

KRB STUDY REQUEST 8: Whitewater Flows

COMMENTS AND RESPONSE

EDISON: *The lack of storage at Fairview Dam coupled with the uncertainty of the snowmelt hydrograph of the NFKR severely limits the scheduling and potential flow volumes that can be investigated for a controlled flow study, thereby violating the experimental design necessary for comparative data analysis.* (PSP at 23.)

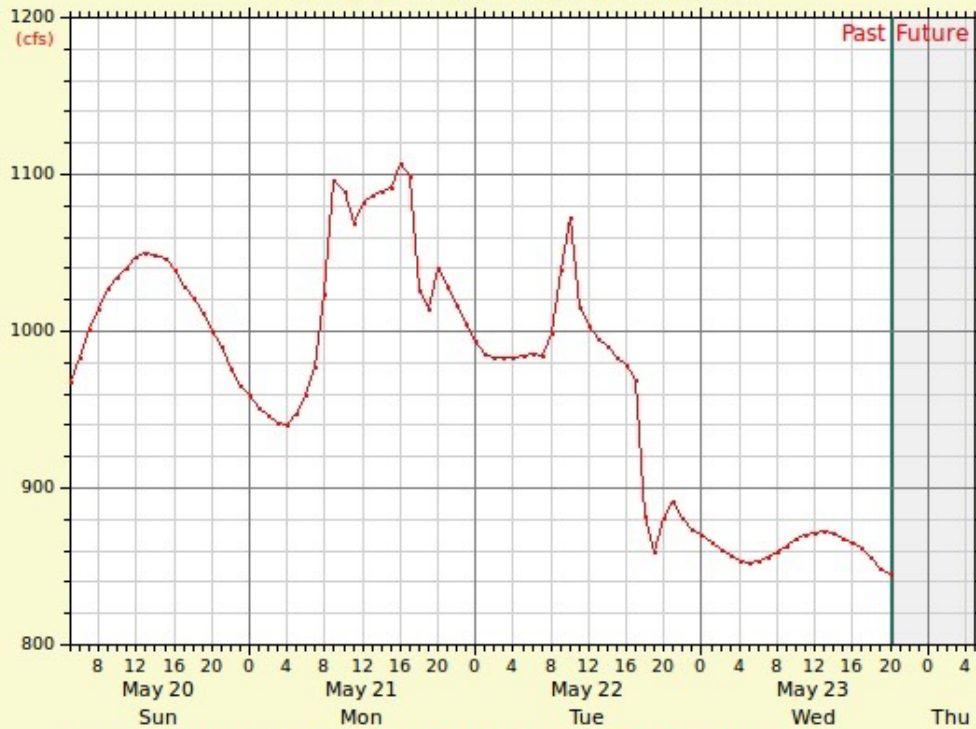
KRB: Not so. First, Edison continues to cite the 1994 on-water boating study without criticism. (See, e.g., REC-1 at 4, PAD at 5-139 & 5-140, 6-5; PAD Appendix A-1 through A-3 & 2021FEB10 TWG.) That study was accomplished notwithstanding the ostensibly “severe” limitations for study posed by the project. So with one hand, Edison wags a finger saying, “No study can be done here,” while with the other hand, Edison holds up an old study and proposes that it inform mitigation in this proceeding. Edison should explain which hand we should believe.

The reality is that constraints for an on-water boating study are not severe. The existence of the 1994 study proves the only thing preventing an updated on-water study is lack of will. This is shown by the old study’s reasonable efforts to work with the hydrograph it was given that year.²²⁵ It is shown further by an analysis of how many days per year, on average, certain flows can be achieved in the dewatered reach by Edison’s ability to “shape” flows anywhere from the level of natural incoming flow at Fairview Dam to a figure 600 cfs below that level. For instance, if incoming flows are 900 cfs, Edison could set the flow in the dewatered reach *anywhere between 300 and 900 cfs for study*. That capability is a powerful tool for study use.

