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FEDERAL ENERGY
REGULATORY COMMISSION

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

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November 22, 1996

Secretary Lois Cashell
Federal Energy Regulatory Commission
888 North Capitol Street N.E.
Washington, DC 20426

Dear Secretary Cashell:

Re: Sullivan Creek Hydroelectric Project, FERC No. D2225
Report on Recreation Instream Flow Evaluation for Sullivan Creek below Mill
Pond Dam

Enclosed is a Department of Ecology report on a Recreation Instream Flow Evaluation for Sullivan Creek below Mill Pond Dam. This evaluation was held on October 11 and 12, 1996, at Sullivan Creek in Pend Oreille County, Washington.

The purpose of the evaluation was to determine instream flow requirements for recreational boating on Sullivan Creek below Mill Pond Dam. This is the segment of Sullivan Creek from which water (up to 370 cfs) would be diverted as part of PUD No. 1 of Pend Oreille County's proposal to re-establish hydroelectric generating facilities at the former powerhouse.

Participants in the evaluation included the Department of Ecology and Pend Oreille County Public Utility District No. 1, the American Whitewater Affiliation, the Rivers Council of Washington, the Spokane Canoe and Kayak Club, and the Washington Kayak Club.

Based upon the evaluation, the Department of Ecology concludes that optimum instream flows for advanced and expert kayaking range from 150 to 250 cfs. We recommend consideration of special recreational flow releases for two weekends in the months of September and/or October, provided such releases would be with fish habitat protection needs. The releases could occur in a number of different ways, and we suggest three different scenarios in our report. We request that these scenarios be evaluated in the environmental impact statement which the Federal Energy Regulatory Commission is now preparing. We also recommend that boating groups be consulted before choosing a final release schedule.

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FERC DOCKETED

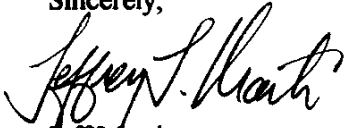
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Secretary Lois Cashell
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If you or anyone else has questions or comments about this report, please contact me at (360) 407-6636. Thank you.

Sincerely,



Jeff Marti
Shorelands and Water Resources Program

JM:pz
Enclosures

cc: Rebecca Martin, FERC
Steve Nachtmann, Stone & Webster
Larry Weis/Robert Geddes, Pend Oreille County P.U.D.
Jack Snyder, Northup, Devine and Tarbell, Inc.
John Blum/Kent Doughty, Cascade Environmental Services
Hal Beecher, WDFW Habitat
Tony Eldred, WDFW, Wenatchee
Glenn Keohn, USFS Colville National Forest
Fred Gonzalez, USFS Sullivan Creek District Ranger
Michelle Eames, USFWS, Spokane
Brooke Drury, The Mountaineers
Mike Deckert, Regional Coordinator, American Whitewater Affiliation
Scott Rosenbaum, Regional Coordinator, American Whitewater Affiliation
Rich Bowers, Conservation Director, American Whitewater Affiliation
Dan Haas, National Park Service
Participants in Sullivan Creek Boating Evaluation

Recreational Instream Flow Evaluation for Sullivan Creek below Mill Pond Dam

On October 11 and 12, 1996, the Department of Ecology and Pend Oreille County Public Utility District No. 1 (PUD or District), the American Whitewater Affiliation, the Rivers Council of Washington, the Spokane Canoe and Kayak Club, and the Washington Kayak Club participated in a recreational flow evaluation at Sullivan Creek near Metaline Falls in Pend Oreille County, Washington.

Need for evaluation

Pend Oreille County PUD No. 1 has applied to the Federal Energy Regulatory Commission (FERC) for an amendment to its existing FERC license. The existing license (FERC No. 02225) is a non-power license issued in 1959. The District proposes to reestablish generating capacity at the project. This would be accomplished by diverting up to 370 cfs from Mill Pond to a refurbished powerhouse about 3.25 miles downstream on Sullivan Creek near the Highway 31 bridge. The District proposes to operate the project according to the terms of a 1910 water right claim for 110 cfs, which is not conditioned by and instream flow provision, and a 1980 water right permit for 550 cfs, which carries a 10 cfs instream flow condition (to be measured at the powerhouse) for the months of April through September. For the remainder of the year, this water right permit has no instream flow provision. The physical capacity of the project would be a maximum diversion of 370 cfs.

Because the District's water right claim and permit authorize different points of diversion than it now proposes, Ecology must approve the District's pending applications to change the points of diversion before the District may rely upon them to operate the project.

According to Section 401 of the Clean Water Act, before FERC may approve an application for an amendment of license, the Department of Ecology must certify that the proposed activity will meet the requirements of the federal Clean Water Act.

Washington state's water quality standards designate Sullivan Creek as a Class AA stream. WAC 173-201A-030 requires that, "water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses." The state's antidegradation policy requires that, "Existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed."

As a Class AA river, Sullivan Creek's designated uses include fish migration, rearing, spawning and harvesting, wildlife habitat, water supply (domestic, industrial, agricultural), recreation (primary contact recreation, sport fishing, boating and aesthetic enjoyment), commerce and navigation.

The purpose of this evaluation was to determine instream flow levels needed to support recreational boating and navigation.

Sullivan Creek setting

The area of interest was the segment of Sullivan Creek below Mill Pond to the powerhouse site, the area which would be dewatered as a result of the District proposal. This segment has a length of about 3.25 miles.

The character of Sullivan Creek changes dramatically from its upper half to its lower half. From Mill Pond Dam to the confluence with the North Fork Sullivan Creek (a distance of approximately 1.5 miles), Sullivan Creek is low-gradient (averaging ~ 1.4 percent), broad, and at the flows we evaluated, shallow.¹ Sullivan Creek loses approximately 114 feet in elevation between Mill Pond and the North Fork confluence.

The boater put-in for this run is via a steep, informal fishermen's trail on the south side of Sullivan Creek downstream about 150 feet from Mill Pond Dam. This trail extends down from a gravel pathway which leads to several historical structures associated with the Mill Pond Historic Site. The head of the fishermen's trail is located a short distance beyond a bench along the trail.

For the upper run, there are no significant navigational challenges except for periodic woody debris in the stream channel. Low flows also can challenge the ease of navigation. Johnson (1995) gave the upper run a Class II rating.² During the evaluation, boaters were able to navigate around almost all debris (this may change from year to year, assuming flows capable of moving such debris continue to occur). There was only one location where debris formed a complete obstacle to downstream navigation. This occurred because several large trees had fallen across the creek and trapped additional debris. This also happened to be the point where boaters interested in running only the upper segment must take out. There is an informal camping/parking area at this location, which is a short distance upstream from the confluence with North Fork Sullivan Creek.

