

### 3.4 Hydrology Study Plan

#### 3.4.1 Pertinent Issue Questions

The Hydrology Study Plan addresses Aquatic/Water issue Questions:

17. How has the Project affected the timing and natural hydrology in all Project reaches and tributaries? What are the effects on habitat and geomorphology?
43. What are the unimpaired (pre-Project) and regulated flows in the Project area? What is the range of variability of those flows?

Note that this study plan only addresses hydrology. Any environmental affects related to hydrology are addressed in other study plans such as the Channel Morphology Study Plan.

#### 3.4.2 Background

Streamflow hydrology is essential when evaluating the management of water resources. This information is used by SMUD on the Upper American River Project (UARP) and by Pacific Gas and Electric Company on the Chili Bar Project for both operations and planning. The regulated flow, diversion and storage data of the UARP and Chili Bar Project are measured by a network of gages maintained by SMUD and Pacific Gas and Electric Company and summarized in the annual California Water Supply Papers that are prepared by the USGS. The USGS certified record for various stream gages in the area of the projects includes some sites that are designed to gage low flows only. SMUD's 2001 Initial Information Package (IIP) describes the available hydrological record on the UARP.

In addition to the gages within the boundaries of the projects, there are additional gages on the South Fork of the American River above and below the confluence of the regulated flows from the UARP that will be included in this Study Plan.

#### 3.4.3 Study Objectives

The objective of this Study Plan is to develop hydrologic information to evaluate the impact of the UARP and Chili Bar Project (Combined Project) on the unregulated flow characteristics. Results from this study will be used as input to other study Plans including the Riparian, Channel Morphology, Water Balance Model, Instream Flow and a variety of recreational study plans.

The following terms will be used for the purpose of this Study Plan:

- "natural flow:" unregulated streamflow computation adjusted for regulation and diversions from upstream projects including Project 184 and the Combined Project
- "unregulated flow:" unregulated streamflow computation adjusted for regulation and diversions made by the Combined Project
- "regulated flow:" refers to the observed or measured flow (not adjusted for regulation and diversion upstream of station).

Study objectives are as follows:

#### Develop Streamflow Database

1. **Mean Daily Data:** Develop mean daily flow data at all Combined Project reservoir release points (summarized in Table 1) under unregulated conditions (without-Project or unimpaired flows) and with-Project conditions (regulated or observed flows) for the period October 1, 1975 through September 30, 2001 (WY 1976-2001). Regulated flow data for the period of investigation may be limited at some locations.
2. **Hourly Flow Data:** Evaluate diurnal fluctuations in unregulated flow for South Fork Silver Creek downstream of Ice House Reservoir and the South Fork American River below Slab Creek Reservoir using hourly flow data from representative unregulated watersheds nearby the UARP. Hourly data are available for the period WY 1990 through WY 2001.

3. **Annual Peak Flow Data:** Summarize annual peak flow data at all gage locations in the Project area with long-term regulated and unregulated peak flow information (summarized in Table 2). All available peak flow data will be used in this analysis (i.e., as early as WY 1925 through WY 2001).
4. **Monthly Accretion Flow estimates in the Project Bypass Reaches:** Synthesize monthly accretion flow data at the bottom of all project bypass reaches, including contributions from significant tributaries (summarized in Table 3). These data will be synthesized for the investigation period, WY 1976 through 2001.

#### Assess Project Effects on the Unregulated Flow Characteristics

- **Flow Statistics.** An analysis will be performed on Mean Daily Data . The analysis will be limited at some locations due to insufficient data.
- **Flood Peak Frequency Analysis:** Flood peak frequency curves (annual-event curves) will be developed from the Annual Peak Flow Data at all locations identified in Table 2, with separate curves developed for regulated and unregulated periods.
- **Diurnal Flow Analysis:** Investigate the relationship between mean daily flow and minimum or maximum daily flow during the spring snowmelt. Hourly streamflow data are readily available from the USGS after 1990. The purpose of this study is to better understand the diurnal fluctuation of the unregulated snowmelt. Hourly unregulated flow data are not available from the Project, therefore unimpaired stream gage data will be collected from nearby watersheds and analyzed. The analysis will be performed on data provided in Table 4. The results from this study may be highly variable.