Here is an example of Edison shaping flows in the dewatered reach from May 2018; the first chart shows flows above Fairview Dam, the second below:

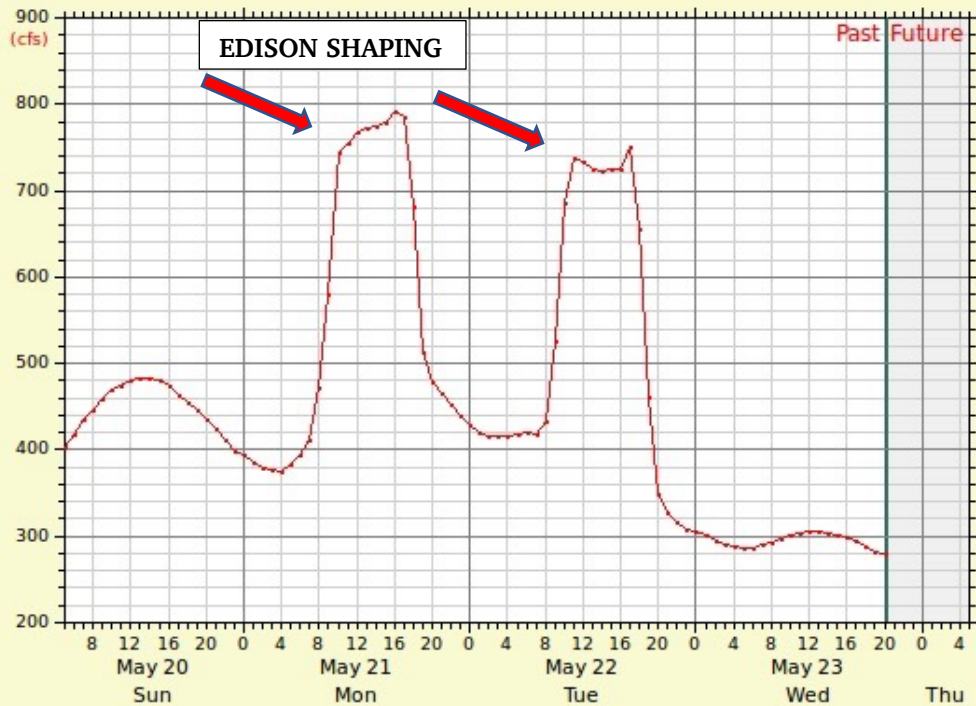
²²⁵ FERC eLibrary No. 19940802-0010 at .tif 143-155 [“Plan of Action for conducting Whitewater River Evaluation and Preparing Summary Report”]

No. Kern - Above Fairview Dam



Note: graph was generated by Dreamflows, using Cal Edison data.

No. Kern - Below Fairview Dam



Note: graph was generated by Dreamflows, using Cal Edison data.

As can be seen above, flows above Fairview Dam between 10 a.m. and 5 p.m. on May 21 were between 1,000 and 1,100 cfs. Edison was able to shape the flows below Fairview and keep them at about 775 cfs (760-790). On May 22, incoming flows were 980 to 1,070 cfs, and Edison shaped flows below the dam at about 730 cfs (720-740).

The fact that Edison can shape flows below Fairview anywhere between the level of incoming flow to a level 600 cfs below that figure means there is a vast inventory of days upon which different flow levels could be tested in the dewatered reach. KRB took the daily average flow data from the last 25 years²²⁶ and found the following average numbers of days upon which different flow levels could be tested annually:

MEAN DAYS PER YEAR FLOWS ARE SUITABLE FOR TESTING WITHIN GIVEN RANGES (NFKR WY 1997-2021)			
RANGE (CFS) LOW	HIGH	TOTAL DAYS	DAYS PER YEAR
200	299	4780	191
300	399	3276	131
400	499	2184	87
500	599	1757	70
600	699	1461	58
700	799	1218	49
800	899	1014	41
900	999	933	37

These figures show there to be more than a month’s worth of days on average — indeed, two or more months’ worth at the 600-699 cfs range and below — for testing at these relevant ranges.

