WATER-QUALITY AND QUANTITY DATA EAST FORK KAWEAH RIVER BASIN CALIFORNIA 1969

OPEN-FILE REPORT

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
Menlo Park, California, 1971
Prepared in cooperation with the
U.S. FOREST SERVICE and the
NATIONAL PARK SERVICE

UNITED STATES
DEPARTMENT OF THE INTERIOR
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By

Willard W. Dean

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INTRODUCTION

In connection with planned development of recreational facilities the U.S. Forest Service and National Park Service in April 1968 requested that the U.S. Geological Survey initiate a water-quality and quantity monitoring program in the East Fork Kaweah River basin. The basin (fig. 1) is a 95-square mile area in the southern Sierra Nevada ranging in altitude from 1,280 to 12,432 feet.

The purpose of the monitoring program is to establish baseline information on selected surface-water quality and quantity parameters, including dissolved solids, temperature, sediment, bacteria, and biology, at the present minimal levels of development of the drainage basin. Data are to be obtained at selected locations, under present conditions, over as wide as possible a range of seasonal flow conditions. Monitoring would be continued during construction of the proposed resort facilities and access highway, and during subsequent operation of these facilities. The records obtained should permit detection of manmade changes, if any, and guide corrective action if required.

This report describes program activity during the 1969 water year and presents basic data obtained during that year. A similar report (Dean, 1969) contains data for the 1968 calendar year. Future annual reports are planned to include data for subsequent water years.

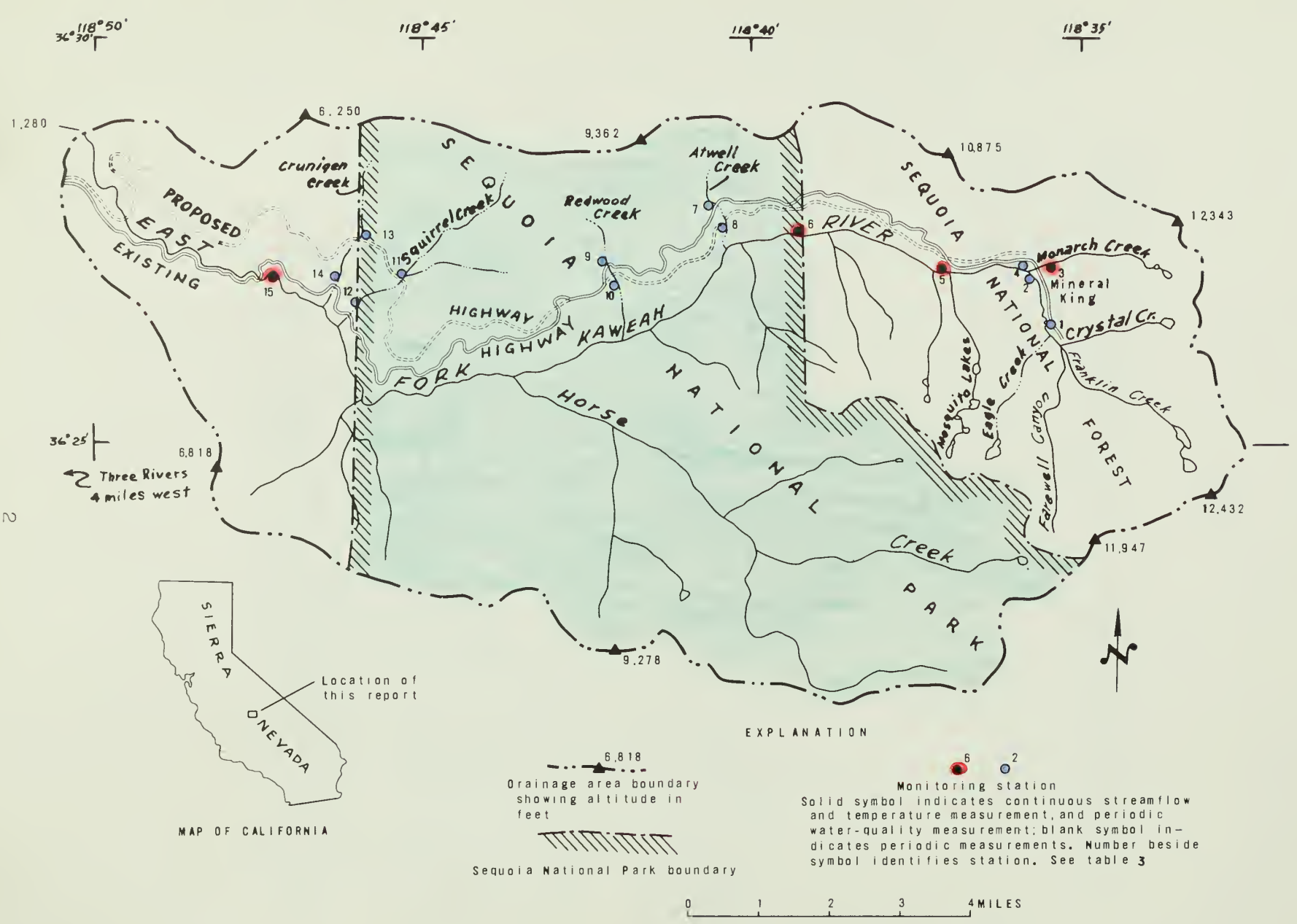

FIGURE 1.--Map showing monitoring stations in the East Fork Kaweah River Basin.

DESCRIPTION OF AREA

The drainage basin of the East Fork Kaweah River generally consists of steep slopes covered with sequoia, fir, cedar, and other conifers. Extreme headwater areas are bare granite and weathered metamorphic-rock slopes, whereas the downstream end of the basin is mantled with soil and covered with brush and oak.

The river originates in Farewell Canyon and flows north-northwest to the Mineral King alpine valley. Enroute through the valley it is augmented by Franklin, Crystal, Eagle, and Monarch Creeks, and smaller tributaries. Each of these tributaries carries flow from one or more cirque lakes at altitudes of 10,000 to 11,000 feet. Downstream, numerous small creeks contribute runoff to the river as it flows generally westward down a steep gradient to its junction with the Middle Fork Kaweah River. The one large downstream tributary is Horse Creek flowing from the southeast corner of the drainage area. The percentage of drainage area below various altitudes is given in figure 2 for the gaging station on East Fork Kaweah River near Three Rivers (sta. 15, fig. 1). The median altitude of the basin is about 7,500 feet.

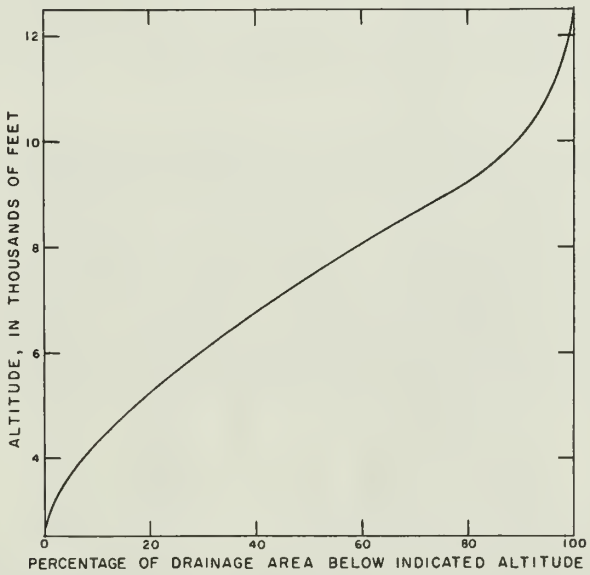

FIGURE 2.--Area-altitude curve, East Fork Kaweah River near Three Rivers.

The upstream 25 percent of the drainage area includes a former mining area called Mineral King that is administered by the U.S. Forest Service as part of Sequoia National Forest. The middle 60 percent is part of the Sequoia National Park. The downstream end of the drainage is a checkerboard of private land and federal land administered by the U.S. Bureau of Land Management.

Present development in Sequoia National Forest consists of scattered cabins along the valley floor at Mineral King and at an adjacent area called Faculty Flats. Access to the area is by a narrow, winding, 25-mile long, paved and dirt road from State Highway 198. The road is blocked by snow at higher altitudes from late October through May or June in most years. Along the road, within Sequoia National Park, are two groups of cabins in settlements called Cabin Cove and Silver City. The land-use pattern dates back to the 1870's when mining was attempted unsuccessfully around Mineral King.

A summer pack station and horse corral are operated on the right bank of East Fork Kaweah River above Mineral King. Developed camp sites are maintained near Mineral King and near Atwell Meadows. Backpack and pack-string campers frequent the high-altitude area during the summer, particularly around headwater lakes. Cattle are grazed in the lower part of the basin around Squirrel and Crunigen Creeks.

Some streamflow regulation is provided by small dams on four headwater lakes. The dams were built by the Mount Whitney Power Co. and are now operated by the Southern California Edison Co. A total of 1,153 acre-feet of water is stored during spring snowmelt and released through valves to augment low flows during late summer. Near the downstream end of the basin, water is diverted through a conduit to the Southern California Edison Co. Kaweah No. 1 hydroelectric plant, a 2,250-kilowatt installation on the Kaweah River downstream from the East Fork.

The U.S. Forest Service has under advisement increased development of a winter and summer resort area by Walt Disney Productions in the 20-square-mile part of the East Fork Kaweah basin that is in the Sequoia National Forest. To provide all-year access to Mineral King, the State of California plans to build a modern all-weather highway from State Highway 198 to Mineral King that would generally parallel the present road within the park and forest (fig. 1). The western segment of the new highway would be located considerably higher than the present road. Construction of the highway and the resort-area facilities at Mineral King has been delayed by litigation.

HYDROLOGY

In the Kaweah River basin the 1969 water year was the wettest in the 66 years since records began at downstream gaging stations. The variation in water year runoff of the Kaweah River near Three Rivers is shown in figure 3, which demonstrates that only 1906 and 1967 approached 1969 in magnitude of recorded runoff. Runoff from the 520-square-mile drainage area of the Kaweah River near Three Rivers includes runoff from the 85.8-square-mile area of the East Fork Kaweah River. The East Fork is one of five major tributaries (in downstream order, Middle, Marble, East, North and South Forks) that comprise most of the 520-square mile Kaweah basin above the gaging station near Three Rivers. Records are longest at the station near Three Rivers.