#### 3.4.4 Study Area and Sampling Sites

The study area includes all Combined Project affected stream reaches, tributaries and Combined Project reservoirs as identified by the Aquatic TWG. Table 5 summarizes available USGS gage data (existing and discontinued gages) for the Combined Project area. Stream gage locations are depicted in Figure 1. Table 6 summarizes the location sites for the Low-flow Monitoring Program (monthly manual measurements during low flow season).

#### 3.4.5 Information Needed From Other Studies

No information is required from other relicensing studies to complete this study. The information developed from this study will be used in other relicensing study plans, including the Riparian, Geomorphology, Instream Flow, Spill Assessment and Recreational study plans. Data will be obtained from El Dorado Irrigation District's FERC Project 184 hydrological analysis. For the purpose of the UARP relicensing, the EID will be considered inflow only: that is, SMUD will not verify or alter EID's data.

#### 3.4.6 Study Methods and Schedule

The tasks of the Study Plan are:

- Define the regulated flow conditions for points described in Table 1
- Define the unregulated flow conditions for points described in Table 1
- Define the natural flow conditions for the South Fork American River below Slab Creek Dam and the South Fork American River near Placerville
- Summarize additional data (hourly streamflow data and annual peak flow data)
- Develop monthly accretion flows in the Project bypass reaches and evaluate background inflow to project reservoirs (Table 3)
- Assess Project effects on the unregulated flows using various tools such as:
  - Indicators of Hydrologic Alteration (IHA)
  - Flood Peak Frequency Analysis
  - Diurnal Flow Analysis

Each of the phases described above will be discussed below. Work is scheduled to be completed sometime in late 2002.

#### 3.4.6.1 Regulated Flows

Regulated flows will be reviewed and missing data estimated using UARP records (e.g., reservoir storage and spill, powerhouse draft and precipitation data) and/or streamflow records from nearby watersheds with similar characteristics (e.g., watershed elevation, basin geology). When missing data cannot be reconstructed from the UARP records, or when synthesized data result in negative numbers, best professional judgment will be applied to estimate the missing data. Adjustment techniques and data modifications will be presented to the Aquatic TWG. Data preparation includes 1) data review; and 2) estimation of missing record. Some of the regulated flow data for the Project was provided to the Aquatic TWG in CD format (dated January???, 2002).

#### 3.4.6.2 Unregulated Flows

Unregulated flows will be computed using the records available from the USGS and the Combined Project records via a mass balance or other synthesis techniques. Unregulated flows will be adjusted for net evaporation at all reservoirs. Missing data will be estimated using streamflow records from nearby watersheds with similar characteristics (e.g., watershed elevation, basin geology). Data to be used in the analysis includes all streamflow gage data in Table 5 (all available record) and the stations summarized in Table 4. Similar techniques will be applied to extend the hydrologic record, if necessary, to develop a record for the entire investigation period. Data preparation includes 1) computation of unregulated flow; 2) estimation of missing record; 3) evaluation of data homogeneity (data consistency).

At locations where historical data are available, an analysis will be performed to compare annual flow characteristics of the investigation period, WY 1976 through WY 2001, to the long-term record, mid-1920's through WY 2001.

#### 3.4.6.3 Natural Flows

“Natural flows” will be computed for the South Fork American River below Slab Creek Dam and the South Fork American River near Placerville using the unregulated flows from this Study Plan and the South Fork American unregulated inflow to Slab Creek Reservoir as computed by El Dorado Irrigation District.

#### 3.4.6.4 Summarize Additional Streamflow Data

Additional analysis of hydrological data is required for other Study Plans. This section describes the data requirements for the additional studies.

Frequency curves generated from the peak flow data will be used in the Geomorphology and Riparian study plans. The USGS has collected and archived annual peak flows at all streamflow gaging sites described in Table 2. Data will be collected, reviewed and summarized in tables.

SMUD has been requested to investigate the relationship of mean daily flow to the minimum and maximum daily flow during the spring snowmelt at the site below Ice House Reservoir. The purpose of the investigation is to develop a better understanding of the unregulated diurnal flow pattern downstream of Ice House Reservoir and Slab Creek Reservoir. There was a gaging site at this location prior to the construction of the reservoir at Ice House, but only mean daily flows are available. Nevertheless, the USGS has, since 1990, recorded and stored 15-minute observations, which are available upon request. Data will be collected from nearby streamflow gages (Table 4). The analysis to be performed is described in the following section.

