

FERC Project No. 2426
South SWP Hydropower
Whitewater Boating Study

FIELD RESULTS AND DATA SUMMARY

May 7, 2019

Consistent with Section 5.0 of the South SWP Hydropower Revised Study Plan and as approved in the Federal Energy Regulatory Commission (FERC) Study Plan Determination dated June 14, 2017, the California Department of Water Resources (DWR) and Los Angeles Department of Water and Power (Licensees) provide the following field results and data summary for Study 4.1.19, *Whitewater Boating Study* (Study), which includes work completed to date, key findings, associated data files, variances, and remaining work. The Licensees consider this data to be public.

Completed Work to Date:

The Study is complete. The Licensees completed Step 1 (Literature Search and Mapping), Step 2 (Hydrology Assessment), Step 3 (Conduct Structured Interviews), and Step 4 (Field Reconnaissance and Site Visit).

Step 1 – Literature Search and Mapping

A literature search and internet review were completed to document known whitewater boating characteristics and opportunities along the 18-mile-long reach of Piru Creek, from Pyramid Dam to Lake Piru. The reach analyzed is referred to as Pyramid reach. In addition, maps of key features of Pyramid reach and gradient profiles were created during Step 1 of the Study.

Step 2 – Hydrology Assessment

The Study utilized information from three different gages on Piru Creek to analyze flows discharged from Pyramid Dam into Piru Creek. A hydrologic record was developed from U.S. Geological Survey (USGS) gage 11109525, located immediately downstream of Pyramid Dam; USGS gage 11109600, located just above Lake Piru in Pyramid reach; a California Data Exchange Center (CDEC) gage at Pyramid Dam (PYM); and Project records on inflow and outflow. The current hydrologic record includes sub-daily flow information that was used for analysis in this Study.

Boaters and other recreationists can access hourly flow discharge data from the CDEC gage at Pyramid Dam. DWR records of supplemental flows were obtained to evaluate the recent past pattern of delivery of water to United Water Conservation District (UWCD) which, when available, is guided by Article 52 of the existing Project license. Article 52 allows for the release of up to 3,150 acre-feet (AF) of State Water Project (SWP) water annually between November 1 and the end of February each year.

Step 3 – Conduct Structured Interviews

Information was sought out from whitewater boating enthusiasts and stakeholders to obtain local knowledge of Pyramid reach regarding current recreation opportunities (including popular put-in and take-out areas), user preferences, and any known flow effects on

whitewater boating for Pyramid reach. Interview candidates were selected from the whitewater boating community, and included user groups and other whitewater recreationists, including experts familiar with whitewater resources in the Project area. These candidates were interviewed to determine the types and locations of whitewater boating activities occurring within Pyramid reach, and the range of conditions (including flows) generally acceptable to whitewater boaters of various skill levels.

Interviews and meetings with stakeholders included questions about: (1) how people use the reach, with the goals of describing the character of recreation opportunities and identifying flow-dependent attributes; (2) whether participants can identify specific flows that affect the quality of opportunities; and (3) how to prioritize opportunities and identify recreation users' needs for improved access and flow information. Most interviews were conducted prior to visits to help inform the site visit participants with respect to observed river conditions and access points.

Step 4 – Field Reconnaissance and Site Visit

Field Reconnaissance

The purpose of the field reconnaissance was to characterize Pyramid reach in the context of its use as a whitewater recreation resource, and to assess whitewater boating conditions and opportunities. Prior to the field reconnaissance, a desktop Geographical Information System (GIS) opportunities analysis was performed to identify, map, and describe any existing and potential sites along Pyramid reach for access (put-in and take-out sites). This was completed by mapping the topography, local roads, vegetation cover, existing trails, and land ownership. The GIS analysis helped inform the physical and spatial characteristics of potential whitewater boating resources, and determine and depict the characteristics of the reach.

