

**SACRAMENTO MUNICIPAL UTILITY DISTRICT  
UPPER AMERICAN RIVER PROJECT  
(FERC Project No. 2101)**

**and**

**PACIFIC GAS AND ELECTRIC COMPANY  
CHILI BAR PROJECT  
(FERC Project No. 2155)**

**RECREATIONAL FLOW (Downstream Reach below Chili  
Bar Dam) TECHNICAL REPORT**

**Prepared by:**

Devine Tarbell & Associates, Inc.  
Sacramento, California

The Louis Berger Group  
Oakhurst, California

**Prepared for:**

Sacramento Municipal Utility District  
Sacramento, California

**and**

Pacific Gas and Electric Company  
San Francisco, California

**SEPTEMBER 2004**

Version 1

## TABLE OF CONTENTS

<b>Section &amp; Description</b>	<b>Page</b>
1.0 INTRODUCTION .....	2
2.0 BACKGROUND .....	3
2.1 Recreational Flow Study Plan (Downstream Reach below Chili Bar Dam) .....	3
2.2 Water Year Types .....	4
2.3 Recreation TWG Determination of Adequacy .....	9
3.0 METHODS .....	10
3.1 Preliminary Range of Flow Scenarios .....	10
3.2 Review Existing Information .....	10
3.3 Interviews .....	11
3.4 Analysis of Hydrologic Information .....	12
3.5 Operational Constraints and Inter-relationships of the Projects .....	12
4.0 RESULTS .....	13
4.1 Preliminary Range of Flow Scenarios .....	13
4.2 Research Literature Review .....	14
4.2.1 Water Temperature .....	15
4.2.2 Flow Criteria .....	17
4.3 Wild and Scenic River Status .....	17
4.4 Regional Recreation Significance .....	18
4.4.1 Whitewater Recreation .....	18
4.4.2 Non-whitewater Recreation .....	19
4.5 Operational Constraints and Inter-relationships of the Projects .....	20
4.6 Key Contact Interviews .....	22
4.6.1 Locations of Whitewater Recreational Activities .....	22
4.6.2 Locations of Non-whitewater Recreational Activities .....	23
4.6.3 Timing of Non-whitewater Recreational Activities .....	24
4.6.4 Characteristic Needs Associated with Non-whitewater Recreational Activities .....	24
4.7 Hydrology .....	26
4.8 Hydrology on an Unregulated River .....	31
5.0 ANALYSIS .....	31
5.1 Whitewater Boating .....	31
5.2 Non-whitewater Recreation .....	32
6.0 FINDINGS .....	33
7.0 LITERATURE CITED .....	33

**LIST OF TABLES**

<b>Table &amp; Description</b>	<b>Page</b>
2.2-1 Application of UARP Relicensing Plenary Group water year types for the period from Calendar Year 1975 through 2001 .....	9
2.3-1 Response to Recreation TWG comments on Recreational Flow (downstream of Chili Bar) Study Technical Report, dated March 2004 .....	10
4.2-1 Range of water temperature and mean monthly water temperature in the SFAR downstream of Chili Bar Dam for the period 1983 to 1994 (PG&E 2003).....	17

## LIST OF FIGURES

<b>Figure &amp; Description</b>	<b>Page</b>
4.2-1 Water temperature (based on fifteen minute average readings from a temperature recorder) at SFAR below Lotus, Aug. 1999-Sept. 2000.....	16
4.2-2 Average number of boatable days per month for four water year types based on unimpaired and synthesized hydrology information. Criteria for a boatable day using the impaired data was a continuous flow of at least 1,200 cfs occurring at least between 8 a.m. and 1 p.m. Criteria for a boatable day using the synthesized unimpaired data was a mean daily flow of 1,200 cfs or greater .....	29
4.2-3 Average number of boatable days on Saturday or Sunday, per month for four water year types based on unimpaired and synthesized hydrology information. Criteria for a boatable day using the impaired data was a continuous flow of at least 1,200 cfs occurring at least between 8 a.m. and 1 p.m. Criteria for a boatable day using the synthesized unimpaired data was a mean daily flow of 1,200 cfs or greater .....	30

