

# Whitewater Boating Five-Year Monitoring Report

## Sacramento Municipal Utility District

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Hydro License Implementation • December 2020

Upper American River Project

FERC Project No. 2101

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## Acronyms and Abbreviations

<b>Acronym</b>	<b>Definition</b>
BLM	Bureau of Land Management
FERC	Federal Energy Regulatory Commission
Ice House Run	South Fork Silver Creek downstream of Ice House Dam
Monitoring Plan	Whitewater Boating Monitoring Plan (SMUD 2015)
SF Silver Creek Whitewater Management Plan	Whitewater Recreation Management Plan for South Fork Silver Creek downstream of Ice House Dam (SMUD 2018)
SFAR	South Fork American River
SMUD	Sacramento Municipal Utility District
SWRCB	State Water Resources Control Board
UARP	Upper American River Project
USGS	U.S. Geological Survey
Forest Service	U.S. Department of Agriculture, Forest Service

## 1.0 INTRODUCTION AND BACKGROUND

This Whitewater Boating Five-year Monitoring Report (Report) presents whitewater boating monitoring results for South Fork Silver Creek downstream of Ice House Dam (Ice House Run) and South Fork American River (SFAR) downstream of Slab Creek Dam (Slab Creek Run) as specified in the Whitewater Boating Monitoring Plan (Monitoring Plan) (SMUD 2015). This Report fulfills requirements of the Upper American River Project (UARP; FERC Project 2101) License set forth in the State Water Resources Control Board (SWRCB) section 401 Water Quality Certification, Condition 4B of Appendix A of the new License order (FERC 2014a), and in the U.S. Department of Agriculture, Forest Service (Forest Service) section 4(e) Condition No. 50 of Appendix B of the new License order (FERC 2014a) and the October 2014 License amendment (FERC 2014b). All minimum streamflows required by the License (FERC 2014a) were implemented in October 2014; therefore, Year 1 as it pertains to whitewater monitoring was 2015. Scheduled whitewater boating flow releases in the Ice House Run were provided in 2015 through 2019 and in the Slab Creek Run in 2016, 2018, and 2019.

On September 20, 2018 SMUD filed the Whitewater Recreation Management Plan for South Fork Silver Creek downstream of Ice House Dam (SF Silver Creek Whitewater Management Plan) (SMUD 2018), as approved by the Forest Service, which identifies thresholds<sup>1</sup> that establish when SMUD will modify the number of days when scheduled whitewater boating flow releases are provided from Ice House Dam. FERC approved this plan on December 5, 2019. Accordingly, this Report also contains an analysis of the monitoring results with regard to boating use thresholds identified in the SF Silver Creek Whitewater Management Plan. Recommendations for the number of release days that would begin in 2020 are based on this analysis and summarized in Section 4 of this Report.

This Report was prepared in coordination with the Consultation Group which includes the Forest Service, SWRCB, U.S. Bureau of Land Management (BLM), and American Whitewater, among others.

### 1.1 MONITORING REPORT OBJECTIVES

The objective of this Report is to provide a five-year summary of whitewater boating monitoring results for the Ice House Run and the Slab Creek Run. This report covers the period 2015 through 2019.

## 2.0 METHODS

Methods used for monitoring whitewater boating use are described in the Monitoring Plan and include field observations, post-run interviews, and photo documentation.

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<sup>1</sup> Thresholds (referred to as “triggers” in the License; FERC 2014) are metrics used to determine adjustments to the number of recreation streamflow release days.

Per the Monitoring Plan, methods may be adjusted to facilitate accurate and efficient data collection based on actual use patterns. SMUD adjusted the methods—which were developed before SMUD made the first scheduled whitewater boating flow releases—to adapt to actual use patterns that evolved during the first years of scheduled releases. These adjustments, described in the sections below, improved SMUD’s ability to quantify and characterize whitewater boating use.

## **2.1 MONITORING SITES**

### **2.1.1 Ice House Run**

Several adjustments were made to Ice House Run monitoring locations to improve data collection. Boating use was monitored at three primary locations along the Ice House Run (Figure 1): (1) below Ice House Dam (designated put-in); (2) Ice House Road Bridge; and (3) Bryant Springs Road Bridge (designated take-out). Ice House Road Bridge was added as a primary monitoring location because boaters were observed using this put-in location during initial monitoring. Boating use was not monitored at Junction Boat Ramp because the information collected at this location would have been duplicative of data collected at Bryant Springs Road Bridge and boaters were not observed using this take-out location during initial monitoring. Monitoring hours for these locations are identified below with Monitoring Plan modifications included in parentheses:

- Ice House Dam 9:00 a.m.–4:00 p.m. (modified from 9:30 a.m.–4:00 p.m.)
- Ice House Road Bridge 9:00 a.m.–4:00 p.m. (modified from 9:30 a.m.–4:00 p.m.)
- Bryant Springs Road Bridge take-out 12:00 noon–7:00 p.m. (modified from 2:30 p.m.–8:30 p.m.)

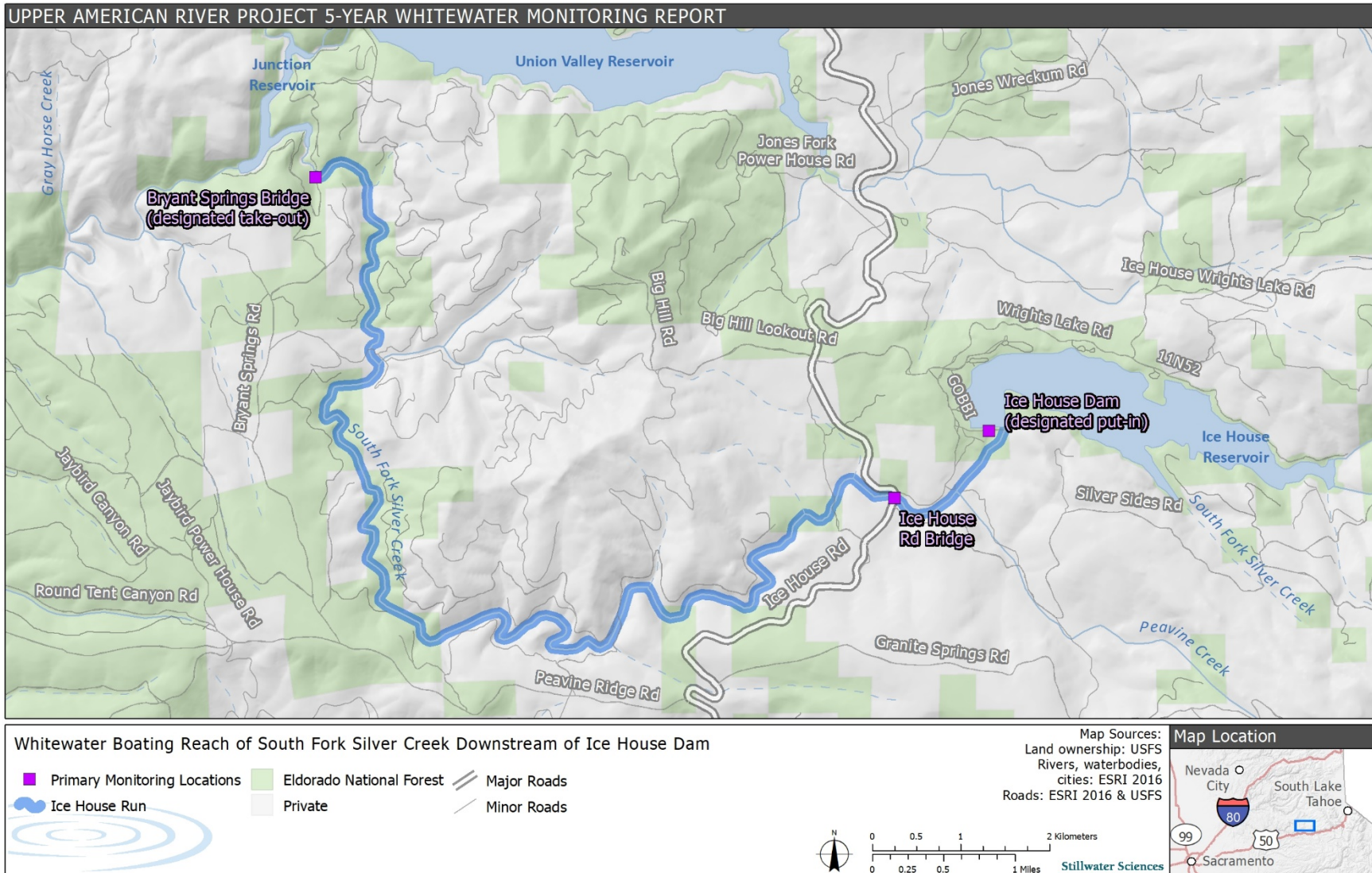
Consistent with the Monitoring Plan, non-boating use monitoring occurred at the above three primary locations, as well as at the South Fork Silver Creek streamflow gage, Silver Creek Group Campground, and Junction Boat Ramp.