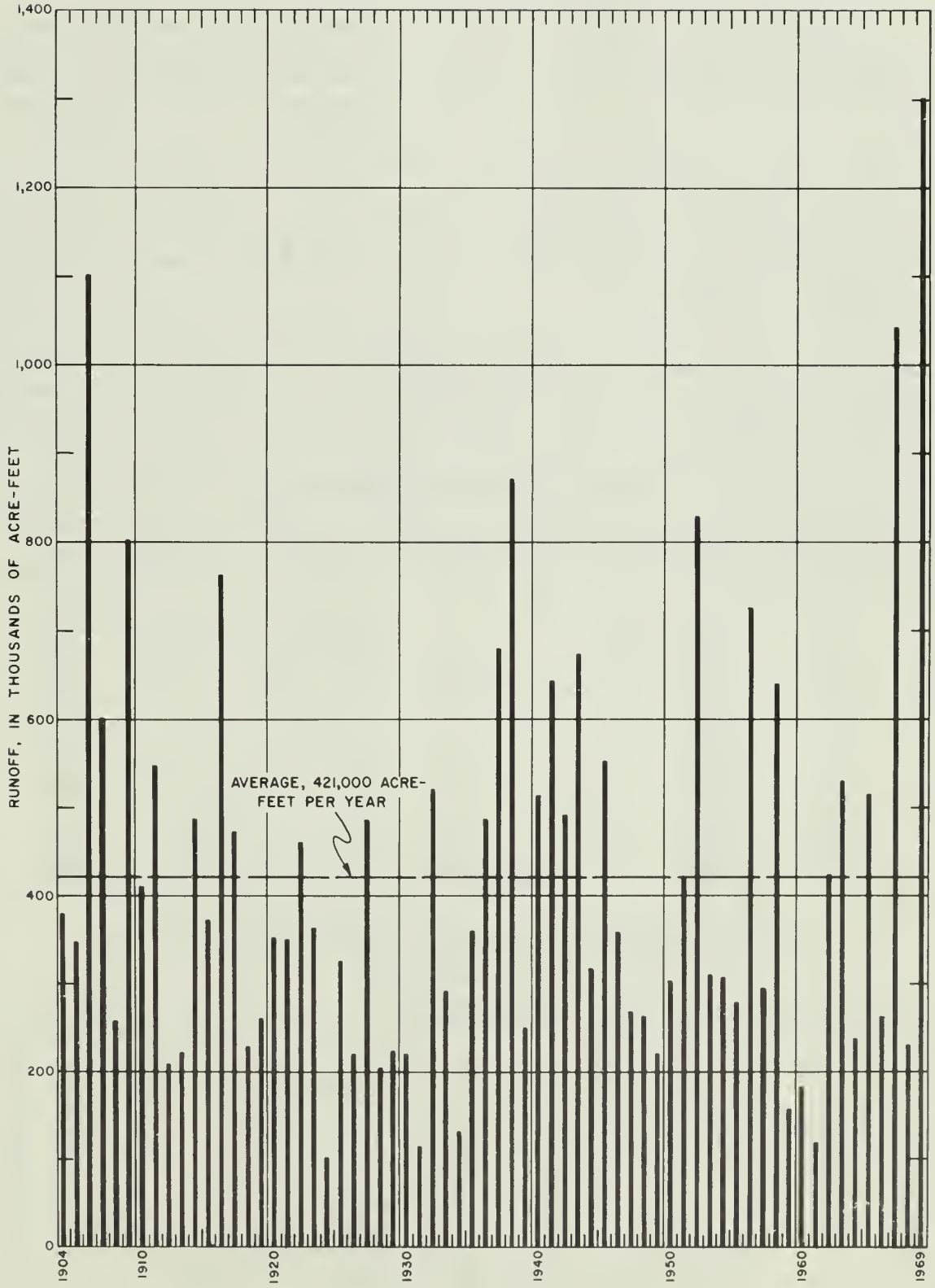

FIGURE 3.--Water year runoff of Kaweah River near Three Rivers during 1904 to 1969.

Three series of storms culminating on January 18, January 25, and February 24, 1969, brought heavy rains to the lower part of the East Fork Kaweah River basin and record-breaking snow at higher altitudes. A peak flow of 4,700 cfs (cubic feet per second) occurred January 25, 1969, at the downstream recording station on East Fork Kaweah River near Three Rivers. The other three recording stations (sta. 3, 5, and 6, fig 1) located at altitudes from 8,200 to 6,160 feet experienced small increases in runoff during the January and February storms. These small increases indicate that most of the rain that fell at times at altitudes above 6,000 feet during the great 1969 storms was absorbed and retained by the thickening snowpack.

The monthly mean discharge during the 1969 water year at the four principal monitoring stations is shown in figure 4. The pattern of runoff, the bulk of which consists of accumulated winter and spring precipitation discharged during the snowmelt season, April through July, is evident at all four stations. The downstream station near Three Rivers also had a marked increase in discharge during the period January through March. The upstream stations, receiving the drainage from higher altitude subbasins, had comparatively small increases in discharge during the same 3-month period. The highest station at 8,200 feet altitude on Monarch Creek (sta. 3, fig. 1) had very slight increases until snowmelt began in April.

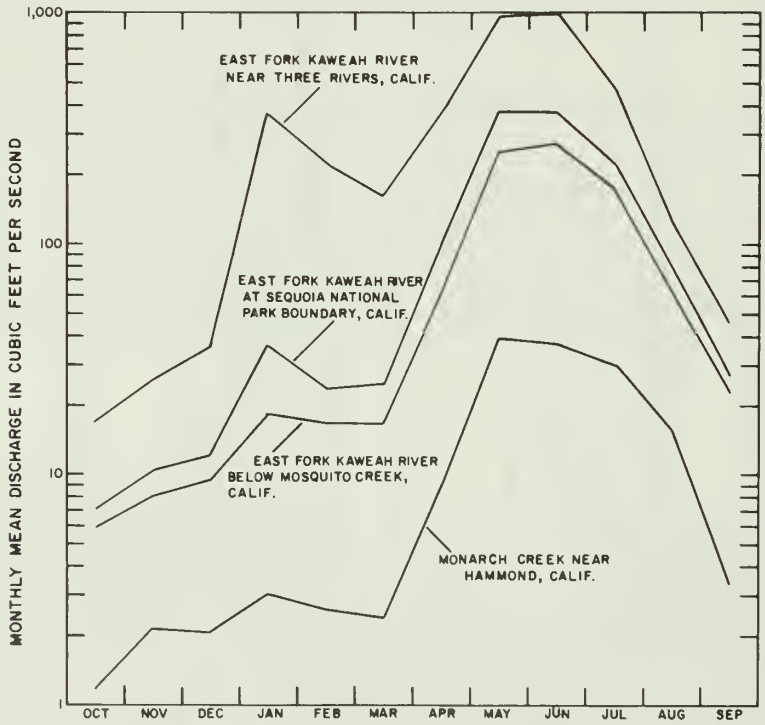

FIGURE 4.--Monthly mean discharge during 1969 water year at principal monitoring stations in East Fork Kaweah River basin.

By mid-March 1969, the depth and water equivalent of the accumulated snowpack were the greatest of record in the East Fork Kaweah River basin. Melting began at lower altitudes in late March and culminated with the greatest monthly runoff of record for the East Fork Kaweah River in May and June 1969.

Streamflow records have been obtained by the Southern California Edison Co. on the East Fork Kaweah River near the downstream end of the basin (sta. 15, fig. 1) in connection with the operation of its diversion to the Kaweah No. 1 powerhouse. Daily records have been reviewed and published by the Geological Survey in annual water-data reports for the periods 1952-55 and 1958 to date. These records are summarized by water years in tables 1 and 2. The records show that peak discharges resulting from spring snowmelt have ranged from 231 to 1,900 cfs (May 31, 1969). Greater peak flows of 2,850, 13,000 and 4,700 cfs occurred during rain floods on February 1, 1963, December 6, 1966, and January 25, 1969. No record was obtained for the flood of December 23, 1955, which was of the same magnitude or greater than that of December 1966 on other Kaweah River tributaries.

Table 1.--Summary of annual runoff data, East Fork Kaweah River near Three Rivers, combined river and conduit

Water year	Momentary maximum discharge (cfs)	Date of maximum discharge	Minimum daily discharge (cfs)	Annual runoff		
				Mean (cfs)	Volume (acre-feet)	Depth (inches)
a1952	1,270	May 27, 1952	--	--	--	--
1953	1,050	Apr. 27, 1953	20	94.6	66,620	15.0
1954	630	Jan. 24, 1954	13	91.4	66,210	14.5
1955	1,090	Feb. 16, 1955	10	73.9	53,460	11.7
1956	1,070	May 22, 1956	14	180	130,100	28.4
1959	541	Feb. 16, 1959	4.0	43.0	31,140	6.8
1960	655	Feb. 1, 1960	3.5	60.2	43,710	9.8
1961	231	May 17, 1961	6.4	40.8	29,370	6.4
1962	755	May 5, 1962	6.7	116	85,310	18.8
1963	2,650	Feb. 1, 1963	5.0	113	95,950	21.0
1964	505	May 20, 1964	13	67.8	49,120	10.7
1965	1,530	Dec. 23, 1964	6.7	137	99,060	21.8
1966	585	Dec. 29, 1965	12	80.1	57,960	12.7
1967	13,000	Dec. 6, 1966	9.4	295	213,300	46.8
1968	450	May 29, 1968	11	74.8	54,300	11.9
1969	4,700	Jan. 25, 1969	11	317	229,400	50.1

a. Period May 15 to September.

Table 2.--Monthly and annual mean discharge, 1952-55, 1957-69, East Fork Kaweah River near Three Rivers, combined river and conduit

(cubic feet per second)

Water year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
1952	--	--	--	--	--	--	--	--	660	256	76.3	34.4	--
1953	25.9	26.4	36.0	60.3	46.1	56.0	159	205	352	115	31.6	22.5	94.6
1954	20.0	17.9	20.0	30.5	50.4	76.3	219	396	171	50.0	23.7	16.6	91.4
1955	11.0	17.4	23.2	29.7	56.6	57.6	96.3	260	239	54.9	24.0	17.5	73.9
1956	20.6	25.3	32.1	34.6	61.6	105	230	690	641	216	60.7	33.0	180
1959	25.0	17.2	16.7	23.9	40.5	55.1	106	113	66.5	21.6	14.6	12.6	43.0
1960	10.2	9.37	10.2	15.0	42.0	57.6	144	234	141	30.4	16.5	10.4	60.2
1961	10.7	17.6	17.9	14.5	17.6	30.6	69.9	147	76.6	21.2	25.0	16.6	40.6
1962	10.6	10.5	13.6	16.2	97.4	51.6	277	403	384	105	27.9	19.1	116
1963	17.6	12.3	11.0	67.3	191	70.6	144	432	441	139	42.3	30.4	133
1964	29.4	42.3	32.3	24.3	27.3	36.6	104	256	175	43.5	20.5	17.6	67.6
1965	11.3	25.6	134	90.5	65.9	69.1	172	357	441	169	71.3	31.9	137
1966	22.7	45.2	40.4	35.5	35.0	66.4	236	326	91.7	27.7	16.7	13.2	60.1
1967	11.0	29.0	597	134	126	156	161	606	647	579	174	73.7	295
1968	33.6	32.5	36.3	41.7	63.3	79.4	134	250	155	35.8	21.0	14.0	74.6
1969	17.0	25.6	a36.0	372	223	161	386	966	966	476	121	45.5	317
Average	16.5	23.6	70.9	66.1	76.4	75.4	177	376	367	147	48.2	25.7	120

a. Revised.

At this same station 15, the annual runoff ranged from 229,400 acre-feet in 1969 to 29,370 acre-feet in 1961. These extremes are equivalent to average depths of runoff of 50.1 and 6.4 inches. The average depth of runoff for 15 years of record is 19.0 inches. Comparison with the 66-year record for Kaweah River near Three Rivers indicates that the East Fork long-term average also is about 19 inches. Mean annual evapotranspiration is estimated to be about 18 inches, which added to the runoff suggests a basinwide mean annual precipitation of about 37 inches.

Figure 5 compares the annual runoff of the East Fork Kaweah River during 1953-55 and 1958-69 to the downstream records on the Kaweah River near Three Rivers. The yield per unit area is larger for the East Fork than for the Kaweah River because precipitation is greater at higher altitudes. The average annual runoff from the East Fork basin is 19 inches, but from the entire Kaweah River basin is only 14 inches.