## LIST OF APPENDICES

### Appendix & Description

---

APPENDIX A	STRAWMAN FLOW PROPOSAL, SOUTH FORK AMERICAN RIVER
APPENDIX B-1	REGULATED AND SYNTHESIZED UNIMPAIRED MEAN DAILY FLOWS AND NUMBER OF BOATABLE DAYS FOR 1993 TO 2001.
APPENDIX B-2	AVERAGE HOURLY REGULATED FLOWS FOR EACH MONTH, 1993 TO 2001(PROVIDED ON CD ONLY)
APPENDIX C	HYDROLOGY DATA FOR THE MERCED RIVER (AN UNREGULATED RIVER)(PROVIDED ON CD ONLY)

## LIST OF APPLICABLE STUDY PLANS

### Description

---

- Recreational Flow Study Plan (Downstream Reach below Chili Bar Dam)

## 8.6 Recreational Flow Study Plan (Downstream Reach below Chili Bar Dam)

### 8.6.1 Pertinent Issue Questions

The Recreational Flow Study addresses the following recreational resource questions:

- 3b. What are the effects of boating flows on water levels of UARP/Chili Bar Project reservoirs?
19. Can there be a flow management hydrology model (unimpaired hydrograph) built with a whitewater filter that estimates flows assuming UARP/Chili Bar presence and absence?
25. What are the impacts of the combined UARP and Chili Bar Projects on all types of recreation downstream of Chili Bar Dam?
- 31b. What are been the benefits of recreation associated with the UARP/Chili Bar Projects?
- 40/48. Are there any and, if so, what is the status of any identified/designated Wild and Scenic river reaches (e.g. USFS, BLM, NRI, or State of California) affected by the UARP/Chili Bar Projects?
41. What are the combined impacts to recreation relative to flows and reservoir levels of the UARP and Project 184 (Silver Creek to confluence downstream)?
69. What are the effects of UARP/Chili Bar Projects operation on whitewater boating in the 20-mile reach below Chili Bar dam?
- 1b. Is it possible to have consistent and regular releases that support boating in the reach below Chili Bar? *[This question will also be addressed in the Recreation Plan because it's a trade-off question.]*
16. Can we provide whitewater boating flow information in advance for different stretches in the Project area, such as flow phone, website, flow modeling for 1-week intervals, and past releases? *[This question will also be addressed in the Recreation Plan because it's a trade-off question.]*
74. How could operational changes to existing UARP facilities enhance the established whitewater-based recreational industry in ElDorado County? What would be the economic consequences to UARP?

### 8.6.2 Background

The Recreational Flow Study (downstream reach below Chili Bar Dam) primarily evaluates how operation of the UARP and Chili Bar Projects (Projects) affect the flow dependent recreational opportunities of fishing, swimming, gold panning, dredging and whitewater boating between Chili Bar Dam and Folsom Reservoir. Available existing whitewater boating information, which has been developed over the years, will be used where appropriate. New information will be developed for swimming, fishing, recreational gold panning and dredging and other types of flow-dependent day use activities. This study will evaluate potential operational changes to enhance recreational use, including constraints, issues, impacts and trade-offs. This study will work in cooperation with the Aquatics TWG to allow the Aquatics TWG to take advantage of any flows that may be considered during the recreational use evaluation.

Because this study addresses issues that are affected by the Projects, SMUD and PG&E will cooperatively conduct the study so that results can be used in both the UARP relicensing and the Chili Bar Project relicensing.

### 8.6.3 Study Objectives

The objectives of this study include:

- Describe existing fishing, swimming, recreational gold panning, dredging and whitewater boating opportunities and other types of flow-dependent day use activities below Chili Bar Dam.
- Identify the regional significance of existing and potential fishing, swimming, gold panning, dredging, whitewater boating opportunities and other types of flow-dependent day use activities below Chili Bar Dam.
- Determine how water year type, flow (including water temperature) and timing affect these opportunities.
- Identify the minimum, optimum and maximum flow regimes (including timing, duration and volume) for each of the identified flow-dependent recreation opportunities. Provide this information to the Aquatics TWG to determine if the Aquatics TWG can take advantage of the identified flows for study purposes.
- Answering the pertinent issue questions identified in 7.5.1

#### 8.6.4 Study Area and Sampling Locations

The study area is defined as the SFAR between Chili Bar Dam and Folsom Reservoir. The analysis of regional significance of the recreational opportunities within the scope of the study will rely on a larger study area, which will include all rivers in Central California.