### **2.1.2 Slab Creek Run**

Consistent with the Monitoring Plan, boating and non-boating use monitoring occurred at three primary locations along the Slab Creek Run (Figure 2): (1) below Slab Creek Dam (designated put-in); (2) Mosquito Bridge; and (3) Rock Creek Powerhouse (designated take-out). Mother Lode Falls was not monitored due to safety concerns. Monitoring hours for these locations are identified below with Monitoring Plan modifications included in parentheses:

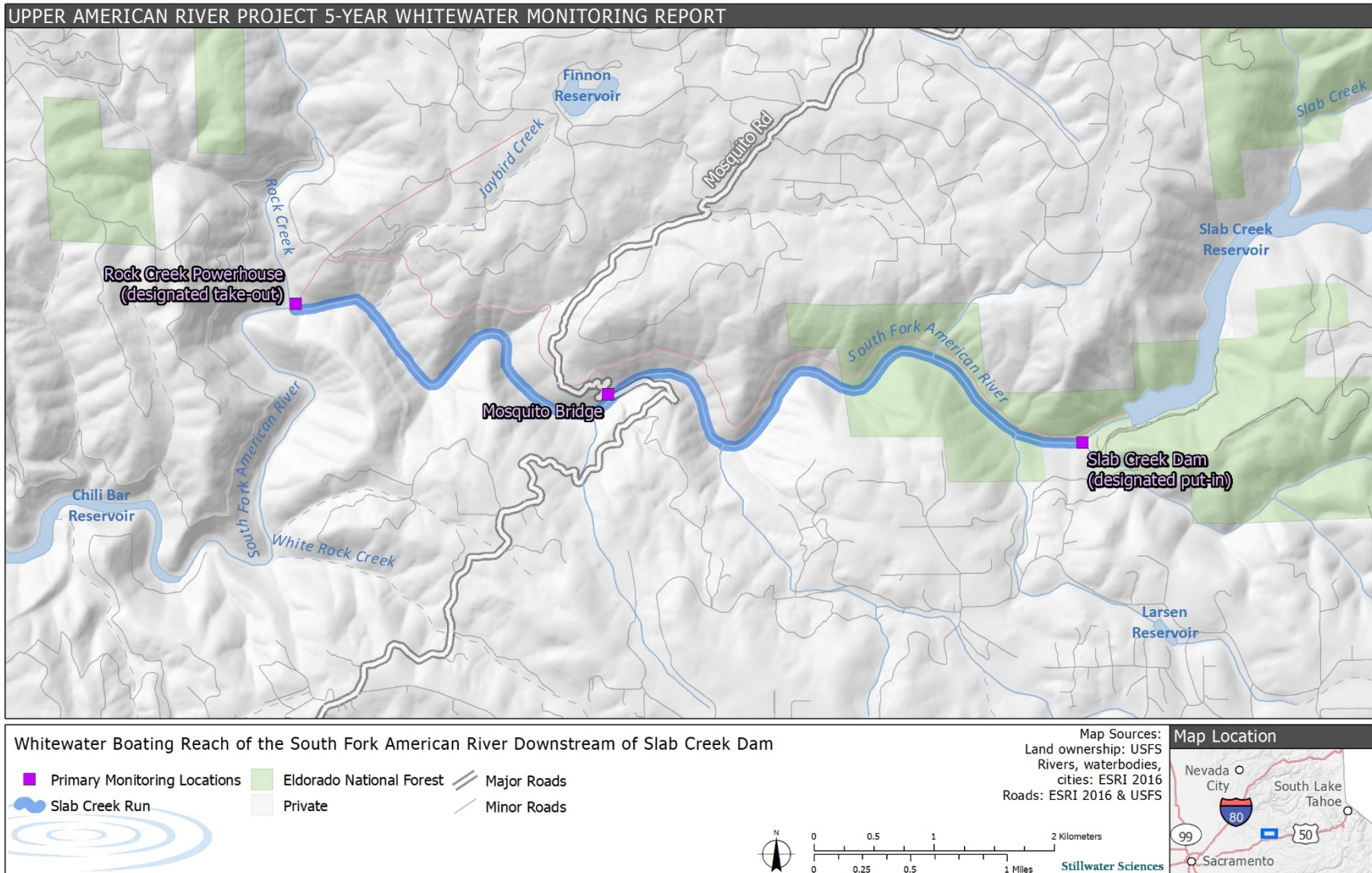
- Slab Creek Dam 9:00 a.m.–5:00 p.m.
- Mosquito Bridge 10:00 a.m.–6:00 p.m. (modified from 10:00 a.m.–7:00 p.m.)
- Rock Creek Powerhouse 11:00 a.m.–7:00 p.m. (modified from 12:00 noon–8:00 p.m.)





**Figure 1. Monitoring locations on South Fork Silver Creek downstream of Ice House Dam**





**Figure 2. Monitoring locations on the South Fork American River downstream of Slab Creek Dam**

## 2.2 WHITEWATER BOATING MONITORING

### 2.2.1 Field Observation Methods

Field observation methods used for monitoring whitewater boating use are described in the Monitoring Plan. To better quantify and characterize whitewater boating use, SMUD adjusted these methods as follows:

- Consolidating the data collection forms to reduce ambiguity and inconsistency among the different data forms identified in the Monitoring Plan.
- Revising the data collection forms to remove columns for:
  - collecting data that could not be objectively and consistently determined (e.g., wait to land, scout time);
  - activities that did not have a bearing on setting thresholds (i.e., columns with headings for entering times for staging, launch, miscellaneous); and
  - information captured elsewhere (e.g., flow magnitude which is provided by operations staff *post hoc*).