The runoff records for East Fork Kaweah River provide a representative sample of the variability in runoff from year to year.[1/] Within the basin considerable difference in runoff in a given year is expected from different subbasins because of the extreme variation in altitude and exposure.

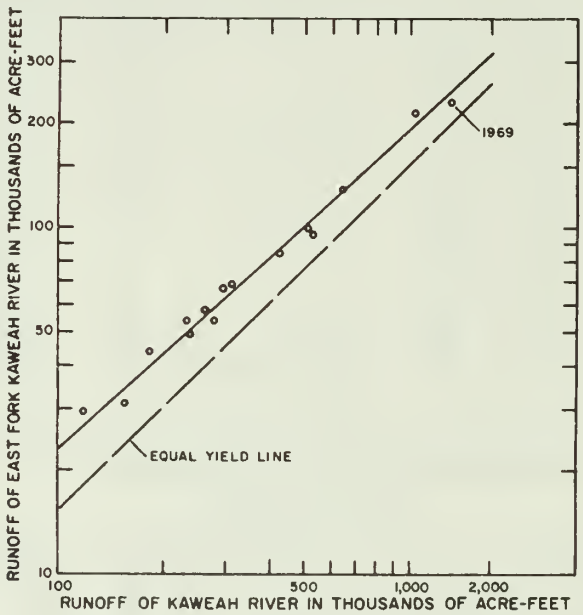

FIGURE 5.--Comparison of water year runoff of East Fork Kaweah River to Kaweah River near Three Rivers.

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1. Annual precipitation has a similar variability and during the period 1953-69 ranged from 19 to 62 inches based on records at Ash Mountain, altitude 1,708 feet, and Grant Grove, 6,560 feet, both to the north, outside the East Fork basin.

The seasonal runoff pattern of the East Fork Kaweah River is typical of high-altitude Sierra Nevada streams at this latitude. Melting of accumulated snow each year causes the greatest runoff during April through July as shown in table 2. Flows recede rapidly during the dry summers to annual minimums in late September or early October. Occasional summer thunderstorms may cause intense localized precipitation and runoff but have little effect on the monthly distribution of total annual runoff. Fall and winter Pacific storms usually deposit deep snow above altitudes from 5,000 to 6,000 feet, but bring rain with attendant runoff to the lower areas. Total precipitation and runoff for any storm vary considerably within the East Fork Kaweah River basin because of orographic effects, the wide range of altitude and exposure, and the variable freezing altitude. In some years severe storms with heavily moisture-laden air from the tropical Pacific have brought heavy rain to altitudes as high as 9,000 feet; the severe floods of 1955, 1963, 1964, 1966, and 1969 resulted.

DETAILS OF MONITORING PROGRAM

Monitoring Locations

A network of monitoring stations was designed by personnel of the Forest Service, Park Service, and Geological Survey as shown in figure 1 and listed in table 3. In addition to the 4 continuous and 11 periodic measuring sites listed, special samples are taken during late-summer flows at several other locations on tributary streams and along the main stem of the East Fork Kaweah River.

Table 3.--Monitoring stations in downstream order

Station number on map[1/]	USGS reference number	Altitude	Drainage area (sq.mi.)	Type of record[2/]			Station location
				Flow	Temperature	Quality	
1	11-2086.05	7,850	9.92	P	P	P	East Fork Kaweah River below Eagle Creek
2	2086.07	7,810	10.2	P	P	P	East Fork Kaweah River above Monarch Creek
3	2086.10	8,200	1.89	C	C	P	Monarch Creek near Hammond
4	2086.15	7,620	12.1	P	P	P	East Fork Kaweah River below Monarch Creek
5	2086.20	7,280	16.0	C	C	P	East Fork Kaweah River below Moequito Creek
6	2086.25	8,180	23.7	C	C	P	East Fork Kaweah River at Sequoia National Park boundary
7	2088.30	6,470	.66	P	P	P	Atwell Creek above Mineral King highway
8	2086.40	--	--	3/	3/	3/	Atwell Creek below Mineral King highway
9	2086.50	5,704	1.38	P	P	P	Redwood Creek above Mineral King highway
10	2088.60	--	--	3/	3/	3/	Redwood Creek below Mineral King highway
11	2088.70	--	--	3/	3/	3/	Squirrel Creek above Mineral King highway
12	2086.80	3,280	5.80	P	P	P	Squirrel Creek below Mineral King highway
13	2087.10	--	--	3/	3/	3/	Crunigen Creek above Mineral King highway
14	2087.15	3,280	1.58	P	P	P	Crunigen Creek below Mineral King highway
15	2087.30	2,500	85.8	C	C	C	East Fork Kaweah River near Three Rivers

1. Figure 1.
2. Type of record
   C - Continuous recording.
   P - Periodic measurements.
3. No monitoring in 1968 or 1969. Specific site to be selected and periodic measurements to begin just before highway construction is initiated.

Instrumentation

Each of the three upstream continuous stations (sta. 3, 5, and 6, fig. 1) is equipped with a 36-inch diameter corrugated-metal pipe stilling well and instrument shelter with appurtenant staff gages, access walkway, and other standard features. The fourth continuous station (sta. 15, fig. 1) is the Southern California Edison Co. station which has been in operation for many years. This station is similar to the upstream stations except for fabrication from 48-inch diameter pipe. Each of the four stations has a Fischer-Porter digital water-stage recorder programmed to punch gage-height readings every 15 minutes for processing by computer. The three upstream stations are equipped with Weksler analog water-temperature recorders while the downstream station records water temperature on an attachment to a SCE Stevens A-35 analog recorder. Records of flow and temperature at the downstream station are obtained jointly by the Geological Survey and Southern California Edison Co.

The three continuous stations on the East Fork Kaweah River are equipped with USGS-standard cableways for measuring streamflow and sediment discharge at stages higher than can be waded. An existing measuring cableway at the downstream East Fork station (sta. 15, fig. 1) was rebuilt completely to allow the use of heavier equipment. The Monarch Creek gaging station has no cableway and current-meter measurements are made only by wading. Any required measurements of higher flows will be by slope-area determination or computation of flows through road culverts.

Periodic sampling sites on East Fork Kaweah River below Monarch Creek and on Atwell, Redwood, Squirrel, and Crunigen Creek have permanent staff gages. On Redwood Creek, a small masonry weir has been constructed to stabilize the stage-discharge relation. All other stations have natural riffles as controls. The periodic sampling site on East Fork Kaweah River above Monarch Creek is at the Mineral King road bridge where a private consultant is maintaining a streamflow measuring station for Walt Disney Productions. There presently is no permanent staff gage at the periodic sampling site on East Fork Kaweah River below Eagle Creek.

PROGRAM ACTIVITIES FOR 1969

Program activity during the water year October 1, 1968, through September 30, 1969, included the collection and analysis of quality and quantity data under a wide range of hydrologic conditions. Low flows prevalent during the summer of 1968 continued through the relatively dry fall of 1968 until mid-January 1969. The series of hydrologic events described in a preceding section of this report caused record-high runoff during the spring and summer of 1969. As previously mentioned, the runoff for the 1969 water year was the greatest experienced in the Kaweah River basin during 66 years of streamflow records.

The deep, heavy snowpack covered the monitoring station on Monarch Creek in March 1969. In April the instrument shelter and stilling well were found bent and crushed after settling of the snowpack. The station was completely rebuilt in June 1969 at the same site.

Standard procedures of the Water Resources Division of the Geological Survey were followed in the installation and operation of the field equipment and in laboratory analyses of samples collected at the monitoring sites. Regular field measurements included streamflow, air and water temperatures, pH, dissolved oxygen, and alkalinity. Results of field and laboratory measurements are presented in tables 5-8 at the end of this report.

The water-quality data continue to indicate that water in the streams of the Mineral King area is mostly of the calcium bicarbonate type. Water in Squirrel, Atwell, and Redwood Creeks is of the calcium sodium or sodium calcium bicarbonate type. Concentrations of dissolved solids range from 19 to 141 mg/l (milligrams per liter). Hardness ranges from soft to moderately hard and varies inversely with discharge. Dissolved oxygen ranges from 7.6 to 13.6 mg/l, and is at or near saturation.

The highest concentration of suspended sediment sampled was 88 mg/l at station 6 on May 29, 1969. Most sediment concentrations were less than 25 mg/l, indicating that little sediment is produced under present conditions.

No major chemical anomalies are shown by the 1969 data. Counts of total coliform colonies are low. Counts for Squirrel and Crunigen Creeks and for East Fork Kaweah River near Three Rivers are somewhat higher than those for headwater streams but are less than about 200 colonies per 100 milliliters (table 5). All chemical, physical, and bacteriological data collected to date document the excellent water quality of the East Fork Kaweah River basin at the present low level of land use and development.

AQUATIC BIOLOGY SURVEYS

Water-quality and biological surveys were conducted in the East Fork Kaweah River basin during November 1967, June 1968, and August 1968, by the Federal Water Pollution Control Administration (now the Environmental Protection Agency). Results are presented in a Federal Water Pollution Control Administration report (1969) that gives classification and counts of phytoplankton species and benthic animals. Reconnaissance biological surveys were made by the Geological Survey on September 24, 1968, and September 23, 1969. Summaries of USGS observations are given in table 4. Organisms found by all surveys were those forms associated with clean water, with high species diversity but low densities.

Table 4.--Biological observations, 1968-69

[x indicates species noted. Station sites are shown in figure 1 and table 3.]

Species observed	Station numbers						
	1	5	15	1	3	5	6
	September 24, 1968			September 23, 1969			
	Phytoplankton			Predominant phytoplankton (from rock scraping)			
Green algae (Chlorophyceae)							
Spirogyra	x	x	--	x	--	--	--
Closterium	--	--	--	x	--	--	--
Cosmarium	--	--	--	x	--	--	--
Chara	--	--	--	--	x	--	--
Phytoconis	--	--	--	--	x	--	--
Blue-green algae (Myxophyceae)							
Oscillatoria	--	--	--	--	--	--	x
Diatoms							
Centric	--	--	--	--	--	--	--
Melosira	x	x	--	x	x	x	x
Pennate							
Cymbella	x	--	x	x	x	x	--
Diatoma	x	x	x	x	x	x	x
Gomphonema	--	--	x	--	--	--	--
Fragilaria	x	x	x	--	--	--	--
Achnanthes	--	--	--	x	--	--	--
Cocconeis	x	x	x	x	--	--	x
Unidentified genera	--	--	--	x	x	x	x
	Benthic animals			Benthic animals found from Surber sampler (Number per square foot)			
Plecoptera (stoneflies)	x	x	--	1.5	3.2	0.5	0.6
Ephemeroptera (mayflies)	x	x	--	4.4	10.2	18.3	6.4
Trichoptera (caddisflies)	x	x	--	.2	2.2	.5	.2
Diptera (true flies)	x	--	--	.6	4.2	1.8	1.4
All other	--	--	--	.1	.9	.1	0
Total	--	--	--	6.8	20.7	21.2	8.6

PLANS FOR FUTURE WORK

The data collection begun in 1968 and 1969 was continued in 1970 during the slightly below-average runoff conditions experienced during the 1970 water year. Sampling is being carried on at least once each month during May through October. During November through April monitoring is done only about once every 6 weeks at the 4 recording stations. A special effort is being made to obtain additional sediment samples during storm runoff.

