

# MEETING MINUTES

## Upstream and Downstream Fish Passage Technical Working Group

*Mission Statement: To develop an efficient fish passage design for the Baker River Project.*

**Project:** Baker River Project  
FERC No. 2150

**Written By:** Nick Verretto

**Meeting Date:** April 2, 2002

**Location:** WestCoast SeaTac Hotel, Seattle

**Attendees:**

Arnie Aspelund, PSE	Wayne Porter, PSE
Ken Bates WDFW	Don Schluter, TU (conference line)
Cary Feldmann, PSE	Gary Sprague, WDFW
Kim Lane, PSE	Jim Stow, USFWS
Brian Mattax, MWH	Nick Verretto, PSE
Mort McMillen, MWH	Stan Walsh, SSC
Ed Meyer, NMFS	

**Purpose:** The purpose of the meeting was to continue development of conceptual design alternatives required for evaluation of downstream and upstream fish passage facilities in the course of relicensing the Baker River Hydroelectric Project.

***Future meeting dates:***

*May 7, Tuesday, 9 a.m. - noon at LB site, noon - 1 p.m. lunch at lodge, 1 p.m. - 7 p.m. design meeting at Baker Lodge, overnight*

*May 8, Wednesday, 7 a.m. - 1 p.m., Upper Baker site visit, studies observation*

*June 4, Tuesday, 9 a.m. - 3 p.m. - passage design at Sea-Tac*

*July 9, Wednesday, 9 a.m. - 3 p.m. - passage design at Sea-Tac*

Item	Description	Description	Action, By
4.1a	<b>Report on Completed Action Items:</b>	Refer to Notes from last meeting: <ul style="list-style-type: none"> <li>Conference calls were all set up, Mondays at 1pm (see e-mail and handout for details)</li> <li>Site visit will be May 7th &amp; 8th. Let Nick know if you cannot attend. Gary Sprague might not be able to attend.</li> <li>Kelts study - 30 fish were taken. Doug is down to 15, and has them on formalin drip.</li> <li>No action on fish truck design.</li> </ul>	<b>All</b> – notify Nick of intent to attend May meeting and site visit
4.1b	<b>Carry-over Action Items</b>	a) Design of the PSE fish truck (item 4.11 below)  b) Information to be provided by Trout Unlimited regarding construction of fish ladders is currently outstanding	
4.2	<b>Technical Memo Distribution</b>	April 2 agenda (PSE), March 5 meeting minutes (PSE), working group list (PSE), studies coordination summary and May 7 meeting information (PSE), upstream and downstream technical memo tracking documents (MWH), upstream & downstream	

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		alternatives tracking documents (MWH), studies information tracking document (MWH), upstream correlation study report and tables (MWH), temperature data collection sites summary (PSE), Draft TM Rev. 1 Alt. LB FL.3 (barge 20%), Draft TM Alt. LB FL.7 (MIS 60%), Draft TM Alt. UB FL.6 (MIS full)	
4.3	<b>Discussion on Biological Studies Update</b>	<p>Brian Mattax of MWH presented a review of Historical Data Analysis. This work was performed to determine if there is a correlation or cause-effect relationship between Project operations, weather, photoperiod, etc., and fish movement. Brian explained how analysis was conducted. Limbs of the hydrograph were examined for any correlations, as were time-staggered relationships. Same data sets were used for both coho and sockeye. Pearson Correlation and step-wise regression analyses were conducted. In conclusion, no cause-effect relationship was identified, although mild correlations were noted.</p> <p>Stan and Gary questioned whether the adult trap data takes into effect entry timing when no trap sampling occurred. This has the potential to show delayed response or correlation when none exist. Fish enter the trap and enter a common holding pool. There is therefore no way to account for slight data discrepancies when trap sampling does not occur every day. These discrepancies are likely to be minimal, because the trap is sampled every day during the migration peak (i.e., when there are five or more fish observed in the trap).</p> <p>The data set was inclusive of June 1990 to December 2001.</p> <p>Pearson Correlation Coefficients Table 2 was examined with group.</p> <p>Looked at flows but also looked at % of flow from Skagit River and Baker River.</p> <p>Purpose of the analysis was to address transport, Baker River flow control and trap attraction. Mainly wanted to determine temperature effects and flow effects on upstream migrations. Temperature analysis will be conducted when sufficient data are collected. Definitions of variables are explained within the document.</p> <p>Jim suggested using hourly flow data versus hourly trap data. Hourly trap data is not available, and using hourly flow data versus daily trap data would likely be misleading. Stan suggested looking only at days when generation was started after minimum flows were in place for a period of time, and looking at periods when flow is under 1000 cfs. It was also suggested to look at on-generation peaking operation vs. no-generation compared with daily trap counts.</p> <p>The fact that no cause-effect relationship was identified during this</p>	<p>Issue will be taken up by the flow issues technical working group, because its effects are predominantly related to these issues, and mild Project connections would likely lead to modification of passage designs.</p> <p><b>Nick</b> - bring this issue to "flows" group and meet with Brian (MWH), Sue and Ph (R2).</p>