### 2.2.2 Post-run Interviews

Methods for conducting post-run interviews are described in the Monitoring Plan, *Monitoring Plan Approach* (SMUD 2015). Specific questions were developed to obtain information about each of the items listed in the Monitoring Plan and to improve data consistency and objectivity (Appendix A).

### 2.2.3 Photo Documentation

To assess potential impacts to the landscape that may be associated with boating activities, SMUD documented resource conditions with photographs of put-in and take-out prior to the first release of each season and after the last release of the season. Staff attempted to consistently photograph monitoring sites before and after releases during the season as well as from year to year. Beginning in 2017, the location and angle of the photographs were standardized to improve comparability. Photographs are provided in Appendices B and C.

## 2.3 DATA ANALYSIS

### 2.3.1 Whitewater Boating Use

SMUD reconciled data collected at three monitoring locations for each run on each release day to account for all boats put in and taken out. This approach accounted for boaters who made partial runs (e.g., ended their run at Mosquito Bridge) as well as those who began and ended their runs at the designated put-in and take-out locations to determine the number of boaters on each release day.

For the Ice House Run, SMUD compared the daily number of boaters to the boating use thresholds identified in the SF Silver Creek Whitewater Management Plan. Results of this comparison are used to assess whether the number of release days should be adjusted in 2020 (see Section 4.1 of this Report).

Thresholds for adjusting the number of release days for the Slab Creek Run will be established when the management plan for that reach is developed.<sup>2</sup> Accordingly, actual boating use is reported but it is not compared to any established threshold.

### 2.3.2 Post-run Interviews

Post-run interview responses were used to summarize information about boaters, safety concerns (e.g., congestion, woody debris), flow satisfaction, and logistical information about how boaters completed their runs (e.g., shuttle approach, multiple runs).

## 3.0 RESULTS

### 3.1 BOATING USE

#### 3.1.1 Ice House Run

A total of 341 boaters were documented using the Ice House Run between 2015 and 2019. All documented use was non-commercial. Table 1 contains the monitoring results for boating use on the Ice House Run from 2015 through 2019. The reported information includes the water year type<sup>3</sup>; required and actual releases; the number of boaters, groups and boats on each day when boating flows were released; and the maximum number of trailers and vehicles-at-one-time observed at the take-out at Bryant Springs Road Bridge. Flows released in each year of the reporting period were at or above the required magnitude and duration and they occurred for the specified numbers of days and events in each year, as required by the License. During each flow event the quantity of flow varies throughout the day as flows are ramped up and down such that the quantity of the actual releases reported in Table 1 reflect the highest measured flow during each day. In compliance with the ramping rate requirement of one foot per hour specified in license<sup>4</sup> SMUD ramped flows in the early morning and late afternoon to ensure the target flows were present in the reach throughout the day.

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<sup>2</sup> On January 6, 2020 FERC approved SMUD's request to extend the filing date for the whitewater boating management plan for the Slab Creek Run to December 24, 2024.

<sup>3</sup> Water year types are specified in SWRCB Condition No. 1 and Forest Service Condition No. 27 (Appendices A and B of the license, respectively).

<sup>4</sup> Forest Service 4(e) condition no. 29 and Water Quality Certification condition no. 3.

**Table 1. Summary of monitoring data for the Ice House Run, 2015 to 2019**

Year/ Water year type	Release Date	Required/ Actual Release (cfs)	Number of Boaters	Number of Groups	Number of Boats
2015/CD	5/02/2015	300/336	29 <sup>a</sup>	8	29
<b>Annual total</b>			<b>29</b>	<b>8</b>	<b>29</b>
<b>Average/Release Day</b>			<b>29</b>	<b>8</b>	<b>29</b>
2016/AN <sup>1</sup>	5/21/2016	500/560	21	6	20
	5/22/2016	500/560	0	0	0
	6/18/2016	500/516	15	3	13
	6/19/2016	500/511	6	2	6
	6/25/2016	400/415	27	7	25
	6/26/2016	400/415	10	4	8
<b>Annual total</b>			<b>79</b>	<b>22</b>	<b>72</b>
<b>Average/Release Day</b>			<b>13.2</b>	<b>3.7</b>	<b>12.0</b>
2017/W	6/09/2017	500/508	0	0	0
	6/10/2017	500/508	5	1	5
	6/11/2017	500/508	9	2	6
	6/16/2017	500/512	0	0	0
	6/17/2017	500/512	14	4	14
	6/18/2017	400/415	6	2	5
	6/23/2017	400/409	6	1	6
	6/24/2017	400/409	7	2	7
	6/25/2017	400/409	6	3	4
<b>Annual Total</b>			<b>53</b>	<b>15</b>	<b>47</b>
<b>Average/Release Day</b>			<b>5.9</b>	<b>1.7</b>	<b>5.2</b>
2018/BN	6/16/2018	400/415	14	3	4
	6/23/2018	500/515	28	6	11
	6/24/2018	500/515	24	3	25
	6/30/2018	400/419	29	5	19
<b>Annual Total</b>			<b>95</b>	<b>17</b>	<b>59</b>
<b>Average/Release Day</b>			<b>23.8</b>	<b>4.3</b>	<b>14.8</b>
2019/W	6/08/2019	400/422	9	2	6
	6/09/2019	500/523	35	6	32
	6/15/2019	400/425	5	1	5
	6/16/2019	500/523	3	2	3
	6/22/2019	400/419	11	2	7
	6/23/2019	500/523	7	2	7
	6/28/2019	400/419	0	0	0
	6/29/2019	500/534	16	4	15
	6/30/2019	500/523	0	0	0
<b>Annual Total</b>			<b>86</b>	<b>19</b>	<b>75</b>
<b>Average/Release Day</b>			<b>9.6</b>	<b>2.1</b>	<b>8.3</b>
<b>5-year Average/Release Day</b>			<b>11.8</b>	<b>2.8</b>	<b>9.8</b>

cfs = cubic feet per second, BSB = Bryant Springs Road Bridge, CD = Critically Dry, BN = Below Normal, AN = Above Normal, W = Wet

<sup>a</sup> A total of 29 people (26 hardshell kayaks and 3 inflatable kayaks) ran the river in 2015, 4 hardshell kayakers ran the reach between Ice House Dam and Ice House Bridge twice bringing the total number of runs up to 33.

<sup>1</sup> The California Department of Water Resources (DWR) May Bulletin 120 forecasted the 2016 water year type as Above Normal, and the UARP was operated under this scenario for the remainder of the water year. However, the final 2016 water year type was later reclassified as Below Normal based on DWR's Full Natural Flow record for the American River at Folsom in October 2016.

The maximum number of vehicles and trailers observed at any one time for primary put-in and take-out locations (Ice House Day Use Area, Ice House Bridge, and Bryant Springs Bridge) as well as Junction Reservoir Boat Ramp are summarized in Table 2. Vehicle and trailer counts reported in this table are associated with both boating and non-boating use. Because the parking area near Ice House Dam is adjacent to Ice House Day Use Area, vehicle counts at this location likely relate to non-boating use.