Site Visit

Experienced whitewater boaters who were interviewed (Step 3) were invited to the field reconnaissance/site visit to assist with: (1) evaluating the quality of boating opportunities along the reach; (2) assessing the access to boating opportunities; (3) estimating potential flow ranges; and (4) identifying obvious hazards. Global Positioning System location data of likely put-in and take-out areas, parking, and general access to Pyramid reach was gathered during the site visit.

Key Accomplishments/Summary of Findings to Date:

Step 1 – Literature Search and Mapping

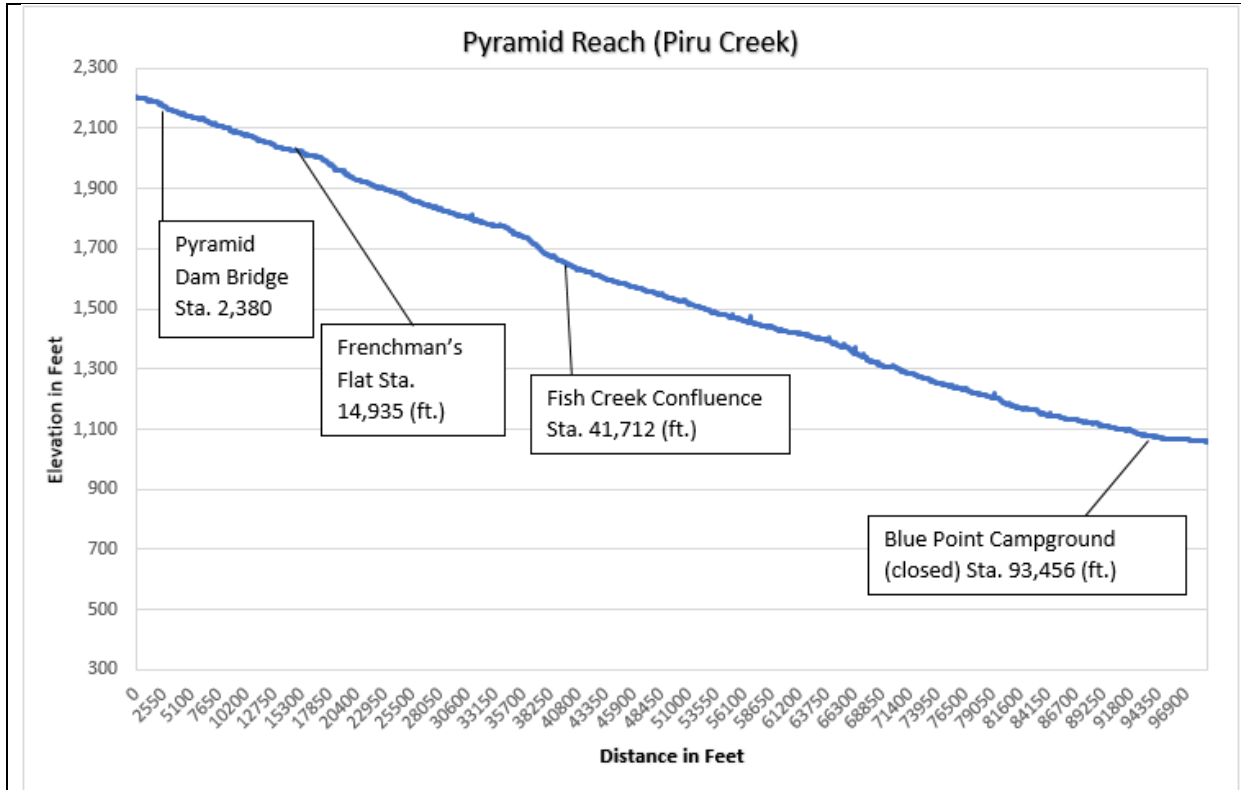
A literature search and internet review examined existing literature, guidebooks, boater diaries, videos, and other available information related to whitewater boating, with the goal of obtaining information specifically about Piru Creek. The literature search identified runs, access points, and levels of whitewater boating difficulty along runs; boater demand; and the range of watercraft that may be able to boat Piru Creek. After reviewing a dozen published outdoor guide books relevant to southern California, only one was found to contain references to whitewater boating in Piru Creek. Additionally, five websites provided further information about Piru Creek whitewater boating opportunities. A summary of these resources follows.

