

ADDENDUM TO REC-1 WHITEWATER BOATING INTERIM TECHNICAL MEMORANDUM: LEVEL 3 SINGLE FLOW SURVEY RESULTS

**KERN RIVER No. 3 HYDROELECTRIC PROJECT
*FERC PROJECT No. 2290***

PREPARED FOR:



March 2024

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LIST OF ACRONYMS AND ABBREVIATIONS

AW	American Whitewater
cfs	cubic feet per second
FERC	Federal Energy Regulatory Commission
IK	inflatable kayak
KR3	Kern River No. 3
NFKR	North Fork Kern River
Project	Kern River No. 3 Hydroelectric Project (FERC Project No. 2290)
QR code	quick-response code
SCE	Southern California Edison
SPD	Study Plan Determination
SQF	Sequoia National Forest
SUP	standup paddleboard

1.0 INTRODUCTION

On October 9, 2023, Southern California Edison (SCE) filed an interim Technical Memorandum for the *REC-1 Whitewater Boating Study Plan* as part of its Initial Study Report (SCE, 2023) in support of the Kern River No. 3 (KR3) Hydroelectric Project (Project) relicensing, Federal Energy Regulatory Commission (FERC) Project No. 2290. As outlined in the revised REC-1 Study Plan (SCE, 2022) and approved in FERC's Study Plan Determination (SPD) (FERC, 2022), the interim Technical Memorandum summarized data collected from November 2022 through September 2023 and included most of the Level 1 Desktop Review of Existing Information elements, which included a literature review, hydrology summary and Project facility evaluation, and information obtained during the Level 2 Limited Reconnaissance. The interim Technical Memorandum also included an overview of the Level 3 Intensive Study Single Flow Survey that was deployed in 2023 and a description of the outstanding tasks scheduled for 2024.

In response to Stakeholder comments on the Initial Study Report, SCE committed to providing an addendum in the first quarter of 2024 that included an analysis of the Level 1 structured interview questions and Level 3 single flow survey (SCE, 2024a). On March 1, 2024, SCE filed the results of the Level 1 Structured Interview Questionnaire in response to FERC's February 1, 2024 additional data request (SCE, 2024b). This report describes the results of the Level 3 single flow survey that was conducted in 2023.

2.0 STUDY GOALS AND OBJECTIVES

The goals of this study are to (1) document the whitewater boating opportunities and the range of whitewater boating flows in the approximately 16-mile bypass reach of the North Fork Kern River (NFKR) from Fairview Dam to the KR3 Powerhouse tailrace (i.e., the Fairview Dam Bypassed Reach) and from the KR3 Powerhouse to the Kern River Park in Kernville under current license conditions; (2) identify potential operational constraints on whitewater boating; and (3) evaluate public safety concerns associated with boating flows.

The study has the following objectives:

- Describe the whitewater boating segments in the NFKR from Fairview Dam to Kernville including the length, whitewater difficulty, name of key rapids, and typical access locations for put-in and take-out.
- Identify the range of flows (minimum acceptable and optimum) that would provide whitewater boating opportunities in each whitewater segment for a variety of watercraft including, kayaks, rafts, packrafts, stand-up paddleboards, and body boards.
- Quantify the annual frequency that minimum acceptable and optimum whitewater flows occur in each whitewater segment with Project operations and unimpaired flows for each watercraft type.

- Document potential conflicts of boating flows with other recreation users and identify strategies to mitigate those conflicts.

Refer to the *REC-1 Whitewater Study Interim Technical Memorandum* (SCE, 2023) and Request to File Study Results (SCE, 2024b) for additional information collected that supports these study goals and objectives.

3.0 STUDY AREA AND STUDY SITES

The study area includes the approximately 16-mile Fairview Dam Bypass Reach from Fairview Dam to the KR3 Powerhouse tailrace and the NFKR from the KR3 Powerhouse to the Riverside Park in Kernville. The Fairview Dam Bypass Reach contains eight whitewater segments ranging in whitewater difficulty from Class II to Class VI (Figure 3-1). The river can be accessed from multiple locations including designated and informal access locations.