Below the North Fork Confluence, Sullivan Creek narrows and enters a gorge. The gradient increases and flow gradually becomes more constricted. From the North Fork confluence to the powerhouse location, a distance of about 1.75 miles, the creek drops about 340 feet in elevation. In some places, large boulders and exposed bedrock further constrict the channel. The water flows over numerous cascades and over ledges, drops and chutes. For much of the lower segment, the canyon walls close in on the stream and provide an extraordinarily dramatic setting. In particularly constricted areas, powerful hydraulics can develop at higher flows. Stream gradient averages about 3.7 percent, but is greater in some locations. The lower .6 mile of Sullivan Creek before the powerhouse, which contains some of the greatest drops, has an average gradient of 5 percent. Johnson (1995) gave the Gorge run a Class Vp rating (Class 5 with portages).³ Johnson stated that a number of portages were required because of unrunnable waterfalls and logjams. During the evaluation, however, some boaters ran this entire segment without portage at a flow of 108 cfs; and with only one portage at a flow of 276 cfs. The need to portage is likely to vary from year to year, depending on flow level and the quantity of large woody debris which forms a hazard or blockage to navigation.

Sullivan Creek is a creek which has just been "discovered" by the whitewater recreation community. Indeed, the only confirmed descents of Sullivan Creek are those documented in Johnson (1995). With the publication of an account of the descents in a whitewater newsletter, however, use is likely to increase as more boaters become aware of the opportunity. Because much of Sullivan Creek is considered a Class V run, increased use probably will be by primarily advanced and expert boaters.

¹ My calculations of stream gradient differ from those figures contained in the PUD's final license application contained on p. E1-6. The application incorrectly states that the distance from Mill Pond Dam to the North Fork confluence is 2500 feet; it actually is about 1.5 miles. This resulted in miscalculating the gradient for the upper segment of Sullivan Creek. Thus, the average gradient of the upper segment, according to my calculations is about 1.4 percent, less than that stated in the license application (2.7%). At a different location in the application (Appendices, Volume II of IV, IFIM Report, Appendix B "Fisheries and IFIM Agency Consultation," p.4), the distance from Mill Pond to the North Fork confluence is put correctly at 1.5 miles.

² According to the International Scale of River Difficulty, a class II run is made up of "easy rapids with waves up to 3 feet, and wide, clear channels that are obvious without scouting. A little maneuvering is required."

³ According to the International Scale of River Difficulty, a class V run is made up of, "Extremely difficult, long, and very violent rapids with highly congested routes which nearly always must be scouted from the shore. Rescue conditions are difficult and there is a significant hazard to life in the event of a mishap."

Study setup

At the request of the Department of Ecology, the District agreed to control the release of water below Mill Pond Dam for a period of three days. These releases were made during a period when the District is ordinarily spilling water from Mill Pond because of the District's obligation to draw down the Sullivan Lake Reservoir for flood control purposes.

The District agreed to provide 100 cfs on Oct. 11, 200 cfs on Oct. 12 and 300 cfs on Oct. 13.⁴ Actual releases measured 108, 276 and 312 cfs.⁵ The Department of Ecology agreed to provide boaters to participate in the assessment. Ecology was assisted in contacting qualified boaters by Brooke Drury, Public Policy Manager of The Mountaineers organization; Richard Bowers, Conservation Director of the American Whitewater Affiliation; Sarah Humphries, Conservation Director of the Rivers Council of Washington; and Mike Deckert, Regional Coordinator for the American Whitewater Affiliation. Boaters who participated in the survey were not compensated for their time, travel expenses, food or lodging.

Ecology also developed a survey instrument with the assistance of the National Park Service. The Ecology survey instrument was adapted from a sample list of recreational boating survey questions contained in Instream Flows for Recreation: A Handbook on Concepts and Research Methods⁶. This survey contained questions regarding the relationship of instream flows and the quality of the recreational boating experience. A copy of the survey instrument is contained in the Appendix.

Ecology had hoped that a boater with video camera skills would be able to accompany the boaters on each run; however, the department was unable to locate such a person who could be available during the evaluation. Ecology and PUD staff each brought a camcorder of their own and attempted to film boaters on river segments which were quickly accessible via road or trail. We were unable to film boaters along much of the creek, however. In addition, due to operator error on a camcorder, much footage was lost on the first flow day. This included footage of boaters putting in and running a key location known as Thumper at 108 cfs, as well as some footage of boaters in the lower canyon area. Scott Rosenbaum, a regional coordinator for the American Whitewater Affiliation, has agreed to edit the existing raw footage into a short overview of the evaluation. The final version of the video should be available by January of 1997. Ecology will make available copies of this video.

Ecology notified the Pend Oreille County emergency services department that the evaluation was going to occur, but did not request that any emergency services personnel or volunteers be on site.

Study Implementation

All boaters were first asked to sign a form releasing and waiving the State of Washington and Pend Oreille County P.U.D from liability for any harm or injury that occurred as a result of their voluntary participation in the boater evaluation. Boaters also signed forms waiving the liability of various recreational boating organizations represented at the evaluation.

⁴ These volumes were selected based on a tentative range of boatable flows identified in the article by Mark Johnson, "Sullivan Creek: This ain't no Tupperware Party!" which appeared in the Oct./Nov/Dec. 1995 edition of Northwestern Whitewater Association News. (This article was published with an incorrect byline of Larry Johnson. Personal conversation with Larry Johnson). The Johnson brothers, who had boated at least some portion of the creek three times before the evaluation, using inflatable kayaka, recommended instream flows of 300 - 500 cfs for the upper segment and 100 - 200 cfs for the lower segment.

Ecology was particularly interested in whether certain flows (say, in the 200 to 300 cfs range) could bridge the gap between the recommended flows for the upper and lower segment. Ecology recommended 100 cfs as a good first flow to evaluate, however, because it would allow boaters running Sullivan Creek for the first time during the evaluation to effectively scout the creek and identify potential hazards.

⁵ To provide this amount of water from Mill Pond, it is necessary for the District to release water from Sullivan Lake Dam. Sullivan Lake Dam discharges to Outlet Creek, which then joins Sullivan Creek. Sullivan Creek flows into Mill Pond. Mill Pond Dam is comprised of an open crest dam which discharges over a spillway and has no gates or valves which allow dam operators to directly control the flow at that point. Therefore, to release a desired amount of water into Sullivan Creek at Mill Pond, it is necessary for the Sullivan Lake dam operator to read the USGS gage on Sullivan Creek above Outlet Creek, and then to release the appropriate amount of water from Sullivan Lake Dam which, when combined with the flow of Sullivan Creek, will result in the desired volume of flow into Mill Pond. Mill Pond is a run-of-river impoundment, which means that what flows into it, flows out of it. There is some buffering and time lag of the added flow effect, however. According to the District, it takes about 3-4 hours for the flow of Sullivan Creek below Mill Pond to establish itself at the desired level once the targeted volume is released from Sullivan Lake Dam.