- Best Whitewater in California: The Guide to 180 Runs by Lars Holbeck (1998). This is a comprehensive guidebook that includes information about Piru Creek. The book describes Piru Creek in Pyramid reach as Class III-IV level, or an intermediate to advanced level of difficulty, with optimum flow of 1,100 cubic feet per second (cfs) for running the reach (16 miles from Frenchman's Flat to Lake Piru). The guidebook describes Piru Creek as runnable for a few days after heavy winter storms. The book notes that the flow as released from Pyramid Lake is usually similar to the flow on upper Piru Creek, but that during boating (through Pyramid reach), by the time one reaches the take-out, the flow levels may double after heavy rains. This is due to the contribution of inflows from tributaries that feed into Piru Creek and then increase the flow throughout the run. The book warns potential boaters that, after heavy rains, if there is more than a few hundred cfs at the put-in, there may be too much water to navigate or portage (go around) at "the big rapids 2/3 of the way down the run."
- The American Whitewater (AW) website describes Piru Creek (between Pyramid Lake and Lake Piru) as a Class IV, advanced difficulty level (for normal flows). According to the website, the average gradient is stated as 67 feet per mile and the maximum gradient is estimated at 100 feet per mile. AW states that the reach "can be runnable for a few days immediately during and after large winter rain storms, or for longer periods during wet winters." Suggested put-in access is at Frenchman's Flat and take-out is at the Lake Piru boat ramp. The AW website warns that there may be barbed wire across the creek at about 2 miles before the creek flows into Lake Piru. The website also states that at the end of the run, the river gets shallow and braided, which may require paddlers to drag their boats in places. The AW website is available at: <https://www.americanwhitewater.org/content/River/detail/id/3154/>.
- There is a link on AW's website to a write-up by Gary Valle that describes Piru Creek from a kayaker's perspective (<http://www.sierraphotography.com/creeking/piru02.htm>). Valle describes a boat trip on March 9, 2005. The flow on that day was reported to have been 235 cfs below Pyramid Dam and 335 cfs upstream of Lake Piru. The website describes the reach as boatable for a few days in February and March, with water years that are average or above average for precipitation. The website also provides a link to the USGS gage above Frenchman's Flat (provides stage in real time) (https://waterdata.usgs.gov/ca/nwis/uv/?site_no=11109550) and a link to USGS recent daily mean flow data above Frenchman's Flat (https://waterdata.usgs.gov/ca/nwis/dv?referred_module=sw&format=html&period=31&site_no=11109550).

- Dreamflows.com lists flow information for boatable rivers and creeks (<http://www.dreamflows.com/alphaReaches.php?st=ca>). Piru Creek is listed and categorized as “yellow,” meaning flow is generally considered low. This does not necessarily mean too low to run safely; many reaches are routinely run at flows that are generally considered low. Reach maps are available on the website with put-in/take-out locations, gauge locations, and rapid locations (<http://www.dreamflows.com/reachMap/index.php?rid=488&num=A>).
- California Wilderness Coalition website describes Piru Creek and states that Frenchman’s Flat is a popular destination for anglers, picnickers, and families (<https://www.calwild.org/portfolio/fact-sheet-piru-creek-wild-scenic-river/>). The site also mentions that when seasonal flows are available, kayakers run the creek through the Sespe Wilderness.
- A website called BRT Insights – WW Kayaking & Hiking includes Piru Creek as a whitewater boating location (<http://brt-insights.blogspot.com/search?q=Piru>). The reach is described as Class IV, with the put-in at Frenchman’s Flat and the take-out at Lake Piru. There is a link on the website that references a book called California River Maps – Atlas & Gazetteer by Delorme (2008), which includes Piru Creek (<http://brt-insights.blogspot.com/2009/08/california-river-maps-atlas-gazetteer.html>).