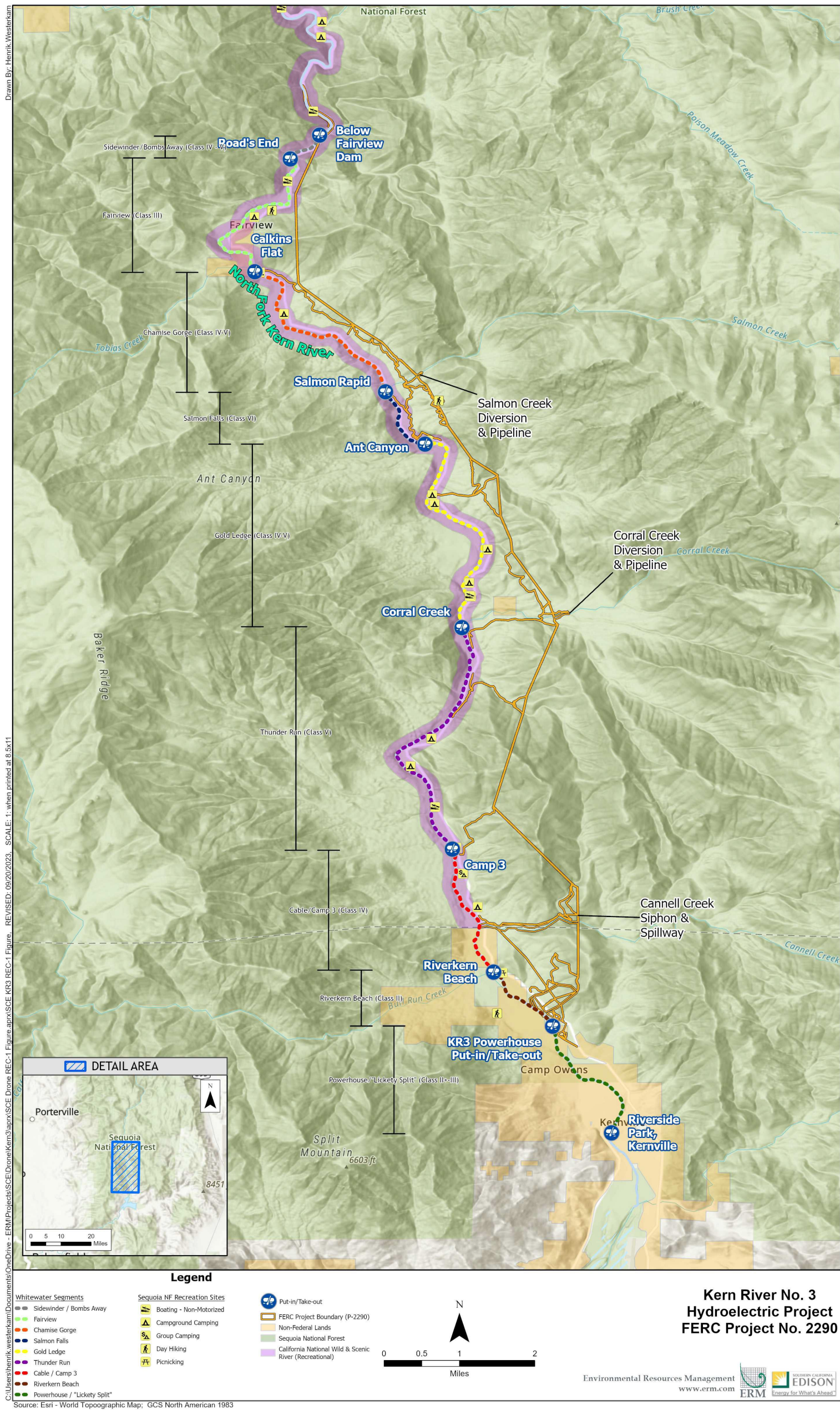


Figure 3-1. Whitewater Boating River Segments in the Study Area.

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4.0 METHODS

This addendum describes methods for the Level 3 Intensive Study. Please refer to the REC-1 interim Technical Memorandum (SCE, 2023) and Request to File Study Results (SCE, 2024b) for additional study methods related to Level 1 Desktop Review of Existing Information and Level 2 Limited Reconnaissance Site Visit.

The REC-1 Study follows the methods in *Flows and Recreation: A Guide to Studies for River Professionals* (Whittaker et al., 2005). The 2005 publication outlines a sequential framework to investigate flow dependent recreation opportunities using various investigative tools across three progressive levels of study. Progression through the framework affords a better understanding of the whitewater recreation opportunities and flow needs in each segment of the bypass reach. The three levels of study increase data resolution as investigations progress from one level to the next and share interim results earlier in the relicensing process across resource disciplines.

4.1. LEVEL 3: INTENSIVE STUDY

The Level 3 Intensive Study collects flow preference information directly from whitewater boaters for a variety of watercraft for the respective whitewater segments using a single flow survey for individual trips and a flow comparison survey for a range of flows. The combination of survey tools is designed to improve the precision of the data when developing flow preference curves for a variety of watercraft types for the respective whitewater segments from Fairview Dam to Riverside Park in Kernville. These survey tools are one of the approaches recommended by Whittaker et al. (2005) for the Level 3 Intensive Study. SCE's approach for Level 3 was outlined in the Revised Study Plan (SCE, 2022) and is summarized below. This approach is consistent with established scientific methods conducted by American Whitewater (AW) to collect flow preference information and recreation use patterns on rivers where a controlled flow study is not possible and/or that have unpredictable flow conditions (AW, 2017 and 2021).

The online single flow and flow comparison survey addresses the Project's infrastructure limitations and resolves the experimental design limitations of a controlled flow study at the Project. The single flow survey and flow comparison survey is not limited to the unpredictable snowpack and associated flows during the Integrated Licensing Process study period. For example, whitewater boaters can provide input immediately after completing individual boating trips using the single flow survey, which was used during 2023 and described in detail below. Similarly, boaters can complete the flow comparison survey based on their collective experience over the course of the study including past experiences over a wide range of water year types. Furthermore, the online single flow and flow comparison survey approach greatly expands the pool of study participants regardless of geographic location or schedule.

The elements of the Level 3 Intensive Study initiated in 2023 and continuing into 2024 are described below.

- Whitewater single flow survey (available online April 1 through December 31, 2023):
 - Boaters completed the single flow survey to evaluate individual flows shortly after experiencing them.
 - Posters containing the link to the single flow survey including a quick-response (QR) code were installed at river access locations and distributed to local retailers in Kernville as well as distributed electronically to local, regional, and national whitewater boating groups and accessible on the KR3 relicensing website.
- 2024 Level 3 Intensive Study implementation:
 - Provide enhanced flow opportunities targeting knowledge gaps in boater experience on the river segments in the Fairview Dam Bypass Reach;
 - Study participants complete an enhanced flow evaluation form rating the quality of whitewater boating opportunity for each enhanced flow opportunity boated;
 - Implement the whitewater flow comparison survey.