⁶ Whittaker, Doug, Bo Shelby, William Jackson and Robert Beschta. 1993. Instream Flows for Recreation: A Handbook on Concepts and Research Methods. National Park Service. 103 pp.

Friday, October 11

The District provided a flow of 108 cfs. Boater turnout for this day was low because it was a weekday; also very little warning time was given to boaters to schedule the evaluation. Six boaters, all using hard shell kayaks, ran the upper run. Travel time was about 30- 40 minutes. At the take-out for the upper run, each boater completed the survey form. This was done at that time so the surveys would be completed while the boaters' memories were fresh.

The initial boaters were joined by two others at this point, both of whom used inflatable kayaks. Thus, a total of eight boaters put in immediately below the log blockage at the take-out point. Travel time for the lower reach was about 2.5 hours. At the conclusion of the run, boaters were once again asked to complete surveys.

All boaters using hard-shell kayaks reported being able to successfully navigate the entire gorge run without portage. One boater, self-described as possessing advanced skills and using an inflatable kayak, fell out of his boat in a chute known in the District's license application as potential "Barrier No. 2" (a possible barrier to the upstream migration of fish).⁷ At this point, Sullivan Creek flows into a narrow chute which drops about 7 - 8 feet. There is a large boulder about 5 feet downstream of the base of the chute. The creek descends the chute at a tremendous velocity and the plunge pool is characterized by powerful hydraulics and turbulence. The boater who came out of his boat was said to have been recirculated a few times in the "hole" at the base of the chute. Another boater threw him a rescue rope and he was able to pull himself out of the hole. Boaters using hard-shell kayaks, which are much more maneuverable, were able to navigate out of the hole and past the boulder. This location was subsequently named "Larry's Laundromat."

Each boater using a hard-shell kayak also successfully ran potential Barrier No. 1, choosing a notch on river right (that is, on the right side of the creek looking downstream). This is about a 9.5 foot waterfall adjacent to a bedrock wall.. The two boaters using inflatable kayaks chose to portage to a point below the potential barrier.

Saturday, October 12

The District provided a flow of 276 cfs. This was more than requested (200 cfs) and, apparently, was due to imprecision in the ability of the District to control flows. There also had been some precipitation the previous evening after the District had set the gates at Sullivan Lake Dam.

More boaters participated this day. Thirteen boaters, including a few self-described as non-expert, ran the upper run. Nine boaters continued on to do the gorge run. However, one boater using an inflatable kayak elected to take out after coming out of his boat while running "Thumper," which is a tight constriction a few hundred yards below the North Fork confluence. There is a trail on the north side of Thumper which leads to the Sullivan Lake Road which enables boaters to take out at this point..

Another boater was forced to take out a short way into the gorge run when his spray skirt tore (a spray skirt is the oversized neoprene waistband which kayakers wear to form a seal over the kayak cockpit). This boater hiked out to the road and caught a ride.

Boaters again completed surveys at both the upper take-out and at the final take-out. One boater failed to turn in a completed survey for the lower run.

At 276 cfs, all boaters elected to portage the chute now known as Larry's Laundromat. At this flow, the plunge area appeared to be a keeper hole that could have prevented even a boater using a hard-shell kayak from navigating out of it⁸. In addition, a semi-submerged log was floating just downstream near the tail of the pool, which could have been especially hazardous for a boater who came out of his boat or was trying to complete a roll. Some boaters continued their portage downstream past potential "Barrier No. 1" (mentioned above).

⁷ See the section classified as "Comment #12 Bull Trout" in the September 1996 Response to FERC's Additional Information Request (AIR) dated February 16, 1996 for the District's analysis of barrier issues in lower Sullivan Creek. The section also includes several photographs of potential barrier no. 2 at different flows.

⁸ Incidentally, while boaters were scouting this chute at 276 cfs, some boaters witnessed a "small trout" attempting to leap it. They said it did not appear that the leap was successful.

Other boaters, however, put back in below Larry's Laundromat (potential Barrier No. 2) and continued downstream. All but one boater, in turn, ran the falls on far river right at potential Barrier No. 1. At 276 cfs, this drop appeared to be more challenging. One boater overturned in her kayak, but was able to roll back upright after several attempts. Another boater caught his paddle on the walls adjacent to the falls and had to let it go. A kayaker in a rescue position in an eddy below the falls threw him his own paddle, allowing the boater to safely navigate out of the situation and retrieve his own paddle.

At the conclusion of this run, the evaluation group decided that the 300 cfs flow scheduled for the next day would probably not be significantly different from the 276 cfs flow present on Saturday. The group decided not to do an additional run. There also was general agreement that 276 cfs was probably close to the upper limit of flows which could be boated safely without additional portaging. Some boaters also mentioned, however, that this perceived upper limit was likely to increase in the future as boaters increased their familiarity with the creek and perfected their run.

Although it was outside the scope of the evaluation, on this day one boater put in directly above the Mill Pond Dam and ran the spillway in his hard-shell kayak. The spillway represents a near-vertical drop of about 50 feet to the lip which curves outward at its base. This boater hurt his back when his boat hit the tailwater pool. He hit the pool at great speed and it evidently was not as aerated as he had expected. He declined to participate in the evaluation that day. Two other boaters who had contemplated running the spillway as well chose not to run it after the first boater hurt his back.

Running the spillway carries a high risk of injury. The boater who ran it reportedly compressed his vertebrae, but is expected to fully recover. The PUD may wish to consider installing a sign warning boaters of this risk. Boating groups may wish to consider publicizing the fact that the one person who has run the spillway injured his back as a result.

Survey results

This section describes the survey results. A full copy of the survey is located in the Appendix. The Appendix also includes a table depicting the raw responses to the survey.

What type of boat did you use?

Virtually all boaters used hard-shell kayaks. Two boaters used inflatable kayaks.

How would you rate your own skill level?

Virtually all participating boaters described themselves as possessing expert or advanced boating skills. Two boaters who described themselves as possessing intermediate skills ran the upper run at 276 cfs.

Did you consider this to be a safe flow for your type of craft?

All boaters agreed that both the upper and gorge runs were safe for their craft at both 108 and 276 cfs (keep in mind that only advanced and expert boaters ran the gorge run). One boater, who described himself as possessing advanced/expert skills, answered "yes and no" to the question of safety for the gorge run at 276 cfs.

If this was not a safe flow, what did you consider to be the chief concerns?

Even though boaters described the evaluated flows as being safe for their craft, many boaters noted that certain hazards existed on Sullivan Creek:

At 108 cfs for the upper run, boaters noted low flows and logs as problems.

At 276 cfs for the upper run, boaters again noted problems with logs and low flows.

At both 108 and 276 cfs for the gorge run, boaters noted the following problems:

Exposed boulders or bedrock
Undercut rocks
Keeper holes
Opportunities to pin
Logs, sweepers or strainers
Narrow channel

One boater stated that low flows also were a problem at 108 cfs for the gorge run..