**Table 2. Summary of parking data for the Ice House Run, 2015 to 2019<sup>a</sup>**

Release Date	Max. No. of Vehicles and Trailers-at-One Time at Ice House Day Use Area	Max. No. of Vehicles and Trailers-at-One-Time at Ice House Road Bridge	Max. No. of Vehicles and Trailers-at-One-Time at Bryant Springs Bridge	Max. No. of Vehicles and Trailers-at-One-Time at Junction Boat Ramp
5/02/2015 <sup>b</sup>	7	--	7	--
5/21/2016 <sup>b</sup>	11	--	8	--
5/22/2016 <sup>b</sup>	6	--	0	--
6/18/2016 <sup>b</sup>	15	1	6	--
6/19/2016 <sup>b</sup>	17	--	4	--
6/25/2016 <sup>b</sup>	26	2	10	--
6/26/2016 <sup>b</sup>	16	1	5	--
6/09/2017	2	1	1	--
6/10/2017	9	4	4	--
6/11/2017	6	0	2	--
6/16/2017	8	0	0	--
6/17/2017	22	5	7	--
6/18/2017	24	3	5	--
6/23/2017	12	4	3	--
6/24/2017	33	3	4	--
6/25/2017	18	3	2	--
6/16/2018	25	3	5	5
6/23/2018	20	4	9	4
6/24/2018	13	4	10	4
6/30/2018	21	5	9	10
6/08/2019	14	5	4	2
6/09/2019	12	4	12	2
6/15/2019	17	2	4	3
6/16/2019	15	0	2	5
6/22/2019	14	3	6	5
6/23/2019	19	3	5	4
6/28/2019	7	0	1	7
6/29/2019	16	3	6	12
6/30/2019	23	4	2	7

<sup>a</sup> Estimates include both boating and non-whitewater boating recreational vehicles and trailers

<sup>b</sup> Data collected in 2015 and 2016 may include administrative or survey vehicles which may overestimate parking.



### 3.1.2 Slab Creek Run

A total of 473 boaters were documented using the Slab Creek Run during 2016, 2018, and 2019. All documented use was non-commercial; however, commercial gear was observed. Table 3 contains the monitoring results for boating use on the Slab Creek Run in 2016, 2018, and 2019 including: water year type; required and actual releases; and the number of boaters, groups, and boats. Boating use on the first weekend of the April 2018 flow event may have been affected by limited access to Rock Creek Powerhouse when the locked gate on the access road prevented vehicular access to the take-out. Because some boaters may not have wanted to hike almost one mile from the take-out to reach their parked car on Rock Creek Road, the nearest public road, some boaters may have opted not to boat on that weekend.

Boating flows were not provided in 2015 because it was a critically dry water year type and the License does not require providing boating flows. Additionally, boating flows were not provided in 2017 because it was a Wet year with high runoff condition that did not allow for controlling the spill over Slab Creek Dam to manage the flows specified in the License. Flows released in the other 3 years during the reporting period were within or above the required 850 to 1,500 cubic feet per second (cfs) magnitude and occurred on 6 days over 3 events in each year, as required. Unlike flows that are provided by a valve, which can be manipulated to create a predictable and stable flow throughout an event, the flows provided in the Slab Creek Run are created by manufacturing a spill. Consequently, the quantity of flow is subject to variability throughout the day of each event and the reported amounts in Table 2 reflect the highest measured flow during each day. SMUD operated the UARP to ensure the target flows, at a minimum, were present in the reach throughout the day.



**Table 3. Summary of monitoring data for Slab Creek Run, 2016, 2018, and 2019**

Year/Water year type	Release Date	Actual Release (Required 850 to 1,500) (cfs)	Number of Boaters	Number of Groups	Number of Boats
2016/AN <sup>1</sup>	4/23/2016	1,125	40	9	37
	4/24/2016	1,137	34	7	27
	4/30/2016	1,166	31	9	21
	5/01/2016	1,166	53	9	29
	5/14/2016	1,160	34	8	30
	5/15/2016	1,166	14	3	9
<b>Annual Total</b>			<b>206</b>	<b>45</b>	<b>153</b>
<b>Annual Average/Release Day</b>			<b>34.3</b>	<b>7.5</b>	<b>25.5</b>
2018/BN	4/21/2018	1,269	22	4	22
	4/22/2018	1,333	8	3	8
	4/28/2018	1,459	31	8	21
	4/29/2018	1,930	15	5	13
	5/05/2018	1,196	35	9	35
	5/06/2018	1,131	14	3	14
<b>Annual Total</b>			<b>125</b>	<b>32</b>	<b>113</b>
<b>Annual Average/Release Day</b>			<b>20.8</b>	<b>5.3</b>	<b>18.8</b>
2019/W	4/13/2019	1,252	41	8	28
	4/14/2019	1,133	37	7	31
	4/27/2019	1,117	13	3	9
	4/28/2019	1,142	14	3	8
	5/04/2019	1,440	0	0	0
	5/05/2019	1,246	37	5	29
<b>Annual Total</b>			<b>142</b>	<b>26</b>	<b>105</b>
<b>Annual Average/Release Day</b>			<b>23.7</b>	<b>4.3</b>	<b>17.5</b>
<b>Average/Release Day during the 3 years when flows were provided</b>			<b>26.3</b>	<b>5.7</b>	<b>20.6</b>

cfs = cubic feet per second, BN = Below Normal, AN = Above Normal, W = Wet

<sup>1</sup> The California Department of Water Resources (DWR) May Bulletin 120 forecasted the 2016 water year type as Above Normal, and the UARP was operated under this scenario for the remainder of the water year. However, the final 2016 water year type was later reclassified as Below Normal based on DWR's Full Natural Flow record for the American River at Folsom in October 2016.

The maximum number of vehicles and trailers observed at any one time for primary put-in and take out locations (i.e., Slab Creek Dam, Mosquito Bridge, and Rock Creek Powerhouse) are summarized in Table 4. Vehicle and trailer counts reported in this table are associated with both boating and non-boating use.

**Table 4. Summary of parking data for Slab Creek Run, 2016, 2018, and 2019**

Release Date	Maximum Number of Vehicles and Trailers-at-One-Time at Slab Creek Dam	Maximum Number of Vehicles and Trailers-at-One-Time at Mosquito Bridge	Maximum Number of Vehicles and Trailers-at-One-Time at Rock Creek Powerhouse
4/23/2016	5	2	18
4/24/2016	7	3	5
4/30/2016	6	5	8
5/01/2016	5	4	8
5/14/2016	9	7	7
5/15/2016	4	3	1
4/21/2018	5	5	2
4/22/2018	4	3	0
4/28/2018	5	4	4
4/29/2018	5	4	5
5/05/2018	7	3	3
5/06/2018	4	7	2
4/13/2019	11	8	8
4/14/2019	8	5	6
4/27/2019	4	3	1
4/28/2019	6	3	3
5/04/2019	0	1	0
5/05/2019	6	4	5

### 3.2 POST-RUN INTERVIEWS

SMUD conducted 125 post-run interviews with those who boated the Ice House Run in 2015 through 2019. This represents about 37 percent of the 342 estimated number of Ice House Run boaters during that period. Table 5 summarizes interview responses for the Ice House Run and Table 6 summarizes flow satisfaction by skill level and boat type.

SMUD conducted 81 post-run interviews with those who boated the Slab Creek Run in 2016, 2018, and 2019. This represents about 17 percent of the 473 estimated number of Slab Creek Run boaters during that period. Table 7 summarizes interview responses for the Slab Creek Run and Table 8 summarizes flow satisfaction by skill level and boat type.