SMUD has also been requested to evaluate accretion flow downstream of Project facilities in Project bypass reaches as well as background flows in major tributaries feeding Project reservoirs. Using existing gage records from locations identified in Table 5, SMUD will synthesize monthly flow statistics for each of the stations identified in Table 3. In addition, SMUD will institute a program to measure, on a monthly basis, low flows at locations identified in Table 6. These data will be used to validate some of the synthesized monthly flow estimates. It is anticipated that the program will be on-line by summer of 2002.

#### 3.4.6.5 Assess Project Effects on Unregulated Flows

The following studies will be performed on the data collected in Section 3.4.6.1 through 3.4.6.3.

##### 3.4.6.5.1 *IHA Analysis*

To assess combined Project effects on the unregulated flow characteristics, flow characteristics will be computed and comparison tables prepared for the regulated and unregulated flow condition. The IHA methodology, as described by Richter et al. (1996), will be applied. Richter suggests that the hydrologic attributes of a stream can be described by five fundamental groups of “statistics”. The five groups are:

- Group #1: Magnitude of monthly water conditions
- Group #2: Magnitude and duration of annual extreme water conditions
- Group #3: Timing of annual extreme water conditions
- Group #4: Frequency and duration of high and low pulses
- Group #5: Rate and frequency of change in water conditions

Statistics will be computed for the five IHA Groups using software developed by Smythe Scientific Software. The IHA methodology will be applied at most locations summarized in Table 1 (due to data limitations, it may not be possible to perform the analysis at all sites).

##### 3.4.6.5.2 *Flood Peak Frequency Analysis*

A flood peak frequency analysis will be performed at locations described in Table 2. This analysis will be performed on instantaneous annual peak flow data (rather than mean daily values) collected by the USGS.

##### 3.4.6.5.3 *Diurnal Flow Analysis*

As discussed in Section 1.1.6.4, SMUD has been requested to investigate the relationship of mean daily flow to the minimum and maximum daily flow during the spring snowmelt at the site below Ice House Reservoir. An hourly time-step has been selected for the analysis. Historical unimpaired hourly flow data are not available at this site so unimpaired stream gage data from nearby watersheds will be analyzed. The relationships will be explored at sites listed in Table 4. The anticipated results of this study are unclear. Results could be extremely variable since the relationship may be influenced by various basin characteristics (e.g., aspect, shape of basin, travel time, geology of basin). If reasonable results are obtained, they will be included in the Recreational Flow Study Plan.

##### 3.4.6.5.4 *Water Year Types*

Water year types will be discussed/developed after the Hydrology Study Plan is completed.

#### 3.4.7 Study Output

A hydrology presentation will be made to the Aquatics TWG and the Plenary Group in late 2002. A report will be prepared documenting basic data used in analysis, record estimation, adjustments and extension techniques, data used in analysis and study results. The report will be prepared in a format to be incorporated into the Licensee’s draft environmental assessment report that will be submitted to FERC with the Licensee’s application for a new license in the form of a CD.

#### 3.4.8 Preliminary Estimated Study Cost

An estimated cost for this study will be prepared after approval by the Plenary Group.

### 3.4.9 TWG and Plenary Endorsement

The Aquatics TWG gave tentative approval to this plan at the June 24, 2002 TWG meeting; the document was circulated for a final electronic review, with no comments received. The Aquatics TWG gave final approval of this plan, as amended, on August 5, 2002. The participants at the meeting who said they could “live with” this study plan were Camp Lotus, California Sportfishing Protection Alliance, US Forest Service, Pacific Gas and Electric, National Marine Fisheries Service, State Water Resources Control Board and SMUD. None of the participants at the meeting said they could not “live with” this study plan. The Plenary Group gave approval of this plan at the August 7, 2002 Plenary Group meeting. The participants at the meeting who said they could “live with” this study plan were Taxpayers of El Dorado County, USFS, El Dorado County Water Agency, State Water Resources Control Board, El Dorado County Citizens for Water, National Park Service, US Bureau of Land Management, Placer County Water Agency, City of Sacramento, PG&E and SMUD. None of the participants at the meeting said they could not “live with” the study plan.

### 3.4.10 Literature Cited

Sacramento Municipal Utility District. 2001. Initial Information Package for Relicensing of the Upper American River Project (FERC Project No. 2101). Sacramento, CA.

Sacramento Municipal Utility District, 2002. UARP Regulated Hydrology (Pre-Project & With Project), Version 2, January 2002. . Sacramento, CA.