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		<p>analysis suggests that a variety of other combination analyses may be of little use, so nothing further will be done at this point.</p> <p>Ken recommended moving further study review and consideration to the flow issues technical working group. The group agreed.</p>	
4.4	Technical Memo Tracking Log	<p>Discussed Mort's memoranda tracking system that lists memos, alternative status, and filter and design processes.</p> <p>Tracking memo contains summary of all alternatives, as well as separate sheets to track technical memoranda chronologically by submittal date.</p> <p>Ed discussed having a field that tracks agency comments. This can also be handled in meeting minutes or within the Technical Memo itself. Communication protocol calls for e-mail with optional paper backup.</p> <p>Significant discussion was held regarding the need to document decisions and input in the administrative record. Ken suggested a system he has used on other projects using an automatic Web-based database, which is available for a small maintenance fee.</p> <p>The team agreed to test the system for a short time to decide whether it would meet the needs of the group.</p>	<p><b>Mort</b> - Include dates and most recent revision number in summary alternative tables. Sort by alternative first, then chronologically. E-mail to group after incorporating changes.</p> <p><b>Ken</b> - "invite" (give access to) Nick, Mort and Kim to the documentation web site.</p>
4.5	Review of Draft TM Rev. 1 LB FL.3	<p><b>Reservoir Fish Attraction Barge / 20% Flow / 0.4 fps.</b></p> <p>Comments: Weirs may need a bottom opening or perforations to create uniform vertical flow. Also need to consider how water will flow across screens if one pump goes out. It was agreed that for this level of analysis the alternative would be accepted until further information is received from results of the biological studies. The group also agreed that 1000 cfs is the maximum size of a surface attraction system due to physical size, power consumption and system complexity.</p>	
4.6	Review of alternative LB FL.7	<p><b>MIS / 60% Flow / High Velocity</b></p> <p>Alternative based upon Howard Hansen Dam, which has a design flow of 1000 cfs and where they are pushing issues pretty far to the limits of what is practical. Consider a physical model for this design option. Screen 30 feet long 16 feet wide.</p> <p>Ed suggested consideration of a design similar to that at Howard Hansen. The sectional design was reviewed.</p> <p>This alternative may work with a full reservoir, but has limitations with pool fluctuation ranges similar to existing.</p> <p>Ed asked whether it was possible to fix the screen module at a lower elevation as moving screens to track the water surface elevation could be a problem. Fixing the screen poses some risk due to the requirement of fish coming in at the surface and then having to sound as much as 100' to enter the screen.</p> <p>A lifting device instead of a float is used at Howard Hansen. Also consider putting screens in a vertical arrangement and use one</p>	<p><b>Nick</b> – coordinate with Mort of Howard Hansen physical model after May meeting.</p>

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		<p>lifting device.</p> <p>Consider 6 fps velocity at throat, 2 fps at screen. Bypass flow - consider trapping velocity, so look at 7 fps. Then consider size of pipe to preclude trapping debris. Then need a dewatering screen and direct fish into a raceway.</p> <p>Consider 500 cfs and modification with fixed screen criteria and variable (moving screen) criteria.</p> <p>The Howard Hansen facility will be complete in 2006, so PSE could use their operational experience when ready to finalize this design if carried forward.</p> <p>Ed assumes that we are dealing with fry of 40 to 60 mm size. If fry size is 100 mm then a higher velocity screen could be used, although we don't want to preclude future options.</p> <p>Elwha uses a 9' diameter penstock, while Howard Hansen has a 16' diameter penstock, and this is considered too large. We may want to consider stacking several smaller penstocks and screens instead of having one large one, especially if constructability issues arise.</p> <p>Ken suggested that success depends on width and length of screens, so a tower should have ports that channel flow into the bypass and then into the penstock. One problem with a vertical arrangement is access to the screen. A horizontal arrangement may be more operationally feasible.</p> <p>Ed suggested we consider Greenpeter Dam, where they have a similar system and operations concerns. Mort has requested a study of Greenpeter from the library.</p> <p>Don wants to consider different velocities for different fish. Group agreed, stating that the design would accommodate the limiting velocity, i.e., the weakest swimming fish likely to encounter the screen.</p> <p>Ed suggested consideration of a fixed screen with multiple, selective bypass and withdrawal points.</p> <p>Cleaning will be accomplished by use of backflow through rotated screens</p> <p>Need to consider effects of surge from load rejection.</p> <p>Consider touring Howard Hansen physical model. Contact Chick Sweeney of ENSR or Fred Goetz of ACE.</p>	
4.7	<b>Review of Alternative UB FL.6</b>	<p><b><i>MIS / Full Flow (5000 cfs) / High Velocity</i></b></p> <p>Mort reviewed the section drawings. It is a very long distance</p>	<b>Mort</b> - discuss design limitations with