During the weekend of August 28-31, 1970, field monitoring was performed and samples were taken for nutrient analysis daily at about 0600, 1200, and 1800 hours at the station on the East Fork Kaweah River below Mosquito Creek. This station is just downstream from a number of summer cabins and the Forest Service Cold Spring campground. The purpose of the weekend monitoring is to detect any peaks that might be caused by the influx of campers. The weekend data will be included in the annual data reports. Preliminary analysis of August 28-31, 1970, data indicates erratic fluctuations in several parameters, no distinct trends, and no very high concentrations. Total coliform count was less than 150 at all times. Several weekend runs during 1971 are planned.

Sites for one additional periodic monitoring station each are to be selected and instrumented on Atwell, Redwood, Squirrel, and Crunigen Creeks prior to the start of any highway construction. Each of these streams is to have one station upstream from the planned new highway and one downstream. The results of present monitoring will define conditions prior to construction. Monitoring is planned to continue during and after highway construction.

It is desirable that the 1967-68 complete aquatic biological surveys by the Environmental Protection Agency be repeated during August or September of 1971, especially if any construction is imminent. Water-quality monitoring, including bacteriological measurements, should be continued during all seasons.

All field and laboratory data are being stored in the Storet water-quality data-storage system. Water-quality data in the following tables are printouts from the Storet system.

ACKNOWLEDGMENTS

The monitoring program is operated under the general supervision of R. Stanley Lord, district chief of the Water Resources Division, Menlo Park, California, and under the direct supervision of the subdistrict office in Sacramento, California. All work is done in cooperation with the U.S. Forest Service and National Park Service. Paul H. Googins, Chief, Water Development and Sanitation Branch, San Francisco, and Peter Wyckoff, Staff Specialist, Sequoia National Forest, represent the Forest Service in design and implementation of the monitoring program. Gerard S. Witucki, Chief, Water Resources Section, San Francisco, and Jerry A. Eubanks and Richard Riegelhuth of the Sequoia National Park similarly represent the National Park Service. Jerry Chilton of the Sequoia National Park has coordinated USGS chartered helicopter operations from the Ash Mountain heliport.

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Federal Water Pollution Control Administration, 1969, Water quality and aquatic biology, East Fork Kaweah River, Mineral King area, California, 36 p.

Table 5.--Chemical analyses of water, monitoring stations in East Fork Kaweah River basin, 1969 water year

11-2086.05 EAST FORK KAWEAH RIVER BELOW EAGLE CREEK, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
OCT. 01...	0720	3.0	5	--	8.4	10	31	1.7	2.0	.9	96	0
JUNE 18...	1630	140	5	12	6.6	20	13	.6	.7	.3	37	0
JULY 29...	0950	85	9	21	4.2	20	12	.5	.3	.3	32	0
AUG. 25...	1350	27	13	21	4.7	0	15	.6	.7	.4	42	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC CON-DUCTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)
OCT. 01...	9.0	.5	.1	1.0	0	102	84	5	172	7.5	.14
JUNE 18...	6.0	.3	.1	.6	30	46	35	5	78	7.1	.06
JULY 29...	3.0	.2	.1	.2	0	37	32	6	68	6.5	.05
AUG. 25...	6.0	.2	.1	.1	0	49	40	6	87	7.2	.07

DATE	PERCENT SODIUM	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)	TOTAL ORGANIC CARBON (C) (MG/L)
OCT. 01...	5	.1	79	9.9	1.1	.02	.23	--	.01	.04	35	--
JUNE 18...	4	.1	30	10.7	1.2	.00	--	.08	.02	.06	3	--
JULY 29...	2	.0	26	10.0	1.7	.04	--	.03	.00	.01	7	--
AUG. 25...	4	.0	34	9.8	1.4	.13	--	.09	.04	.04	19	.0

11-2086.07. EAST FORK KAWEAH RIVER ABOVE MONARCH CREEK, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
JULY 29...	1130	85	9	15	4.3	20	12	.6	.2	.3	34	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC CON-DUCTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)
JULY 29...	4.0	.2	.1	.2	0	39	32	4	70	6.5	.05

DATE	PERCENT SODIUM	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)
JULY 29...	1	.0	28	9.8	1.0	.05	.20	.24	.00	.00	20

Table 5.--Continued

11-2086 10 MONARCH CREEK NEAR HAMMOND, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
OCT.												
01...	0900	1.0	4	3	9.5	0	16	.6	1.8	.3	48	0
29...	0930	.98	4	8	8.6	0	16	.7	1.7	.3	47	0
DEC.												
07...	1055	1.5	1	11	7.2	10	11	.4	1.5	.3	32	0
JAN.												
18...	0930	2.0	2	5	7.1	0	14	.4	1.3	.3	43	0
FEB.												
08...	1600	2.2	0	-2	6.5	0	12	.5	1.1	.2	36	0
MAR.												
25...	1100	2.4	4	10	7.8	0	22	.7	1.5	.4	66	0
APR.												
22...	0830	16	3	11	5.9	20	14	.5	.8	.3	40	0
MAY												
21...	0900	52	4	15	5.2	40	8.6	.3	.9	.3	24	0
JUNE												
18...	1250	29	6	19	6.4	10	7.0	.3	.7	.2	20	0
JULY												
29...	1330	25	10	22	4.0	10	4.9	.3	.4	.2	14	0
AUG.												
25...	1440	6.0	12	18	5.2	0	7.6	.4	.9	.2	23	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC COND-UCTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)
OCT.											
01...	6.0	.9	.1	.8	20	60	42	3	96	7.5	.08
29...	6.0	2.7	.1	.3	0	59	43	4	92	7.5	.08
DEC.											
07...	4.0	1.0	.2	.6	0	42	29	3	69	6.8	.06
JAN.											
18...	5.0	.7	.1	.5	0	50	36	1	81	7.7	.07
FEB.											
08...	5.0	.4	.0	.1	0	44	32	2	72	7.1	.06
MAR.											
25...	5.0	.4	.1	1.2	10	72	58	4	119	7.4	.10
APR.											
22...	3.0	.4	.1	.4	0	46	37	4	79	7.1	.06
MAY											
21...	3.0	.3	.0	.6	40	31	22	2	51	6.8	.04
JUNE											
18...	3.0	.4	.1	.4	30	28	18	2	44	7.1	.04
JULY											
29...	2.0	.4	.1	.2	0	19	13	2	32	6.3	.03
AUG.											
25...	3.0	.2	.1	.2	20	29	20	1	47	7.2	.04

DATE	PERCENT SODIUM	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)
OCT.											
01...	9	.1	39	10.1	--	.00	.32	--	.04	.04	53
29...	7	.1	39	10.3	1	.00	.46	--	.03	.03	36
DEC.											
07...	11	.1	26	11.5	0	.05	.04	--	.03	.04	10
JAN.											
18...	8	.1	35	11.7	0	.08	--	.48	.02	.11	1
FEB.											
08...	7	.1	30	11.6	--	--	--	--	--	--	--
MAR.											
25...	5	.1	54	12.2	0	--	--	--	--	--	--
APR.											
22...	4	.1	33	11.2	2	.06	--	.68	.02	--	1
MAY											
21...	8	.1	20	11.5	3	.06	--	.12	.00	.04	1
JUNE											
18...	7	.1	16	12.0	2	.10	--	.03	.02	.04	1
JULY											
29...	6	.0	11	9.5	2	.08	--	.06	.04	.04	1
AUG.											
25...	9	.1	19	8.4	3	.10	--	.36	.09	.09	6

Table 5.--Continued

11-2086.15. EAST FORK KAWEAH RIVER BELOW MONARCH CREEK, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
JUNE												
17...	1615	168	5	11	6.6	20	11	.6	.9	.4	32	0
JULY												
29...	1450	110	11	27	4.4	20	10	.5	.3	.3	30	0
AUG.												
25...	1545	33	12	29	5.7	0	16	.8	.9	.4	49	0

DATE	SULFATE (SO4) (MG/L)	CHLO-R(DE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC CONDU-CTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)	PERCENT SODIUM
JUNE												
17...	4.0	.3	.1	.5	30	40	30	4	74	7.0	.05	6
JULY												
29...	3.0	.4	.1	.1	0	34	27	2	61	6.5	.05	2
AUG.												
25...	4.0	.3	.0	.1	20	52	44	4	94	7.3	.07	4

DATE	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)
JUNE										
17...	.1	26	12.0	2.5	.01	.06	.07	.01	.05	1
JULY										
29...	.0	25	9.7	2.4	.04	.00	.03	.00	.00	10
AUG.										
25...	.1	40	7.6	.0	.04	.41	.44	.04	.04	12

Table 5.--Continued

11-2086.20. EAST FORK KAWEAH RIVER BELOW MOSQUITO CREEK, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
OCT.												
01...	1100	4.4	7	10	27	0	31	1.8	2.8	.9	104	0
29...	1100	5.4	6	--	10	0	36	2.0	2.8	.8	115	0
DEC.												
07...	1330	7.4	2	1	9.1	10	32	1.7	2.7	.8	99	0
JAN.												
18...	1115	10	2	2	8.8	10	30	1.5	2.3	.9	95	0
MAR.												
25...	1400	17	4	10	9.3	0	26	1.4	2.0	.7	82	0
APR.												
22...	1200	96	4	10	7.3	10	19	.9	1.2	.6	57	0
MAY												
21...	1230	280	5	9	5.6	10	12	.6	1.1	.6	34	0
JUNE												
18...	1545	205	7	16	6.2	20	13	.6	1.1	.3	34	0
JULY												
29...	1600	116	10	19	4.5	20	10	.5	.4	.3	30	0
AUG.												
25...	1700	41	15	18	6.0	0	17	.9	1.1	.4	51	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC CONDU-CTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)	PERCENT SODIUM
OCT.												
01...	8.0	.8	.1	.8	0	124	85	0	182	7.8	.17	7
29...	8.0	1.9	.1	.3	0	119	98	4	196	8.1	.16	6
DEC.												
07...	8.0	1.0	.3	.2	0	105	87	6	181	7.7	.14	6
JAN.												
18...	9.0	.7	.2	.5	0	101	81	3	168	8.0	.14	6
MAR.												
25...	7.0	.3	.1	.4	30	88	71	4	148	7.8	.12	6
APR.												
22...	5.0	.4	.1	.5	0	63	51	4	109	7.8	.09	5
MAY												
21...	5.0	.2	.0	.7	10	43	32	4	73	6.8	.06	7
JUNE												
18...	6.0	.5	.1	.3	20	45	35	7	73	6.9	.06	6
JULY												
29...	3.0	.2	.1	.1	0	34	27	2	61	6.5	.05	3
AUG.												
25...	4.0	.2	.1	.1	0	55	46	4	96	7.6	.07	5

DATE	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)	TOTAL ORGANIC CARBON (C) (MG/L)
OCT.											
01...	.1	85	9.8	.0	--	--	--	--	--	4	--
29...	.1	94	10.2	.7	--	--	--	--	--	18	--
DEC.											
07...	.1	81	11.4	.8	.04	.00	.04	.00	.04	2	--
JAN.											
18...	.1	78	11.8	1.1	.04	.16	.29	.00	.04	1	--
MAR.											
25...	.1	67	10.9	.0	.12	.61	.80	.00	.08	--	--
APR.											
22...	.1	47	11.3	3.1	.22	.19	.46	.05	--	3	--
MAY											
21...	.1	28	13.4	2.7	.05	.20	.44	.02	.14	1	--
JUNE											
18...	.1	28	11.4	3.2	.30	.29	.22	.18	.26	2	--
JULY											
29...	.0	25	9.8	1.5	.01	.00	.03	.01	.03	21	--
AUG.											
25...	.1	42	7.6	1.5	.06	.18	.23	.18	.27	20	.0