The qualitative information collected during the post-run interviews represents only a subset of boaters and may or may not reflect the quantitative results collected during field observations. To account for different water year types, flows, and site-specific conditions (e.g., woody material), responses to SMUD’s post-run interviews for each run are summarized below by year.

Post-run interviews indicated commercial boating use did not occur on either the Ice House or Slab Creek run during the 2015-2019 monitoring period. However, in 2016 and 2019 a few boaters mentioned they were using a commercial shuttle service for the Slab Creek run with pick-up and drop-off points of Slab Creek Dam, Mosquito Bridge, and Rock Creek Powerhouse. Note these summaries include boater responses about the presence and effects of wood and vegetation in each run.

**Table 5. Interview response summary for the Ice House Run, 2015 to 2019**

Interview Topic	Year				
	2015 (n=9)	2016 (n=23)	2017 (n=13)	2018 (n=53)	2019 (n=27)
<b>Reported individual skill level (Class III, IV, V<sup>1</sup>)</b>	III-1 boater IV-6 boaters V-2 boaters	IV-7 boaters V-16 boaters	III-2 boaters IV-7 boaters V-4 boaters	II-1 boater III-4 boaters IV-36 boaters V-11 boaters Not reported-1 boater	III-1 boater IV-21 boaters V-5 boaters
<b>Type of craft used</b>	Hardshell kayaks-7 Inflatable kayaks-2	Hardshell kayaks-17 Paddle rafts-5 Inflatable kayak-1	Hardshell kayaks-7 Paddle rafts-2 Inflatable kayaks-4	Hardshell kayaks-32 Paddle rafts-14 Inflatable kayaks-7	Hardshell kayaks-15 Paddle rafts-7 Inflatable kayaks-4 Cataraft-1
<b>Flow satisfaction— was the flow too high, too low or just right for the boaters' skill level Would boaters return for the flow?</b>	336 cfs flow Too high-none Just right-3 boaters Too low-6 boaters  All boaters said they would return for this flow.	415 cfs flow Too high-none Just right-4 boaters Too low-6 boaters  All boaters said they would return for this flow.	409–415 cfs flow Too high-none Just right-5 boaters Too low-none  All boaters said they would return for this flow.	415–419 cfs flow Too high-none Just right-13 boaters Too low-13 boaters  23 boaters said they would return for this flow; 1 boater said 'probably', 1 said 'maybe' and 1 said 'no'.	419–425 cfs flow Too high-none Just right-6 boaters Too low-2 boaters All boaters said they would return for this flow.
		511–560 cfs flow Too high-2 boaters Just right-8 boaters Too low-3 boaters  All boaters said they would return for this flow.	508–512 cfs flow Too high-2 boaters Just right-6 boaters Too low-none  All boaters said they would return for this flow.	515 cfs flow Too high-none Just right-25 boaters Too low-1 boaters  26 boaters said they would return for this flow.	523–534 cfs flow Too high-4 boaters Just right-13 boaters Too low-2 boaters  17 boaters said they would return for this flow. 2 said they would not return; 1 because the flow was too high and 1 because the flow was too low.

Interview Topic	Year				
	2015 (n=9)	2016 (n=23)	2017 (n=13)	2018 (n=53)	2019 (n=27)
<b>Comments related to safety, portages, or other issues<sup>2</sup></b>	Several boaters said they observed logs and vegetation in the reach but they did not consider them to be problems; portaging, as necessary, was not difficult.	One boater mentioned two incidents where boats were pinned by trees and others said woody vegetation is a safety concern.	Two boaters said they portaged due to woody vegetation.	Boaters mentioned safety concerns with woody debris in the run and specifically identified tree(s) across the reach upstream of Ice House Road Bridge and streamside vegetation.	Boaters mentioned safety concerns with woody debris in the run and specifically identified tree(s) across the reach upstream of Ice House Road Bridge and streamside vegetation.
<b>Put-in and take-out locations</b>	<i>Put-in</i> IH Dam-6 boaters IH Road Bridge-3 boaters <i>Take-out</i> BSB-All	<i>Put-in</i> IH Dam-18 boaters IH Road Bridge-1 boater IH Resort-4 boaters <i>Take-out</i> BSB-21 boaters IH Road Bridge-2 boaters	<i>Put-in</i> IH Dam-4 boaters IH Road Bridge-5 boaters IH Resort-4 boaters <i>Take-out</i> BSB-All	<i>Put-in</i> IH Dam-22 boaters IH Road Bridge-29 boaters IH Resort-2 boaters <i>Take-out</i> BSB-All	<i>Put-in</i> IH Dam-7 boaters IH Road Bridge-12 boaters IH Resort-4 boaters Gaging station-4 boaters <i>Take-out</i> BSB-All
<b>Encounters on the river and effects</b>	6 of 9 encountered other boaters No effect-5 boaters No response-1 boater	18 of 23 encountered other boaters No effect-11 boaters No response-7 boaters	3 of 13 encountered other boaters No effect-3 boaters	43 of 53 encountered other boaters Positive effect-26 No effect-16 boaters Negative effect-1 boater	18 of 27 encountered other boaters Positive effect-16 boaters No effect-2 boaters
<b>Shuttle management</b>	Boaters managed their shuttles by dropping vehicles at Ice House Day Use Area, Ice House Road Bridge, and Bryant Springs Road Bridge; one group bicycled and one group hitchhiked to accomplish their shuttle.	All but one boater managed their shuttle by parking a vehicle at Bryant Springs Road Bridge. The other boater parked at Ice House Road Bridge.	All boaters managed their shuttle by parking a vehicle at Bryant Springs Road Bridge.	Nearly all boaters dropped a vehicle at Bryant Springs Road Bridge to support their shuttle (one group used a non-boating friend as its designated shuttle driver).	Nearly all boaters dropped a vehicle at Bryant Springs Road Bridge to support their shuttle (one group used a shuttle driver).

Interview Topic	Year				
	2015 (n=9)	2016 (n=23)	2017 (n=13)	2018 (n=53)	2019 (n=27)
<b>Comments about parking</b>	No comments received	No comments received	Two boaters were dissatisfied with parking at their put-in locations because one had to park along the side of the road near Ice House Resort and the other said it was a long way to carry their raft to the base of the dam.	Several boaters reported parking was crowded at Bryant Springs Road Bridge. A few individuals reported parking 1/8 to 1/4 mile up the road from the bridge.	Several boaters reported parking would be crowded at Bryant Springs Road Bridge if the run gets more popular.

n=total number of interviews; BSB=Bryant Springs Road Bridge; cfs=cubic feet per second; IH=Ice House

<sup>1</sup> The International Scale of River Difficulty is a U.S. system used to rate the difficulty of a stretch of river. There are six classes from Class I, which is fast moving water, to Class VI, which signifies the most extreme whitewater navigable.

<sup>2</sup> Interviewees reported wood occurred primarily on private land; hazardous wood in the reach has not been reported on National Forest System land.