In addition to the literature search discussed above, Pyramid reach was mapped in a series of panels that displayed the river miles downstream of Pyramid Dam; tributaries, wilderness, and access features; and boundaries and designations of the Wild and Scenic River reach below Pyramid Dam. Additionally, a gradient map was generated to evaluate the gradients and profile characteristics of the 18-mile reach.

Maps that were prepared to identify the Project reach relative to the routes of access and other important features (e.g., Project dam/diversion, developed recreation facilities, and wilderness boundaries) can be found as the associated data file labeled “SSWP_Whitewater_Overview_Map.” The gradient profile of Pyramid reach (Figure 1) shows that the creek drops from approximately 2,200 feet to about 1,055 feet in just over 18 miles. This represents a gradient of roughly 58 feet per mile.



Note: Elevation in feet above mean sea level on Y axis, with distance downstream from Pyramid Dam in feet on X axis

Key:

ft. = feet

Sta. = Station

Figure 1. Gradient Profile of Pyramid Reach

Step 2 – Hydrology Assessment

Water releases into Pyramid reach are generally equal to natural inflow into Pyramid Lake, consistent with Article 52 of the existing Project license, to avoid adverse effects on the federally endangered arroyo toad (*Anaxyrus californicus*), as described in the Licensees' Pre-Application Document and the Revised Study Plan for South SWP Hydropower.

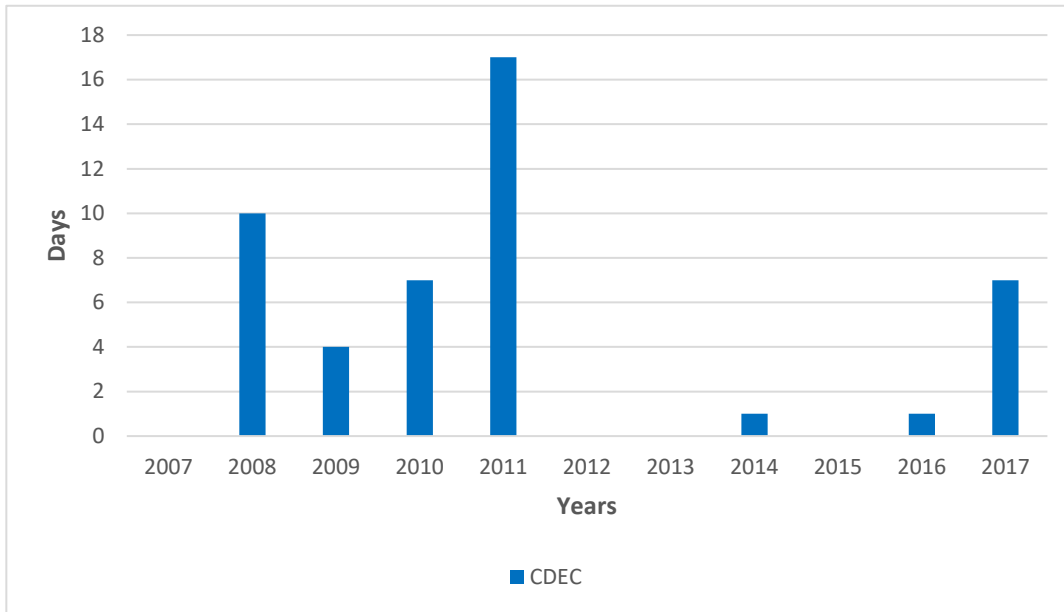
An estimated 200 cfs released from Pyramid Dam (based on information provided by AW and the boaters interviewed) was set as a minimum flow used to evaluate the number of days boating might be possible.