Table 5.--Continued

11-2086 25 EAST FORK KAWEAH RIVER AT SEQUOIA NATIONAL PARK BOUNDARY, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
OCT.												
01...	1400	5.4	8	10	11	0	26	1.6	3.3	1.0	90	0
29...	1330	6.4	6	--	11	0	30	1.6	3.3	.8	98	0
DEC.												
07...	1550	9.4	1	2	11	10	26	1.5	2.7	.8	85	0
FEB.												
08...	1130	23	0	5	11	0	17	1.1	2.1	.7	54	0
MAR.												
26...	1000	30	2	9	11	10	15	1.0	2.1	.7	52	0
APR.												
22...	1600	169	4	6	8.1	20	12	.7	1.3	.7	39	0
MAY												
29...	1615	528	9	23	5.4	10	8.2	.4	.9	.5	23	0
JUNE												
18...	0900	282	5	9	8.2	20	8.5	.5	.9	.3	26	0
JULY												
30...	0900	155	10	16	5.4	20	9.1	.5	.5	.4	28	0
AUG.												
25...	1200	39	13	22	7.2	0	14	.8	1.3	.5	44	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC CONDU-CTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)	PERCENT SODIUM
OCT.												
01...	7.0	.8	.1	.2	20	96	72	0	162	7.7	.13	9
29...	5.0	.8	.1	.0	0	101	82	2	169	7.9	.14	8
DEC.												
07...	7.0	1.0	.3	.2	0	93	71	1	154	7.5	.13	8
FEB.												
08...	5.0	.4	.0	.6	40	64	47	3	102	7.5	.09	9
MAR.												
26...	4.0	.2	.2	.4	30	61	42	0	97	7.5	.08	10
APR.												
22...	4.0	.4	.1	.2	0	47	33	1	78	6.8	.06	8
MAY												
29...	3.0	.3	.0	.4	10	30	22	3	49	6.8	.04	8
JUNE												
18...	3.0	.2	.1	.3	0	35	23	2	55	7.1	.05	8
JULY												
30...	3.0	.2	.1	.1	0	33	24	1	56	6.5	.04	4
AUG.												
25...	4.0	.2	.0	.1	0	50	38	2	85	7.5	.07	7

DATE	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)	TOTAL ORGANIC CARBON (TOC) (MG/L)
OCT.											
01...	.2	74	9.9	.7	.00	.51	.51	.05	.02	44	--
29...	.2	80	10.7	.7	.02	.78	.80	.08	.07	27	--
DEC.											
07...	.1	70	12.7	1.4	.51	1.7	2.4	.00	.12	--	--
FEB.											
08...	.1	44	13.6	.8	.80	.13	.85	.03	.06	--	--
MAR.											
26...	.1	43	--	.2	.41	1.1	1.6	.02	.09	--	--
APR.											
22...	.1	32	12.1	2.9	.09	.63	.70	.02	--	9	--
MAY											
29...	.1	19	11.4	3.8	.05	.12	.26	.03	.26	1	--
JUNE											
18...	.1	21	12.1	3.7	.01	.08	.19	.02	.07	1	--
JULY											
30...	.0	23	10.8	2.5	.04	.03	.06	.00	.04	7	1.0
AUG.											
25...	.1	36	9.9	1.7	.04	.17	.20	.04	.04	26	.0

Table 5.--Continued

11-2086.30 ATWELL CREEK ABOVE MINERAL KING HIGHWAY, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
MAY												
05...	1045	3.4	4	6	18	20	3.4	.6	3.0	1.1	19	0
JUNE												
19...	1000	5.6	7	17	17	30	2.5	.5	2.2	.6	16	0
JULY												
29...	1740	1.4	12	22	20	40	3.4	.6	2.8	1.3	20	0
AUG.												
26...	0750	.67	11	15	22	10	4.0	.8	3.6	1.3	25	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC CONDU-CTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)	PERCENT SODIUM
MAY												
05...	1.0	.3	.0	.0	40	36	11	0	37	7.1	.05	35
JUNE												
19...	1.0	.9	.1	.1	40	33	8	0	30	7.0	.04	36
JULY												
29...	1.0	.4	.1	.0	0	40	11	0	39	6.4	.05	33
AUG.												
26...	.0	.2	.0	.1	0	44	14	0	43	7.2	.06	35

DATE	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)	TOTAL ORGANIC CARBON (C) (MG/L)
MAY											
05...	.4	16	11.4	.0	.27	.75	.93	.10	--	3	--
JUNE											
19...	.4	13	10.8	3.3	.06	.22	.29	.03	.18	20	--
JULY											
29...	.4	16	9.6	1.7	.04	.00	.03	.01	.08	10	--
AUG.											
26...	.4	21	9.5	2.8	.04	.36	.41	.12	.16	35	1.5

Table 5.--Continued

11-2086.50. REDWOOD CREEK ABOVE MINERAL KING HIGHWAY, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
MAY												
05...	1220	10	6	9	13	20	2.7	.4	2.4	.8	14	0
JUNE												
19...	1100	6.0	11	16	17	30	3.1	.5	2.6	.7	18	0
JULY												
30...	1100	1.6	15	19	20	30	4.3	.7	3.0	1.1	24	0
AUG.												
26...	0845	.91	11	19	22	10	5.2	.8	3.6	1.0	27	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC CONDU-CTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)	PERCENT SODIUM
MAY												
05...	1.0	.4	.1	.0	10	28	8	0	29	6.8	.04	36
JUNE												
19...	1.0	.4	.1	.0	0	34	10	0	34	6.8	.05	35
JULY												
30...	.0	.4	.1	.0	0	42	14	0	46	7.0	.06	30
AUG.												
26...	1.0	.2	.0	.0	0	47	16	0	51	7.3	.06	31

DATE	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)	TOTAL ORGANIC CARBON (C) (MG/L)
MAY											
05...	.4	11	11.2	.0	.09	.38	.45	.02	--	1	--
JUNE											
19...	.4	15	11.3	2.3	.05	.16	.20	.03	.08	69	--
JULY											
30...	.4	20	9.2	.9	.04	.00	.03	.00	.07	104	--
AUG.											
26...	.4	22	8.5	1.7	.17	.28	.41	.03	.03	83	1.0

Table 5.--Continued

11-2086.80 SQUIRREL CREEK BELOW MINERAL KING HIGHWAY, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
MAY												
05...	1330	19	11	18	20	20	4.2	.8	3.9	1.5	24	0
JUNE												
19...	1230	13	16	28	24	40	4.7	.9	4.1	1.3	30	0
JULY												
30...	1240	3.6	20	29	27	100	5.7	1.2	5.0	1.9	34	0
AUG.												
26...	0950	1.4	15	19	28	60	6.0	1.2	5.5	1.7	37	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC COND-UCTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)	PERCENT SODIUM
MAY												
05...	1.0	1.0	.0	.1	30	44	14	0	48	6.8	.06	35
JUNE												
19...	1.0	.8	.2	.0	100	52	15	0	52	6.8	.07	34
JULY												
30...	1.0	1.2	.0	.0	0	60	19	0	65	6.5	.08	34
AUG.												
26...	.0	.8	.1	.1	20	61	20	0	68	7.3	.08	35

DATE	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)
MAY										
05...	.5	20	11.1	2.6	.09	.54	.63	.08	--	1
JUNE										
19...	.5	25	10.1	1.9	.13	.17	.27	.07	.12	26
JULY										
30...	.5	28	8.7	1.8	.04	.00	.03	.07	.08	--
AUG.										
26...	.5	30	8.7	1.7	.03	.27	.31	.06	.10	75

Table 5.--Continued

11-2087 15 CRUNIGEN CREEK BELOW MINERAL KING HIGHWAY, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
MAY												
05...	1445	1.2	13	19	31	10	17	2.6	6.9	1.4	76	0
29...	1200	.83	17	29	34	20	20	2.7	7.8	1.5	85	0
JUNE												
19...	1330	.95	18	24	36	40	22	3.1	8.1	1.3	92	0
JULY												
30...	1330	.16	22	31	38	40	25	3.2	9.6	1.6	106	0
AUG.												
26...	1245	.23	19	32	40	10	25	3.3	11	1.4	115	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)	PERCENT SODIUM
MAY											
05...	4.0	2.2	.1	.6	10	103	53	0	7.2	.14	21
29...	3.0	2.6	.1	1.1	0	114	61	0	7.4	.16	21
JUNE											
19...	6.0	2.4	.2	.8	0	124	68	0	7.2	.17	20
JULY											
30...	4.0	2.8	.1	.1	0	136	76	0	7.4	.18	21
AUG.											
26...	1.0	2.2	.1	.1	0	141	76	0	7.8	.19	24

DATE	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)
MAY										
05...	.4	62	10.4	5.8	--	.10	--	.05	--	8
29...	.4	70	9.6	3.0	.03	.23	.55	.04	.08	12
JUNE										
19...	.4	75	10.0	3.6	.05	.22	.44	.13	.17	167
JULY										
30...	.5	87	9.5	1.1	.15	.31	.45	.05	.07	73
AUG.										
26...	.5	94	9.1	1.3	.03	.22	.26	.05	.08	100

Table 5.--Continued

11-2087.30 EAST FORK KAWEAH RIVER NEAR THREE RIVERS, CALIF.

