**Placer County Water Agency**

**Middle Fork American River Project**

**(FERC No. 2079)**

***DRAFT***

**Whitewater Boating Flow Study Report**

**Rubicon River -**

**Ellicott Bridge to Ralston Afterbay**

****

Placer County Water Agency

P.O. Box 6570

Auburn, CA 95604

October 2011

Table of Contents

Page

1.0 Introduction 1

2.0 Background 1

3.0 Study Objective 2

4.0 Study Area 2

5.0 Study Approach 3

5.1 Web-based Surveys 4

5.1.1 Analysis of Survey Data 5

5.2 Focus Group Meeting 5

6.0 Study Results 6

6.1 Web-Based Survey Results 6

6.2 Focus Group Meeting Results 7

7.0 Literature Cited 8

List of Tables

Table 1. Rubicon River Whitewater Boating Flow Study On-Line Survey –Boating Trip Start Dates and Start Times.

Table 2. Rubicon River Whitewater Boating Flow Study On-Line Survey – Estimated Flows During Trips based on Put-in Dates and Times.

Table 3 Rubicon River Whitewater Boating Flow Study On-line Flow Survey –

Boater and Boating Trip Characteristics Summary.

Table 4. Rubicon River Whitewater Boating Flow Study On-line Flow Survey –Flow Characteristics Evaluation Summary.

Table 5. Rubicon River Whitewater Boating Flow Study On-line Flow Survey – Minimum Acceptable, Optimum, and Maximum Acceptable Flow Estimates.

List of Figures

Figure 1. Hydrograph for the Rubicon River at Ellicott Bridge –  
June 1, 2011 to July 11, 2011.

Figure 2. Hydrograph for the Rubicon River during Whitewater Boating Survey Period.

Figure 3. Minimum Acceptable Flow Range Graph.

Figure 4. Optimum Flow Range Graph.

Figure 5. Maximum Acceptable Flow Range Graph.

Figure 6. Combined Minimum Acceptable, Optimum, and Maximum Acceptable Flow Range Graph.

List of Maps

Map 1. REC 4 – Contingency Study: Whitewater Boating Study Reaches.

Map 2. Rubicon River – Ellicott Bridge to Ralston Afterbay.

Appendices

Appendix A. Rubicon River Whitewater Boating Study On-line Flow Study Survey Form.

Appendix B. Rubicon River Whitewater Boating Study Focus Group Meeting Materials (Invitation, Agenda, Meeting Participant List).

Appendix C. Completed Survey Forms.

# Introduction

This report describes supplemental information developed by Placer County Water Agency (PCWA) in coordination with the whitewater community on whitewater boating flow preferences for the Rubicon River between Ellicott Bridge and Ralston Afterbay. The information presented in this report relies on the results of on-line surveys completed by boaters who ran this reach during the spring of 2011 when Hell Hole Reservoir spilled, and information developed during a follow-up focus group meeting. The information presented in this report is intended to augment the whitewater boating information for this reach that was presented in PCWA’s Application for New License (herein referred to as the Final License Application (FLA)) for the Middle Fork American River Project (MFP or Project), which PCWA filed with the Federal Energy Regulatory Commission (FERC) on February 23, 2011 (PCWA 2011). This additional information will be provided to the FERC for consideration in their National Environmental Policy Act (NEPA) analysis. The additional information should facilitate a more robust and inclusive NEPA analysis by FERC.

# Background

PCWA’s FLA contained whitewater boating flow information for the bypass and peaking reaches associated with the MFP, including the Rubicon River. The information contained in the FLA regarding the Rubicon River was developed based on: (1) information contained in published whitewater guide books; (2) information developed through a whitewater boating focus group meeting held on April 23, 2008; (3) information provided by the Foothills Water Network (FWN) after the focus group meeting; and (4) follow-up consultation with experienced, local boaters. Information developed through these sources was used in combination with hydrologic data to describe and evaluate whitewater boating flows and opportunities on the bypass and peaking reaches, including the Rubicon River. These efforts are documented in detail in the REC 4 – Stream Based Recreation Opportunities Technical Study Report (REC 4 – TSR), which is available in Supporting Document B of PCWA’s FLA (PCWA 2011; SD B).