#### ***AQUATIC TWG NOTE***

1. *The Aquatic TWG recognizes that there may be additional flow data that may need to be collected or synthesized for the Water Quality studies.*

Sacramento Municipal Utility District  
Upper American River Project  
FERC Project No. 2101

<b>Table 1. Combined Project Reservoir Release Points</b>	
Rubicon River below Rubicon Dam	Silver Creek below Junction Dam
Little Rubicon River below Buck Island Dam	Silver Creek below Camino Dam
Gerle Creek below Loon Lake	Brush Creek below Brush Creek Dam
South Fork Rubicon River below Robbs Peak Dam	South Fork American River below Slab Creek Dam
Gerle Creek below Gerle Creek Dam	South Fork American River near Placerville
South Fork Silver Creek below Ice House Dam <sup>1/</sup>	

<sup>1/</sup> Only regulated flows subsequent to the completion of Jones Fork PH will be developed at this site.

<b>Table 2. USGS Instantaneous Peak Flow Data to be used in Flood Frequency Analysis</b>		
<b>USGS Number</b>	<b>USGS Description</b>	<b>Period of Record</b>
<i>Location of regulated and unregulated comparison</i>		
11441500	South Fork Silver Creek near Ice House, CA	10/1/24 to 12/31/57 (unregulated) 1/58 to present (regulated by Project)
11442000 <sup>1/</sup>	Silver Creek near Placerville, CA	5/1/22-9/30/61 (unregulated)
11441900	Silver Creek below Camino Diversion Dam, CA	10/1960 to present (regulated)
11443500	South Fork American River near Camino, CA	10/1922 to 12/31/57 (no regulation by SMUD) 1/1/58 to present (regulated by Project)
11444500	South Fork American River near Placerville, CA	10/1/1911 to 12/31/57 (no regulation by SMUD) 1/1/58 to present (regulated by Project)
<i>Location of regulated or unregulated analysis only</i>		
11429500	Gerle Creek below Loon Lake Dam near Meeks Bay, CA	9/1962 to present
11430000	South Fork Rubicon River below Gerle Creek near Georgetown, CA	8/1961 to present
11441000	Silver Creek at Union Valley, CA	10/1/24-12/31/27 10/1/28-1/31/50 7/27/50-2/28/51 8/31/51-9/30/60
11445500	South Fork American River near Lotus	1951 to 1995

<sup>1/</sup> The gage at Silver Creek below Camino Diversion Dam is upstream of the original gage. One site will be adjusted for precipitation and drainage area.

<b>Table 3. Locations throughout the Project area where monthly flow statistics will be synthesized to evaluate accretion flow in project bypass reaches and inflow from major tributaries to Project reservoirs</b>
Rubicon River inflow to Rubicon Reservoir
Highland Creek inflow to Rockbound Reservoir
Little Rubicon River outflow from Rockbound Lake
Jerrett Creek upstream of confluence with Gerle Creek
Barts/Dellar Creek upstream of confluence with Gerle Creek
Rocky Basin Creek upstream of confluence with Gerle Creek
S.F. Rubicon River upstream of confluence with Gerle Creek
Gerle Creek inflow to Gerle Creek Reservoir
S.F. Rubicon River upstream of Rubicon River
Tells Creek inflow to Union Valley Reservoir
Big Silver Creek inflow to Union Valley Reservoir
Jones Fork Silver Creek inflow to Union Valley Reservoir
S.F. Silver Creek 3-4 miles downstream of Ice House Reservoir
S.F. Silver Creek upstream of Big Hill Canyon
Little Silver Creek inflow to Junction Reservoir
Silver Creek immediately upstream of S.F. American River
S.F. American River upstream of confluence with Silver Creek
S.F. American River upstream of Camino Powerhouse
S.F. American River downstream of Camino Powerhouse
Slab Creek inflow to Slab Creek Reservoir
S.F. American River outflow from Slab Creek Reservoir (upstream of Iowa-Brushy Canyon Creek Confluence)
S.F. American River between Slab Creek Reservoir and Rock Creek
Rock Creek upstream of confluence with S.F. American River