Based on your experience, what was the level of difficulty in maneuvering your craft downstream, avoiding obstacles, and setting up for running riffle or rapid areas?

Upper Run @ 108 CFS

Boaters described the run as either moderate or easy.

Upper Run @ 276 CFS

Ten of 13 boaters described the run as being easy. Three boaters said the run had a moderate level of difficulty.

Gorge Run @ 108 CFS

Seven of 8 boaters rated the run as being difficult. One boater said it was very difficult.

Gorge Run @ 276 CFS

Seven of 8 boaters said the run was very difficult. One boater said it was difficult.

Were there a few critical spots at this flow level and, if so, where?

For the upper run, most boaters noted the logs at the upper run take-out as being a critical location. This was true for both 108 and 276 cfs.

For the gorge run, boaters noted the last 1/2 mile or so of Sullivan Creek -- the high-gradient gorge segment -- as containing a number of critical spots. These spots included the two large drops know as potential Barriers No. 1 and No. 2. In other locations, logs were present in swift current. One boater noted two rapids near the top of the gorge, one of which is presumably the location where the channel is very constricted named Thumper a few hundred yards downstream of the North Fork confluence. Another place, known as "Itchy and Scratchy" also was noted.

What is the minimum skill level necessary to safely run this segment at this flow?

Upper Run @ 108 CFS

Four out of 6 respondents said intermediate skills are necessary.

Two out of 6 said beginner skills are necessary.

Upper Run @ 276 CFS

Nine of 13 respondents said intermediate skills are necessary.

Three respondents said beginner skills are necessary.

One respondent said "beginner/intermediate" skills are necessary"

Gorge Run @ 108 CFS

Four of eight respondents said advanced skills are necessary.

Two respondents said expert skills are necessary.

One respondent said intermediate/advanced skills are necessary.

One respondent said advanced/expert skills are necessary.

Gorge Run @ 276 CFS

Five of seven respondents said expert skills are necessary.

Two respondents said advanced skills were acceptable if the boaters are willing to portage critical areas.

Satisfaction with flows for Boatability, Challenge, Rate of Travel and Aesthetics

Mean values for satisfaction for the experience attributes of boatability, challenge, rate of travel and aesthetics for the upper and gorge runs at flows of 108 and 276 cfs are portrayed at Figure 1 in the Appendix.

The results generally show that satisfaction for each attribute increases with the increase in flow from 108 to 276 cfs. A flow of 108 cfs in the gorge run provides roughly the same level of acceptability for boatability, rate of travel and aesthetics as 276 cfs in the upper run, though it is considered less challenging. A flow of 108 cfs in the upper run was considered less than acceptable for experience attributes.

For the upper run, it is likely that flows would need to be further increased beyond 276 cfs to provide a totally acceptable experience. However, a boater who does both the upper and gorge run on the same day as one trip (a likely scenario for expert and advanced boaters), would probably place a higher priority on experiencing optimum flows in the gorge run than in the upper run. For the advanced and expert boater, the gorge run is clearly the main attraction. It provides a very challenging experience in a visually dramatic setting.

For the beginning and intermediate boater who elects to do only the upper run, a flow of 276 cfs provides an acceptable experience in terms of boatability and rate of travel. Aesthetics at this flow level were considered more than acceptable. The two boaters who described themselves as possessing intermediate boating skills said that the upper run at 276 cfs was either neutral or acceptable in terms of challenge.

Rate the overall suitability of this water level for boating in your craft.

Results for the question in which boaters were asked to rate the overall suitability of a water level for boating in their craft are illustrated as Figure 2 in the Appendix. Once again, ratings were higher as flows increased from 108 to 276 cfs. Respondents gave higher ratings to the gorge run at 108 cfs than the upper run at 276 cfs, even though boaters also rated the gorge run as being much more difficult to run.

What could be done to improve the quality of the experience?

Upper Run @ 108 and 276 cfs

Nearly all boaters suggested that more water was required. This was the case for responses in regard to both 108 and 276 cfs. Another suggestion was "fewer logs."

One boater suggested a better put-in.

Gorge Run @ 108 cfs

Respondents suggested that more water and fewer logs would improve the experience.

Gorge Run @ 276 cfs

Respondents suggested that removing a few logs would improve the experience.

Access Issues

Upper Run

Access to the upper run was generally regarded as easy to moderately easy. Access would not discourage use in the future.

Although the put-in trail is informal and very steep, it is wide enough to carry a boat and it leads to an eddy conducive to putting a boat in the water. One boater did suggest a better put-in. It may be possible to construct a few steps in the steepest portion of the trail to improve this access point.

At 276 cfs, one boater elected to access the upper run by scrambling down the steep slope below Mill Pond Dam on the north side.

Gorge Run

Access to the gorge run was considered easy. The present quality of access would not discourage use in the future.

This put-in has vehicle access and is at an informal parking and camping area. There is enough calm water near shore to allow boaters to easily put in their boats.

This survey did not ask about the quality of the take-out location near the powerhouse, but this take-out seemed to work well. There is another possible take-out immediately downstream of the Highway 31 bridge on river left with a small vehicle parking area (property ownership is unknown). This location could be used instead of the powerhouse exit, particularly when the PUD has locked the entry gate to the powerhouse. However, in the event the project is built, there is a possible safety issue because the powerhouse would represent the point of return for diverted water. Thus, there may be a sudden change in volume and velocity of water at this location. A provision in the FERC license for the District to grant access across District property for boaters taking out upstream of the powerhouse discharge may be appropriate.

Given the opportunity to boat this segment again in the future, under identical flow conditions, would you return?

Upper Run @ 108 CFS

Only one of 6 boaters said he would boat the upper run again at this flow.

Upper Run @ 276 CFS

All boaters said they would boat the upper run again at 276 cfs.

Gorge Run @ 108 CFS

Five of six boaters said they would boat the gorge run again at this flow. One respondent qualified his affirmative response with a comment that he would "rather see more" flow.

Gorge Run @ 276 CFS

All respondents said they would be willing to do the gorge run again at 276 cfs.

During what season would you most likely return to boat Sullivan Creek?

Taken together, the results for this question showed a willingness to boat Sullivan Creek during all seasons. However, most respondents expressed a preference for fall. This is probably because Sullivan Creek is a rarity among steep creeks in that it can be reliably predicted to have boatable flows in the fall before a winter weather pattern sets in⁹. This is because the District draws down Sullivan Lake every year beginning in October. Should this continue, Sullivan Creek would provide an opportunity for advanced and expert boating when other rivers and streams are not runnable.