**Table 6. Flow satisfaction response summary for the Ice House Run, 2015 to 2019**

Skill Level	Boat Type	Flow	Return	Flow Satisfaction (No.)			
				Too High	Just Right	Too Low	No Response
Class III	Hardshell Kayak	336	Yes	--	--	1	--
		512	Yes	--	2	--	--
	Paddle Raft	415	Yes	--	1	--	--
		419	Yes	--	1	--	--
		515	Yes	--	2	--	--
		523	No	--	--	1	--
Class IV	Cataract	523	Yes	1	--	--	--
	Hardshell Kayak	336	Yes	--	2	2	--
		415	Yes	--	4	2	--
		419	Maybe	--	--	1	--
			Yes	--	--	3	--
		425	Yes	--	1	--	--
		508	No Answer	--	1	--	--
			Yes	1	1	--	--
		515	Yes	--	11	--	--
		516	Yes	--	1	--	--
		523	Yes	--	11	--	--
		560	No Answer	1	--	--	--
			Yes	1	--	--	--
	Inflatable Kayak	336	Yes	--	1	1	--
		409	Yes	--	4	--	--
		415	Yes	--	1	--	--
		419	Yes	--	1	1	--
		515	Yes	--	5	--	--
		523	No	1	--	--	--
			Yes	--	1	--	--
		Paddle Raft	415	Probably	--	--	1
	Yes			--	1	1	--
	419		Yes	--	2	1	--
	422		Yes	--	4	1	--
	515		Yes	--	5	--	--
	560		Yes	--	1	--	--

Skill Level	Boat Type	Flow	Return	Flow Satisfaction (No.)			
				Too High	Just Right	Too Low	No Response
Class V	Hardshell Kayak	336	Yes	--	--	2	--
		415	Yes	--	4	3	--
		419	No	--	--	1	--
			Yes	--	2	3	--
		508	Yes	--	1	--	--
		511	Yes	--	1	1	--
		512	Yes	--	1	--	--
		515	Yes	--	2	1	--
		516	Yes	--	2	1	--
		523	Yes	--	1	1	--
		534	Yes	--	--	1	--
		560	Yes	--	2	1	--
	Inflatable Kayak	422	Yes	--	1	--	--
	Paddle Raft	415	Yes	--	1	2	--
		508	Yes	1	--	--	--
516		Yes	--	1	--	--	
523		Yes	--	--	1	--	
No Skill Level Given	Hardshell Kayak	515	No response	--	--		1
	Inflatable Kayak	419	Yes	--	--	1	--
<b>Total</b>				<b>6</b>	<b>83</b>	<b>35</b>	<b>1</b>

**Table 7. Interview response summary for the Slab Creek Run, 2016, 2018, and 2019**

Interview topic	Year		
	2016 (n=24)	2018 (n=12)	2019 (n=45)
<b>Reported individual skill level (Class III, IV, V<sup>1</sup>)</b>	III-1 boater IV-11 boaters V-9 boaters Not reported-3 boaters	IV-5 boaters V-7 boaters	IV-20 boaters V-25 boaters
<b>Type of craft used</b>	Hardshell kayaks-17 Paddle rafts-5 Not reported-2	Hardshell kayaks-9 Paddle rafts-3	Hardshell kayaks-26 Paddle rafts-19
<b>Flow satisfaction—was the flow too high, too low or just right for the boaters' skill level</b>  <b>Would boaters return for the flow?</b>	<i>1,125–1,166 cfs flow</i> Too high-none Just right-11 boaters Too low-10 boaters Not reported-3 boaters  20 boaters said they would return for this flow; 2 said 'maybe' and 2 did not provide a response.	<i>1,125–1,166 cfs flow</i> Too high-1 boater Just right-11 boaters Too low-none  All boaters said they would return for this flow.	<i>1,125–1,166 cfs flow</i> Too high-none Just right-38 boaters Too low-6 boaters 'Awkward'-1 boater  All boaters said they would return for this flow.
<b>Comments related to safety, portages or other issues</b>	Few boaters mentioned safety concerns with wood and vegetation. Also mentioned portaging Mother Lode Falls because of its difficulty.	Boaters commented that construction activity at the Southfork Powerhouse near the dam caused congestion and limited parking at the put-in.	Few boaters mentioned encountering wood in the run but said it was either avoidable or otherwise manageable; also mentioned metal may be present in the second rapid.
<b>Put-in and take-out locations</b>	<i>Put-in</i> Slab Cr. Dam-All  <i>Take-out</i> Mosquito Road Bridge-13 boaters Rock Cr. Powerhouse-10 boaters	<i>Put-in</i> Slab Cr. Dam-All  <i>Take-out</i> Mosquito Road Bridge-11 boaters Rock Cr. Powerhouse-1 boater	<i>Put-in</i> Slab Cr. Dam-All  <i>Take-out</i> Mosquito Road Bridge-25 boaters Rock Cr. Powerhouse-20 boaters

Interview topic	Year		
	2016 (n=24)	2018 (n=12)	2019 (n=45)
	No response-1 boater		
<b>Encounters on the river and effects</b>	17 of 24 encountered other boaters  Positive effect-none No effect-1 boater Negative effect-none No response-16 boaters	8 of 12 encountered other boaters  Positive effect-6 boaters No effect-2 boaters Negative effect-none	27 of 45 encountered other boaters  Positive effect-19 boaters No effect-8 boaters Negative effect-none
<b>Shuttle management</b>	The 45 boaters interviewed represented 17 groups. Of these 17 groups, 8 dropped vehicles at Mosquito Bridge, 3 dropped vehicles at Rock Creek Powerhouse, 3 used a commercial shuttle to Mosquito Bridge and 3 used a commercial shuttle to Rock Creek Powerhouse.	Of the 12 boaters interviewed, 10 dropped vehicles at Mosquito Bridge, 1 used a private shuttle to Mosquito Bridge and 1 used a private shuttle to Rock Creek Powerhouse.	The 45 boaters interviewed represented 25 groups. Of these 25 groups, 18 dropped a vehicle at their take-out location (9 at Mosquito Bridge and 9 at Rock Creek Powerhouse), 6 used a shuttle pick up from Mosquito Bridge, and 1 hitchhiked from Mosquito Bridge.
<b>Comments about parking</b>	No comments received	Several comments about lack of parking capacity at Mosquito Bridge.	Several comments about safety, lack of sufficient parking, and difficult egress from the river at Mosquito Bridge.

n = number of interviews

<sup>1</sup> The International Scale of River Difficulty is a U.S. system used to rate the difficulty of a stretch of river. There are six classes from Class I, which is fast moving water, to Class VI, which signifies the most extreme whitewater navigable-

**Table 8. Flow satisfaction response summary for the Slab Creek Run, 2016, 2018, and 2019**

Skill Level	Boat Type	Flow (cfs)	Return	Flow Satisfaction (No.)			
				Too High	Just Right	Too Low	No Response
Class III	Paddle Raft	1,166	Maybe	--	--	1	--
Class IV	Hardshell Kayak	1,117	Yes	--	1	--	--
		1,125	Yes	--	1	--	--
		1,133	Yes	--	2	1	--
		1,137	Yes	--	--	1	--
		1,142	Yes	--	1	--	--
		1,160	Yes	--	1	1	1
		1,166	Maybe	--	1	--	--
			Yes	--	1	2	--
		1,196	Yes	--	1	--	--
		1,246	Yes	--	3	1	--
		1,252	Yes	--	4	--	--
		1,269	Yes	--	1	--	--
		1,333	Yes	--	1	--	--
		1,930	Yes	--	1	--	--
	Paddle Raft	1,117	Yes	--	2	--	--
		1,133	Yes	--	2	1	--
		1,142	Yes	--	--	1	--
		1,166	Yes	--	--	1	--
		1,246	Yes	--	--	1	--
		1,459	Yes	--	1	--	--
Not reported	1,137	Yes	--	1	--	--	
Class V	Hardshell Kayak	1,117	Yes	--	1	--	--
		1,125	Yes	--	1	1	--
		1,133	Yes	--	4	--	--
		1,142	Yes	--	2	--	--
		1,166	Yes	--	3	--	--
		1,196	Yes	--	2	--	--
		1,246	Yes	--	4	--	--
		1,252	Yes	--	2	--	--
		1,269	Yes	--	1	--	--
		1,333	Yes	--	1	--	--
		1,459	Yes	--	1	--	--