Tightening the targeted range, moreover, does not appreciably decrease these opportunities; here is the same data with the testing range decreased to 50 cfs, which is about the range tested in 1994 (“Probable Flow During Boating”)²²⁷:

²²⁶ USGS gauges:

https://waterdata.usgs.gov/nwis/dv?referred_module=sw&site_no=11185500 & https://waterdata.usgs.gov/nwis/dv?referred_module=sw&site_no=11186000

²²⁷ 1994 Whitewater Study at .pdf 118:

MEAN DAYS PER YEAR FLOWS ARE SUITABLE FOR TESTING WITHIN GIVEN RANGES (NFKR WY 1997-2021)			
RANGE (CFS) LOW	HIGH	TOTAL DAYS	DAYS PER YEAR
200	249	4681	187
250	299	3926	157
300	349	3191	128
350	399	2581	103
400	449	2110	84
450	499	1863	75
500	549	1677	67
550	599	1547	62
600	649	1402	56
650	699	1273	51
700	749	1166	47
750	799	1075	43
800	849	967	39
850	899	922	37
900	949	883	35
950	999	828	33

We have updated our study request to reflect this information.

EDISON: *A controlled flow study below Fairview Dam would be limited to collecting data for a narrow range of flows, thus failing to meet the study objectives as described in Whittaker et al. (2005).* (PSP at 23.)

KRB: Whittaker does not demand the study of a wide range of flows. To the contrary, Whittaker notes that only “[t]hree to four flows are commonly assessed in these [on-water] studies,”²²⁸ and then makes clear that these studies “*work best when they are focused on discrete flow ranges where more precision is needed.*”²²⁹ Focusing on discrete flow ranges is precisely what we have proposed. No one in this proceeding has suggested that the 1994 study’s determination that kayakers enjoy flows at 550 cfs and above and rafters enjoy flows at 700 cfs and above is incorrect. The only suggestion is that as times have changed, boaters enjoy paddling at even lower flows, the project’s negative effects on recreation have increased commensurately, and thus flows below those levels should be tested.²³⁰ We believe that — at a minimum — an evaluation of flows at 300, 400, 500, and 600 cfs is in

²²⁸ *Id.*, at 26

²²⁹ *Id.*, at 27 (italics added)

²³⁰ KRB SD1 at 48-61

order to capture present-day project effects on all craft. These levels fall below those identified as enjoyable by various craft in the 1994 study — *i.e.*, these are four levels where, in Whittaker’s words, “more precision is needed.” Nevertheless, the particular levels of flow to be evaluated can await guidance from the level 1 and 2 portions of the proposed study.

We have updated our study request to reflect this information.

EDISON: *[S]tudy participants will likely vary across flow increments and not represent a broad cross-section of the boating community because study participants would need to mobilize multiple times on short notice to boat a number of flow increments. The experimental design of the controlled flow study requires the same group of study participants to boat each flow increment across a broad range of flows for comparative purposes.* (PSP at 23.)

KRB: At no point in *Flows and Recreation* does Whittaker demand that on-water studies be conducted by the same group of people. Given the contingencies of life confronting individuals involved in an on-water study, such a standard would invite failure: it is more likely than not that a statistically significant group would not complete its work without absenteeism. Further, the 1994 study did not feature the same people running every segment at every different level, yet Edison does not criticize the 1994 study for that; to the contrary, Edison embraces that study.²³¹ Edison is asserting (without authority) its idea of the perfect — identical groups running each segment at each level — as a means to avoid the cost of an on-water study and substitute instead a tool much with less reliability, an online survey untethered to contemporaneous boating trips. Again, Whittaker does not demand that user groups be identical; but Whittaker *does* warn about the phenomenon of groupthink and bad memory that can make mischief in an untethered survey.

As for the issue of cross-section, Edison again posits the perfect — a perfect cross-section of the boating community — as a means to avoid the cost of this study and settle for a survey of much less reliability. Whittaker points out that there are obvious “trade-off[s] between] ‘representativeness’ against potential cost or logistical complexity.”²³² These trade-offs did not make Whittaker question the value of on-water studies or elevate untethered surveys above them; rather, these are questions that go to study design: “Most studies use ‘purposive sampling,’ inviting participants based on their 1) skill and safety record, 2) proximity to the river, and 3) ability to evaluate a diversity of whitewater opportunities. This requires close coordination with stakeholder groups.” There is no reason purposive sampling cannot be used to obtain the most accurate results possible given the

²³¹ See PSP REC-1; PAD at 5-139 & 5-140, 6-5; PAD Appendix A-1 through A-3 & REC-1 at 4; 2021FEB10 TWG

²³² Whittaker, *Flows and Recreation* (2005) at 26

configuration of the project. Further, had Whittaker been as flummoxed as Edison by the absence of storage, he would not have included the use of natural flows in his guide.²³³

We have updated our study request to reflect this information.