USGS Number	USGS Description	Nature Of Data	Gage Elevation (feet) <sup>1</sup>	Drainage Area (sq-mi)	Period Of Record
10336660	Blackwood Creek near Tahoe City, CA	Hourly and mean daily flow	6240	11.2	10/1/1960 to present
10336676	Ward Creek at Hwy 89 near Tahoe Pines, CA	Hourly and mean daily flow	6230	9.7	10/1/1972 to present
10336780	Trout Creek near Tahoe Valley, CA	Hourly and mean daily flow	6250	36.7	10/1/1960 to present
11427700	Duncan Creek near French Meadows, CA	Hourly and mean daily flow	5270	9.9	10/1/1960 to present
11431800	Pilot Creek above Stumpy Meadows, CA	Mean daily flow	4280	11.7	10/1/1960 to present
11264500	Merced River at Happy Isle Bridge, near Yosemite, CA	Hourly flow	4017	181	10/1/1989 to present
11266500	Merced River at Pohono Bridge, near Yosemite, CA	Hourly flow	3862	321	10/1/1989 to present
11427000	North Fork American River at North Fork Dam	Hourly flow	715	342	10/1/1989 to present

USGS Number	USGS Description	Nature Of Data	Gage Elevation (feet) <sup>1</sup>	Drainage Area (sq-mi)	Period Of Record <sup>4/</sup>
<b>Stream/River Flow Gages</b>					
11427960	Rubicon River below Rubicon Dam near Meeks Bay, CA	Low flow only (<10 cfs) does not record dam spill	6,520	29.8	Unpublished: 1964 to 1991 Published: 10/91 to present
11428000 <sup>3</sup> (formally gage 391)	Rubicon River at Rubicon Springs, CA	Entire record prior to UARP. Gage was located downstream of present Rubicon Dam, 0.75 mile upstream of Miller Creek		31.6	2/1/10-12/31/13 10/1/56 –9/30/62
11428400	Little Rubicon River below Buck Island Dam near Meeks Bay, CA	Low flow only (<2 cfs) does not record dam spill	6,420	6.0	Unpublished: 1964 to 1990 Published: 10/1990 to present
11429500	Gerle Creek below Loon Lake Dam near Meeks Bay, CA	Records Loon Lake spill and release	6,250	8.0	9/1962 to present
11430000	South Fork Rubicon River below Gerle Creek near Georgetown, CA	Records release and spill from Gerle and Robbs Peak Reservoirs	4,970	47.6	8/1961 to present
11441000 <sup>3</sup> (formally gage 414)	Silver Creek at Union Valley, CA	Entire record prior to UARP. Gage was located near present Union Valley Dam, 0.6 mile downstream of confluence of Big Silver and Jones Fork creeks.		82.7	10/1/24-12/31/27 10/1/28-1/31/50 7/27/50-2/28/51 8/31/51-9/30/60
11441500 <sup>3</sup> (formally gage 415)	South Fork Silver Creek near Ice House, CA	Entire record prior to UARP. Gage was located near the present Ice House Dam, 0.3 mile downstream of Peavine Creek	5,290	27.2	10/1/24-12/31/57
11441500	South Fork Silver Creek near Ice House, CA	Records Ice House Dam spill and release	5,290	27.5	1/58 to present
11441800	Silver Creek below Junction Dam near Pollock Pines, CA	Low flow only (<30 cfs) does not record dam spill	4,280	147	Unpublished: 1965 to 1987 Published: 10/1987 to present
11441900	Silver Creek below Camino Diversion Dam, CA	Records Camino Dam spill and release plus Round Tent Canyon	2,754	171	10/1960 to present
11442000 <sup>3</sup> (formally gage 417)	Silver Creek near Placerville, CA	Entire record prior to UARP. Gage was located 0.2 mile upstream of confluence with SFAR.		177	5/1/22-9/30/61