SCE will work with the boating community to compile a list of potential study participants prior to implementing flow enhancements. Any interested boater may sign up to participate in the evaluation of the flow enhancements. SCE will work with the boating community to compile a list of participants that are representative of the broader boating community, including watercraft, geographic location, skill level, and gender. However, full representation of the boating community may not be possible for all flow enhancement opportunities given the short notice that may occur. SCE will use the list of interested boaters to directly communicate information about the flow enhancement schedule and links to surveys to evaluate each flow enhancement. Documentation of the outreach efforts will be included in the final Technical Memorandum. Where possible, the Study REC-1 lead will observe targeted flow enhancement opportunities where sufficient notice is provided.

Boaters participating in the targeted flow enhancements will complete a flow evaluation survey for each enhanced flow. Upon completion of the range of flow enhancements, boaters will complete a flow comparison survey.

The whitewater flow comparison survey will be designed to obtain information on flow preferences between minimum acceptable and optimum flow for respective whitewater river segments from Fairview Dam to Riverside Park. Survey questions will ask respondents to rate the acceptability of a range of flows for each whitewater segment and watercraft type, timing of use, flow information needs, and comparison with other whitewater opportunities in the Kern River basin. Information collected in Levels 1 and 2 as well as the Level 3 single flow survey will be used to develop whitewater flow comparison survey. The link to the online whitewater flow comparison survey will be

distributed to local, regional, and national whitewater boating groups and accessible on the KR3 relicensing website.

SCE will develop minimum acceptable and optimum flow preference curves based on watercraft types used for respective river segments using data from the individual flow evaluations and the flow comparison survey. Data collected in the 2023 single flow survey will be cross-referenced with the results from the 2024 flow preference results. Results will be reported in the final Technical Memorandum.

- Conduct a whitewater focus group:
 - The Level 3 Intensive Study will include a focus group designed to gather information from boaters with direct experience on the whitewater river segments from Fairview Dam to Riverside Park. Focus group questions will prompt discussion on suitable range of flows for a variety of watercraft for each whitewater segment; navigability and whitewater difficulty across a range of flows; preferred whitewater segment(s) from Fairview Dam to Riverside Park; daily, weekly, and seasonal use patterns; flow information needs; river access; safety; other areas of concern; and uniqueness of the whitewater river segments compared to other opportunities in the region.
 - Focus group participants will be identified in advance and nominated collaboratively with the whitewater community. Selection will be based in part on knowledge of whitewater boating opportunities in the Kern River basin and direct experience on the river segments from Fairview Dam to Riverside Park. The focus group will include representation across watercraft types, commercial and non-commercial as well as the local boating community and boaters traveling to paddle on the bypass from outside the North Fork Kern watershed.
- Complete a hydrology analysis:
 - Quantify annual number of days of whitewater boating using flow preference curves developed from data collected in the online single flow and flow comparison survey and supplemented with information obtained in focus groups. Analysis will be done for respective watercraft in each whitewater segment under impaired and unimpaired hydrology in the Fairview Dam Bypass Reach.

Public safety concerns associated with whitewater boating flows will be documented using available information such as the Kernville Chamber of Commerce, SQF, California Department of Boating and Waterways, AW accident database and other FERC proceedings where whitewater releases occur. Potential measures to mitigate public safety concerns will also be described.

Potential recreation-use conflicts associated with whitewater boating flows will be identified where possible. Recreation uses occurring in and adjacent to the NFKR documented in the *REC-2 Recreation Facilities Use Assessment Study* (SCE, 2022) will be integrated into the REC-1 Updated Study Report. Potential flow-related conflicts will

be described based on REC-2 survey responses. Mitigation measures to reduce or manage recreation conflicts will be identified where appropriate.

5.0 DATA SUMMARY

The data summary in this addendum to the REC-1 interim Technical Memorandum is limited to the results for the Level 3 single flow survey (SCE, 2023).

5.1. LEVEL 3: INTENSIVE STUDY

The REC-1 Study Plan uses two approaches approved in the SPD (FERC, 2022) for the Level 3 Intensive Study: Multiple Flow Reconnaissance Assessment and Flow Comparison Survey. Both of these approaches are described in the Level 3 Intensive Study approaches described by Whittaker et al. (2005). SCE launched the Level 3 Multiple Flow Reconnaissance Assessment April 1, 2023, referring to it publicly as the Single Flow Survey so boaters would better understand the survey purpose.

This section summarizes the results from the Level 3 Intensive Study Single Flow Survey and provides recommendations for further implementing Level 3, including enhanced flow opportunities and the Flow Comparison Survey. The single flow survey analysis documents the composition of the survey participants and whitewater recreation use patterns across river segments during the survey.

5.1.1. SINGLE FLOW SURVEY ANALYSIS

SCE launched the Level 3 Intensive Study Single Flow Survey on April 1, 2023. A total of 404 responses were received, providing information on their whitewater boating trips on the NFKR. Single flow survey responses were distributed April, May, June, July, August, September, and October evaluating flows ranging from 250 cubic feet per second (cfs) in September to 8,500 cfs in May. Single flow surveys have been completed for all nine river segments using a variety of watercraft. The single flow survey remained open through December 31, 2023, allowing boaters to continue evaluating flows in the NFKR as the hydrograph decreased through the fall and early winter months. Information obtained in the single flow survey will be used to support and guide planning and implementation for the Level 3 Flow Comparison Survey in 2024.

A total of 91 individuals participated in the single flow survey. The single flow survey respondents included a mix of genders and skill levels of the whitewater boating community on the NFKR (Table 5.1-1). Sixty-eight percent of the respondents were male and 26 percent female. The majority of single flow respondents (51 percent) self-identified as possessing expert whitewater skills. Intermediate and advanced boaters comprised the next two largest groups of respondents: 22 and 24 percent, respectively. Novice boaters comprised only 3 percent of the respondents.