#### 8.6.5 Information Needed From Other Studies

The pre- and post-Projects hydrograph (with data in graphical and tabular form) for the 20-mile reach below Chili Bar Dam and reservoir level information is needed from the Hydrology Study. The Recreation TWG needs hourly or better flow and reservoir level data, where available. Supply and Demand Studies will provide regional perspective information.

#### 8.6.6 Study Methods and Schedule

The Recreational Flow Study will include several methodologies: 1) development of a preliminary range of flow scenarios to provide other TWG's, 2) review existing information, 3) interviews with key contacts, 4) analysis of hydrologic information, 5) operational constraints/inter-relationships between the Projects and 6) if necessary, a flow evaluation by representative user groups. If there is insufficient reliable data to determine minimum, optimum and maximum flows, the Licensees will develop a study plan to evaluate the suitability of different flows for all recreational activities.

1. PRELIMINARY RANGE OF FLOW SCENARIOS – A sub-group of local technical experts have developed a preliminary range of flow scenarios for whitewater boating that include the quantity of the flow in terms of the time of year, day of the week and time of day. This information is important to provide to other TWG's to make sure the effects of these possible flow scenarios on other resources are studied in the course of relicensing. The Recreation TWG reviewed the preliminary set of flow scenarios at its February 19, 2002, meeting and forwarded them to the Aquatics TWG.

2. REVIEW EXISTING INFORMATION – Existing information sources that relate to the recreational resources in the study area will be reviewed and summarized. There are planning documents and monitoring sources of information that can provide descriptions, use level information for the range of recreational uses, minimum, optimum and maximum whitewater flows and benefits of flow-dependent activities below Chili Bar Dam. These include the EDC River Management Plan (and supporting planning documents) and EDC & BLM monitoring data. Websites, recreation guides, chamber of commerce publications, BLM Land Management Plan, Wild and Scenic River Inventory (both state and federal) and similar publicly available information will be used to identify regional recreation opportunities and the existing & potential significance of the recreational resources in the study area. Information in recreational research literature regarding suitable flow, depth and water temperature ranges for swimming, recreational gold panning, dredging, and fishing will be reviewed and used to refine ranges of suitable flows for these flow-dependent activities (Note: The range of suitable flows for these uses will be initially determined from interviews with key contacts and the literature standards will be used to supplement the findings). Review ways that are used to provide current and predicted whitewater boating flow information. This information will be compiled beginning in the summer of 2002.

3. INTERVIEWS – The Licensees will conduct interviews with key contacts. The purpose of these interviews will be to obtain a perspective on the nature of and needs associated with flow-dependent recreation activities including whitewater boating, swimming, recreational gold panning, dredging and angling between Chili Bar Dam and Folsom Reservoir. Key contacts will be asked about locations of activities and flow-related needs that may exist for flow-dependent activities associated with their commercial operation or recreational interest. These local key contacts may include: agency representatives, El Dorado County Parks representatives, boating experts, fishing organizations, (i.e., fishing clubs, CSPA) and recreation facility operators in the Coloma area (American River Resort, Coloma Resort, Ponderosa Park, Marshall Gold Discovery Park, Henningson Park). A questionnaire will be developed to conduct the interviews in the summer and fall of 2002.



4. FOCUS GROUP – The Licensees will attempt to determine the range of suitable flows and water temperature for swimming, recreational gold panning, dredging and angling from interviews with key contacts and existing information as described above. Interview data will be reviewed relative to existing standards in recreation research literature to determine minimum, optimum and maximum flows for swimming, recreational gold panning, dredging and fishing. If there is insufficient reliable data to determine minimum, optimum and maximum flows, the Licensees will develop a study plan to evaluate the suitability of different flows for these activities using representative groups of users of swimmers, recreational gold panners and anglers. Potential recommended flow regimes will be forwarded to the Aquatics TWG.