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		from top to bottom. This is a very challenging alternative due to its size. There is a threshold for size, but a full 5000-cfs structure cantilevered off the dam appears impossible. The dam is designed to hold water back, not to take load in the reverse direction. For next iteration, consider issues such as how to direct and crowd fish.	structural engineer.
4.8	<b>Advancement of Lower Baker Alternatives</b>	Mort reviewed log of TM's. Some of the alternatives are pending development of similar simpler alternatives, i.e., F.2 to F.8, depends upon development of F.1. Mort will advance design of alternatives LB F.9 & F.10, LB FL.6 & FL.7	<b>Mort</b> – continue advancing design alternatives LB F.9 & F.10, LB FL.6 & FL.7 for next meeting.
4.9	<b>Destination Matrix</b>	<p>The current work done on the destination matrix was presented. Possible destinations for each species were taken and compared with the timing of the associated species to develop the number of holding ponds required. Kim discussed use of matrix as basis of design for trap and haul. There are often many destinations and for the majority of the year very few fish. Holding pond must be sized for the maximum number of fish arriving in a given period of time, however flexibility must be taken into account in the final design.</p> <p>Ken suggested holding tanks on trucks when ponds are up to capacity in holding facilities. Gary would like to see consideration be given to disease treatment, such as vaccinations, which could require another holding tank.</p>	<p>.</p> <p><b>Kim</b> - E-mail matrix spread sheets to group for review. Also consider adding holding areas for disease treatment.</p>
4.10	<b>Discussion of Tram and Fish Lock Alternative</b>	<p>The discussion centered around tram alternatives rather than fish locks, which are considered very complex without much gain due to the difficulty of construction at the base of Baker Dam. Both tram and lock systems will require extensive modification of the current barrier dam.</p> <p>The current tram alternative was presented. Comments tended to compare this alternative with the current truck system of transport. Ken Bates mentioned that there are also possibilities of greater consequences with the failure of a tram, as opposed to that of a truck. A truck is easy to repair as opposed to a complex fixed system such as a tram. Also, it is difficult to determine if there are any biological benefits of a tram vs. a truck.</p> <p>. Issues with a tram system center around the fact that at present there is no species, aside from trout species, that one would consider placing into Lake Shannon, and transport of any species can still be accomplished with a truck. Gary pointed out to Don that there is very little spawning area in Lake Shannon. Don thinks the streams coming into Lake Shannon could make good spawning grounds, which Gary disagrees. Those streams are steep, more vertical than horizontal.</p> <p>Design of alternatives U2.1 &amp; U2.2, U3.1 &amp; U3.2 will be advanced for the next meeting.</p>	<p><b>Don</b> – research basis of tram at Cowlitz and current status.</p> <p><b>Don</b> is to report back regarding TU position removal of ladder alternative. He asked That research on Existing trams be Presented</p> <p><b>Mort</b> – Advance designs U2.1 &amp; U2.2, U3.1 &amp; U3.2 for the May 7 meeting.</p>

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4.11	<b>Fish Truck</b>	No additional design information on fish truck was available for this meeting.	
4.12	<b>Charles Howard Model</b>	Demonstration April 10 at the Economics WG meeting, April 11 at the Aquatics WG meeting, full-day workshop June 12 at PSE Bellevue office.	

**May 7<sup>th</sup> Tentative Meeting Agenda, 1 p.m. – 7 p.m. @ Upper Baker lodge**

Review Agenda & Handouts

Administrative tracking procedures development

***Downstream Passage***

Review minutes & action items

Biological studies update

Summarize remaining alternatives, TMs, alts. Status

Designs review – LB F.9 & F.10, LB FL.6 & FL.7

***Upstream Passage***

Review minutes & action items

Review fatal flaw analysis, alts. Status

Select upstream alternative

Fish Transport destination matrix development

Other issues – fish truck, operations model

Evaluate meeting & review assignments

Schedule next meeting, agenda, and facilitation