CHEMICAL ANALYSES, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	DIS-CHARGE (CFS)	TEMP-ERATURE (DEG C)	AIR TEMP-ERATURE (DEG C)	SILICA (SIO2) (MG/L)	DIS-SOLVED IRON (FE) (UG/L)	CAL-CIUM (CA) (MG/L)	MAG-NE-SIUM (MG) (MG/L)	SODIUM (NA) (MG/L)	PO-TAS-SIUM (K) (MG/L)	BICAR-BONATE (HCO3) (MG/L)	CAR-BONATE (CO3) (MG/L)
OCT.												
31...	1000	20	9	11	15	10	14	1.3	4.7	1.1	56	0
DEC.												
11...	1400	31	5	6	15	20	11	1.0	4.2	1.1	42	0
JAN.												
14...	1130	88	6	11	14	40	7.3	.5	3.4	.9	32	0
MAR.												
20...	1130	113	7	18	23	40	6.6	.9	4.8	1.2	34	0
MAY												
05...	1525	378	10	24	13	20	7.1	.6	2.6	.8	26	0
29...	1045	1170	10	22	7.7	20	4.6	.4	1.3	.6	16	0
JUNE												
19...	1500	720	12	33	9.3	20	4.5	.4	1.4	.5	17	0
JULY												
30...	1500	266	18	28	9.1	30	6.5	.5	1.2	.6	24	0
AUG.												
26...	1040	79	15	30	13	10	10	.8	2.6	.8	37	0

DATE	SULFATE (SO4) (MG/L)	CHLO-RIDE (CL) (MG/L)	FLUO-RIDE (F) (MG/L)	NITRATE (NO3) (MG/L)	BORON (B) (UG/L)	DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L)	HARD-NESS (CA,MG) (MG/L)	NON-CAR-BONATE HARD-NESS (MG/L)	SPECI-FIC CONO-UCTANCE (MICRO-MHOS)	PH (UNITS)	DIS-SOLVED SOLIDS (TONS PER AC-FT)	PERCENT SODIUM
OCT.												
31...	3.0	1.5	.1	.3	0	69	40	0	102	7.7	.09	20
DEC.												
11...	3.0	1.2	.3	.3	0	58	32	0	87	6.9	.08	22
JAN.												
14...	3.0	.6	.2	.7	30	46	20	0	58	7.3	.06	26
MAR.												
20...	1.0	.6	.2	.3	30	56	20	0	64	7.3	.08	32
MAY												
05...	3.0	.4	.0	.0	20	41	20	0	53	6.8	.06	21
29...	2.0	.3	.0	.2	40	25	13	0	33	6.6	.03	17
JUNE												
19...	2.0	.5	.1	.1	20	27	12	0	35	6.8	.04	18
JULY												
30...	1.0	.4	.0	.0	0	31	18	0	46	6.5	.04	12
AUG.												
26...	3.0	.4	.0	.1	0	49	28	0	73	7.4	.07	16

DATE	SODIUM AD-SORP-TION RATIO	ALKA-LINITY AS CACO3 (MG/L)	DISS-OLVED OXYGEN (MG/L)	BIO-CHEM-ICAL OXYGEN DEMAND (MG/L)	AMMONIA (NH4) (MG/L)	ORGANIC NITRO-GEN (N) (MG/L)	TOTAL NITRO-GEN (N) (MG/L)	ORTHO PHOS-PHATE (PO4) (MG/L)	PHOS-PHATE (PO4) (MG/L)	COLI-FORM (COL-ONIES PER 100 ML)	TOTAL ORGANIC CARBON (C) (MG/L)
OCT.											
31...	.3	46	9.0	1.9	--	--	--	--	--	208	--
DEC.											
11...	.3	34	12.6	1.3	.08	.13	.26	.02	.09	--	--
JAN.											
14...	.3	26	12.2	.8	.01	.30	.47	.07	.19	14	--
MAR.											
20...	.5	28	13.1	.0	.32	--	--	.12	.21	--	--
MAY											
05...	.3	21	11.7	.0	.23	.38	.56	.01	--	1	--
29...	.2	13	12.3	3.9	.00	.24	.29	.03	.19	--	--
JUNE											
19...	.2	14	11.5	2.8	.03	.11	.15	.04	.07	14	--
JULY											
30...	.1	20	10.2	4.5	.04	.00	.03	.00	.03	20	--
AUG.											
26...	.2	30	8.9	3.1	.04	.15	.20	.03	.04	18	.0

Table 6.--Daily discharge, monitoring stations in East Fork Kaweah River basin, 1969 water year

11-2086 10 MONARCH CREEK NEAR HAMMOND

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	1.1	3.6	1.8	2.6	2.4	6.9	21	56	36	21	4.5
2	1.1	1.2	5.7	1.8	2.6	2.2	6.9	21	63	35	19	4.4
3	1.1	1.6	2.0	1.9	2.4	2.1	6.1	20	57	34	19	4.3
4	1.1	1.6	1.8	2.0	2.4	2.0	5.7	18	50	34	18	4.2
5	1.1	1.4	1.7	2.2	2.2	2.0	5.9	18	45	34	16	4.2
6	1.1	1.3	1.6	2.3	2.6	1.9	5.1	17	46	34	14	4.3
7	1.1	1.3	1.6	2.4	2.4	1.9	4.4	21	45	34	14	4.1
8	1.1	1.3	1.5	2.6	2.2	1.8	4.0	28	40	33	13	4.0
9	1.1	1.4	1.5	2.5	2.2	1.8	4.0	33	35	33	13	3.8
10	1.0	1.4	1.5	2.4	2.1	1.7	3.7	36	31	34	17	3.7
11	1.0	1.3	3.8	2.3	2.2	1.7	4.1	36	27	33	14	3.6
12	1.0	1.7	2.7	2.2	2.1	1.7	5.3	36	26	33	12	3.4
13	1.2	1.6	1.7	2.3	2.1	1.6	5.9	41	28	36	12	3.4
14	2.0	1.7	1.7	2.4	2.0	1.6	6.9	43	33	32	11	3.3
15	1.5	3.6	1.8	2.2	2.1	1.6	6.1	45	35	32	11	3.3
16	1.3	2.2	1.8	2.1	2.1	1.6	5.3	47	34	32	9.6	3.3
17	1.2	2.2	1.8	2.1	2.0	1.7	6.1	52	33	32	9.1	3.3
18	1.2	2.4	1.8	2.6	2.0	1.8	7.5	51	33	30	8.4	3.2
19	1.2	2.6	1.8	5.3	2.0	1.9	7.5	51	33	30	8.0	3.2
20	1.2	2.8	1.8	4.0	1.9	1.9	11	48	33	31	7.6	3.2
21	1.1	3.0	1.8	4.3	1.9	2.0	14	53	34	31	7.2	3.1
22	1.1	3.0	1.6	4.2	1.9	2.1	16	49	36	30	6.8	3.1
23	1.1	3.0	1.7	3.4	1.9	2.2	16	44	36	30	6.5	3.0
24	1.1	2.5	1.8	3.6	2.5	2.3	14	48	36	27	6.4	2.9
25	1.1	3.6	2.0	9.0	6.8	2.4	13	49	35	26	6.0	2.8
26	1.1	4.3	2.0	4.2	5.6	2.8	13	46	34	25	5.4	2.8
27	1.1	2.2	2.0	3.6	4.3	3.2	14	45	34	25	5.2	2.7
28	1.1	2.1	2.0	3.2	2.8	3.7	17	47	33	23	5.0	2.7
29	1.1	2.0	1.9	3.0	------	4.6	18	55	34	23	4.8	2.8
30	1.3	1.8	1.9	2.8	------	5.3	19	54	36	24	4.6	2.7
31	1.1	------	1.8	2.6	------	6.5	------	49	------	23	4.5	------
TOTAL	36.0	63.2	63.7	93.5	71.9	74.0	272.4	1,222	1,131	949	329.1	103.3
MEAN	1.16	2.11	2.05	3.02	2.57	2.39	9.08	39.4	37.7	30.6	10.6	3.44
MAX	2.0	4.3	5.7	9.0	6.8	6.5	19	55	63	36	21	4.5
MIN	1.0	1.1	1.5	1.8	1.9	1.6	3.7	17	26	23	4.5	2.7
AC-FT	71	125	126	185	143	147	540	2,420	2,240	1,880	653	205

CAL YR 1968 TOTAL MEAN MAX MIN AC-FT
WTR YR 1969 TOTAL 4,409.1 MEAN 12.1 MAX 63 MIN 1.0 AC-FT 8,750

11-2088 20 EAST FORK KAWEAH RIVER BELOW MOSQUITO CREEK

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.0	6.0	7.6	10	17	16	45	118	497	233	108	33
2	5.0	6.0	8.2	9.6	16	15	45	123	479	233	103	33
3	5.0	7.9	7.2	9.6	16	14	43	114	473	228	99	32
4	5.0	7.9	7.2	9.6	15	14	42	105	414	221	97	31
5	5.0	7.6	7.2	10	15	13	43	97	386	219	89	30
6	5.0	6.9	7.2	10	14	13	39	98	370	216	79	30
7	5.0	6.9	7.2	11	14	13	35	117	350	208	74	30
8	4.7	6.6	7.6	11	14	12	33	152	270	197	70	30
9	4.7	6.6	7.6	11	14	12	33	182	195	191	69	29
10	4.7	6.9	7.9	11	14	12	32	201	180	190	92	28
11	4.7	6.9	8.6	10	14	12	36	194	175	185	89	26
12	4.7	7.9	10	10	14	12	44	195	170	188	75	24
13	6.0	7.6	7.9	12	14	11	50	210	190	226	70	23
14	9.6	7.2	8.2	12	13	11	53	221	215	200	66	23
15	7.9	11	8.6	12	14	11	47	222	220	191	63	22
16	7.2	8.6	9.0	11	14	11	46	237	230	191	60	21
17	7.2	8.2	10	10	14	12	50	266	220	181	56	20
18	7.2	8.6	10	12	13	13	55	280	229	169	54	20
19	6.9	9.0	8.0	33	14	14	57	284	231	169	51	19
20	6.6	9.3	13	24	13	14	70	281	242	168	49	19
21	6.3	9.6	14	24	13	14	88	315	245	166	47	18
22	6.0	9.6	9.5	28	13	14	99	321	268	161	45	17
23	5.7	10	9.2	24	13	16	97	266	286	167	44	18
24	5.7	10	10	23	15	17	83	318	288	146	44	19
25	5.7	9.0	10	53	46	19	74	360	257	132	43	18
26	5.4	8.6	13	39	39	21	72	357	235	122	41	18
27	5.4	8.2	16	32	28	24	77	355	233	124	40	17
28	5.4	7.9	12	25	17	28	88	363	222	115	38	16
29	5.4	7.6	11	26	------	33	97	430	215	111	36	17
30	6.3	7.6	10	20	------	37	106	488	228	115	34	17
31	6.0	------	10	18	------	43	------	522	------	114	33	------
TOTAL	180.4	241.7	292.9	560.8	470	521	1,779	7,792	8,213	5,477	1,958	698
MEAN	5.82	8.06	9.45	18.1	16.8	16.8	59.3	251	274	177	63.2	23.3
MAX	9.6	11	16	53	46	43	106	522	497	233	108	33
MIN	4.7	6.0	7.2	9.6	13	11	32	97	170	111	33	16
AC-FT	358	479	581	1,110	932	1,030	3,530	15,460	16,290	10,860	3,880	1,380

CAL YR 1968 TOTAL MEAN MAX MIN AC-FT
WTR YR 1969 TOTAL 28,183.8 MEAN 77.2 MAX 522 MIN 4.7 AC-FT 55,900

Table 6.--Continued

11-2086 25 EAST FORK KAWEAH RIVER AT SEQUOIA NATIONAL PARK BOUNDARY

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.6	7.6	9.5	12	27	20	82	184	760	288	150	35
2	5.6	7.7	11	12	24	17	81	189	719	285	141	35
3	5.5	11	9.8	12	22	17	73	175	645	280	134	34
4	5.5	10	9.5	13	22	16	71	157	571	272	128	33
5	5.5	9.5	9.1	15	21	16	74	148	534	266	118	32
6	5.5	8.8	9.1	16	14	16	65	158	541	264	104	33
7	5.5	8.4	9.1	16	20	16	56	193	514	255	96	32
8	5.5	8.4	8.8	16	23	16	54	244	429	247	90	32
9	5.4	8.4	8.8	15	19	15	53	296	334	239	89	32
10	5.4	8.8	9.5	14	19	15	54	318	266	237	122	30
11	5.4	8.8	11	13	19	15	65	310	234	233	120	27
12	5.4	11	12	13	19	14	79	315	219	230	96	26
13	7.5	9.8	9.8	18	18	14	90	332	248	264	89	24
14	14	9.1	12	20	18	14	89	339	287	244	83	24
15	9.8	13	13	17	19	14	78	337	298	235	76	23
16	8.8	12	12	16	18	15	77	364	299	233	71	22
17	8.3	12	14	15	17	16	88	413	300	221	67	22
18	8.3	12	16	16	17	18	98	436	281	210	63	20
19	8.1	12	10	50	17	18	101	434	296	213	60	20
20	7.7	12	15	39	17	19	129	437	312	211	58	20
21	7.5	12	16	64	16	18	163	476	313	210	55	20
22	7.3	12	15	47	16	18	169	470	344	207	52	20
23	7.0	12	14	36	16	21	156	410	368	208	50	19
24	6.8	12	12	72	17	25	131	483	361	188	50	18
25	6.8	11	11	213	76	29	115	511	322	175	50	18
26	6.7	10	14	114	62	34	112	507	291	168	49	18
27	6.6	10	18	68	46	40	122	496	292	170	45	18
28	6.5	9.8	14	48	24	49	138	502	272	160	42	17
29	6.5	9.5	13	39	------	58	152	579	269	156	40	18
30	9.5	9.5	13	33	------	67	169	640	282	161	37	18
31	7.9	------	12	32	------	78	------	719	------	159	36	------
TOTAL	217.4	308.1	371.0	1,124	663	758	2,984	11,572	11,201	6,889	2,461	740
MEAN	7.01	10.3	12.0	36.3	23.7	24.5	99.5	373	373	222	79.4	24.7
MAX	14	13	18	213	76	78	169	719	760	288	150	35
MIN	5.4	7.6	8.8	12	14	14	53	148	219	156	36	17
AC-FT	431	611	736	2,230	1,320	1,500	5,920	22,950	22,220	13,660	4,880	1,470