In addition, about half of the respondents were boaters from western Washington. During Washington State's primary boating season (Spring - early Summer), it would be easier for these boaters to choose a waterbody closer to home. Interestingly, however, even boaters from eastern Washington and Idaho expressed a preference for boating Sullivan Creek in the fall. It might be possible to do some follow-up on this question to determine if this is due to a perception that other creeks or rivers are for some reason more worthwhile for boating than Sullivan Creek during the usual boating season.

Or, as may be the case with the boaters from western Washington, it also might be due to an desire to have a fall boating

⁹ October 14, 1996 letter from Michael G. Deckert, boating participant, to Jeff Marti, Department of Ecology.

opportunity.

Are there other runs in the area comparable to this run?

Boaters from western Washington generally did not know the answer to this question and answered that they did not know of any comparable runs. Two boaters said comparable runs to the upper run were available; but one said "not at this time of year." One boater stated that Sullivan Creek is "the only steep creek within two hours of Spokane."

Comments:

Upper Run @ 108 CFS

No comments

Upper Run @ 276 CFS

"Good warm up for lower run"

"Paddled upper run as entry to lower run"

Gorge Run @ 108 CFS

"More flow would help"

"Great run! Beautiful & Exciting"

"A fantastic run, absolutely beautiful, four-star rating"

Gorge Run @ 276 CFS

"Great run in a beautiful area, great access & length. Optimum levels maybe 150 - 250 cfs range (dependent on logs)."

"At this level, this is a classic steep creek."

"A fantastic run, beautiful scenery, challenging but runnable rapids, estimate optimum level ~150 - 250 cfs. Certain logs pose a significant hazard. These could be easily moved making the run a first class hard run. Loved it! Will definitely be back."

"Challenging run for expert boaters."

Recommendations and Other Issues

While this evaluation had a limited sample size, it did increase our knowledge about recreation instream flows in Sullivan Creek. The data that was collected was generally very consistent from boater to boater.

Prior to this evaluation, there was some question whether Sullivan Creek was suitable for hard-shell kayaks. Johnson (1995) had written, "Because of the tight channel, shallowness, and portages I wouldn't recommend this run except for inflatable kayaks, it's way too small for cats and too steep and shallow for hard kayaks." During the evaluation, expert boaters who used hard-shell kayaks were able to navigate Sullivan Creek for its entire length at a flow of 108 cfs and with only one portage at 276 cfs.

Survey respondents stated that 276 cfs was a much more acceptable flow than 108 cfs. In discussions following the evaluation, there seemed to be general agreement that a flow between 150 and 250 cfs would provide a optimal flow for recreational boating. This contrasts with prior suggestions that suitable boating flows were in the range of 68 and 172 cfs¹⁰. Boaters regarded 108 cfs as less than acceptable for boatability, challenge, rate of travel and aesthetics. Still, 108 cfs was sufficient for being able to navigate boats downstream.

While 150 to 250 cfs may provide a marginally acceptable to acceptable experience for the upper run, flow requirements

¹⁰ Pend Oreille County PUD No. 1. September 1996. Response to FERC's Additional Information Request (AIR) dated February 16, 1996. Page 2-2.

in the gorge run are the controlling factor for boaters doing the entire run. Flows which optimized the boating experience in the upper run [estimated by Johnson (1995) to be 300 - 500 cfs] would probably result in conditions being too dangerous for the gorge run. However, some boaters noted that as individual boaters become familiar with the gorge run, it is likely that, given the opportunity, some boaters will attempt the gorge run at higher flows (>276 cfs). At 276 cfs, several locations proved very challenging. Some boaters overturned their boats and had to roll upright (to be sure, this is a common occurrence in whitewater kayaking). Also, at a couple locations, boaters contended with undercut and exposed bedrock that appeared to create a high level of risk. The range of boatable flows for the gorge run -- that is, the range of flows which is generally navigable by advanced and expert boaters -- probably ranges from about 100 to 300 cfs.

Boaters expressed a preference for boating releases in the fall. This raises the potential of flow conflicts with fisheries. Ecology consulted with the Washington Department of Fish and Wildlife (WDFW) on this issue. WDFW stated that flow releases for recreational boating would be acceptable until the end of September (October 24, 1996 memo from Tony Eldred, WDFW to Jeff Marti, Department of Ecology, included in the Appendix). WDFW has recommended a minimum flow requirement to protect fish habitat of 125 cfs for August - September, and a flow of 75 cfs for October.

In October, if the project operates as proposed, weekend flow pulsing could be disruptive to the spawning activity of bull and brown trout. Therefore, weekend flow pulsing would be discouraged. Weekend recreational flows in October would not be discouraged under the current management regime, because recreational flows (150 - 250 cfs) would be occurring when flows already are at or near that level. Thus, extreme fluctuations associated with flow pulsing would not occur, especially if the District shapes its annual drawdown to produce flows within or close to the optimal boating flows. Under the current operating regime, the District begins drawing down the reservoir October 1.

Even with the diversion of 370 cfs from Sullivan Creek, and with no instream flow restriction imposed on the diversion, the creek would continue to be boatable at times during spring runoff. Figure 3 and Figure 4 in the Appendix show how often optimal boating flows and boatable flows for the Gorge run occur under existing and proposed operating conditions. May and June instream flows would continue to average between 200 and 300 cfs.¹¹ WDFW, the United States Forest Service and the United States Fish and Wildlife Service all recommend minimum instream flows of 200 cfs for the period from April 21 to July 31. This recommendation also would support recreational boating. Figure 5 in the Appendix portrays the resource agency flow recommendations and exceedence flows for Sullivan Creek at Mill Pond.

Another issue is how to notify boaters of when flows suitable for boating would be released. The District has suggested advertising boating release dates in a local paper and notifying whitewater groups in advance. These are welcome suggestions. Advertising release dates in local papers may not reach boaters who do not reside in the local area; such advertising would, however, alert other local river users (e.g., recreational gold miners and fishers). Sending announcements to recreational boating organizations may prove more effective. A phone number for boaters to call for flow information could provide another source of information.

In addition, the District may wish to consider funding the conversion of the USGS Gage, Sullivan Creek at Metaline Falls (12398000), to a telemetered gage. Real-time streamflow data would then be available via the USGS ADAPS system, as well as through its Internet site which lists current streamflow conditions for Washington state (http://www.dwtcm.wr.usgs.gov/realtime/rt_latest_data.html).

If this project is licensed, Ecology recommends that the District provide recreational boating releases for at least two weekends (a total of four days) each fall sometime between the beginning of September and the middle of October if such releases can be provided in a manner consistent with fisheries management. While the District currently proposes to operate its project according to the terms of its existing water right (and assumes that its request to change the points of diversion will be approved), it also has expressed some support for the concept of two weekend releases per year.¹² Providing two weekends of releases should, for the time being at least, minimize crowding among boaters on the river. As for the specific volume of releases, the District, interested agencies and boater groups should explore release alternatives. Some possible alternatives might include:

¹¹ Pend Oreille County PUD No. 1. Final License Application. Figure B-4.