5. ANALYSIS OF HYDROLOGIC INFORMATION – The available historical flow information will be summarized to display the flows in the study area under pre- and post-Project conditions. The data will be presented for the entire year. The data will be sorted by the type of water year (e.g., critically dry, dry, below normal, above normal and wet); graphs of the data as well as the tabular data will be provided. Daily flows will be presented and, where available, hourly flow data will also be presented. This information will be developed as part of the Hydrology Study, which is scheduled to have study results available late in 2002. Selected historical events reflected in the flow record such as deregulation, the power crisis and the cooperation between SMUD, PG&E and the boating community will be identified and explained as case studies. This information will be used to determine the volume and timing of water releases that have occurred under regulated conditions in the 20-mile reach below Chili Bar Dam. The suitable range of flows that are determined for whitewater boating, swimming, recreational gold panning, dredging and angling will be compared to the historical flow information and the preliminary range of flow scenarios (discussed in No. 1 above). The comparison will display the number of suitable days for each activity and the timing of their occurrence (time of year, time of day, duration and day of week, as data is available) under the pre- and post- Projects and potential flow conditions. In addition, the study will present historical hydrological flow information of similar unregulated rivers in the central region of the Sierra Nevada (i.e., Merced River) to obtain information on water temperature, seasonal and diurnal flow fluctuations if available. This data will be sorted by the type of water year similar to the pre- and post- Project flow data.

6. OPERATIONAL CONSTRAINTS AND INTER-RELATIONSHIPS OF THE PROJECTS - The study will include a description of the operational and facility constraints, opportunities and inter-relationships of the Projects including: capacities of the Chili Bar and White Rock powerhouses, reservoir storage, existing minimum flow and ramping rates requirements, and operating agreements. The water balance model will provide the methodology to assess the effects of different flow scenarios during different types of water years on the levels of the upstream Project reservoirs.

#### 8.6.7 Analysis

The information developed in this study will be used to display the existing and potential flow-related impacts of the Projects on recreational activities below Chili Bar Dam and the level of the upstream Project reservoirs. Elevations of Slab Cr. and Chili Bar reservoirs will be looked at on a daily or hourly basis. The minimum, optimum and maximum flows for different river-related recreational activities will be compared to the pre-Project, post-Project, and preliminary flow scenarios to determine the opportunities that exist under each set of conditions. This comparison will be presented in terms of number of days available and timing (time of year and hour of day) for each activity. In addition, the projected level of the Project reservoirs will be presented for the post-Project and preliminary flow scenarios. Typical end-of-month upstream reservoir levels under each scenario will be presented over the course a year for the different types of water years. This side-by-side comparison of activities and effects on reservoir levels will be used in the Recreation Plan for the purpose of identifying the trade-offs if any, between types of recreation activities that would exist under different flow conditions.

#### 8.6.8 Study Output

The study output will be a narrative report including summarized interview data and document reviews. Tables, charts and graphs will be used to display: 1) hydrologic data, 2) minimum, optimum and maximum flows for different activities, 3) projected upstream reservoir levels and 4) numbers of available days for different activities under different flow scenarios. Maps may be included to provide location information about flow-related recreation activities. The report will include the issue questions addressed, objectives, study area, methods, results, analysis,

discussion and conclusions. The report will be prepared in a format that allows the information to be inserted directly into (1) SMUD's Draft Environmental Assessment that will be submitted to the FERC with SMUD's application for a new license, and (2) PG&E's application for new license.

8.6.9 Preliminary Estimated Study Cost

A cost estimate for this study plan will be prepared after the Plenary Group approves the plan.