The single flow survey respondents were fairly evenly distributed across the 10-year age groups older than 29 years (Figure 5.1-1). Twelve percent of the respondents were between the age of 20 to 29. None of the survey respondents were younger than 20 years of age. The majority of single flow survey responses by far were for boating trips in

kayaks, followed in distant second by cataraft trips (Figure 5.1-2). Thirty-two percent of the respondents' primary residence was in the Kernville area between the community of Lake Isabella and Kernville (Figure 5.1-3). Los Angeles County and Orange County were represented by 21 percent and 5 percent of the respondents, respectively.

Table 5.1-1. Single Flow Survey Respondent Gender and Whitewater Skill Level.

Gender	Count		Skill Level			
	No.	% of Total	Novice	Intermediate	Advanced	Expert
Male	62	68%	1%	13%	19%	35%
Female	24	26%	2%	9%	3%	12%
Non-binary	0	0%	0%	0%	0%	0%
Choose not to answer	5	5%	0%	0%	2%	3%
Total	91	100%	3%	22%	24%	51%

Note: Total may not sum 100% due to rounding.

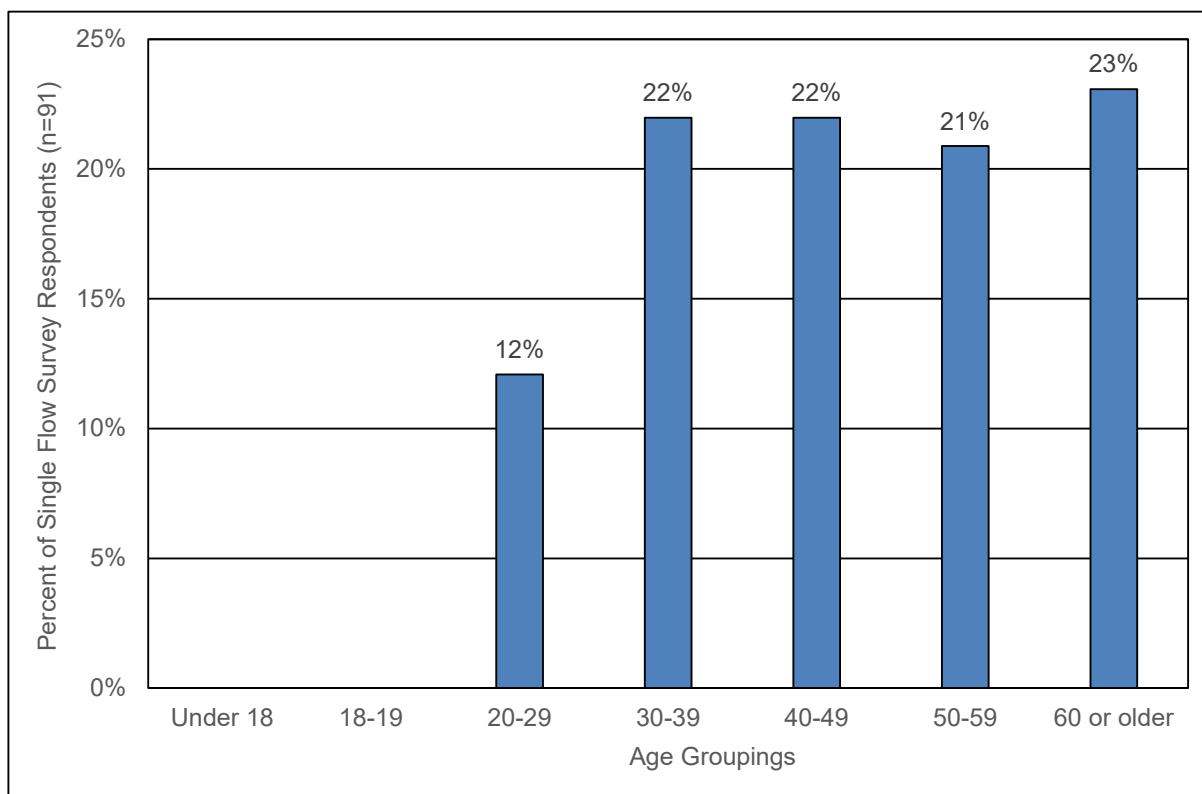
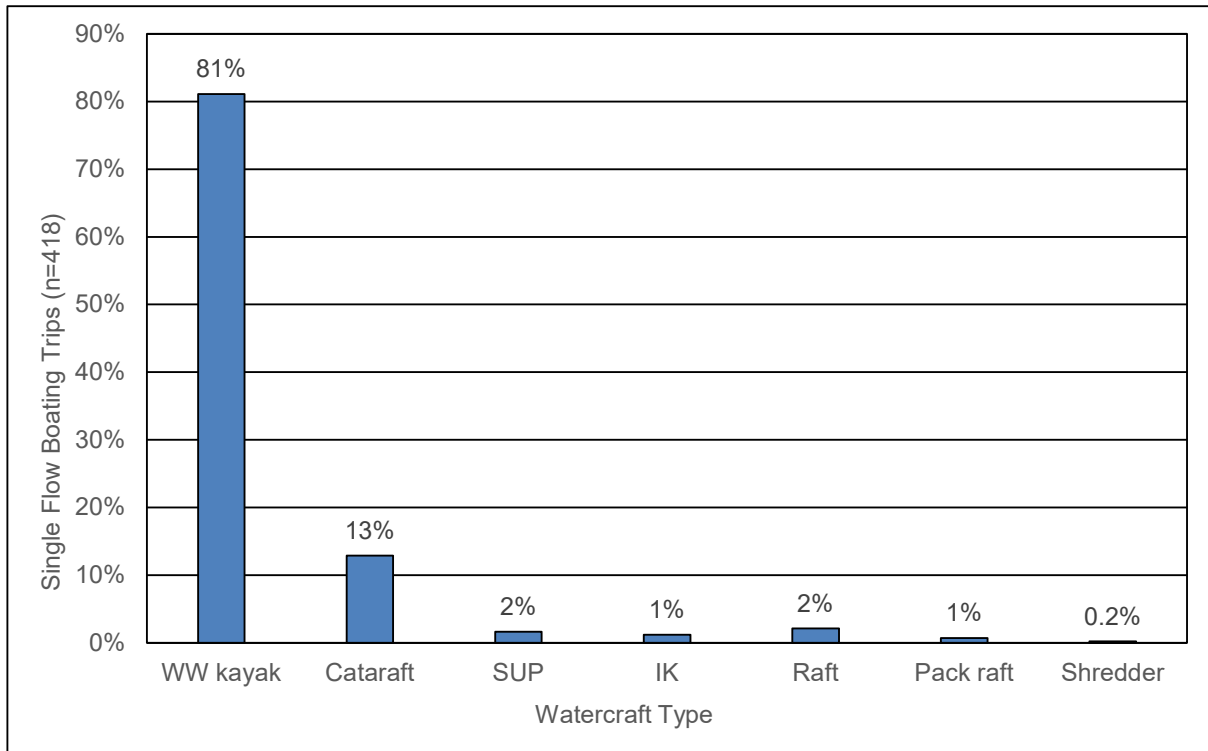