¹² Pend Oreille County PUD No. 1. September 1996. Response to FERC's Additional Information Request (AIR) dated February 16, 1996. Page 2-3.

Alternative A: A release schedule which offers a flow from the lower end of the suitable range (e.g., 150 cfs) on one weekend and one from the higher end of the range on another weekend (250 cfs).

Alternative B: Two weekends of flow releases in which 150 cfs is provided on Saturday and 250 cfs is provided on Sunday.

Alternative C: Two weekends of 200 cfs.

Ecology recommends further consultation between the District, interested agencies and boating groups before choosing a final boating release schedule.

Some boaters recommended that removal of logs and woody debris would improve the boating experience. Because woody debris is an important component of fish habitat, Ecology can not support implementing this recommendation. It is up to the boaters to exercise good judgment in running Sullivan Creek, and this includes being vigilant for downstream hazards and knowing when it is best to avoid or portage them.

An additional issue which needs to be addressed is the impact of instream enhancement measures on navigation. The PUD has proposed some conceptual measures for resource agencies to consider.¹³ Possible measures include log structures for rearing cover; logs placed to trap and hold spawning gravel; and boulder clusters to provide feeding stations and gravel traps. The PUD proposes these measures for only the upper half of Sullivan Creek between the North Fork confluence and Mill Pond Dam; these are designated as Reaches 4 and 5 in the PUD draft Sullivan Creek Habitat Enhancement Report. Thus, no structures are proposed for the gorge run, where additional logs in high-velocity, high-gradient areas could significantly increase the hazard to boaters.

It is likely that structural configurations are available which would enhance fish habitat, yet continue to provide a clear channel for boaters to safely pass through. For example, the PUD report notes that, to withstand peak flow events, lateral structures should extend no further than 1/3 the bankfull width of the stream or at a greater than 30° angle (pointing downstream). Boulder clusters as well would be placed 1/4 to 1/3 the bankfull width from the channel edge. Conceivably, structures such as boulder clusters also could enhance boating in some locations by providing eddies, hydraulic variation and opportunities for challenge.

The use of cable to tie together logs and boulders is another concern. However, cable used for this purpose is generally drawn very tight against the boulders and logs and not strung across open areas (Personal conversation with John Blum, Cascade Environmental Services, November 19, 1996). We recommend that boaters be consulted regarding the placement of instream structures to enhance the probability that these structures will be compatible with navigational safety.

Questions regarding this report should be addressed to:

Jeff Marti
Shorelands and Water Resources Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Phone: (360) 407-6636 Fax: (360) 407-7162
Email: jema461@ecy.wa.gov

¹³ Pend Oreille County PUD No. 1. Final License Application. Appendices, Volume 11 of IV, Appendix G, Draft Habitat Enhancement Plan, Sullivan Creek



State of Washington
DEPARTMENT OF FISH AND WILDLIFE
HABITAT PROGRAM
Major Projects Section
608 South Elliott Ave.
Wenatchee, WA 98801

October 24, 1996

TO: Jeff Marti
Department of Ecology
Shorelands and Water Resources Program

FROM: Tony Eldred *TE*
Fish Biologist 4

SUBJECT: Sullivan Creek Hydroelectric Project No. 2225
Timing of kayaking stream flows

In our discussion of the recent kayaking stream flow trials, you indicated flows in the range of 150 cfs to 250 cfs appeared optimal. You inquired as to whether kayaking releases from Sullivan Lake in the above flow range on weekends into October would be compatible with fishery considerations. I believe I replied I thought that weekend pulses of 150 cfs - 250 cfs, up from the seasonal historic mean flows of 65 cfs - 75 cfs, could disturb either bull trout and brown trout spawning or the establishment of spawning territories. I said this was my opinion and I would consult with Curt Vail (WDFW area fishery biologist), Hal Beecher (WDFW instream flow scientist) and Tom Shuhda (Colville National Forest staff fishery biologist).

I have consulted with Curt Vail, Hal Beecher and Tom Shuhda. We all agree that intermittent weekend pulses of the above magnitude in October could be disruptive to spawning activity. We believe weekend pulsing up to the end of September would not have significant adverse affect on spawning activity. Kayaking on the existing

Jeff Marti
Sullivan Creek recreational flows
Page 2

October flow regime when Pend Oreille PUD is drafting Sullivan Lake should be innocuous in regard to fishery considerations.

Should you have further questions, please call me at (509) 663-4677.

cc: FERC
Larry Weis, Pend Oreille PUD
Jack Snyder, ND&T
John Blum, CES
Edward L. Schultz, CNF
Michelle Eames, USFWS
Joseph Klein, Stone & Webster
David Mudd, WDFW
Hal Beecher, WDFW
Curt Vail, WDFW
Keitlyn Watson/John Whalen, WDFW

APPENDIX

Contents in order:

1. Sullivan Creek survey instrument
2. Figure 1: Rating of flow levels for the Upper and gorge Runs at 108 and 276 cfs for the experience attributes of boatability, challenge, rate of travel and aesthetics.
3. Figure 2: Overall satisfaction for 108 and 276 cfs for the Upper and Gorge Runs
4. Figure 3: Percentage of Time Sullivan Creek has Optimum Flows for Kayaking the Gorge Run
5. Figure 4: Percentage of Time Sullivan Creek has Boatable Flows for Kayaking the Gorge Run
6. Figure 5: Exceedence Flows for Sullivan Creek at Mill Pond Dam (under current operations) and resource agency IFIM recommendations
7. October 14, 1996 letter from Michael Deckert to Department of Ecology
8. October 24, 1996 letter from Tony Elred, Washington Department of Fish and Wildlife to Department of Ecology
9. Raw responses to survey (last four pages)

Sullivan Creek Instream Flow Survey

Name _____ Date _____

Place of Residence (City, State) _____

RIVER SEGMENT: Upper Run: Mill Pond to North Fork Confluence (culvert on river right)
 Gorge Run: North Fork Confluence to Highway Bridge

1. I have boated Sullivan Creek _____ times before today.

2. What type of boat did you use?

- Inflatable Kayak
- Hard-shell Kayak
- Whitewater (C-1) Canoe
- Cataract
- Other _____

3. How would you rate your skill level?

- Intermediate
- Advanced
- Expert

Safety

4. Did you consider this to be a safe flow for your type of craft? Yes No

5. If this was not a safe flow, what did you consider to be the chief concerns? (Check all that apply.)

- Exposed boulders or bedrock
- Undercut rocks
- Overhanging shoreline vegetation (sweepers or strainers)
- Recirculating holes (keepers)
- Channel was too narrow
- Too many opportunities to pin
- Lack of rescue opportunities
- Flow volume too high
- Flow volume too low
- Lack of scouting opportunities
- Lack of portage opportunities
- Other

6. Based on your experience, what was the level of difficulty in maneuvering your craft downstream, avoiding obstacles, and setting up for running riffle or rapid areas?