EDISON: *The online flow comparison survey resolves the limitations of a controlled flow study in the 16-mile bypass below Fairview Dam. The online flow comparison survey is not limited to the unpredictable snowpack and associated flows during the ILP study period. (PSP at 24.)*

KRB: Edison’s proposed survey “resolves” these purported issues by decreasing the rigor and reliability of the data obtained. In our experience, most boaters do not independently investigate, follow, log, or record flows and the experiences they have had with those flows. As Whittaker cautions, “Assessing how well users are calibrated to a gage is important with [the flow survey] method. Pre-testing or pre-study interviews/focus groups should be considered to probe whether users really pay attention to a gage through the range of interest.”²³⁴ Further, “Some users may not independently evaluate flows, and simply repeat ‘conventional wisdom’ about acceptable or optimal flows for a recreation opportunity. Unfortunately, this method is limited in its ability to distinguish independent evaluations from those that are ‘passed down’ over the years.”²³⁵ As Whittaker concludes, far greater *reliable* resolution of boater preferences is to be found with on-water studies.²³⁶

And again, Whittaker is simply undeterred by a project’s inability to pinpoint flows with storage: “In some cases, the study may capitalize on natural flows instead of controlled

²³³ *Ibid.* Note, moreover, that the “natural flows” Whittaker references invariably entail a diurnal, and thus what is tested is user experience in a reasonably constrained range of flow, as seen in the 1994 study (“probable boating flow”). See 1994 Whitewater Study at .pdf 118:

	Approximate Peak Flow Below Dam	Probable Flow During Boating	Average Daily Flow Below Dam
May 11	322	298 - 322	261
May 12	696	670 - 696	560
May 13	1085	1048 - 1085	919
May 14	1239	1165 - 1239	1065
May 15	1357	1315 - 1357	1180

²³⁴ *Id.*, at 24

²³⁵ *Ibid.*

²³⁶ *Id.*, at 26

flows,” Whittaker writes.²³⁷ Indeed, that is precisely how the 1994 study came to be. But as we have shown above, the existence of Fairview Dam and its capacity to divert up to 600 cfs *greatly expands* the ability of Edison to conduct a study on a range of targeted flows. No one has suggested that the 1994 study’s determination that kayakers enjoy flows at 550 cfs and above and rafters enjoy flows at 700 cfs and above is incorrect. We still do. The only suggestion is that, as times have changed, we have come to enjoy flows lower than those levels. As Chris Brown, owner of the local Whitewater Voyages rafting company recently commented, the project “eliminates the very good Kayaking and ‘low water’ craft (splashyaks, shredders, paddle board, etc.) flows of 200-700cfs.”²³⁸ We agree that the low end of the numbers obtained by the 1994 study has come down, the project’s negative effect on recreation has increased commensurately, and thus flows below those levels beg to be tested.²³⁹

There is another way to obtain reasonably reliable results comparable to a targeted on-water flow study: namely, to gather survey results that are tethered to actual boating trips. These would be reasonably contemporaneous reports of experiences in each segment at relevant target flow ranges. Tying survey results to actual recent boater trips goes well towards reducing the problems of memory haze and groupthink identified by Whittaker. This can be accomplished through one of two means: either through an intercept team or through a tightly controlled online reporting system. Intercepting boaters taking out at segments when the flows are “right” — *i.e.*, at targeted levels of interest for study — appears to provide a heightened quality of data in comparison with a more generalized survey untethered to recent boating. Results of intercept surveys would be contemporaneous with the segment and flow level run, and thus there would be no issue with memory and less concern about the rote transmission of “conventional wisdom.” Alternatively, a controlled online survey system could be established that asks boaters to report within a reasonable time (say, 18 hours) of their running a trip on a segment. Boaters could describe the date, time, and experience on the segment per study design, and those responses would then be cross-checked against actual gauge information and included in (or excluded from) the study analysis.