Figure 5.1-1. Single Flow Survey Respondent Age Range.



IK = inflatable kayak; SUP = standup paddleboard; WW = whitewater

Figure 5.1-2. Watercraft Types Used for Single Flow Survey Boating Trips.

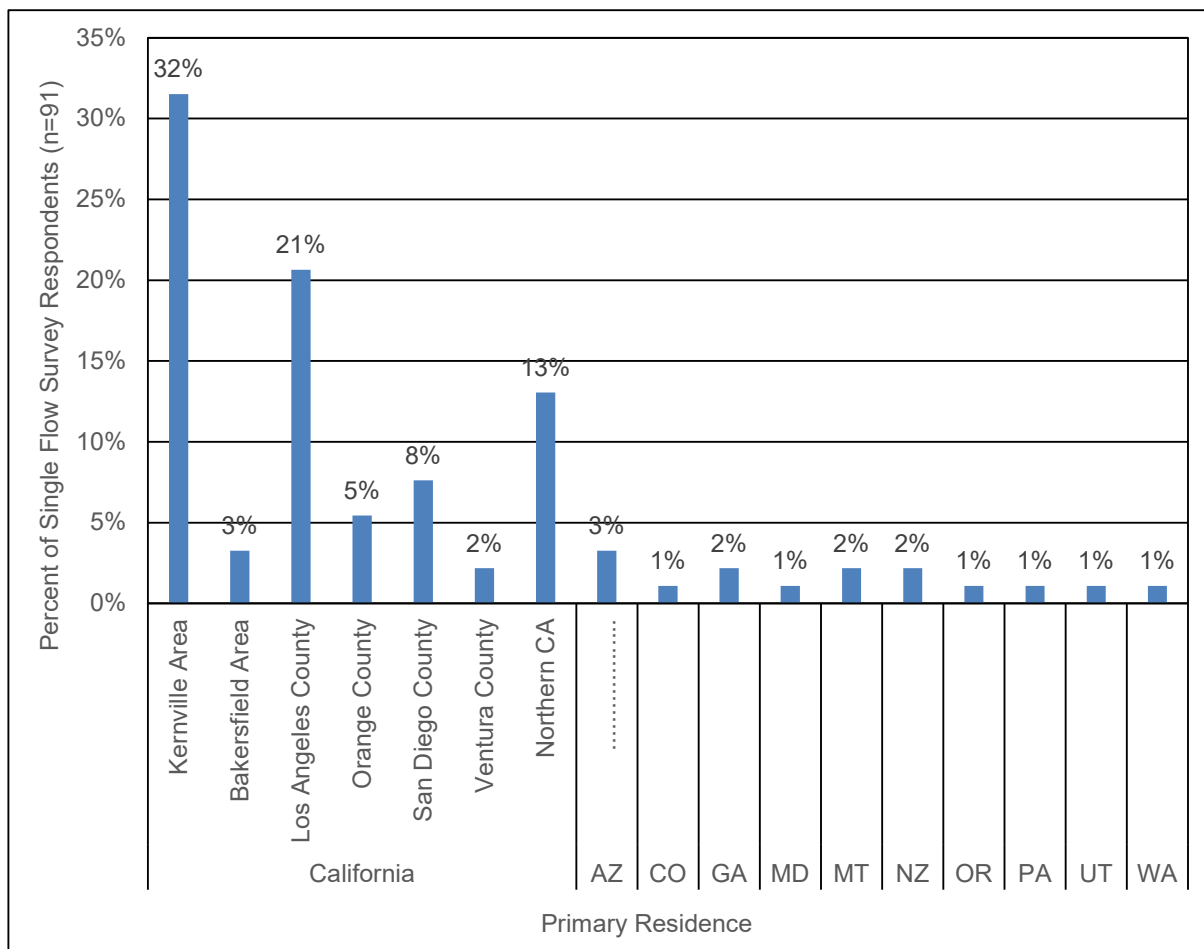


Figure 5.1-3. Single Flow Survey Respondent Primary Residence.