Skill Level	Boat Type	Flow (cfs)	Return	Flow Satisfaction (No.)			
				Too High	Just Right	Too Low	No Response
Class V (cont.)	Paddle Raft	1,117	Yes	--	2	--	--
		1,133	Yes	--	1	1	--
		1,142	Yes	--	3	--	--
		1,166	Yes	--	2	1	--
		1,196	Yes	1	1	--	--
		1,252	Yes	--	4	--	1 "awkward"
	Not reported	1,137	Yes	--	--	1	--
Not reported	Hardshell Kayak	1,125	No Response	--	--	--	1
		1,166	No Response	--	--	--	1
			Yes	--	--	1	--
Total				1	60	16	4

### 3.3 PHOTO DOCUMENTATION

Photo documentation indicated that no noticeable changes occurred to the physical conditions of the designated put-in and take-out locations on either run over the monitoring period. However, it should be noted that the Slab Creek Run put-in was in a dynamic state during the monitoring period because it is in an area that continues to be affected by construction of the Southfork Powerhouse which began in 2017. Photographs are provided in Appendices B and C.

### 4.0 DISCUSSION

This section presents the boating flow events SMUD will implement during the next five-year period. Per the SF Silver Creek Whitewater Management Plan, the number of flow events is based on monitoring results from the previous five-year period. Monitoring results are compiled in a database that SMUD will continue supplementing each year so all data can be further analyzed during the license term, as may be necessary.

#### 4.1 ICE HOUSE RUN THRESHOLD COMPARISON

Table 9 shows the projected number of release days for the next five-year period using Equation 1 of the SF Silver Creek Whitewater Management Plan Fork. The calculated number of release days for each water year type is less than the minimum number of days required by the license. Consequently, the flow schedule will not be adjusted and SMUD will continue implementing the minimum number of release days for each water year type, as specified in the license, from 2020 to 2024.



**Table 9. Calculation of the number of release days to be provided 2020-2024.**

Water year type	Annual No. of release days for the 5-yr monitoring period ( <i>P</i> )	No. of days to be released based on monitoring results ( $B/c * P$ )	Annual No. of release days for 2020-2024 ( <i>R</i> )
Critically dry	1	$(11.8/68)*1=0.17 < 1 \text{ day}^1$	1
Dry	3	$(11.8/68)*3=0.52 < 3 \text{ days}^1$	3
Below normal	4	$(11.8/68)*4=0.69 < 4 \text{ days}^1$	4
Above Normal	6	$(11.8/68)*6=1.04 < 6 \text{ days}^1$	6
Wet	9	$(11.8/68)*9=1.56 < 9 \text{ days}^1$	9

*R* is the number of days to be released for a given water year type

*B* is 11.8 boaters per day as calculated for the five-year monitoring period (see Table 1)

*P* is the number of release days for the previous five-year monitoring period flow schedule

*c* is the capacity threshold of 68 boaters per release day (SMUD 2018)

<sup>1</sup> Minimum number of release days required by the License (FERC 2014a).

## 4.2 SLAB CREEK RUN

The whitewater recreation plan for the Slab Creek Run will be developed, including thresholds for adjusting the flow schedule, based on the monitoring results. However, for the first 15 years of the license the initial flow schedule will remain in effect, which is to provide streamflows in below normal, above normal and wet water year types between 850 and 1,500 cfs between 10:00 a.m. and 4:00 p.m. for 6 days in no less than three events in the period beginning March 1 and ending May 31. If conditions permit, one of the events will be replaced with a 3-day event on Memorial Day weekend, in which case the total number of days for the year will be increased to 7 days.

## 5.0 ANNUAL DATA SYNTHESIS AND REPORTING

SMUD has provided summaries of the annual monitoring data to the Consultation Group in the following formats: a written report for the single day monitoring conducted in 2015; annual presentations at License Compliance meetings for monitoring conducted in 2016 and 2017; and a comprehensive summary of findings for monitoring conducted from 2015 to 2018, including all post-trip interview responses. SMUD and the Consultation Group intend to standardize the format and content of future annual summaries.

## 6.0 BOATER SAFETY MEASURES

Pursuant to the State Water Resources Control Board letter approving the SF Silver Creek Whitewater Management Plan (SMUD 2019), safety measures were developed in coordination with American Whitewater and the Forest Service to address boater safety on release days. The Forest Service is responsible for identifying and implementing these measures. To date, SMUD is aware that Forest Service boater safety measure implementation includes posting a safety sign at the put-in for the Ice House Run (Figure 3). The Forest Service and American Whitewater are still developing safety measures.



**Figure 3. Forest Service boater safety sign located at Ice House Day Use Area near the west dam abutment (point of access to the designated put-in for the Ice House Run)**

## 7.0 LITERATURE CITED

- FERC (Federal Energy Regulatory Commission). 2014a. Order Issuing New License, to Sacramento Municipal Utility District for Upper American River Project, FERC No. 2101-084. Accession no. 20140723-3046. July 23.
- FERC. 2014b. Order Granting Rehearing in part, Denying Rehearing in part, and Amending License, to Sacramento Municipal Utility District for Upper American River Project, FERC No. 2101-095. Accession no. 20141016-3008. October 16.
- SMUD. 2015. Whitewater Boating Monitoring Plan. Hydro License Implementation for the SMUD Upper American River Project (FERC Project No. 2101). January.
- SMUD. 2018. Whitewater Recreation Management Plan for South Fork Silver Creek downstream of Ice House Dam. Hydro License Implementation for the SMUD Upper American River Project (FERC Project No. 2101). September.
- SMUD. 2019. SMUD Supplemental Filing for SF Silver Creek Whitewater Recreation Management Plan for the Upper American River Project (UARP; FERC Project No. 2101). July.

**Appendix A**  
**Post-run Interview Questions**

## Post-Trip Interview Questions

FROM DATASHEET:

Name:

Phone:

Run:

Run date:

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### INTERVIEW

“Hi this is [identify yourself and employer] calling to ask a couple of questions about your experience on the [Ice House/Slab Creek] Run. Do you have about 10 minutes to spare?”

1. What is your residence city?
2. We have you paddling a (hardshell/paddle raft/inflatable), is this correct?
3. What did you do for shuttle (drop a car, bike shuttle, shuttle driver)?
  - a. How many vehicles leave at take-out? Where?
  - b. How many vehicles leave at put-in? Where?
  - c. On a scale of 1 to 10 were you satisfied with parking?
    - i. If less than a 6 = why?
4. Put-in:
  - a. Did you have to wait to launch? Why?
  - b. On a scale of 1 to 10, were you satisfied with the Put-in?  
If less than a 6 = why?
  - c. Take out:
    - i. Did you have to wait to take-out? Why?
    - ii. On a scale of 1 to 10, were you satisfied with the Take Out?  
If less than a 6 = why?
5. Multiple runs:
  - a. How many runs did you make that day?
  - b. Did you do other runs on other reaches or rivers that weekend?