We have updated our study request to reflect this information.

EDISON: *American Whitewater has also used online flow comparison surveys to collect flow preference information and recreation use patterns on rivers where a controlled flow study is not possible* (PSP at 24.)

²³⁷ *Ibid.*

²³⁸ FERC eLibrary at 20220121-5024

²³⁹ KRB SD1 at 48-61

KRB: The two AW studies cited by Edison are inapposite. One was an internal study²⁴⁰; the other the result of a grant²⁴¹; neither was conducted during a FERC proceeding, and thus both were done to keep costs down rather than to obtain the most reliable data with the best available science. Here, by contrast, we have a relicensing proceeding and an applicant that can substantially affect flows in the dewatered reach. An on-water study has been conducted before, and it can be again. There is no reason to settle for less reliable data when an on-water study would most accurately capture project effects upon whitewater recreation for this outstanding public resource.

We have updated our study request with this information. We have also corrected two errors identified by Edison.²⁴²

KRB SR-8: WHITEWATER FLOWS UPDATED STUDY PROPOSAL

Criterion (1) – Describe the goals and objectives of each study proposal and the information to be obtained.

The goal of this study is to establish the inventory of days whitewater recreation is lost to project operations. It will elicit the ranges of flow at which enjoyable low flow boating and low-optimal flow boating exist for each form of whitewater recreation. That information, coupled with the historical hydrograph of incoming flows at Fairview Dam, will paint a full picture of project effects in the dewatered reach, thus informing both the scope of the problem to be mitigated and the opportunities for mitigation.

Criterion (2) – If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.

Not applicable.

Criterion (3) – if the requester is not a resource agency, explain any relevant public interest considerations in regards to the proposed study.

The Commission is charged by the Federal Power Act to balance developmental values with nondevelopment values, including recreational and environmental values, in its formation of hydropower licenses in a manner best adapted for the affected resource, its user groups, and the goals of existing management plans. The United States Forest Service is charged with establishing conditions in hydropower licenses that are necessary for the

²⁴⁰ https://www.americanwhitewater.org/content/Article/view/article_id/33759/

²⁴¹

https://www.americanwhitewater.org/content/Article/view/article_id/jAtde6mnf7fUPZoVvAvD9/

²⁴² PSP at 23 [“Level 3” and “(2005)”]

public's utilization and enjoyment of the affected resource, including whitewater recreation. The results of this study will further the managing agencies' goals by providing solid data about project effects and potential enhancements *vis-à-vis* the number of days incoming flows at Fairview Dam are sufficient for whitewater recreation in the dewatered reach, but those opportunities are removed by project operations. This study would accordingly serve the public interest in the design of a license best adapted for use of this public resource.

Criterion (4) – Describe existing information concerning the subject of the study proposal, and the need for additional information.

The proposed study seeks to ultimately replace the only existing on-water study of whitewater flows on the NFKR: the 1994 Edison study.

The 1994 study methodology and report were heavily criticized by American Whitewater when it was released.²⁴³ In addition, it did not test any flows between 325 and 675 cfs.²⁴⁴ Moreover, times have changed: boater enjoyment of low water creeking has increased, new boater skills for enjoying low water boating have been developed, and boat designs have made low water boating more enjoyable. There is a new generation of boats, boaters, and boating skills on the Kern that simply were not present in 1994 and thus were not accounted for in the study.²⁴⁵ No one in this proceeding has suggested that the 1994 study's determination that kayakers enjoy flows at 550 cfs and above and rafters enjoy flows at 700 cfs and above is incorrect. The only suggestion is that as times have changed, boaters enjoy paddling at even lower flows, the project's negative effects on recreation have increased commensurately, and thus flows below those levels should be tested.