The information contained in the REC 4 – TSR was discussed with the Recreation Technical Working Group (TWG) participants on March 16, 2009, April 6, 2009, and June 15, 2009. After reviewing the REC 4 – TSR, the Recreation TWG participants determined that additional “high value” study information was needed for three bypass reaches to assist in the development and evaluation of potential license conditions. These reaches are identified as: (1) Middle Fork American River – French Meadows Dam to Middle Fork Interbay; (2) Middle Fork American River – Middle Fork Interbay Dam to Ralston Afterbay; and (3) Rubicon River – Ellicott Bridge to Ralston Afterbay. The location of these reaches is shown on Map 1.

To address this interest PCWA developed a Revised Whitewater Boating Flow Study Proposal – Bypass Reaches, dated July 23, 2009. This proposal was discussed with the Recreation TWG during a meeting held on August 3, 2009. This proposal was approved by the Recreation TWG with the understanding that specific study dates would be determined in consultation with the Recreation TWG. The Revised Whitewater Boating Flow Study Proposal was subsequently included in PCWA’s 2009 Updated Study Report, which was filed with the FERC on January 21, 2010 (PCWA 2010).

The Revised Whitewater Boating Flow Study Proposal called for single-flow boating studies to be conducted on the three bypass reaches identified above during the winter of 2009 and/or the spring/summer of 2010. PCWA subsequently conducted a single-flow whitewater boating study on the Middle Fork American River, Middle Fork Interbay Dam to Ralston Afterbay Reach on Saturday, May 8, 2010. Another single-flow study was conducted on the Middle Fork American River, French Meadows Dam to Middle Fork Interbay Reach, on Saturday, May 22, 2010. The results of these studies are documented in the, REC 4 – Contingency Whitewater Boating Study TSR dated August 2010, which is available in SD-B of PCWA’s FLA (PCW 2011; SD B).

The Revised Whitewater Boating Flow Study Proposal (PCWA 2010) stated that the Rubicon River whitewater boating flow study would be conducted on a “spill or high runoff event” during the winter of 2009 or spring/summer of 2010. Flows necessary to conduct a boating study on the Rubicon River were not present during the winter of 2009 or spring/summer of 2010. The information presented in the Technical Study Report, REC 4 – Contingency Whitewater Boating Study (PCWA 2011; SD B) relied on the existing information presented in the REC 4 – TSR, supplemented with information obtained through additional consultation with experienced, local boaters.

The Recreation TWG participants continued to express an interest in conducting an on-the-water boating study in the Rubicon River between Ellicott Bridge and Ralston Afterbay to refine the boatable flow range estimates. Heavy precipitation during the spring of 2011 caused Hell Hole Reservoir to spill, which provided boatable flows in the Rubicon River. The 2011 spill event provided an opportunity for PCWA and the whitewater boating community to develop additional flow preference information for the Rubicon River. The flow preference information was developed by: (1) surveying boaters who ran the Rubicon River during the spill event using a web-based on-line survey; and (2) conducting a follow-up focus group meeting. This information was used to identify the minimum acceptable, optimum, and maximum acceptable boating flows for the Rubicon River from Ellicott River to Ralston Afterbay. These efforts are described further in this report.

# Study Objective

The overall objective of the study was to determine the minimum acceptable boating flow for the Rubicon River from Ellicott Bridge to Ralston Afterbay. Although not the primary objective, information about optimum and maximum acceptable boating flows was also developed.

# Study Area

The study area includes the Rubicon River from Ellicott Bridge and Ralston Afterbay. The study area is shown on Map 2 along with river miles.

# Study Approach

The 2011 spill event provided an opportunity for PCWA and the whitewater boating community to develop additional flow preference information for the Rubicon River from Ellicott Bridge and Ralston Afterbay. Rainfall and snow condition measurements taken during the winter of 2011 indicated a very high probability that Hell Hole Reservoir would spill during the spring. Therefore, PCWA began coordinating with American Whitewater (AW) and Recreation TWG representatives to organize a boating study team to conduct a single-flow study on the Rubicon River.