8.6.10 Recreation and Aesthetic TWG Endorsement

This study plan was approved on April 17, 2002 by the following entities of the TWG: ENF, American River Recreation Association, NPS, PCWA, BLM, California Outdoors, SWRCB, PG&E and SMUD. None of the participants at the meeting identified any objection to the content of the study plan. This study plan will be sent out to other members of the Recreation and Aesthetics TWG for their consideration. On May 1, 2002 the following participants gave Plenary Group approval to the plan: USFS, BLM, USFWS, Taxpayers of El Dorado County, Friends of El Dorado County, Camp Lotus, El Dorado County Water Agency, El Dorado County, Placer County Water Agency, California Department of Fish and Game, California State Water Resources Control Board, Pacific Gas and Electric and Friends of the River. None of the participants at the meeting said they could not "live with" this study plan.

8.6.11 Literature Cited.

None.

## RECREATIONAL FLOW (Downstream Reach Below Chili Bar Dam) TECHNICAL REPORT

---

### SUMMARY

This study investigated conditions influenced by hydropower operations in the South Fork American River (SFAR) downstream of Chili Bar Dam as they relate to recreational uses. This study was conducted by both Pacific Gas and Electric Company and the Sacramento Municipal Utility District because operation of both the Chili Bar Project and the Upper American River Project (UARP) influence conditions in this Reach Downstream of Chili Bar Dam (Downstream Reach). This study centered on three areas: 1) development of a range of possible flow scenarios that could be considered in development of protection, mitigation and enhancement measures for the Projects; 2) the regional importance of the Downstream Reach for recreation opportunities; and 3) factors that may affect flow-related recreational activities in the Downstream Reach. The recreation activities investigated in this study included: whitewater boating, swimming, fishing, gold panning and gold dredging.

The methods used in this study included: 1) development of a preliminary range of flow scenarios that may be considered for providing whitewater boating opportunities in the Downstream Reach; 2) identification of the operational constraints and inter-relationships between the Projects; 3) interviews with key contacts; 4) a review of existing information; and 5) analysis of hydrology information.

The preliminary range of flow scenarios was developed, presented to the Recreation and Aesthetics Technical Working Group (R&A TWG) and other interested parties in the boating community and ultimately provided to the Aquatics TWG for their consideration in development of the Aquatic studies for the Projects. The operational constraints were identified and the inter-relationships of the Projects were described. The UARP controls the major storage of water use in the river system upstream of the Chili Bar Project. This seasonal storage is then regulated through releases for power generation into the Downstream Reach. The storage capacity of the Chili Bar reservoir and the quantity and timing of water delivered to Chili Bar Reservoir can be limiting factors in providing suitable flows for whitewater boating. This creates a need for communication and coordination between operations staff of the two Projects to avoid spills at Chili Bar Dam, provide enough water in Chili Bar Reservoir to provide sustained suitable flows and to schedule releases at times most beneficial for whitewater boating.

The SFAR downstream of Chili Bar Dam has regional significance as it is recognized on the Nationwide Rivers Inventory; its outstandingly remarkable values are 'historical' and 'recreation'. The historical importance relates to the gold discovery site in Coloma and the historical importance relates to whitewater boating use in the Downstream Reach.

Existing information and interviews with key contacts revealed that swimming, fishing, gold panning and gold dredging in the Downstream Reach are mainly dependent on factors that are not affected by flows provided in the Downstream Reach for whitewater boating. This information also identifies the area in the vicinity of Coloma as the most important area for these activities. Swimming is a popular activity in the Downstream Reach and there are a number of suitable sites within the range of flows that typically occur in the summer when most swimming occurs. Swimmers do not appear to be displaced when flows increase for whitewater boating but rather visitors take advantage of substitutable sites for this activity as flows in the Downstream Reach change. Although water temperatures in the Downstream Reach drop during the summer as a result of releases from Chili Bar Dam, this does not appear to deter visitors from swimming however they may spend less time in the water. Similarly, fishing does not seem to be affected by fluctuating flows in the Downstream Reach and participation in this activity is restricted to the fishing season as established by state regulations. Anglers prefer lower flows and morning hours for their activity and they prepare for contact with cold water. Currently the flow patterns in the Downstream Reach provide these conditions. Gold panning does not appear to be affected by changing flows in the Downstream Reach. Channel characteristics in the area most important for gold panning provides many areas with suitable water depths and velocities so that this activity can take place under a wide range of flows. Access to the river is the most determining factor for this activity. Since gold dredging is only allowed during certain times of the year,

participation in this activity depends on season rather than flow. Similar to gold panning, this activity is also heavily dependent upon access to the river.