Criterion (5) – Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

By taking the first 605 cfs out of the river at Fairview Dam once MIF requirements are met, project operations significantly decrease water levels on the dewatered stretch below. The results of this study will help inform the inventory of days on which the diversion denies the public opportunity for whitewater recreation, which is the only way to fully capture the effects of project operations and understand the scope of effects to be mitigated, along with informing managers of when there are opportunities to mitigate those effects. This study will also prevent old, misleading data and analysis from the 1994 study from invading the current process. Edison has clearly signaled it intends to use the 1994

²⁴³ FERC eLibrary No. 19941011-0107

²⁴⁴ FERC eLibrary No. 19940802-0010

²⁴⁵ See KRB SD1 at 58

study in this proceeding.²⁴⁶ A new study with contemporary boats, boaters, boating techniques, and study methodologies will ensure that the 1994 study not have undue or unmerited impact on managing agencies as they attempt to capture and understand the full impact of project operations on NFKR recreation.

Criterion (6) – Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

Whittaker *et al.* (2005) have described the methodology for this study. Results of the Level 1 and 2 studies should inform the flows tested in a Level 3 on-water targeted flow study. We propose a study consistent with those standards. It would include a range of boating craft: oar rigs, paddle rafts, shredders, open canoes, hardshell kayaks, inflatable kayaks, riverboards, and stand-up paddleboards. We believe it should take place with at least four targeted flow levels: 300, 400, 500, and 600 cfs. It would distinguish between “segment 1” (the dewatered reach above Hospital Flat) and “segment 2” (the dewatered reach below)²⁴⁷, and be open to all interested boaters. It would have a simplified evaluation process compared to that of the 1994 study questionnaire. And it would take place prior to peak snowmelt, when more days are likely to be available to test the various flow levels and KR3 operations are more likely to deprive boaters of recreational opportunities.²⁴⁸

The existence of the 1994 study proves the only thing preventing an updated on-water study is lack of will. This is shown by the old study’s reasonable efforts to work with the hydrograph it was given that year.²⁴⁹ It is shown further by an analysis of how many days per year, on average, certain flows can be achieved in the dewatered reach by Edison’s ability to “shape” flows anywhere from the level of natural incoming flow at Fairview Dam to a figure 600 cfs below that level.

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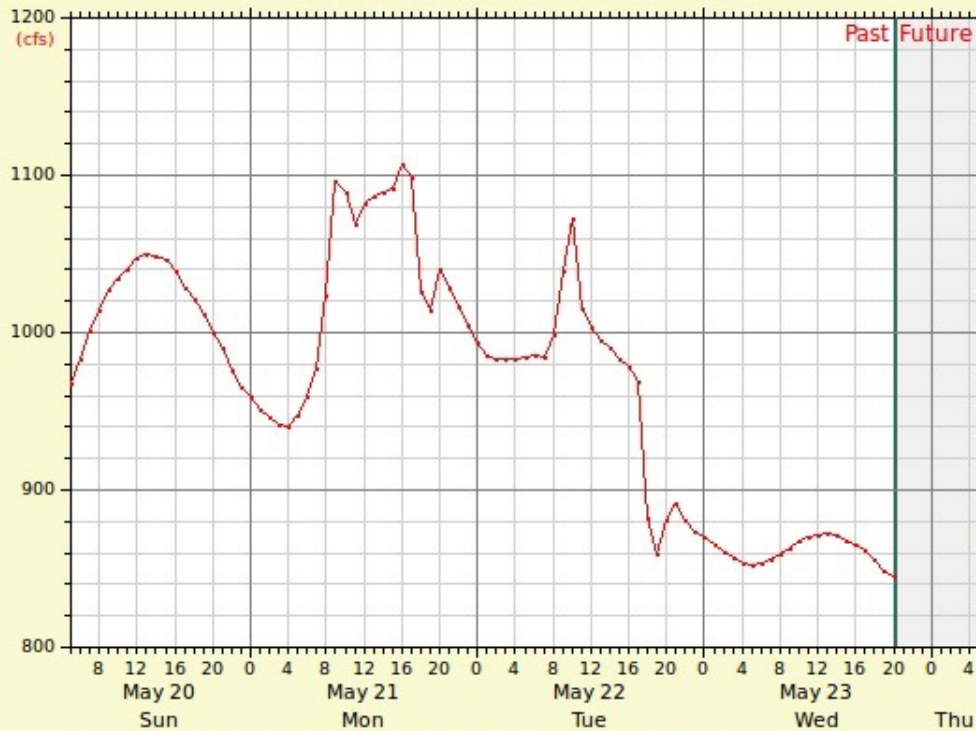
²⁴⁶ PAD at 5-139 & 5-140, 6-5; PAD Appendix A-1 through A-3 & REC-1 at 4; 2021FEB10 TWG