CAL YR 1968 TOTAL MEAN MAX MIN AC-FT
WTR YR 1969 TOTAL 39,288.5 MEAN 108 MAX 760 MIN 5.4 AC-FT 77,930

11-2087 30 EAST FORK KAWEAH RIVER NEAR THREE RIVERS

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	18	22	31	181	252	318	545	1,610	708	250	59
2	12	17	22	30	163	194	334	554	1,560	697	234	58
3	12	32	26	30	156	198	321	482	1,440	674	211	57
4	12	29	25	31	153	176	288	414	1,340	658	196	56
5	12	22	23	34	153	167	338	393	1,290	652	182	54
6	12	20	22	36	167	164	276	450	1,300	635	150	54
7	12	20	21	35	192	157	267	554	1,250	602	135	54
8	12	20	20	36	232	154	283	675	1,100	556	139	56
9	12	20	19	35	178	150	274	782	932	526	122	54
10	12	20	20	33	143	140	276	887	713	512	163	50
11	12	20	47	33	143	130	311	907	552	496	189	48
12	11	35	24	33	156	124	352	909	634	486	140	45
13	13	29	24	52	146	121	366	1,060	649	538	128	42
14	66	22	62	96	190	114	361	1,050	784	493	120	42
15	28	70	80	73	309	114	329	1,010	895	464	113	42
16	21	35	66	44	282	110	316	1,060	1,020	456	106	41
17	19	29	31	38	209	116	347	1,160	1,080	431	101	40
18	18	29	29	178	156	118	376	1,190	844	421	96	41
19	18	29	27	1,470	156	118	371	1,150	914	437	90	40
20	17	26	a27	483	179	116	421	1,120	564	437	86	42
21	16	26	a28	883	232	119	494	1,140	958	440	83	45
22	16	25	a28	490	232	104	554	1,080	1,010	431	82	41
23	15	25	28	316	228	118	513	1,010	1,060	416	80	38
24	15	26	47	822	603	134	404	1,140	1,100	385	78	37
25	15	24	70	2,840	430	164	393	1,220	947	357	78	35
26	15	22	56	1,490	312	174	393	1,220	787	325	75	34
27	15	22	48	626	272	192	404	1,220	758	343	72	34
28	14	21	50	402	292	216	419	1,200	719	316	71	34
29	14	21	51	320	------	241	445	1,160	708	288	68	45
30	30	21	39	280	------	280	502	1,430	719	290	64	42
31	20	------	33	236	------	302	------	1,570	------	280	60	------
TOTAL	528	775	a1,115	11,536	6,245	4,977	11,046	29,942	29,636	14,750	3,762	1,365
MEAN	17.0	25.8	a36.0	372	223	161	368	966	988	476	121	45.5
MAX	66	70	80	2,840	603	302	554	1,570	1,610	708	250	59
MIN	11	17	19	30	143	104	267	393	552	280	60	34
AC-FT	1,050	1,540	a2,210	22,880	12,390	9,870	21,910	59,390	58,780	29,260	7,460	2,710

CAL YR 1968 TOTAL 26,591 MEAN 72.7 MAX 161 MIN 11 AC-FT 52,740
WTR YR 1969 TOTAL 115,677 MEAN 317 MAX 2,840 MIN 11 AC-FT 229,400

a. Revised since 1968 report.

Table 7.--Periodic determinations of suspended sediment discharge, monitoring stations in East Fork Kaweah River basin, 1969 water year

PERIODIC DETERMINATIONS OF SUSPENDED-SEDIMENT DISCHARGE, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

DATE	TIME	WATER TEMPERATURE (°C)	DISCHARGE (CFS)	CONCENTRATION (MG/L)	SUSPENDED SEDIMENT DISCHARGE (TONS/DAY)
11-2086.05. East Fork Kaweah River below Eagle Creek					
OCT 1, 1968	0720	5	3.0	2	.02
JUN 18, 1969	1630	5	140	7	2.6
JUL 29.....	0950	9	85	1	.23
AUG 25.....	1350	14	27	2	.15
11-2086.07. East Fork Kaweah River above Monarch Creek					
JUL 29, 1969	1130	9	85	7	1.6
11-2086.10. Monarch Creek near Hammond					
OCT 1, 1968	0900	4	1.0	1	0
OCT 29.....	0930	4	.98	1	0
DEC 7.....	1100	1	1.5	1	0
JAN 18, 1969	0930	2	2.0	1	.01
FEB 8.....	1620	0	2.2	1	.01
MAR 25.....	1100	4	2.4	2	.01
APR 22.....	0900	3	16	6	.26
MAY 21.....	0900	4	52	3	.42
JUN 17.....	1300	6	29	1	.08
JUL 29.....	1330	10	25	1	.07
AUG 25.....	1440	12	6.0	2	.03
11-2086.15. East Fork Kaweah River below Monarch Creek					
OCT 15, 1968	1550	8	10	2	.05
JUN 17, 1969	1615	5	168	4	1.8
JUL 29.....	1450	11	110	2	.59
AUG 25.....	1545	12	33	2	.18
11-2086.20. East Fork Kaweah River below Mosquito Creek					
OCT 1, 1968	1100	7	4.4	6	.07
OCT 15.....	1500	8	8.0	1	.02
OCT 29.....	1100	6	5.4	1	.01
DEC 7.....	1330	2	7.4	2	.04
JAN 18, 1969	1115	2	10	1	.03
MAR 25.....	1400	4	17	11	.50
APR 22.....	1200	4	96	24	6.2
MAY 21.....	1330	5	280	32	24
JUN 18.....	1450	7	205	9	5.0
JUL 29.....	1600	10	116	3	.94
AUG 25.....	1700	15	41	2	.22
11-2086.25. East Fork Kaweah River at Sequoia National Park Boundary					
OCT 1, 1968	1400	8	5.4	2	.03
OCT 29.....	1230	6	6.5	1	.02
FEB 8, 1969	1130	0	23	7	.43
MAR 26.....	1030	2	30	14	1.1
APR 22.....	1600	4	169	18	8.2
MAY 29.....	1615	9	528	88	125
JUN 18.....	0900	5	282	8	6.1
JUL 30.....	0900	10	155	4	1.7
AUG 25.....	1045	13	39	4	.42
11-2086.30. Atwell Creek above Mineral King Highway					
MAY 5, 1969	1045	4	3.4	3	.03
JUN 19.....	1000	7	5.6	6	.09
JUL 29.....	1740	12	1.4	1	0
AUG 28.....	0750	11	.67	2	0
11-2086.50. Redwood Creek above Mineral King Highway					
MAY 5, 1969	1220	6	10	5	.14
JUN 19.....	1100	11	6.0	3	.05
JUL 30.....	1100	15	1.5	2	.01
AUG 26.....	0845	11	.91	3	.01
11-2086.80. Squirrel Creek below Mineral King Highway					
DEC 11, 1968	1220	4	1.4	20	.08
MAY 5, 1969	1330	11	19	16	.82
JUN 19.....	1230	16	13	13	.46
JUL 30.....	1240	20	3.6	4	.04
AUG 26.....	0950	15	1.4	2	.01
11-2087.15. Crunigen Creek below Mineral King Highway					
DEC 11, 1968	1305	8	.20	26	.01
MAY 5, 1969	1445	13	1.2	5	.02
MAY 29.....	1200	17	.83	5	.01
JUN 19.....	1330	18	.95	28	.07
JUL 30.....	1330	21	.16	2	0
AUG 26.....	1245	19	.23	4	0
11-2087.30. East Fork Kaweah River near Three Rivers					
OCT 31, 1968	1000	10	20	2	.11
DEC 11.....	1430	5	31	9	.75
JAN 14, 1969	1130	6	88	14	3.3
JAN 20.....	1200	6	433	50	58
MAR 20.....	1130	7	141	17	6.5
MAY 1.....	0950	7	516	24	33
MAY 29.....	1045	10	1170	83	262
JUN 19.....	1500	12	720	14	27
JUL 30.....	1500	18	266	2	1.4
AUG 26.....	1040	15	79	2	.43

Table 8.--Daily water temperature, monitoring stations in East Fork Kaweah River basin, 1969 water year

11-2086.1. MONARCH CREEK NEAR HAMMOND, CALIF.

TEMPERATURE (°C) OF WATER, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

MONTH	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVERAGE
OCTOBER																																
MAXIMUM	3	3	2	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	3
MINIMUM	1	1	2	1	1	1	1	2	2	2	2	2	3	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	3	4	4	2
NOVEMBER																																
MAXIMUM	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MINIMUM	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DECEMBER																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
JANUARY																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
FEBRUARY																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MARCH																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
APRIL																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MAY																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	4	4	4	4	4	4	4	4	4	5	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2	2	2	2	2	2	2	2	2	3	--
JUNE																																
MAXIMUM	5	5	5	5	6	6	6	6	6	6	6	6	6	6	7	7	--	--	7	7	7	8	8	8	8	7	7	7	8	8	--	7
MINIMUM	3	3	3	3	4	4	4	5	6	6	5	5	4	4	6	6	--	--	6	6	6	6	6	6	6	6	6	6	6	6	--	5
JULY																																
MAXIMUM	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	9	10	10	10	10	10	10	10	10	10	10	11	9
MINIMUM	6	7	7	7	7	7	7	7	7	7	7	8	8	8	8	7	7	8	8	8	8	9	9	9	9	9	9	9	9	9	9	8
AUGUST																																
MAXIMUM	10	10	11	11	12	11	11	11	11	12	12	12	12	12	12	11	12	11	13	13	12	13	13	13	13	13	12	12	11	11	12	12
MINIMUM	9	9	9	9	10	9	10	10	10	11	11	10	10	10	10	10	10	9	10	11	11	11	11	11	11	11	11	11	11	10	10	10
SEPTEMBER																																
MAXIMUM	12	12	12	11	11	11	11	11	11	11	10	9	9	10	9	9	9	8	8	8	8	8	7	7	7	7	7	7	6	6	--	9
MINIMUM	11	11	11	10	10	10	10	10	10	9	8	8	8	8	8	8	7	7	7	7	7	7	6	6	6	6	6	6	5	5	--	8

11-2086.2. EAST FORK KAWEAH RIVER BELOW MOSQUITO CREEK, NEAR HAMMOND, CALIF.