<b>Table 5. Existing and discontinued United States Geological Survey gage records in the Combined Project Area</b>					
<b>USGS Number</b>	<b>USGS Description</b>	<b>Nature Of Data</b>	<b>Gage Elevation (feet)<sup>1</sup></b>	<b>Drainage Area (sq-mi)</b>	<b>Period Of Record<sup>4</sup></b>
11442700	Brush Creek below Brush Creek Dam near Pollock Pines, CA	Flow released from Brush Creek Dam, spill not recorded	2,700	8.0	Unpublished: 1971 to 1987 Published: 10/1987 to present
11443500	South Fork American River near Camino, CA	Records Slab Creek Dam spill and release	1,625	493	10/1922 to present
1144500	South Fork American River near Placerville	Records Chili Bar Reservoir spill and release	920	598	1911-1920 1964 to present
11445500	South Fork American River near Lotus	Records flow below Lotus	673	635	1951 to 1995
<b>Powerhouse and Tunnel Flow</b>					
11427940	Rubicon-Rockbound Tunnel near Meeks Bay, CA	Flow that is diverted to Buck Island Reservoir	6,533	N/A <sup>3</sup>	10/1963 to present
11428300	Buck-Loon Tunnel near Meeks Bay, CA	Flow that is diverted from Buck Island to Loon Lake	6,425	N/A	10/1963 to present
11429300	Robbs Peak Powerplant	Flow through powerhouse	4,827	N/A	10/1962 to present
11429340	Loon Lake Powerplant	Flow through powerhouse	5,270	N/A	10/1974 to present
11440900	Jones Fork Powerplant	Flow through powerhouse	4,870	N/A	10/1984 to present
11441002	Union Valley Powerplant	Flow through powerhouse	4,435	N/A	10/1972 to present
11441780	Jaybird Powerplant	Flow through powerhouse	2,920	N/A	10/1991 to present
11441895	Camino Powerplant	Flow through powerhouse	1,848	N/A	10/1973 to present
11443460	White Rock Powerhouse	Flow through powerhouse	990	N/A	3/1972 to present
<b>Reservoir Elevation</b>					
11429350	Loon Lake near Meeks Bay, CA	Daily Observation at midnight	N/A	8.0	12/1963 to present
11429600	Gerle Reservoir near Meeks Bay, CA	Daily Observation at midnight	N/A	28.7	10/1990 to present
11441001	Union Valley Reservoir near Riverton, CA	Daily Observation at midnight	N/A	83.7	11/1962 to present
11441100	Ice House Reservoir near Kyburz, CA	Daily Observation at midnight	N/A	27.2	10/1959 to present
11441760	Junction Reservoir near Pollock Pines, CA	Daily Observation at midnight	N/A	147	Unpublished: 1980 to 1991 Published: 10/1991 to present
11441890	Camino Reservoir near Pollock Pines, CA	Daily Observation at midnight	N/A	160	Unpublished: 1980 to 1991 Published: 10/1991 to present
11442690	Brush Creek Reservoir near Pollock Pines, CA	Daily Observation at midnight	N/A	8.0	Unpublished: 1980 to 1991 Published: 10/1991 to present
11443450	Slab Creek Reservoir near Camino, CA	Daily Observation at midnight	N/A	493	Unpublished: 1969 to 1986 Published: 5/1987 to present

<sup>1/</sup> Powerplant elevation is based on centerline of turbines.

<sup>2/</sup> N/A means not applicable.

<sup>3/</sup> Gage discontinued.

<sup>4/</sup> The quality or time-step of the unpublished USGS record is uncertain.

<b>Table 6. Locations throughout UARP area where monthly flow low flow measurements will be taken to supplement synthesized monthly flow estimates.</b>
Rubicon River inflow to Rubicon Reservoir
Highland Creek inflow to Rockbound Reservoir
Little Rubicon River outflow from Rockbound Lake
Jerrett Creek Upstream of confluence with Gerle Creek
Barts/Dellar Creek upstream of confluence with Gerle Creek
Rocky Basin Creek upstream of confluence with Gerle Creek
S.F. Rubicon River upstream of confluence with Gerle Creek
Gerle Creek inflow to Gerle Creek Reservoir
S.F. Rubicon River inflow to Robbs Peak Reservoir
Tells Creek inflow to Union Valley Reservoir
Big Silver Creek Inflow to Union Valley Reservoir
Jones Fork Silver Creek inflow to Union Valley Reservoir
S.F. Silver Creek inflow to Ice House Reservoir
S.F. Silver Creek 3-4 miles downstream of Ice House Reservoir (one time)
S.F. Silver Creek upstream of Big Hill Canyon (one time)
Little Silver Creek inflow to Junction Reservoir
Silver Creek inflow to Camino Reservoir
Silver Creek upstream confluence with S. F. American River
Slab Creek inflow to Slab Creek Reservoir (one time)
S.F. American River between Slab Creek Reservoir and Rock Creek
Rock Creek, upstream of confluence with S.F. American River
S.F. American River upstream of White Rock Powerhouse

*[Insert Figure B1.2-1 from IIP that shows the location of all the USGS gages]*  
*\*\*\*[Note: Cheri, you have this file]*