- Easy
- Moderate
- Difficult
- Very Difficult

7. Were there a few critical spots at this flow level and, if so, where?

- No Yes - Where? _____

8. What is the minimum skill level necessary to safely run this segment at this flow?

- Beginner
- Intermediate
- Advanced
- Expert

Experience

9. Please rate the flow or water level with regard to the following features:

	Flow or water level was ...				If unacceptable, was it ...		
	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable	Too Low	Too High
Boatability	-2	-1	0	1	2	<input type="checkbox"/>	<input type="checkbox"/>
Challenge	-2	-1	0	1	2	<input type="checkbox"/>	<input type="checkbox"/>
Rate of Travel	-2	-1	0	1	2	<input type="checkbox"/>	<input type="checkbox"/>
Aesthetics	-2	-1	0	1	2	<input type="checkbox"/>	<input type="checkbox"/>

10. Rate the overall suitability of this water level for boating in your craft.

- Unacceptable
- Marginally Acceptable
- Acceptable
- Totally Acceptable

11. What could be done to improve the quality of the experience?

Access

12. Was access to the river ... Easy Moderately easy Difficult

13. Would the difficulty of the access discourage you from boating this segment in the future? Yes No

Other Questions

14. Given the opportunity to boat this segment again in the future, under identical flow conditions, would you return?

- Yes No

15. During what season would you most likely return to boat Sullivan Creek?

- Spring
- Summer
- Fall
- Winter

16. Are there other runs in the area comparable to this run? Yes No

Comments?

FIGURE 1: Rating of flow levels for the Upper and Gorge Runs at 108 and 276 cfs for the experience attributes of boatability, challenge, rate of travel and aesthetics

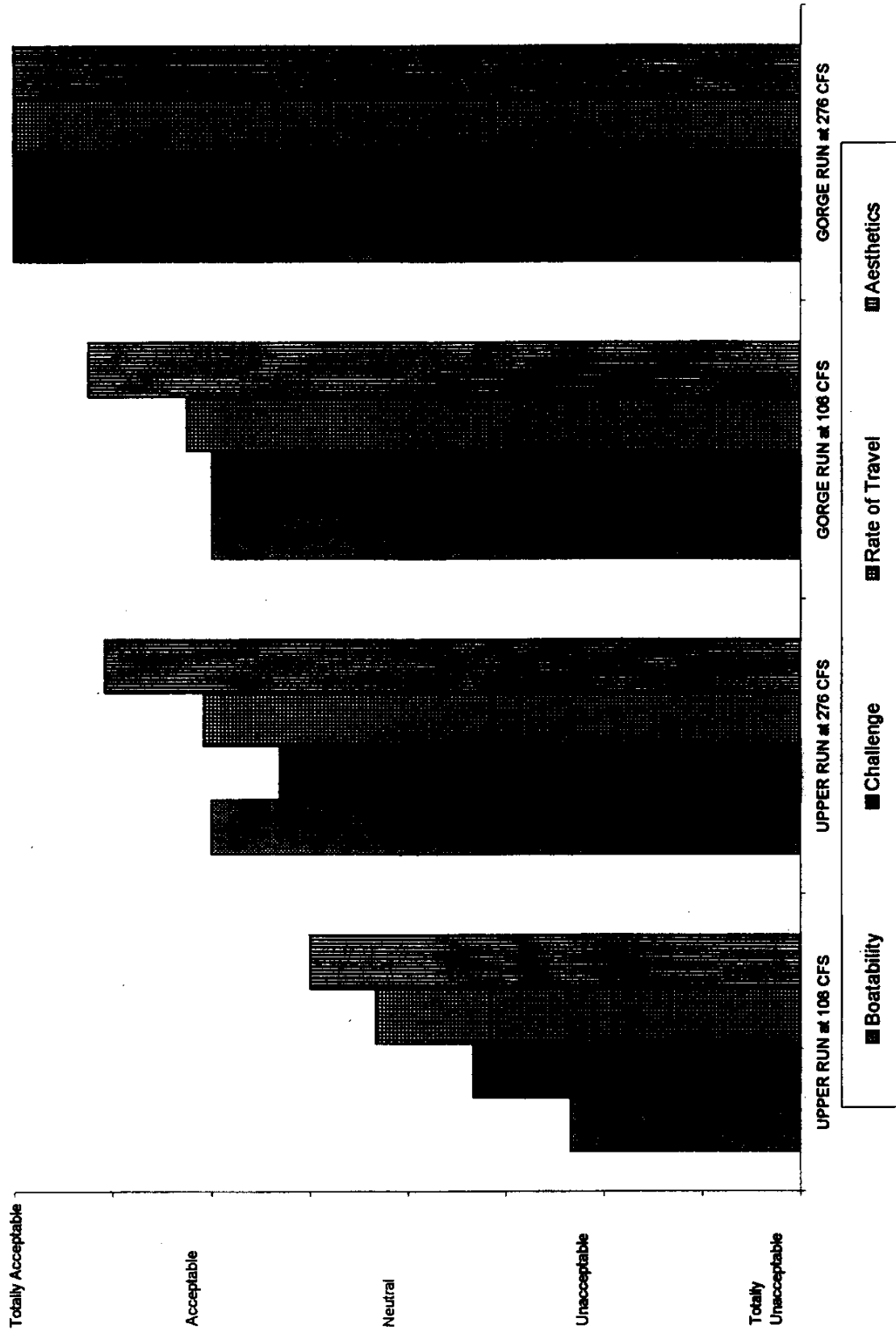
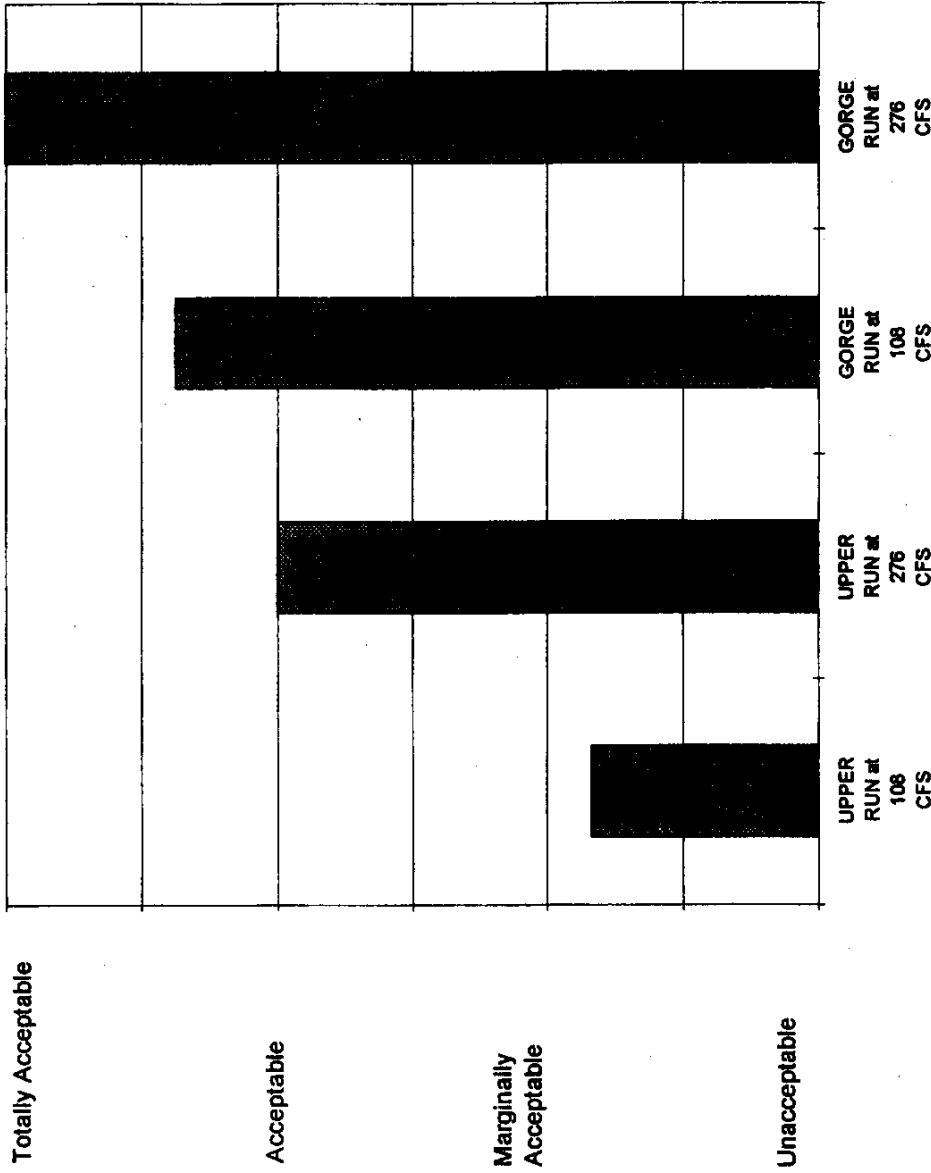