As noted above, the single flow survey was open from April 1 to December 31, 2023; a total of 404 single flow survey responses were completed during that time. The highest percentage of responses occurred in September (Figure 5.1-4), followed by April and August. Discharge in the bypass decreased in September from approximately 500 cfs at the start of the month to 107 cfs by the end of the month. One single flow survey was completed on October 14 for the Powerhouse segment by a boater in an inflatable kayak (IK). Discharge below the powerhouse was approximately 550 cfs for this IK trip. No other single flow surveys were completed in October, November, or December. Seven single flow survey respondents reported historic trips occurring in 1998 (1 response), 2019 (1 response), and 2022 (5 responses).

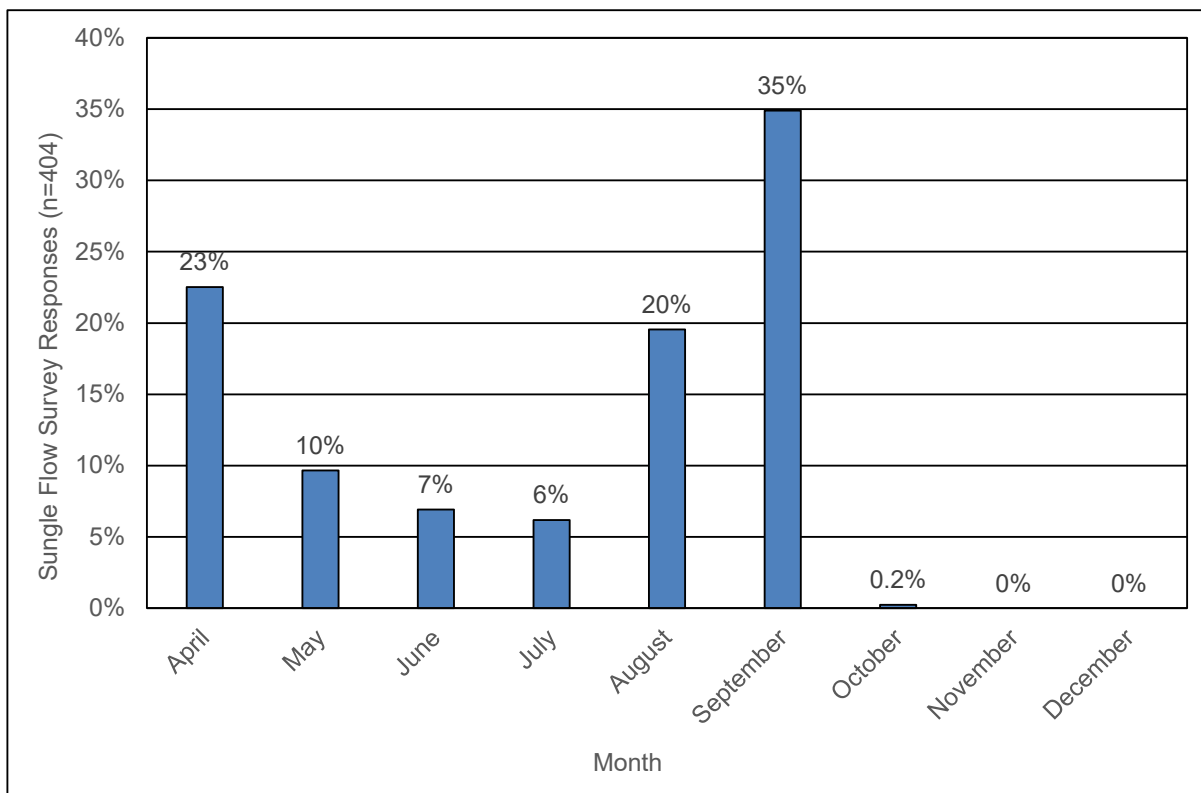


Figure 5.1-4. Single Flow Survey Monthly Responses Between April 1 and December 31, 2023.

Single flow survey respondents boated all nine river segments (Figure 5.1-5). The highest number of respondent trips were on the Powerhouse river segment, and the least were on the Sidewinder river segment (Table 5.1-2). Respondent trips were highest in the Chamise river segment when discharge in the bypass was less than 700 cfs. When flows were greater than 3,000 cfs, the vast majority of trips were on the Camp 3 / Cable run, Riverkern, and Powerhouse river segments.

Single flow survey respondents used a variety of watercraft types (Figure 5.1-6). Kayaks were the predominant watercraft used by respondents, comprising 81 percent of the single flow survey trips (Table 5.1-3). Kayaks were almost exclusively used when discharge was less than 700 cfs in the bypass.