The analysis shows most boating flows are based on natural flows stemming from the upper Piru Creek basin that are released by the Licensees as part of Article 52, which requires Pyramid Lake inflows and outflows to be equal to the extent operationally feasible and consistent with safety requirements. Flows released from Pyramid Dam below 1,200 cfs are generally accomplished through a low-level outlet structure. Hourly flow information is available to the public in real time via CDEC's gauging website at the gauge designated PYM (<http://cdec.water.ca.gov/dynamicapp/QueryF?s=PYM>).

The Licensees found that both USGS gages are managed by the Santa Maria USGS field office, and that USGS11190550 only records data during November through April, and does not record any data during the months May through October. This was determined to not

significantly affect findings, since there likely would be few or no days with target flows during those summer months. The earliest CDEC sensor information available was October 24, 2007, and therefore the first few months of 2007 are not represented by the CDEC sensor data.

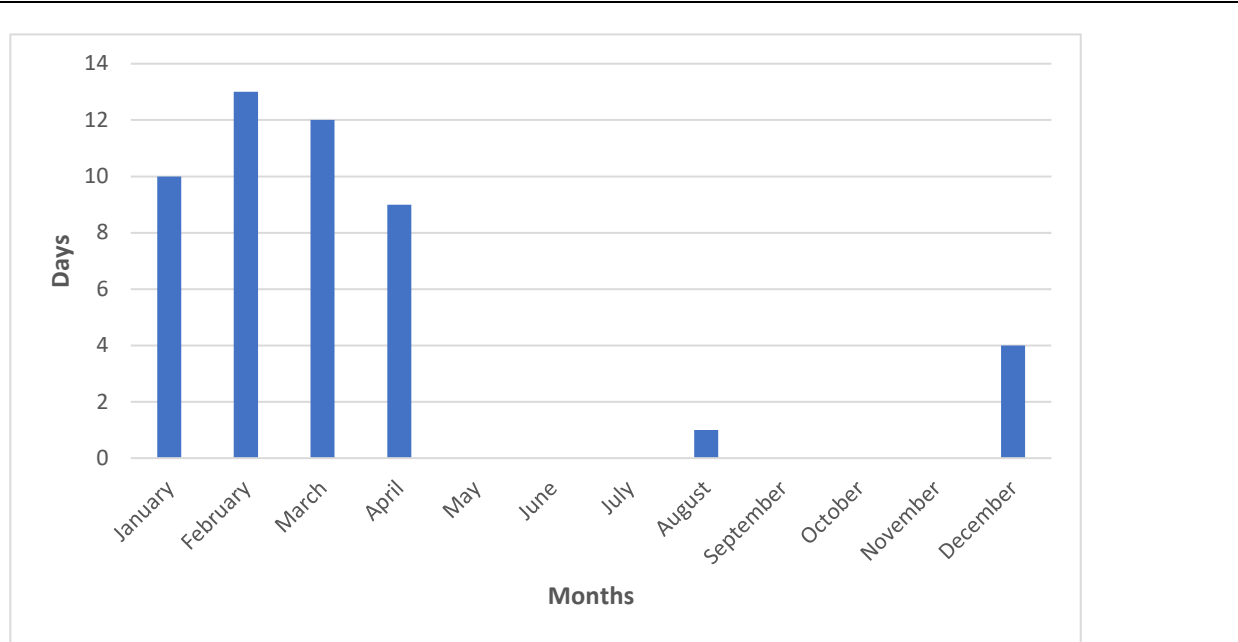
As shown in Figure 2, from 2007 through 2017, some years presented no opportunities for boating, while in other years, as many as 16 boating days may have been possible.



Source: CDEC PYM gauge records

Figure 2. Annual Number of Days with 200 Cubic Feet per Second Flows Released at Pyramid Dam (2007 through 2017)

Figure 3 presents the distribution of potentially boatable days by month for 2007 through 2017.



