	10-MAR	8,550	10-MAR	6,809	3-MAR	4,635
1996	5-MAR	7,917	20-FEB	5,388	19-FEB	3,694	20-FEB	2,915	19-FEB	2,468
1997	2-JAN	61,822	1-JAN	35,431	30-DEC	19,553	21-DEC	10,851	30-DEC	7,569
1998	3-FEB	14,989	24-MAR	8,355	3-FEB	6,766	3-FEB	4,780	2-FEB	3,609
1999	---	---	---	---	---	---	---	---	---	---

ATTACHMENT B.7

CORRELATION DATA

DESCRIPTION OF DATA

Data tabulated in this attachment were used to extend systematic records (Attachment C.6) during computation of statistics (Attachment B.5) and construction of unregulated frequency curves (Attachment B.2). Extensions were performed based on single or multi-station correlations. A complete list follows:

Record to be extended (site)	Correlation station(s) (data table)
1) Battle Creek below Coleman Fish Hatchery (5)	Deer Creek near Vina (B.6-10)
2) Mill Creek near Los Molinos (7)	Deer Creek near Vina (B.6-10)
3) Butte Creek near Chico (13)	Deer Creek near Vina (B.6-10)
4) North Yuba at New Bullards Bar Dam (18)	Yuba River near Marysville (B.6-17)
5) Fresno River at Hidden Dam (29)	Chowchilla River at Buchanan Dam (B.6-30) Fresno River near Knowles (B.7-1)
6) Chowchilla River at Buchanan Dam (30)	Fresno River at Hidden Dam (B.6-29) Fresno River near Knowles (B.7-1)

METHODS

Extended records and related statistics were calculated using USACE Regional Frequency Computations software (HEC-REGFREQ). Refer to notes on the frequency curves for additional information (Attachment B.2).

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TABLE B.7-1

FRESNO RIVER NEAR KNOWLES
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS

(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1910	---	---	---	---	---	---	---	---	---	---
1911	---	---	---	---	---	---	---	---	---	---
1912	6-MAR	189	6-MAR	185	14-APR	151	6-APR	131	27-APR	124
1913	---	---	---	---	---	---	---	---	---	---
1914	---	---	---	---	---	---	---	---	---	---
1915	---	---	---	---	---	---	---	---	---	---
1916	---	---	---	---	---	---	---	---	---	---
1917	21-FEB	3,060	21-FEB	2,057	20-FEB	1,444	20-FEB	826	20-FEB	524
1918	19-MAR	1,910	19-MAR	960	7-MAR	562	7-MAR	525	2-MAR	388
1919	11-FEB	1,320	10-FEB	705	10-FEB	422	10-FEB	269	10-FEB	229
1920	16-APR	942	21-MAR	686	21-MAR	454	17-MAR	316	1-MAR	271
1921	18-JAN	1,110	18-JAN	619	27-JAN	365	18-JAN	347	18-JAN	248
1922	11-FEB	1,860	9-FEB	1,064	9-FEB	759	9-FEB	617	9-FEB	432
1923	6-APR	1,210	11-DEC	747	10-DEC	575	7-DEC	431	22-JAN	336
1924	27-MAR	164	27-MAR	124	25-MAR	94	17-MAR	86	2-MAR	82
1925	6-FEB	705	6-FEB	543	6-FEB	457	5-FEB	312	5-FEB	195
1926	14-FEB	985	13-FEB	563	9-FEB	416	31-JAN	301	18-JAN	220
1927	4-FEB	1,600	4-FEB	775	15-FEB	608	14-FEB	450	4-FEB	356
1928	27-MAR	1,600	25-MAR	923	24-MAR	579	17-MAR	394	2-MAR	280
1929	5-APR	144	4-FEB	133	24-MAR	110	17-MAR	93	2-MAR	92
1930	23-FEB	255	23-FEB	230	23-FEB	171	23-FEB	152	23-FEB	122
1931	17-NOV	111	17-NOV	56	14-FEB	32	9-FEB	27	30-JAN	23
1932	7-FEB	2,580	7-FEB	1,827	6-FEB	1,200	31-JAN	789	31-JAN	475
1933	17-MAR	202	17-MAR	135	12-MAR	127	12-MAR	119	2-MAR	108
1934	23-FEB	265	23-FEB	157	23-FEB	125	19-FEB	89	19-FEB	73
1935	8-APR	1,390	7-MAR	827	7-MAR	535	5-JAN	457	2-MAR	356
1936	22-FEB	1,980	22-FEB	1,400	22-FEB	815	11-FEB	766	2-FEB	491
1937	6-FEB	4,020	5-FEB	2,287	5-FEB	1,161	5-FEB	918	5-FEB	580
1938	11-FEB	4,710	12-MAR	2,827	12-MAR	1,785	1-MAR	1,608	1-MAR	1,158
1939	27-MAR	381	26-MAR	309	25-MAR	224	17-MAR	204	2-MAR	177
1940	26-JAN	1,310	27-FEB	1,117	23-FEB	788	23-FEB	551	14-FEB	350
1941	27-DEC	1,740	27-DEC	1,279	27-DEC	945	27-DEC	651	27-DEC	645
1942	---	1,300	---	1,100	---	696	---	380	---	246
1943	---	1,720	---	1,271	---	769	---	627	---	450
1944	---	572	---	445	---	361	---	262	---	197
1945	---	2,910	---	2,020	---	1,095	---	614	---	371
1946	---	842	---	489	---	316	---	223	---	176
1947	---	384	---	225	---	139	---	85	---	77
1948	---	1,170	---	619	---	391	---	257	---	178
1949	---	678	---	369	---	211	---	159	---	144
1950	---	649	---	478	---	276	---	164	---	119
1951	---	3,300	---	1,679	---	770	---	403	---	392
1952	---	1,950	---	1,013	---	817	---	595	---	471
1953	---	509	---	326	---	222	---	174	---	130
1954	---	454	---	278	---	207	---	184	---	152
1955	---	234	---	200	---	162	---	138	---	128
1956	---	7,610	---	4,293	---	2,410	---	1,277	---	740
1957	---	684	---	411	---	284	---	205	---	154
1958	---	3,320	---	1,987	---	1,438	---	940	---	776