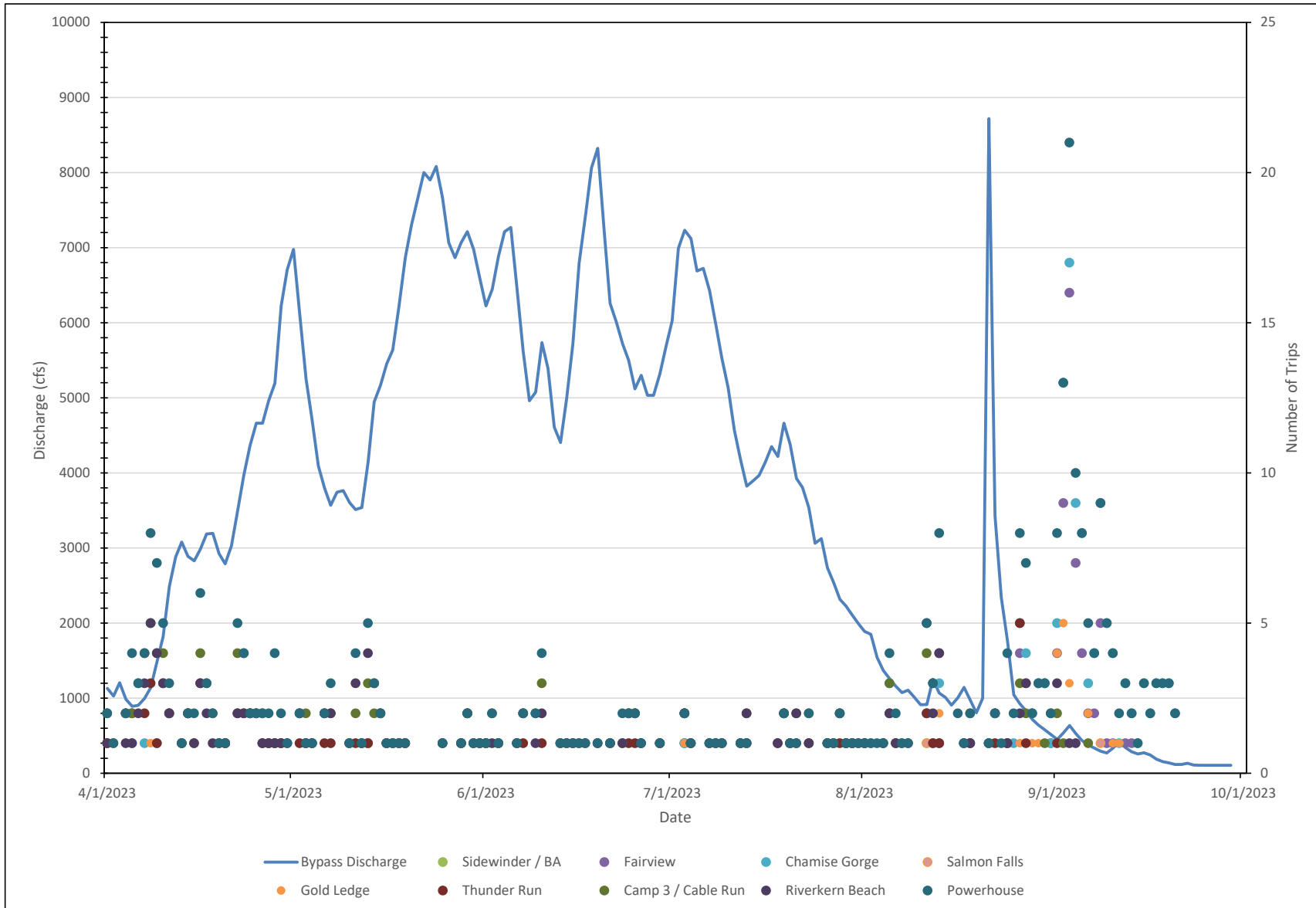
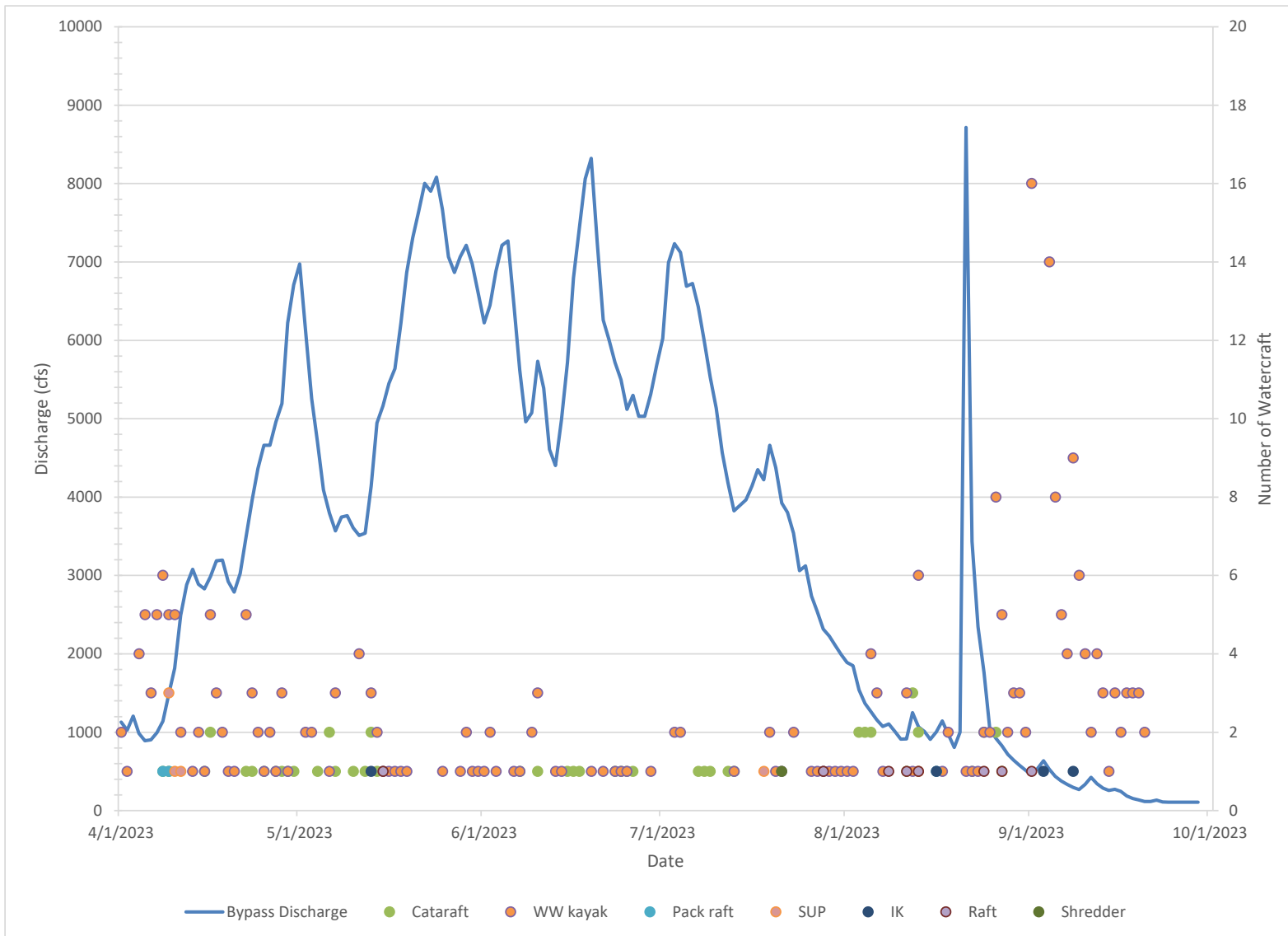