²⁴⁷ See PAD at 5-52 [steeper, more channelized nature of Segment 1 (which includes the popular Fairview, Chamise Gorge, and Ant Canyon runs) offers enjoyable boating at flows lower than are required for enjoyable boating in Segment 2]

²⁴⁸ See KRB SD1 at 48

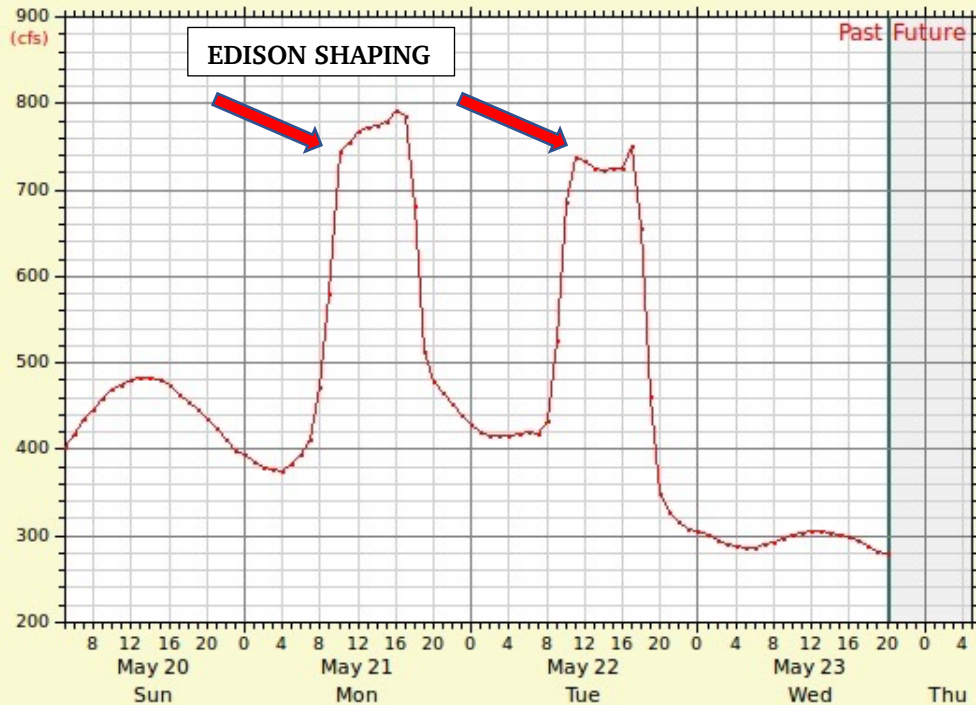
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The fact that Edison can shape flows below Fairview anywhere between the level of incoming flow to a level 600 cfs below that figure means there is a vast inventory of days upon which different flow ranges could be tested in the dewatered reach. KRB took the daily average flow data from the last 25 years²⁵⁰ and found the following average numbers of days upon which different flow levels could be tested annually:

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Tightening the targeted range, moreover, does not appreciably decrease these opportunities; here is the same data with the testing range decreased to 50 cfs:

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²⁵¹ Spreadsheet available:

https://www.kernriverboaters.com/s/KRB_KR3_SHAPE_FLOWS.xlsx

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Whittaker does not demand the study of a wide range of flows. To the contrary, Whittaker notes that only “[t]hree to four flows are commonly assessed in these [on-water] studies,”²⁵² and then makes clear that these studies “*work best when they are focused on discrete flow ranges where more precision is needed.*”²⁵³ Focusing on discrete flow ranges is precisely what we have proposed. No one in this proceeding has suggested that the 1994 study’s determination that kayakers enjoy flows at 550 cfs and above and rafters enjoy flows at 700 cfs and above is incorrect. The only suggestion is that as times have changed, boaters enjoy paddling at even lower flows, the project’s negative effects on recreation have increased commensurately, and thus flows below those levels should be tested.²⁵⁴ As Chris Brown, owner of the local Whitewater Voyages rafting company recently commented, the project “eliminates the very good Kayaking and ‘low water’ craft (splashyaks, shredders, paddle board, etc.) flows of 200-700cfs.”²⁵⁵ We believe that — at a minimum — an evaluation of flows at 300, 400, 500, and 600 cfs is in order to capture present-day project effects on all craft. These levels fall below those identified as enjoyable by various craft in

²⁵² *Id.*, at 26

²⁵³ *Id.*, at 27 (italics added)

²⁵⁴ KRB SD1 at 48-61

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the 1994 study — *i.e.*, these are four levels where, in Whittaker’s words, “more precision is needed.” Nevertheless, the particular levels of flow to be evaluated can await guidance from the level 1 and 2 portions of the proposed study.

At no point in *Flows and Recreation* does Whittaker demand that on-water studies be conducted by the same group of people. Given the contingencies of life confronting individuals involved in an on-water study, such a standard would invite failure: it is more likely than not that a statistically significant group would not complete its work without absenteeism. Further, the 1994 study did not feature the same people running every segment at every different level, yet Edison does not criticize the 1994 study for that; to the contrary, Edison embraces that study.²⁵⁶

Whittaker points out that there are obvious “trade-off[s between] ‘representativeness’ against potential cost or logistical complexity.”²⁵⁷ These trade-offs did not make Whittaker question the value of on-water studies or elevate untethered surveys above them; rather, these are questions that go to study design: “Most studies use ‘purposive sampling,’ inviting participants based on their 1) skill and safety record, 2) proximity to the river, and 3) ability to evaluate a diversity of whitewater opportunities. This requires close coordination with stakeholder groups.” There is no reason purposive sampling cannot be used to obtain the most accurate results possible given the configuration of the project. Further, had Whittaker been as flummoxed as Edison by the absence of storage, he would not have included the use of natural flows in his guide: “In some cases, the study may capitalize on natural flows instead of controlled flows,” Whittaker writes.²⁵⁸ And again, Edison maintains a substantial capacity to shape the flows

²⁵⁶ See PSP REC-1; PAD at 5-139 & 5-140, 6-5; PAD Appendix A-1 through A-3 & REC-1 at 4; 2021FEB10 TWG

²⁵⁷ Whittaker, *Flows and Recreation* (2005) at 26

²⁵⁸ *Ibid.* Note, moreover, that the “natural flows” Whittaker references invariably entail a diurnal, and thus what is tested is user experience in a reasonably constrained range of flow, as seen in the 1994 study (“probable boating flow”). See 1994 Whitewater Study at .pdf 118:

below Fairview Dam, radically increasing the number of days available for testing at desired levels.

Criterion (7) – Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

The cost for the Level 3 portion of this study could be as little as \$30,000 if Edison used teams of interceptors for one Spring to obtain paddler flow evaluations at whitewater takeouts. The cost and effort are justified given the vast inventory of days project operations remove all opportunity for whitewater recreation on this river²⁵⁹, the protected nature of this river given its outstanding recreational values, and the importance of this river to all of Southern California. Edison’s alternative proposed study is insufficient as it arbitrarily forecloses a path to an on-water study based on a misreading of Whittaker and without a full exploration of the methods by which an on-water study can be accomplished. This study promises superior reliability and resolution of data in comparison with Edison’s proposed untethered online survey.

	Approximate Peak Flow Below Dam	Probable Flow During Boating	Average Daily Flow Below Dam
May 11	322	298 - 322	261
May 12	696	670 - 696	560
May 13	1085	1048 - 1085	919
May 14	1239	1165 - 1239	1065
May 15	1357	1315 - 1357	1180

²⁵⁹ See KRB SD1 at 56