PCWA regularly monitored flow conditions in the Rubicon River throughout the spring and Hell Hole Reservoir began spilling on June 8, 2011. PCWA provided the boating study team, AW, and Recreation TWG representatives with daily flow information from the Rubicon River Gage at Ellicott Bridge and from the Rubicon River above Ralston Afterbay Gage so that they could also monitor flows and could mobilize when flows were near the target range.

The initial target flow range was 500 cfs – 800 cfs, which was the flow range identified in the Revised Whitewater Boating Flow Study Proposal – Bypass Reaches (PCWA 2010). During the spill event, several people boated on the Rubicon River and provided PCWA with feedback about their boating experience. Based on this feedback it was apparent that the higher end of the target flow range would not provide useful information that could be used to determine the minimum acceptable boating flow. Based on this feedback, and in consultation with AW, whitewater boaters, and other interested stakeholders, the target flow range for the boating study was refined downward to 450 to 500 cfs.

PCWA continued to monitor flow conditions on a daily basis. When flows appeared to be trending towards the target flow range, flows were monitored twice daily, at a minimum. During the 2011 spill event, flows in the study reach were above 800 cfs from June 9th to July 8th. After July 8th the flow decreased rapidly. On July 9th (8:00 am), the flow at Ellicott Bridge was 652 cfs and by July 11th (8:00 am), the flow had decreased to 312 cfs ( too low to conduct the boating study). The flows on the Rubicon River as measured at Ellicott Bridge and above Ralston Afterbay during the spill event are shown on Figure 1.

Flow in the Rubicon River fell through the target range too quickly to mobilize a two-day[[1]](#footnote-1) on-the-water boating study. However, because PCWA had been disseminating spill event notifications and daily flow reports for the Rubicon River at Ellicott Bridge and above Ralston Afterbay, the boating community had reliable flow information to plan boating trips. As a result, numerous boating trips occurred on the study reach over a wide range of flows, including at (and below) the target flow range. These trips were not associated with the formal boating study, but due to on-going dialog between PCWA, AW and the local boating community, most of the boaters were aware of the proposed study and the need to collect flow preference information. PCWA, AW, and REC TWG representatives collectively decided to survey these boaters to develop information about boating flow preferences on the Rubicon River. The survey was posted on the internet and the data developed through the surveys was subsequently discussed and refined with a focus group, as described in the following sections.

## Web-based Surveys

PCWA in consultation with AW and the REC TWG representatives developed an on-line boating survey form and posted the form on the internet. The on-line boating survey was targeted at boaters who had run the Rubicon River during the 2011 spill event, primarily so the survey responses could be correlated to measured flows at the time the reach was boated. The initial list of boaters was provided by AW and Recreation TWG representatives.

The survey form was developed in consultation with Dave Steindorf (AW representative) and Ms. Hilde Schwietzer (REC TWG representative). The on-line survey form was based on the Single Flow Evaluation Form that was used for the other bypass and peaking reach boating studies completed for the MFP relicensing, revised to accommodate on-line response formats and to simplify the survey form so it could be completed without guidance. A blank survey form is provided in Appendix A.

The online survey was designed to collect information about the following topics:

* Respondent’s whitewater boating experience;
* Boating trip information;
* Overall nature and character of the resource;
* Difficulty of the whitewater (initial class rating based on the International Scale of River Difficulty Classification System);
* Flow conditions as related to navigability, safety, and recreational values;
* Estimates of Minimum Acceptable, Optimum, and Maximum Acceptable flow thresholds.

The on-line survey from was posted, and responses collected, by Survey Monkey, a commercial web-site specializing in the development, distribution, and collection of on-line surveys and data (<http://www.surveymonkey.com/>). The survey form was posted on July 15, 2011 and was “live” through August 8, 2011. Boaters were noticed of the on-line flow survey by e-mail and through postings on www.boof.com[[2]](#footnote-2) and on the AW website. A total of 59 surveys were completed during this period by a total of 51 boaters. (Note that some boaters ran multiple trips and, therefore, completed multiple surveys.) Flows during the period covered by the surveys range from a low of approximately 290 cfs to a high of 1,400 cfs. A hydrograph showing the flows on the Rubicon River during the survey period is provided on Figure 2.