TEMPERATURE (°C) OF WATER, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

MONTH	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVERAGE
OCTOBER																																
MAXIMUM	10	10	9	9	10	10	9	9	8	9	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	6	8
MINIMUM	7	7	8	7	8	8	8	7	7	7	7	7	8	7	6	6	7	7	7	7	7	6	6	6	6	6	6	6	6	6	5	7
NOVEMBER																																
MAXIMUM	6	6	6	6	6	6	6	6	6	6	7	6	4	4	2	4	4	4	4	4	4	4	4	3	2	2	2	2	2	2	--	4
MINIMUM	5	5	5	4	4	4	5	5	5	6	6	4	4	2	2	2	3	4	4	4	4	3	3	2	2	1	2	1	1	2	--	3
DECEMBER																																
MAXIMUM	2	1	2	2	2	3	2	2	3	2	1	1	2	1	2	2	0	1	1	0	0	1	2	2	1	0	0	0	0	0	1	1
MINIMUM	1	0	1	1	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
JANUARY																																
MAXIMUM	2	2	2	2	3	3	2	2	3	2	2	3	2	4	2	3	2	2	0	0	0	0	0	0	1	1	1	1	1	1	1	2
MINIMUM	1	1	2	2	2	2	2	2	1	2	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
FEBRUARY																																
MAXIMUM	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	--	--	--	2
MINIMUM	1	1	1	2	1	1	1	1	1	2	2	2	1	2	1	1	1	2	1	1	2	2	1	1	1	1	1	1	--	--	--	1
MARCH																																
MAXIMUM	1	1	2	2	2	2	2	3	2	2	3	3	3	2	2	2	2	3	3	3	3	3	4	4	4	--	--	--	--	--	--	3
MINIMUM	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	--	--	--	--	--	--	2
APRIL																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	4	5	5	5	5	5	4	4	--	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4	4	4	4	4	4	4	4	4	--	--
MAY																																
MAXIMUM	4	4	4	4	5	5	5	6	5	5	5	6	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	5
MINIMUM	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	4	3	3	3	3	4	3	4
JUNE																																
MAXIMUM	4	5	5	5	6	7	7	6	6	5	6	6	7	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	--	7
MINIMUM	3	3	4	4	4	5	5	5	5	5	5	5	6	7	7	7	7	7	6	7	7	7	7	7	6	6	6	6	6	6	--	6
JULY																																
MAXIMUM	8	8	8	8	8	9	9	9	9	9	9	9	9	9	10	10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	12	10
MINIMUM	6	6	6	7	7	7	7	8	8	8	8	8	8	8	8	9	9	9	9	10	10	10	10	10	10	10	10	10	10	10	11	9
AUGUST																																
MAXIMUM	12	12	13	14	13	13	13	13	13	13	13	15	15	15	14	14	14	14	14	15	15	16	16	16	15	15	15	14	14	15	15	14
MINIMUM	10	10	12	12	11	11	11	11	12	12	12	13	13	13	13	13	13	12	12	12	13	13	13	14	13	12	12	11	11	12	12	12
SEPTEMBER																																
MAXIMUM	15	15	14	14	14	13	13	14	14	14	13	13	13	13	13	13	13	13	13	12	11	12	12	12	12	12	12	11	11	11	--	13
MINIMUM	12	12	12	11	11	12	12	12	12	11	11	11	10	11	11	11	11	10	10	11	9	10	10	9	10	10	9	9	10	10	--	11

Table 8.--Continued

11-2086.25. EAST FORK KAWEAH RIVER AT SEQUOIA NATIONAL PARK BOUNDARY, NEAR HAMMOND, CALIF.

TEMPERATURE (°C) OF WATER, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

MONTH	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVERAGE
OCTOBER																																
MAXIMUM	9	9	9	9	9	9	9	8	8	8	8	8	8	9	8	7	8	8	7	7	7	7	7	7	7	7	7	7	6	6		8
MINIMUM	8	7	7	7	8	7	7	6	7	7	7	6	7	8	6	6	6	6	6	7	6	6	6	6	6	6	6	6	6	5		6
NOVEMBER																																
MAXIMUM	6	6	6	5	4	5	6	6	6	6	6	6	5	4	4	4	4	5	4	4	4	4	4	4	4	3	--	--	--	--	--	5
MINIMUM	4	5	5	4	4	4	5	4	5	5	6	5	4	3	3	3	3	4	4	4	4	4	4	4	3	2	--	--	--	--	--	4
DECEMBER																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		--
MINIMUM	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		--
JANUARY																																
MAXIMUM	0	0	1	1	2	2	2	2	1	0	1	1	1	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
MINIMUM	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FEBRUARY																																
MAXIMUM	0	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
MINIMUM	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
MARCH																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3	3	3	3	3	3	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2	2	2	2	2	2	--
APRIL																																
MAXIMUM	4	4	4	4	4	3	4	4	4	5	5	5	4	3	4	4	5	4	5	5	5	5	4	4	5	5	5	5	5	5	--	4
MINIMUM	2	1	1	2	1	2	1	2	2	3	3	3	2	2	2	2	2	3	3	3	3	3	3	3	2	3	3	3	3	3	--	2
MAY																																
MAXIMUM	5	4	4	4	5	6	6	6	5	5	5	5	5	5	6	6	6	6	6	7	8	7	8	8	8	8	9	9	9	9	9	6
MINIMUM	3	2	3	3	3	4	4	3	3	3	3	3	3	3	4	4	4	4	4	4	5	5	6	6	6	6	6	7	7	7	7	4
JUNE																																
MAXIMUM	9	9	9	9	10	10	10	8	6	7	8	9	10	9	8	8	8	8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MINIMUM	7	7	7	7	7	7	7	6	6	6	6	6	6	7	6	6	6	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
JULY																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13	14	--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10	10	--
AUGUST																																
MAXIMUM	13	13	14	14	13	13	13	13	13	14	13	13	12	13	12	12	12	11	12	12	11	12	12	12	--	--	--	--	--	--	--	--
MINIMUM	9	10	10	11	9	9	9	9	10	11	11	10	10	9	10	10	10	8	8	9	8	8	9	9	--	--	--	--	--	--	--	--
SEPTEMBER																																
MAXIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
MINIMUM	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--

11-2087.3. EAST FORK KAWEAH RIVER NEAR THREE RIVERS, CALIF.

TEMPERATURE (°C) OF WATER, WATER YEAR OCTOBER 1968 TO SEPTEMBER 1969

MONTH	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	AVERAGE
OCTOBER																																
MAXIMUM	15	14	14	14	14	14	14	14	14	13	13	13	13	13	13	12	12	12	11	11	11	11	11	11	11	11	11	11	11	11	10	12
MINIMUM	14	14	14	14	14	14	14	14	13	13	13	12	12	13	12	11	11	11	11	11	11	11	10	10	11	11	11	11	11	11	10	12
NOVEMBER																																
MAXIMUM	10	10	10	10	9	9	8	8	8	8	9	9	9	--	--	--	8	7	7	7	7	7	7	6	6	6	5	4	3	3	--		7
MINIMUM	10	9	9	9	9	8	8	8	8	8	8	9	9	--	--	--	7	7	7	7	7	7	6	6	6	5	4	3	3	3	--		7
DECEMBER																																
MAXIMUM	3	3	3	3	3	3	4	4	4	4	6	5	4	4	5	5	5	3	2	2	2	1	2	3	3	3	2	2	2	2	2	3
MINIMUM	3	3	2	2	3	3	3	4	4	4	4	4	3	2	4	5	3	2	2	2	1	1	1	2	3	2	1	1	2	2	2	2
JANUARY																																
MAXIMUM	2	2	3	3	4	4	4	4	4	3	3	4	6	6	6	5	4	5	6	6	6	6	4	6	6	6	4	4	2	2	2	4
MINIMUM	2	2	2	3	3	4	4	4	3	3	2	3	4	6	5	4	3	3	5	6	6	4	3	3	6	4	4	2	1	1	1	3
FEBRUARY																																
MAXIMUM	3	3	3	4	4	3	2	3	3	4	4	5	5	5	5	4	5	5	3	4	4	4	4	4	5	5	5	5	--	--	--	4
MINIMUM	2	3	3	3	3	2	2	2	3	3	4	4	4	4	4	3	3	3	3	3	4	3	3	3	3	4	3	4	--	--	--	3
MARCH																																
MAXIMUM	6	6	6	4	5	5	4	4	4	4	4	4	4	5	6	7	8	8	7	7	7	8	8	8	8	8	8	9	9	9	8	6
MINIMUM	4	4	3	3	3	4	3	3	3	3	3	3	3	3	3	4	5	5	5	4	6	5	5	5	5	5	6	6	6	6	7	4
APRIL																																
MAXIMUM	8	7	7	8	8	6	7	8	7	8	10	10	9	8	7	9	9	9	9	10	10	9	7	7	7	9	9	9	10	9	--	8
MINIMUM	6	6	4	5	5	4	3	4	6	6	6	7	7	6	4	5	6	7	6	7	7	7	6	6	4	5	6	6	6	6	--	6
MAY																																
MAXIMUM	9	7	8	8	9	10	10	11	11	10	9	11	10	9	10	10	10	10	10	10	11	9	11	11	11	11	10	11	11	12	12	10
MINIMUM	6	6	7	5	6	7	7	7	6	7	7	7	7	6	6	6	7	6	6	7	7	6	7	7	7	7	7	7	7	7	7	6
JUNE																																
MAXIMUM	12	12	12	12	12	12	11	9	8	8	9	10	13	13	11	11	11	12	13	13	12	13	13	12	12	12	12	12	12	13	--	11
MINIMUM	7	7	7	7	7	7	7	7	7	7	8	8	8	8	9	8	8	8	8	9	9	8	8	9	9	8	7	8	7	7	8	--	8
JULY																																
MAXIMUM	14	14	14	13	13	13	14	14	14	14	14	14	14	15	16	16	16	16	17	16	16	17	17	17	17	17	17	18	18	17	18	15
MINIMUM	8	8	8	8	9	9	9	10	11	11	11	11	12	11	12	12	12	12	13	13	13	13	14	13	14	14	14	14	15	15	15	12
AUGUST																																
MAXIMUM	18	17	17	18	18	16	16	16	16	17	17	17	17	17	18	18	17	17	16	17	17	16	17	17	17	16	16	16	15	15	16	17
MINIMUM	13	14	14	15	14	13	13	14	14	16	15	15	15	15	16	16	16	14	14	14	14	14	14	15	14	14	14	13	13	13	13	14
SEPTEMBER																																
MAXIMUM	17	17	17	17	16	16	17	17	17	17	17	16	16	15	15	14	14	14	14	14	13	13	14	14	14	14	14	14	15	15	--	15
MINIMUM	14	15	16	14	14	14	14	16	16	16	14	14	13	14	13	13	13	13	13	13	12	12	13	13	13	13	13	13	13	14	--	14


U.S. DEPARTMENT OF THE INTERIOR
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