- i. If No- Did you consider other runs on other reaches or rivers that weekend?
6. Did you have any safety issues?
  - a. What?
  - b. Where?
  - c. Did you have any portages?
  - d. Did you have any scouts?
  - e. *Safety Comments (make sure to note reports of wood, logs, or trees):*
7. Did you see encounter other people on the river?
  - a. Did it positively or negatively affect your experience, or have no effect?
8. What is your Individual skill level (Class 3, 4, 5)? Not the group.
9. Was the flow too high, too low, or just right for your skill level?
  - a. Why?
  - b. Would you return with the flows you experienced?
10. On a scale of 1 to 10, how was the over-all quality of the run?
  - a. Less than a 6 = why?
  - b. Did it meet your expectations?
11. Any other information you'd like to provide? (say this exactly as it is written)

#### OTHER COMMENTS/ANNOTATIONS MENTIONED

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**APPENDIX B****Pre- and Post-release Photographs for the Ice House Run**



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**Figure B-1. Ice House Dam put-in for the Ice House Run, pre-release (top) post-release (bottom) 2015.**





**Figure B-2. Ice House Run take-out at Bryant Springs Road Bridge, pre-release (top) post-release (bottom) 2015.**





**Figure B-3. Ice House Dam put-in for the Ice House Run, pre-release (post-release photos were not obtained) 2016.**



**Figure B-4. Ice House Run take-out at Bryant Springs Road Bridge, pre-release (post-release photos were not obtained) 2016.**





**Figure B-5. Ice House Dam put-in for the Ice House Run, first release date (post-release photos were not obtained) 2017.**



**Figure B-6. Ice House Dam alternate put-in for the Ice House Run, first release date (post-release photos were not obtained) 2017.**



**Figure B-7. Ice House Run take-out at Bryant Springs Road Bridge, first release date (post-release photos were not obtained) 2017.**





**Figure B-8. Ice House Dam put-in for the Ice House Run, pre-release (top) post-release (bottom) 2018.**





**Figure B-9. Put-in for the Ice House Run looking toward the valve house, pre-release (top) post-release (bottom) 2018.**





**Figure B-10. Ice House Dam alternate put-in for the Ice House Run, pre-release (top) post-release (bottom) 2018.**





**Figure B-11. Trail to Ice House Road Bridge put-in for the Ice House Run looking toward shoreline, pre-release (top) post-release (bottom) 2018.**





**Figure B-12. Trail to Ice House Road Bridge put-in for the Ice House Run looking away from shoreline, pre-release (top) post-release (bottom) 2018.**





**Figure B-13. Shoreline at Ice House Road Bridge put-in for the Ice House Run, pre-release (top) post-release (bottom) 2018.**





**Figure B-14. Ice House Run take-out at Bryant Springs Road Bridge view from bridge, pre-release (top) post-release (bottom) 2018.**





**Figure B-15. Ice House Run take-out at Bryant Springs Road Bridge view from road, pre-release (top) post-release (bottom) 2018.**





**Figure B-16. Ice House Run take-out at Bryant Springs Road Bridge view from shoreline, pre-release (top) post-release (bottom) 2018.**





**Figure B-17. Ice House Dam put-in for the Ice House Run, pre-release (top) post-release (bottom) 2019.**





**Figure B18. Put-in for the Ice House Run looking toward the valve house, pre-release (top) post-release (bottom) 2019.**





**Figure B-19. Ice House Dam alternate put-in for the Ice House Run, pre-release (top) post-release (bottom) 2019.**





**Figure B-20. Trail to Ice House Road Bridge put-in for the Ice House Run looking toward shoreline, pre-release (top) post-release (bottom) 2019.**





**Figure B-21. Trail to Ice House Road Bridge put-in for the Ice House Run looking away from shoreline, pre-release (top) post-release (bottom) 2019.**





**Figure B-22. Shoreline at Ice House Road Bridge put-in for the Ice House Run, pre-release (top) post-release (bottom) 2019.**





**Figure B-23. Ice House Run take-out at Bryant Springs Road Bridge view from bridge, pre-release (top) post-release (bottom) 2019.**





**Figure B-24. Ice House Run take-out at Bryant Springs Road Bridge view from road, pre-release (top) post-release (bottom) 2019.**





**Figure B-25. Ice House Run take-out at Bryant Springs Road Bridge view from shoreline, pre-release (top) post-release (bottom) 2019.**

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**APPENDIX C****Pre- and Post-release Photographs for the Slab Creek Run**

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**Figure C-1. Trail to Slab Creek Dam put-in for the Slab Creek Dam Run looking toward shoreline, pre-release (top) post-release (bottom) 2016.**





**Figure C-2. Trail used for put-in and take-out at Mosquito Bridge for the Slab Creek Run, pre-release (left) post-release (right) 2016.**





**Figure C-3. Staging area at Mosquito Bridge for the Slab Creek Dam Run, pre-release (top) post-release (bottom) 2016.**





**Figure C-4. Shoreline at Rock Creek Powerhouse, take-out for the Slab Creek Run looking toward shoreline, pre-release (top) post-release (bottom) 2016.**



**Figure C-5. Parking area at Rock Creek Powerhouse, take-out for the Slab Creek Run looking toward shoreline, post-release (pre-release not obtained) 2016.**





**Figure C-6. Trail to Slab Creek Dam put-in for the Slab Creek Dam Run, pre-release (top) post-release (bottom) 2018.**





**Figure C-7. Trail used for put-in and take-out at Mosquito Bridge for the Slab Creek Run, pre-release (top) post-release (bottom) 2018.**





**Figure C-8. Staging area at Mosquito Bridge for the Slab Creek Dam Run, pre-release (top) post-release (bottom) 2018.**





**Figure C-9. Confluence of Rock Creek with South Fork American River used as take-out for the Slab Creek Run, pre-release (top) post-release (bottom) 2018.**





**Figure C-10. Trail to take-out for the Slab Creek Run looking away from shoreline, pre-release (top) post-release (bottom) 2018.**





**Figure C-11. Parking area at Rock Creek Powerhouse, take-out for the Slab Creek Run looking toward shoreline, pre-release (top) and post-release (bottom) 2018.**





**Figure C-12. Trail to Slab Creek Dam put-in for the Slab Creek Dam Run, pre-release (top) post-release (bottom) 2019.**



**Figure C-13. Trail used for put-in and take-out at Mosquito Bridge for the Slab Creek Run, pre-release (top) post-release (bottom) 2019.**





**Figure C-14. Staging area at Mosquito Bridge for the Slab Creek Dam Run, pre-release (top) post-release (bottom) 2019.**





**Figure C-15. Confluence of Rock Creek with the South Fork American River used as take-out for the Slab Creek Run, pre-release (top) post-release (bottom) 2019.**





**Figure C-16. Trail to take-out for the Slab Creek Run looking away from shoreline, pre-release (top) post-release (bottom) 2019.**





**Figure C-17** Parking area at Rock Creek Powerhouse, take-out for the Slab Creek Run looking toward shoreline, pre-release (top) and post-release (bottom) 2019.



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