### Analysis of Survey Data

The survey forms were downloaded and the survey data on the forms was entered into an Excel spreadsheet, reviewed, and analyzed. Put-in flow estimates for each boating trip were developed by correlating boating trip start dates and times provided from the survey to the measured flow data at Ellicott Bridge. It should be noted that there is sometimes a range in put-in flows within multi-boater trips due to variations in the times that each respondent indicated that they put-in. Survey responses were analyzed by boating trip flow range. The flow range categories are[[3]](#footnote-3):

* 216 cfs (n=1)
* 291–305 cfs (n=9)
* 575–616 cfs (n=7)
* 634–648 cfs (n=7)
* 783–798 cfs (n=2)
* 860–888 cfs (n=9)
* 907–945 cfs (n=15)
* 989–994 cfs (n-2)
* 1044–1416 cfs (n=6)

The data were then compiled to develop boater and boating trip characteristics, flow characteristic evaluations, and estimates of minimum acceptable, optimum, and maximum acceptable boatable flow ranges.

## Focus Group Meeting

After tabulating and analyzing the survey data, PCWA conducted a focus group meeting to discuss and refine the survey results. Participation in the focus group meeting was limited to boaters that had run the study reach during the 2011 spill event, and to AW and Recreation TWG representatives. PCWA emailed invitation letters to those on the initial flow study list provided by AW as well as those who participated in the on-line survey. The focus group invitation and agenda are provided in Appendix B.

The follow-up focus group meeting was held on the evening of August 15, 2011 at PCWA’s headquarters in Auburn California. A conference call line and a WebEx connection were also provided for those who could not attend the meeting in person. A total of 21 people were present at the meeting, including four people who participated by conference call. A list of meeting participants is provided in Appendix B.

The primary objective of the focus group meeting was to develop a consensus regarding the minimum acceptable boating flow range for the Rubicon River from – Ellicott Bridge to Ralston Afterbay using the data collected through the on-line surveys. Although not the primary objective, information about optimum and maximum acceptable boating flow ranges developed through the surveys was also discussed. To support the discussion, the focus group participants were provided with summaries of the following information: 2011 spill event hydrology; boating trip put-in dates and estimated put-in flows; and, summaries of the survey data organized by flow range. The group discussed the challenges of establishing the minimum, optimum, and maximum flow ranges and eventually came to consensus on the flow range thresholds during the meeting.

# Study Results

This section first describes the results of the on-line survey effort, followed by a discussion of the results as refined by the focus group participants.

## Web-Based Survey Results

PCWA analyzed the whitewater boating surveys collected between July 15 and August 8, 2011. A total of 59 surveys were collected. Copies of the completed survey forms are provided in Appendix C. Note that personal information such as names and contact information has been concealed to protect the privacy of the respondents.

Data provided on the survey forms indicate that the survey respondents boated the Rubicon River at flows ranging from a low of 216 cfs to a high of 1,416 cfs. The low flow of 216 cfs was linked to incorrect put-in date information and was later revised upward to 290 cfs based on information provided by the survey respondent during the focus group meeting. Boating trip start dates and times as documented on the survey forms are summarized on Table 1. Estimated put-in flows at Ellicott Bridge as derived from the start dates and times are summarized on Table 2. Trip put-in dates are graphically depicted on Figure 2 relative to flow on the Rubicon River during the survey period.

Boater and trip characteristics as derived through the survey forms are summarized on Table 3. The summary statistics indicate:

* All of the boaters who participated in the survey had a boating skill level of Class 5 or higher;
* 92.2% of the boaters were in hard-shell kayaks;
* The majority of survey respondents (62.3%) had not boated the Rubicon River previously;
* The majority of survey respondents (92.3%) rated the run as Class 5 on the International Scale of Difficulty;
* Almost all of the boating trips (98.1%) were two or more days.