Source: CDEC PYM gauge records

Figure 3. Total Number of Days with 200 Cubic Feet per Second Flows Released at Pyramid Dam by Month (2007 through 2017)

In addition to the passing of natural flows above Pyramid Lake, supplemental flows are provided in Pyramid reach in most years as part of delivery of SWP water to UWCD. UWCD receives water as part of the Ventura County Watershed Protection District's (VCWPD) long-term water supply contract with DWR. While the VCWPD water supply contract is for 20,000 AF/year, UWCD is contracted to receive a maximum of 5,000 AF/year of the 20,000 AF. UWCD receives up to 3,150 AF of SWP water from Pyramid Lake, using Pyramid reach as a means of conveyance. Annual water deliveries are based on the amount of SWP water available each year and water deliveries are determined based on a proportional share divided among all SWP water contractors up to the maximum amount specified in the contract.

Since 2009, when Article 52 of the License was amended, SWP water deliveries have been carried out between the first of November and the end of February each water year to prevent releases from interfering with the breeding habits of the arroyo toad. During this timeframe, water deliveries may be made over a period of a few days, ramping flows up and down to simulate the hydrograph of a typical storm event, or they may be released more gradually over a longer period. Table 1 shows the amount of water delivered to UWCD for the period 2004 through 2014.

Year	Deliveries to United Water Conservation District (AF)	Months During Which Releases Occurred	Maximum Single-Day Release (cfs)	Average Single-Day Release (cfs)
2004	2,431	August, September	53	46.8
2005	0	--	--	--
2006	0	--	--	--
2007	1,890	November	182	90
2008	1,980	November, December	109	55
2009	3,150	November, December	200	112.5
2010	3,150	November	158	108.6
2011	2,520	November, December	120	93.3
2012	3,150	November	169	108.6
2013	2,258	March, June, November	103	53.8
2014	0	--	--	--

Table 1. Annual Deliveries to United Water Conservation District, 2004 through 2014

Key:

AF = acre-feet

cfs = cubic feet per second

Generally, deliveries to UWCD begin in early November. The releases usually follow a rough bell-curve shape, in which they begin at a low or moderate pace, gradually ramp up through mid-November, and then trickle back down through the end of November or December. No scheduled deliveries occurred during January or February for the years analyzed (2007 through 2017).

SWP water is generally delivered to UWCD in flows averaging between 40 and 110 cfs per day to accommodate some private landowners' wet crossings of lower Pyramid reach. UWCD has reported to DWR that these land owners can have difficulty accessing their property if flows in Pyramid reach are greater than 100 cfs. Although this does occur naturally, in the past, UWCD has scheduled delivery of their SWP contract water to keep flows low and not impede downstream land owners' access.

Step 3 – Conduct Structured Interviews

The Licensees identified 12 boaters who had indicated they had boated Pyramid reach at least once in the past. Interviews were conducted by phone or by email with those willing and available to participate. Of the 10 interviewed boaters, most said they had boated the reach more than 10 years ago. Most noted that they had boated following storm events, and all indicated they had put-in at Frenchman's Flat, running about six to 10 hours to get through to Blue Point Campground or beyond, and taken-out in Lake Piru. Some boaters discussed several short portages, including some large boulder fields, log jams, and areas of brush extending heavily into the moving channel. Several noted the geologic setting as extremely interesting, enhancing their trip experiences. In terms of flow levels, most described entering Piru Creek at Frenchman's Flat between 200 and 400 cfs, but in most storms, Fish Creek,

Michael Creek, and particularly Agua Blanca Creek contributed to substantial inflows leading some to have thought they entered Lake Piru on flows of 700 cfs or above. Many described the need to put-in at Frenchman's Flat at flows of about 200 cfs to not be overwhelmed by the tributary inflow contributions downstream. One boater noted he had boated Agua Blanca Creek previously. Most found the reach to be a Class III and Class IV level of difficulty, with a leaning toward the Class IV designation due to the one-way committed nature of the venture. None of the boaters indicated hiking out of the canyon was anything they would want to undertake. Rather, each felt it was better to pass through the whole canyon to Lake Piru once entering the creek at Frenchman's Flat. Documentation of the interviews can be found as the associated data file labeled "SSWP_Documentation_of_Interviews_with_Whitewater_boaters".