Figure 5.1-5. River Segments Boated by Single Flow Survey Respondents (n=404).

Table 5.1-2. River Segments Boated by Single Flow Survey Respondents Grouped by Discharge

Discharge Range (cfs)	Sidewinder	Fairview	Chamise	Salmon Falls	Gold Ledge	Thunder Run	Camp 3 / Cable Run	Riverkern	Powerhouse
>3,000	3	3	3	1	10	45	96	89	110
1,500–3,000	0	0	4	2	5	19	23	20	35
1,000–1,500	0	1	12	2	7	9	26	22	43
700–1,000	1	11	16	1	5	15	22	18	37
<700	0	60	107	1	20	1	7	5	119
Total per River Segment	4	75	142	7	47	89	174	154	344

cfs = cubic feet per second



cfs = cubic feet per second; IK = inflatable kayak; SUP = standup paddleboard; WW = whitewater

Figure 5.1-6. Watercraft Used by Single Flow Survey Respondents (n=404).

Table 5.1-3. Watercraft Used by Single Flow Survey Respondents Grouped by Discharge

Discharge Range (cfs)	Kayak	Cataract	Packraft	SUP	IK	Raft	Shredder	Total
>3,000	21%	8%	0%	0.2%	0.2%	0.2%	0.2%	29%
1,500–3,000	7%	2%	0%	0.5%	0.0%	0.5%	0%	10%
1,000–1,500	8%	3%	0.7%	1.0%	0.2%	0.5%	0%	13%
700–1,000	9%	1%	0%	0.0%	0.0%	0.5%	0%	11%
<700	36%	0%	0%	0.0%	0.7%	0.2%	0%	37%
Total	81%	13%	1%	2%	1%	2%	0.2%	100%

cfs = cubic feet per second; IK = inflatable kayak; SUP = standup paddleboard
 Note: Total may not sum 100% due to rounding.

Single flow survey respondents were asked to self-identify their whitewater boating skill level. The majority of single flow survey respondents self-identified as advanced and expert level boaters (Table 5.1-4). Novice boaters participated least in the single flow survey. Advanced boaters comprised the majority of the trips when discharge was less than 700 cfs in the bypass.

Table 5.1-4. Single Flow Survey Respondent Boating Skill Level Grouped by Discharge

Discharge Range (cfs)	Novice	Intermediate	Advanced	Expert	Total
>3000	0%	2%	11%	17%	29%
1,500–3,000	0%	1%	3%	5%	10%
1,000–1,500	0.5%	3%	5%	4.0%	13%
700–1,000	0%	1%	6%	3.0%	11%
<700	0.5%	3%	29%	5.0%	37%
Total	1%	11%	54%	34%	100%

cfs = cubic feet per second; SUP = standup paddleboard
 Note: Total may not sum 100% due to rounding.

5.1.2. LEVEL 3 INTENSIVE STUDY IMPLEMENTATION NEXT STEPS

In 2024, SCE proposes four flow enhancements (ranging from approximately 200 cfs up to 800 cfs) to collect flow evaluations from boaters rating the quality of whitewater boating opportunities. The range of flows proposed for the enhanced flow opportunities is based on boater input in the Level 1 Structured Interview Questionnaire and the Level 2 Limited Reconnaissance site visit (SCE, 2024a and 2024b), as well as the Level 3 Intensive Study Single Flow Survey responses. Providing enhanced flow opportunities targeting this range of flows will improve data resolution on the quality of the whitewater boating opportunities where knowledge gaps were previously identified. SCE is preparing to provide flow enhancements as conditions allow.

Study participants will have an opportunity to complete a final flow comparison survey to evaluate the quality of boating opportunities across a range of flows. The flow evaluation data collected in the Level 3 Intensive Study will be used to develop flow preference curves for each watercraft type for the respective river segments.

6.0 STUDY SPECIFIC CONSULTATION

No additional consultation has occurred in support of the REC-1 Study Plan.

7.0 OUTSTANDING STUDY PLAN ELEMENTS

The Level 3 Intensive Study is ongoing. The Level 3 flow comparison survey will be launched in spring/summer 2024. Refer to the Request to File Study Results (SCE, 2024b) for summary of remaining study elements. Results and an updated Technical Memorandum from the Level 3 flow comparison survey and remaining tasks outlined in Section 5.1, Level 3: Intensive Study, will be included in the Updated Study Report.

Date	Activity
Spring–Summer 2024	Implement Level 3 Intensive Study: Targeted Flow Enhancements and Flow Comparison Survey.
Fall 2024	Provide Level 3 results in the Updated Study Report

8.0 REFERENCES

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