Unlike the four recreation activities discussed above, whitewater boating is heavily dependent on flows provided in the Downstream Reach. Analysis of hydrology information indicated that the Projects create whitewater boating opportunities in the Downstream Reach through the summer and fall seasons when typically there would be no boatable days during this time if the Projects did not exist.

---

## 1.0 INTRODUCTION

This technical report is one in a series of reports prepared by Devine Tarbell and Associates, Inc. and The Louis Berger Group for the Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric Company (jointly referred to as the Licensees) to support the relicensings of SMUD's Upper American River Project (UARP) and Pacific Gas and Electric Company's Chili Bar Project (jointly referred to as the Projects. The El Dorado Project, FERC 184, though mentioned in this report, is not operated by the Licensees and is not included when the term "the projects" is used). The Licensees intend to append this technical report to their respective applications to the Federal Energy Regulatory Commission (FERC) for new licenses. This report includes the following sections:

- **BACKGROUND** – Includes when the applicable study plan was approved by the UARP Relicensing Plenary Group; a brief description of the issue questions addressed, in part, by the study plan; the objectives of the study plan; and the study area. In addition, requests by resource agencies for additions to and modifications of this technical report are described in this section.
- **METHODS** – A description of the methods used in the study, including a listing of study sites.
- **RESULTS** – A description of the salient data results. Raw data where copious and detailed model results are provided in a separate compact disc (CD) for additional data analysis and review by interested parties.
- **ANALYSIS** - An analysis of the results, where appropriate.
- **FINDINGS** – A listing of broad findings.
- **LITERATURE CITED** – A listing of all literature cited in the report.

This technical report does not include a detailed description of the UARP Alternative Licensing Process (ALP) or the Project, which can be found in the following sections of the Licensee's application for a new license: The UARP Relicensing Process, Exhibit A (Project Description), Exhibit B (Project Operations), and Exhibit C (Construction).

Also, this technical report does not include a discussion regarding the effects of the UARP or Pacific Gas and Electric Company's Chili Bar Project on whitewater boating or other recreational resources or associated environmental resources, nor does the report include a discussion of appropriate protection, mitigation and enhancement measures. A discussion regarding resource impacts associated with the UARP will be included in the applicant-prepared preliminary draft environmental assessment (PDEA) document, which will be part of the SMUD's application for a new license. Development of resource measures will occur in

settlement discussions, which will commence in early 2004, and will be reported on in the PDEA. A discussion regarding resource impacts associated with the Chili Bar Project will be included in Pacific Gas and Electric Company's application for a new license.

## 2.0 BACKGROUND

The UARP Relicensing Recreation and Aesthetics Technical Working Group (TWG) developed a total of eight recreation studies to collect information to answer the issue questions relating to recreation resources associated with the UARP. This report contains the results of the Recreational Flow (downstream of Chili Bar) Study, which is discussed below.

### 2.1 Recreational Flow Study Plan (Downstream Reach below Chili Bar Dam)

On May 1, 2002 the UARP Relicensing Plenary Group approved the Recreational Flow Study Plan (Downstream Reach below Chili Bar Dam) that was developed and approved by the Recreation and Aesthetics TWG on April 17, 2002. The study plan was designed to address, in part, the following issues questions developed by the UARP Relicensing Plenary Group:

- |                      |   |
|----------------------|---|
| Issue Question 3b    | What are the effects of boating flows on water levels of UARP/Chili Bar Project reservoirs?   |
| Issue Question 19    | Can there be a flow management hydrology model (unimpaired hydrograph) built with a whitewater filter that estimates flows assuming UARP/Chili Bar presence and absence?  |
| Issue Question 25    | What are the impacts of the combined UARP and Chili Bar Projects on all types of recreation downstream of Chili Bar Dam?  |
| Issue Question 31b   | What have been the benefits of recreation associated with the UARP/Chili Bar Projects?  |
| Issue Question 40/48 | Are there any and, if so, what is the status of any identified/designated Wild and Scenic river reaches (e.g. USFS, BLM, NRI, or State of California) affected by the UARP/Chili Bar Projects?                    |
| Issue Question 41    | What are the combined impacts to recreation relative to flows and reservoir levels of the UARP and Project 184 (Silver Creek to confluence downstream)?   |
| Issue Question 69    | What are the effects of UARP/Chili Bar Projects operation on whitewater boating in the 19.1-mile reach below Chili Bar dam?   |
| Issue Question 1b    | Is it possible to have consistent and regular releases that support boating in the reach below Chili Bar? <i>[This question will also be addressed in the Recreation Plan because it's a trade-off question.]</i> |

Issue Question 16      Can we provide whitewater boating flow information in advance for different stretches in the Project area, such as flow phone, website, flow modeling for 1-week intervals, and past releases?  
***[This question will also be addressed in the Recreation Plan because it's a trade-off question.]***

Specifically, the objectives of the study plan were to:

- Describe existing fishing, swimming, recreational gold panning, dredging and whitewater boating opportunities and other types of flow-dependent day use activities below Chili Bar Dam.
- Determine how water year type, flow (including water temperature) and timing affect these opportunities.
- Identify the minimum, optimum and maximum flow regimes (including timing, duration and volume) for each of the identified flow-dependent recreation opportunities. Provide this information to the Aquatics TWG to determine if the Aquatics TWG can take advantage of the identified flows for study purposes.

As discussed above, this *Recreational Flow (Downstream Reach Below Chili Bar Dam) Technical Report* does not address Project impacts or protection, mitigation or enhancement measures. Therefore, this report does not address Issue Questions 3b and 19. Note that Issue Questions 3b and 19 may be addressed using the UARP CHEOPS Water Balance Model as resource measures are developed and considered by the settlement negotiations group.

This study primarily evaluates how operation of the UARP and Chili Bar Projects (Projects) affect the flow dependent recreational opportunities of fishing, swimming, gold panning, gold dredging and whitewater boating in the Reach Downstream of Chili Bar Dam (Downstream Reach), the 19.1-mile-long section of the South Fork American River from Chili Bar Dam to Folsom Reservoir. The report also includes development of a range of flow scenarios that could be considered into the future to provide for whitewater boating opportunities in the Downstream Reach.

The study area was the Downstream Reach, however, an analysis of regional significance of the recreational opportunities within the study area relied on all rivers in Central California. A map of the Downstream Reach is provided in Figure 2.2-1.

## **2.2            Water Year Types**

The information in this subsection is provided for informational purposes, as requested by agencies. The UARP Relicensing Water Balance Model Subcommittee established five water year types to be applied to all preliminary analysis with the understanding that the UARP Relicensing Plenary Group, with cause, may modify the current water year types in the future. The five current water year types are triggered by the February 1, March 1, April 1 and May 1 California Department of Water Resources (CDWR) forecast for total water year unimpaired inflow into Folsom Reservoir. An additional trigger is CDWR's October 1 estimate of the actual total water year unimpaired inflow into Folsom Reservoir. The February 1 forecast determines the water year type applied for the period from February 10 through March 9; the March 1

forecast the period from March 10 through April 9; the April 1 forecast the period from April 10 through May 9; the May 1 forecast the period from May 10 through October 9; and the October 1 estimate the period from October 10 through February 9. The inflow levels are:

- Critically Dry (CD) Water Year      Less than 900,000 acre-feet
- Dry (D) Water Year                      From 900,001 to 1,700,000 acre-feet
- Below Normal (BN) Water Year        From 1,700,001 to 2,600,000 acre-feet
- Above Normal (AN) Water Year        From 2,600,001 to 3,500,000 acre-feet
- Wet (W) Water Year                      More Than 3,500,000 acre-feet