Table 4 summarizes the survey responses regarding specific flow characteristics, organized by put-in flow at Ellicott Bridge. Responses regarding flow characteristics varied widely. In general, specific flow characteristics improved as flow increased. One notable consistency was observed. When asked “would you return to boat the Rubicon River again at the flow you boated during this trip”, all (*n* = 28) of the respondents who put-in at flows ranging from about 780 to 995 cfs responded “yes”.

Table 5 summarizes the survey responses regarding minimum acceptable, optimum, and maximum acceptable flow estimates, organized by put-in flow at Ellicott Bridge. The data indicate that minimum acceptable, optimum, and maximum acceptable flow range preferences vary widely. In general, the boaters who put-in at higher flows preferred higher minimum acceptable and optimum flows. This variation is most noticeable in the responses provided by the boaters who put in at flows of 1,000 cfs or higher. In some cases, these boaters identified minimum acceptable flows that exceed the maximum acceptable flows identified by other boaters. This trend was also reflected in the estimates of the optimum flow range. The estimates for minimum acceptable, optimum, and maximum acceptable boating flow ranges as derived through the on-line survey data are graphically depicted on Figure 3, Figure, 4, and Figure 5, respectively. Figure 6 presents the same information combined into one graph.

## Focus Group Meeting Results

A focus group meeting was held on August 15, 2011 to discuss the survey results. The meeting participants indicated that flow preferences are difficult to determine because they are tied to other opportunity considerations. For example, a decision to boat the Rubicon River may be affected by boating opportunities available on other comparable, nearby rivers, regardless of flow. The meeting participants also indicated that flow range estimates reflect personal experiential objectives, resulting in the large variation in responses observed in the survey data.

The minimum acceptable, optimum, and maximum acceptable boatable flow ranges for kayaks and rafts that were developed in consultation with the focus group participants are summarized below. These flow ranges were developed after review and considerable discussion of the on-line survey results.

| **Rubicon River: Ellicott Bridge to Ralston Afterbay** | | |
| --- | --- | --- |
| **Flow** | **Flow Range (cfs)** | |
| **Kayaks** | **Rafts** |
| Minimum Acceptable Flow | 500–600 at put-in | 875–900 at put-in |
| Optimum Flow | 700–1,000 at put-in | 1,000–1,200 at put-n |
| Maximum Acceptable Flow | 1,500–1,800 at put-in | 1,500–1,800 at put-in |

In addition to the above flow ranges, two other flow thresholds were discussed during the focus group meeting, as follows:

* At flows greater than 1,100 cfs, the Rubicon River takes on “big water” boating characteristics.

* At flows lower that 700 - 800 cfs, the Rubicon River transitions from a “standard boating trip” to a “low-water technical boating trip”.

These differentiations were highlighted by the focus group participants to underscore the effect flows have on the experiential aspects of the resource.

# Literature Cited

Placer County Water Agency (PCWA). 2007. Pre-Application Document. Middle Fork American River Project. FERC Project No. 2079.

\_\_\_\_\_. 2010. 2009 Study Implementation Progress Report for the Middle Fork American River Project (FERC Project No. 2079) per 18 CFR § 5.15 (c)(1).

\_\_\_\_\_. 2011. Application for New License. Filed with FERC February 23, 2011.

TABLES

FIGURES

MAPS

**APPENDIX A**

**Rubicon River Whitewater Boating Study On-line Flow Study Survey Form**

Appendix B

**Rubicon River Whitewater Boating Study Focus Group Meeting Materials**

**(Invitation, Agenda, Meeting Participant List)**

Appendix C

**Completed Survey Forms**

1. The Rubicon River – Ellicott Bridge to Ralston Afterbay is considered to be a minimum two-day wilderness run due to the length of the reach, difficulty, and the remoteness of the Rubicon River canyon. [↑](#footnote-ref-1)
2. www.boof.com is a popular online boating forum that is extensively utilized by the whitewater boating community to share information. [↑](#footnote-ref-2)
3. A total of 59 on-line surveys were completed. However, one survey did not include put-in date and time information so this survey could not be used to estimate put-in flow. Therefore, *n* for flow range categories = 58. [↑](#footnote-ref-3)