Step 4 – Field Reconnaissance and Site Visit

The Licensees performed three separate field reconnaissance efforts with experienced whitewater boaters to assess current channel conditions, potential put-in and take-out areas, and creek reaches that have favorable boating characteristics. Whitewater boating experts, including those who were interviewed, participated in the field reconnaissance. On August 25, 2018, a site visit was conducted with a small group consisting of one experienced boater who has boated Pyramid reach twice in the past, an experienced boater representative from AW, and the Licensees. The group scouted upper Pyramid reach from Frenchman's Flat to Pyramid Dam. The August 25, 2018 site visit resulted in observations by and discussions between the experienced boater and the AW representative:

- The upper reach was likely a good local boating resource when flows were high enough and boaters had some advance or real-time knowledge of the flow levels.
- The upper Pyramid reach section was likely less known as a potential boating resource prior to this trip. It was also discussed that boaters can access real-time flow information under current conditions through the CDEC gauging system.
- After viewing the creek channel and access conditions, the AW representative and experienced boater concluded the upper reach (alongside the old Golden State Highway) is a good potential boating resource under current conditions when natural flows are high enough.
- There was interest expressed in looking into the feasibility of boating on the scheduled water delivery flows that are typically released in the fall.

Following the field reconnaissance, a controlled flow test was scheduled and field visit arranged with seven experienced boaters, including boaters from the Los Angeles Kayak Club. There was no boating undertaken as this test was arranged in coordination with AW to observe the conditions related to the potential for boating. The flow observation test coincided with a release of 1,100 AF to UWCD that had been scheduled for late November and early December 2018. On December 2, 2018, DWR began gradually ramping up flow releases to Pyramid reach in order to sustain a peak flow of about 200 cfs for four hours between 10:00 a.m. and 2:00 p.m. on December 7, 2018, for the flow observation test. During the flow observation test, participants were taken to five pre-arranged shoreline locations to evaluate upper Pyramid reach from Pyramid Dam to Frenchman's Flat relative to its boating condition and potential. As a result of the flow observation test, boaters unanimously concluded boating

in the upper reach is feasible with only a few portages. In particular they noted the potential for multiple runs and training opportunities if the flows could be scheduled in advance and released at a rate of between 200 and 250 cfs for several hours during weekend daylight periods.

Subsequent to the December 7, 2018 flow observation test, on January 9 and 10, 2019, experienced boaters and study staff conducted site visits to Pyramid reach; on the first day, from Frenchman's Flat into the middle of the canyon, and on the second day, from Blue Point Campground to the middle of the canyon. During these field excursions, several areas of channel obstructions were noted; however, the overall assessment was generally positive in terms of judging whether advanced/expert boaters would be able to boat the reach when flows were above 200 cfs from Frenchman's Flat to Lake Piru.

Associated Data Files (All associated data can be found in the folder with this summary form. Note: confidential CEII/privileged information will not be posted publicly.):

File Name	Data Description	File Type	File Location
20181012_SSWP_PiruCreek_Mapbook	Maps of Pyramid Reach.	PDF	Project website
20180825_Whitewater_Meeting_Materials	Documentation of the August 25, 2018 meeting.	PDF	Project website
20181207_Meeting_Materials	Documentation of the December 7, 2019 observation flow.	PDF	Project website
20190109-10_Meeting_Materials	Documentation of the January 10 – 11, 2019 field reconnaissance.	PDF	Project website
20180000_SSWP_Documentation_of_Interviews_with_Whitewater_boaters	Documentation of interviews conducted via phone and email.	PDF	Project website

Variations from Study Methods, Schedule, or Approach and Abnormalities in Expected Field Conditions:

There were no variations from the FERC-approved Study.

Remaining Work:

None; the Study is complete.