TABLE B.7-1

FRESNO RIVER NEAR KNOWLES
ANNUAL MAXIMUM RAIN FLOOD FLOWS
UNREGULATED CONDITIONS

(FLOWS IN CFS)

WATER	1-DAY		3-DAY		7-DAY		15-DAY		30-DAY	
YEAR	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW	DATE	FLOW
1959	---	543	---	418	---	281	---	192	---	148
1960	---	390	---	265	---	162	---	118	---	97
1961	---	200	---	106	---	61	---	54	---	51
1962	---	2,120	---	1,684	---	1,126	---	720	---	470
1963	---	2,590	---	1,722	---	828	---	477	---	287
1964	---	250	---	167	---	138	---	105	---	98
1965	---	1,420	---	1,063	---	749	---	585	---	434
1966	---	408	---	340	---	240	---	162	---	108
1967	---	2,510	---	1,284	---	1,068	---	811	---	673
1968	---	160	---	145	---	123	---	98	---	90
1969	---	3,240	---	2,473	---	1,832	---	1,315	---	938
1970	---	1,810	---	1,047	---	591	---	388	---	258
1971	---	268	---	192	---	163	---	143	---	132
1972	---	187	---	163	---	138	---	95	---	77
1973	---	1,980	---	1,258	---	783	---	487	---	378
1974	---	1,520	---	943	---	568	---	387	---	270
1975	---	754	---	537	---	400	---	292	---	268
1976	---	230	---	140	---	96	---	71	---	62
1977	---	67	---	38	---	24	---	20	---	18
1978	---	2,160	---	1,571	---	1,180	---	752	---	681
1979	---	1,270	---	742	---	486	---	333	---	272
1980	---	2,280	---	1,790	---	1,117	---	708	---	608
1981	---	325	---	243	---	196	---	163	---	123
1982	---	4,100	---	2,342	---	1,358	---	982	---	722
1983	---	4,800	---	2,480	---	2,033	---	1,247	---	1,098
1984	---	1,520	---	1,340	---	822	---	510	---	333
1985	---	490	---	353	---	237	---	175	---	149
1986	---	4,490	---	4,313	---	2,990	---	1,698	---	1,184
1987	---	500	---	321	---	191	---	120	---	98
1988	---	292	---	192	---	146	---	106	---	76
1989	---	350	---	249	---	168	---	116	---	112
1990	---	215	---	161	---	123	---	77	---	66
1991	---	---	---	---	---	---	---	---	---	---
1992	---	---	---	---	---	---	---	---	---	---
1993	---	---	---	---	---	---	---	---	---	---
1994	---	---	---	---	---	---	---	---	---	---

ATTACHMENT B.8

REGULATED FREQUENCY CURVES

OVERVIEW

To date, the Comprehensive Study has focused on establishing without-project conditions as a precursor to the development of planning studies. Synthetic 50-, 10-, 4-, 2-, 1-, 0.2-, and 0.5-percent chance exceedence frequency events have been developed in this effort to define baseline unregulated hydrology throughout the Sacramento and San Joaquin River basins.

This "synthetic hydrology" has since been used to develop unregulated rainflood frequency curves at key mainstem and tributary locations in both river basins. These unregulated frequency curves plot historic points and statistical distributions of unimpaired flows or conditions of rainflood events as they would occur without the influence of existing reservoirs. In these unregulated frequency curves, all snowmelt-driven events were screened out from the duration peaks. The screened events were then replaced with the highest rainflood- or rainfall-driven maxima experienced during that water year.

The analytical basis for creating rainflood frequency curves is clearly spelled out in several publications of the Department of the Army. The following is a partial listing:

1. Bulletin 17B, "Guidelines for Determining Flood Flow Frequency"
2. Engineering Regulation 1110-2-1450, "Hydrologic Frequency Estimates"
3. Engineering Manual 1110-2-1415, "Hydrologic Frequency Analysis"
4. Engineering Technical Letter 1110-2-537, "Uncertainty Estimates for Nonanalytic Frequency Curves"
5. Engineering Pamphlet 1110-8-7, "Hydrologic Risk"

To examine the effects of regulation on riverine and floodplain hydrology, however, regulated frequency curves are required, and they too must be developed according to established nonanalytical methods. Typically, when there are two or more distinct and independent causes of floods, better results can be obtained by segregating the data according to cause. This is done because the slope (standard deviation) of the curve for each climatic condition may be significantly different. By separating the data, these populations can be analyzed individually and then statistically recombined. The Sierra Nevada region of California provides a climatic situation to which this method is commonly applied: frequency studies are made separately for rainflood events, which occur principally from November through March, and for snowmelt floods, which occur from April through July.

Frequency curves representing regulated flow conditions have not yet been developed for use in the Comprehensive Study, but they will be fundamental to the development of alternative plans and initial projects being formulated as part of the Study.