FIGURE 2: Overall Satisfaction for 108 and 276 cfs for the Upper and Gorge Runs



Michael G. Deckert
8518 20th Street East
Puyallup, WA 98371
(206) 922-3952

October 14, 1996

Jeff Marti
Washington Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

RE: Sullivan Creek, FERC Project No. 2225-008

Dear Mr. Marti,

Thank you for the Department of Ecology's interest concerning Sullivan Creek in Pend Oreille County. As an expert participant in the recent whitewater boating survey of the creek (October 11th and 12th), I was impressed with the aesthetic and the solid class V qualities of the creek.

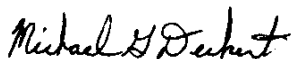
Paddling the creek, from the Mill Pond Dam to the former powerhouse, was an enjoyable and pleasant way to admire the fall scenery. The whitewater challenged my skills and excited my imagination. While every corner in the lower gorge presented new challenges, the entire run was completed without portaging. At the same time, portages are available at all of the major drops and were utilized by some people during the whitewater survey.

In addition to the quality of the whitewater, the current hydrological conditions support an autumn paddling season. It is my understanding that the creek flows during the annual autumnal draw down of Sullivan Lake. This timing is important. Other fall whitewater recreational opportunities in the area are limited due to normal seasonal low flows.

As you are aware, a flow regime in Sullivan Creek imposed by a new hydroelectric operation could curtail the recreational use of this resource. A new hydroelectric flow regime would impact the timing and availability of recreational opportunities during both the spring and autumn paddling season.

I thoroughly enjoyed paddling the creek and look forward to boating it again in the future. I urge you to support and maintain the current recreational values offered by Sullivan Creek. Please feel free to contact me if I can provide additional help or further information.

Sincerely,



Michael G. Deckert

FLOW: 100 CFS, GORGE RUN

1. # Times boated/Summer	M. Johnson	L. Johnson	M. Linsen	M. Decker	J. Conroy	L. Green	S. Rosenbaum	B. Simons	Mean Rating
2. Type Boat	Inflatable	Inflatable	Handball	Handball	Handball	Handball	Handball	Handball	
3. Skill Level	Advanced	Advanced	Expert	Expert	Yes	Expert	Expert	Expert	
4. Safe flow for your craft?	Y		Y	Y		Y	Y	Y	
5. If not safe flow, problems		Safe, but hazards were exposed boulders or bedrock; underrock; hipper holes	Exposed boulders or bedrock; underrock; narrow channel; flow volume too low			Exposed boulders or bedrock; underrock; hipper holes; too many opportunities to port; logs		Exposed boulders or bedrock; underrock; hipper holes; narrow channel	
6. Level of difficulty	Difficult	Difficult	Difficult	Difficult	Difficult	Difficult	Very Difficult	Difficult	
7. Critical spots?	Yes, 2 Falls	Two rapids near top, last 1/2 mile or so	- 1/4 mile above take out	Several falls/steep near end of run; portage reachable	Many tight, steep drops; One 10' waterfall	Rocky section; 2nd Gorge; final falls	Lanal 1/2 mile (The "Big Drop")	Rocky & Screeby; second gorge; final falls	
8. Skill needed at this level	Advanced	Advanced	Advanced	Intermediate/Advanced	Advanced	Expert	Advanced (lots of wading)/Expert	Expert	
9. Flow level ratings									
Boatability (1-5)	4	4	2	4	5	5	3	5	4
Challenge (1-5)	4	4	4	4	3	5	3	5	4
Rate of Travel (1-5)	4	4	4	4	4	5	3	5	4.125
Accessibility (1-5)	5	5	4	5	5	5	3	5	4.625
Overall Substrate (1-4)	4	3	2	3	4	4	3	4	3.575
11. What could improve			Increase water level	1/2 mile to see more water	More water	Remove a few logs; a little brush		Waded towards at take out	Remove some logs
12. Access was...	Easy	Easy	Easy	Easy	Easy	Easy	Easy	Easy	
13. Access discouraged future use?	N	Y	No	No	N	N	N	N	
14. Boat again at same flow?	Y	Y	Y	Y	No	Y	Y	Y	
15. What season most likely to return	Spring, Summer, Fall	All	Sum, Fall	Fall	Spring, Summer, Fall	Fall	The only steep creek within 2 hrs of Sudman	All, Fall, Best	
16. Comparable runs in area?	No	No	No	Don't know	Don't know	Don't know		No	
17. Comments			More flow would help			Great run! Beautiful & exciting		A beautiful run, definitely beautiful.	

